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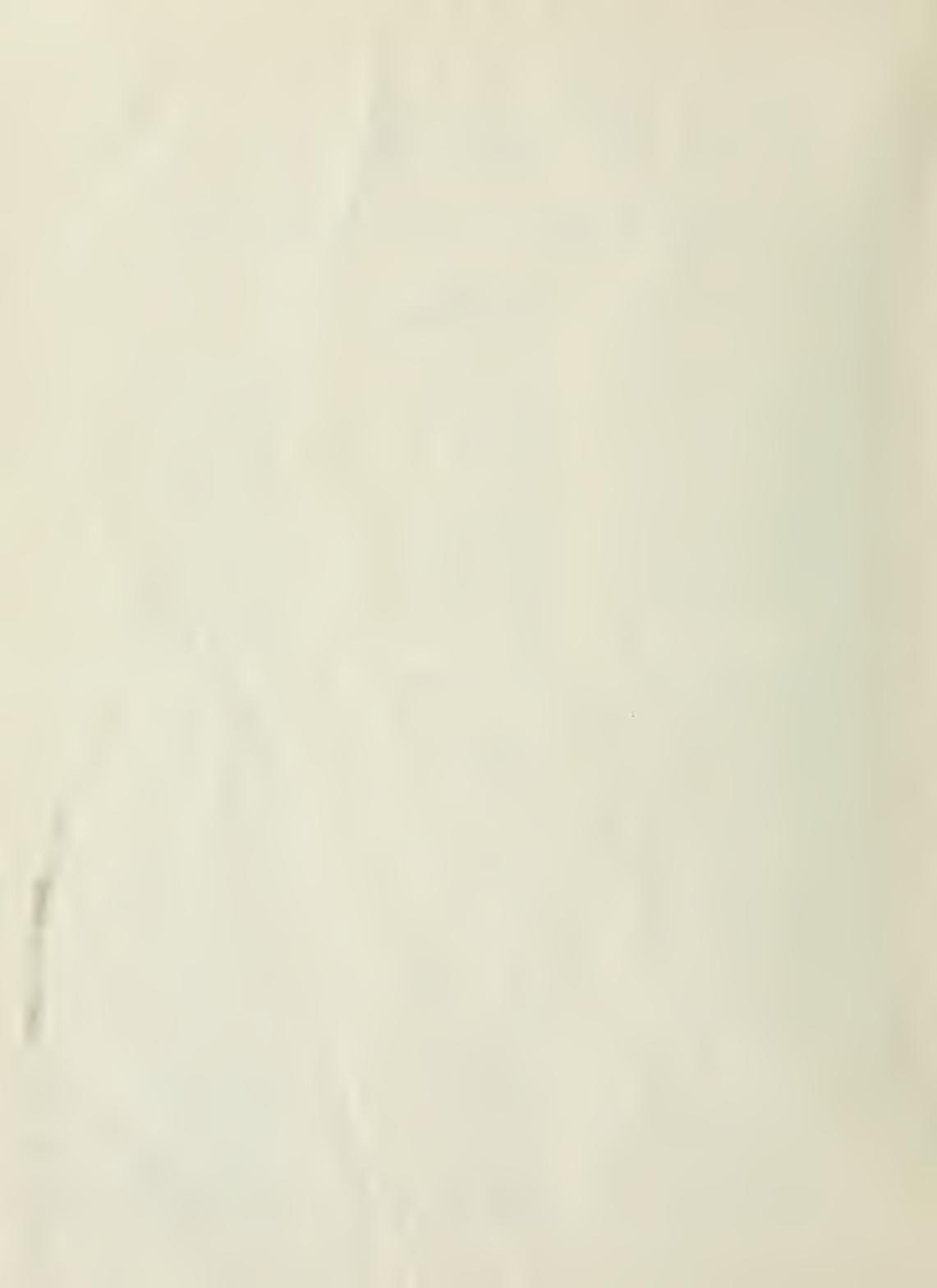
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EDITORIAL

Railway Age

EDITORIAL

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The Worst Railway Year in History

THERE HAVE been bad years in the history of the railways of the United States before. In most respects 1921 was much the worst of all.

The declines of freight and passenger business were much the greatest ever known. The percentage of net return earned on the property investment shown by the companies' books was the smallest ever known except in 1919 and 1920, and of course in 1919 and most of 1920 their net returns were guaranteed by the government. For the twelve months ending with October 31, 1921, the net return earned on property investment was less than 2.75 per cent, and it is not probable the net return for the 12 months of the year 1921 will be found to have been any larger when the complete statistics are available. The smallest percentage of net return ever earned before in a year when net returns were not guaranteed was in 1894, when the largest slump in business previous to 1921 occurred, and when the net return earned on property investment was 3.2 per cent.

It is no exaggeration to say that throughout the year a large part of the companies were struggling to keep out of bankruptcy. The Bureau of Railway Economics estimates the year's net operating income of the Class I roads at \$616,000,000. This will not meet their fixed charges, which are: Interest, \$477,000,000; rentals, \$129,000,000; other charges, \$34,000,000; total, \$640,000,000. Many roads failed to earn enough to pay their interest.

Under such conditions it was impossible for most railways adequately to maintain their properties, much less make additions or improvements. The *Railway Age's* annual compilations of statistics, published elsewhere in this issue, show that the amount of new mileage built was the smallest in history since such records have been kept, except in 1920; that the mileage of railway lines abandoned was the largest in history, and that new low records were set for the acquisition of new equipment.

The number of new locomotives ordered for domestic service totaled only about 250, the number of freight cars ordered only slightly over 20,000, and the passenger car orders something over 200. With one or two exceptions the equipment ordered and built figures for 1921 are the lowest on record.

These statistics are very significant, but they acquire increased significance when compared with corresponding statistics for past periods of years. Prior to the adoption of government control in 1918 the number of freight cars scrapped annually had for some years been about 100,000, or almost five times as great as the number ordered in 1920. In the five years ending with 1917 the number of freight cars ordered was regarded as small compared with former years, but it averaged 108,000 a year, or more than five times

as great as it was in 1921. The number of locomotives ordered in the five years ending with 1917 was regarded as comparatively small at the time, but it averaged almost 2,400, or ten times as much as the orders placed in 1921.

One who judged entirely, or even mainly, by the foregoing facts would be obliged to conclude that railroad transportation in the United States is a dying industry. Fortunately, however, this cloud, like most clouds, has a silver lining. The conditions in the business were relatively at their worst in the early part of the year, and grew better as the year advanced. In January and February the railways as a whole not only did not earn any net return, but incurred operating deficits. Drastic retrenchments and the reduction in wages granted by the Railroad Labor Board caused the net operating income to improve, until in October it amounted to \$108,500,000. The operating ratio declined from 95 per cent in February, to 74 per cent in October. There was a sharp decline of freight business in November and December and these months will make bad showings, but throughout the entire year the tendency of operating costs was downward. Wages were reduced, improvements were made in the rules and working conditions of employees, and the prices of fuel and materials declined.

In consequence, the railways have entered the year 1922 on a lower basis of operating costs. The reduction of costs has been inadequate, but it is reasonable to assume that they will continue to decline. Under the conditions existing it is impossible to believe that the Railroad Labor Board will hesitate to grant further reductions of wages. Furthermore, it seems reasonable to assume that in 1922 there will be a gradual recovery of business from its present low level, and this is what the railways need more than anything else. Of course, however, whether there will be an increase of business is purely speculative, and will be determined mainly by developments and conditions entirely outside the control of the managements of the railways. It is evident, therefore, that the only road to safety for the railways is to continue to make the greatest efforts to secure further reductions in their operating costs, and especially in their labor and fuel costs.

If the darkest hour of all the night is just before the morning light, then the railways should soon begin to see the morning light. Certainly they never passed through a darker night than the year 1921.

While the year was marked by relatively the smallest amount of improvement work and the smallest volume of purchases ever known, there was a marked increase of orders for equipment and materials toward the close of the year, when the net earnings were becoming more favorable. This

showed that the managements were fully awake to the need for doing more improvement work and acquiring more equipment as rapidly as they became financially able. The country sorely needs a readjustment of conditions which will enable

the farmers to increase their purchases. Next to that the principal requisite for a revival of prosperity which will be real and lasting is the restoration of the earning power of the railways and of their ability to make normal purchases.

The Work of the Railroad Labor Board

PROCEEDINGS before the Railroad Labor Board were the center of interest in the railway field a large part of the time during 1921. The board has had presented to it for solution some of the most highly controversial, complicated and difficult problems ever submitted to any government body. It received much criticism from numerous sources regarding the way it dealt with these problems. Many of the criticisms made were directly contradictory to each other. In spite of the numerous criticisms passed on it, and even demands from influential interests for its abolition, it appears that on the whole the board's prestige was higher at the end than at the beginning of 1921.

It is only fair to recognize that the provisions of law under which the board acts, and the work of the board itself, must be appraised separately. The Transportation Act both specifies what the board must do and prescribes the conditions and fixes the limits of what it can do. The board should not be criticised for doing what the law requires it, or for refraining from doing what the law does not authorize it to do.

One of the most important controversies the board had to settle during the year was that over the national agreements. The board tried to act in accordance with the demands of the railways that rules and working conditions of employees should be made by direct negotiations between the individual railways and their own employees. When, however, it remanded the rules and working conditions to negotiation between the individual railways and their employees the heads of the labor unions made the negotiations almost fruitless by directing the general chairman of the unions on the individual lines to accept nothing less than the rules of the national agreements. The individual railways and their employees being unable to agree, the Labor Board was practically forced by the provisions of the Transportation Act to fix most of the rules and working conditions itself. It was impracticable for it to fix different rules and working conditions for every individual railway. As a practical matter it had to make rules of national application. In formulating these rules it seems on the whole to have done as well as it could in the circumstances. The rules made by it are a great improvement over those contained in the national agreements.

It is doubtful, however, if the board acted wisely, or even legally, in the case of the Pennsylvania. The management of the Pennsylvania and representatives of a majority of its employees at the Altoona shops reached an agreement. The board held this illegal on the ground that the road had not dealt with representatives of the labor unions concerned on the entire Pennsylvania System, who included in their membership a majority of all the shop employees. The question involved is one regarding the correct interpretation of the law. It has been taken to the courts and it is to be hoped the courts will settle it.

Another question of great importance upon which the board had to pass was that of a general reduction of wages. The railways, being in serious financial straits, asked it in substance to wipe out the entire advance in wages granted by it on July 20, 1920, and which was made effective from May 1, 1920. The board granted a reduction effective on July 1, 1921, which, however, did not seem then, and does not seem now, to have been as large as the conditions existing demanded and the provisions of the Transportation Act warranted. The cost of living in the United States, according to the best authorities, is now only about 52 per cent more than it was in 1916, while since the reduction in wages was made the average hourly earnings of railway employees working on an hourly basis are 121 per cent more than in 1916.

The failure of the board to make a larger reduction of wages has been harmful to almost everybody concerned, including many railway employees themselves. It has rendered it necessary for the railways to incur the odium of maintaining the present freight rates in spite of a general demand for reductions; it has helped to render it impossible for the railways adequately to increase their net income; it has helped to force them to continue a policy of the most drastic retrenchments in maintenance; and it has rendered it necessary for them to refrain from taking back into service many thousands of employees who otherwise would have been used in maintenance work. The railways intend to ask the board for further reductions in wages and it is difficult to see how, under existing conditions, it can refuse to grant them.

One of the most acute problems presented to the board for solution arose when the train service employees issued their order for a strike in October. It is difficult to say whether public sentiment, the attitude of the Department of Justice or the activities of the Railroad Labor Board contributed the most toward preventing the strike. At any rate, the board contributed largely. The board issued a statement at the time saying that the employees were crossing bridges long before they could get to them, since the board intended to dispose of all cases involving the rules and working conditions of any class of employees before it heard any case involving the wages of that class. This statement was generally interpreted to mean that the board would postpone for months hearing any case for reductions of wages. The *Railway Age* refused at the time to put any interpretation on the statement, saying that was for the board itself to do. Subsequently members of the board have announced that all cases involving rules and working conditions have been disposed of and called attention to the fact that no case involving wages on any large railway is before it.

It is almost two months since the railway executives met in Chicago and announced their intention to ask for further reductions of wages. It will take weeks, or even months, for

These are the only important declines of passenger business that have occurred. In 1919, when freight business fell off, passenger business substantially increased.

The decline in passenger business by months in 1921 is shown in Table II. The decline in passenger business steadily became relatively greater, month by month, until and including August.

There can be no question that these unprecedented declines of freight and passenger business were due mainly to general business conditions. A relatively small part of them may also have been due to the fact that large advances in both freight and passenger rates were made late in 1920, just when the greatest decline of commodity prices ever known was beginning. It is probable that the advances in passenger rates had more effect on traffic than the advances in freight rates. People ship freight for purely business reasons, and the rates are relatively so small a part of the prices of practically all commodities that if a market can be found for the commodities a comparatively small difference in freight rates will not prevent them from moving. On the other hand, a great deal of traveling is done for pleasure, and the fact that passenger rates are regarded as high doubtless has had a tendency in many cases to prevent people

from making trips which they otherwise would have made.

How long will it take to recover from this slump? This is a question which many are asking and which nobody can answer. Experience following past slumps may be interesting, however, even if it is not instructive. After the panic of 1893 the railways never handled a freight business equal to that year's until 1896. Each of the other declines of business was followed by a quicker recovery. The freight business of both 1908 and 1909 was less than that of 1907, but that of 1910 exceeded that of 1907. The small decline in 1911 was followed by large increases in 1912 and 1913. The business handled in both 1914 and 1915 was less than in 1913, but that of 1916 again set a new high record. The slump in 1919 lasted only a year, the business of 1920 being the largest up to the present time.

If one judged entirely by past experience he would be justified in expecting the business handled by the railroads in 1922 to be considerably larger than in 1921, but to be smaller than in 1920, and perhaps even smaller than in 1918. However, since the decline of business has been so much larger, both absolutely and relatively, than ever was known before, it would be most hazardous to venture a prediction as to how long it will take for a complete recovery to be made.

Entering Another Year of Struggle

THE YEAR 1921 was one of constant, and even desperate, struggle in the railroad business.

It was a year of struggle to reduce operating expenses.

In the first ten months of the year total expenses were reduced \$923,000,000 as compared with those of the same months of the preceding year. If the results for the entire year show a corresponding reduction it will amount to \$1,100,000,000.

Reductions of maintenance expenses may be real or merely nominal. Reductions of transportation expenses are always real. While total operating expenses were reduced 19 per cent in the first ten months of the year, transportation expenses were reduced more than 23 per cent, or relatively more than the decline of traffic. The railway managements made real progress in their struggle with expenses.

It was a year of struggle to prevent a hostile and unfair public sentiment regarding private management of railways from being formed. More misleading and downright false propaganda against the railways was disseminated than in many years. Most of it came from spokesmen and organs of the railway labor unions who were engaged in trying to blacken private management to promote the Plumb plan. Unfortunately, this propaganda had some effect on public sentiment. The necessity the railways were under of charging relatively high rates in a year of falling prices and profound business depression added greatly to the difficulties of keeping public sentiment reasonable and friendly.

Hard as was the struggle in 1921, it is to be feared it will be equally hard in 1922. The efforts to reduce operating costs will have to be continued without relaxation. It will be necessary to try to obtain further reductions of wages, and this will tend to have an unhappy effect upon the attitude and morale of employees. The agitation for general reductions of railway rates undoubtedly will be continued, and

the greatest efforts will have to be made to prevent premature and excessive reductions.

The year 1922 apparently will deal railway officers a bad hand. It is an old saying, however, that credit belongs not to the man who wins a game of cards, but to him who plays well the hand that is dealt him, whether good or bad. It is not whether a man wins a fight, but how fairly and how well he fights that counts to his credit or discredit.

Railway officers made a splendid and successful fight in 1920 to move the largest traffic ever offered. They made a splendid, efficient and courageous fight in 1921 to reduce operating expenses and prevent reductions of rates that would have been ruinous.

What the year 1922 will bring forth nobody can now foretell. That will depend very largely upon conditions beyond the control of railway officers. But railway officers can and will "carry on" with the same energy, loyalty and courage as in 1920 and 1921.

They will be fighting this year largely to determine the future of railway ownership and management in this country. They should spare no effort to make the operation of the railways as efficient and economical as possible. At the same time they should meet the selfish, malicious and misleading propaganda against private management which is coming from so many sources with redoubled courage and energy. If private management is to be made successful and to be perpetuated railway officers apparently will have to imitate the American pioneer who worked with one hand upon the plow and the other upon his rifle.

The year 1922 can be made the most memorable in railway history if railway officers will mightily resolve to run the railways as well as they can, and at the same time to return blow for blow to everybody who unfairly attacks them.

Executives Review Railway Prospects for 1922

The Background of Conditions During 1921

By Thomas DeWitt Cuyler
Chairman, Association of Railway Executives

DURING THE YEAR 1920, the chief effort of railway management was necessarily upon the improvement of the physical maintenance of the railroads and breaking up the congestion of traffic by intensive loading and movement. Hardly had the backbone of traffic congestion been broken, in October, before the general rate of business activity began to diminish and railroad traffic to decline.

So rapid was this decline that in January and February of 1921, the railroads could not even earn their operating expenses, and it became obvious that the great task before management in 1921 was to reduce the operating expenses of the railroads, and to restore their earning power, at least sufficiently to keep them out of bankruptcy.

This effort ran along two lines—one, to increase the productivity of employees by getting rid of the national agreements and other burdensome rules and working conditions, and the second consisted in a reduction of basic wages.

Wage and Freight Rate Reductions

The desire of railway management was to secure the first relief by an increase in the productivity of employees, postponing a reduction in basic wages until a later date. The relief which they actually secured came in just the reverse order. A reduction in basic wages, amounting to approximately 12 per cent, became effective on July 1, but it was late in 1921 before the railroads began to receive any relief from burdensome rules and working conditions.

Between the reduction in wages, effective July 1, and a very severe cutting of maintenance expenditures, the railroads will probably make for 1921 a net operating income between \$550,000,000 and \$600,000,000. This will mean that interest on funded and unfunded debt can be met, but that normal dividends will not be earned.

With the more or less rapid and unequal fall in commodity prices, the relation of freight rates to commodity values became of increasing importance as the year 1921 progressed, and led to widespread demands for reductions in rates. In meeting this situation the railroads, of course, had no wartime profits to fall back upon. They were at the same time operating under costs, nine-tenths of which had been set by governmental authority, directly or indirectly, and they had no ability to make rapid changes to meet changing economic conditions. It has been and is, however, the earnest intention of the railway executives to get railway transportation and railway rates as rapidly as possible back into a normal relation to the industry and agriculture of the country. They can do this, however, only step by step.

Some misunderstanding in the public mind may have been occasioned by the inability of the railroads to translate their wage reduction of July 1 into rate reductions. It must be remembered, however, that when the increase in rates was

made in 1920 it was expected to give the railroads a fair chance at a 6 per cent return, on the basis of a flow of traffic such as the railroads experienced at the end of 1919 and for the greater part of 1920. With the enormous decline in business activity, the rates established by the Interstate Commerce Commission did not produce the return contemplated, and many railroads would not have been able to earn even their fixed charges during 1921 had it not been for the wage reduction of July 1.

Under these circumstances it was, of course, impossible for the railroads to make general rate reductions predicated upon this wage reduction. As, however, their situation improved, during the second part of 1921, the railway executives attempted to find a method whereby the desire of the country for lower rates could be gradually met. They feel that they have found this method in the action adopted at their meeting of October 14, when they decided to request another reduction in basic wages, and undertook to turn over to the public in the shape of reduced rates the full benefit of this reduction. This policy recognizes that the cause of high rates is high operating expense, and that the chief item in excessive operating expense is excessive labor cost.

Earning Power Must Be Restored

Of the threatened railroad strike in October, little need be said. The reaction of public opinion to this threat was one of the most hopeful indications that this country is going to work its way back to normal conditions in accordance with fundamental American principles.

The chief danger in the present situation is that the great body of our people may overlook for the moment the importance to them of allowing the railroads to get back on their feet financially. Yet this in itself would make a very substantial contribution toward resumption of normal business. The railroads are the country's largest single industry; they consume about a third of the normal product of the coal and steel industries; and are large consumers in many other lines. There is a substantial deferred maintenance carried over from the period of federal control, and probably as much deferred maintenance accrued during the present year. In addition, by causes outside of the control of railway management, the railroads have practically been in a condition of arrested development now for some years past. Without in the least denying the desirability and ultimate necessity of substantial reductions in railroad rates, it is sincerely to be hoped that shippers will not demand, and that the Interstate Commerce Commission will not require, from the railroads rate reductions so great as to make it impossible for the railroads to restore their earning power during the coming year, and to assume their normal place as the greatest single consumer of the products of other industries.

How to Better Railroad Conditions

By J. Kruttschnitt

Chairman of the Southern Pacific Company

YOU ASK: 1. *What can and should be done by railroad managements to better existing railway conditions?*

Railroad managers will continue to exercise the close watch over expenses that in 30 years has resulted in handling *four times* the traffic units in 1920 that were handled in 1890, in *two-thirds less train miles* than 1890 operating conditions would have required. The annual savings each year compared with 1890 were large, the cost of handling the enormous traffic of 1920 being \$6,742,000,000 less than the cost of handling it by 1890 methods. This *saving* is \$633,000,000 *more than the entire operating expense* of the railroads in 1920 notwithstanding high cost of wages and materials. Without adequate revenues and improved credit, which the Transportation Act was designed to produce, but which it has not been allowed to do, little can be done to reduce operating costs by elimination of curves and reduction of grades and distances, but managers must seek to improve technical details of manufacture of rails, castings and other materials; and of locomotive design, so as to reduce consumption of fuel, and to convert more of the heat energy in fuels into useful work by the free use of appliances of merit, with such little control over operations as remains in their hands.

2. *What can and should be done by railroad regulating authorities to better the railroad situation?*

(a) The Transportation Act, 1920, passed after years of close study and bitter experience, was designed to nourish and restore the railroads that had been starved well nigh to dissolution by a generation of repressive and punitive regulation, and to enable them to provide adequate facilities for the public by constructing new and improving existing lines. The effect of the long period of punitive regulation is reflected in the construction of only 314 miles of new line in 1920 compared with 717 miles in 1841, *eighty years ago*; and the effect of preventing the Transportation Act from functioning is shown in the authority granted by the Commission to *abandon and scrap 764 miles of railroad* in 1920, and in the low income returns on the value of the properties since September 1, 1920.

Month	Net Income Earned (Annual Basis) Per Cent.
September, 1920	4.1
October, 1920	4.6
November, 1920	3.3
December, 1920	0.7
January, 1921	Def
February, 1921	Def
March, 1921	5.3
April, 1921	2.1
May, 1921	2.3
June, 1921	3.1
July, 1921	4.5
August, 1921	5.0
Average	2.9

(b) The Transportation Act concentrated rate regulation in the Interstate Commerce Commission and empowered it to prevent conflict of state with interstate rates. A bill is now before Congress to repeal this power; another seeks to reduce the 6 per cent rate of return.

(c) The Transportation Act created a board to control wages. Obviously there should be close co-ordination between the revenue and expense controlling bodies, the Interstate

Commerce Commission and the Labor Board, in order to insure the statutory net income of 6 per cent; but we have seen one of these agencies reduce freight rates regardless of labor costs fixed by the government and of material costs fixed by economic conditions, and another fix fictitious scales of wages, violating economic laws and regardless of the ability to pay them. The framers of the Transportation Act meant well, but their intentions are defeated by faulty administration. To insure perfect co-ordination it is imperative that the same agency that controls revenues should also control expenses.

(d) There should be an immutable rate-making policy. For many years when prosperity was rampant and all industries were making large profits, those of railroads alone were restricted by law; increases of rates were denied, while increasing costs were steadily reducing the margin between income and expense. Financial starvation was to be checked by the Transportation Act, but before its influence could be felt the depression in business had set in and the rate increases allowed September 1, 1920, at the end of the guarantee period, were offset, first, by many reductions made voluntarily by the carriers to correct inequalities in the horizontal increase of rates, and thereafter by others made by the Interstate Commerce Commission, notwithstanding the statutory return on the value of the railroads had never been enjoyed and they were physically and financially unable to stand the reductions. During the years when business could easily have stood them, the applications of the railroads for higher rates were repeatedly denied, and now when business can ill afford to pay existing rates and the railroads can still less afford to reduce them they nevertheless are reduced, and the owners of railroads are required to relieve those who feasted while they fasted. The enumeration of the troubles of the railroads indicates the remedies:

1. Place the regulation of wages and the regulation of income under the same agency.
2. Adopt a fixed policy of rate-making.
3. Protect the first and only constructive railroad legislation the Congress has ever passed; save it from being destroyed by amendments.

4. In their own interest the people should not permit the light traffic enjoyed by the railroads under stagnant business conditions to be further reduced by agencies created and nourished by taxes gathered from all the people, as is being done by government-owned ships using the Panama canal on ridiculously inadequate tolls; by government-owned and operated towboats and barges on the Mississippi and Warrior rivers quoting rates of 20 per cent below railroad rates; and by motor trucks on free highways paralleling the railroads, and provided by state and federal moneys. A bill has been introduced in Congress authorizing the government to lend money at 5 per cent to assist corporations in organizing highway motor transportation to compete with existing transportation lines, the obvious purpose being to destroy the value of railroad investments, as the loan is to be contingent on

the business of the proposed corporations offering "reasonable hope of success." In 1920 the people through their representatives pronounced overwhelmingly against government own-

ership; unless their policy towards the railroads is radically changed the people will defeat their own will and make private ownership and operation impossible.

Some of the Hopeful Signs

By A. H. Smith

President, New York Central Lines

THE present railway situation represents progress under the Cummins Act toward the restoration of the character and cost of service and railway credit formerly enjoyed, with the ultimate hope that the former record shall some day be surpassed and thus truly serve the general welfare.

If each factor—investor, official, employee, patron and regulator—will do tomorrow better than he has done today within the field of duty, it will be a splendid groundwork on which to expect fruition.

Why should the railway situation get worse when such a policy can be? Are there not many now imbued and working with this aim? Is not the burden of taxation and

public spending curtailed? Do we lack the normal yield of the earth's increase? Are there not hopeful signs to be read in current trend of international relations?

If these are grounds for faith—and I think they are—it is a good sign.

However, the country has been on a level of spending which it cannot long sustain. It is shaping its descent from these flights to return to a sound sense of normal value. Conditions, including rates, inherent to the evolution from the war state of affairs, will no doubt retard the rate at which we approach the aim.

It may well be so, because there is much to do that must be done well in order to be right and endure.

The Railroads' Hope Lies with the Public

By C. H. Markham

President, Illinois Central

I BELIEVE we should not be discouraged over the railway outlook for 1922. Some aspects of the situation are disheartening, but I have an impelling faith in the soundness of American business and the fairness of the American public, and that faith will not allow me to lose heart over the gloomy phases of the situation.

The railroads of the country, in common with all other business institutions, have had a most eventful year. The demands made upon the railroads by changing economic conditions have contributed to an unusual extent in making it impossible for the railroads to follow out carefully developed plans. More than ever before, the railroads have been forced to live from month to month, hoping, oftentimes in vain, for the clouds to clear away and disclose a brighter prospect. Many plans for development have had to be postponed; even the normal demands for maintenance of properties have had to be deferred by many roads. More than three years have elapsed since the signing of the armistice, and the railroads have not yet been freed from the incumbrances which the war placed upon them.

We should recognize frankly that the changes which have come in public opinion during the year have, in many cases, not been for the best. A year ago the public had accepted a great increase in railway rates and public sentiment was arrayed solidly behind the railroads in their efforts for a rehabilitation of their organizations and their plants, which had been devastated by the war. There are gaps in that array of public sentiment now. In many quarters active support has lapsed into indifference. The lessons taught by the transportation shortage of the latter part of 1920 seem to have been forgotten. The public has not actively concerned

itself with the news that railway earnings throughout the year have been insufficient. Economic changes have lent themselves to a widespread agitation for a lowering of rates in the face of insufficient earnings' and the lack of an adequate return has not permitted the roads to fortify themselves for the business revival which is certain to come.

A year ago government control of the railroads had lost almost its entire following. It has not regained many of its lost adherents during the past year, but its followers are awaiting the first sign of the railroads' inability to handle all the business offered to press their demands. Government ownership will not come as a carefully thought out and rationally adopted plan of action, but we should be on our guard lest it come as a possible way out of a situation into which we are fast drifting.

I said that I have an impelling faith in the fairness of the American public, and I believe that our hope lies with the public. We have a situation before us with which we should be acquainting the public. The railroads must be assured of earning a fair and reasonable return upon their valuation, not alone as a matter of simple justice to the millions who have directly and indirectly invested their savings in and made the railroads possible, but in protection of future railway development and progress. The public must be brought to realize its great stake in the railroads, and it lies with us to give the public that vision.

We are facing many pressing problems as we enter upon another year, but there is none more pressing than this duty to guide public thought into channels which will make possible a rail transportation system capable of serving the public efficiently and adequately.

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Railway Executives at the White House—Left to Right, Front Row: S. M. Felton, Howard Elliott, T. De Witt Cuyler, A. P. Thom, C. H. Markham, Samuel Rea, R. S. Lovett. Back Row: J. Kruttschnitt, Icy Lee, A. H. Smith, Hale Holden, W. B. Storey, Secretary of Labor Davis, W. W. Atterbury.

General Railroad Developments During the Year

The Principal Events Center Around the Efforts to Reduce the Cost of Transportation

By Harold F. Lane

A REVIEW of the developments of 1920, published in the *Railway Age* of a year ago, began by saying that it consisted largely of an account of the measures that had been necessary "to enable the roads to recover from the effects of the war and 26 months of unified operation by the government and of the process of readjustment to the new conditions created by the Transportation Act." A similar review for 1921 can only report further progress, as the process of readjustment is taking longer than was generally considered would be necessary, and is still far from complete.

In the case of the railroad industry, this readjustment has been complicated by the fact that its adjustment to the war period conditions had been delayed to the last and had hardly been completed when the period of deflation for other industries set in. As a result the railroads have been subjected to a tremendous pressure and much criticism because of their inability to respond promptly to the forced deflation in many other lines. The principal events of the year have centered around the manifestations of this pressure and the efforts of the railroads to meet it.

Throughout the greater part of the year, the railroads, under high rates and with a volume of traffic which, although much below that of the last three years, would have seemed big before the war, and with large sums still owing them from the government, were engaged in a desperate struggle to keep out of bankruptcy. As their condition has gradually improved during the year, the struggle has been almost as desperate to retain that position until they could work out the readjustment of their operating expenses necessary to comply with the universal demand for rate reductions.

Rate Advance Too Long Delayed

One of the reasons for the commanding of the railroads by the government was to prevent the inflation in the transportation industry which had manifested itself in other lines.

Instead of allowing the railroads to increase their rates in proportion to the increase in cost caused by the inflation of prices and wages in the unregulated industries, an element in the administration allowed itself to be persuaded that in the case of the railroads it could arrest this tendency by operating the railroads itself much more cheaply, as well as more efficiently, under a unified management than they could be operated by their owners.

THE RAILROADS, in the face of falling traffic, were in no position to come to the assistance of other industries by reducing rates until their own costs could be adjusted. Only the most rigid economies enabled them to avert bankruptcy.

Plans for a new wage cut are under way and the Interstate Commerce Commission has begun an investigation as to what, if any, further rate reductions may be ordered.

The experiment failed, but as the Railroad Administration was not under the necessity for keeping itself on a self-sustaining basis, since any deficiency in the amount necessary to meet its guaranty to the roads could be met from Congressional appropriations, it failed to adjust the rates to the level of expenses that it found imposed upon it. After it had been decided that the experiment was to continue no longer, even the wage adjustment was postponed and passed along with the rate problem to the private managements. The cycle of wage increases was, therefore, not completed until July, 1920, although the wages then awarded were made retroactive to May 1 and the adjustment of the rates was not made until August 26. Even then there was little complaint of the high cost of transportation, because it was not high levels that had been reached by prices generally. The most representative shippers of the country had even urged a generous increase in the hope that it would give them the service they needed.

By the time the force of the post-war boom had spent itself, however—and it is now clear that this had begun to occur even before the date of the rate increase—the inflation of railroad costs and rates took on another aspect and many business men who had felt they could afford to be "generous" to the railroads in the summer of 1920, wanted to take it back by January, 1921. Although the high tide of traffic, to some extent retarded early in the year 1920 by the switchmen's strike and the car shortage, continued during

the last four months of 1920, the first weeks of 1921 showed that a period of depression had set in and the railroads were at once faced with a demand for readjustment at a time when their own condition least justified such a course and within only four months of the time when their rates had been placed on a sustaining basis.

For eight months of 1920 the railroads had been guaranteed, but the actual payment of much of the guaranty had been delayed. They had actually earned practically no net operating income for the entire year in which they had broken all records for the volume of freight and passenger business handled. Although they had a net of some \$225,000,000 for the four months after the rate increase, and after their guaranty had expired, the new rates had been in force such a short time as to afford the roads no elasticity to help meet the new conditions of low traffic and high wages. The earnings for the last four months were needed to offset the deficits of the earlier eight months for which they had not yet collected the guaranty and also, as it soon became apparent, the new deficits that they were to face in January and February, 1921.

The drop in the level of general business and in the wholesale prices of commodities came so rapidly that the high level of railroad rates stood out as a prominent target for those in search of a quick remedy for the general situation. The government having regulated freight rates for many years, but not having made much progress in other directions in repealing the fundamental laws of supply and demand, and other economic laws, it was exceedingly natural for many people to attribute the effect of the business depression, which they did not know how to relieve in any other way, to the cause of high freight rates which they could ask the government to reduce for them. It having become the custom to regulate rates more in accordance with the needs or wishes of the shippers than of the railroads, a demand for a reduction proportionate to the change in the condition of other industries seemed only natural and Congress and the commission began to be flooded with demands for action to reduce rates in order to revive business.

For a time the commission under the leadership of Chairman Clark stood firm against this onslaught and Mr. Clark wrote numerous letters to members of Congress and others pointing out that the railroads, far from having been guaranteed a specific return, were in most cases not even earning operating expenses and that the causes for the depression lay far deeper than rates.

Agitation for Repeal of Rate Law

The idea that the railroads had been guaranteed 6 per cent had been so sedulously spread, both by deliberate propaganda and by the careless statements of those who had not bothered to read the law, that a repeal of the rate-making provisions of the Transportation Act appeared to many as the easy solution of the difficulty, and it appealed with particular force to the average Congressman as the only way in which he could exert himself to comply with the demands of his constituents.

Because of the particularly rapid deflation of the prices of agricultural products, the idea of reducing rates by law was taken up by many members of what is now called the agricultural bloc and many bills were introduced, particularly in the Senate, to either repeal Section 15a of the law or to substitute a lower percentage of return, in spite of the fact that the railroads were earning as much as even the minimum rate allowed.

The action of the Interstate Commerce Commission in ordering increases in intrastate rates where the state authorities had refused to do so also added to the resentment in many quarters and the strength of the advocates of so-called "state rights" was added to that of those who merely desired lower rates.

Attempts of Railroads to Reduce Labor Cost

Meanwhile the railroads were being driven to the most drastic economies merely to meet their current running expenses, to say nothing of lowering rates. Acquiescing in the award of the Railroad Labor Board increasing wages in 1920, they had first turned their attention to the abrogation of the standard rules and working conditions—imposed by the national agreements entered into by the Railroad Administration shortly before it relinquished the railroads—before giving any consideration to the question of wage reductions.

The Labor Board was proceeding in a somewhat leisurely fashion to hear the voluminous evidence in this case when General Atterbury of the Pennsylvania, on behalf of the labor committee of the Association of Railway Executives, appeared before the board on January 31 and asked that the national agreements, which he estimated were costing the roads \$300,000,000 a year in increased expenses, be abrogated at once to save the roads from bankruptcy. He also asked that the board make a reduction in the wages of unskilled labor, promising that if these requests were complied with, his committee would recommend to the roads that they withhold for at least 90 days any action looking to a reduction in basic wages. The board declined to grant the request, and the railroads thereupon began to take the necessary steps toward a wage reduction.

Partial Payment of Guaranty Provided For

The roads had also taken up with Congress and secured an amendment to the Transportation Act to provide for partial payments on account of their six months guaranty which the comptroller of the treasury had held could not be made beyond the advances specifically provided for on applications filed prior to September 1, 1920, until the commission was in a position to certify the final adjustment of the total amounts due in each case. Congress was willing to extend this assistance to the railroads because it had been generally understood that the law as originally passed provided for partial payments.

Labor Charges Managements With Extravagance

The passage of the bill, however, brought out a good deal of discussion of the railroad rate situation and also of charges made by the railroad labor organizations that the railroads had been extravagant at government expense during the six-months guaranty period of 1920. The charges were based particularly on the contracts made by certain railroads for car and locomotive repairs in outside shops for which they paid some high prices to get the work done quickly, although the law specifically limited the amount of maintenance expenditures for which they should be guaranteed. The Interstate Commerce Commission in January ordered a general investigation of these charges and held several hearings upon them besides securing a mass of information on the subject through questionnaires and the work of its examiners. No report, however, has yet been issued.

President Harding Tries to Bring

About Rate Reductions

President Harding had joined in the demand for rate reductions in his address to Congress on April 12, in which he said that "railway rates and the cost of operation must be reduced," although he did not recommend any additional legislation to accomplish that result and he did not fall into the error of condemning the rates without recognition of the cause. While he said that "freight-carrying charges have mounted higher and higher until commerce is halted and production discouraged," and that no improvement in the general business situation can be permanent "until the railroads are operated efficiently at a cost within that which the traffic will bear," he also referred to the situation in a way

to indicate that the low tide of business was a cause rather than entirely the effect of the difficult transportation situation.

Following this the President held a conference with Chairman Clark of the Interstate Commerce Commission and Chairman Barton of the Labor Board, after which he called in one at a time various representatives of the railroads, the labor organizations, the shippers and the security owners' association for the purpose of informing himself. It became evident after these conferences that the President had been brought to a realization that it would require more time to straighten things out than he had perhaps at first appreciated and that the railroads could do little to assist business generally through the period of readjustment without some assistance for themselves.

General Public Misunderstanding

The railroads have been confronted throughout the year not only by the practical problem of reducing their expenses, but also by an important psychological problem which made the practical one even more difficult. The American people, having been led to believe that private management of the railroads would be more economical than government management, had reached the conclusion that results in this direction should be shown at once. When it appeared, therefore, that the operating expenses of the railroads for the year 1920 were some \$1,400,000,000 greater than they were in 1919, the situation called for an explanation that was difficult to make to those who were not sufficiently and directly interested in the problem to keep the figures in their heads. They had had their attention called to a wage advance of \$600,000,000 to \$700,000,000 in 1920 but not to the total of the various wage advances made in the latter part of 1919, which had their effect in 1920, and hardly at all to the effect of the national agreements made by the Railroad Administration in the latter part of 1919 and the early part of 1920, which the railroads estimated added \$300,000,000 a year to their cost of operation. Moreover, the effect on expenses of the handling of a greater volume of traffic in 1920 than had ever been known was not generally appreciated except among those whose direct business it was to notice it.

When added to all this was the fact that the railroads had been guaranteed for the first six months after the end of federal control—although a highly technical provision of the law carefully restricted this guaranty so as not to protect the railroads on any increase in maintenance—and the popular belief that the 6 per cent rate-making rule constituted a real guaranty, only a little demagoguery and a little propaganda were necessary to create a state of public opinion which caused a most difficult position for the railroads.

Neither the demagoguery nor the propaganda, however, were confined to "a little" and aside from the selfish propaganda, high authorities in the government were obtaining wide publicity for their opinions that rates were too high and must be reduced. Close and continued attention to the public utterances made on these subjects by President Harding and Secretary Hoover leaves no reason to believe that they ever had any particular idea of insisting upon large rate reductions until the foundation could first be laid by a reduction of operating costs, although at first they were apparently impressed with the popular idea that high rates were defeating their purpose and lower ones might produce more revenue, but any qualifications with which they expressed their opinions were not always emphasized and were soon lost sight of. Thus some very influential voices were raised to swell the volume of protest and as these gentlemen progressed in their understanding of the situation they were not always able to bring about a corresponding transition in the minds of the newspaper men who interpreted their views to the public.

President Harding discussed his views of the rate question on many occasions with the Washington correspondents but, as the President is not quoted, the main idea of his remarks, to the effect that rates must come down, was the feature that was made public. Even after he had personally visited the Interstate Commerce Commission and had caused a statement to be issued from the White House that he was surprised and gratified at the progress being made in the way of readjustment and voluntary reductions in rates, and after he had stated that he was not in favor of a general percentage reduction, the effect of the development of his ideas failed to "get across." This is not to deny the fact that the influence of both President Harding and Secretary Hoover has been on the side of a rate reduction, but it is also true that for several months they have also recognized that no extensive reduction in rates was practicable until there had been more of a reduction in the cost of performing the service and that the efforts of the roads to lower wages have had their moral support.

Senate Orders General Railroad Inquiry

The demand for lower rates and the charges against the railroads led to the introduction by Senator Cummins and the passage by the Senate on April 12 of a resolution authorizing the Interstate Commerce committee to conduct a general investigation of the railroad situation, to inquire among other things into "the reasons which led to the extraordinary cost of maintenance and operation from March 1, 1920, to March 1, 1921, the reasons which induced the diminished volume of traffic including the influence of the increased rates, the efficiency or inefficiency of railroad management and of labor," and "the best means of bringing about a condition that will warrant the Interstate Commerce Commission in reducing freight and passenger rates."

Before introducing the resolution Senator Cummins had made some investigation of his own and it is believed that one of the purposes was to head off some of the various amendments to the Transportation Act that were being proposed.

The Senate committee began its hearings on May 10 and the railway executives and their statisticians put before it a comprehensive explanation of the condition of the carriers, showing that it was an inheritance from the period of federal control which they must overcome before they could again demonstrate the economy of private management as compared with governmental operation. They were also able to show conclusively that the general business depression had numerous perfectly good causes entirely independent of freight rates.

Following the railroad testimony, witnesses were heard on behalf of the National Association of Owners of Railroad Securities, who were somewhat critical of the railroad managements but at least sustained their statements as to the principal elements in the situation. At any rate the railroads succeeded in making at least a prima facie case before the committee to demonstrate the main causes for the increase in expenses without leaving much room for faith in the charges of deliberate extravagance that had been made against them, and sufficient also to demonstrate to almost anyone who was willing to give attention to the subject that the Transportation Act was not at the root of the difficulty.

Comparatively few representatives of the shippers had asked to be heard by the committee and while the labor organizations had asked to be heard, they had postponed the date for their appearance so when hot weather came and Chairman Cummins' health demanded a rest, the hearings were adjourned and not resumed until fall.

The railroads had at least succeeded in convincing the committee that no change in the rate-making provisions in the law could help the rate situation and that little could be done by anyone pending a determination of the wage

question then before the Labor Board. The committee apparently came to the conclusion that there was practically nothing that Congress could do to remedy the situation of which the public was complaining. About the time the hearings were adjourned, the Labor Board made its 12 per cent reduction in wages and traffic was beginning to pick up and the adjournment gave an opportunity for time to demonstrate the results. Moreover, the railroads had shown that some very considerable rate reductions were being made by way of readjustment.

Efforts to Expedite Settlements

With Railroad Administration

One result of the Senate committee hearings, however, was to bring to the attention of Senator Cummins and other leading members of the committee the difficult position the railroads were in with relation to their accounts with the Railroad Administration. President Rea of the Pennsylvania stressed this point particularly, saying that the greatest immediate relief that could be given the roads was some way of expediting the payment of the large sums still owing to the roads for the period of federal control, and also the balance still due for the six months guaranty period. He showed that while the Railroad Administration owed the roads several hundred million dollars, it was attempting to offset against it the amounts due from the railroads to the government for capital improvements which the roads should finance by long term securities, and, moreover, that the payment of the sums due the roads was delayed by the complicated nature of the settlements and the undecided controversy over the basis of the maintenance claims.

While the committee itself took no action, Senator Cummins bestirred himself and assisted the roads in enlisting the interest of the President. Many conferences were held, which took in the director general of railroads, the Interstate Commerce Commission, Secretaries Hoover and Mellon, and the managing director of the War Finance Corporation. The result was that the administration took up the matter as a plan for improving general business conditions by assisting the railroads to obtain the cash with which to pay outstanding bills and undertake maintenance work which would put money into circulation and give employment to many men.

As a condition, however, to the funding of the railroad indebtedness, it was insisted that the railroads agree to waive their claims for reimbursement for undermaintenance based on the so-called "inefficiency of labor" factor, as far as settlements with the Railroad Administration were concerned, although they were to retain their right to go to the courts. When they had done this, thus relieving the government of a contingent liability estimated as high as \$800,000,000 which no one could be sure the courts would not allow, the President in July urged upon Congress the passage of a bill to authorize the War Finance Corporation to purchase railroad securities taken by the United States Railroad Administration in payment for the additions and betterments, thereby giving the Railroad Administration funds with which to pay its indebtedness to the railroads without an appropriation.

The President under the Transportation Act had the power to fund the capital expenditures but the Railroad Administration did not have funds sufficient to pay the roads what it would owe them without offsetting the capital expenditures. The purpose of the bill was to enable the government to convert into cash the obligations it had taken from the railroads, and would take in connection with the funding, by transferring the indebtedness of the railroads from the government to the investing public, but it was considered necessary at that time to have the War Finance Corporation carry some of the securities temporarily until market conditions improved so that it could sell them at par.

The bill was passed by the House in August, although

with a provision that would bar any road, even one that declined to settle with the Railroad Administration, from pursuing a claim for inefficiency of labor in the courts, but it struck a snag in the Senate in the agricultural bloc that was unwilling to do anything for the railroads without first obtaining a reduction in rates. Careless newspaper reporting, middle-headed demagoguery and deliberate propaganda largely instigated by the labor organizations soon created a general impression that the sole plan was to give or at least loan the railroads \$500,000,000 of new money and when the Senate committee finally reported the Winslow bill in a modified form it was promptly assailed with so many amendments designed to emasculate the Transportation Act that the efforts of its supporters to pass the bill were relaxed before the close of the extra session.

Meanwhile the War Finance Corporation in September, acting unofficially for the director general of railroads, made an offering of some of the car trust certificates which it had taken from the railroads in payment for the cars and locomotives bought during federal control and found it possible to sell some of the best of them at par and accrued interest. More sales were then made, which gave the Railroad Administration additional funds with which to make settlements with the railroads without the need of an additional appropriation and considerable progress has been made in settling with the roads that were either so needy as to desire a quick settlement without funding or could afford to allow their indebtedness on capital account to be subtracted from the sums due them on open account. When the regular session of Congress began on December 5 no efforts were made to push the passage of the bill.

Bills to Amend Transportation Act

All through the year various bills were introduced in Congress to repeal the provisions of the Transportation Act which direct the commission to try to make rates that would produce as nearly as may be an annual return of 5½ or 6 per cent and those under which the Interstate Commerce Commission had ordered increases in intrastate rates in those states which refused to increase rates by the amount which the commission had found necessary in its decision in Ex Parte 74 to enable the roads to earn the fair return prescribed by the act. Some of these bills were so drawn as to nullify every order ever issued by the Interstate Commerce Commission to correct state discrimination against interstate commerce, including those that had been sustained by the Supreme Court under the old law. These bills reposed quietly in committee during most of the session and while the Senate committee was conducting its general investigation, but after some of the western Congressmen had gone back home during the summer the pressure was renewed and the Senate committee on October 24 began a series of hearings on the Capper and Nicholson bills instead of resuming the general investigation.

For about two weeks the committee listened to the testimony of state railroad commissioners and such representatives of the shippers as Clifford Thorne and S. H. Cowan, who gave such a warped and biased view of what the commission had done to the rates that the committee seemed to be about to report a bill. An effort was made to hurry up the testimony on behalf of the railroads but they insisted on their right to present their case and with the assistance of several witnesses representing the National Association of Owners of Railroad Securities, including E. F. Clark, apparently soon succeeded in counteracting much of the effect of the previous testimony. Walker D. Hines, formerly director general of railroads, also appeared before the committee and made a strong defense of the various provisions of the Transportation Act, as did representatives of the Railway Business Association and the Chamber of Commerce of the United States.

Attitude of the I. C. C.

The demand for reduced rates was met by the Interstate Commerce Commission during the early part of the year by having its traffic bureau arrange various informal conferences between representatives of the railroads and the shippers for the purpose of seeing whether reductions could be agreed upon. In many cases where it was shown that a peculiar hardship was being caused by the rates, or that lower rates would make possible the movement of certain classes of traffic, these conferences resulted in reductions, but in several important cases the roads felt unable to grant the requests.

There was a general readjustment of grain rates made necessary in the first instance to restore relationships disrupted by the percentage advance, but before it was completed competition with the Canadian roads and between the roads serving Atlantic and Gulf ports led to some very extensive reductions, particularly in export rates. Before the end of the year it was estimated that reductions amounting to \$200,000,000 a year had been made.

The first formal case heard by the commission involving a request for extensive reductions in rates was the western live stock case, in which the commission did not issue an order. It did, however, issue a report on August 15 recommending a reduction to 80 per cent of the rates in effect in western territory which were higher than 50 cents as justified not by transportation conditions but by the economic condition of the industry. The railroads complied with this recommendation.

Then the commission, acting on petitions filed by the western state commissions and the American Farm Bureau Federation ordered an investigation of the rates on grain, hay and grain products in the western districts and after an expedited hearing issued a report saying it expected the roads to make reductions but did not issue an order until the railroads had failed to observe its recommendations.

The Threatened Strike

The question of rate reductions has been complicated by its dependence upon the wage question. During the early part of the year the roads were asking that wages be reduced and the rules of the national agreement be modified in order to save them from bankruptcy, as for several months a large proportion of the roads were not earning operating expenses. During this time many of the shippers were refraining from pressing for rate reductions, realizing that the high rates were largely due to the wage increases that had been made.

The National Industrial Traffic League went on record as deprecating the agitation for general rate reductions and it tried to intervene in the rate case with evidence on behalf of the shipping public but was denied a hearing by the board. As the condition of the railroads gradually improved, as a result of their drastic curtailment of maintenance and other expenses, including the laying off of several hundred thousand employees, and as a result of the gradual increase in traffic, the agitation for rate decreases became stronger, particularly after the Labor Board had made a reduction in wages estimated at \$300,000,000 to \$400,000,000 a year. The roads showed, however, that this was not sufficient to justify general rate reductions, and even when their net income began to approach the statutory rate of return, reaching 5 per cent in August, they pointed out that this had been done largely at the expense of maintenance and that it was necessary to make up for the deficits of the early part of the year to be able to pay fixed charges for the year.

Some of the more conservative elements among the shippers began to complain that the railroads were hiding behind the Labor Board and there was more or less agitation for the abolition of the board or its co-ordination with the Interstate Commerce Commission. After the decision of the com-

mission in the western livestock case, in which it became evident that the commission was not inclined to wait too long for a further reduction in wages, and after some correspondence with Chairman McChord of the Interstate Commerce Commission, who had urged the roads to make some voluntary reductions in rates, the Association of Railway Executives tried to adopt a general rate policy and its executive committee went to Washington where it held conferences with President Harding, Mr. McChord, Secretary Hoover and Chairmen Cummins and Winslow of the two Congressional committees on interstate commerce. All of these men told the railroad executives that they considered it highly important from a policy standpoint that the roads make some voluntary reductions.

The committee went to a general meeting of the member roads of the association at Chicago on October 14 with a recommendation that the roads make an immediate reduction of 10 per cent in the rates on agricultural products and then take steps to ask for another wage reduction with the understanding that it should be translated at once into rate reductions. At the meeting, however, a number of the roads, particularly those in the West, declared that they could not afford to make the 10 per cent cut proposed and only the latter part of the plan was adopted.

On the same day a committee representing the railroad brotherhoods asked for a conference to present a demand that the 12 per cent wage cut of July 1 be rescinded and that the roads make no further reductions for a year. This demand was backed up by a strike vote and when the roads met it by handing the brotherhood committee a copy of the resolutions adopted proposing a new wage cut, the strike orders were issued. The strike vote had been taken in protest against the wage reduction ordered by the board effective July 1, but it was commonly accepted as being intended merely to head off a new move in the direction of further reductions. The railroads had called the bluff, however, and the labor organizations were thus placed in the position of threatening to strike against the order of an impartial public tribunal.

When it was made clear that such a strike would have no support in public sentiment and that the government was proposing to put some teeth in the labor provisions of the law by seeking injunctions against a violation of the Labor Board's orders, the brotherhoods were given an opportunity to call off the strike without too much appearance of surrender by an announcement of the Labor Board that it could not take up a new wage case for any class of employees until it had cleared its docket of cases involving rules and working conditions for that class.

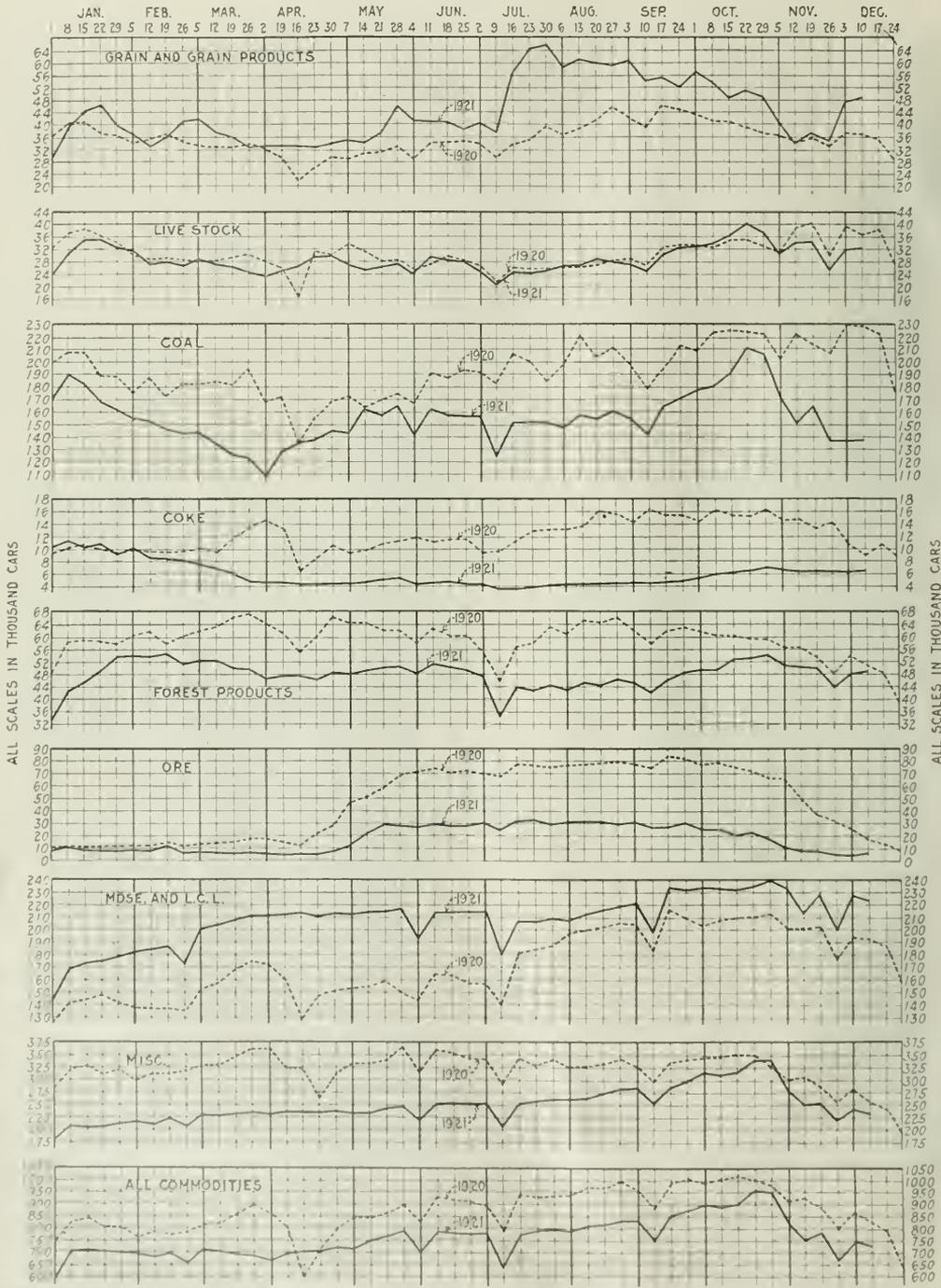
The settlement of the strike was made without any promises or concessions of any kind from the railroads. They had made it clear that they were proposing wage reductions as the only way of complying with the public demand for rate reductions and they began to proceed at once with the steps necessary to get a wage dispute before the Labor Board with a view to showing that if there was any delay the responsibility for it was not theirs.

This required the service of notice of a proposed reduction upon the employees of various classes and an effort to reach an agreement with them before application could be made to the board.

Meanwhile the Interstate Commerce Commission issued its report in the western grain case directing the roads to make on or before November 20 reductions by one-half of the 35 per cent and 25 per cent increases made in the Western and Mountain Pacific districts. The commission made no order, however, but said that one would be issued if necessary. In this decision the commission made little attempt to show that the reductions were justified from a transportation standpoint. The reduction was based on the economic condition of the agricultural industry and reconciled with Section 15a

(Continued on page 26)

REVENUE FREIGHT LOADED





Illinois Central Yard on Lake Front, Chicago—Photo by Underwood & Underwood

Five Years of Freight Traffic Growth Is Lost

Railways in 1921 Carry Less Freight Than in Any Year Since 1915
—Passenger Traffic Exceeds 1916

By Harold F. Lane

WASHINGTON, D. C.

THE VOLUME of railroad freight and passenger traffic throughout 1921, with the important exception of grain, has naturally reflected the general business depression; the effect of the decreased traffic has also shown itself in many of the statistics which are commonly used to measure railway performance.

So far as freight traffic is concerned the railroads in 1921 lost five years of growth, the volume of freight business for the year having fallen below that for 1920, 1919, 1918, 1917 and 1916. In the case of passenger traffic 1921 was somewhat ahead of 1916. While the ton-mile statistics are available only for the ten months ending with October—except as it is possible to make estimates for November based on incomplete returns—a current index of the amount of freight business handled by the railroads is afforded by the weekly report compiled by the Car Service Division of the American Railway Association showing the number of cars loaded with revenue freight during the week subdivided into groups of the principal commodities. These reports are available in about 10 or 12 days from the close of the week, whereas ton-mile figures are not available for some weeks after the close of the month. Moreover, the weekly reports show fluctuations which are not shown in the monthly reports and the car loading figures give the division by commodities which is not otherwise available except in quarterly reports.

The car loading figures are, however, less exact than the tonnage and ton-mile statistics because the average carload

is subject to variations; during 1921 it has averaged between one and two tons less than in 1920. Measured by the number of cars loaded, freight traffic in 1921 has been only about 13 per cent less than in 1920, the record year. However, the ton-miles for the first ten months of the year show a decrease of 23 per cent as compared with 1920. Passenger traffic shows a reduction of about 20 per cent.

RAILROAD FREIGHT TRAFFIC fell about 23 per cent below that of the record year 1920; and was less than for any year since 1915.

Passenger traffic less than for any year since 1916; about 20 per cent less than in 1920.

Effect of reduced traffic is shown in reduced miles per car per day, car load and train load.

Car surplus existed throughout year, reaching record-breaking figure of 507,000 cars on April 8.

Car Loading and

Ton-Mile Statistics

Up to December 17 the number of cars loaded with revenue freight was 38,716,335, as compared with 44,613,864 for the corresponding period of 1920. The total for the year, therefore, may be estimated at approximately 40,000,000 as compared with 45,237,941 in 1920, 42,180,328 in 1919 and 44,655,041 in 1918. The car loading figures for the railroads as a whole were not compiled before 1918. The net ton-miles, which are shown in the accompanying charts and tables compiled by the Bureau of Railway Economics, show a greater decrease as compared with 1920 than is shown by the car loading figures. For the ten months, January to October, inclusive, the total net ton-miles for the current year were 289,634,000,000, as compared with 376,760,000,000 in the corresponding ten months of 1920, a decrease of 23 per cent. The reduction in traffic has been greater than that indicated by the car loading due to the fact that for varying reasons the average car load was less in 1921 than in 1920.

The revenue ton-miles and passenger miles by months for recent years have been as given in the following table:

The car loading by months, by the principal groups of commodities, is shown in the second table compiled by the Car Service Division:

Trend of Freight Traffic

On the chart showing the trend of the ton-mile figures the line for 1921 has been below that for each of the last five years throughout the year, and it crossed the 1916 line only at two points, representing May and October. The car-

loading was in the week of October 22, when the total was 962,292 cars, or about 5 per cent less than the 1920 peak of 1,011,666 cars. Since that time there has been a rapid decrease. Coal production per week, which heretofore has reached as high as 12,000,000 and 13,000,000 tons in the latter part of the year fell back to a little over 7,000,000 tons, which is about the average for April. For the week ending December 17 the total car loading had fallen to 727,332, which was 75,268 less than for the corresponding week of 1920 and 79,731 cars less than for 1919.

The deeper "valleys" shown in the car loading chart gen-

NET TON-MILES—BY MONTHS

CLASS I RAILWAYS—UNITED STATES

Month	1916	1917	1918	1919	1920	1921
January	32,652,616.000	27,619,867.000	30,352,685.000	34,764,807.000	29,824,191.000	28,389,000.000
February	28,386,351.000	29,678,260.000	25,625,783.000	32,695,352.000	24,113,294.000	26,825,588.000
March	31,674,619.000	37,706,100.000	37,061,000.000	29,123,675.000	26,825,588.000	25,578,883.000
April	30,163,818.000	34,279,893.000	37,992,810.000	28,759,160.000	28,530,657.000	28,218,768.000
May	27,691,982.000	38,552,223.000	37,506,933.000	32,567,778.000	37,902,007.000	38,157,869.000
June	28,737,016.000	38,477,863.000	37,667,517.000	32,271,433.000	38,157,869.000	38,412,404.000
July	30,409,037.000	37,137,163.000	39,347,137.000	35,214,224.000	40,450,994.000	37,458,630.000
August	34,231,761.000	36,044,333.000	40,776,125.000	36,525,943.000	42,706,838.000	30,841,958.000
September	33,131,238.000	35,469,005.000	39,579,023.000	39,015,351.000	40,999,843.000	30,821,944.000
October	36,164,923.000	38,224,033.000	39,842,297.000	40,549,232.000	42,562,687.000	36,506,565.000
November	34,929,276.000	36,434,612.000	35,564,236.000	32,750,629.000	37,458,630.000	34,722,365.000
December	32,680,284.000	31,960,171.000	33,639,389.000	33,668,668.000	34,722,365.000	.....

REVENUE PASSENGER-MILES—BY MONTHS

CLASS I RAILWAYS—UNITED STATES

Month	1917	1918	1919	1920	1921
January	3,101,995.000	3,479,000.000	3,501,000.000	3,358,000.000
February	2,905,442.000	3,169,000.000	3,174,000.000	2,839,000.000
March	3,378,231.000	3,443,853.000	3,539,902.000	3,056,000.000
April	3,371,015.000	3,466,195.000	3,551,811.000	2,832,811.000
May	3,691,058.000	3,649,431.000	3,769,702.000	2,969,406.000
June	3,924,525.000	4,150,578.000	4,149,434.000	3,214,806.000
July	4,037,083.000	4,528,608.000	4,785,323.000	3,637,499.000
August	4,375,695.000	4,771,981.000	4,988,015.000	3,622,959.000
September	3,965,260.000	4,218,446.000	4,294,118.000	3,291,452.000
October	3,201,992.000	3,872,391.000	3,761,875.000	.....
November	3,068,533.000	3,549,294.000	3,518,107.000	.....
December	3,752,798.000	3,620,183.000	3,807,165.000	3,640,548.000	.....

*Not available by months

loading chart shows, however, the 1921 line above that for 1919 at several points and during the week of October 22 it approached very closely to the 1920 line.

Traffic was considerably stimulated during October by the anticipation of a possible railroad strike which led to some stocking up, particularly of coal. The peak car loading

erally represent weeks which include holidays, although the one for April 16, 1920, indicates the low point of loading at the time of the switchmen's strike and the August 13, 1919, depression represents the loss of loading at the time of the shop crafts strike. The sharp falling off in the latter part of 1919 also represents to some extent the coal strike

COMMODITY LOADING BY CALENDAR MONTHS, 1921-1920-1919

	Grain and grain products			Live stock			Coal			Coke			Forest products		
	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
Jan.	177,222	161,156	176,992	139,455	151,684	172,498	741,153	824,597	804,867	34,268	42,859	Inc. in coal	200,070	244,439	225,351
Feb.	147,874	141,425	126,325	113,007	116,602	133,548	594,287	720,163	570,496	35,826	39,825	Inc. in coal	213,314	240,372	226,658
March	164,077	148,531	160,724	117,880	129,890	129,992	576,753	827,078	631,592	28,167	53,491	Inc. in coal	276,854	291,387	250,527
April	145,041	118,663	163,235	119,240	114,314	127,492	553,716	688,129	637,140	20,076	44,876	Inc. in coal	206,615	265,316	233,440
May	161,132	130,641	140,460	111,416	127,266	121,611	658,022	713,029	682,090	21,622	44,801	Inc. in coal	207,598	264,882	231,253
June	181,081	149,534	136,947	121,752	124,800	122,278	696,313	838,934	778,707	21,065	51,300	Inc. in coal	221,570	268,005	271,205
July	139,856	150,430	199,551	104,223	109,734	127,580	634,099	843,280	840,520	17,056	51,275	Inc. in coal	18,077	242,681	262,052
Aug.	260,877	184,822	211,665	123,398	128,862	130,832	609,192	936,018	790,192	19,874	66,750	Inc. in coal	207,546	387,300	272,304
Sept.	29,518	187,691	104,189	139,596	135,762	152,660	705,830	865,696	877,871	21,408	67,463	Inc. in coal	201,248	266,594	274,381
Oct.	204,976	122,470	184,213	148,266	146,486	177,314	792,609	968,613	962,533	26,184	69,177	Inc. in coal	209,965	259,889	257,872
Nov.	164,652	151,808	173,705	136,589	151,204	175,821	669,235	934,625	500,724	28,034	62,970	Inc. in coal	211,662	231,837	248,016
Dec.	156,309	170,962	.....	126,634	161,226	.....	.....	954,567	766,161	.....	58,589	46,062	.....	207,750	235,739
Total	1,853,290	2,048,968	.....	1,557,238	1,732,852	.....	20,114,739	3,879,883	.....	653,326	225,517	.....	3,072,342	2,988,807	.....

COMMODITY LOADING BY CALENDAR MONTHS, 1921-1920-1919

	Merchandise L.C.I.			Miscellaneous			Total		
	1921	1920	1919	1921	1920	1919	1921	1920	1919
Jan.	37,400	45,479	64,977	594,010	601,731	Inc. in misc.	1,032,132	1,334,566	1,822,789
Feb.	.....	14,439	65,116	740,996	552,309	Inc. in misc.	87,440	1,260,693	1,625,220
March	79,160	71,927	66,16	933,563	743,542	Inc. in misc.	1,043,666	1,553,108	1,889,731
April	49,000	31,393	94,61	803,059	645,437	Inc. in misc.	1,024,636	1,248,497	1,853,456
May	106,370	81,661	87,866	901,845	670,064	Inc. in misc.	1,026,631	1,441,010	1,796,439
June	190,883	214,997	89,614	947,161	719,517	Inc. in misc.	1,106,764	1,549,670	2,010,368
July	131,005	4,35	10,77	879,383	749,824	Inc. in misc.	1,077,777	1,429,446	2,142,365
Aug.	14,006	71,000	11,738	968,747	911,741	Inc. in misc.	1,237,000	1,403,882	1,631,110
Sept.	115,000	147,571	88,461	971,577	885,597	Inc. in misc.	1,348,816	1,434,034	1,709,921
Oct.	29,441	9,911	1,811	942,111	907,730	Inc. in misc.	1,047,141	1,311,908	1,490,847
Nov.	131,000	188,111	161,34	951,999	840,667	Inc. in misc.	1,080,006	1,254,531	1,586,097
Dec.	.....	67,266	13,943	814,096	660,109	Inc. in misc.	.....	1,065,666	1,430,892
Total	1,848,815	1,99,989	.....	8,081,151	3,165,611	.....	16,546,037	21,201,811	.....

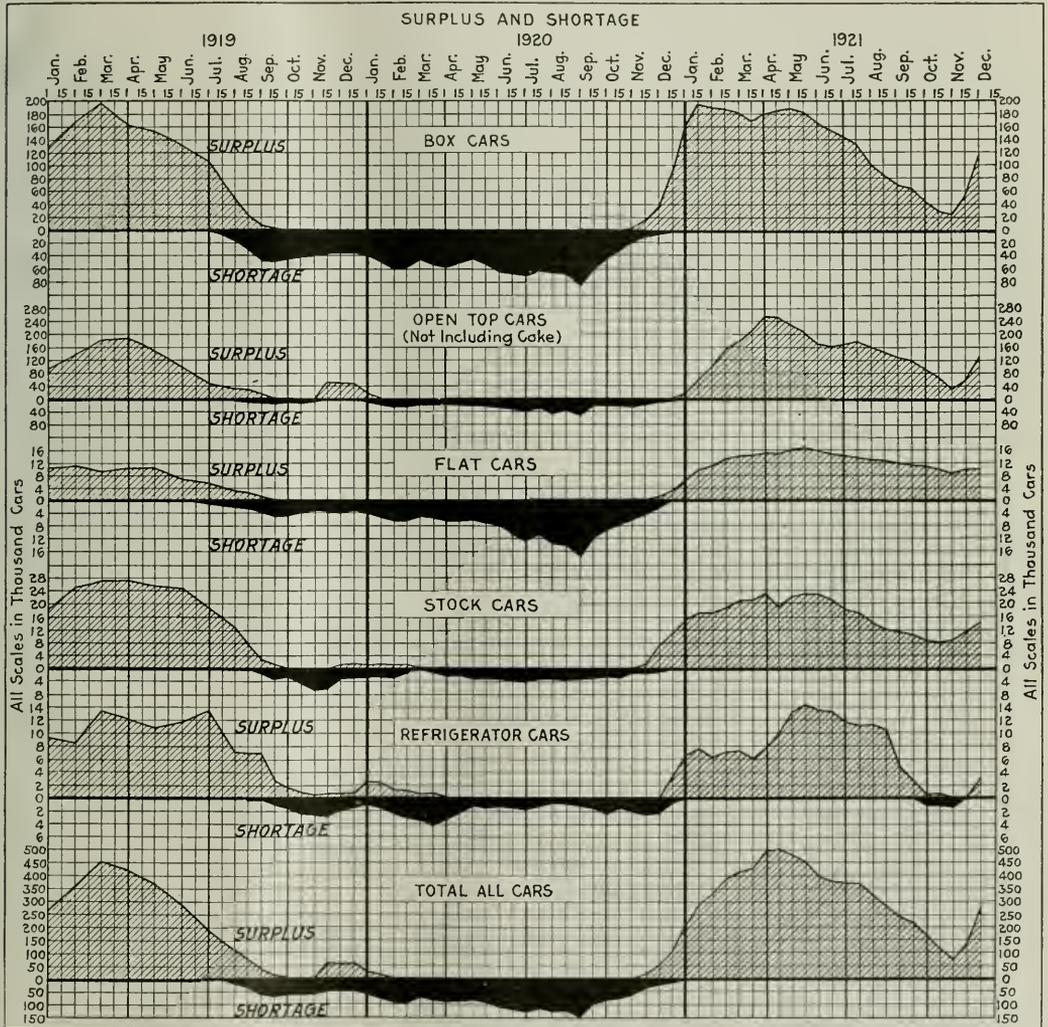
*Detail for Michigan Central not shown, 23,186 and 10,776 included in totals—56,962 included in total for year. Figures compiled from weekly reports ending Saturday. Figures shown are for calendar 1920 unless otherwise specified. Loading averaged for such days in weeks that occur in different months.

of that year, although the demand for transportation at that time was such that the shortage of coal tonnage gave an opportunity for an increased traffic of other kinds of freight.

The Car Service Division has recently been publishing a weekly information bulletin containing each week a number of charts and diagrams accompanied by text illustrating some phase of the transportation situation.

The series of charts showing the trend of the classified

the harvesting of the new crop began in July, and the regularly heavier loading of l.c.l. merchandise. The former is generally attributed to the rapid marketing of this year's crop by the farmers, and the latter to the tendency in 1921 to do business in smaller units than in the previous year. The other outstanding feature of these charts is the marked decline in 1921 of the loading of coal, coke and ore, none of which have at any time approached the totals reached



commodities in 1920 and 1921 displays, with the exception of the switchmen's strike period in April, 1920, a remarkable degree of uniformity in respect to the extent to which the total loading of all commodities in 1921 is below the figure for the same period of 1920. That uniformity of trend as to the total revenue freight loading does not obtain with respect to each classification, however.

Concerning these charts, the outstanding features are the heavier grain loading in the present year, particularly since

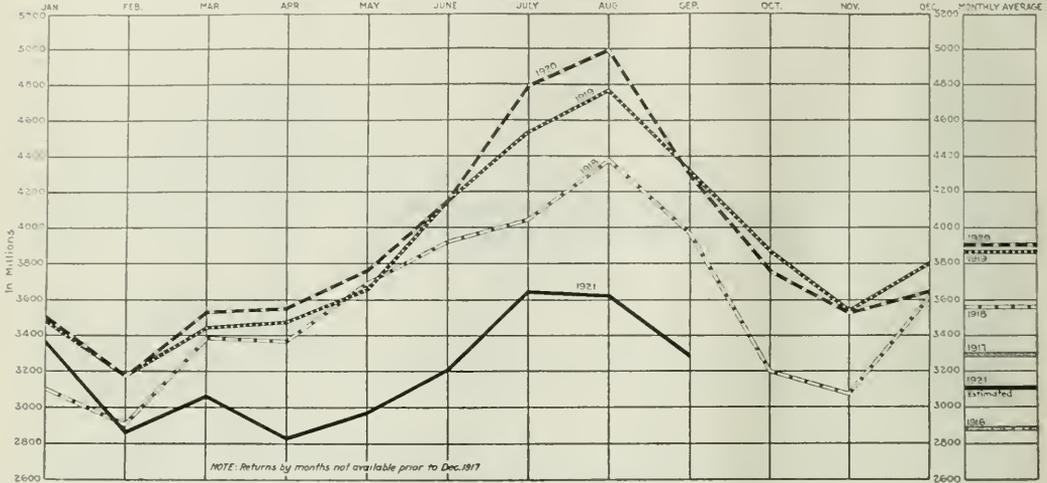
in the previous year. It will be noted that the grain loading has been above that for 1920 ever since the first of April and the loading for the year has broken previous records. The live stock movement follows closely that of 1920.

The maximum and minimum records of agricultural commodities reflect the usual seasonal variations. Extraordinary conditions have frequently contributed to these high and low records of other commodities. Thus, the records on coal loading reflect the periods of greatest demand in anticipation

of, and greatest loss of production during, the bituminous coal miners' strike of November and December, 1919. The maximum records of coke and ore, basic commodities in iron and steel manufacture, were reached when the industrial boom of 1920 was about at its climax; the minima of these commodities is in the period of great depression in the iron and steel industry during 1921. The heaviest loading of

1915-1921 (ending November) inclusive, shows in a very emphatic way the comparative stabilization of production in the anthracite industry and the lack of stabilization of production in the bituminous industry. The marked valley in bituminous production usually reached in April, or thereabouts, reflects the gradual discontinuance of winter demand, the termination of the coal contract year on March 31, and

REVENUE PASSENGER-MILES — UNITED STATES — CLASS I RAILWAYS



forest products was early in 1920 before the dislocation of transportation which resulted from the switchmen's strike of that year; the low figure occurred at the very beginning of 1921 before the rehabilitation of the building industries had fairly begun.

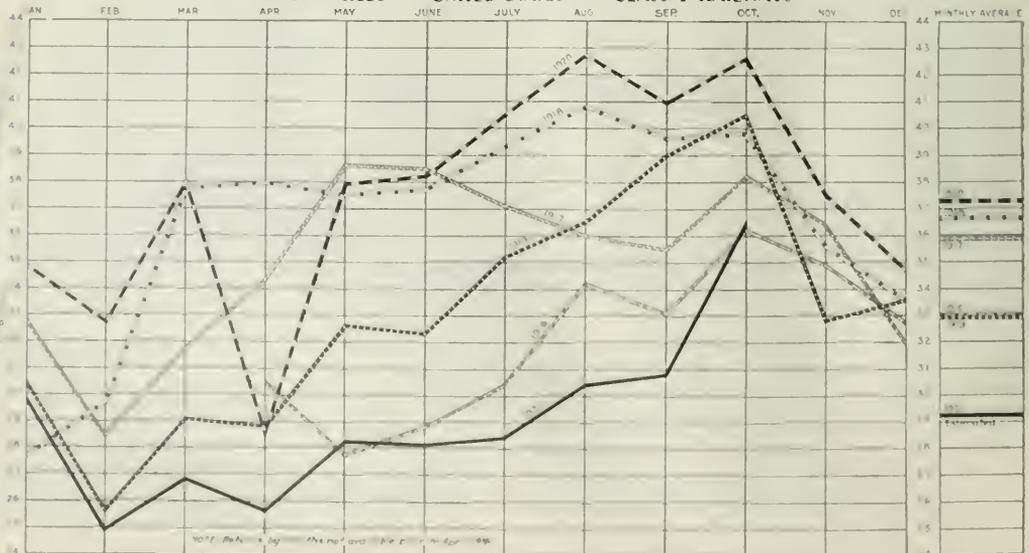
The chart showing monthly production of anthracite and bituminous coal and of beehive coke for the calendar years

the termination of the labor contract period on the same date with labor disturbances in consequence, at times.

Coal Production

The marked depression in the bituminous production in late 1919 was the result of the bituminous miners' strike beginning November 1 that year, while the marked depres-

NET TON-MILES — UNITED STATES — CLASS I RAILWAYS

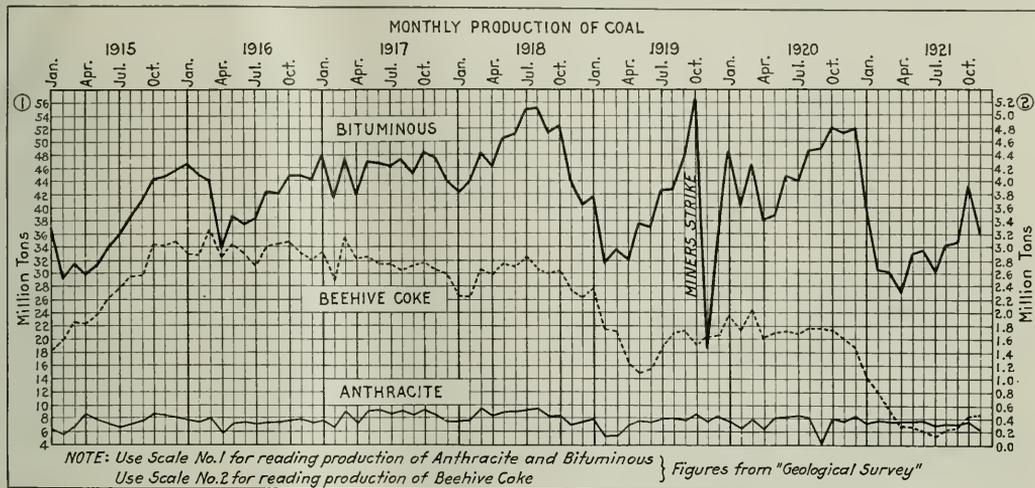


sion in anthracite production in August to October, 1920, was the result of the anthracite miners' strike during that period. The post-armistice depression of 1918-1919 accounts for the great falling off in bituminous production at that time and the existing industrial depression accounts for the low figure since December, 1920, which persisted throughout the year except when in October an increase resulted because of apprehension of labor disturbances on the railroads.

The outstanding feature of beehive coke production, as

of the current year, but the great loss of export coal trade is also a factor.

The relative increase of business in the southern district is accounted for by the fact that lumber loading in that territory has not suffered to as great an extent as in other districts, while contemporaneously certain of the non-union coal producing sections of the southern district have been working very regularly and in some weeks making record production, while in other districts coal loading has been



shown on the chart, is the gradual decline from 1916. This is, of course, most marked in the two periods of depression already noted, but the general trend results from the gradual displacement of the beehive coke by by-product coke which began during the war period and is quite naturally more pronounced during periods of industrial depression.

The circular diagrams show at a glance the extent of participation by the railroads in each of the seven specified districts in the revenue freight business of 1921 as compared with 1920. In a general way these statements reflect the

very severely depressed. The figures for the three western districts reflect the increased grain loading since mid-summer 1921, but the beneficial effects thereof have been considerably overcome in the northwestern district by the great decline in ore loading. These diagrams cover the year to November 19.

Ratios of Operation

The effect of the light traffic during 1921 is reflected in the various ratios of operation as shown in the table com-

MONTHLY SUMMARY OF RATIOS OF OPERATION, UNITED STATES—JANUARY, 1917, TO OCTOBER, 1921

Month	Car-miles per day					Tons per car (revenue and non-revenue)					Percentage of unserviceable freight cars				Per cent loaded to total car-miles				Percentage of unserviceable locomotives				
	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921	1919	1920*	1921
January	25.3	18.3	21.4	22.8	23.2	26.4	29.6	29.0	28.3	30.2	5.6	5.1	6.0	6.6	8.7	70.1	70.0	66.2	70.9	57.5	25.8	25.7	24.3
February	23.9	22.0	20.3	22.3	21.3	26.1	28.4	27.7	28.3	28.4	5.5	5.2	5.6	6.5	9.7	71.5	70.9	67.5	72.0	61.1	26.7	26.1	24.8
March	25.6	24.9	20.4	23.8	20.9	26.4	28.1	27.6	28.3	27.2	5.4	5.0	5.6	7.0	10.8	70.8	71.4	68.1	72.3	63.3	27.5	25.9	23.6
April	27.4	25.9	21.0	19.4	20.6	25.6	29.4	27.3	28.6	26.9	5.8	5.1	6.4	6.5	12.3	71.6	68.0	68.1	68.3	63.9	27.5	26.2	23.9
May	29.0	26.4	22.8	24.2	21.3	26.7	27.7	27.7	28.3	27.8	5.6	5.4	7.3	6.6	13.6	70.1	66.8	67.4	71.2	63.5	27.0	24.5	23.3
June	28.4	26.8	23.0	25.0	22.0	27.8	28.3	27.5	29.0	27.7	5.6	5.9	8.1	7.0	14.4	68.7	66.8	67.9	69.5	63.3	26.9	23.8	23.3
July	28.3	26.5	24.1	26.1	21.6	27.1	30.1	27.8	29.6	27.5	6.0	6.9	8.7	7.2	15.4	67.9	64.7	68.0	67.8	63.3	26.8	23.9	23.5
August	27.1	26.0	24.2	27.4	22.7	27.9	30.1	28.0	29.8	27.4	6.0	6.6	9.2	7.1	15.4	68.7	67.6	70.4	68.2	64.3	27.2	23.3	23.5
September	26.6	26.8	26.5	28.1	23.8	27.0	29.7	28.3	30.0	27.1	5.8	6.2	8.5	7.2	15.4	70.0	66.9	69.6	67.0	65.2	26.3	23.3	23.3
October	26.3	26.2	27.3	28.5	26.8	27.7	29.7	28.0	29.9	27.2	5.6	6.0	7.4	7.3	14.8	71.5	67.9	68.4	66.0	66.2	26.5	23.2	23.1
November	26.2	24.6	23.3	26.8	...	27.2	29.5	26.2	30.5	...	5.2	5.6	6.3	7.5	...	71.0	67.1	71.3	63.2	...	27.0	23.2	...
December	21.3	22.8	22.3	24.8	...	29.2	29.8	27.7	31.2	...	5.2	5.8	6.2	7.9	...	70.9	65.9	71.1	60.3	...	27.1	23.5	...
Total	26.1	24.9	23.1	24.9	...	27.0	29.1	27.8	29.3	...	5.6	5.7	7.1	7.0	...	70.2	67.7	68.7	67.9	...	26.9	...	...

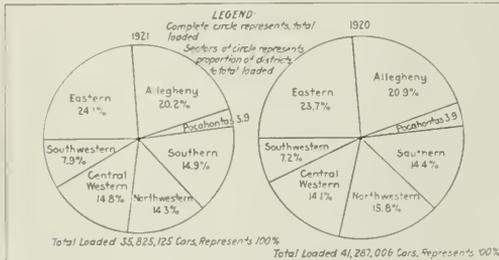
*Data for November to December, 1920, subject to change.

existence of conditions peculiar to the several districts. Thus, for instance, in the eastern district, merchandise, i.e., forms a very considerable portion of the total loading and the increase in the proportion of business handled in that district in 1921 results largely from this fact. In the Allegheny and Pocahontas districts the decline is accounted for by the depression in the coal and iron and steel trades, both of which have suffered considerably in the business depression

piled by the Bureau of Railway Economics. During 1920, when the railroad facilities were taxed to handle the business offered them, a campaign was made to increase the miles per car per day and the tons per car. The railway executives set as a mark to try to attain 30 miles per car per day and 30 tons per car and intensive efforts were made among the railroad forces and among shippers to try to reach those figures. The mark set for car mileage was not attained,

although an average of 28.5 was reached in October, but with the falling off in traffic these figures were naturally reduced, not only because of the lessening of the pressure but also because the number of idle cars tends to decrease the average.

The mark of 30 tons per car was attained in 1920 in September and again in November, 1920, and January, 1921, but since February the average has been less each month than it was in the corresponding month of 1920 and has remained between 27 and 28 most of the time. The great decrease in the coal traffic, which loads heavily, and the



Revenue Freight Loaded—Cumulative, January 1 to November 19, Inclusive

increase in the volume of l.c.l. freight this year have tended to reduce the average, although the unusually large volume of grain traffic would tend to increase it. The reduction in the average car load must be attributed primarily to the reduced pressure as the available supply of cars has increased.

For the ten months for which the Interstate Commerce Commission reports are available, the car miles per day averaged 22.4 as compared with 24.9 in 1920; the net tons per loaded car averaged 27.7 as compared with 29; the net ton miles per car day 393 as compared with 499 and the net tons per train 656 as compared with 715. The net ton miles per mile of road per day averaged 4,086 as compared with 5,320. With the lighter train loading the train speed has increased from 10.5 to 11.5 miles per hour. The average haul of freight has shown no appreciable change. This figure is available only for nine months. The average miles per revenue ton per road averaged 186.67 as compared with 186.48 in 1920.

Car Surplus

There has been a freight car surplus throughout the year. The car shortage of 1920 began to give way to a surplus of cars about the first of the year and by April 8 the surplus had reached a new high record at 507,000. From that time on the surplus was rapidly reduced, however, and by November 1 had fallen to 80,203 cars. Since then the surplus has been rapidly increasing each week and for the week ending December 15 was 371,221 cars, including 138,214 box cars and 186,508 coal cars.

The chart shows the surplus and shortage of freight cars, classified, during the calendar years 1919, 1920 and 1921 (to December 1) inclusive. Generally speaking, any consequential shortage or surplus of all freight cars during this period affected all classes of freight cars, but not, however, in the same degree. Thus, while the maximum shortage of all cars during this period was about 50 per cent of the maximum surplus of all cars, in the same period, the percentage relation in the case of box cars is about 40 per cent, and in the case of open top cars only about 20 per cent. In flat cars, on the other hand, the maximum shortage just about equalled the maximum surplus and it is also of interest to note that the shortage of flat cars persisted for a longer

period than was the case in any other class of freight equipment. The stock and refrigerator car shortages have seldom been sufficiently pronounced to produce any considerable net shortage of these classes of cars, while the surplus in both cases has been particularly marked.

The temporary surplus of all cars in the fall of 1919 and early 1920 is for the most part a reflection of the decreased demand for open top and refrigerator cars at that particular time. The decreased demand for open top cars was the result of the bituminous coal miners' strike. With respect to refrigerator cars it was the normal seasonal decline in movement.

The traffic of 1921 has been handled not only with less cars in existence than in previous years but also with a large percentage of the cars out of service awaiting repairs. According to the latest report of the Interstate Commerce Commission the number of freight cars owned was 2,341,757 as compared with 2,365,122 in 1920, and the percentage of bad order cars has reached as high as 16, although there has recently been some reduction.

Passenger Traffic

The passenger traffic in 1921 has been about 20 per cent less than in 1920 and has been less than in the four previous years for which the monthly figures are available, since about February 1, when the passenger miles fell below that for 1918. While many people have attributed the decrease in travel to the increase in passenger fares, railroad officers insist that it has merely been a natural accompaniment of the general business depression, since so large a proportion of railroad passenger traffic is for business purposes.

The average journey per passenger, during the nine months of 1921 for which the statistics are available, averaged 36.45 miles per road as compared with 38.29 in 1920. The number of revenue passengers per car fell from 20.28 to 16.84.

THE LOUISVILLE & NASHVILLE in the year 1920 and the first nine months of 1921—twenty-one months altogether—killed on its tracks enough live stock to supply a city of 25,000 population with meat for almost two years. The loss incurred was about \$750,000. These facts are stated in a circular which has been issued to employees.



Courtesy, American Railway Union

On the Peking-Kalgan, China—Great Chinese Wall in Background



The Regulation of Securities Under Section 20a

An Analysis of the Decisions in a Wide Variety of Cases—I. C. C.
to Be Commended

By Roberts Walker

TWO BILLION DOLLARS is the approximate principal amount of securities passed upon by the Interstate Commerce Commission to the present time. The commission's power to regulate securities began on June 28, 1920. At the time of writing, there has been less than 18 months of regulation. Thus the commission has dealt with an average of over \$100,000,000 of bonds and stocks per month. These figures alone indicate the magnitude of the commission's task.

But it is only when these aggregates have been subdivided among the various applicant carriers and among the infinite diversity of their applications that the staggering complexity of the commission's responsibilities becomes apparent. Nearly every carrier in the country, constructed, under construction or hoping to construct, has already been before the commission. Almost every phase of financing has been considered.

Division 4

These matters are dealt with in the first instance by Division 4 of the commission, comprising Commissioners Meyer, Daniels, Eastman and Potter. Their staff, which in June, 1920, embraced some five or six persons, has perforce grown to about 125. The ranking members of this force are: Col. William A. Colston, Director; J. F. Gray, office assistant; C. V. Burnside, legal assistant; G. J. Bunting, accounting assistant; and S. S. Roberts, engineering assistant.

Securities Section: A. Stuard Young, chief, and the following examiners: Pace Oberlin, George H. Gardner, Charles E. Boles, R. H. Jewell, Thos. F. Sullivan, A. Van Meter, A. C. De Voe, J. E. Snider, and Paul E. Loydy.

The staff of necessity includes accountants and other experts in various lines. No small part of the consideration of each case seems to be, judging from statements in the commission's reports and requirements in its orders, an examination of the commission's own files and accounting records, to see whether the applicant carrier has any matters, pending or decided, that might bear upon the application for securities. Besides this research, the commission has before it all the application papers called for by its regulations, and often calls for other data and, presumably, makes some separate examination of the authorities—legal, financial, market, or what not—pertinent to the application. Oral hearings before examiners of Division 4 itself swell the mass of material to be sifted. In view of all this study of each case, the commission's record for celerity in securities applications is wholly praiseworthy. Rate cases are not, perhaps, fairly comparable; there are usually pleadings to be filed and one or more hearings, on a crowded docket, to be held; and yet it may not be unfair to remark that the reports of rate cases show intervals of from two months to two years or more between submission and decision, while the

THE Interstate Commerce Commission in 18 months has passed on securities approximating two billion dollars. It has responded well to the heavy demands upon it.

Experience has shown that federal regulation of securities has not proven as dreadful as many feared it might. Commission regulation has cleared away the atmosphere of suspicion and distrust that has hung over railroad securities.

Relations with the states are still an uncompleted chapter.

average securities case has been decided within one month from its submission.

The Methods of Procedure

It is the commission's usual practice to render a "report" and docket an "order" in each case acted upon. These reports vary from formal perfunctory findings to long, carefully stated reasons for the order to be entered. In examining hundreds of these reports, one is struck by the



lack of stereotyped phrases and by the individual character of each report. These are indications of one excellent policy early adopted by the commission, viz.: to deal with each case by itself and on its own merits. This practice is not novel to bankers; but its prompt recognition by the commission as a rule in acting upon security issues is matter for congratulation. In the reports, however, one phrase is "standard," the substance of which is:

"We find that the proposed issue of bonds (or notes, or stock) is (a) for lawful objects within the corporate purposes of the Overland Railway and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the applicant of service to the public as a common carrier, and which will not impair its ability to perform that service; and (b) reasonably necessary and appropriate for such purpose."

This is the fundamental finding required by clause (2) of Section 20a. Two or three provisions are also common to practically all permissive orders, such as

(a) "Nothing herein shall be construed to imply any guaranty or obligation as to said bonds, or interest thereon, in the part of the United States."

This reflects the substance of clause (8) of Section 20a (Sec. 439, Transportation Act, 1920).

(b) "Except as herein authorized to be pledged, said bonds shall not be sold, pledged, repledged or otherwise disposed of by the applicant, unless and until so authorized by our future order."

This phraseology suitably adapted, occurs in authorities to pledge bonds under note issues or to take bonds into the corporate treasury. The obvious intent is to retain control of all securities up to the moment when the sale thereof to the public is finally authorized. Then, of course, they will become like umbrellas in Roswell Field's famous burlesque of Lord Ellenborough's opinion on property rights in same, and "join the world's great common store of securities, whither the Law will not attempt to pursue them."

(c) "The applicant shall, within ten days, report to us all pertinent facts relating to the issue and sale of said securities and the disposition of the proceeds thereof, etc., such report to be signed by applicant's designated officers and verified by their oaths."

We have not used the precise language of any particular order. The phraseology varies with the needs of the case. Sometimes periodical reports during the sale or exchange of securities are ordered. As may well be imagined, these requirements necessitate that the commission keep an elaborate diary and "tickler" system, so that reports may be called for if they do not come punctually to hand and that the commission's oversight may continue till each authority is exhausted.

The application papers in the various cases will probably never be printed in published volumes. It is a pity that not even the reports and orders thus far made have been printed so as to be available to railroad people, bankers and students, but evidently this division of the commission has been too much engrossed in doing its job to see a book through the press. It is understood that a volume will be before long be issued, as part of I. C. C. reports, containing many if not all of the reports and orders in decided cases.

Relations with the States an Unfinished Chapter

Relations with the states form an unfinished chapter. No one can yet say where the clash with state regulation of securities will end. A case from Texas is in the U. S. Supreme Court, and a case in Michigan will soon be on its way thither. The New York state courts have thus far decided against the state. The language of the statute is clear: "the jurisdiction conferred upon the commission shall be exclusive and plenary, and a carrier may issue securities . . . without securing approval other than specified herein" (1. 7); and provision is made for notice to state commissions, and a hearing, if deemed necessary (1. 6). Yet the Interstate Commerce Commission's first set of regulations (circular letter June 26, 1920) com-

pletely enough contained a requirement that affirmative ap-

proval by state authorities be shown or that its absence be explained. Railroads betrayed a strange reluctance to go near their state commissions in the face of the words "exclusive and plenary," and railroad counsel disclosed an equally odd unwillingness to "opine" on that subject. So the definitive regulations (cir. let., revised), issued under date of September 22, 1920, but in actual practice prior thereto, omitted the troublesome reference to state control. Ever since, the commission has gone to the mat on this point with commendable spunk. For instance:

(a) In the New York Central \$25,000,000 10-yr. collat. bond case (Finance Docket No. 39), decided September 13, 1920, the commission's report noted that notice had been sent to the governors of all the states in which applicant operates. "No objection to the granting of the authority desired was offered on behalf of any of these states except the state of Michigan. Because of an understanding reached between authorities of that state and the applicant, this objection was not pressed before us." In other words, the "differences were accommodated," as President Wilson would say, and the matter was left for court action.

The Big Four Note Case

(b) In the Big Four note case (F. D. 1086; Dec. 22, 1920), the report shows that Ohio and Michigan asked for dismissal of the application, on the grounds that the commission has no jurisdiction because applicant is a creature of Ohio and Indiana, that the issue of securities does not involve a federal question, that the applicant, not being a federal corporation, is not amenable to the federal government as to its securities issues, and that (in Michigan) the state is financially interested because of fees payable to it on securities authorizations. Whereupon the commission dryly remarks:

"It is well settled that . . . carriers . . . in interstate commerce, although organized . . . as state corporations, are nevertheless subject to our jurisdiction. Section 20a . . . confers exclusive and plenary jurisdiction upon us to authorize the issue of securities. . . . A carrier may, under our authority, issue securities and assume obligations or liabilities . . . without securing other approval."

Section 20a provides that it shall be unlawful for a carrier . . . to issue securities, even though permitted by the authority creating it, unless and until, and then only to the extent that, we authorize such issue. Any security for the issue of which our authority is required, is void if issued without said authority having been first obtained. Upon consideration of the answers of the public utilities commissions of Ohio and Michigan, we are of the opinion that we have jurisdiction."

Then follows a statement, common in other reports, that no objection has been offered by the authorities of the other states concerned.

(c) The Chicago & North Western Equipment Trust report is an instance where a state seems not to have contested the commission's general power, but to have wished to manage a particular detail, to wit:

"The Nebraska State Railway Commission suggested that the authority for the issue of these securities be conditioned upon the payment of the trust certificates out of funds derived from the sale of securities and not out of operating revenues. This suggestion is intimately related to the question of proper provision for depreciation which we now have under investigation. It will receive consideration in that connection."

(Readers familiar with the struggles of the Commission, ever since 1906, to express rules on depreciation, will be forgiven if they smile at the thought that the state of Nebraska is to be added to those who are watchfully waiting for the determination of the depreciation policy of the commission.)

Other instances could be cited, all establishing that the commission now asserts and exercises its sole jurisdiction, in supersession of state commissions, over railroad securities.

The matter just discussed doubtless has sound legal foundation. Where the federal government has moved into an area which, by our Constitution, it has a right to control, it will usually be held to have taken entire authority over that area. As an element of the power "to regulate

commerce," this assumption of control of railroad securities should and probably will be held to have ousted the states from such control as they have previously exercised.

The Charter Powers of State Corporations

But there is another cognate matter that is not so clear, viz., whether the charter power of state corporations may be deemed to have been enlarged by Section 20a. The present regulations require that an attested copy of its charter be filed by each applicant carrier, and that carrier's counsel's opinion shall show that the issue "is or will be legally authorized and valid if approved by the commission. In such opinion specific reference should be made to any provisions of the charter . . . upon which special reliance is placed."

The carrier's fundamental law may provide that bonds may not be issued in excess of two-thirds of the outstanding stock, or may not bear more than a stated rate of interest; or may prohibit the issue of convertible bonds; or may otherwise restrict certain financial expedients. Can the commission in effect supplement the charter granted by the state, by permitting the carrier to do that which the state restricts or prohibits? The question has not been settled. From the commission's requirements just quoted, it can be deciphered that the authority granted and limited by the states is deemed of grave consequence (except only as to the exclusive and plenary power to authorize securities issues). But might not "plenary" power include the right to authorize financial programs not countenanced by a carrier's state? The question must some day be answered.

It was dealt with, in a negative way, in the Lackawanna's stock dividend case (where no state authority interposed objection). The commission went comprehensively into the Lackawanna's statutory power. "Whether or not applicant is prohibited from issuing stock dividends by its charters is not clear. Counsel stated that he knew of no provision which would permit such dividends." Relying upon Section 20a, the commission authorized the capitalization of part of the surplus through the declaration of a stock dividend. That is to say, the commission authorized the exercise of a power not expressly granted by state law. But whether, in an equally persuasive case, the commission would go counter to state law, seems not to have been conclusively settled.

The Matter of Valuation

One other general question is in an unsettled state: the matter of valuation. What part is it to play in the regulation of securities? Many have held the theory that valuation would disclose and limit the amount of securities that a carrier could sustain; and that such limitation would hold down rate increases, by minimizing the interest and dividends to earn which rates are, presumably, fixed. But here we are, with scarcely any valuations established, and the commission busily authorizing securities issues. Their reports disclose hardly any cases where valuation is a determining factor. On the other hand, it is plain from their reports that value of property is often taken into account. The lack of basic evidence of value must be a considerable handicap. Book value is sometimes taken into consideration: the Detroit & Toledo Shore Line application, to issue additional stock, was denied on the ground that the evidence did not show that the value of the road and equipment, plus working capital, materials and supplies, exceeded the then existing capital.

In the Lackawanna stock dividend case, the report contains much discussion of expenditures made from surplus. The prevailing opinion (for the case seems to have been heard before the whole commission) contains an express finding that "the evidence establishes . . . that the present capitalization is below the actual investment or fair

value of the property." The surplus on the books was about \$90,000,000, but the commission allowed a stock dividend of only \$45,000,000. Commissioners Daniels and Potter wrote opinions to the effect that, on the commission's own theory, a larger stock dividend and a smaller remaining surplus would have been permissible. (Commissioner Eastman's dissent was on the same ground as in the Burlington case, that capitalization of surplus ought not to be permitted). Thus the commission affirmatively found ample values for the stock dividend permitted or even for a larger dividend; value was conceded, and the real point was how much surplus ought to be left.

In a small application from Pennsylvania, the Williamsport & North Branch, the report recited that the investment of the foreclosed company, as shown by its books, was \$2,000,000, while the proposed securities aggregated \$900,000; and the purchasing committee was allowed to receive these \$900,000 new securities in exchange for the railroad bought by them at foreclosure sale. In the Chicago & Eastern Illinois reorganization (F. D. 1146), the commission virtually allowed the securities because they improved the financial set-up, their report stating:

"Under the plan of reorganization, the total capitalization will be \$91,321,150. The valuation of the property which will be taken over by applicant has not yet been completed, so that it is not practicable to compare this capitalization with underlying value. It is clear, however, that the proposed new capitalization will be relatively lower, even when allowance is made for the properties which are not to be taken over, than the outstanding capitalization of the old company, and that the fixed charges will very materially be reduced, with a subsequent improvement in credit. The evidence also indicates that the new capitalization will not be disproportionate to the earning power of applicant. Under these circumstances, in view of the manifest desirability of ending the long period of receivership, we think that approval ought not to be withheld because of lack of complete information as to the value of the property to be taken over by applicant."

The report in the Kansas, Oklahoma & Gulf reorganization matter states that no evidence was offered as to the value of the property and that it is not now practicable to determine such value, but that in this instance the commission was asked only to give effect to the reorganization plan devised by the late U. S. District Judge William C. Hook. Valuation and its corollary, earning power, have figured in one or two denials of applications for loans under Section 210 of the Transportation Act, 1920. A loan of \$42,250 to a short line railroad was refused because of deficits in net income and of the doubtful earning power and security of the carrier. In another such refusal, the same ground was stated, and the commission seems also to have taken judicial notice of the fact that a railroad built in 1913 would be confronted in 1920 with the period of its heaviest operating expenses.

Generally speaking, however, the commission refrains from mentioning valuation. Whether it will make more of the matter when valuations have more generally been determined, remains for the future to disclose.

Reorganizations

In considering valuation, the subject of reorganization naturally comes to mind. It is elementary, on the theory underlying Section 20a, that a new company should not embark upon business with securities in excess of demonstrable valuation; it is also clear that the effectiveness of the commission's control over railroad securities would be lessened if upon a reorganization securities should be authorized grossly in excess of fair valuation. The commission has had so few reorganization cases before it, that it is unsafe to generalize. The cases of the Williamsport & North Branch and the Kansas, Oklahoma & Gulf, above referred to, contain nothing of special interest, as neither had anything to do with priorities and liens. Those two and the Chicago & Eastern Illinois case, however, do indicate one practice that is of considerable comfort, viz., the focussing of the commission's attention upon the new company and its securities, and limiting its report and order

to the new company's issues. The foreclosed or reorganized company and its securities are left, where they belong, to the court in which the receivership or other proceeding is pending. Hence the commission passes upon the classes and aggregate of the new company's securities, and any special terms, if there be any, connected with the new issues; but has not thus far concerned itself with the basis upon which an old security-holder is to receive new securities under the reorganization plan.

In the Chicago & Eastern Illinois, the commission's report stated that "holders of small blocks of bonds have protested against the plan of exchanging bonds for stock. This is a matter properly to be brought before the court having jurisdiction in the premises, which have expressly reserved the determination of the equities in the receivership proceeding." In the same case, no other mention appears in the report of the basis on which the new securities are to issue. The questions of reorganization expenses, underwriting, etc., seem not to have been raised. The new securities and the assumption of certain old issues are the consideration for the purchase by the new company of most of the mileage of the old company. The commission finds that the aggregate of securities and the annual fixed charges will be less under the plan than they were with the old company's securities. The order requires the new company to file full reports of the issuance of securities, specimens of each type of security, copies of each indenture, etc. A time limit to the authority was fixed, which has been once or twice extended. The details of certain of the securities have been authorized to be changed. These matters are mentioned as indicating that the commission quite properly does not give authorities running too far into the future, but is flexible and reasonable about extensions and changes.

As to the other pending reorganizations of receivership properties, it is understood that the Missouri, Kansas & Texas authority has not yet been formally requested. The Denver & Rio Grande Western (purchaser at the D. & R. G. sale) has received authority to issue shares without par value, but appears to have received no authority as to bonds, nor as to assuming the bonds subject to which it took over the railroad. The report of the commission refers with considerable detail to the court proceedings, objections by stockholders, etc., and finds the Western Pacific holding company not within its jurisdiction under Par. 2 of Section 5 of the Interstate Commerce Act as amended.

Voluntary Refinancing of Roads Not in Receivership

There have been a few cases of voluntary refinancing of roads not in a receiver's hands. The Lehigh & Hudson River Railway Company was authorized to issue and sell \$2,987,000 stock, for the purpose of retiring all its bonded indebtedness. The El Paso & Southwestern Railroad Company was authorized to issue capital stock without par value, in exchange, three shares of new for one of old, for stock with par value then outstanding. The refinancing of the Burlington Joint 4 1/2% as is well known to the business world, was passed upon by the commission in the early months of 1921, and the reissue at Great Northern and Northern Pacific issues authorized to make the refunding possible.

Securities for New Enterprises

With railroad construction so nearly at a standstill, the possibilities for authority to issue the securities of a new enterprise have not been many. Doubtless the commission has had one or two such before it that have never reached the stage of report and order or have been withdrawn. In such cases it also involved a "certificate of public convenience and necessity" under Sec. 402 (I. C. C. Act, Sec. 1, new par. 18). The way in which new enterprises are dealt with will be watched with keen interest. States that have regulated securities have found one of their greatest

difficulties in liberalizing new issues so as to make the program inviting to capital. Texas created a state of affairs where practically all railroad building had to be done by foreign corporations—the very thing the statute sought to prevent—because no reward was in sight for local capital. The old problem of a suitable amount of bonus securities to represent earning power, promoter's profit, or whatever one may call it, seems to remain to be considered by the commission.

Discretion Exercised Upon

Strictly Business Questions

Some hopeful augury may, perhaps, be spelled out from the wide range of authority granted, and of discretion exercised upon strictly business questions. One of the early cases before the commission was the New York Central \$25,000,000 10-yr. 7 per cent bond issue (F. D. 39; Sept. 13, 1920). The Association of Railway Executives was represented by its counsel, and the banker also had such counsel. The commission in a way served notice that consummated trades should not be brought before it for mere ratification, by stating:

"It developed at the hearing that the proposed collateral trust bonds had been sold on August 20, 1920, subject to our authorization. While the law does not prohibit such a conditional sale in advance of approval of an issue of securities, carriers should realize that we shall not be controlled in our action by representations that failure to accord approval of issues conditionally sold will result in disturbance or disarrangement of plans based upon anticipated approval."

But this attitude does not seem to have meant that the commission desires to do any of the trading. It has been interpreted and acted upon as meaning that parties should trade subject to the commission's order, or after the authorization has been granted. Yet the commission is by no means unwilling to keep an eye on the market. In one or two reports, the authorized price is higher than the price stated in the application. This must mean that somebody made a better offer or that the commission ascertained that the price was too low and insisted on raising it. In the New York Central case above cited, the commission's remarks on price, underwriting, commissions, etc., are well worth citing *in toto*:

"The facts in regard to the sale are briefly these: It was made without competition. Applicant dealt only with J. P. Morgan & Company and accepted that firm's agreement to endeavor to form a syndicate to purchase from ourselves and associates at 97 per cent and accrued interest and offer for public subscription at par and accrued interest. If this endeavor proved successful, J. P. Morgan & Company agreed to buy the bonds at 96 5/8 per cent of par and accrued interest, or, in other words, upon a 7 1/8 per cent basis. The 'associates' mentioned in the agreement were eventually the National City Company and the First National Bank of New York. The evidence shows that on August 18, 1920, J. P. Morgan & Company, by wire and letter, invited various dealers in investment securities throughout the country to become members of the syndicate, notifying them of the amounts of their participation, to which they were to signify their assent by 10 o'clock of the morning of August 20 when the subscription books were to be formally opened. Out of 433 dealers to whom the invitation was sent, including J. P. Morgan & Company 433 accepted. The subscription books were closed within two hours of this opening, and there were 6,473 subscribers, 1,000 of whom had not yet paid \$2,333,500, an oversubscription of more than 50 per cent. The evidence shows that the contract of conditional sale between J. P. Morgan & Company and applicant was not consummated until after the first closing of the syndicate on August 20. "The entire cost to the applicant of consummating the issue was the difference between the par value of the bonds and the sale price to J. P. Morgan & Company, this difference being \$8,825,500, this small amount for excess subscriptions, and the earnings of the certificates. J. P. Morgan & Company received as such its net amount of \$11,000,000, which was divided with its associates, and out of which it paid certain incidental expenses, but none of the other expenses of the syndicate. The syndicate members who placed the bonds with investors received from the syndicate for such services a commission of 1 1/2 per cent on all sales, and on the amounts allowed to them and a commission of 2 per cent on the amounts of the placements. After deducting these commissions and the expenses of the syndicate, the portion of the \$50,000,000 remaining was distributed to members of the syndicate in proportion to their allotments. This profit amounted to about 1 1/2 per cent. Out of the 153 syndicate members 26 sold no bonds. The distribution of the \$50,000,000 is shown in the following table:

Gross profit of 1 1/2 per cent	\$7,650,000
One and one-half per cent straight selling commission on	
\$8,500,000	\$375,000
One-half per cent of the selling commission on \$10,000,000	50,130
	411,130
	\$34,870
Legal expenses, advertising, etc.	50,000
Net profit of 1.09948 per cent of \$25,000,000	\$274,870

"It appears that the main items of expense comprising the \$50,000 were approximately \$27,000 for advertising and \$15,000 for legal services.

"Conditions arising out of the war have radically changed the character of the investment market. Evidence was offered to the effect that owing to the heavy income tax the tendency of large individual buyers is to purchase tax-free securities. High returns promised in competing lines of investment deter some investors from investing freely in railroad securities. Higher margins on the placement of certain competing investments also incline distributors to prefer the placement of the latter. The banks, moreover, find it necessary to use their funds chiefly for commercial purposes. To a much greater extent than heretofore railroad securities must, therefore, be sold to small buyers, and this makes necessary more comprehensive and expensive machinery of distribution. Applicant testified that it had no means of effecting such distribution upon its own account, and that it resorted to J. P. Morgan & Company because of that firm's prestige and experience, and established connections with investment houses all over the country. In other words, Morgan & Company acted as middleman between the corporation and the distribution machinery necessary to place so large an issue of securities, and in the opinion of applicant the issue could not have been effected in any other way. Evidence was also offered by representatives of investment houses as to the greatly enhanced cost at the present time of distributing securities, because of increased salaries, higher rents, the necessity of appealing to a wider field of investors, and other factors entering into the conduct of the business.

"We have thought it necessary to set forth in detail the circumstances and cost attending the marketing of the proposed issue, because the assurance of reasonable terms afforded by competitive bids was not present. In saying this we realize that, under the conditions prevailing in the financial world, applicant probably could not have obtained the advantage of open competition; but this fact merely emphasizes the necessity of our considering in this and all similar cases the terms of sale which we are asked to approve. In the present instance, in view of the small financial risk and the apparent ease with which the subscriptions were obtained, we think the discount at which the bonds were sold was liberal. The evidence, however, is not sufficient to justify a conclusion that the cost of floating the issue was such that we ought, under all the circumstances, to withhold approval of the terms and conditions set forth in applicant's petition.

"The subject matter is plainly one deserving of attention, and it is desirable that carriers intending to present applications for the approval of security issues should appreciate that the proposed terms and conditions will be the subject of our careful consideration."

As specimens of prices actually authorized, there may be mentioned: Equipment notes, average maturity $7\frac{3}{4}$ years, at 8 per cent basis; mortgage bonds on a 7.75 per cent basis; 6 per cent bonds with 2 years to run at 90.

The Scope of Authority

As to the scope of its authority, the commission seems to act on the sound theory that if it doesn't assert jurisdiction over everything, it may miss something. This position has brought before the commission quite an assortment of oddments. For instance, the matter of dollar bonds in conversion of sterling bonds under a mortgage and bond issue preexisting federal control of securities. In an Oregon-Washington Railroad & Navigation application, the report said:

"While it is not our intent to find the proposed conversion in substance accomplishes anything more than a change in form of existing liabilities, we are of opinion that the delivery of dollar bonds in exchange for sterling bonds . . . involves an issue of securities within the meaning and purpose of Section 20a of the Interstate Commerce Act."

The same ruling was made in a Union Pacific case and in an Atchison, Topeka & Santa Fe case, the latter involving the feature that the fixed rate of exchange provided in the mortgage resulted, upon conversion, in an increase of obligation of \$26.70 per \$1,000 bond. Even bonds issued into the carrier's treasury, not sold or pledged, must obtain authorization (B. & O. Refunding & General Mortgage bonds, for example. A carrier that had issued, subsequent to June 28, 1920, without commission authority, \$50,000 of promissory notes was given authority to retrace its steps, cancel the guilty notes and issue innocent ones. Refusal to issue bonds to finance a purchase of another railroad has been denied where the purchase had first been made without obtaining the commission's approval. A subordinate refunding operation, the issuance of Rock Island General Mortgage bonds, which can be used only for pledge under and refund into the First and Refunding bonds, receives the commission's approval.

A more burdensome income tax provision was authorized to be inserted into some O-W R. R. & N. bonds; this was another instance of increase of obligation. The issue of stock upon conversion privileges has been permitted to the Southern

Pacific Company, the Atchison, the Norfolk & Western, the Wabash, the Delaware & Hudson and the Chesapeake & Ohio. Fractional bond scrip in such cases has also received formal sanction. The issuance of further preferred stock under a consolidation of corporations made in 1906 was withheld by the carrier until commission authorization had been granted (Chicago & Alton). The New Orleans, Texas & Mexico case may be taken to indicate that the commission does not deem the provisions of a mortgage beyond the scope of its authority. There the mortgage permitted bonds for betterments to be drawn down on the basis or price of not less than \$950 per \$1,000 bond. The commission, however, refused to allow a principal of bonds in excess of the cash actually expended, and cut the application from \$561,800 to \$533,700.

Pledge of Bonds for Short-Term Notes

Railroads with treasury bonds often wish to pledge them for short-term loans. The loans (if they do not overrun the two year and 5 per cent limitation of paragraph 9 of Section 20a) do not require commission authority. But the pledge does. The commission has granted a number of permissions of this sort, and has changed some of them from time to time to fit bond market conditions. In a Rock Island case, the authority first granted was to pledge not over a stated par amount of bonds per each \$100 of loan. Later this was changed to permit not over \$125 of bonds at market value to be pledged per \$100 of loan. This, as will be observed, is the wholly familiar rule of maintaining "margin."

With the recent improvement in the bond market, sensible provisions like these have resulted in lessening the amount of bonds to be pledged per \$100 of loan, but of course would operate the other way if the bond market were getting weaker. General permissions to pledge bonds have been given to the B. & O., the Frisco, the Illinois Central, the L. & N. and a number of other carriers, not to mention specific authorities to many carriers of issues of collateral notes.

We have seen the commission's attitude on stock dividends in the Lackawanna case where, roughly, half of the dividend asked for was allowed. The Burlington application for leave to declare a bond dividend had even harder sledding. Six opinions were written by as many commissioners, and the prevailing opinion was careful to limit the scope of the refusal of permission, in these words:

"No one questions the right of owners to compensation for sacrifices made in foregoing dividends. The denial in this case extends only to the issuance of a bond dividend by a railroad which has no need for the bonds, and which can advantageously issue all the stock reasonably required for its needs. The more adaptable form of mortgage which the applicant desires can be provided without the issuance of a bond dividend."

There is an echo here of the argument that the rule should be "fewer bonds and more shares." Commissioner Eastman, in both the Lackawanna and Burlington matters vigorously dissented. He believes that "undercapitalized railroad corporations are a source of strength to the nation, and they are all too few."

Stock Issued at Less Than Par

It is an interesting thing that Section 20a puts the emphasis on value, rather than on par value. There is nothing in the section to indicate that stock may not be issued, in a persuasive case, at less than par. No square instance has been found, but the commission has the right to consider the carrier's charter and, if it interpose no difficulties, to authorize stock to be sold below par. The treatment of an issuance of investment preferred stock, should such be brought before the commission, would demonstrate the commission's attitude, in case, as often happens, there were a sale price below par or a banker's commission that brought the net proceeds below par.

Other Activities

The scope of this article does not embrace the other activities of Division 4. Among such are the consideration of proposed abandonment of lines of railroad, applications for loans from the United States, applications for certificates of convenience and necessity to construct new lines, and leave to hold directorships on more than one board. As evincing the efforts of the commission to be helpful, however, attention is called to F. D. 2, decided Nov. 22, 1920, as to loans to carriers by the United States. The commission there held that inability to procure funds elsewhere, within the meaning of Sec. 210, does not mean an absolute inability, but a practical inability within the sound business discretion of the commission with a view to the public interests involved, and to determine on the facts of each case.

Two good illustrations of permission to trunk lines to acquire shorter lines are afforded by the Minneapolis, St. Paul & Sault Ste. Marie application to buy, with its bonds and some cash, the Wisconsin & Northern (F. D. 1288) and by the application of the Chicago, Milwaukee & St. Paul for leave to acquire control of the Chicago, Terre Haute & Southeastern by lease and purchase of capital stock (F. D. 1383).

Conclusion

The conclusion of the survey must be that on the whole, general regulation of securities is not so dreadful as many feared that it might be. It is fortunate that the power began to be exercised at a time when difficult financial conditions were not peculiar to this or that carrier, but were conceded almost universal. The commission has responded well to the demands upon it, and has done its best to facilitate financing.

In no carping spirit, we may be permitted to remark that some of the commission's past pronouncements gave no

promise of any such breadth of vision. Its earlier reports on investigations of the financial conditions of carriers might have been written by doctrinaire professors or by prosecuting attorneys, so little some of them contained of judicial poise and of appreciation of the other fellow's problems. Only those who have worked years endeavoring to carry along a handicapped enterprise can realize how nearly all the financing was done under stress of dire financial conditions and how little of it, if any, was done with any purpose to deceive investors or injure the public. Yet the latter theory was usually the underlying thought of the commission's old reports. In the Frisco investigation, for instance, there was criticism because bonds were sold in the face of known insolvency. Recently, on the other hand, the commission authorized the Central Vermont to renew obligations for the purpose of averting receivership. There may have been differences between the two cases, but their spirit is identical. Each carrier was seeking to patch a rent. Verily, responsibility does sober public men.

To cite the Frisco report again, it maintains throughout an attitude toward bond discounts that would lead any student to believe that the commission deemed them somehow heinous. Yet, since Section 20a went into effect, the commission has unblinkingly authorized many bond discounts, and prices of 90 and even 80 have not been unheard of. All these point to a great improvement in the public attitude toward railroad securities. The commission's regulation of them and of other carrier activities, may not make the securities intrinsically worth any more, but at least it has cleared away the atmosphere of suspicion and distrust that had hung over railroad securities, arising, no doubt, in some degree from the commission's own public attitude in securities matters passed upon by it. Let us hope the new attitude will work well for carrier finances.

General Railroad Developments During the Year

(Continued from page 13)

of the Transportation Act by a prediction that the condition of the railroads would be improved in the future.

Roads Propose Cut on Agricultural Products and Ask General Investigation

The railroads failed to file the new grain tariffs and the executive committee of the Association of Railroad Executives held a conference with the Interstate Commerce Commission on November 12, the nature of which was not disclosed. As a result, however, the roads at a meeting in New York on November 15 announced their intention of asking the commission to reopen the western grain case to allow them to substitute a general 10 per cent reduction for six months on agricultural products except in New England, and to make a general investigation as to whether any further reductions in rates could lawfully be ordered in view of the financial condition of the carriers.

Commission Orders Rate Investigation

Before the petition was actually filed the commission issued a formal order in the grain case that the reductions be made on or before December 27; on the day that it was filed, November 23, the commission issued an order for a general investigation to determine whether and to what extent, if any, further general reductions in rates can lawfully be recommended by order of the commission. The commission did not refer to the carriers' petition. It did issue a notice refer-

ring to various petitions that had been filed by various interests asking the institution of investigations more or less general in scope, with a view to effecting reductions in rates on various descriptions of traffic, and also to the proposal of the carriers for a 10 per cent reduction on agricultural products. It was also stated that the order was along lines under consideration by the commission for some time past. On November 29 it was modified to include the question as to what percentage will constitute a fair return after March 1, when the 5 1/2 per cent figure provided in the law expires.

On December 3 the commission responded to the request for permission to file the 10 per cent tariffs and on December 9 it announced that the petition for a rehearing in the grain case would be set for oral argument on December 14 at the opening of the hearing on the general investigation. At the hearing the railroads asked that the grain order be suspended for six months, but on December 16 the commission denied the petition for a rehearing which put it up to the roads to make both the 10 per cent general reduction and the still greater reduction on hay, grain and grain products west of the Mississippi river.

The hearings in the general investigation began on December 14, the first week being given over to the testimony on behalf of the railroads, after which an adjournment was taken to January 11. The prospects of the railroads for the new year, therefore, are largely dependent upon the conclusions which will be reached by the commission as a result of its investigation.



Union Station, Baltimore—Photo by Ewing Galloway

The I. C. C. Regulation of Security Issues

All Issues Since June 27, 1920, Have Been Subject to Approval by the Commission

By Harold F. Lane

ONE OF THE NUMEROUS new conditions created for the railroads by the passage of the Transportation Act of 1920, under which they were returned to private management, was that authority had been given to the Interstate Commerce Commission to regulate their issues of securities.

There had been much agitation for many years for some such regulation, arising mainly from the disclosures of some of the methods of high finance which were made in various investigations of financial scandals. In many cases these investigations merely resulted in additional publicity and an official location of the responsibility for transactions that had been carried on quite openly and without much criticism until they turned out badly. The demand for laws to make their recurrence impossible in the future led to the appointment of the Railroad Securities Commission in 1910 to make recommendations. At hearings before this commission, many representatives of the railroads welcomed the idea of federal regulation on the subject as a substitute for the regulation by various states which had attempted to deal with the subject with varying degrees of intelligence and a total absence of uniformity. The railroad officers, however, urged that the regulation or supervision to be undertaken should not attempt to go farther than necessary and pointed out how their financial operations would be hampered if opportunity for taking advantage of a favorable market were to be delayed by prolonged deliberation by a commission.

The Railroad Securities Commission accepted this point

of view and in its report submitted in 1911 it recommended against a system of regulation by the commission as not warranted at that time. It expressed a belief that accurate knowledge of the facts concerning issues of securities and the expenditures of the proceeds is of the most importance and recommended that railroads should be required by law to file detailed reports on these points with the commission.

These recommendations were hardly drastic enough to suit those who had been agitating for the regulation of financial transactions of the carriers and there was also much controversy over the question as to whether federal regulation should be made exclusive or merely superimposed upon that of the states.

The House of Representatives in 1914, and again in 1916, passed the Rayburn bill, but it was not passed by the Senate. There was a good deal of discussion on the subject during the hearings before the Newlands joint Congressional committee in 1916, in which the railroads went so far as to advocate federal supervision of security issues to escape from the vagaries of state regulation, but some doubts

were expressed in Congress as to whether the federal government could constitutionally assume exclusive jurisdiction over the security issues of state-chartered companies.

The discussion was dropped when the Newlands committee's investigation was interrupted by the war. After it had been decided that the roads were to be returned and a new law was being formulated in an effort to bring about some improvements over the pre-war system of railroad regulation, the provisions relating to security issues were adopted with

THE Interstate Commerce Commission during the year ending October 31, 1921, authorized railroad security issues in the following aggregate amounts:

Stocks	\$242,657,500.00
Bonds	1,276,761,616.39
Notes	98,402,194.79
Miscellaneous	97,780,313.24
Total	1,715,601,624.42

comparatively little new discussion, the Rayburn bill being taken as the basis, although many changes were made. No one was objecting to the regulation of security issues and there had been no recent scandals to cause any particular affirmative demand for action. There was a rather strong sentiment at the time, however, for concentrating the regulating authority more closely in the hands of the Interstate Commerce Commission and for treating the transportation system of the United States as a national system. While the state commissions opposed bitterly the idea of curtailing their authority over rates in any way, most of them were willing to give the Interstate Commerce Commission a jurisdiction which many of them had never attempted to exercise.

The commission's jurisdiction was made, therefore, "exclusive and plenary."

The Hadley securities commission had said that if securities were to be issued only after specific authorization by the commission it was difficult to see how the government could escape the moral, if not the legal, obligation to recognize them in regulating freight rates, but this objection was probably obviated by the provisions of the Transportation Act which based rate regulation on the value of the property rather than upon securities. The provisions of the act relating to security issues, which are included in Section 20-A, became effective on June 27, 1920.

Provisions of the Law

The law provides that after its effective date it shall be unlawful for any carrier to issue securities or assume obligation or liability in respect of the securities of any other person, even though permitted by the authority creating the carrier corporation, unless and until, and then only to the extent that, upon application by the carrier and after investigation by the commission of the purposes and uses of the proposed issue and the proceeds thereof or of the proposed assumption of obligation or liability, the commission by order authorizes such issue or assumption. The commission is to make such an order only if it finds that such issue or assumption, (a) is for some lawful object within its corporate purpose and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the carrier of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) is reasonably necessary and appropriate for such purpose.

The commission is authorized to grant or deny the application as made or in part or with such modifications and upon such terms and conditions as the commission may deem necessary or appropriate. It also may make supplemental orders modifying the provisions of the previous order. These provisions do not apply to notes maturing in not more than two years, aggregating, together with other then outstanding notes of maturity of two years or less, not more than five per cent of the par value of the securities then outstanding. A certificate of notification regarding such notes is to be filed with the commission within 10 days. The commission is directed to require periodical or special reports from such carrier, depending on the disposition made of securities and the qualifications of the general.

Bureau of Finance

To administer these and other related provisions of the act the commission created a Bureau of Finance under the supervision of Col. W. A. Colburn, formerly general advisor to the Louisville & Nashville, and this bureau soon grew to be part of the fabric of the commission's organization. Its other functions have to do with the administration of the \$5,000,000 cash loan fund, the determination of the six months guarantee of issuance of certificates of public convenience and necessity for construction or abandonment of lines and acquisition of control of another carrier.

During the first months of its existence its time was largely occupied with matters pertaining to the loan fund and the guaranty. During the past year, however, its functions with relation to the authorizing of security issues have assumed a greater importance. On June 26, 1920, an order was issued by the commission which was revised on September 22, 1920, prescribing the form of application to be filed by a carrier for authority to issue securities and stating the character of supporting papers required to be filed therewith. It also prescribed the form of notification, when short term notes have been issued which do not require the authority of the commission. On September 2, 1920, an order was also issued prescribing "Special Report Series Circular No. 29" for use by carriers in reporting securities issued or assumed at the close of June 27, 1920.

In its annual report for the year ending October 31, 1920, the commission stated that 61 applications for authority to issue securities had been received, 28 had been granted, 1 had been withdrawn and 32 were pending. Forty-three certificates of notification had been filed under paragraph 9 of Section 20-A, representing the issuance of notes maturing in two years or less of an aggregate amount of \$28,542,764.

Securities Authorized

The annual report for the year ended October 31, 1921, showed that 283 additional applications had been received since the previous report, making a total of 344, and the issue of securities totaling \$1,715,601,624, largely for refunding purposes, has been authorized. Certificates of notification of the issuance of short-term notes to the amount of \$137,502,723 also were filed.

Most Applications Approved

As it is impossible to estimate how many financial crimes may have been prevented by the fact that the railroads have been required to obtain an official O. K. upon their plans before proceeding with them, it would be difficult to estimate how much good has been accomplished by the commission's supervision thus far. In most cases the commission has approved the applications, although in one or two conspicuous cases it has not. As to the instances in which the commission has substituted its own judgment for that of the railroad managements and their financial advisers there are probably varying opinions as to which was the more correct.

One feature of the situation that attracts attention is the delay and the amount of paper work required to obtain authorization of even simple transactions. Undoubtedly, however, much of the delay that has been experienced during the past year has arisen from the fact that both the commission itself and its finance bureau have been overwhelmed with work and have had to go through the usual experiences involved in administering a new statute. Many questions arising from differences of interpretation of the law have come up to cause delay which may be obviated in the future and the commission has also had to build up a new organization to deal with the financial matters. With each application a large amount of supporting data is required to be furnished and with many of the applications the material had been very voluminous. Many of the orders cases have been passed on very quickly, but naturally will require a considerable amount of checking with the organization of the bureau and what questions arise at that time necessary to conduct hearings. The number of cases in which there have been no hearings or exceeds those in which hearings have been held and the hearings, except as to a few applications, have been largely ex parte.

The decisions are usually rendered by Division 4 of the commission. Commissioners Meyer, Pitter, Daniels and Eastman, but in case of disagreement among them, cases are passed upon by the entire commission.

The Burlington Case

The most conspicuous example in which the commission declined to grant the application made by a railroad was that involving the refinancing by the Great Northern and Northern Pacific of their purchase of most of the stock of the Chicago, Burlington & Quincy, made by James J. Hill 20 years ago. The two companies had outstanding some \$215,000,000 of joint 4 per cent collateral trust bonds secured by the deposit of 97 per cent of the Burlington stock, which, paying an 8 per cent dividend, carried itself for the two roads. The bonds came due, however, on July 1 and it would obviously require a higher interest rate to refund them, while the two northern companies had no way of paying them off, except by selling or forfeiting the Burlington collateral and giving up their control.

After a great deal of planning and consultation with bankers, a plan was evolved by which the Burlington was to be made to pay in part for itself by the use of part of the large surplus it had built up by making extensions and improvements out of earnings without capitalizing them. The commission was asked to approve an issue of \$60,000,000 of Burlington stock to be used as a stock dividend, most of which would go to the two northern lines, and a new mortgage, which the Burlington needed anyway, and under which the commission was asked to authorize an issue of \$80,000,000 of bonds, against expenditures made out of income, to be also used as a dividend.

Both issues were designed to bring the Burlington capitalization nearer to its value and the proceeds of the bond issue were to be used to reduce the amount of bonds to be issued against the Burlington to approximately \$140,000,000. It was argued that this would result in a saving of interest charges for the three roads considered together as compared with the cost of refunding the entire issue of joint bonds, although it would increase the fixed charges of the Burlington. The application was filed with the commission about November 1, 1920. Extensive hearings were held, at which the plan was opposed vigorously by the state of Nebraska.

After long consideration within the commission's organization, during which several reports of various kinds were written by subordinates, the commission on February 28 issued its decision in which a majority approved the \$60,000,000 stock issue, which was of no particular value since it was not desired to sell the stock, but disapproved the bond issue for dividend purposes, which was the most important feature of the plan. The commission was much divided in opinion. Eight members approved the stock issue, but only four approved the bond issue, and there were several dissenting and partially concurring opinions.

This made it necessary for the railroads to work out a new plan and get it approved in time to meet the maturity of the bonds by July 1. On March 25 a new plan was proposed which the commission later approved, providing for a new joint bond issue of \$230,000,000 at 6½ per cent to refund the entire amount of the joint 4½, secured by both the Burlington collateral and in addition by \$33,000,000 of mortgage bonds of each of the two northern companies, but with provision for conversion of the joint bonds into the individual issues of the two companies. This was approved by the commission on April 21 and the exchange and sale of the new joint issue was successfully made, although at a considerable increase in interest charges as compared with the earlier plan.

Later on when the two northern companies needed additional funds with which to maintain their usual dividend disbursements, the Burlington went to their assistance with an increased cash dividend, which it was able to declare without obtaining the approval of the commission, and the Burlington is now before the commission with an applica-

tion for a bond issue to meet its own capital requirements. This entire transaction illustrates in an exaggerated degree the possibilities for delay which are inherent in a system of commission regulation of security issues, although on the other hand, no comparison is available as to the time that would have been required if it had been necessary to obtain approval for so complicated a plan from the various state authorities. The same observation applies to many other cases in which a considerable length of time has been taken by the commission to pass upon the carriers' applications.

For a transaction involving one of the largest corporate issues ever made the Burlington financing attracted very little public attention. The newspapers devoted little space to it and the public hearings were not reported in the daily press. As the commission was so closely divided as to the lawfulness and propriety of the original plan which was disapproved, its majority opinion presumably carried little, if any, more weight than did the opinion of the minority and there is probably as much room for argument now as existed before as to whether the Burlington should have been allowed to issue a bond dividend.

No public criticism of the commission's decision was made by representatives of the interested railroads and apparently they attached more importance to finding a feasible plan to which the commission would give its official approval than to any particular plan in detail.

The commission in the Burlington and one or two other cases did establish one principle as to which there has been much argument in the past, in authorizing the issue of stock for the purpose of capitalizing improvements made out of surplus earnings. This question was made an issue in the Burlington case both by the representatives of Nebraska, who opposed it, and in the opinion by Commissioner Eastman, the argument against the plan being that the surplus was rather held in trust for the public than the property of the stockholders.

The Lackawanna Case

The same point was involved in the application of the Delaware, Lackawanna & Western for authority to issue approximately \$90,000,000 of additional stock, representing the amount of its surplus, as a stock dividend. In the case of both the Lackawanna and Burlington, it had been common knowledge that the capitalization had been kept at a very low point, as compared with the value of the properties, which had been gradually built up out of earnings and in the Lackawanna case there was no real opposition to the application. The commission did not allow the full amount of the issue applied for but after having the case under consideration for about seven months, it finally on April 18 authorized an issue of \$45,000,000.

Louisville & Nashville

The Louisville & Nashville applied to the commission in August for authority to issue \$53,000,000 of stock as a stock dividend and also to issue some bonds. On December 17 the commission issued an order authorizing the bond issue but consideration of the stock issue was held in abeyance.

Three applications requesting authority to issue shares of capital stock without nominal or par value have been filed with the Commission. One of them, filed by the El Paso & Southwestern Company, involved the exchange of stock without par value for stock having a par value; authority upon this application was granted. The other two applications involved the issue of stock without par value under reorganization plans for railroads previously in receivership. Authority upon one of these, filed by the Denver & Rio Grande Western Railroad Company, was granted.

Bonds Sold Subject to Commission's Approval

In the discussion of the subject of security regulation before the law was passed railroad men have laid much stress upon the importance of being able to act promptly to take advantage of a favorable market in placing securities and upon the serious effect of the delay required by the necessity for obtaining governmental approval. In numerous cases, however, during the past year, they have got around this difficulty by making arrangements for the sale of bonds in advance, subject to the commission's approval. In many cases large bond issues have been advertised in the newspapers before the formal applications were filed with the commission and several weeks in advance of the issuance of the order of authorization. Undoubtedly in such cases the financial officers of the roads have been confident that their plans contained no objectionable features and in some cases they may have consulted informally with members of the commission's organization in advance, because the commission in administering the provisions of the law relating to security issues has adopted a policy of working in more close co-operation with the carriers than has been the usual practice in rate cases.

However, the commission took occasion to issue a warning in the first case of this kind that came to its attention that "while the law does not prohibit such a conditional sale in advance of an approval of an issue of securities, carriers should realize that we shall not be controlled in our action by representations that failure to accord approval of issues conditionally sold will result in disturbance or disarrangements of plans based upon anticipated approval."

The first application involving a large security issue to come to the commission was that of the New York Central for authority to issue \$25,000,000 of 7 per cent collateral trust bonds, and also \$25,000,000 of refunding and improvement mortgage bonds to be pledged as part of the security. The application was dated August 19, the day before the bonds had been conditionally sold, but it was not made public at the commission's office until the next day following the sale. The commission's decision was issued on September 13, containing the warning above quoted.

Some States Object to Commission's Jurisdiction

The New York Central case served to bring forward the question of state rights. The railroad, in filing its application with the federal commission, had ignored the state commissions and the Michigan Public Utilities Commission protested, denying the power of the Interstate Commerce Commission to supplant the state authorities. The commission met this by simply stating in its opinion that "we are of opinion that we have jurisdiction" and this remark has been repeated since in various cases in which state commissions have raised the jurisdiction question.

Publicity

When the Railroad Securities Commission referred to the importance of publicity in connection with security issues, it presumably was thinking particularly of the character of publicity involved in making matters pertaining to security issues a public record and subject to the scrutiny of public officials rather than the kind of publicity that reaches the public through the medium of the press.

As far as newspaper publicity goes, the public has received very little idea of what has been done either by the railroads or by the commission. Railroad financial scandals have largely faded into history and the public has become somewhat accustomed to large transactions. Therefore the application to the commission and its orders have been treated as routine and have been very inadequately reported in the daily press. Even the important Burlington and Lucka-

wanna cases were given little attention and the issues upon which the commission decided them required more space to explain than the newspapers were willing to give to the subject.

Probably the general impression that has been created by what publicity has been given the subject has been that the railroads were issuing a very large amount of bonds and that therefore the market conditions must have been favorable for the absorption of railroad securities, because although most of the bonds have been issued for refunding purposes and a large proportion of them for purposes of collateral, the news items have usually made no distinction between those that were to be sold and those which were merely to be exchanged for maturing issues bearing lower interest rates, or to be deposited with the Secretary of the Treasury as security for a loan from the government or with a trustee as collateral for another bond issue.

In many cases, where a railroad proposed to issue a series of bonds bearing a rate of interest at which they could not be marketed under favorable conditions as collateral for an issue bearing a higher rate, the news items have added the two amounts together. For example, when the New York Central applied for authority to issue \$25,000,000 of bonds and another \$25,000,000 as collateral for the first issue, it was generally reported that the New York Central was going to issue and presumably sell \$50,000,000 of bonds. In this way a very exaggerated idea has been conveyed of the extent of railroad financing during the past year.

In many of the applications the railroads have explained the arrangements made in advance for the sale of securities and the commission's order in stating the conditions on which authority is granted has usually referred to the price named as a minimum. In many cases the application explains that no arrangements have yet been made and none will be made until the commission has issued its decision.

The commission has scrutinized very closely the rate of interest proposed to be paid in connection with bond issues and has made many efforts to hold down the rate. In making loans from the revolving fund it has attempted to prevent the payment or the execution of what it considered an unduly high rate by making a condition that the company should meet a certain proportion of its requirements by private financing and often has prescribed a maximum rate of interest. In other cases where it has appeared that the best rate which the railroad was able to obtain was above what the commission considered reasonable, it has met the situation by allowing the road a loan from the revolving fund at 6 per cent and the application to issue guaranties has been withdrawn.



The R. F. & P.'s Richmond Terminal



Opening Session of the Labor Board's Investigation of Threatened Strike of Train Service Employees, G. A. Cook, Secretary of the Board's Bureau No. 3, (Standing Behind the Board), Is Reading the Call to the Meeting. Railway Executives and Brotherhood Leaders Are Grouped on the Left.

Progress Towards Normalcy In Railway Labor Field

Year 1921 One of Many Controversies Between Railways and Employees, But Situation Has Been Improved

By Holcombe Parkes

SLOW BUT SUBSTANTIAL progress toward normalcy in the railroad labor situation can be recorded for the past year. Contributions to post-war readjustment have been made both by the railroads and by railroad employees. The railroads have made some progress in their fight to bring about lower labor costs but in many respects they have lost their fight for principles. The employees have lost in actual wages and many working conditions which they valued, but they have won recognition of principles for which they contended. Both sides express dissatisfaction as a result.

This outcome is largely the result of the existence of a regulatory body, the Railroad Labor Board, the three public members of which, in whose hands is the balance of power, are flanked by six partisan members whose opposing influences tend to cause compromise decisions. It may be, however, that the very slowness of the progress which has been made will be recognized some day as having helped the nation to pass safely through a precarious reconstruction period. At any rate, real progress has been made and the serious industrial strife which many predicted has been avoided.

Three outstanding developments of major significance marked the past year. They were:

(1) The controversy over national agreements and the settlement of a large part of this dispute.

(2) The reduction of labor costs through wage reductions, the elimination of employees and the curtailment of overtime of the forces remaining on duty.

(3) The threat of a general strike of the train service

employees, which was averted by a strong public sentiment and the activities of the Labor Board and other government officials.

To appraise properly the labor developments of the last 12 months it is necessary to keep in mind that the year opened with widespread bankruptcy apparently threatening the railroads as the result of a maladjustment between revenues and expenses. In a period of less than four months the traffic of the railroads had fallen from the heaviest ever recorded to the lightest in some years. Earnings had declined correspondingly, and the higher freight and passenger rates, placed in effect August 26, 1920, had failed by ever increasing amounts to produce the net return fixed by Congress and the Interstate Commerce Commission as just and necessary.

Labor Board Begins Consideration of National Agreements

When the Labor Board handed down its wage increase award in July, 1920, it continued the national agreements in effect pending further hearings. These hearings began on January 10, 1921, when E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, and B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, fired the opening guns in a four months' pitched battle. For 19 days Mr. Whiter attacked the rules in the various national agreements, showing in detail the inefficiency and waste caused by the universal application of rules regardless of widely varying local conditions.

THE PAST YEAR witnessed a continual struggle between railroads and labor leaders over national agreements and the readjustment of labor costs.

Slow but substantial progress has been made, however, in improving the labor situation.

The year 1922 will see a further struggle to reduce labor costs.

Mr. Jewell retaliated at intervals by "statements" aimed, not at the rules under discussion or at the board, but at the public in an attempt to influence public opinion, and divert attention from the real issues. Charges that the railroads were mismanaged, that they had broken faith with the public, violated the Transportation Act and defrauded the public out of millions of dollars were spread broadcast by Mr. Jewell.

Meantime the financial condition of the carriers became more precarious. The seriousness of the situation brought General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the labor committee of the Association of Railway Executives, before the board on January 31 with requests for immediate abrogation of all national agreements, a return to the rules and working conditions of December 31, 1917, and the right to pay unskilled labor prevailing local rates. Assurances that the carriers would refrain from asking for wage revisions for 90 days if these requests were granted were made. A bitter battle of "statements" to the public and the board and telegrams to President Wilson ensued. The President declined to interfere, but the public was awakened to the seriousness of the situation.

Mr. Jewell, reinforced by Frank P. Walsh, counsel, W. Jett Lauck, "consulting economist," and a battery of publicity men, reopened the battle on February 10 after widely advertising that he intended to sidestep the national agreements issue temporarily to bring charges of a "huge conspiracy" on the part of Wall street banking interests and railway executives to "crush organized labor." The board, realizing that such testimony was irrelevant, ruled it out. At the same time the board denied General Atterbury's requests. The decks were cleared for consideration of the real issues involved.

Employees' Spokesmen Delay Hearings

The testimony on behalf of the carriers was completed on February 3. The opportunity to delay the hearings, thus continuing the national agreements in effect, was not overlooked by the labor leaders. Petitions for additional time in which to prepare replies to the carriers' testimony, offers of "settlements" involving the recognition of the principle of collective bargaining as defined by the labor leaders—bargaining solely on a national basis—and requests for the subpoenaing of officers of the Association of Railway Executives and railway executives who were members of the labor committee of that organization were utilized by Messrs. Jewell and Walsh to postpone the hearings.

Some of the petitions for delays were granted by the board. The insistent demand for the calling of railway executives as witnesses finally resulted in their being asked to appear on March 18. With the exception of seven days in which representatives of several of the smaller organizations presented testimony in favor of the continuation of their national agreements, the period from February 3 to March 18 represented the results of Mr. Jewell's efforts to prolong the life of these petitions.

Five days of cross-examination of railway executives at that time and five days of the same thing later, from April 4 to 8, had caused the railway to set forth with greater force than the national application of rules regarding working conditions is supposed to be without a loss of economy and efficiency. A desperate attempt to bring out evidence in support of the "huge conspiracy" charges fell flat.

Mr. Jewell Presents Labor's "Bill of Rights"

Mr. Jewell presented a significant "bill of rights," outlining 11 basic principles for which the employees were fighting. These principles, "the irreducible minimum in labor's bill of rights," included the eight-hour day, punitive overtime, and rules dealing with (1) the arrangement of the beginning and ending of working shifts "so as to permit

of reasonable living arrangements," (2) the safety of employees, (3) the delimitation of the work to be performed by each craft, (4) apprentices, (5) the requirements for employment, (6) the right of the majority of the employees of any craft to elect an organization to represent them, (7) the right of the majority to elect committees to handle grievances for all employees of the craft, (8) seniority, and (9) the right to organize and the protection of employees against discrimination.

On March 24, almost eight weeks after the carriers had closed their case, Mr. Jewell began his real reply. After another delay for the cross examination of more executives, interest in the national agreements controversy gradually dwindled. The hearings, however, did serve as an agency through which voluminous exhibits prepared by Mr. Lauck could be given wide circulation bearing the stamp of authentic testimony before a government body. Sometimes these exhibits dealt with national agreements. For the most part they consisted of alleged evidence of the "conspiracy" and mismanagement charges and loose allegations made by representatives of the employees.

Labor Board Abrogates, Then Continues, National Agreements

The first of a series of decisions in this dispute was handed down by the Board on April 14. It abrogated national agreements on July 1, remanded the negotiation of new agreements to the individual carriers and their own employees and upheld the railroad's interpretation of collective bargaining and their contention that varying local conditions should govern in fixing rules and working conditions. It also outlined 16 principles with which the new agreements should be consistent, thus awarding the employees one of the major points for which they had been contending.

The subsequent negotiations between the individual railways and their own employees were almost fruitless, mainly because the leaders of the national labor unions instructed their followers to accept nothing less than the rules in the national agreements. On June 28, therefore, the Board issued an order continuing all national agreements until such time as the board could pass on the rules and ending until further notice time-and-one-half for overtime.

Overtime and Piecework Disputes Decided by Board

The Board handed down the first of its final decisions in the controversy over the shopmen's agreement on August 11, almost six months later. Seven new rules, recognizing and continuing the principle of punitive pay for overtime work, were promulgated. The new rules sanctioned the principle of the eight-hour day, the policy of paying time-and-one-half for work performed on Sundays and holidays, except that which is absolutely essential to continuous operation, and the practice of paying an allowance to an employee called but not required to work. On the other hand, the new rules so changed the overtime provisions of the shop crafts' national agreement as to eliminate many wasteful and ridiculous efforts brought to the attention of the Board.

Drafts of 17 more rules for inclusion in the new agreements with the shopmen were announced on October 13. One of these rules removed the ban on piece-work and of the total of 17 rules, 10 were so worded as to obviate inefficiency and waste caused by the application of rules in the national agreement and seven were exact counterparts of rules of the national agreement.

Labor Board Announces New "National Agreement"

The Board handed down its final ruling, insofar as the shop crafts' agreement is concerned, in the form of a complete new set of rules on November 29. These new rules applied wherever disagreements had arisen over the points covered by any particular rule of the national agreement. In

other words, a new "national agreement" for the shops crafts was promulgated. Instead of having the rules incorporated in one agreement applicable to all carriers and shop employees, identical rules will, in the future, be incorporated in all the agreements between the carriers and their shopmen. The effect will be that against which the carriers have principally directed their whole fight—the universal application of rules regardless of varying local conditions. To this extent this final decision represents defeat for the railroads.

On the other hand, the revised rules will relieve the railroads of much of the waste caused by similar rules of the national agreement. These new rules made by the Board do not apply where agreements on rules regarding the same matters have been reached by the individual carriers and their shopmen. It is likely, however, that as opportunities present themselves either the employees or the carriers will ask for the establishment of the rules that are the most favorable to themselves. If disagreements ensue and cases come before the Labor Board, it is logical to assume that the Board, having already determined what it considers a just and reasonable rule upon the point in question, will simply order the application of its own rule. Thus, so long as the Labor Board regulates the working conditions of any class of employees, there will be a strong tendency for the working conditions of that class of employees to be made uniform throughout the country.

Financial Situation Forces Roads to Cut Forces, Overtime and Finally Wages

The extremely serious situation in which the carriers found themselves at the beginning of the year, together with the refusal of the Labor Board to grant immediate relief by authorizing the changes suggested by General Atterbury, forced the railways to ask reductions in the wages of all employees. The laying off of 655,000 employees between August, 1920, and April, 1921, and cutting the working time and the overtime of the employees remaining in service so that the average earnings dropped from \$162.25 a month in the third quarter of 1920 to \$149 a month in the second quarter of 1921, despite the fact that the wage rates in these two quarters were exactly the same, failed to solve the problem. So in March, while the national agreements controversy was still holding the spotlight, each railway, acting in accordance with a general policy of decentralization, brought disputes over proposed wage reductions to the Board.

The carriers' testimony was based entirely on (1) the decline in the cost of living and (2) the wage reductions in other industries. The employees replied with amplifications of the old charges of mismanagement, etc., their only relevant defense being predicated upon (1) the fact that there had been no decrease in the wages of workers in the coal and steel industries and (2) a denial that the decrease in the cost of living justified wage reductions. The Board's decision, announced on June 1, provided for a wage cut on July 1 averaging about 12 per cent. The average reduction represented almost exactly the halving of the opposing demands of the carriers and the employees.

Labor Leaders Try to Use Wage Cut to Ward Off Further Readjustments

The labor leaders immediately made preparations to use this moderate reduction as a means of warding off further readjustments of labor costs. United action by the various unions was desired, but factional differences made this impossible. The train service organizations finally agreed upon a plan of action which involved a referendum vote, and the association of the wage cut issue with protests against further wage reductions and the proposed abolition of punitive overtime. Subsequently, representatives of the brotherhoods asked the carriers to (1) wipe out the wage cut of July 1, (2) withdraw all demands for further wage reductions and

(3) withdraw all demands for the abolition of punitive overtime for a stated period. The demands were rejected by the carriers and the question of a strike was submitted to the men. Meantime, the other organizations had been taking strike votes against the wage cut, and talk of a general strike began to be widespread.

Brotherhoods Call Strike for October 30

The controversy came to a head on October 14. The union leaders had already completed the count of their strike ballots and found a large majority in favor of a walkout. A meeting of the Association of Railway Executives was being held in Chicago and the heads of the train service brotherhoods sought a conference and received a final rejection of their demands. At the same time the railway executives announced that further wage reductions were to be sought immediately as a means of meeting the insistent demand for reduced rates. As a result of this combination of circumstances the leaders of the train service organizations called a strike for October 30 to become effective on groups of carriers on succeeding days.

The heads of the other railway labor organizations meanwhile had had little to say. It developed later that the so-called "associated standard recognized railroad labor organizations" had broken into two groups, the train service organizations comprising one and the remaining unions the other. The cause of the break, which was expected for some time, was given as the inability of the two groups to agree upon the terms on which the impending strike would be terminated.

Labor Board as a Peace Maker

Here the Labor Board, gathering courage from the attitude of the government and the President, made its first energetic attempt to bring peace. The leaders of the brotherhoods were called into conference by it, but the meeting was a complete failure. The Board, realizing its existence probably depended upon averting the threatened tieup, immediately arranged for an investigation of the whole situation and called the chiefs, executive committees and general chairmen of the train service organizations and the chief executives of practically all of the larger railways together in Chicago. This investigation was the dramatic event of the year. B. W. Hooper, vice-chairman of the Board, developed the fact clearly through examination of the labor leaders, that the strike was called, technically as a protest against the wage reduction, but in reality as a "bluff" to ward off further wage reductions and changes in the working rules of the men involved. Nevertheless the brotherhood leaders stoutly maintained that nothing could stop the strike but a "satisfactory settlement."

Just previous to this investigation the Board had issued a memorandum in which it stated among other things, that further requests for reductions in wages of any class of employees would not be considered until all pending disputes regarding the rules and working conditions of that class were disposed of. This memorandum, however, was not presented to the brotherhood chiefs until later, when Mr. Hooper read and explained its provisions before a meeting of brotherhood leaders. The provisions of this memorandum, together with Mr. Hooper's explanation of its intent, constituted a "satisfactory settlement." The strike was called off on October 27. There followed a period of comparative calm.

Labor Board Fails to Bring "Peace"

In creating the Labor Board, Congress obviously had in mind the establishment of machinery which would make for peace between the carriers and their organized employees. Throughout the year, however, there has been constant dissension and several small strikes culminating in the threat

of a general strike. Real peace was not achieved, but at the same time nation-wide strikes were avoided.

The Atlanta, Birmingham & Atlantic Case

At the same time General Atterbury went before the Board with his request for immediate relief, there developed a situation on two small roads which later resulted in serious strikes. The Atlanta, Birmingham & Atlantic was losing \$100,000 a month and its financial position, therefore, became so precarious that it finally ordered wage reductions for February 1, and later petitioned the Board to sanction the cuts. After hearing the case on January 25, the Board ordered the carrier to rescind its wage reduction order and later, on February 21, ordered the dispute remanded to further negotiation, in accordance with the terms of the Transportation Act. On March 5, about 1,500 employees of the A., B. & A. went out on an "unauthorized" strike which completely tied up the road for some time. In the meantime, however, a receiver for the road had been appointed by the United States District Court and the wage reduction orders were re-issued to become effective on March 26. This raised an interesting issue as to superior jurisdiction as between the District Court and the Labor Board. The Board called representatives of the A., B. & A. before it on March 21, to determine whether or not the carrier, in reducing wages in accordance with a court order, had violated the Board's previous wage rulings.

The action of the carrier in reducing wages in compliance with the ruling of the District Court was adjudged a violation of the Transportation Act by the Labor Board in a ruling handed down on April 21. This ruling at the same time avoided demanding the recall of the wage cut order and suggested further conferences between the management and the employees. The controversy between the court and the Labor Board was never definitely decided, but the fact remains that the dispute resulted in a strike which was for some time a source of much trouble and inconvenience in the territory served by this road.

The Missouri & North Arkansas Controversy

Another case very similar to this and resulting in an even more serious situation first came before the Board on February 15, as a result of a wage reduction put into effect on February 1, on the Missouri & North Arkansas by order of the receiver of that road. Before the case came before the Board, the employees involved went on strike and their pleas were taken by new employees as rapidly as they could be obtained. At hearings before the Labor Board on February 15, this dispute was also remanded to negotiations in accordance with the terms of the Transportation Act. However, the Board's order also directed the employees to accept the reduced wages under protest because of "extenuating circumstances." Strenuous efforts were made to maintain service, but the belligerency of the strikers finally resulted in tying up the entire road. An attempt was made to resume operation, beginning on March 24, after repairs to the property had been made, but by July it became evident that further attempts to operate under the conditions were useless and on July 31, the road discontinued operation.

A strike occurred on the International & Great Northern immediately prior to the threatened strike of train service employees in October. The trainmen on this carrier walked out despite orders of the Labor Board although the interruption to traffic was not serious and the men returned to work "on probation" after the threatened general strike was called off.

Controversy Between Labor Board and Pennsylvania

There is one other significant dispute which should be briefly included in a review of the failure of the labor provisions of the Transportation Act to bring "peace," namely the dispute between the Board and the Pennsylvania. When

the Labor Board remanded the dispute over national agreements to negotiation between individual carriers and their own employees, the Pennsylvania immediately set out to determine who the majority of its employees desired to have represent them. It sought this information by means of a secret ballot, providing for the election of employees of the company and not organizations or men who were not in the employ of the company at the time. As a result of these elections, committees were appointed and negotiations conducted resulting in the formation of a new set of rules governing the working conditions of shopmen at the Altoona shops and later at other points.

The protests of the system organization of the Federated Shop Crafts brought the Pennsylvania before the Board on July 14 and 15, when it defended the elections and the subsequent negotiations, on the grounds that (1) the board exceeded its authority in extending the national agreements, (2) the rulings of the Board on this controversy will have the effect of perpetuating the national agreement, thus providing for the "closed shop," and (3) the Pennsylvania has carried out its understanding of the Board's purpose in remanding the dispute over national agreements.

The employee's arguments were based largely on the request for a ruling on (1) the right of the majority to determine what organization shall represent them, (2) the right of the organization to negotiate for all employees of a craft, through representatives of their own choosing, regardless of whether these representatives are employees of the carrier or not, and (3) the right of the organization to elect representatives in accord with its own laws. These three points, they claimed, were settled in favor of the unions by the 16 principles which the Labor Board said should govern in the negotiation of new agreements and were violated by the Pennsylvania in this case.

On August 1, the Labor Board ordered a new election on the Pennsylvania, finding both the carrier and the employees guilty of "illegal and unfair" actions. The Pennsylvania replied on August 24 by asserting that the new agreements already made were in full force and asking the Board to vacate its ruling calling for a new election. The Labor Board in turn defended its position in the case in a lengthy order, calling for further hearings. When these further hearings were scheduled, September 26, the Pennsylvania declined to appear before the Board because of restrictions on the testimony to be presented which automatically prohibited the Pennsylvania from clearly outlining its position.

However, on October 20, the Pennsylvania again came before the Board and outlined its previous stand. No further developments came, however, until December 9, when the Pennsylvania obtained a temporary injunction from the Federal Court at Chicago, restraining the Labor Board from publishing a decision which it had promulgated as a result of this controversy. Hearings on the carrier's plea to make this injunction permanent were subsequently set for December 26, leaving another important phase of the railroad labor problem as a legacy for the new year.

Regional Boards of Adjustment Formed

The question of the formation of boards of adjustment, a matter left to agreements between the carriers and their employees by the terms of the Transportation Act, has been partially solved during the past year through the creation of three regional boards on which are represented the four train service organizations and a number of the larger carriers. Immediately after the passage of the Transportation Act the labor organizations stood solidly for national boards of adjustment. However, the train service brotherhoods later receded from this position and suggested regional boards. The first results of this were seen in the establishment of a board of adjustment in September to handle disputes over personal grievances and the interpretation of schedules be-

tween the Baltimore & Ohio and the New York Central and the four train service organizations. This board is composed of eight members; four representing the two railroads and one representing each of the organizations involved. In October a similar board to handle disputes between the train service organizations and eight of the larger western carriers was created. Still another, to handle disputes between the train service organizations and 17 southeastern roads, was created in November. In the southwest, negotiations are still in progress looking to the creation of a board for that territory. The purpose and jurisdiction of all of these boards are substantially the same.

The Pennsylvania and its employees went even further, in the establishment in September of system and regional boards of adjustment for the following groups of its employees: (1) train and engine service; (2) maintenance-of-way and structures; (3) signal department; (4) mechanical helpers and apprentices, maintenance of equipment and telegraph and telephone, eastern region; (5) clerical forces, eastern region; and (6) miscellaneous station forces, eastern region. These boards, or "reviewing committees" as they are called, for the first three groups cover the entire system; for the last three the regions indicated.

Being created, as all of these boards were, during the last four months of the year, they did not materially change the course of events or affect the work of the Labor Board. They will tend, however, to relieve the Board of a number of disputes which that body has had to handle through the sub-division of its members into three bureaus and through examiners, leaving it more time in which to take up and consider more important controversies.

The Outlook for 1922

A year of constant wrangling has brought a decided improvement in the railroad labor situation, but the year 1922 promises to be another year of wrangling and struggle. The year opened with the vital question of national agreements undecided, with readjustments of wage scales in prospect and with the future of the Labor Board dependent upon its accomplishments. The year has passed and the national agreements are still "among those present" although in greatly modified form, a further readjustment of wage scales is imminent and the future of the Labor Board is still undecided.

Three developments of significance brought the year to a close. On December 20 the Labor Board announced its

decision in the several controversies resulting from the negotiation between individual carriers and their maintenance-of-way employees of new rules to supersede the national agreement. This decision contains specific rules to be applied in all cases where dispute had arisen on the points covered by these rules. In other words, the form and application of the decision are the same as those of the shop crafts decision. In this case, however, part of the old national agreement was not passed upon, namely the seniority and the promotion clauses, inasmuch as practically all of the carriers and their employees had agreed upon rules to cover these subjects. Other rules in the national agreement were written to eliminate the objectionable features of their counterpart in the national agreement. For instance, the overtime rules were changed so that punitive overtime for all workers in the maintenance-of-way department would start after the tenth hour, instead of the eighth hour as had been the case under provisions of the maintenance-of-way national agreement. In addition, many points covered specifically in the national agreement were expressly left open for local adjustment.

Year Closes With Three Significant Developments

On December 9 another chapter was added to the jurisdictional dispute between the Pennsylvania and the Board, when a temporary injunction restraining the Board from publishing a decision which was believed to be detrimental to the interests of the carrier, was issued by the Federal Court at Chicago, on the plea of representatives of the carrier. Arguments on a plea for a permanent restraining order were first scheduled for the following day, then postponed to December 21, and finally to January 3 of the present year, by mutual agreement.

The third development of significance was a ruling made by the Labor Board in which, for the first time, the "ability of the carrier to pay" was recognized by the Board as an element of "secondary consideration" in the fixing of just and reasonable wage scales. The decision came in a dispute between the New Orleans Great Northern and its train and engine service and maintenance-of-way employees, station agents, assistant station agents, and telegraph operators. This decision is interpreted as a recession from its former position in that it not only specifically states that testimony of this character is worthy of "secondary consideration" but it reduced the rates of pay of the employees involved, in compliance with the request of the carrier.

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Photo by Keystone

The Bush Terminal, Brooklyn, N. Y.



The Federal Valuation Is Entering New Stages

Tentative Reports Being Served on Carriers—Hearings on Protests Scheduled—Forces Reduced

By E. T. Howson

THE MOST IMPORTANT development in the work of valuing the properties of the railways during the year which has just closed has been the completion and serving on the roads by the Interstate Commerce Commission of a large number of tentative valuations, with figures for the first time of the Commission's estimate of tentative "final value." While 55 tentative valuations were served on the roads last year, they did not contain any figure purporting to show this "final value." The decision of the United States Supreme Court in the mandamus action brought by the Kansas City Southern, handed down on March 8, 1920, made it necessary for the Commission to prepare supplemental valuations, the first of which were not served until April 5 of this year. Since that time others have been issued at frequent intervals, with the result that a total of 177 tentative valuations have now been issued on roads with an aggregate of over 26,000 miles of line, or slightly over 10 per cent of the mileage of the country.

The valuation work received a severe blow in the death of C. A. Prouty on July 8. Mr. Prouty had been director of the Division of Valuation since its organization. In his passing the valuation work has lost more than its official head. Mr. Prouty had been a leading member of the Interstate Commerce Commission for 18 years and was its chairman for one year, prior to his connection with the valuation of the railways. As a commissioner he had gained

the confidence of the carriers and the public to a degree enjoyed by few in similar positions. In that capacity he had long advocated the making of a valuation for use in regulating the railways and, following the passage of the Valuation Act in 1913, he resigned from the Commission to organize and direct this newly created activity. In this capacity his sense of fairness and the confidence which he inspired did much to launch this work successfully in its early days when there were so many possible points of controversy between the Division of Valuation and the carriers on the one hand, and the state commissions on the other hand.

Another development which came unexpectedly late in 1921, was the closing of the five district offices of the Bureau of Valuation and the concentration of all work in Washington. Incident to this move, the forces were cut practically in half, the cut being especially drastic among the higher officers in these district offices, the large majority of whom severed their connection with the work. This consolidation of offices and reduction in forces was brought about by the program of retrenchment instituted by the administration. It has resulted in considerable temporary disorganization which is necessarily incident to a transfer of forces of this magnitude, but will probably not delay the ultimate date of completion of the work.

The valuation work is divided into three major groups, the engineering, the land, and the accounting departments.

REPORTS containing tentative "final value" were served on 177 carriers during the year. Carriers' book records of investment in road and equipment are being sustained as more valuations are being reported. Valuation work suffered severe loss in death of C. A. Prouty, director of the division since its organization.

All district offices were closed and forces were cut in half late in the year. Future of the work is being regarded with increasing uncertainty.

Shortly after the inauguration of this work in 1914, Director Prouty estimated that the inventory work of all of the railroads of the United States would be completed as of the average date of January 1, 1920. While the war interfered somewhat with that schedule, it was finished and the field parties disbanded during 1920 in all of the districts except the eastern where, because of the greater complications, this work was not finished until early in June. Since that time the engineering department has concentrated its attention on the completion of the engineering reports and on June 30, 1921, reports covering 111,682 miles, representing the properties of some 425 carriers, had been submitted to the director of the division. A total of 244 engineering reports had been tendered to the roads informally prior to November 30, 1921, in addition to those incorporated in the tentative valuations which had been served on the carriers by the Commission.

Present Status of the Work

The work of the land department has lagged somewhat behind that of the engineering section. Additional duties were also thrown upon this branch by the Kansas City Southern decision, which required the Commission to ascertain and report "the present cost of condemnation and damages or of purchase in excess of present value" of common carrier lands. However, this department is now making greater progress and the field work is practically complete, except for terminals in all except the eastern districts, where owing to the extreme density of the larger lines, work will continue for some time. The field forces in the land department were reduced to 25 per cent of their former personnel on July 1. Up to November 30 of this year, 199 land reports had been tendered to the railroads in addition to those included in the tentative valuations.

The work of the accounting department has progressed less rapidly. This branch was greatly handicapped by the impossibility of retaining adequate efficient forces during the war, resulting in a high turn-over and an almost constant shortage of employees. However, the increased salaries which were put into effect in 1920 and the change in employment conditions throughout the country, have resulted in alleviating this condition so that better progress is now being made, and it is expected that the field work will all be completed shortly after the first of the year and the field forces disbanded. On November 30, 1921, 109 accounting reports had been tendered to the carriers, beyond those incorporated in the tentative valuations which have been served to date.

The progress which has been made during the past year can best be stated in the words of the Commission itself, as contained in its annual report for the year ending October 31, 1921, as follows:

"Prior to November 1, 1920, 55 tentative valuation reports, representing the properties of 70 carriers, had been issued. The decision of the Supreme Court of the United States handed down March 8, 1920, required the Commission to investigate and report 'the present cost of condemnation and damages, or of purchase, in excess of present value' of common carrier lands. Having determined the excess cost of acquisition figures for the properties covered by the 55 tentative valuation reports, a supplemental tentative valuation has been issued and served, in each case, showing excess cost of acquisition of the lands and final value figures.

"In addition to the above mentioned, 96 tentative valuation reports upon the properties of 123 carriers have been completed and served on interested parties during this period, bringing to 193 the number of properties upon which tentative valuations have been issued to October 31, 1921. Every energy is now being directed to the work of completing tentative valuation reports.

"The work of the bureau of valuation divides itself, in

all sections, into two broad classifications, field and office. In the engineering section, which required a larger and more expensive organization than either the land or accounting sections, all field work has been completed and the parties have been disbanded. In the accounting section approximately 98 per cent of the field work has been completed and the balance will be finished in the current year. The work yet remaining to be done is largely on carriers of less than 500 miles, that is, below the importance of major properties. In the land section, on a basis of mileage, the field work is 98 per cent completed and the personnel reduced to about one-fifth of its quota at the beginning of the year. The force developed by the land section to comply with the Supreme Court decision above referred to, has covered a large part of the studies upon which its findings are based. It has completed reports on all properties upon which tentative valuations had already been issued and is keeping abreast of the other sections in covering current reports.

"The completion of the field inventory will mark an important step in the progress of the valuation work. There will then follow the analytical work of assembling the data accumulated through the inventory and compiling therefrom the underlying reports which form the bases for the tentative valuations, 193 of which have been issued as before stated. There will remain the work of hearing the carriers on their protests against the tentative valuations, which may result in modifications of the tentative valuations, and after this the publishing in final form of our reports on the properties of the individual carriers."

Since the termination of the year covered by this report, namely, October 31, 1921, 24 additional reports have been issued on 27 properties up to December 9, making a total of 177 reports on 220 properties which have been issued to that date.

The largest road on which a report fixing a tentative final value has yet been issued is the Chicago, Rock Island & Pacific which, with its subsidiaries which were also reported on, included 7,685 miles of line. Other large roads on which reports have been issued during the past year include the Atlanta, Birmingham & Atlantic; the Kansas City Southern; the Elgin, Joliet & Eastern; the Los Angeles & Salt Lake; the Norfolk Southern; the Central of Georgia; the Western Pacific; the St. Louis Southwestern; the Mobile & Ohio; the Florida East Coast and the Monon.

The roads are filing their protests on these valuations as fast as they can be prepared. The Commission has announced the first of the hearings on these protests on January 6, when the Los Angeles & Salt Lake will come before it; the Elgin, Joliet & Eastern and the Atlanta, Birmingham & Atlantic are scheduled to appear on January 9, the Evansville & Indianapolis on January 16, and the Central of Georgia and the Florida East Coast on January 23. Following the hearings on these and other protests, the Commission will revise or sustain its tentative valuations and issue them in final form. When this is done, the conclusion appears to be gaining ground that the roads have no recourse until this valuation is used, when, if not satisfactory, they can attack it in the courts. It would appear that the use of the figure of "final value" as a basis for the fixing of the rate of return and the division of earnings as provided for in the Transportation Act would constitute such a use.

As these valuations have been served on the roads, they have been scanned intently to ascertain wherein they have differed from the contentions of the carriers. In general there have been less discrepancies in quantities than might have been expected originally. It is to be expected that there would be wide disagreement as to many of the prices, but there has probably been less dissatisfaction as a whole than might be expected on so vital a point, the principal cause for complaint being the use of 1914 prices throughout.

The roads are, however, making strong objection to the failure of the Commission to include allowances for contingencies, for costs of preliminary and location surveys, for the removal of buildings or other structures from the right-of-way, and for trestles and other temporary construction actually used but not considered essential for new construction, assessments for public improvements, appreciation, going value, etc. There has also been considerable criticism regarding the period of construction which has been assumed for the computation of the allowance of interest during construction. Likewise, no allowance has been made for the excess cost of carrier lands over the acreage price of adjoining lands.

What the Valuations Show

The principal interest in the valuation results centers, of course, in the relation which these results bear to the capitalization of the corresponding properties. Unfortunately it is not possible to make any accurate comparison of the valuations which have been issued to date with the capitalization of the corresponding properties because of the difficulty of eliminating duplications in capitalization. The valuation placed on the "total owned" properties of the 77 carriers reported on to date aggregates \$1,091,986,543, while the corresponding records of the carriers' investment in road and equipment aggregates \$1,445,758,800. These are 1914, 1915 and 1916 figures which include the Atlanta, Birmingham & Atlantic, the Kansas City Southern, the Western Pacific and the Los Angeles & Salt Lake properties; the difference between whose valuations and book records accounts for over \$213,000,000 of this discrepancy. In making any comparison at this time, it should also be borne in mind that the first roads for which the government undertook its valuation work were either small lines selected for the purpose of testing out proper methods or were roads that were in the hands of the receivers or had been subject to reorganization. They have in general been the weak roads or those which will afford the least favorable comparison.

Furthermore it should be borne in mind that these comparisons are as of the date of valuation, which in the case of most of the larger roads reported on to date is June 30, 1914 or 1915. Since that time a number of these roads, such as the Western Pacific, the Atlanta, Birmingham & Atlantic and the Chicago, Rock Island & Pacific, have been reorganized and their capitalization reduced.

Insofar as the carriers' records of road and equipment are concerned, it is also instructive to note that the Commis-

sion has examined the records of carriers with a book record of investment aggregating \$8,679,181,721 and has certified to the correctness of \$3,401,670,282 or 92.7 per cent of this amount. Furthermore, a large part of the deduction is for excess of securities and discounts in the sale of these securities, the exclusion of which is at least debatable.

It is therefore becoming increasingly evident that the railroads have little to fear from the valuation. As reports are made upon the stronger and more conservatively financed roads, it is evident that the values of the properties found by the Commission will equal and in many cases exceed their capitalization by a considerable margin.

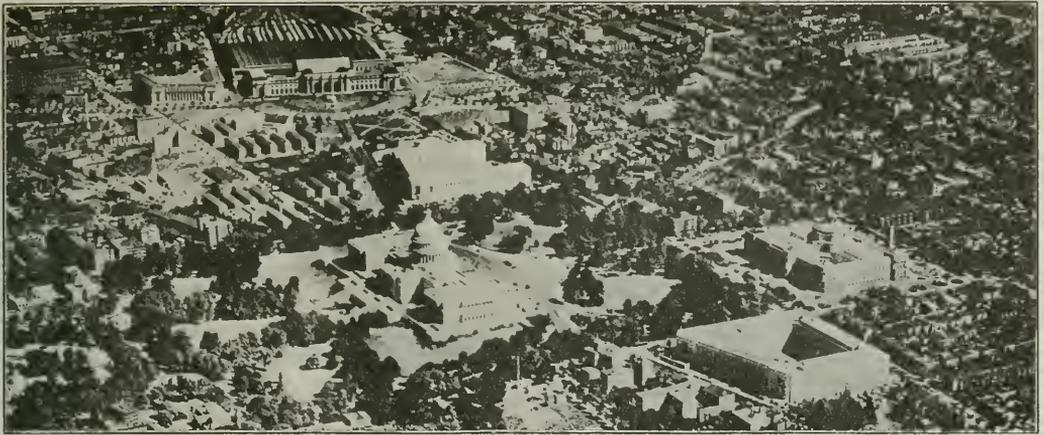
Future of Valuation

As the year came to a close it has become apparent that there is increasing uncertainty regarding the ultimate completion of the valuation work. This feeling is attributable to numerous influences. The failure of the Commission to appoint a successor to Director Prouty, although the vacancy has now existed for six months, indicates a lack of decision on its part. In the meantime various candidates, both within and without the Division of Valuation, have been offered more or less aggressively by their friends, which has not added to the efficiency of the organization. The drastic cut in forces during the fall as a measure of retrenchment in the enforcement of the Dawes program has added to this feeling of uncertainty.

More pronounced, however, is the fact that this work is rapidly losing its supporters in Congress, if indeed it has not already lost them. When the Valuation Act was passed in 1913, it was sponsored by those legislators who had been hostile to the railroads and who hoped by this measure to bolster up their claims that the roads were grossly over-capitalized. Now that sufficient valuations have been issued to prove the fallacy of this contention, they are no longer interested in it and some in fact are now believed to be opposed to it. This lack of support accounts even more than the nominal reduction in forces incident to the completion of certain portions of the work, for the reduction in the appropriation for the year ending June 30, 1923. This appropriation, which has just been recommended to Congress by President Harding, has been cut to \$1,500,000 or only slightly more than half of the appropriation of \$2,750,000 for the fiscal year which ended on June 30, 1921. As a matter of fact, the pressure for the completion of this valuation work is now coming from the railroads rather than from the regulatory bodies.

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Union Station, Senate Offices, Capitol, Congressional Library and House Offices, Washington, D. C.—Photo by Ewing Galloway

Status of Railroad Accounts With the Government

Large Amounts Still Due Carriers While Latter Owe for Additions and Betterments and Loans

By Harold F. Lane

ALTHOUGH it is now nearly two years since the railroads were relinquished from federal control, much remains yet to be done in the way of settling the accounts between the companies and the government covering the 26 months of federal operation and the six months' period following it, during which the guaranteed compensation was continued to allow time for the necessary readjustment of the rates.

Accounts with the Railroad Administration

Of the 241,194 miles of road that were taken over by the government, roads operating 107,063 miles have effected final settlements with the Railroad Administration, and according to the latest estimate made by the Railroad Administration (as of December 1) it still owes the remaining roads \$750,670,588 on account of compensation money taken over, maintenance, materials and supplies, depreciation and all other accounts, exclusive of additions and betterments. On the other hand the roads also owe the Railroad Administration a balance of \$507,628,508 as yet unadjusted on account of additions and betterments chargeable to capital account made by the government while it was operating the properties. This does not mean that all of the rest of the \$1,144,000,000 of additions and betterments has been actually paid for but it has been taken care of in some way, part having been paid in cash, part by 15-year equipment trust certificates and part

funded by giving the Railroad Administration negotiable promissory notes.

If the unadjusted indebtedness of the roads on capital account be offset against the indebtedness of the Railroad

INDEBTEDNESS of Railroad Administration to the railroads is estimated at \$750,670,588, while the unadjusted balance due the Railroad Administration for additions and betterments is placed at \$507,628,508, making a net balance of \$243,042,080.

Claims of 215 companies for \$436,145,307 have been settled for \$132,221,839.

I. C. C. estimates the six-months guaranty to railroads at \$536,000,000, of which \$105,000,000 has not yet been paid.

Railroads have received \$263,000,000 in loans from revolving fund and have repaid \$21,000,000.

Administration to them on open account, according to the estimate of the director general of railroads, it still owes the roads \$243,042,080. This estimate is made on the assumption that the remaining settlements will be made on the Railroad Administration's construction of the contracts between it and the roads. The claims of the railroads call for a larger sum.

Roads operating 208,721 miles have filed claims for \$940,587,256 in final settlement and on this basis the total claims for all the roads are estimated at about \$1,100,000,000. Claims to the amount of \$436,145,307, representing 215 roads and 107,063 miles, have been settled for \$132,221,839, which means that the carriers still have claims to the amount of approximately \$664,000,000 against the Railroad Administration's estimate of \$243,000,000. However, the roads are expected to waive a large part of these claims that is based on the so-called "inefficiency of labor" in accordance with an informal understanding

reached with the President in July in return for an agreement on his part to fund a part of the indebtedness of the roads.

In the settlements that have been made \$179,710,117 of additions and betterments (exclusive of equipment) were

charged to the carriers and \$33,443,000 was funded, while \$42,250,000 had been funded prior to final settlement. All of the \$381,000,000 of standard equipment was financed by the roads, while Mr. Hines was still director general of railroads, \$311,000,000 of the amount having been taken care of by equipment trust certificates.

Six-Months Guaranty

The Interstate Commerce Commission has also made an estimate as of November 30 that there is still payable to the carriers on account of the six-months guaranty about \$105,000,000. Its estimate of the total amount payable under the guaranty is about \$536,000,000, of which \$264,000,000 has been paid in the form of advances under section 209 of the law, \$166,000,000 as partial payments under section 212, and \$721,658 in final settlement with five companies. These are the Alabama & Mississippi, Ann Arbor, Electric Short Line, Electric Short Line Terminal Company and Norfolk Southern. The railroads had filed returns showing an aggregate amount due them under the guaranty provisions of the act of \$818,400,184 but the amount to be paid has been considerably reduced by differences between the interpretation placed on the provision of the law by the roads and by the commission.

Loan Fund

On the other hand, the roads also owe the government some \$240,000,000 on account of loans made from the revolving fund provided for by section 210 of the law on certificates of the Interstate Commerce Commission. As security for the loans and for the indebtedness of the roads to the Railroad Administration which has been funded in one form or another, the government holds over half a billion dollars of railroad securities, while it has sold to the investing public over \$135,000,000 of railroad equipment trust certificates. The Treasury, at the end of its fiscal year, according to its annual report to Congress, held railroad securities amounting to \$680,438,653. This consisted of obligations acquired by the director general of railroads, including equipment trust certificates to the amount of \$311,260,300 and \$215,574,603 of obligations of the carriers held as security for loans from the revolving fund. The holdings of railroad securities increased \$235,000,000 during the fiscal year, principally on account of the loan fund, but have since been reduced by the sale of equipment trusts.

The total loans authorized by the commission up to November 30, the date of the latest public report of the status of the revolving fund, amounted to \$263,407,717, which went to 70 companies. Of this, \$21,466,067 has already been repaid. The repayments and accrued interest had added \$27,525,000 to the fund, while \$40,000,000 of the fund has been tentatively reserved for claims, judgments, etc., against the Railroad Administration arising out of federal control, so that there was an uncertified balance at the date of the report of \$24,117,283; tentative approvals and commitments, had been made, however, to the amount of \$14,013,500, leaving an unencumbered balance of \$10,103,783.

Because of the general depression in business during the year and the resulting decline in the costs of materials and labor, some carriers, considering it sound business discretion to defer expenditures of the proceeds of loans certified to them, requested the commission to cancel its certificates and to consider their applications as withdrawn. Other carriers requested the commission to authorize them to expend a portion of the proceeds of their loans for purposes other than those for which the loans were originally made. The commission has generally approved this policy and has thus been able to extend the benefits of the revolving fund to other carriers more urgently in need of financial help, particularly in respect to maturing indebtedness.

National Railway Service Corporation

The amendment to section 210 effected by section 5 of the sundry civil appropriations act, approved June 5, 1920, authorized the commission to make loans for equipment to or through such organization, car trust or other agency as it might determine upon, approve or organize for the purpose "as most appropriate in the public interest," subject to the provisions of the act. The National Railway Service Corporation, organized under the auspices of the National Association of Owners of Railroad Securities, was approved as an agency for this purpose, and the commission certified to this corporation the following loans for the benefit of carriers named:

Baltimore & Ohio	\$5,200,000
New Orleans, Texas & Mexico.....	926,000
Bangor & Aroostook	53,100
Chicago, Rock Island & Pacific.....	1,568,540
Minneapolis & St. Louis.....	386,190
Wheeling & Lake Erie.....	3,304,000
Total.....	\$11,437,830

As a condition of the certification of these loans the National Railway Service Corporation and the carriers themselves were required to finance from outside sources \$18,409,765.

The law providing for the loan fund limits the time within which application for loans may be filed with the commission to two years from February 28, 1920. The commission in its annual report to Congress suggested that this period be extended, pointing out that in prescribing this limitation Congress apparently anticipated that the "transition period" would be of relatively short duration, but that "the progress of readjustment throughout the country has been slower than was generally anticipated." The commission estimated that repayments of principal of loans already made, which by their terms require early or serial repayments, and accretions to the fund from semi-annual interest payments during the two years, would aggregate \$93,000,000, making an approximate total of \$103,000,000 available for additional loans if the period for filing application should be extended.

A table on the following page shows the loans to the carriers which the Commission has certified from this fund.

The repayments have been: Ann Arbor, \$60,000; Atlanta, Birmingham & Atlantic, \$20,000; Bangor & Aroostook, \$4,000; Carolina, Clinchfield & Ohio, \$1,000,000; Chicago, Indianapolis & Louisville, \$45,000; Chicago & Western Indiana, \$89,000; Great Northern, \$15,134,000; Illinois Central, \$296,000; Missouri Pacific, \$4,362,000; National Railway Service Corporation, \$380,368.70; Salt Lake & Utah, \$15,700; Waterloo, Cedar Falls & Northern, \$60,000.

Railroad Administration Settlements

The Railroad Administration had effected some 20 final settlements with the smaller roads up to the end of 1920, but most of the larger roads had not filed their complete claims and some of them have not yet done so. The settlement of the claims is a complicated process at best, but it was made even more complicated by the controversy between the roads and the Railroad Administration over the claims for under-maintenance into which entered the question of the so-called "inefficiency of labor." While the Railroad Administration admitted some under-maintenance, the railroads claimed that even after materials and hours of labor had been estimated in proper relation to similar expenditures in the pre-war period the "inefficiency of labor," from one cause or another still left a wide difference between actual upkeep and the expenditures made during federal control, while the Railroad Administration took the position that its obligation had been fulfilled if it had expended the proper amount of money.

The Railroad Administration had consistently refused to settle except on its own interpretation of the contract unless

its position were reversed by the highest court. The same question, however, had been put up to the Interstate Commerce Commission by a provision in the law which made the maintenance provision of the standard contract its criterion in determining the amount of maintenance expenditures to be allowed the carriers in computing the six-months guaranty and there were some hopes that a decision on its

to exercise the discretion allowed him by the Transportation Act to fund indebtedness of the railroads, while the railroads agreed to waive their claims based on the inefficiency of labor in their negotiations with the Railroad Administration, in order to hasten complete and final settlements, without surrender of any rights in court in case of a failure to settle.

LOANS CERTIFIED BY THE COMMISSION TO THE SECRETARY OF THE TREASURY UNDER SECTION 210 OF THE TRANSPORTATION ACT, 1920, AS AMENDED

Name of carrier	Amount
Akron, Canton & Youngstown	\$212,000
Alabama & Vicksburg	1,394,000
Alabama, Tennessee & Northern	90,000
Ann Arbor	650,000
Arkansas Harbor Terminal	30,000
Atlanta, Birmingham & Atlantic	200,000
Baltimore & Ohio	8,200,000
Bangor & Aroostook	253,100
Boston & Maine	14,708,479
Buffalo, Rochester & Pittsburgh	1,000,000
Cambria & Indiana	250,000
Carolina, Clinchfield & Ohio	3,000,000
Central New England	300,000
Central of Georgia	237,900
Central Vermont	65,000
Charles City Western	140,000
Chesapeake & Ohio	9,079,000
Chicago & Western Indiana	8,000,000
Chicago Great Western	2,445,373
Chicago, Indianapolis & Louisville	315,000
Chicago, Milwaukee & St. Paul	35,450,000
Chicago, Rock Island & Pacific	11,430,000
Cumberland & Manchester	375,000
Erie	11,574,450
Evansville, Indianapolis & Terre Haute	400,000
Fernwood, Columbia & Gulf	33,000
Flemingsburg & Northern	7,250
Fert Dodge, Des Moines & Southern	200,000
Fort Smith & Western	15,000
Georgia & Florida	800,000
Great Northern	33,496,000
Greene County	60,000
Gulf, Mobile & Northern	515,000
Hocking Valley	1,665,000
Illinois Central	4,440,000
Indiana Harbor Belt	579,000
Inter-Urban	633,500
International Great Northern	194,300
Kansas City, Mexico & Orient	2,500,000
Kansas City Terminal	580,000
Lake Erie, Franklin & Clarion	25,000
Long Island	710,000
Louisville & Jeffersonville Bridge & R. R. Co.	162,000
Maine Central	2,373,000
Minneapolis & St. Louis	1,768,190
Missouri, Kansas & Texas	450,000
Missouri Pacific	10,071,860
New Orleans, Texas & Mexico	1,160,000
New York Central	26,775,000
New York, New Haven & Hartford	17,630,000
Norfolk Southern	311,000
Northern Pacific	6,000,000
Pennsylvania Railroad	12,480,000
Perris & Palmdale Union	1,770,000
Rutland	61,000
Salt Lake & Utah	1,008,000
Seaboard Air Line	8,698,000
Shearwood	29,000
Tampa Northern	100,000
Terminal R. R. Association of St. Louis	896,925
Toledo, St. Louis & Western	692,000
Trans-Mississippi Terminal	1,000,000
Virginia Blue Ridge	106,000
Virginia Southern	38,000
Virginian	2,000,000
Waterloo, Cedar Falls & Northern	145,000
Western Maryland	3,422,800
Wheeling & Lake Erie	6,264,000
Wichita Northwestern	381,750
Wilmington, Brunswick & Southern	90,000
Total loans certified	\$263,407,717

To fund the carriers' indebtedness, however, would increase the amount that would be needed by the Railroad Administration to make its settlements. The President on July 26 sent a message to Congress urging the passage of a bill to extend the authority of the War Finance Corporation so that it might purchase the railroad securities accepted by the director general. "No added expense, no added investment is required on the part of the government," he said; "there is no added liability, no added tax burden. It is merely the grant of authority necessary to enable a most useful and efficient government agency to use its available funds to purchase securities for which Congress has already authorized the issue, and turn them into the channels of finance ready to float them." The bill was passed by the House on August 22 but it was delayed in the Senate by the opposition of the agricultural bloc and finally, toward the close of the extra session, efforts to put it through were practically abandoned.

On August 6, the Interstate Commerce Commission issued its decision in which it held that differences in the "cost of labor," as those words are used in the upkeep section of the contract, do not include changes in the quality or effectiveness of labor but only changes in wages, and that in fixing the maximum amount to be included in operating expenses for maintenance, under the guaranty, the commission will use as the basic measure the expenditure during an average six months of the test period, adjusted to differences in the cost of labor and materials and in the amount and use of the property.

The cash derived from the sale of equipment trust certificates is made available to the Railroad Administration for payment in final settlements and to that extent obviates the need of an appropriation. It had cash on hand on December 1 to the amount of \$152,000,000. Without the authority proposed by the Winslow bill to the War Finance Corporation to purchase railroad securities taken by the government in funding operations, the President is still at liberty to sell them direct if he can, but if market conditions improve so that he can do so on favorable terms it is probable that many of the railroads can market securities with which to settle their indebtedness to the Railroad Administration. A list of the roads and other transportation companies which have made final settlements with the Railroad Administration and the amounts they received is as follows:

Ahlene & Southern	\$150,000
Akron Union Passenger Depot Company	14,000
Alabama Great Southern	1,530,000
Albany Passenger Terminal	54,000
Alton & Southern	385,000
Ann Arbor	*600,000
Arkansas & Memphis Railway Bridge & Terminal Company	90,000
Asheville & Craggy Mountain	95,364
Atlantic Coast Line	5,500,000
Baltimore Steam Packet Company	820,000
Bangor & Aroostook	575,000
Belt Railway Company of Chicago	29,500
Bennettsville & Cheraw	29,500
Bessemer Lake Erie	3,050,000
Birmingham & Northwestern	10,000
Boston Terminal Company	1,000,000
Buffalo, Rochester & Pittsburgh	1,000,000
Cambria & Indiana	70,000
Carolina & Northeastern	15,000
Carolina & Tennessee	5,000
Carolina, Clinchfield & Ohio	550,000
Charleston Terminal Company	90,000
Chatanooga Station Company	19,623
Chesapeake Steamship Company	62,303
Chicago & Eastern Illinois	3,000,000
Chicago & North Western	6,500,000
Chicago & Western Indiana	450,000
Chicago, Burlington & Quincy	8,000,000
Chicago Junction	380,000
Chicago, Milwaukee & Gary	200,000

part in favor of the contention of the carriers would have some effect on the Railroad Administration. The Bureau of Finance of the Interstate Commerce Commission at one time took a position in favor of the roads on this point and it was reported that the commission had tentatively decided in the same way by a vote of 6 to 5 but if this were true it reversed itself before issuing its decision and sustained the contention of the Railroad Administration.

Legislation to Provide Funds for Railroad Administration Fails

Before this, however, the entire question became involved in a series of negotiations between the railroads and the administration, in which the President expressed a willingness



Railroads Profit From Lower Material Costs



Marked Reductions Have Been Made in the Price of Practically All Important Commodities

By W. S. Lacher and C. B. Peck

THE RAILROADS are now a preferred customer in a buyer's market. This is a most remarkable transition from the status in the summer of 1920, when a seller's market gave first consideration to the devotees of the buy-at-any-price hysteria which was then sweeping the country. Prices in nearly all lines have been greatly reduced, as is evident from the charts showing the range of manufacturers' quotations appearing throughout this article. The decline has also been fairly steady throughout the year with considerable evidences of an upturn in the later months following a more general resumption of railroad purchases. While reductions in the prices of finished products have lagged considerably behind those of raw materials, the readjustment as regards these has also been of a substantial nature.

Marked Readjustment in the Steel Industry

The story of the iron and steel market for 1921 is one of exceeding interest and insofar as the buyer is concerned one of satisfaction as well. This year saw the disappearance of the last vestige of priorities, established prices and other distasteful features that made up the market conditions with which the purchaser became all too well acquainted during the war period. What established prices there are today outside of those for rail and one or two other items have little bearing on the actual sales.

The story of a declining market is always a difficult one to tell accurately because the real prices are not disclosed. It is only when concessions become general that they are recognized in published quotations. For this reason the trend of prices over the past year or more has been given in several charts showing the general tendencies rather than tables of specific quotations.

To get a proper perspective of the decline in the market, it is necessary to go back to the fall of 1920, when the price schedule of the United States Steel Corporation was clearly below the ruling market. Thus, the corporation's price for open-hearth rail was \$47 per ton while the independents

were holding out for \$57 or even more and there was a great deal of uncertainty as to just what the price would be for rails delivered in 1921. All indications pointed to a readjustment upward of the United States Steel Corporation's schedules, including the rail price.

However, the softening influence of the incipient business depression was at work, and on November 19, 1920, Judge Gary announced that the established prices of the Corporation, with a few minor modifications, would remain effective in 1921. This served also to fix the price of rail at \$47, and although the independents clung to the higher figure for some time, they were eventually forced to recognize the lower price. In the meantime, the independent prices for other commodities came tumbling down and by February prices were pretty well established at the Corporation level.

The early months of 1921 witnessed an interesting reversal in market conditions. Whereas in the autumn of 1920 the Corporation's prices were below the current market, the drop of prices in the spring of 1921 saw the United States Steel quotations left on a level considerably above the actual selling prices. As this condition became more apparent rumor gained current that the United States Steel Corporation would announce a reduction in its schedule of prices and this finally took place on April 13. This reduction received publicity in the newspapers as a definite measure in the direction of readjustment, but those familiar with conditions in the market recognized at once that the new prices were still well above the active market quotations at the time and with further softening of the market the schedule quickly became a dead-letter.

On July 4 the Bethlehem Steel Company announced a new schedule of prices which was followed shortly by corresponding announcement from the United States Steel headquarters, but these schedules also fell short of the market. Since that time but limited attention has been given to established schedules, the market becoming more and more a matter of actual agreement between buyer and seller.

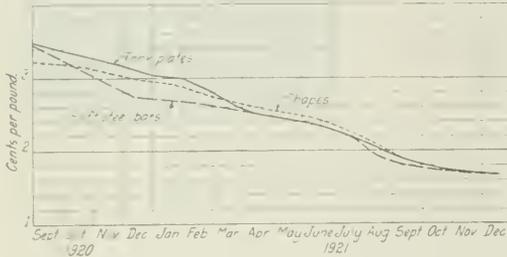
EIGHTEEN MONTHS have seen remarkable changes. July, 1920, saw a seller's market. Buyers scrambled to buy where and when they could at any price and for any date for delivery. Today we have a buyer's market. Sellers are making every possible concession as to both price and delivery in an effort to get a share of the business offered. Some prices have fallen more than others. In many lines the readjustment seems well-nigh complete.

The United States Steel Corporation's price for open-hearth rails of \$47 remained the basis for deliveries during 1921, but many railroads failed to make requisitions to cover their full orders so that a considerable tonnage on old orders remained on the books. This no doubt was one influence which led to a reduction to \$40 announced on October 25, with a provision that it would apply alike to new contracts and unfilled tonnages on old orders. This change apparently provided the necessary stimulant to the rail market, for at least 500,000 tons of rails have been ordered subsequent to

The railroads, unlike small consumers, buy wholesale and in many cases f.o.b. mill. Therefore, they are realizing the full benefit of the price decline to a much greater extent than the small purchaser who must buy through a retailer or jobber.

Cars and Locomotives

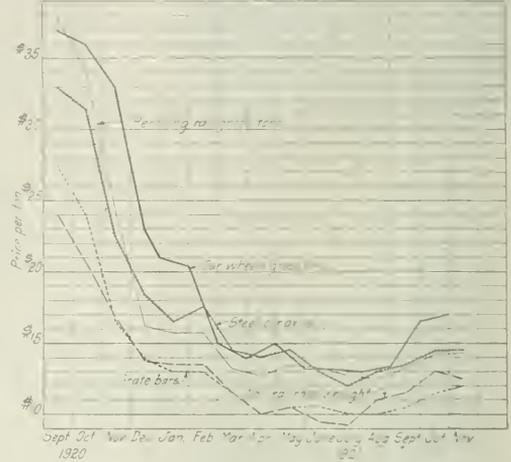
Last year in an article on locomotive and car prices (*Railway Age*, January 7, 1921, page 87), data were pre-



General Tendency of Structural Steel Prices

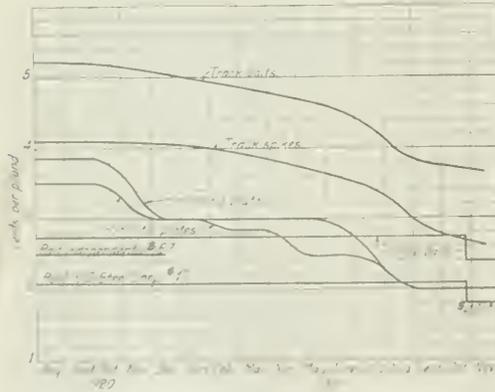
this announcement with inquiries current for an even larger tonnage.

The decline in structural steel has been more steady and with the fall in the price of the plain material, an even greater decline has taken place in the pound prices for fabricated structural steel. In an effort to keep their shop organizations together the fabricators have cut the spread between the plain material and the finished product to a minimum. As a consequence, the railways have been able to buy steel



The Range of Scrap Prices in the Last Fifteen Months

sented showing the trend of prices of the various classes of equipment since 1910. Using the average price of 1910 to 1914 as 100 per cent, the prices of freight cars were found to have increased at a comparatively uniform rate from 1915,

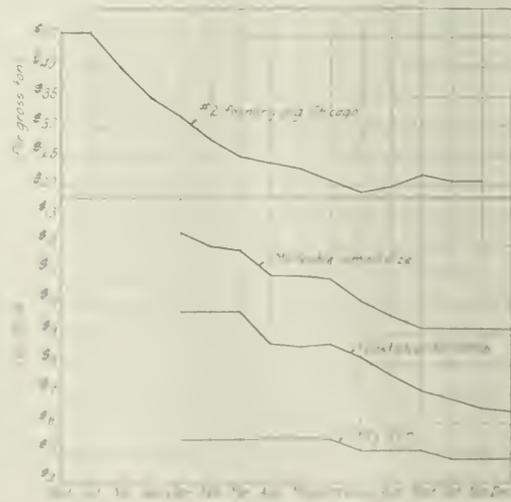


General Tendencies of Track Material Prices

broken during the latter part of the present year at reductions in price greater than that measured by the decline in the steel itself.

Lumber Market on a New Basis

The two to three months to month quotations on lumber items of domestic production to the railroad field show a steady decline of prices in the 12 months from June, 1920, to May, 1921, since which time the market has been practically stationary. In certain grades, as for example car material, there has been a well-defined upturn in recent months due no doubt to the influence of recent car orders.



Trend of Prices for Pig Iron and Iron and Steel Castings

reaching a maximum in 1920 of 300 in the case of all steel cars and 315 in the case of cars of composite construction. Passenger cars, starting in 1915 from 82 per cent of the

1910 to 1914 average, increased with like uniformity to 218 in 1920. In the case of locomotives the same uniformity in the rate of price increase was not observed. Starting at 100

of business done during the first six months, attention was called to the fact that very few equipment orders were placed during the last half of the year. What was true of the last

TABLE I—MILL PRICES FOR DOUGLAS FIR LUMBER

	1920						1921									
	Jan.	Apr.	June	Aug.	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Stringers, 8 by 16, No. 1, common.....	\$33.00	\$36.00	\$35.00	\$31.00	\$27.00	\$25.00	\$26.00	\$23.00	\$21.00	\$17.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
Timbers, 12 by 12, No. 1, common.....	32.00	33.00	30.00	27.00	25.00	22.00	22.00	20.00	18.00	15.00	14.00	14.00	13.00	13.00	13.00	14.00
Car framing, select, common.....	25.00	40.00	35.00	33.00	27.00	27.00	27.00	24.00	20.00	20.00	20.00	20.00	16.00	14.00	14.00	14.00
Car sills, 41-45 ft.....	40.00	45.00	40.00	38.00	35.00	32.00	32.00	28.00	24.00	24.00	24.00	17.00	16.00	16.00	16.00	16.00
Car siding, No. 2, clear and better.....	75.00	85.00	85.00	70.00	45.00	44.00	44.00	36.00	36.00	36.00	30.00	26.00	25.00	28.00	30.00	40.00
Car lining, select common, D. & M.....	46.50	56.00	45.00	38.00	30.00	27.00	27.00	22.00	20.00	18.50	18.00	18.00	17.00	17.00	17.00	19.00
Car decking, finished select common, D. & M.....	38.00	45.00	35.00	35.00	30.00	30.00	30.00	24.00	22.00	18.00	17.00	17.00	13.50	17.00	17.00	19.00
Switch ties, No. 2, clear and better.....	32.00	33.00	30.00	27.00	25.00	25.00	22.00	22.00	18.00	15.00	13.00	13.00	13.00	13.00	13.00	13.00
Crossing plank.....	32.00	33.00	30.00	27.00	25.00	25.00	22.00	22.00	18.00	15.00	14.00	14.00	13.00	13.00	13.00	13.00

TABLE II—MILL PRICES FOR SOUTHERN YELLOW PINE LUMBER

	1920											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Stringers 7 by 16-28 ft.....	\$59.00	\$59.00	\$60.00	\$65.00	.....	.....	.....	.....	.....	.....	.....	.....
Bridge Material 12 by 12.....	46.00	48.00	.....	52.00	50.00	50.00	.....	.....	.....	.....	.....	.....
Car Sills 36-40 ft.....	52.00	54.00	54.00	54.00	51.00	51.00	.....	.....	.....	.....	.....	.....
Car Lining 36-40 ft.....	57.00	60.00	65.00	65.00	60.00	56.00	.....	.....	48.00	.....	35.00	.....
Car Decking 36-40 ft.....	45.00	48.00	48.00	50.00	50.00	31.00	.....	.....	48.00	.....	.....	.....
Crossing Plank 36-40 ft.....	.....	.....	52.00	52.00	.....	.....	48.00	50.00	48.00	46.00	.....	.....

	1921											
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Stringers 7 by 16-28 ft.....	\$38.00	\$37.00	.....	.....	.....	.....	.....	\$37.00	\$38.00	\$39.00
Bridge Material 12 by 12.....	31.00	30.50	27.00	25.00	26.00	27.00	28.00	28.00	30.00	30.00		
Car Sills 36-40 ft.....	.....	.....	.....	.....	32.00	.....	.....	35.00	35.00	35.00
Car Lining 36-40 ft.....	.....	.....	.....	.....	.....	24.00	25.50	.....	30.00	29.00
Car Decking 36-40 ft.....	.....	35.00	.....	25.00	26.00	26.00	28.00	28.00	28.00	29.00
Crossing Plank 36-40 ft.....	.....	.....	27.00	25.00	24.00	26.00	27.00	28.00	30.00	.....	

in 1915, the average price reached 210 in 1917 and after dropping back to 206 during the next year, recovered to 212

six months of 1920 was also true of the first ten months of 1921. Since November 1 there has been considerably more activity in cars and index prices for 1921 must be based on November and December conditions. Such data as are available clearly indicate a marked drop in the prices from the high levels of last year, varying from 30 to 35 per cent.

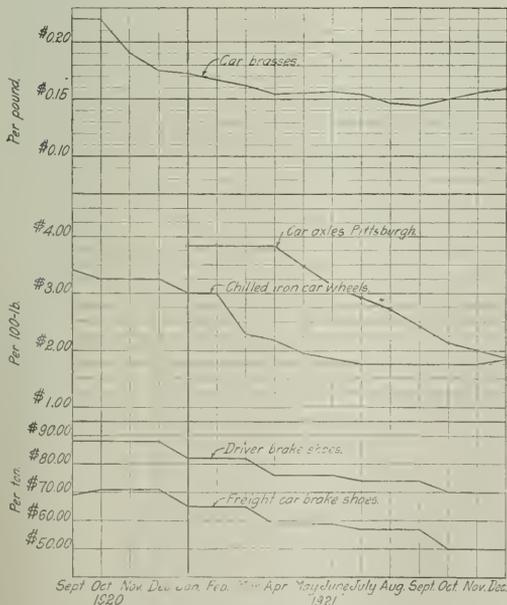
In the case of all-steel freight cars the average of this reduction has been from the 300 index number of 1920 to about 213.

Similarly, composite steel and wood equipment has dropped from 313 in 1920 to about 215.

What has been said with respect to cars applies with even greater force to the locomotive market. Indeed, it may be truthfully said that there has been no locomotive market during 1921. It is true that several sizeable orders have been placed during recent weeks, but the number of these orders has been entirely too limited to average out the effect of special provisions in the specifications even if complete data were available for use in calculating an index number for the year. Quotations on comparable specifications have been made in 1921, ranging from 25 to 50 per cent less than those of 1920, but it is doubtful whether these comparisons are at all indicative of the trend of the conditions which would fix prices if a reasonably steady volume of business were to be established.

Miscellaneous Car and Locomotive Material

Supplementing the diagram showing the trend of prices of several basic iron and steel commodities, which in a general way may be taken as an index of the trend of prices of finished materials into the manufacture of which they enter extensively, the trend of the prices of a number of finished products which are used extensively, not only in the construction of new equipment but in every-day running repairs and maintenance, are shown in one of the diagrams. Some of these materials are purchased under contract and are not quoted at uniform prices. In such cases the curves present averages of a number of quotations, and are sufficiently accurate to indicate the trend of the market.



Price Tendencies of Finished Materials Used in Maintenance of Equipment

in 1919. Then came an increase to 251 during the first half of 1920.

In establishing these index numbers for 1920 on the basis

Cost of Ties Greatly Reduced

The cross tie industry has undergone a process of severe readjustment. Prices have been greatly reduced, but owing to the wide range of conditions, variety of grades and, still more important, character of inspection, it is not practicable to present tabular data that would be representative of the entire country. The following statements are indicative of tendencies. Tie hackers in southeast Texas are now making 8-in. by 8-in., 8 ft. yellow pine ties for 25 cents and hardwood ties for 35 cents. In the north Atlantic states pine ties, delivered, now cost only about 35 cents more than they did before the war; oaks in the same territory are about 25 per cent higher than before the war. The price of yellow pine switch ties represents about the same advance over pre-war prices and is equal to about two-thirds of the price of a year ago.

One road in the middle west reports that prices for ties produced locally are now about 55 cents lower than last year and very close to the pre-war basis. The following table is also indicative of changes in the prices of cross ties although it is carried only to April whereas prices have decreased appreciably since that time:

NORTH ATLANTIC STATES		
	Season of 1920	April 1, 1921
White oak—7 by 9.....	\$1.85	\$1.50
Chestnut—7 by 9.....	1.50	0.95
Red Oak—7 by 9.....	1.75	1.25
Hard maple and gum—7 by 9.....	1.50	0.90
Elms, soft maple, etc.—7 by 9.....	1.50	0.90
Southern yellow heart pine.....	2.25	1.35
Southern yellow sap pine.....	2.00	0.90

SOUTH ATLANTIC STATES		
	Season of 1920	Fall of 1921
Yellow pine ties, various sizes	\$0.99 to \$1.50	\$0.40 to \$0.80

The present low prices are the results of one of the most remarkable gluts the tie market has ever known. As in the case of steel, the story goes back to 1920 when the transition from government to corporate purchases in March, 1920, caused a number of the roads to delay getting into the tie market. As a consequence the railroads, generally speaking, not only scrambled for their requirements but probably over-purchased, in many cases, to a considerable amount. Freight rates went up, labor was high, preservatives increased in price, so that the ties purchased in 1920 cost the railroads more than they have ever paid for ties before. When the lumber market broke in the fall of 1920, the situation was very quickly reversed. Saw mills turned to the manufacture of ties and the roads were soon offered a large supply at more favorable prices. The condition was also influenced by the change in the labor market and the decreased demand for cotton and other agricultural products, resulting in a great impetus in tie production for right-of-way delivery.

The railroads did not sense this condition at once and for a time took no steps to curtail production until they suddenly found themselves overwhelmed with the delivery of a much larger quantity of ties than they had expected to purchase. The result was that nearly all of the stronger roads, which were in a financial position to go into the tie market in the latter part of 1920 for large quantities of ties, were compelled to withdraw from the market early in 1921 and, notwithstanding drastic cancellations, some of them accumulated surpluses of ties which are sufficient to take care of all of 1922 and a part of 1923 requirements.

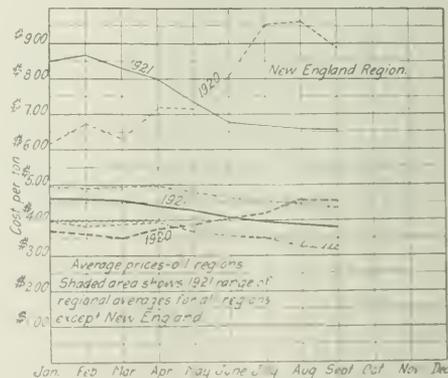
The greatly decreased demand has resulted in a very marked scaling down in the prices, but unfortunately many of the roads are now stocked up with ties bought at much higher figures. Consequently, participation in the low prices is restricted largely to the roads which had been compelled to limit their purchases during 1920. Another effect of the change in market conditions is the general use of a better grade of ties. The railroads have been in a position to demand them and are now securing more hardwood ties than they had been able to obtain for a number of years.

The report of the American Wood-Preservers' Association shows that 1920 was a banner year for timber treatment, the number of ties treated, 44,987,532, being larger than in any previous year, and indicating a complete recovery from the decline in treatment prevailing during the war period. There is every indication that the record for timber treatment in 1921 will also be very good, one inducement in this direction being a plentiful supply of creosote and other preservatives at much more favorable prices than have prevailed for a long time. The most important influence in this direction has been the resumption of creosote imports on a large scale from both England and Germany.

Generally speaking, the cost of railroad coal has shown a steady though not large decline during the first three-quarters of 1921. Data compiled by the Interstate Commerce Commission show a decline in the average cost of the coal used in road service by a large percentage of the Class I railroads of the United States from \$4.61 in January to \$3.80 in September, or about 17.5 per cent. The cost given by the Interstate Commerce Commission includes the invoice price plus freight charges and is a weighted average. A comparison of the cost by months for 1920 and 1921 for the United States as a whole and for each region is shown in Table III.

The greatest reduction within the year from a dollars and cents basis, took place in the New England region. From \$8.72 in February the price declined to \$6.57 in September, or 24.5 per cent. Although less in amount, reductions

Coal



Trend of Average Cost of Railroad Fuel—1921 and 1920

of 25.8 per cent and 24 per cent occurred in the Ohio-Indiana-Allegheny region and the Pocahontas region respectively, the Great Lakes region following with a decline of 20 per cent. The reductions in the western regions have been much less marked, particularly in the Northwestern region where the average cost in September was but five per cent below the price at the beginning of the year. In the Northwestern and Central regions, however, it should be noted that the trend has not been uniformly downward throughout the year. In the Northwestern region the cost of fuel increased gradually from January until April, at which time a maximum of \$4.96 a ton was reached. Since that time the decline has been uninterrupted. In the case of the Central Western region, although the maximum average for 1921 is shown for the month of January, with a well-marked decline in February, this was followed by increases in March and April, the average cost for the latter month being \$3.95 a ton, but two cents a ton less than the cost in January.

The significant fact brought out by the graphical presentation
(Continued on page 52)



New York Central Yards, East Buffalo, N. Y.

Improved Service and Morale Features of 1921

Considerable Progress Made but Pre-War Standards Not Yet Restored

By Charles W. Foss

PRIMARILY because of the aching void that the absence of it left in railway operation during the larger part of the period of federal control and a few months succeeding, railway officers and students of railway affairs were given an entirely new appreciation of that factor in railway operation known as *morale*. During 1921 there was much in the way of labor difficulties; on the whole, however, perhaps not as much as might have been expected under the trying conditions. He would be a true pessimist who would not admit that the railways have succeeded in taking a long step in the direction of restoring that old time loyalty on the part of officers and men alike. The change in that respect as compared with 1920 and 1919 is one of the outstanding features of 1921. It is not necessary to produce facts to prove that the railroads have again restored, in large measure, the morale of their men. The fact has been noticed by travelers and shippers. There is no fair-minded railroad man who will not admit it.

It is interesting to observe in what manner the improvement in railway morale has accompanied or has been accompanied by a similar improvement in railway service.

Reasons for Improved Service

The railways today are moving freight over the road in much better shape than was the case either during the war or after the armistice. They are for the most part not producing quite the same sort of service, however, that they produced prior to the war. There are some who declare that the fact that the freight is being moved faster this year is due to the smaller amount of business that is being carried. While there can be no question that the lack of that congestion which resulted when the railroads were being worked practically beyond their capacity, is an important factor,

there is still room for belief that the improved morale has been the determining feature. This would seem to be borne out by the conditions of 1919. That year was not a peculiarly busy one. It represented, however, the low point insofar as railroad service to the shippers and the traveling public was concerned.

EVIDENCE of the past three or four years seems to indicate that good morale and high grade service are interrelated factors.

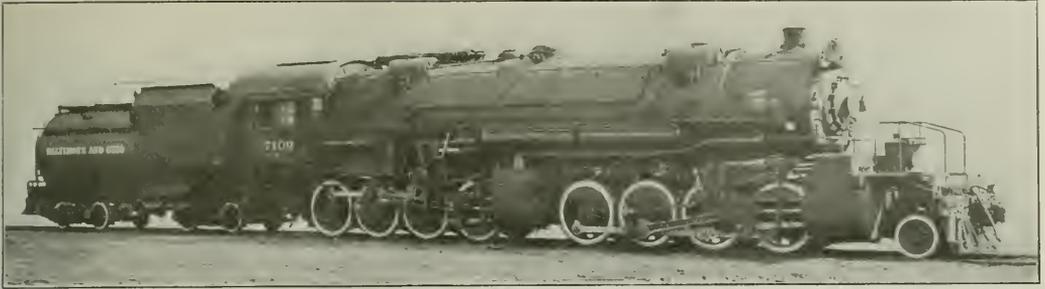
During the war neither service nor morale were as good as prior to the war. After the armistice both were exceedingly poor. At present both show much progress towards pre-war standards.

Competition of the right kind is one of the best assets the railroads can have.

Train Speed—Miles Per Hour

A factor that is of interest in connection with the speed with which the movement of freight is conducted may be gleaned from the operating statistics. The particular figure in mind is that of "train speed—miles per hour." The latest available figures are those for October issued recently by the Interstate Commerce Commission Bureau of Statistics. Taking the averages for the ten months ending October 31, we find that in the first ten months of 1921 the railroads of the United States moved their freight trains at an average speed of 11.4 miles an hour as against 10.3 miles an hour shown as the average for the first ten months of 1920. This indicates an improvement but for the fact that the net tons per train were but 702 in the first ten months of 1921, as against 737 in the same period of 1920. The increase in train speed does not therefore necessarily represent an improvement; it means rather that with lighter loads the trains can be moved faster, or that with less congestion on the division the trains are given a better opportunity to keep moving instead of being laid up frequently on sidings. We cannot, therefore, take the figure of "train speed—miles per hour" as our criterion.

Readers of the *Railway Age* have been hearing from time to time of rather spectacular fast movements of manifest or other freight made by different roads. Such performances as these are a somewhat better indication of improved freight train service. They point out at least that the railways



Baltimore & Ohio Mallet 2-8-8-0 Freight Locomotive

Recent Tendencies in Locomotive Development

Demands for Efficiency Forcing Changes in Design—Capacity and Reliability Alone Not Sufficient

By R. C. Augur

IT IS WISE occasionally to stop and look back over the road that has been traveled before looking forward to see where the road is leading. If a comparison is made between typical freight, passenger or switch locomotives of the present day and those which were considered modern 20 or 30 years ago the differences are striking. The progress of the years has been marked by a steady increase in size, weight, power and efficiency. Every such increase has either been brought about by, or has been accompanied by, an advance in car weight and capacity and in average train tonnage. These changes have necessitated the introduction of such strong couplers, draft gears and car frames that there are serious dangers in an attempt to handle small old cars mixed in trains of heavier high-capacity cars. There are consequently many cars still in existence that are not safe to use in general traffic.

The increase in weights of rolling stock have also made necessary the rebuilding of bridges and the laying of heavier rails, followed by steadily greater outlays for track maintenance. These investments have unquestionably been well warranted and have proved profitable in places where there was a heavy traffic in ore, coal and low grade freight. It is possible, however, that the efforts to obtain an increase in train tonnage have caused the movement to go farther than was economically wise on some roads where the bulk of the traffic consists of general freight or which handle a large amount of such short seasonal freight as grain. Taking every item into consideration the price paid for the increase in train tonnage has been a large one. Would it not be advisable for the American Railway Association to undertake an investigation of the effect of the various factors which enter into the over-all cost of moving the traffic to determine definitely what are the most economical practices under different conditions?

Turning to passenger trains we note a tremendous increase in the weight of passenger cars; where an American type locomotive formerly hauled an express train, a Pacific type is now found to be unable to make the time and a Mountain type is being substituted. The amount of dead weight per

passenger would seem to be greater than necessary and it is hoped that the future will see an improvement in this respect.

What of the Future?

The evolution of the locomotive has been slow, but steady, as is true of the evolution of any piece of machinery. It is a case of the survival of the fittest, every modification having to meet the acid test of time. The development in the past has been noticeable mostly for the growth in size and capacity. Increase in capacity, however, has not been due entirely to changes in size and weight since the general adoption of improved designs and the introduction of desirable appliances has resulted in a marked gain in efficiency as well as capacity.

The trend of development in the immediate future will probably not be so much in the direction of size as along the lines of greater thermal efficiency together with an increase in the durability and reliability of the machinery. This will reduce the expenditures for maintenance, decrease the time required at terminals, make much longer runs practical and lengthen the mileage between shoppings for heavy repairs. Much more attention will unquestionably, and with advantage, be given to improvements in details of design, points which it has not been necessary seriously to consider when fuel was abundant and labor less expensive.

The Locomotive Boiler

The locomotive boiler in its present form is the result of the efforts of years to reach the maximum capacity with the

INCREASING ATTENTION is being given to points of design that affect the efficiency of boiler or engine. Such radical innovations as steam turbines and Diesel engine locomotives are being tested.

Locomotives have been rendered obsolete in the past because they did not have the power to haul heavy trains necessary for the economical movement of traffic. Many existing locomotives must be retired unless rendered more economical in fuel and maintenance costs.

minimum increase of weight and size. Efforts in the future will be directed toward obtaining a steadily increasing amount of steam for each pound of fuel consumed, without sacrificing any of the capacity that has been acquired by past exertions. With this object in view every detail of design will be subjected to a more critical scrutiny than has been customary hitherto.

The size and relative proportion of grate area, firebox volume, combustion chamber, length of tubes, distribution of heating and superheating surfaces, air openings through grates, air inlets to ash pan and circulation within the boiler, together with the purification and heating of feed-water by exhaust steam or waste gases, are some of the points that will be given greater consideration. At present far too much energy is lost in waste gases and in exhaust steam, losses which will probably be considered as inexcusable at no very distant date and characteristic of an extravagant past. Although efficiency will be given prime consideration, the question of a minimum maintenance expenditure and a minimum amount of attention and loss of time while in the shop will not be lost sight of.

The present arrangement of the front end and the means by which the necessary draft is secured is extremely simple and highly effective but no one would dream of calling it efficient. The defect has long been recognized and although it is not apparent that any other arrangement could be substituted without too much complication, the future will probably see a serious attempt to improve this method.

The Locomotive Engine

It is the function of the engine to produce the desired drawbar pull and furthermore, it should produce this drawbar pull with a minimum consumption of steam. The future will probably witness some marked developments in the direction of increased efficiency. Lower cylinder clearances, improved steam distribution, a reduction in exhaust pressure, and a better adjustment of the cut-off in relation to speed will demand increasing attention.

The use of a condenser has been proposed, but the added complication, the additional space required and the increase in cylinder size which would tend to exceed the clearance limits makes its adoption highly improbable unless other radical changes are made.

The day of the compound, at least in this country, ended with the advent of the superheater. It never was popular on American railroads but has been extensively used in Europe. It is interesting to note that even in those countries where it has been long and extensively employed the tendency towards its abandonment has been strongly marked, especially during the past year. Aside from Mallet locomotives, no compounds have been brought out in the United States and comparatively few new designs are being made in any other country.

In Europe, where crank axes and multiple cylinders are not considered as unwarranted complications, the present tendency is in the direction of four-cylinder or three-cylinder simples, with an increasing tendency toward the adoption of the latter, although the counterbalancing is not as perfect as in the four-cylinder type. This practice of using more than two cylinders is largely due to greater restriction in clearances than are common in this country. Despite the prevailing prejudice, it is by no means improbable that engines of the three cylinder type will in the near future be tried out for large size freight locomotives. The more uniform torque will make it possible to reduce the factor of adhesion while the smaller diameter of the pistons and the beveled over-all width will be favorably received. Counterbalancing will also be simplified.

With the increase in production of alloy steels, a better knowledge of the methods of working them, together with a widening appreciation of the necessity and advantage of heat

treating, it is probable that there will be a considerable extension of their use in locomotive construction.

During the last few years marked advancements have been made in the development of light non-ferrous alloys of high tensile strength. Some of these alloys may prove to be suitable for pistons or other reciprocating parts where a reduction in weight would be highly desirable.

Turbine Locomotives

The steam turbine years ago won recognition as the standard prime mover in large stationary power plants and also has been extensively used in the marine field. Its high efficiency, simplicity and large power for limited space and weight have forced locomotive designers to consider seriously the problem of its application to the locomotive. Thus far the pioneer work has been done in Europe, where the fuel costs are greater than in this country. In Switzerland, the Winterthur Locomotive Works has fitted up a locomotive with a Zoelly turbine. At Stockholm a Swedish State Railway locomotive has been equipped with apparatus furnished by the Ljungströms Steam Turbine Company. Both of these locomotives are now being tested and according to reports are showing satisfactory results.

In general appearance the locomotives closely resemble old familiar designs. A high-speed turbine is coupled to the driving wheels through a reduction gear, the exhaust carried to a condenser and a fan provided for creating the draft. In England a turbine locomotive with electric transmission is being built by Sir W. G. Armstrong, Whitworth and Company. In Italy a small switching locomotive driven by a Belluzo turbine has been in service for a number of years. As a result of this experience a large Pacific type road locomotive is now being fitted up. A number of other turbine locomotives have been designed, or are under construction, although but little information is yet available in regard to them.

Diesel and Other Internal Combustion Locomotives

Internal combustion engines designed to use gasoline or a similar fuel have been employed to a considerable extent for driving small locomotives of the type required for mines, industrial plants and light switching purposes. Common sizes have varied from 50 hp. to 75 hp.; in some cases they have been made of 150 hp. The field for the use of such engines appears to be limited to small, special locomotives and to motor rail-cars hauling not more than one trailer.

The Diesel or heavy oil engine has been developed to a high degree of efficiency and reliability. It has not only been a success for submarines, but is now being used for merchant ships in all parts of the world. These engines are far more efficient than any type of steam apparatus, but unfortunately have been bulky, heavy, complicated and expensive to build. The efficiency has been so attractive, however, that several Diesel locomotives have been brought out in Europe. Some of these were of the Diesel-electric type and others had the engines direct-connected.

It is possible that the recent development of the compound Diesel engine in this country will go a long way toward solving the problem of the Diesel locomotive and that it will find a definite field in railroad work. At the present time it would appear that its greatest usefulness would be in those localities where fuel is expensive and the traffic not sufficiently dense to warrant the heavy expense of electrification. It may require years of work to perfect and bring into extensive use the Diesel locomotive, but a number of such machines undoubtedly will be constructed in the near future and the results obtained will be watched with interest.

As a transportation unit, the present steam locomotive is a highly developed specialized machine. Still it is probably only in its infancy and the future may see many unexpected, if not radical, developments.



A Train of Seventy 100-Ton Cars on the Norfolk & Western

Many Special Types of Cars Introduced in 1921

High Capacity Equipment Most Notable Development;
Concrete Cars in Europe

By A. F. Stuebing

DURING RECENT YEARS the design of cars has tended gradually toward the adoption of a few major types.

Few new methods of construction have been adopted and the principal variations were those dictated by local conditions. During the year just past, however, a new tendency has manifested itself. New types have been developed, some to meet special operating conditions, and others to handle special classes of traffic more efficiently. The resourcefulness of railroad officers and equipment builders is exemplified in several notable developments, the most important of which are the high capacity gondola cars, container cars and self-propelled motor cars.

High Capacity Coal Cars

Unquestionably the most important step in the development of freight car equipment during the year was the extensive introduction of cars of extremely high capacity for handling coal between the mines and the car dumpers at tidewater and at the lakes. The three roads handling export coal at Hampton Roads all adopted new and heavier car equipment during the year. The Virginian, after prolonged trials of four different designs, placed in service 1,000 cars of 120 tons capacity, the largest units in general service on any road. These cars have made it possible for the Virginian to increase the trainload to a point never before attained, the maximum train consisting of 110 cars weighing 17,250 tons.

Shortly after the 120-ton cars were placed in service on the Virginian, the Norfolk & Western received 500 cars of 100 tons capacity, which were likewise designed for hauling coal from the mines to the car dumpers at tidewater. The notable features of this equipment are the new design of six-

wheel truck which carries the load on side bearings instead of on the center plate and the high ratio of load to total weight—78.9 per cent.

The high capacity cars of the Chesapeake & Ohio, like those of the Norfolk & Western, are of 100 tons capacity.

They differ from either of the other designs in having drop doors, which adapt the cars for general service where dumpers are not available.

The three cars mentioned are all equipped with six-wheel trucks. Although the additional pair of wheels has been considered necessary on these high capacity cars to keep the load on the axle, journals and wheels within proper limits, the six-wheel truck has certain disadvantages. Trials are now being conducted to determine whether it is feasible to operate cars of 100 tons capacity with four-wheel trucks. This type of car would impose a load of about 65,000 lb. on each axle. There is a question whether the metal in the wheels and in the rails can bear such a heavy load without flowing and without rapid failures. If no difficulty is experienced due to the concentrated load, the four-wheel truck will probably become the prevailing type for cars up to 100 tons capacity. The

THREE HAVE BEEN THREE outstanding developments in car design. High capacity gondola cars have enabled coal carrying roads to increase the tonnage per train and reduce operating costs. Container cars have facilitated the handling of mail, express and less than carload freight. Self-propelled cars have practically solved the problem of passenger service on branch lines.

Concrete freight cars, container cars and a novel five-car dining unit have been built in Europe.

ratio of load to total weight could probably be made higher in such a car than in one with six-wheel trucks and the ease of maintaining the four-wheel truck would be a decided advantage.

The Container Car

Another important development of the past year was the container car. This type of equipment has been used by the New York Central for express, mail and less than carload freight service, and the Boston & Maine is planning to

introduce a slightly different design of car in local freight service. The general advantages of the container system were brought out in an article in the *Railway Age* of December 10 and further comment is unnecessary. There appears to be a wide field for container cars and as soon as the details of design are worked out and difficulties of handling at terminals are overcome, an extensive development is to be expected.

Self-Propelled Cars

The need for reliable and economical self-propelled cars for service on branch lines has resulted in the construction of many types of equipment in the past, few of which have remained in service for any considerable time. The problem of designing a satisfactory car for this service now seems well toward solution; in fact, three types having as the source of power steam engines, gasoline engines, and electric motors receiving current from storage batteries have now passed the experimental stage. At least one of these types should be suitable under almost any local conditions. The motor car, like the container car, gives promise of reducing the cost of handling a class of service which in the past has been a liability, rather than an asset, on many roads.

Car Construction in Foreign Countries

Economic, industrial and political conditions in European countries have all influenced the recent design of cars. For example, Poland is experimenting with a modified type of container car in which the bodies are interchangeable on several types of running gear in order to overcome the handicap of the three gages, the Russian 5 ft., the German standard gage and the narrow gage. In France, Germany and Austria concrete cars have been built and have apparently met with a fair degree of success. Only one concrete car has been built in this country but it is probably fair to say that under American conditions concrete is not satisfactory as a material for freight cars. In Germany, on the other hand, it is stated that concrete cars are technically and economically

feasible and the use of this material does not increase the weight of the equipment as compared with steel construction.

There are numerous reasons why concrete may be applicable abroad but not in this country. The European cars are smaller, trains are lighter and the screw coupling eliminates the severe shocks in road service due to slack between cars. It is still too early to judge the relative merits of wood, steel and concrete. The elimination of decay and corrosion would be an important advantage for the concrete car if not offset by abrasion and disintegration. At the present stage the concrete cars are of interest chiefly because of the possibilities of future development.

Articulated Dining Train

One of the interesting developments in Great Britain is the construction of a dining unit of five cars on the articulated principle. The passenger train cars on British roads are much lighter than in this country. Whereas six-wheel trucks are necessary in America, the cars in England do not even tax the capacity of four-wheel trucks. In certain classes of service where the cars can be kept together, the Great Northern Railway of England has joined several cars permanently and instead of placing two trucks under each car, has located a single truck under the abutting ends of two coaches. The advantages claimed for this arrangement are improved riding qualities, due to a reduction of oscillation, and reduced weight. The articulated dining unit of the Great Northern consists of one first-class and one third-class corridor coach, the first and third-class dining cars and a kitchen car. The five cars measure 246 ft. over buffers and are carried on six four-wheel trucks. In making up a train cars can be added at either end, but the five-car unit cannot be separated. The weight per passenger of this equipment is 27 per cent less than the ordinary cars formerly used. It is interesting to note that the kitchen in this car is fitted with electric ranges, the current being obtained from two axle generators under the car. So far as known this is the first application of electric cooking in dining car service.

Railroads Profit From Lower Material Costs

(Continued from page 46)

tion in the diagram is the steady upward trend of prices during the first eight months of 1920 for the United States as a whole and notably for the New England region, as compared with the general downward tendency during the past year.

The trend of railway fuel costs shows little relation to the conditions in the spot coal market. While there has been a steady decline in the average cost to the railroads as a whole

during the first nine months of 1921, there has been no marked change in the trend of spot coal prices from February to the end of the same period, either upward or downward from the average government price of 1918. During the months of October and November, however, spot prices have shown a marked downward tendency, which, it may be said, has probably had little influence on the trend of railway fuel costs during the same period.

TABLE III—AVERAGE COST OF COAL PER TON BY MONTHS, FIRST THREE QUARTERS OF 1920 AND 1921
(INDEX PRICE FREIGHT)

	Jan.	Feb.	Mar.	Apr.	May	June	1918	Ave.	1919	1920	1921
New England Region	1.14	\$9.54	\$7.72	10.51	\$9.31	\$7.33	\$6.77	\$6.61	\$5.17	\$5.10	\$7.55
Great Lakes Region	1.11	6.12	6.77	6.11	7.30	7.18	8.14	6.61	8.88	7.63	8.88
Great Lakes Region	1.11	4.39	4.93	3.88	4.80	4.46	4.33	4.11	4.33	3.99	4.45
Great Lakes Region	1.00	3.00	3.83	3.59	3.80	4.11	4.35	4.30	4.66	4.19	4.19
Great Lakes Region	1.00	4.48	4.42	4.11	4.03	3.93	3.68	3.48	3.2	1.17	3.81
Great Lakes Region	1.00	3.00	3.12	3.05	3.46	3.68	3.83	3.62	4.6	4.16	3.65
Piedmont Region	1.11	4.13	4.30	4.11	3.97	3.69	3.56	3.48	3.42	3.17	3.84
Piedmont Region	1.00	3.80	2.88	2.84	3.00	3.44	3.83	4.06	4.48	4.98	3.53
Southern District	1.00	4.41	4.40	4.28	4.31	4.11	3.97	3.87	3.67	3.57	4.10
Southern District	1.00	3.38	3.41	3.25	3.41	3.50	3.70	3.98	4.48	4.21	3.71
Northwestern Region	1.00	4.61	4.87	4.94	4.96	4.70	4.62	4.57	4.46	4.37	4.67
Northwestern Region	1.00	4.28	4.01	3.72	3.86	3.91	4.00	4.13	4.60	4.56	4.13
Central Western Region	1.00	3.91	3.93	3.87	3.95	3.80	3.75	3.75	3.68	3.57	3.80
Central Western Region	1.00	3.75	3.05	3.13	3.27	3.23	3.36	3.40	3.57	3.52	3.35
Southwestern Region	1.00	4.35	4.13	4.12	4.10	4.05	4.04	3.96	3.92	3.82	4.05
Southwestern Region	1.00	3.47	3.98	3.67	3.84	3.91	3.80	3.77	4.47	4.50	4.06
United States	1.00	4.61	4.61	4.48	4.31	4.38	4.07	3.99	3.88	3.80	4.26
United States	1.00	3.71	3.58	3.45	3.72	3.80	4.03	4.20	4.55	4.57	3.97



Maintenance-of-Way Is Now on the Upgrade

Railroads Are Slowly Restoring Tracks to Normal Condition
—Renewals Still in Arrears

By W. S. Lacher

JUDGING FROM RELATIVE expenditures and rates of pay in 1920 and 1921, one would gain the impression that the year just past was one of greatly restricted performance. This would be the case without doubt if it were not for the fact that certain influences have served to compensate for the seeming disparity in outlays. Because of this it is conceded that most of the tracks are now in better condition than they have been for some time insofar as the line, surface and riding qualities are concerned, and that in consequence the roads have entered the winter season in a more favorable, though not entirely satisfactory condition.

Expenditures for maintenance-of-way work for the first ten months ending October 31, 1921, were \$651,551,597 as compared with \$878,074,290 and \$647,326,552 for the corresponding periods of 1920 and 1919, respectively. These figures are not subject to exact comparison because of the influence of the wage increase effective May 1, 1920, and the wage reduction of July 1, 1921, but in general the effect was to make the work more expensive as regards the rate per hour during 1921 than in either of the preceding years.

In the early months of the past year when the roads were confronted with operating deficits, maintenance-of-way work was restricted to bare necessities and the opening of the season for the active prosecution of the work was delayed until later than usual, much work being held up until July. However, active work during that month and the three months following was effective in accomplishing an appreciable improvement in conditions.

Other factors must also be taken into consideration. The winter of 1920 and 1921 was exceedingly mild so that the tracks came out of the frozen period in much better condition than usual. Following this the country generally had one of the longest and most satisfactory summer seasons that has been experienced for many years. Furthermore, the limited volume of traffic proved of considerable advantage, both in the reduced wear and tear on the fixed property and in the decreased interference with maintenance-of-way operations. However, the largest single factor which was favorable to the accomplishment of a good season's work was the increased efficiency of the men. This was by far the most encouraging phase of the maintenance-of-way situation

which has occurred on the railroads during the past year.

To accomplish the favorable showing in spite of the limited expenditure, attention was concentrated on necessary items of upkeep. Renewals received less attention, although lack of specific statistics makes it impossible to present any definite facts. Rail consumption in 1920 in the sections used in standard gage track averaged well up to the previous years. During 1921, however, production in the mills was somewhat slow because the roads did not specify fully on their orders. Although no statistics as to quantities are available there is no question but that little progress was made in taking up the large accumulation of rail renewals which have been deferred from year to year since almost the beginning of the war period.

Evidence of further activity in the direction of corrective measures is noted in recent large orders and inquiries for rail by roads in both the United States and Canada. A plan for the purchase of 1,000 miles of 100 lb. rail by one large system is particularly emphatic on this point.

The condition also is not favorable in the case of cross ties. Renewals in 1920 were restricted because of inadequate supplies of ties. This situation as to supply was improved during 1921, but renewals were restricted because of a failure of the roads to prosecute the renewal program to the fullest extent. Therefore, with ties, also, the bulk of the deferred renewals still remains to be made.

One item which has been largely neglected is painting. Many roads dispensed with their painting forces entirely. This means that enlarged programs must be undertaken eventually to make up the deficiency. Such items as weed cutting and general policing were also given less than normal attention.

Labor Efficiency Improved

The thought behind maintenance-of-way operations during the working season of 1921 was to improve the efficiency of labor by taking every advantage of the favorable condition of the labor market. In the early months of the season many of the subordinate officers were inclined toward the opinion that the growing differential in wages paid by the railroads and those generally prevailing outside were primarily responsible for the greater industry observed in the

EXPENDITURES for maintenance-of-way during 1921 will probably total only three-fourths as much as in 1920.

Concentration on essentials, decreased cost of materials and increased efficiency of labor have enabled the roads to put the tracks in reasonably good condition.

Marked improvement has been made in the spirit and industry of the forces but little progress has been made in reducing the accumulation of deferred renewals.

railway forces. These officers were, therefore, somewhat chagrined when they learned of the reduction in wages authorized by the Labor Board on June 1, 1921. However, it did not take them long to discover what others had realized all along, namely, that the rate of wage is a minor factor at times when the number of jobs is smaller than the demand—that men will exert themselves to hold a job whenever they know that another is not to be had.

The campaign for increased production was directed primarily at the supervisor and the foreman in impressing on them the fact that performance records of the past five years are in no sense a measure of the reasonable volume of work to be expected from the men; in other words, this was an abnormal period in which the average performance of men was far from satisfactory. This situation was also improved to an extent in industrial centers by enlisting the services of old foremen who had entered more profitable employment during the war period. With the current depression many of these men have been glad to get back into track work. The same is true in a large measure of the laborers. For example, many high-grade Italian trackmen who had obtained employment in more remunerative lines during the war period were reenlisted in railway work during the past season.

On the other hand, men of certain nationalities from southeastern Europe who have been found generally unfit for railway work have been very largely eliminated. These various measures have all served to raise the general tone of the forces; the men take more interest in the work and a larger output is accomplished. Some maintenance-of-way officers have gone so far as to say that the efficiency now is as high as at any time in the past.

But in spite of the notable improvement in the performance of the men, the roads have felt deeply the restrictions which prevent them from taking at least partial advantage of the prevailing low rate for common labor. Not only is there a great differential in favor of the railway employee as regards wages, but the standardization of wages is peculiarly unjust to the roads. The rate for trackmen, which is nearly the same the country over, is in some localities now nearly double the rate at which men could readily be obtained in adequate numbers.

Roads Turning to Contract Work

Partial relief was obtained by a number of the roads through the contracting of some of the major items of maintenance-of-way work, such as rail and tie renewals and ballasting. Cost plus and force account agreements have been applied in part to this work but growing favor is being evidenced for the contract form under which the work is awarded on the basis of unit price bids for the various items covered. This plan can only be put into effect where both the railways and the contractor are in possession of sufficient cost data to enable them to have a fair check on the reason-

ableness of the bids offered and taken. The railroads which have tried both systems are now inclined to favor the unit price arrangement as being most equitable and as offering the least opportunity for criticism.

An idea of the extent to which general interest has been manifested in the contracting of maintenance-of-way work is indicated by the fact that the Committee on Economics of Railway Labor of the American Railway Engineering Association has been at work during the past year on the development of specifications suitable for use in such contracts. The general interest in this subject is in no sense to be measured by the number of roads which have followed the practice during the past season and it is certain that unless some means are devised by which the railroads are enabled to secure track labor at a rate considerably below that prevailing at present, nearly all work other than routine policing by section forces will be conducted under some contract arrangement.

Tendencies of the Times

Certain influences and tendencies which have been manifest for a longer period than a single year have been given an added impetus during the past 12 months. Further progress has been made in the adoption of heavier sections of rail. Fifteen out of 25 of the larger roads are now buying rail weighing more than 100 lb. per yd. and at least two introduced these heavier sections in 1921. Similarly many roads using rail of less than 100 lb. section have the adoption of heavier sections under advisement. Some heavy designs of joint bars represent an accompanying development. The use of heat-treated, high-carbon or other special steels for tie plates, joints, bolts and spikes has been given further impetus, a more receptive attitude of manufacturers being a factor of importance.

One of the noteworthy tendencies during the past year has been the expression of a general need for improved methods of accounting in maintenance-of-way work. This is prompted by the feeling that the records made to satisfy the requirements of the Interstate Commerce Commission do not provide the maintenance-of-way officer with the information which he should have as a measure of the work done by the various forces under his direction and for the fixing of budgets for the monthly distribution of annual appropriations. Thus far only a very limited amount has been done in the actual development of such systems of performance records, but various associations and individuals have emphatically advocated this plan. The fact that the need of better records has been expressed by railway men in important official positions gives promise that this movement will be given a general impetus. When it has been accomplished the incentive for efficiency will be more nearly of the same measure as that now obtained in industrial plants conducted under the control of such systems.



New York Central Shop, East Buffalo, N. Y.

Cutting Freight Loss and Damage in Half



Packages Properly Prepared for Shipment



What Happens to Freight Improperly Prepared for Shipment

Freight Claim Division of A. R. A. Has Developed Successful Campaign

By K. H. Koach

WITH THE SLOGAN "Cut Loss and Damage in Half—It Can Be Done," the freight claim division of the American Railway Association has conducted a vigorous campaign during the past year to reduce by at least 50 per cent the amount paid out in the settlement of freight claims. Figures relative to the work of this organization are now available for the year September 1, 1920, to September 1, 1921, to which period this article is confined except for a few of the more important matters handled by the division during the last four months of 1921.

The present operations of the division may be divided into three general phases. The first has for its object the minimizing of controversies in connection with freight claims, and the corresponding expenses incident to litigation brought against the carriers by the shipping public. This has been accomplished by conferences with the representatives of commercial organizations, and also by keeping current and effective the freight claim rules and rulings, which, in their operation, facilitate the investigation of freight claims and the adjustment with claimants.

The second objective is to make the freight claim rules and rulings more effective in order to maintain the least expensive methods of claim investigation and accounting by the carriers. Particular attention has been given to the claims filed in connection with freight moving over several lines in order to avoid the necessity of litigation and prolonged disputes between carriers; likewise controlling the expense of lawsuits for claims filed by one carrier for loss or damage which may have occurred on a connecting line.

The third phase of the work is that promoted by the claim prevention committee. This committee inaugurated an educational campaign through personal conferences with representatives of the various branches of transportation service,

FREIGHT CLAIM DIVISION

of A. R. A. has conducted a vigorous campaign to cut in half the freight claim payments, which exceeded \$120,000,000 in 1920. The number of claims filed has been reduced from 335,540 in November, 1920, to 208,404 in August, 1921.

The collection of statistics, dissemination of information, co-ordination of freight claim work on the various railroads, perfect package campaign and freight claim prevention congress are other activities of the division.

such as the freight claim, claim prevention, and operating departments, and followed it with a large amount of correspondence, supplemented by bulletin service, all of which outlined methods and suggestions for improved service. Much has also been gained by the co-ordination of the activities of sectional claim conferences, which conferences in turn co-ordinate the activities of the various carriers in each of the various sections of the country.

Claim prevention representatives have concentrated their efforts during the past year upon the following causes, which contributed approximately 80 per cent to the loss and damage account in 1920, namely: (1) robberies, (2) rough handling, (3) loss of entire packages, (4) defective equipment, and (5) delay.

Loss due to robberies averaged nearly \$2,000,000 per month in 1920, and was confined mainly to such commodities as clothing, dry goods, notions, boots and shoes, tobacco, cigarettes and cigars. "Rough handling" totaled almost \$1,000,000 per month, and was largely chargeable to improper switching in yards. "Loss of entire packages" was responsible for claims amounting to more than \$1,250,000 per month, and was due apparently to certain definite causes, the correction of which calls for uniform action in the handling of astray packages. "Defective equipment" cost nearly \$1,000,000 a month and was confined largely to grain, flour, mill products and coal. "Delay" caused payments of \$500,000 per month, affecting mainly fresh fruits, vegetables and live stock. The total freight loss and damage expenditure for the first six months of 1921, as compiled from the reports of 227 carriers, representing 90.4 per cent of the railroad mileage in this country, was \$55,707,753.

Largely through the efforts of the Freight Claim Division of the American Railway Association, a curtailment of this drain on freight earnings has been effected during the past

year. Realization of this fact has resulted in the rapidly growing interest which the carriers have shown in claim prevention work. The old method whereby each road handled its own claim problems has now become practically obsolete. In September, 1920, the number of carriers reporting to the Freight Claim Division was 165, while in July, 1921, the number had increased to 230. With last year's growing interest in the Freight Claim Division and its claim prevention work, the results so far have shown that the number of claims is gradually being lessened each month, and that the carriers are giving closer supervision to the problem than ever before. The total number of claims received by the carriers from claimants in November, 1920, was 335,540, which number was reduced to 208,404 by August, 1921. The number of claims paid to claimants in January, 1921, was 314,178, which number was reduced to 206,684 by the end of August. The number of unadjusted claims at the close of November, 1920, was 548,097, this number being reduced by August, 1921, to 290,275.

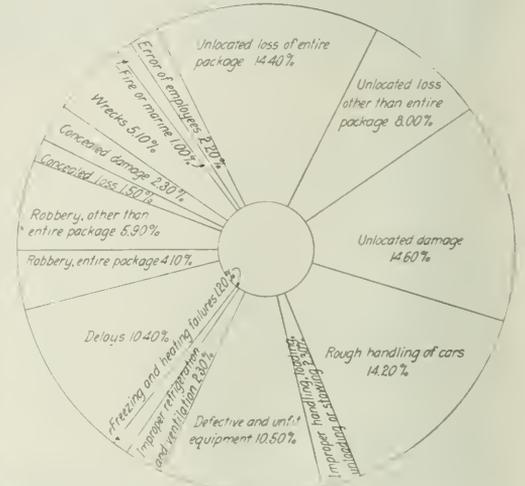
The outstanding feature of last year's work was the employment of three experienced men as special representatives to devote their entire time to claim prevention problems. Prior to this action, which was effective the first of last year, the most noteworthy feature of claim prevention work was the freight claim prevention congress which was held at Chicago, Ill., November 15-16, 1920, with an attendance of 309 representatives of the various member carriers. As the immediate result of this congress the usefulness of the claim prevention organizations on many of the lines was extended, while on others where no such organization had existed, one was established and its course of operation directed advantageously by the Freight Claim Division. It is expected that a similar congress will be held at Chicago during the first part of this year.

Statistics of Freight Claim Payments

With the need of complete statistics of claim payments upon which to base its investigations, the subject of "uniform

Form No. 1 came into existence and was made effective with the claim payments for the month of September, 1920, since which time the reports have been made monthly, and summaries thereof have been prepared and issued through the organization of the Committee on Cause and Prevention.

Prior to the inauguration of these reports the only compilation of claim statistics by causes and commodities was that prepared by the Interstate Commerce Commission on figures received from Class I railroads for 1914. With the exception of that period of one year, the carriers have not heretofore recorded their claim payments on any regular and uniform basis. The promptness, accuracy, and completeness with which these reports are now being rendered by the members are of the utmost assistance to the committee in directing its



Distribution of Freight Claim Payments According to Causes

work intelligently. Summaries of these reports, accompanied by brief analytical statements pointing out the causes and commodities chiefly involved, with suggestions for preventive



Nails Pulled from Floors and Sides of Freight Cars Set for Loading at the Union Pacific-Oregon Short Line Freight House at Salt Lake City, Utah, from May 1 to September 30, 1921

claim statistics" was among the first considered by the Freight Claim Division committee at the inauguration of the Freight Claim Association with the American Railway Association in 1919. Final and definite action was taken at the last annual session, when a special committee was created to prepare and promulgate to the membership a form for reporting monthly the claim payments of each carrier, separated according to the designated causes and commodities.

In accordance with this action the division's standard

TABLE OF FREIGHT LOSS AND DAMAGE CLAIMS PRESENTED, PAID AND UNADJUSTED, AS REPORTED TO THE FREIGHT CLAIM DIVISION OF THE AMERICAN RAILWAY ASSOCIATION

Month	Number of carriers reporting	Total number claims received from claimants	Average number of claims received per carrier	Per cent increase or decrease in column 4 over Sept., 1920	Number claims paid to claimants	Number claims unadjusted at close of month	Average number of claims unadjusted per carrier	Per cent increase or decrease in column 8 over Sept., 1920
Sept., 1920.	165	295,590	1,791	—	246,600	404,729	2,452	—
Oct.	185	280,930	1,519	-15.1	19,799	416,579	2,250	-8.2
Nov.	180	335,540	1,864	+ 4.0	297,434	548,097	3,044	+24.1
Dec.	180	315,372	1,752	-2.2	305,557	511,624	2,842	+15.9
Jan., 1921.	228	305,816	1,341	-25.1	314,178	542,093	2,379	-3.0
Feb.	230	198,657	864	-51.7	222,867	425,286	1,819	-24.6
Mar.	223	226,796	1,017	-43.2	241,919	498,629	1,812	-25.3
April	214	216,007	1,009	-43.7	244,889	389,909	1,780	-27.4
May	223	231,492	912	-49.1	19,315	347,419	1,558	-36.5
June	228	196,625	862	-53.9	214,915	312,680	1,371	-44.1
July	230	192,889	839	-53.6	199,864	305,075	1,326	-45.9
Aug.	228	208,404	907	-49.4	206,684	290,275	1,273	-48.1

* Embraces approximately 90 per cent of United States and 15 per cent of Canadian mileage represented in American Railway Association. Includes claims paid, but unadjusted, on other carriers.

measures, are prepared monthly and distributed to railway basis. The promptness, accuracy, and completeness with officers, as well as to classification committees, weighing and

inspection bureaus, and to interested divisions of the American Railway Association.

A claim prevention bulletin service was placed in operation the first of last year, the bulletins being sent to freight claim, freight claim prevention, transportation and traffic officers, chief special agents, freight agents, and others concerned in this work.

These bulletins serve to convey suggestions covering all phases of claim causes, and the methods for prevention as determined by existing practices developed through investigations of the Freight Claim Division. In addition to the bulletin service, separate action has been taken on a large number of important subjects which came up for immediate attention during the current year; circulars were issued to the membership covering such matters.

Public Not Neglected

The public has not been neglected in this claim reduction campaign. Those concerned in this work have been reached by conferences with commercial clubs, through special articles prepared for trade journals, associations and conventions, and by circulars to chambers of commerce and similar organizations. Definite ideas are presented to each individual group as to the best means of securing co-operation in the correct handling of freight.

The Freight Claim Division, in conjunction with the American Railway Express Company, inaugurated a "perfect package" campaign during the month of November, 1921. This was the first attempt for national co-operation between railroads, shippers, receivers and express people, for the purpose of studying the best ways of handling freight safely. The good spirit with which all concerned entered into this work, and the beneficial results which emanated from the campaign are considered by the division as a fair indication of the excellent outlook for co-operative claim prevention

work with respect to the various other organizations interested.

The Lost Package Evil

Among the most recent activities of the Freight Claim Division is the national plan for controlling the lost package evil which was placed in operation the early part of last month. An eight-page circular was sent to the member carriers under the title "Uniform Method of Handling Over and Astray Freight and Matching Against Shorts at Destination Points." The committee on Freight Claim Prevention stated in this circular that for the first six months ending June 30, 1921, the unlocated loss of entire packages cost the carriers \$8,039,572, or 14.4 per cent of the total claim payments. This sum added to the \$2,285,601, charged during this period to robbery of entire packages, entails a total expenditure of more than \$20,000,000 per year. The committee outlined in the bulletin detailed methods of making effective and uniform the present rules and practices, which to be successful, it believed, needed only the support of those in charge of supervision:

It is felt that the good results coming from the activity of the Freight Claim Division's prevention work are represented, not only by the increased number of committees formed on individual roads for the study of the causes of transportation failures, but also by the recent formation of a committee on freight claim prevention by the National Industrial Traffic League, which will be one of the means of bringing the organized shippers into an intensive study of the problem.

A plan to co-ordinate the activities of carriers to prevent damage to perishable freight, will also be placed in effect during 1922 with the co-operation of the National Perishable Freight Committee. Cut loss and damage in half—it can be done if the present enthusiasm and efforts may be taken as the indication of the future.

Improved Service and Morale Features of 1921

(Continued from page 48)

and to New York, 13 days. At present the schedule to Chicago is 8 days and to New York, 11 days.

Southern Lines

The Southern lines during the war were given considerably more traffic than previously because of the many training camps situated in the southern states. The southern lines, however, with few exceptions, made no changes in their fast freight schedules to northern points, although in many cases more time was taken to move the cars beyond the connecting points by connecting carriers in the north and east.

Morale and Service Interrelated

It is believed that this resumé of the changes that have taken place in connection with fast freight service show on the whole: (1) that service during the war was not up to pre-war standards; (2) that service after the armistice and during the latter part of the federal control period was exceedingly poor; (3) that the railroads in 1921 have made great strides towards returning to their former excellence and (4) that there is still some ground left to cover.

Somewhat the same thing has happened to morale. We will presume for the sake of argument that morale on the railways was good before the war. Following the same comparison as given for fast freight service, we may say: (1) that it was fair during the war, but not up to pre-war standard; (2) that after the armistice and during the second

year of federal control it was exceedingly poor; (3) that the railroads in 1921 have made great strides towards restoring their pre-war excellent morale and (4) that there is still some ground left to cover.

Morale and excellence of service go together. The excellence of service creates morale and excellent service can only be secured through morale. A thing which brings us back to that old argument: Is competition really worth while on the railways? While it is recognized that exceedingly fast schedules will do more harm than good, there can be no question that competitive service of the proper kind is one of the best assets the railroads can have. The experiences of the past three or four years apparently emphasize this fact.

THE RAILROAD PROBLEM is still confused. Messrs. Kruttschnitt and Hines give conflicting impressions. They agree, however, upon this one thing: criticism, whether directed against the railroads or in behalf of the railroads, is far from being what it ought to be. Mr. Kruttschnitt, for the railroad managers, welcomes criticism—"preferably fair criticism, if it shows a reasonable respect for the facts." Mr. Hines, by his reference to the national agreements, shows what he thinks of a good many "facts" that come from the other side. The public finds itself lost in this dizzy play of billions of dollars. It, too, would welcome facts from an unquestionably authoritative and impartial source. It is a problem for somebody at Washington.—New York Evening Post.

Mandatory Rules Feature 1921 Accounting Progress

Effective January 1, 1922, New Rules for Interline Work
Mark Taking of Important Step

By Charles W. Foss

THE LETTERS R. A. O. A. bear to railway accounting the same relationship that the letters M. C. B. bear to the railway mechanical department. In the past, this has been due to the position that has been held in the accounting field by the Railway Accounting Officers Association. Effective January 1, 1922, R. A. O. A. took on an additional meaning because on that date there went into effect the R. A. O. A. Mandatory Interline Accounting Rules and Forms.

These rules and forms are mandatory and binding upon all carriers operating in North America. The step to make them mandatory was taken at the annual meeting of the Railway Accounting Officers Association at Atlantic City last June. The recommendations that are made mandatory naturally include but a portion of all the recommendations or standard practices that have been formulated by the Association since its organization. Speaking generally, they include only rules or recommendations that have been established for some time, and have been tested out by several years of experience. Those rules not made mandatory still stand as recommendations only.

Prior to the action taken in June, or rather prior to the effective date of this action, namely, January 1, the rules of the Railway Accounting Officers Association relating to interline accounting—that is, accounting transactions affecting two or more carriers—were purely recommendatory. They, therefore, had no binding effect beyond the merit of the recommendation and the facility they gave to the transactions to which they related. Nevertheless, they had been generally adopted and had been generally in effect on all, or substantially all, carriers.

Provision for Arbitration

A feature of the mandatory rules is the provision for arbitration of disputes. This is a necessary part of the mandatory idea, but it has an additional importance in that the arbitration provisions fill a long felt want by establishing for the settlement of disputes, a procedure that is of a judicial nature.

The R. A. O. A. Mandatory Accounting Rules and Forms, as is to be expected, do not necessarily represent the final word. The rules take cognizance of the latitude essential for progress and the incentive necessary for the development of interline accounting. In other words, they have been arranged on a common sense basis of permitting further progress and development. Presumably various of the present rules that are now recommendatory only will be added to the mandatory group, so that as time goes on, an increasingly large proportion of all the R. A. O. A. rules and forms will be made mandatory.

It is the opinion of many people well informed on the subject that this step represents the most momentous advance ever made in the history of railway accounting. This seems to be a rather strong characterization in view of the importance of the various steps that in the past had to be taken to bring American railway accounting up to its present pre-eminence. Nevertheless, there can be no question that January 1—the date the mandatory rules become effective—does mark the beginning of a new era in railway accounting.

The principle is well recognized that the railways should render their accounts relating to interline business in a uni-

form manner. Such uniformity promotes fairness and impartiality and is a necessity insofar as concerns efficient and economical accounting among the carriers. It is a natural step to say, then, that uniform standard rules, impartially applied, constitute an integral part of inter-road accounting. It is further evident that conditions should not be allowed to continue which may make it possible for a carrier to deviate from an interline accounting rule according to the whim of the moment, or according to its interests in an individual case, while, under other circumstances, the same carrier may insist on making a literal application of the same rule when its interests lie in that direction.

Carriers Should Render Interline Accounts in Uniform Manner

Carrying the idea further, it hardly seems proper that a carrier is warranted in sending to other carriers statements or reports of a size and arrangement that do not conform to a generally accepted standard. Reports, statements, or other interline forms—if lacking uniformity of size and standardization of arrangement—are the source of additional labor and inconvenience in filing and using such reports, statements, or other interline forms by carriers receiving them. Some idea of the significance of this can be gleaned from the fact that the accounting department of a large carrier receives—from all other carriers—in the neighborhood of a million such forms each month.

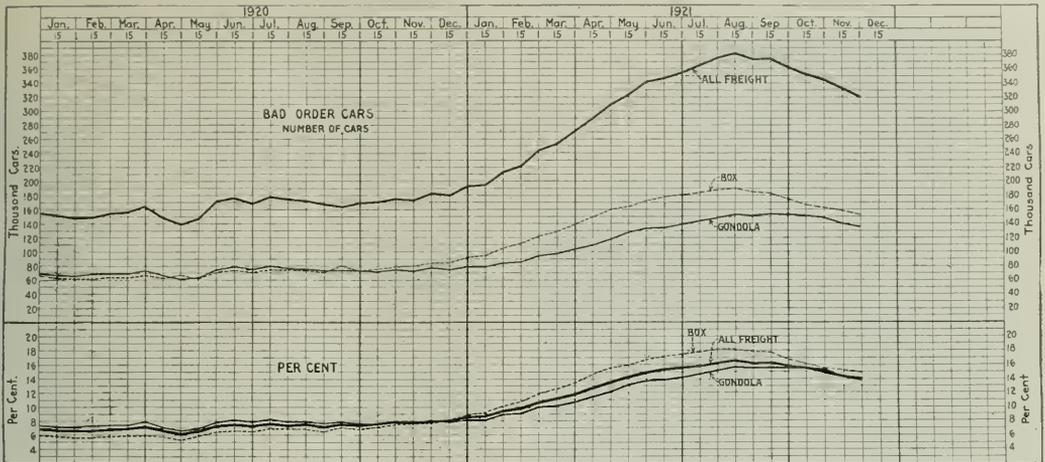
Standardization, as used in this connection, is synonymous with simplification. The saving of clerical work through standardization or simplification of forms will be obvious, to say nothing of the economy in printing usually attained by the use of standardized forms.

Relations With I. C. C.

The Interstate Commerce Commission has the power to prescribe railroad accounting in the most minute detail. The Commission has confined its accounting regulations principally to the accounting classifications, and the Commission has had the restraint, foresight and wisdom not to exercise its power in prescribing minute details of accounting, for the reason that action to that effect would bring irreparable damage to the railway industry by destroying the profession of railway accounting through reducing it to a mere matter of following minutely prescribed rules.

The accounting officer will probably express the opinion that the Commission is to be commended for having believed that carriers, individually and collectively, would voluntarily take adequate and effective action in respect to such matters, thus eliminating any necessity for action by the Commission. Whether it is the Commission that is to be commended or the Railway Accounting Officers Association, or both, is, of course, not the question. The fact is that the manner in which the two bodies have worked together and the excellent spirit of co-operation which has been shown on both sides are noteworthy.

Co-operation between the carriers is an equally important matter. To bring about uniformity in a matter such as these rules for interline accounting means sacrifices in individual cases, and it should be said—to the credit of the carriers—that they are making those sacrifices whole-heartedly and in ungrudging measure.



Bad Order Cars—Number and Per Cent

Equipment Conditions Show Dangerous Tendency

Low Earnings and High Prices Have Led to Small Purchases and Perpetuation of Old Rolling Stock

By A. F. Stuebing

IN ANY ANALYSIS of the equipment situation, there are two factors that at once command attention. The first is the large proportion of unserviceable equipment; the second, the small amount built. Both are unhealthy signs. In fact, the equipment record in 1921 is notable only as a horrible example.

Causes of the Bad Order Situation

So much has already been written concerning the abnormal number of bad order freight cars existing during the past year, that further comments might seem quite uncalled for. Nevertheless, it may be worth while to analyze the situation not as it concerns present problems, but rather with a view to its bearing on future conditions.

The year opened with bad order freight cars amounting to over eight per cent of the total. This was the greatest percentage ever recorded with the sole exception of the autumn of 1919 when it was over nine per cent. But these figures seem reasonable when compared with the record established during 1921 which was 16.6 per cent on August 15, as reported by the Car Service Section of the American Railway Association. Barring a recurrence of government control, it is doubtful whether this maximum will ever be exceeded, for the combination of circumstances that brought it about could hardly be duplicated. The majority of the bad order cars were a heritage from the policy of under-maintenance adopted by the Railroad Administration. At the beginning of last year the percentage of cars on the home lines was exceptionally small and as cars were returned to their owners many were found to be in defective condition and were set aside.

Even if the maximum repair forces had been employed, it would have been impossible to prevent a large increase in the bad orders under these circumstances. The condition

was aggravated by several other factors. Many roads were not meeting operating expenses and drastic retrenchment was imperative. The number of car repairers decreased almost 50 per cent from October, 1920, to June, 1921. A considerable amount of work was deferred in expectation of reduced expenses for wages through reductions in hourly rates and abrogation of the national agreement and also for materials, the prices of which were constantly falling.

It is probable, too, that the bad order statements were, and still are, inflated by a very considerable number of cars which the railroads hope can be retired but which under present conditions must be set on side tracks and kept on the books because their retirement would involve a considerable charge to operating expenses which the railroads are not able to take care of at present. The statement of the Car Service Division of the American Railway Association for six months of the year shows that only 27,087 freight cars were retired in that period, the retirement being at the rate of only 54,000 cars annually. This is a smaller number than has been retired in any year recorded with the exception of 1919 when the Railroad Administration had adopted its policy of perpetuating weak equipment.

Few Freight Cars Replaced in Recent Years

An analysis of the equipment acquired and retired shows that in recent years the railroads have been following a policy of expediency in this regard which will bring disastrous consequences if it is not soon checked. During the years 1910 to 1914, inclusive, the Class I roads added an average of 134,316 freight cars to their equipment annually; from 1915 to 1920 the average annual acquirement was only 82,900 cars. The number of cars retired annually in the former period was 81,474; in the latter period, 72,399.

Studies have shown that the normal average life of freight cars is approximately 20 years. Twenty years ago the railroads were adding to their stock about 120,000 cars each year so at the rate of retirement that prevailed from 1915 to 1919 there remained each year about 50,000 more cars that had exceeded the normal expectancy of life. Looking at it from another standpoint, the average number of cars in the period, 1915-1920, was about 2,300,000. At the annual rate of retirement of 72,000 the average life of the equipment would be 31.8 years.

While the small number of retirements shows the tendency with respect to the replacement of freight equipment very plainly this is brought out in a more striking manner by the net change in the number of cars. From 1910 to 1914 there was an average annual net increase of 62,842 cars; from 1915 to 1920, the average annual increase was only 10,501. From these figures it is apparent that even though the capacity of the cars installed exceeded that of the cars retired, the net increase was by no means adequate to take care of the normal growth of business. The figures for last year, while incomplete, indicate that there has been an actual decrease in the number of cars, the retirements for six months exceeding the number installed by 719. The showing will be even worse when complete figures for the year are available. The acquisitions are certain to be small for the report of September 30 showed only 2,142 freight cars on order.

There would be nothing alarming in the slight decrease in the number of cars that occurred last year if it were an isolated case. There have been periods of depression in the past when freight car equipment decreased, notably in 1909 when retirements exceeded acquisitions by 15,298. However, in the years 1907 and 1908 the net increase in the number of freight cars was 193,355 and 100,580, respectively, and 1910 again brought an increase of 60,000 cars. The figures for 1921 have an untoward significance because they indicate the continuance of the unfavorable tendency of the preceding five years.

Past experience has shown that whenever traffic recovers after a period of depression, the volume of business exceeds all previous records. For six years there has been practically no growth in the freight equipment of the railroads. Population has not ceased to grow and commerce has not received more than a temporary check. There is reason to question whether an increase in business will not cause serious embarrassment to the railroads because of lack of cars.

There are some who contend that the railroads should take care of increases in traffic by improved utilization of cars rather than by increasing the amount of equipment. This argument is refuted by the serious car shortage of 1920, when the railroads were using their equipment more effectively than ever before. Even granting for the sake of argument that additional equipment is not needed, there is cause for concern when the rate of replacement of equipment over a five-year period is only 11 percent a year.

New Equipment Would Effect Economies

The last report of the Interstate Commerce Commission for December 31, 1919, showed a total of 1,505,707 freight cars of all steel or steel underframe construction. Of the remaining 855,000, possibly at least 400,000 should be replaced with modern equipment to improve operation and reduce maintenance costs. The wages of car repairers have been increased more than almost any other class of employees and maintenance has gone up correspondingly. In 1920 the average cost of repairs per freight car was \$257. Considering the variations between weak cars and well-designed cars, the expenditure for repairs, transferring, switching, etc., the present cost of maintaining and operating the old equipment may be considerably more than the fixed costs on new cars.

The majority of railroad officers apparently believe it is advisable to purchase additional freight cars as promptly as possible. The reason for the small orders and few retirements during the past year is to be found in the unfavorable financial condition. Retirement of cars generally involves a considerable charge to operating expenses; therefore, when earnings are low cars are set aside but kept on the books. During the time the cars are standing idle the depreciation reserve accumulates and the charge that must be made to the retirement account when the car is scrapped is gradually reduced. On the other hand as time goes on more cars are constantly coming due for retirement and the situation becomes worse. Failure to retire cars at the end of their normal life merely postpones the day of reckoning.

Are Higher Depreciation Rates Needed?

If depreciation rates were sufficiently high to make the depreciation reserve at the end of the normal life equal to the cost of the car minus salvage, there would be no charge to the retirement account. This might seem the ideal arrangement, but in practice most roads find it desirable to use a lower rate because it enables them to adjust expenditures more nearly in proportion to the revenues. If low rates are used one fact must not be overlooked. Insofar as the depreciation reserve is less than is actually required to retire the cars when due, and if retirements are less than normal, operating charges are reduced and earnings are inflated thereby. The last six or seven years furnish an illustration of how retirements may be deferred almost indefinitely. The inevitable result of such a policy will be deterioration of equipment. Roads that carry low depreciation rates are always tempted to postpone retirements in periods of low net earnings. During recent years expenses have no doubt been decreased in this way to the detriment of the equipment.

Locomotive Situation Continues Unsatisfactory

The motive power situation has been similar to the freight car situation, although conditions have not been as bad. As regards acquisitions and retirements of equipment, the figures are also similar. From 1910 to 1914 the average number of locomotives installed was 3,451. From 1915 to 1920 it averaged only 1,939. This year the total number built was only 1,121. The net annual increase from 1910 to 1914 was 1,655 and from 1915 to 1920 only 488. For six months of 1921 the number of locomotives increased only 105.

Little Progress in Retiring

Wooden Passenger Equipment

The additions to passenger equipment have likewise shown a remarkable decrease in recent years. The number of passenger cars installed from 1910 to 1914 averaged 3,453 a year; from 1915 to 1920 it was 1,583. The net annual increase in the former period was 1,713; in the latter period it was 301. The Interstate Commerce Commission's report for December 31, 1919, shows 53,765 passenger train cars on the Class I roads. The report of the Car Service Division for June 30, 1921, shows 53,884. In the 18 months the number of all steel cars increased 1,059; the number with steel underframes increased 79. At this rate the remaining wooden cars will be replaced with steel or steel underframe equipment in about 41 years.

It is certain that the railroads made great progress toward putting their house in order during the past year. Many problems have demanded attention and equipment has been more or less neglected. Some of the other aspects of the railroad problem are becoming less menacing, but the equipment question is growing more serious. The solution cannot be put off until facilities are again taxed to the limit. Improvement can only come slowly; it should be started without delay.

Electrical Developments for the Year 1921

Definite Progress Has Been Made in Trac-
tion, Welding, Material Handling,
Power and Lighting

By Alfred G. Oehler

DEVELOPMENTS in the electrical field made during the year have not been in the form of large installations of electrical machinery, but existing equipment has been made to perform new services and many new devices were brought out to meet new and changing demands. Electrical apparatus has been used to effect large economies and it would appear that some of the new devices will revolutionize existing practices. The electrical departments of the railroads and the manufacturers have responded effectively to the demand for economy and increased efficiency.

A lively interest has been maintained throughout the year in the subject of heavy electric traction, in spite of the fact that there has been no new application in this country.

The reasons for the interest and for the lack of new applications are quite simple. Railroad expansion has become largely a matter of intensive, rather than extensive, development. The number of new lines built has decreased steadily since 1906, and the present tendency in construction is to so arrange track as to get most efficient operation and greatest capacity. Electric operation affords an excellent means for increasing track capacity and for relieving congestion.

Many roads have electrification programs in view. Practically any electrification program must be considered as a major improvement involving the expenditure of large sums of money; that is probably the only reason why some of the contemplated work was not started. Twice during the year the Lackawanna has asked for bids on electrification apparatus. The program for the Illinois Central is, of course, definitely launched and that road recently purchased 20 new steel suburban coaches for use in steam service, but so designed that they can be equipped with motors and multiple-unit control apparatus.

Electric Traction in Foreign Countries

Electric operation for 11 eastern railroads was proposed in the report of the Superpower Survey (*Railway Age*, November 5, 1921, page 881) and it is highly probable that some of the roads mentioned in the report will electrify certain sections at some time in the near future.



Electric Operation Is Most Suitable Where Grades Are Heavy and Traffic Is Congested

In Europe many large electrification programs are underway. The scarcity of coal and the abundance of water power in these countries has materially hastened the adoption of electric operation. The programs for the various countries, which will be put into effect as rapidly as possible, are outlined in the table:

RAILROAD ELECTRIFICATION IN EUROPE (ROUTE MILES)

	In operation	Under construction	Proposed
Sweden	300	125	1,000
Norway	60	50	500
Germany	400	100	1,500
Austria	200	....	1,000
Switzerland ...	250	275	1,000
Italy	600	....	3,000
France	50	....	5,000
England	200	....	1,000
Holland	50	....	600
Belgium .....	....	....	500

IN SPITE OF the business depression, more than the usual amount of new and improved electrical equipment has been placed on the market.

It exemplifies the old adage about necessity. When devices prove inadequate or uneconomical, new ones are promptly developed to meet the new or increased demands. A return to normal conditions should permit the railroads to take advantage of the improvements that have been devised, with resulting increased economy.

Two important electrification contracts were given to American companies during the past year. One of these, amounting to \$7,000,000, was let to the Westinghouse Electric International Company by the Chilean State Railways to cover equipment for 116 miles of main line and 144 miles of track. The other, amounting to more than \$1,000,000, was let to the International General Electric Company by the Spanish Northern Railway and include about 40 miles of line.

During the year both of these manufacturers have supplied equipment to the Central Railway of Paulista and a section of that road is now operated electrically. The same two companies have also supplied large amounts of electric railway material to Japan and to some of the European countries during the year.

Plans for electric operation have been made for railroads in the Philippines, Jamaica and Madagascar and it is expected that contracts will soon be awarded involving the electrification of about 90 miles of line in South Africa.

Notable development work has been done which has greatly improved the operation of automatic substations, and a number of such installations have been made during the

year. These have all been made for power and street railway companies. But it is highly probable that such substations will soon find a place in trunk line railroad service.

Electric Welding

Electric arc welding during the past year has been used successfully in repairing a considerably greater variety of parts than ever before. Some of the more recent applications are listed in the table:

APPLICATIONS OF ELECTRIC ARC WELDING

1. Cast Steel Wheel Centers.
2. Cast Iron Wheel Centers.
3. Application of Hub Liners.
4. Building up Tires on Wheels.
5. Couplers.
6. Coupler Knuckles.
7. Truck Castings and Bolters.
8. Draft Castings and Car Sills.
9. Side Plates and End Plates.
10. Building up Worn Crossings, Frogs and Switches.
11. Erecting Iron and Steel Structures, Including Tanks.

The table lists only a small part of recent applications and is presented to show the trend in the use of arc welding. Few roads use all of the practices listed, but it will probably be only a matter of time before they will be used generally.

Large savings can be made by the use of autogenous welding, both electric and gas, and that will, of course, cause its use to be extended as rapidly as the users can learn how to obtain dependable welds. It has been shown that an investment of \$150,000 in welding equipment on the Rock Island has in a few years saved three times its cost. After the practice of welding locomotive tires was established, no new tires were purchased for a period of three years, and the number now bought is only about one-third of the former average.

Electric resistance welding will probably come into much greater use than at present for safe-ending boiler tubes. The committee of the Master Boiler Makers' Association on Methods of Welding Safe Ends on Locomotive Boiler Tubes made the following statement in its last report: "Welding safe ends by the electrical welding machine, in the opinion of the committee, will eventually supersede the present method."

Rivet heating cannot be classified as welding, but as a closely allied work it should be said that electric rivet heaters have proved their economy and usefulness and are rapidly finding favor in boiler, tank and car shops.

Practically all of the manufacturers of welding machinery have made improvements in their equipment. Among the outstanding developments is the so-called semi-automatic welding lead which has been applied to the General Electric automatic welder. It consists of a 10-foot length of flexible steel tubing, equipped at one end with an adapter for attaching it to the automatic head; and at the other end with a guide nozzle to direct the electrode wire to the arc. This device combines the advantages of a steady supply of wire and constant arc length of the automatic welder with that obtained by allowing the operator to direct the arc manually.

Several new gas-engine-driven welding sets have been designed for use in places where electric power is unavailable or where it is inconvenient or costly to bring it to the work.

Marked progress has also been made in percussive welding and for certain purposes it has been shown to be the quickest and most efficient method.

Alloy steels have been welded successfully by the electric arc process, and with adequate mechanical and heat treatment tensile strengths of the weld of 130,000 lb. per square inch have been secured.

Electrical Devices for Handling Material

Two new types of electric crane trucks were developed during the year which will probably find a wide application. These have a capacity of 3,000 lb. and have a boom long

enough to lift an air pump or front end into position on a locomotive. They are designed for use in enginehouses and similar places where an overhead crane is not available and have the added advantage of being able to carry material from one building to another, as from the storage platform to the repair shop.

They are being used by the Western Maryland and the New York Central. In describing their usefulness, M. E. Townner, general purchasing agent, Western Maryland, writes:

"Electric crane trucks are being installed on a regular tour of duties, including routing through shops, with loading and unloading stations marked where material is unloaded or assembled. Air pumps are taken from the side of a locomotive; and in one instance the operation of taking down an air pump, delivering to repair point and bringing back an extra pump, consumed 21 minutes, as against one and one-half hours for the operation by former methods. Another operation was the handling of side rods and equally heavy material in 30 minutes as against previous four hours' operation. This tour of duties includes from a one-day ahead program to a 30-day ahead program in conjunction with the shop heavy repair program."

The successful operation of tractors and trailers in freight transfer service was particularly well demonstrated by an installation on the New Haven at the Cedar Hill transfer, where 14 tractors are used. One hundred and thirty-one distinct classifications are made daily and as many as 305 cars have been worked in one day, a normal daily performance being between 260 and 285 cars. The ability of the transfer to work this number of cars, with tractors and trailers, has resulted in the closing of the transfers at Westchester and Maybrook permanently. Furthermore, approximately 80 per cent of the transfers at Bridgeport and Hartford and 50 per cent of the transfers at Waterbury, Danbury and Poughkeepsie, have been eliminated through the concentration of the transfer business on the west end of the line.

Motors and Control Devices

A remarkably large number of switches and switch controls have been developed during the year. Most of these were designed principally for the sake of safety and convenience. The old open-type switches are being rapidly displaced by those which are fully enclosed. Automatic starters have been developed for synchronous motors.

In the application of electric motors to shop machines, there have been two developments of note. One is the application of "built in" high-speed induction motors to various wood-working machines, grinders and other machines which require high uniform speeds; and the other is a new form of direct-connected, reversing-motor drive for planers. The new planer drive was developed to overcome troubles caused by planers over-traveling from any one of several causes.

Lighting

The most notable developments in lighting for railroad service have been in yard and enginehouse lighting. Detailed methods have been worked out by the Lighting Service Department of the Edison Lamp Works of the General Electric Company for using flood lights for night illumination of classification yards, scale houses and turntables, and these methods have been applied with excellent results.

Enginehouses are now lighted on the Boston & Albany, the Lehigh & Hudson and Chicago & Northwestern by mounting two floodlights with crossed beams on the outer circle wall between each stall. This method does not solve all of the wiring difficulties of enginehouse lighting, but it simplifies them and supplies effective lighting. It represents a big step in the right direction.



Repair Shop and Enginehouse Developments

Few Additional Facilities—Contracted Work and Leased Shops—Future Possibilities

By E. L. Woodward

RELATIVELY FEW additional facilities either in new railroad shops and enginehouses, or more modern equipment for those already built, were provided during the year 1921. Repair work was some shops were leased and others closed, and yet there is reason to believe that railroad shops will come into their old position of importance again in 1922. The Labor Board has already abrogated most of the efficiency-destroying rules promulgated during the Railroad Administration and has removed the inhibition against piecework. Wages are being considered and will undoubtedly in the long run be adjusted to the level of those paid for similar work in adjoining territory, thus placing railroad shops on a more even basis with the contractors.

Difficulty in obtaining capital was one of the factors that retarded shop improvements in 1921. Now money is easier, net earnings are on the increase, and many railroads have already developed ambitious improvement programs. Eighty replies to a questionnaire recently sent out to Class I railroads showed that many individual shop and terminal projects, costing anywhere from \$200,000 to \$3,550,000, are contemplated. These projects each call for machine tools and shop equipment costing from \$20,000 to \$948,000, so it is plain that the majority of railroad men are awake to future needs, and improvement programs will be carried out in 1922 to an extent depending upon financial considerations and the rapidity with which business and traffic pick up.

No big shop construction programs were undertaken in 1921 and the general condition of the railroads as regards ability to maintain locomotives and cars in good repair and running condition is

not better than it was a year ago. In fact, at many points the facilities for handling general and running repair work are naturally less effective than before because of depreciation and because the railroads have been unable, for financial reasons, to make needed replacements or additions and betterments.

It is true that there was little agitation for greater shop capacity during the past year because of the fact that the railroads were able to handle the reduced traffic with little or no difficulty. This does not prove that shop facilities are in any way adequate or up to the point which would be necessary to furnish power for even a normal traffic. One has but to visit any average shop and see the old, worn-out machinery and equipment which railroads are compelled to use through lack of funds, to be convinced of the imperative need not only of additional shops, but of more modern, productive machinery in those already built.

No modern business would be able to meet a competitor's prices if it depended for production on machinery which had long since outlived its usefulness. Fifty years ago, for example, it was quite common to ornament the cross rail or housings of a planer with acorns or other artistic designs and yet these "acorn" planers are found all too frequently in railroad shops at the present time. The cost-

A QUESTIONNAIRE was recently sent to the Class I railroads; 80 replies received show that many individual shop and engine-house improvement projects, costing from \$200,000 to \$3,550,000, are contemplated.

Extensive lists of shop machinery and equipment are in the respective budgets and in some cases orders have already been placed against these lists.

The extent to which improvement programs are carried out in 1922 will depend upon how quickly business picks up.

liness of using antiquated machines has been pointed out times without number. No one acquainted with the facts will deny that many railroad shops were badly under-equipped as to modern machinery at the beginning of 1921 and that comparatively little was done during the year to relieve the situation.

Replies to the questionnaires indicated that in some cases 1921 programs, not fully carried out, will be completed in 1922. Certain railroads, for example, were unable to purchase necessary new boilers and air compressors for power houses and these will now be secured. It is also planned to install automatic stokers with a view to increasing power plant capacity and efficiency. Other roads reported that extensive programs of improvement are under way but not settled as to details. The questionnaires showed that railroads realize the necessity for greater shop and enginehouse facilities as a means of getting the maximum service from equipment and keeping the proper relation between rolling stock and shop capacity. The need for modernizing existing power was also strongly emphasized and it developed that modernizing programs are now being delayed for lack of shop facilities to carry them out. In view of the need for improvements in railroad shops and enginehouses and the reasonable ground for belief that at least some of these improvements are on the way, it will be interesting to note what is actually accomplished along this line in 1922.

Much Repair Work Done on Contract

One of the most noticeable developments in the past year was the increasing tendency to let out repair work to contractors and lease both shops and terminals to contractors or local companies organized for the purpose. In view of the importance of this step, it may be well to analyze the reasons for it and some of its advantages and disadvantages.

The contracting of repair work is by no means new and has been common to a greater or less extent on railroads for many years. It is only recently that objections to this practice have been taken by national labor leaders in an effort to discredit the managements in the eyes of the public by claiming that the real purpose was to disrupt labor organizations or secure graft. The railroads refused to be put on the defensive as to either of these two charges of which they must justly be considered innocent until proved guilty.

There are two sound reasons why it has been necessary for the railroads to have a considerable proportion of repair work, particularly on cars, done by outside contractors. The first of these reasons is lack of shop facilities to handle normal repair work and the second is the possibility of reduction in cost up to 25 per cent after allowing a reasonable profit for the contractor. Railroad men anticipated difficulty in handling traffic in the early months of 1921 due to a severe winter which did not develop and an increase of business which did not materialize. To insure that traffic would not be delayed it was felt that locomotives and cars should be placed in the best possible operating condition and inasmuch as existing railroad shops were not able to handle all this work, a great deal of it was given to contractors. Had the railroads foreseen the mild winter and rapid decrease in traffic it is probable that less repair work would have been contracted, but, as in many other cases, hindsight is always better than foresight. Had business returned to normal more quickly with the railroads unprepared to handle it, they would have been severely censured.

With present wages, and the working conditions in force up to December 1 in railroad shops, private contractors with plants in the same localities could handle repair work, pay the cost of moving equipment and needed material, add a profit of 10 per cent and yet repair the cars at approximately 25 per cent less than when the work was done in local shops. It is the duty of the management to operate the lines as efficiently and economically as possible and in ful-

filling this duty repair work must be done in a way which involves the least cost consistent with good quality of work. In line with this policy the railroads had no alternative but to give the work to outside contractors and this explains why so much car and locomotive maintenance work was contracted out in 1921.

The railroads were able to let contracts for car repair work to outside companies because there are many plants in the country equipped for the handling of this particular kind of work. These plants specialize in the building and repair of equipment and have both the facilities and organization to handle it efficiently. In maintaining locomotives on the contrary, except for the big locomotive builders, few shops are equipped with cranes and machinery for handling strictly locomotive repair work and the builders themselves, while physically equipped to handle the work, are more or less unfamiliar with the process of stripping and distributing locomotive parts to the various departments for repairs. In a test case, three or four locomotives were sent to each of three locomotive builders and it was maintained that they were repaired at a loss as contracted. There are a few small industrial locomotive repair shops in the country, but these are entirely inadequate in number and equipment to handle ordinary repair work.

Essential Reasons for Leased Shops

There are many reasons justifying the leasing of repair shops. In the first place, it is a question of relative costs, the advantage being in favor of the contractor or lessee who is not hampered by outside interference, settles local grievances quickly, pays prevailing rates of wages and increases production by installing piecework or some other method of paying men in proportion to output. Another fact to be considered is that an idle plant always deteriorates faster than one in operation which is properly cared for. It is therefore an advantage to have shops operated, even by outside parties, rather than to have them idle. In addition, the operation of these plants will keep repairmen of ability in the locality available for use when the shops are again operated by the railroads. It is estimated that 60 per cent of the men will thus be available for re-employment. In most cases the shops are leased under contracts terminable on comparatively short notice and the idea is that when the Labor Board removes the handicaps formerly placed on shop managements and adjusts wages to the level paid in other industries the railroads will again be able to take over their own plants and secure economical operation.

Piecework and Shop Production

There must be an entire reversal of attitude on the part of many railroad shop employees regarding production and what constitutes a fair day's work if this tendency to contract repair work and lease shops is to be overcome. It is obvious that where costly rules and disproportionate wages are responsible for turning repair work over to contractors the rules must be changed and wages adjusted. Otherwise repair work will never be brought back to the railroad shops where it belongs. Under recent rulings of the Labor Board most of the objectionable rules have been changed, wage adjustments are being considered and it is therefore up to the shop workers to decide whether or not they will increase their efficiency to a point equal to or greater than that of workers for private contractors.

It is an unfortunate fact that every industrial organization harbors at least a few men who are determined to do as little as possible for the individual or company employing them. The only method to handle these men is to pay them in proportion to their output by the installation of piecework or some such wage payment system based on individual effort. Piecework systems have been used in practically all branches of repair shop work and have been

satisfactory to the majority of workers by affording increased pay, and to the railroads by increasing shop output. Many of the contractors have used the old piecework rates developed on the railroads and in certain cases railroad shops have reopened because of the piecework method of payment being adopted by a majority of the men. It seems probable that one answer to the present railroad shop problem to be worked out during 1922 will be the further and more general use of piecework systems.

A Good Time to Install Shop Schedules

The reasons why the expression "shop schedule" is synonymous with orderly work and good production have been explained many times in these columns and are well-known to railroad men. During the year, labor problems received almost the exclusive attention of mechanical department officers and the use of shop schedules or routing systems was not extended to any considerable number of shops. In fact, owing to the decreased need of maximum shop output, scheduling as a means to this end was not as necessary as formerly. It is safe to say that the time will come, however, when shops will again be taxed to their capacity and this time may be sooner than some expect. The present affords a splendid opportunity to develop shop scheduling systems in those shops not already benefiting by their operation. The result will be that work will be arranged in the order of its importance, detail repair parts kept moving and finished in time for assembly, material ordered in advance to be on hand when necessary, and locomotives and cars turned out in a minimum length of time with a resultant desirable effect on railroad earnings.

Engine Terminal Developments and Needs

Owing to reduced traffic during 1921, there was not the usual incentive to provide greater terminal facilities and increase the efficiency of terminal operations. Additions and improvements to existing terminals were made, in many cases, however, and several new terminals, built by the contractors, are now ready to be turned over to the railroads for operation.

It is interesting to note the greater attention being given to the machine tool equipment of enginehouses, and in spite of the difficulty in getting appropriations many antiquated machines have been replaced by new ones. This practice is in line with sound business policy because any expenditure which will speed up the handling of locomotives at terminals will show immediately in increased revenue tonnage movement per locomotive.

The old idea that any machine that will run is good enough for a roundhouse has long since been out of date and railroad men are coming to see that not only should roundhouses be equipped with modern productive tools, but these tools should be of sufficient number and capacity to handle heavy running repairs. With a roundhouse under-equipped, this work must be handled at the back shop where its injection into general repair work always results in a disorganized schedule and decreased production.

Cranes and Material Handling Devices

The range of work handled at big terminals varies almost as much in kind and quantity as that handled at back shops and many mechanical hoists have been installed for the handling of heavy locomotive parts. The modern tendency in every industry is to reduce the manual labor involved in handling either finished parts or raw material and in line with this policy is the growing feeling that terminals and large roundhouses should be equipped with traveling cranes, of probably not less than 15 tons capacity, to handle any locomotive part except the boiler. These cranes have already been installed at some terminals with good results.

Existing roundhouses could not be equipped with travel-

ing cranes without being practically redesigned, including in most cases strengthening the walls, and the result is that the cost probably would not warrant the installation of traveling cranes except in new, large roundhouses where much heavy running repair work is to be handled. The proper location of jib cranes, however, will do much to facilitate the handling of heavy parts and these cranes can be installed at a nominal cost.

Power-operated trucks are coming into much more common use not only in shops but roundhouses and there are many ways in which these trucks prove of value. They are used not only for the transportation of material either directly or on trailers, and with a great saving in labor, but often they can be jockeyed into position and used to push or pull heavy wheels and other parts which would require the efforts of several laborers to move. The power-operated truck, equipped with a swinging crane is particularly valuable in shops or roundhouses and saves many hard lifts.

Ash Pits and Coaling Stations

The problem of coaling locomotives and handling ashes is ever present at terminals where coal-burning locomotives are turned. While many of the smaller terminals especially are required to handle ashes, either in part or in whole by hand shoveling, this costly work is being eliminated as fast as appropriations can be obtained to finance improvements. Gantry cranes and grab buckets have demonstrated their superiority for performing this work and no modern terminal, turning any considerable number of locomotives, can be operated without these facilities. At many small terminals the installation of mono-rail pneumatic hoists and buckets has helped to relieve the situation.

It is essential that all coal and ash handling equipment be periodically inspected and kept in good repair so that locomotive delays due to break-downs may be avoided. The result, for example, when the hoisting machinery in a coaling plant goes out of commission, can well be imagined. Coal cars are brought up, either a crane or hand shovelers hunted up and, in spite of the most strenuous efforts, locomotives are usually delayed and trains tied up.

Enginehouse Personnel Most Important

As with other departments of railroading and all branches of industry, the human element is most important. Even with a modern plant and the best machinery and equipment that money can buy, no terminal can be operated efficiently or satisfactorily with incapable or discontented men. This attitude of the men is so largely dependent upon the character and ability of their immediate supervisory officers that the utmost care should be taken to develop and select able men for these positions. To their great credit be it said that many roundhouse foremen, while modestly and effectively performing daily duties during the past year were able to inspire their men with respect and confidence and never experienced difficulty in getting workmen to undertake tasks which they could legally have refused to do owing to technical rules. It was a case of leading and not driving, coupled with fairness in all relations between foremen and men.

One reason why certain terminals are more efficiently operated than others is because their foremen and supervising officers have recognized the need of trained forces, each workman being instructed in his particular task until he fully understands what should be done and knows how to do it. Responsibility for inspection and repair is fixed and this insures that locomotives have the proper, careful attention each time they come to the terminals. Defects are thus discovered in time before serious wear or accident has occurred. It is not maintained that all terminals, or even 25 per cent of them, are operated in this manner, but the few that are demonstrate the possibilities and present an example which can well be followed by others.



Chronological Review



A Resumé of the Outstanding Events of the Twelve Months,
Arranged for Ready Reference

By J. E. Cole

THE PAST YEAR has been marked by a constant effort for readjustment of railroad conditions by railway officers, the state and national commissions, the shippers and the general public. The railroad problem has, as never before, become the people's problem. But despite the widespread publicity given to railway conditions, the progress toward readjustment has been slow. The roads have experienced a year of decreased business, with the costs of materials and wages decreasing relatively little, while they have been fettered by prolonged investigations and hearings on rates and wages. However, the roads have demonstrated the economic advantages of private operation by the increased efficiency of operation and economy of management which they have been able to effect and they have come forward with a number of voluntary rate reductions which are in effect as the year closes. With these conditions in mind, the following list of the outstanding developments and decisions of the year has been compiled:

JANUARY

- January 1, 1921.—Section 10 of the Clayton act regulating dealings in railroad securities and supplies between companies having "interlocking relationship" became effective.
- January 5.—Hearings on the Frelinghuysen bill offered as a substitute for Section 10 of the Clayton act began before a sub-committee of the Senate Committee on Interstate Commerce.
- January 6.—Winslow bill introduced in Congress to provide for partial payments to railroads for deficits incurred during the guarantee period.
- January 6.—Interstate Commerce Commission announced that a formal investigation would be made of the charges made by representatives of railroad labor organizations that certain railroads were paying excessive prices for the repair of cars and locomotives.
- January 10.—Hearings on national agreements and working conditions began before Labor Board.
- January 28.—Interstate Commerce Commission rendered decision making interstate rates effective in Illinois for intrastate rates.
- January 28.—Atlanta, Birmingham & Atlantic petitioned Labor Board for authority to reduce wages.
- January 31.—Labor committee of the Association of Railway Executives suggested to Labor Board that it set aside at once all rules and working conditions imposed since December 31, 1917.
- January 31.—Winslow bill reported favorably to the Senate by the Senate Committee on Interstate Commerce

LABOR BOARD in almost continuous session on adjustment of wages and working conditions.

Congress gave much attention to railway problem.

Numerous reductions in rates put into effect late in year.

Labor difficulties culminated in threatened strike which was called off at the last minute.

FEBRUARY

- February 6.—President Wilson declined railroad employees' request that he interfere in the controversy over the abrogation of the national agreements.
- February 8.—Winslow bill passed by House.
- February 14.—Labor Board directed Erie to rescind wage cut and ruled that no change in wages or working conditions was to be made except by agreement between the parties, until the dispute was heard and opportunity given for the Board to pass upon it.
- February 17.—Labor Board rendered decision setting forth procedure to be followed in handling matters over which it has jurisdiction.
- February 21.—Labor Board remanded wage reduction disputes of the Atlanta, Birmingham & Atlantic and the Missouri & North Arkansas to parties involved.
- February 22.—Winslow bill passed by Senate.
- February 22.—Milton H. Smith president of the Louisville & Nashville, died at Louisville, Ky.
- February 25.—Atlanta, Birmingham & Atlantic thrown into receivership and B. L. Bugg, president of the road, appointed receiver.
- February 26.—President Wilson signed Winslow bill.
- February 27.—Missouri & North Arkansas employees struck following a reduction of wages by the receiver of the road.
- February 27.—New York Central-Michigan Central wreck at Porter, Ind.—37 killed.
- February 28.—Forty-two state commissions filed briefs with Supreme Court denying power of the Interstate Commerce Commission to fix intrastate rates.

MARCH

- March 3.—Treasury department made first payments under Winslow bill.
- March 4.—Labor committee of the Association of Railway Executives abolished, following decision that individual roads would henceforth handle labor questions directly with the employees.
- March 4.—John Barton Payne retired as Secretary of the Interior and Director General of Railroads.
- March 5.—Atlanta, Birmingham & Atlantic employees struck following wage reductions. Road came before Labor Board to justify reduction in wages.

March 14.—Railway executives summoned by Labor Board as witnesses in hearing on abrogation of national agreements.

March 15.—National Industrial Traffic League filed petition with Labor Board for a hearing in national agreements controversy.

March 15.—Hearings of the New England governors' committee started inquiring into the railroad situation.

March 17.—Wible L. Mapother elected president of the Louisville & Nashville.

March 19.—Chicago & North Western grain elevator at Chicago destroyed by dust explosion. Six people killed and loss estimated at \$4,000,000.

March 24.—President called conference with the chairman of the Interstate Commerce Commission and the chairman of the Labor Board on the wage and rate situation.

March 25.—Missouri & North Arkansas suspended operation.

March 25.—John J. Esch appointed recess member of the Interstate Commerce Commission.

March 25.—S. Davies Warfield filed a plan of railroad administration with Senate Committee on Interstate Commerce in behalf of the National Association of Owners of Railroad Securities.

March 26.—President Harding appointed James C. Davis director general of railroads.

March 29.—Labor Board denied petition of the National Industrial Traffic League for hearing in national agreements controversy.

APRIL

April 4.—National Association of Owners of Railroad Securities met with representatives of "Big Four" brotherhoods to discuss railroad situation.

April 4.—Final valuations served on the Kansas City Southern, the Los Angeles & Salt Lake, the Atlanta, Birmingham & Atlantic and the Winston-Salem Southbound.

April 12.—President Harding, before Congress, declared railway rates and the cost of operation must be reduced.

April 12.—Senator Cummins introduced resolution in Senate providing for investigation of railroad situation.

April 14.—Labor Board ruled national agreements were to end on July 1.

April 19.—Senate ordered investigation of railroad situation by the Senate Committee on Interstate Commerce.

April 19.—Joseph H. Young elected president of the Denver & Rio Grande Western.

April 21.—Labor Board ruled Atlanta, Birmingham & Atlantic wage cut was illegal.

April 25.—Senate confirmed appointment of B. W. Hooper, S. Higgins and W. L. McMenimen, as members of the Railroad Labor Board to succeed H. W. Hunt, W. L. Park and J. J. Forrester, respectively.

April 28.—Railroad employees began fight against the wage reductions asked for by the railroads.

April 29.—Governor's committee opposed rate raise in New England.

MAY

May 3.—Senate confirmed appointments of E. I. Lewis and J. B. Campbell to Interstate Commerce Commission.

May 7.—Railroads completed plea for first wage reduction before Labor Board.

May 10.—Senate committee began investigation of railroad situation.

May 12.—George R. Loyall elected president of the Norfolk Southern.

May 16.—Seasonal coal rate bill reported favorably by Senate committee on Interstate Commerce.

May 18.—Franklin K. Lane, former member of the Interstate Commerce Commission, died at Rochester, Minn.

May 22.—Edward L. Brown, formerly president of the Minneapolis & St. Louis, and the Denver & Rio Grande, died at St. Paul, Minn.

May 25.—Union Pacific acquired full control of Los Angeles & Salt Lake by purchase of holdings of Senator W. A. Clark and friends.

May 25.—Henry B. Ledyard, chairman of the board of directors and former president of the Michigan Central, died at Detroit, Mich.

JUNE

June 1.—Labor Board ordered wage reduction approximating 12 per cent, effective on July 1, in order No. 147.

June 3.—Pueblo, Colo., flood caused \$5,000,000 damage to railroads.

June 6.—National Association of Owners of Railroad Securities appointed committee to study railroad problems.

June 6.—Carriers asked Labor Board to reduce wages to the rates existing prior to Decision No. 2 of the Labor Board.

June 17.—Labor Board decided against Pullman Company which sought to bring a plea for wage reductions before Board. Ordered to go to employees and then to Board.

June 18.—Edgar E. Clark, re-elected chairman of the Interstate Commerce Commission.

June 27.—Labor Board extended scope of wage reductions, adding 92 carriers and one labor organization as parties to wage reduction order Decision No. 147.

June 28.—Labor Board continued national agreements until such time as rules are considered and decided by the Labor Board.

JULY

July 1.—Wage reductions totaling 12 per cent of pay roll became effective.

July 1.—Numerous changes in car service rules became effective.

July 1.—New classifications of railroad employees were made effective.

July 3.—John Findley Wallace, consulting engineer and chairman of the Chicago Railway Terminal Commission, died at Washington, D. C.

July 8.—Charles A. Prouty, director of valuation and former member of the Interstate Commerce Commission, died at Newport, Vt.

July 14.—Representatives of Pennsylvania Railroad appeared before Labor Board defending employee representation plan of the company.

July 16.—Charles F. Staples appointed acting director of valuation of the Interstate Commerce Commission.

July 22.—Railroad settlement plan providing for the

funding of the debt of the railroads to the Railroad Administration, announced by the President.

July 22.—Edgar E. Clark resigned as a member and chairman of the Interstate Commerce Commission. Frederick I. Cox succeeded Mr. Clark as a member of the commission.

July 28.—Interstate Commerce Commission declined to fix New England rate divisions.

AUGUST

August 1.—Reorganization of Car Service Commission of the American Railway Association became effective.

August 1.—Labor Board ordered new election of representatives of employees on the Pennsylvania to negotiate new rules and working conditions.

August 1.—U. S. Chamber of Commerce appointed two committees to deal with transportation.

August 6.—Interstate Commerce Commission prescribed method for fixing operating expenses for maintenance during the guarantee period.

August 9.—Hearings began before Senate Committee on the Townsend bill which would allow War Finance Corporation to purchase obligations of the carriers.

August 11.—Roads refused "Big Four" brotherhood's demand that wages be restored to the level of June 30.

August 15.—Interstate Commerce Commission decided that freight rates on live stock should be reduced in western territory.

August 16.—Overtime controversy settled by Labor Board with compromise decision containing seven new rules to govern punitive payments.

August 22.—Epes Randolph, president of the Southern Pacific of Mexico and the Arizona Eastern, died at Tucson, Ariz.

August 22.—House passed railroad funding bill.

August 24.—Pennsylvania Railroad denied right of Labor Board to regulate working conditions.

SEPTEMBER

September 12.—Sale of equipment trust certificates by the director general of railroads started.

September 24.—Labor Board defined its powers and legal status.

September 25.—H. P. Titcomb elected president of Southern Pacific of Mexico and the Arizona Eastern succeeding Epes Randolph, deceased.

September 28.—Interstate Commerce Commission presented tentative consolidation plan, proposing 19 competing systems.

OCTOBER

October 3.—Charles C. McChord elected chairman of the Interstate Commerce Commission.

October 11.—Unemployment conference urged railway rate revision.

October 11.—State commissioners at Atlanta, Ga., debated federal vs. state regulatory powers.

October 13.—Labor Board lifted piece-work ban.

October 14.—Association of Railway Executives decided to ask Labor Board for further wage reductions.

October 15.—Labor leaders called strike of train service employees for October 30.

October 15.—President conferred with public group of the Labor Board on strike situation.

October 22.—Trainmen of the International & Great Northern struck as "opening gun" despite instructions of Labor Board to await decision of October 26 conference.

October 22.—Interstate Commerce Commission ordered western grain and hay rates reduced.

October 26.—Labor Board held inquiry on the threatened strike.

October 27.—Threatened strike called off.

NOVEMBER

November 1.—Nation-wide "Perfect Package Month" campaign opened.

November 1.—Labor Board recognized "ability to pay" as "secondary" factor in fixing wages in determining wage scales.

November 3.—Erie freight piers at Weehawken, N. J., destroyed by fire with loss of \$2,000,000.

November 14.—Hearings on Capper bill which proposes amendment of Transportation Act began by Senate Committee.

November 16.—Association of Railway Executives passed a resolution providing for a petition to be filed with the Interstate Commerce Commission asking that the Commission announce its rate policy, and announcing a 10 per cent reduction in rates on all agricultural products which it was expected would be substituted for the reduction in western rates on grain and hay.

November 23.—Interstate Commerce Commission ordered general rate inquiry.

November 29.—Labor Board announced complete new rules to supersede the provisions of the Shop Craft's National Agreement, to be made effective December 1.

DECEMBER

December 1.—United States Shipping Board asked railroads to abrogate the foreign shipping line contracts at hearing before committee of that body.

December 5.—Arguments started before the United States Supreme Court on the bill filed by the state of Texas attacking the constitutionality of the Transportation Act.

December 5.—Collision on the Newton branch of the Philadelphia & Reading, at Bryn Athyn, Pa.—25 persons killed, 20 injured.

December 14.—Interstate Commerce Commission began general rate investigation, to determine whether and to what extent further rate reductions are justified.

December 14.—Labor Board announced new code of working rules for maintenance-of-way employees, providing that punitive overtime be allowed after ten hours instead of eight.

December 19.—Labor Board opened hearing on the right of the railroads to contract locomotive and car repair and maintenance of way work.

Foreign Railways Section

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Luthbridge Viaduct on the Canadian Pacific. This 5,327-ft. Structure Reduced the Mileage More Than Five Miles and Cut Out 37 Curves.

The Canadian Railways Are in a Bad Way

Public Is Awakening to Seriousness of the Situation, but No Solution Seems to Be in Sight

By J. L. Payne

FROM THE BEGINNING of 1914 to the end of 1919, the railways of Canada had a trying experience. In 1920 conditions grew worse. Bad, however, as things were during the years of the war, and acute as they became in 1920, they were still worse in 1921. They might be said to have passed during the past seven years from the positive to the comparative, and then to the superlative degree.

In all this one sees the close parallel between operating results on both sides of the line. While this has always been true in a measure, it has been peculiarly true during recent years, for a specific reason. The fundamental causes of trouble have come to be more and more identical. Washington and Ottawa have drawn closer together in regulative policy; so that if there had been no international boundary during the past ten years it would not have mattered seriously whether the railways of Canada and the United States had been controlled by either the Interstate Commerce Commission or the Board of Railway Commissioners at Ottawa. If these tribunals had agreed upon a plan of co-operation or joint action, they could scarcely have concurred more closely in their rulings and general scheme of administration, broadly of course that in all essential respects the general conditions of operation, as governed by state regulation, have been the same on both sides of the line.

No International Boundary for Brotherhoods

This coincidence as to regulative policy took very positive shape in 1918. When the McAdoo award was given in that

year it became as immediately effective in Canada as it did in the United States, barring only the national agreements. They could not specifically apply to Canada because of the nature of the agreements themselves; but Canadian railways were at once affected by many of their baneful features. The same thing occurred in 1920 when the Chicago award was given. The railways of Canada were as directly bound by the judgment of a foreign tribunal as if that tribunal had positive jurisdiction in the Dominion; and it is a strange thing the question of national solidarity was not raised. It was not, for the sufficient reason that it would have been futile. The National Railways Labor Board could not legislate for Canada any more than could Congress; but the brotherhoods could.

The international scope of the railway labor organizations explains the whole thing.

The tightening troubles of the railways grew out of rising operating cost, and rising operating cost grew very distinctly out of the swollen payroll. The brotherhoods had no international boundary. What they gained in the United States was passed on to Canada. And this situation persists. The forces of labor have no flag. They

fight under a common banner.

Worst Year in Canadian Railway History

Let it be repeated, so as to return to the primary theme, that 1921 was the worst year in Canadian railway history. The situation in the first three months of the year had in it all the possibilities of general bankruptcy. In January the ratio of operating expenses to gross earnings was over 108

THE YEAR 1921 was the worst one in Canadian railway history. Labor situation and operating results have closely paralleled those in United States.

Increases in net have been made at the expense of maintenance; this is piling up and, of course, must be made up in the future. Labor demands arouse the public. A rate cut was made in November.

Will the Canadian Pacific be forced to take over the national group?

It might be said,

per cent for all the railways of Canada as a group. This meant that, while strong roads, like the Canadian Pacific and four or five others, were holding their heads above water, the government system was floundering under an adverse ratio of 125 per cent. But there was this vital difference. The state system had the treasury of the Dominion to fall back upon, and represented over 52 per cent of the total operating mileage of the country.

Obviously this could not long endure. Traffic was slumping month after month. Relief from burdensome operating cost was not in sight. Deflation was under way in all the countries of the world, causing trade to shrink alarmingly; and traffic and trade are always interchangeable terms. If the headlong plunge toward insolvency was to be arrested the initiative must come from within rather than from without. The logical remedy would have been to increase the earning power of the railways; but it was felt that would be a most unpopular move, and a doubtful expedient too. Past a certain point you cannot go in the matter of tolls, without defeating the end in view. The people of North America had become accustomed to the lowest freight rates in the world, and were fretting under the increases which had been imposed as a means of offsetting the additions made to operating cost. That these increases had not been sufficient was ignored by the public. It was believed the new rates were cramping business, and probably they were. So the railways resolved to save themselves by heroic and intensive, albeit not wholly sound, measures of retrenchment.

"Life or Death?"

In April began a slashing of expenses which has had no precedent in Canadian railroading. Maintenance was cut to a point hitherto regarded as inexpedient and unsafe. Train mileage was reduced in every possible direction. Men were let go from every department by the thousands. Then in July came the cut of 12 per cent in wages, and in September the movement of a bountiful harvest once more brought traffic to a temporarily buoyant state. While gross earnings steadily declined from the 1920 level, net earnings rose as the result of lowered operating expenses.

It is possible that unthinking and uninformed onlookers were deceived by this betterment on the side of net earnings; but not so the railways. They knew full well that such results had been won by methods both temporary and unsound. They did not delude themselves with the notion that maintenance could be cut without carrying with it the necessity of restoring to the property the money thus withheld; so that what was saved today would be lost tomorrow. Yet necessity is a cruel master. They had to do it. It was the only way of meeting an emergency which had in it the elements of life or death. Just how the experiment will turn out in the long run is in the lap of the gods; but those who are open-eyed and conservative are apprehensive about the results.

Official statistics for the full year are not available. The monthly reports at this time of writing come down to the end of August. For that period the gross earnings of Class I roads had an aggregate of \$277,478,122, as compared with \$282,841,087 for the corresponding eight months of 1920. Operating expenses, on the other hand, totalled \$268,266,928, as against \$285,592,109 for the preceding year. Thus, while income declined by 1.9 per cent, outgo shrank by 6.1 per cent. That tells the story of economy; and those who are familiar with the general situation in North America will see how closely this result corresponds with what happened coincidentally in the United States, and by precisely the same means. Collateral to the foregoing figures is the fact that ton-miles decreased from 18,855,679,998 to 14,739,895,867, or by 16.6 per cent.

This enforced policy of retrenchment struck directly at the payroll, which was the controlling factor in operating

expenses. This will be seen by a comparison of the wages bill by months:

	1920	1921
January	\$19,378,812	\$21,960,258
February	19,525,340	19,923,386
March	20,808,205	20,327,326
April	20,097,354	18,989,580
May	23,076,014	19,415,027
June	24,578,970	20,220,220
July	25,500,767	20,155,796
August	25,430,331	20,312,321

It will be observed that, while for the first three months of the year the increase over 1920 amounted to \$2,498,613, the decrease for the succeeding five months reached \$19,580,092. During this latter term there had been a cut of nearly 16.5 per cent, which will be conceded to have been drastic. And this occurred with only slight relief from the decision of the Labor Board, which was not made effective in Canada until toward the end of July. It was simply the result of reducing the maintenance and operating staffs to the lowest possible point under the pressure of circumstances.

Public Becomes Aroused

The tribulations of the railways were not, however, without some measure of compensation. They aroused public interest in the situation. People began to inquire why the railways were in such a desperate plight. About that time the long drawn-out hearing before the Labor Board in Chicago caught general attention. The press, for the first time, took up the matter, and, from the publication of the news dispatches, went on to editorial criticisms. This was all novel, and, stranger still, the comments were favorable to the railway side. Men of affairs were impressed by the facts, as disclosing the pinch of labor cost on the agencies of transportation. The greedy grip of the brotherhoods was recognized in the adversities of the railways. Everybody saw clearly the relationship between cause and effect. Obviously, the railways could not hold their own while operating expenses had been raised far beyond the earning power involved in higher rates. The question was too simple to admit of any other than one conclusion.

Back of this attitude on the part of the public was a wholly selfish consideration, as natural as it was logical. High tolls were positively unpopular. Everybody wanted them reduced; yet everybody realized that they could not be reduced, except at the expense of ruining the railways, while wages remained high. Under normal circumstances, actuated by a standing grudge against the transportation corporations, their sympathies would have been with the workers. It was something new, therefore, both to the railways and to the employees, to find public sentiment take this swing, and probably as surprising to one as to the other. The press, without an exception, voiced this disposition of the people. The wages problem came in for nearly as much consideration as did politics, and for the first time in more than half a century the cause of the railways did not lack for valiant champions. The papers teemed with examples of the scales of pay awarded to railway employees.

It would be pertinent at this juncture to tell succinctly what happened in Canada when the Labor Board ordered a 12 per cent cut in wages. It has already been made clear that when the McAdoo and the Chicago awards were given, the question of jurisdiction was not raised on the Canadian side of the line. Instead, instant effect was given to these judgments. When, however, the Labor Board gave a decision in May last adverse to labor, the Canadian unions at once fell back on their geographical position. They refused to recognize the jurisdiction of a foreign tribunal, and appealed for a board of arbitration under the Industrial Disputes Act. They got it. Meanwhile, however, the railways had given effect to the cut. And then, just as the arbitration proceedings had got well under way, the threat to strike in the United States was announced. Public feeling burst out afresh against the unions, and, when the strike order had

been withdrawn across the boundary, the struggle in Canada came to an abrupt termination with a verdict adverse to the appellants.

Rates Reduced 10 Per Cent

With the reduced wages scale in effect there has ensued an insistent demand for the lowering of freight tolls. Press and public are as united in this action as they were in opposing the demands of labor. There are not, however, the old allegations of greed, nor is there in this appeal the former spirit of cold hostility. The demand is based on public interests. Deflated freight rates are said to be as urgently needed for the revival of trade as are deflated prices in general, and the railways are being asked to take their share of the common losses incident to readjustment. The matter came to a focus about the middle of November, when the Railway Commission ordered a reduction in both freight and sleeping car tolls, the effect of which will work out at 10 per cent all round. In their efforts to meet this cut, which will involve a loss in revenues of something over \$40,000,000, the railways may have a hard time of it. They are not yet out of the woods. Far from it. At no later date than the early spring can they hold off on making up for the autumn skimp in maintenance. Meanwhile, a revival of traffic has not begun.

In this connection, a grave question is slowly but surely pushing its way to the front. Whence will the railways obtain capital for needed extensions and betterments? In view of the immediate situation as to net earnings, investors will be apt to be shy. With high class bonds selling at from six to eight per cent, the railways have very little chance to get in at lower rates. And it must be remembered that, so far as Canadian roads are concerned, 75 per cent of their financing was done at rates of five per cent and under. The matter has not been looked into for the purposes of this article; but it is definitely known that a considerable volume of liability will soon mature. To increase fixed charges will inevitably intensify the problem of making both ends meet, already acute. This is an aspect to which the onlooking public gives little or no consideration; but it is nevertheless very real and very serious. It applies to all those units within the national system whose liabilities were assumed by government as well as to corporate roads.

Enormous Deficit of Government Railways

This reference to the nationalized group brings to mind two significant happenings of the year. In the first place, the Grand Trunk was formally added to the state group on a basis, decreed by the arbitrators, which cuts the stockholders off without compensation. This has been all the more astounding because of the treatment accorded in 1918 to the Canadian Northern, which certainly was in a vastly worse position than was the Grand Trunk. The national system is now complete, and there is no indication that any further additions will be made. In the next place, a general election was announced in October, with polling fixed for December 6, and the campaign at this moment under way has, for the first time, brought the railway policy of government up for public discussion. The only constructive feature developed has been the stand of the Liberal party, led by Hon. Rodolphe Lemieux—who was prominent in the Quebec representation in the Laurier administration of 1896-1911—in favor of the plan of Lord Shaughnessy. That plan contemplates the taking over of the national system by the Canadian Pacific, but the time is not ripe for fair and unprejudiced consideration of such a measure. On the other hand alarm is freely expressed at the enormous annual deficit which attaches to the government group. Yet all this discussion is more academic than practical; for the Canadian National Railways, for good or ill, is an accomplished fact, and nothing that can be said at this stage will to the slightest degree alter it.

At the commencement of the campaign, Sir Joseph Flavelle issued a statement which put the case fairly before the people. He intimated that the deficit for the current year would probably be \$67,000,000, and that there was no hope for any more than a gradual reduction of that loss as time proceeded. Everything would depend on circumstances, with the settlement of the North West as a prime factor. Nevertheless, to everybody's surprise, Sir Joseph's announcement had scarcely been given out than the Canadian National reported an operating surplus of \$40,000 for August, and, a month later, a credit balance of \$500,000 for September. While this is purely a bookkeeping showing, and has not aroused any genuine hope, it should be explained that the Canadian National moved a much higher proportion of the western crop this year than it did last. This was the result of sustained propaganda in behalf of the government system, the basis of which was that the people should support their own road in the interest of their own pocket.

The situation has not been vitally altered as to the Canadian National. When the account in full has been made up for the year, it will be found that any temporary benefits realized by a spurt in traffic, and helped out by a favorable monthly pro-rating of expenses, will be wholly offset by the increase in fixed charges arising out of larger capital liability. It would not, in fact, be at all surprising if, when sound accounting has been applied to the system—which, by the way, has been wholly lacking in the past—the shortage for 1921 should exceed \$120,000,000. It might be nominally put down at somewhere around \$70,000,000; but that would leave out of the calculation a very large amount of fixed charges which, while hitherto ignored, are nevertheless just as genuine as those which are recognized.

Summing Up

Summing up the facts for the year in relation to all railways, it might be said that gross earnings will probably run slightly ahead of those of 1920, while operating expenses will show a decrease. Freight tonnage will reveal a considerable slump; but, on the other hand, passenger traffic may go beyond that of last year. There has not been any addition to operating mileage; for while there has been some construction in the west, there has at the same time been a reduction of parallel mileage on the government units. Substantial additions to equipment have been made, most of them from domestic sources of supply and for the Canadian National, which had been shockingly short. In one way and another, probably \$100,000,000 has been added to capital on the government lines. In the labor field the horizon for the time being is clear, although the Canadian roads will be impelled by their urgent needs to follow suit in whatever may be done by the American roads. In short, the year 1922 will open with intense anxiety on the part of all the railways of the Dominion.



A Typical Swiss Railway Station



Saddle Mountain, Monterey, Mexico.

Mexico Makes Progress in Railway Rehabilitation

Traffic Arrangements with United States Lines Restored—Large Additions to Motive Power

THE PROGRESS towards rehabilitation which characterized 1921 in the railway situation in Mexico approaches the remarkable. It is in sharp contrast with what took place on the railway lines of almost every other country. Suggestions that the railway situation in Mexico was showing considerable improvement were in evidence prior to the beginning of the year. The steps of real importance, insofar as concerns the relations between Mexico and the United States, took place in 1921.

The beginning of the year was signalized by the restoration, effective January 1, of the A. R. A. per diem rules and the resumption of interchange with the United States carriers. For a period there was considerable congestion at the border points. In February, however, Francisco Perez, then director-general of the Mexican railways, arranged for the loan of a considerable number of locomotives. He secured ten from the St. Louis Southwestern, nine from the Illinois Central, eight from the Missouri, Kansas & Texas, three from the Gulf Coast Lines and a number from the International & Great Northern. He also similarly secured 200 tank cars. The Mexican motive power situation was bad. Mr. Perez said at the time that there were 581 locomotives in service and 161 awaiting repairs. He also said that there were 13,262 cars in service as compared with 22,000 before the revolution. The borrowed locomotives and others, leased or purchased, promptly enabled the Mexican lines to make a better attempt to move their traffic and the congestion was greatly relieved.

Not satisfied with this alone, the National Railways shortly after placed sizeable orders for new locomotives. The orders for the year included 35 Mikado, 20 Pacific, 40 Con-

solidation and 22 narrow gage locomotives ordered from the Baldwin Locomotive Works and 20 heavy Consolidation and seven heavy Mikado locomotives ordered from the American Locomotive Company. The importance of the order is contained not only in the fact that it represented a restoration of Mexican purchases after a lapse of several years; it also represented the largest order for locomotives placed by any system in North America during 1920.

PER DIEM and interchange relations with United States lines have been restored, and traffic congestion at the border has been relieved.

The National Railways of Mexico placed the largest orders for new locomotives in 1921 of any system in North America. They built 102 miles of new line.

Officers of connecting roads in the United States express optimistic views regarding their relations with Mexican lines.

W. M. Whinton, assistant chief operating officer of the Missouri, Kansas & Texas, in an article in the *Railway Age* of January 7, 1920, entitled "The Present Railway Condition in Mexico," said, "As I view the situation, the crying need of the Mexican railways is capital for the rehabilitation of the rolling stock and motive power and the expansion of facilities in order to take care of what must necessarily follow a stable government—an increased volume of traffic." Mr. Whinton's statement points out the importance of the motive power situation. The placing of the orders for nearly 150 new locomotives shows, therefore, the courage with which the matter has been approached.

Another interesting factor during the year is shown in the construction of new lines. The National Railways of Mexico in 1921 built 102 miles of new line, as follows: From Llano Grande to El Salto, in the state of Durango, 24 miles; from Los Bancos to Cerro de la Cruz, also in Durango, 17 miles; from Zaragoza to Santo Tomas, in Coahuila, 32 miles, and from La Vibora to El Oro, also in Coahuila, 30 miles. There are also two lines under construction in Coahuila, from El Oro to Sierra Mojada, 9 miles, and from Santo Tomas to Villa Acuña, 28 miles. A line is projected and is

now being surveyed from El Salto to Mazatlan, 165 miles.

One of the several unusual methods of operation developed to meet the conditions of revolution and its aftermath was a scheme whereby private companies contracted to move freight in their own trains. The rate was 50 per cent above the regular rate and the contractors did a thriving business. With the restoration of the Mexican railway management, this idea was finally superseded by more ordinary methods of operation.

Relations With U. S. Lines

The Mexican railway situation is extremely interesting of itself. The American railway man will find even a more interesting aspect of the matter in the relationships between his own lines and the Mexican lines. With that idea in mind, the *Railway Age* has communicated with a number of the executives whose lines are handling Mexican business. It has received replies from J. S. Pyeatt, president of the Gulf Coast Lines; Thornwell Fay, executive officer for the receiver of the International & Great Northern and from H. B. Titcomb, president of the Southern Pacific of Mexico. Their communications are given below. The impression conveyed by them is most optimistic.

"The congestion of freight, and limited passenger service, which resulted from the destruction and disabling of locomotives and equipment during the revolution has now disappeared," says Mr. Pyeatt. He also says, "We operate through sleeping parlor and dining cars to Monterey, Tampico and Mexico City and the service, with few exceptions, is operated on schedule and I understand is quite satisfactory to the traveling public."

"There has been, since the early part of this year, a remarkable improvement in the operation of the National Railways of Mexico," says Mr. Fay. "They are giving most expeditious movement now to all traffic which is delivered to them." Mr. Fay comments, however, on the decreased volume of traffic. The International & Great Northern, he notes, has for some time been operating through sleeping cars from San Antonio to the city of Mexico. One of his most interesting comments is a statement concerning the main line between Nuevo Laredo and the city of Mexico. "The physical condition of this line," he says, "being as good as almost any road in the United States."

Mr. Titcomb's remarks relate to conditions in Mexico in general and outside of the railway situation. He has some interesting comments on the possibility of constructing a line of railway from La Quemada to Tepic which has been in contemplation for some time.

The letters follow:

Observations On a Trip in Mexico

By H. B. Titcomb

President, Southern Pacific of Mexico

We traveled over the National Railways of Mexico, from Nuevo Laredo, through Monterey and Victoria, to Tampico. The great steel mills at Monterey were active, and there is a considerable output of rail shipped from this plant.

At Tampico there was considerable activity and development work going on in the oil fields. True, this is not to the extent and magnitude of a few years past, but the improvement work on the Panuco river, such as dredging 200 meters in width and ten meters in depth, has been in continuous progress under the direction of the Mexican government for some time, thereby giving facilities to large tankers and making it possible to increase and facilitate the exportation of oil from this very rich field.

The city itself is suffering, however, from decrease in business and there are a great many unemployed there, but the bustle and activity on all sides portend the return of business in the very near future.

The question of the export tax on oil as covered by a decree of the government of June 7, 1921, has tended to retard development and exportation, but on every hand optimistic feeling was manifest that conditions would improve and that some satisfactory arrangement would be made with reference to this situation.

From Tampico to San Luis Potosi, and thence to Mexico City, was made without any particular incident. At San Luis Potosi, where the day was spent on inspection, I was impressed with the friendly feeling and respectful attitude of the Mexican citizens. This is really a beautiful city. The people seem to be contented even though not enjoying all the pleasures of this world. Merchants are optimistic, even to the small peddlars on the street, who were pleasant and happy.

From Mexico City to Guadalajara and Grendain, we traversed a very interesting part of the country. The state of Jalisco is particularly rich in its grain products, cattle and in the cultivation of the "maguey" plant, from which is extracted the famous "tequila" wine. My mission to Mexico City was to establish cordial relations with the government as representative of the large properties under my jurisdiction, and I am pleased to state that on every hand, I met a very pleasant reception. I was particularly impressed with the attitude of President Obregon, and his frankness in discussing the problems that confront him.

I conveyed to President Obregon the wish of the Southern Pacific Railroad of Mexico to complete the long-deferred construction of the railroad from La Quemada to Tepic, a distance of about 100 miles, which would give Mexico City a complete rail connection from the west coast of Mexico, and to this end suggested that if it were possible for the government of Mexico to recognize the claims of the railroad company, which amount to approximately 32,500,000 pesos, either by bonds or other negotiable paper of the federal government, the railroad company, in turn, would spend the amount in the construction of the 100-mile gap and in the reconstruction of its west coast properties, as fast as the government could liquidate these obligations. By these means the Republic of Mexico would be given a much needed rail transportation line, or it might be called transcontinental line, and at the same time liquidate its just obligation.

I was highly gratified at the interest shown by President Obregon in his statement that the matter would be given careful consideration. He was careful to make no promises that he could not fulfill, which is a trait to be admired. The completion of this line from Tepic to La Quemada will open up a stretch of territory for development and for the marketing of its products, that is beyond the dream of the ordinary individual.

There are 11 main streams that cross the state of Sinaloa alone, and there are upwards of 3,000,000 acres of land susceptible of cultivation of the highest degree. On one of the large holdings in the state of Nayarit, known as the Hacienda de Aguirre, are three textile mills and one sugar factory that has a large revenue yearly, even under the most primitive methods that are employed, and in spite of being separated from the tremendous markets of Mexico City and Guadalajara.

President Obregon and the chamber of deputies are now wrestling with the subject of the agrarian laws, and it is confidently hoped that in the near future security of land titles will be perfected, which will invite thousands of settlers and the investment of millions of dollars in development work on the west coast of Mexico.

In all my travel through Mexico I met with most courteous treatment and no foreigner need fear of traveling in Mexico as long as his mission is an honest one and he goes there not to exploit the country, but to develop it. I was particularly impressed with the patriotism of the Mexican and the love for his country, which is admirable.

Congestion Has Practically Disappeared

By J. S. Pyeatt

President, Gulf Coast Lines

Concerning conditions on the National Railways of Mexico, it is entirely fair to say that from a standpoint of service they are now quite satisfactory.

The congestion of freight and the limited passenger service which resulted from the destruction and disabling of locomotives and equipment during the revolution has practically disappeared. The Mexican railways now operate on their primary lines double daily passenger service, and sufficient freight service to transport without unusual delay all freight traffic offered. A considerable amount of new motive power has been purchased and delivered to the National lines during the past six months, which enables them to meet at least in a fair degree the transportation needs of the country. The heavy reduction in traffic has also contributed to this result.

The roadbed generally seems to be in good condition and disabled equipment, fit for further use, is rapidly being rehabilitated and put in service.

The Gulf Coast Lines operate through sleeping, parlor and dining cars to Monterey, Tampico and Mexico City, and the service with few exceptions is operated on schedule and I understand is quite satisfactory to the traveling public. Our principal interchange is through Brownsville and Laredo; at the former place we make direct connection over International Bridge, and at the latter through the Texas-Mexican Railway, a subsidiary of the National Railways of Mexico. Interchange relations have been entirely satisfactory. The National Railways comply strictly with the American Railway Association rules governing interchange, per diem, inspection, etc., and have always met promptly all of their obligations so far as our company is concerned.

Summing up, my opinion is that while we have no knowledge of the operating results of the National Railways, the service, both freight and passenger, is now ample to meet the normal requirements of the country and there are no unusual difficulties attending the use of the railways at the border by the public, or the interchange relations of the different roads forming junctions at the border.

Remarkable Improvement in Operation of Mexican Lines

By Thornwell Fay

Executive Officer for Receiver, I. & G. N.

There has been, since the early part of this year, a remarkable improvement in the operation of the National Railways of Mexico. In the months of January and February, 1921, there was quite an accumulation of freight at all Mexican border points, for Mexico, and the National Railways were short of power. At this time a number of private concerns, which either owned or managed to rent locomotives, had arrangements with the National lines for operating trains over their lines. They were handling freight for the public at 50 per cent above the regular rates, and for a while had all the business they could handle. The Mexican lines also rented a number of locomotives, principally from Texas railroads, and later placed a contract with locomotive builders for building new locomotives. With the assistance of this additional power the accumulation was gradually decreased and the operation of trains by private individuals was discontinued about September 1, 1921.

About this time also there was a marked decrease in the volume of traffic into Mexico, to a great extent in corn and other grain—the Mexican crops having been harvested. At the present time the Mexican roads are suffering from the decreased volume of traffic, the same as most of the railroads

in the United States and particularly those in Texas, and they are giving most expeditious movement now to all traffic which is delivered them. My information is that they are making regularly from four to five days from Laredo to the City of Mexico on car load shipments. Many of their new locomotives have been received and the congestion everywhere has been cleared up some time since.

The present management of the Mexican Lines is quite progressive. The lines are fast getting rid of the large number of American railroad cars that formerly went into the country. There is very little northbound traffic out of Mexico and unfortunately most of these cars come back to the American connections empty. The International & Great Northern for some time has been operating through sleepers from San Antonio to the City of Mexico, and return, and since October 15 a cafe dining car has been run on these through trains, which also goes through between San Antonio and the City of Mexico, making the trip exceedingly comfortable.

During a recent trip to the City of Mexico we noted, with great pleasure, the excellent physical condition of the track on the main line between Nuevo Laredo and the City of Mexico. The greater part of this line is laid with heavy rail and excellent stone ballast, and the physical condition of the line is as good as almost any road in the United States. The locomotive enginemen on the Mexican railroads seem to be exceedingly efficient and their handling of the air brakes was so skillfully done that never a jar or a jerk was experienced in stopping or starting from stations or water tanks. This is quite a contrast to the experience on some of the American railroads.

Our relationship with the Mexican National Lines and officials has been most cordial and agreeable. I feel sure that they are now in a position to handle promptly a largely increased volume of traffic.



A Triple Electric Weld in the Face of a Coupler and a Welded Coupler Shank



Photo by Keystone

Station at Caracas, Venezuela



View of Midland Railway Main Line 5 Miles from St. Pancras

Review of English Railways During 1921

A Year of Revolutionary Changes—Railway Act Becomes a Law
and Roads Returned to Private Owners

By Robert E. Thayer

THE YEAR 1921 will stand long as a momentous year in English railway history, with its Railway Act; the return of the railways, after seven years, to private control; a serious coal strike, and an abnormal slump in traffic. All these things have contributed to complicate the railway problem in Great Britain and so wide-reaching are their effects that no one is in a position to prognosticate as to the future. The situation is so fundamentally novel that there is no precedence upon which deductions can be based. This is particularly disconcerting to the British railway man who has in the past been able to prognosticate with a fair degree of accuracy future railway conditions. During the past 50 years Great Britain's railway developments have been gradual and along well preconceived lines so that now, with what might be termed a revolution in railway management and operation, the British railway men find themselves faced with a gigantic problem.

The British railways have not only got to face the more or less theoretical problems imposed upon them by the new Railway Act, which of itself is a great undertaking, but they have also to face practical problems such as an abnormal slump in traffic and an extraordinary increase in expense. Existing rates are conceded to be, both by the railway owner and the shippers, considerably higher than what the traffic will bear. At the same time wages are about 200 per cent higher than obtained before the war. The railways are thus in the unfortunate position of not having revenue enough even with the high rates which must be reduced, to meet the present wage scale and working conditions to which they are bound by an Act of Parliament. One great purpose of the Railway Act, with its grouping scheme, was to so consolidate railway affairs in Great Britain as to permit of economy of management, but it is well recognized that any economies possible from this consolidation will be a mere

drop in the bucket of the economy necessary to put the English railways on a sound financial basis.

The abnormal decrease in traffic which has and will upset the best calculations is, of course, the direct result of the economic conditions of the country and Europe. It is patent that railway prosperity depends upon the prosperity of the nation's industries. The reason for Great Britain's industries being in such bad shape is attributable to two factors: the high cost of production and the disparity in money values between England and the other manufacturing countries of Europe.

ENGLISH railways have been and are faced with the most serious and difficult problems they have ever been called upon to solve. Enforced by law to unite themselves into four distinct groups, and at the same time called upon to face the most unprecedented financial situation, with abnormal trade conditions, high wages and rates that must be reduced, their problems are stupendous. Old established English railway methods are destined to receive harsh and revolutionary treatment.

Great Britain is an exporting nation. It can only live by the trade it carries on with other countries. Europe is Great Britain's best customer, but Europe cannot afford to purchase British goods. Furthermore with the greatly decreased value of the currency in the Continental countries, those countries can produce cheaper to themselves than can England. Furthermore, the Continental countries are in a position, and have for the past two years, to undersell Great Britain in practically all foreign trade. These countries came out of the war in much worse condition than Great Britain to the

extent, poverty having become so keen, that the laboring classes are working for lower real wages (when the depreciated value of the currency is taken into account) than they did before the war. These trade conditions therefore will have a great deal to do in the next five years with the prosperity of the British railways, and the prospects as they appear today are poor.

The grouping of the railways as required by the Railway Act involves of itself a heavy task for the British railway companies. A scheme on such a grandiose scale is wholly foreign to previous railway policy, not because the British railways did not desire railway amalgamation, but because the people of the nation would not permit it. While there

may be railway systems in the United States which will approach in magnitude the size of the groups outlined by the Railway Bill, it must be remembered that these American problems have been developed gradually over a period of years and along economic lines. The English grouping on the other hand may be called a "paper amalgamation" based more upon theoretical and geographical lines than on practical and economic lines. Thus the British railways are called upon to perform overnight, as it were, what the United States has done over a period of years.

Furthermore, the managerial policy adopted by the British railways in the past does not lend itself to the management of a large group of railways. Thus almost an entirely new system of management must be installed to give, as Sir Henry W. Thornton expresses it, "a centralization of policy and a decentralization of detail." That the British railways will measure up to the task there is no question of a doubt, for there is yet to be recorded an economic problem which the good sense of the British nation, taken as a whole, has not solved.

It is thus apparent that the British railway situation is by no means a simple one. It will demand the best railway talent in Great Britain to solve it and the most searching inquiry into all phases of railway operation. Being blessed with a very low wage scale up until the war and being cursed by the lethargic tendencies of the seven years government control, the problem of making good under a 200 per cent increase in wages without being able to absorb that increase by an increase of rates, it is evident that the problem becomes a stupendous one.

The Financial Situation

Strange as it may seem, it is impossible to say definitely just what the financial situation of the railways is at the present time. In fact, the railways hardly know themselves. Being handed back to their private owners on August 16, last, there has been no opportunity of casting up figures to give any definite idea of the exact situation. During the seven years of government control a different system of accounting and of keeping records was installed than that which the railways generally followed. On the return to the owners the government's method was more or less scrapped and the old method followed by the railway companies before the war was replaced. This primarily accounts for the fact that sufficient information is not available at present to get a proper idea of the situation.

An indication of the situation, however, may be found in the fact that the British government found itself at the close of its operations last August with a deficit of \$250,000,000, even though it was anticipated that the increase in rates put into effect the latter part of 1919 and at the beginning of 1920 would allow the government to break even. The reason these plans did not materialize is attributable to the serious coal strike in the Spring of the past year, with the accompanying increase in railway expenses, and with the great decrease in business. It will be remembered that these increases in rates amounted to 75 per cent in passenger fares and about 112 per cent in freight rates.

In 1913 the operating ratio was 64 per cent. In 1919 it rose to 94 per cent, in 1920 to 98 per cent; between 1913 and 1920 there was an increase of 97 per cent in the receipts accompanied by an increase of 200 per cent in expenses. What the position is today it is not possible to say, but the railway companies are looking forward with great anticipation to the \$125,000,000 due them from the government on January 1, 1922, in accordance with the provisions of the Railway Act, to carry them over any difficulties in which they may find themselves.

While this \$125,000,000 will be available for dividends, Sir George Paish, in discussing the "Future of the British Railways" before a recent meeting of the Institute of Trans-

port, has cautioned the railways to think wisely before they part with this amount for dividend purposes. Sir George foresees difficult times ahead and recommends the utmost conservatism in order to forestall receiverships and loss of confidence in railway securities.

An indication of the degree of confidence the investing public now has in railway securities is indicated by Table 1, which compares the high stock values of 1913 with those obtaining on December 6, 1920, and December 13, 1921.

TABLE 1—COMPARISON OF STOCK VALUES

	High, 1913	December 6, 1920	December 13, 1921
Caledonian:			
Ordinary stock.....	79½	36½	29½
Preferred converted.....	59½	28¾	24½
Glasgow & South Western:			
Deferred ordinary.....	44½	21¾	15¾
Great Central:			
Deferred ordinary.....	17¼	5½	4
Preferred ordinary.....	39¾	10½	8
Great Eastern.....	63½	30	27¾
Great Northern:			
Deferred.....	57¼	28¾	23¾
Preferred.....	88¾	44½	41¾
Great Western.....	119¾	74¾	70¼
Lancashire & Yorkshire.....	91½	53	49¾
London, Brighton & South Coast:			
Deferred ordinary.....	95	44½	38½
London & North Western.....	136¾	75¼	69¾
London & South Western.....	39¾	20¾	18¾
Midland:			
Deferred.....	77½	48	43¾
Preferred.....	60¾	33	34¾
North British.....	32¾	13	9¼
North Eastern.....	124	78½	71¾

It will be seen that there has been quite an appreciable decrease during the past year and a most decided decrease over the 1913 values.

Under the present circumstances the railways obviously would encounter difficulties if they went into the open market for funds for capital expenditures. As a matter of fact, while there are a number of opportunities for capital expenditures, particularly for electrification purposes, there is the tendency not to enter upon any such work until the grouping scheme has materialized. It is quite apparent that such a procedure would complicate the financial arrangements that must necessarily be made in forming groups and until they are formed there is not much liability of heavy new construction being undertaken. The largest project under consideration at present is the extension of the electrification of the London, Brighton & South Coast which will involve further electrification of the suburban lines around London and the electrifying of the line to Brighton. Detailed plans have been evolved but the manner in which this work is to be financed has not yet been decided.

The Ministry of Transport

The Ministry of Transport, having performed the particular function for which it was formed, namely, providing a solution of the British railway problem, is now more or less in the process of disintegration. Sir Eric Geddes resigned as Minister shortly after the roads were turned back to the private owners and is now chairman of a governmental committee known as the "super-axe" committee, which has been formed for the purpose of scrutinizing all government expenditures with the idea of eliminating those which can be dispensed with. There is now no Minister of Transport and the chief work of that department which will extend over a period of two or three years is the settling of the many claims arising from the government's control of the railways. While no definite governmental action has been taken as regards the Ministry of Transport it is anticipated that its functions will be absorbed by the Board of Trade and the Railway and Canal Commission. It is interesting to note in this connection the strong plea of labor for its continuance.

The outstanding work of the Ministry is, of course, the draft of a Railway Act and pushing it through Parliament. Sir Eric Geddes is deserving of considerable credit for his work, for he had to contend with much opposition. Whether

or not his work has been for the best remains to be seen. There were only two radical changes in the bill as it was presented to Parliament. These were in the rearrangement of the groups, whereby the Scottish railways instead of acting as an individual group were linked up with two English groups to form the North Eastern, Eastern & East Scottish group and the North Western, Midland & West Scottish group, and the elimination of the representatives of labor on the Board of Directors of the groups. These changes came about by agreement between the railways themselves in the first case and between the railways and labor in the second case and against the government's own judgment.

Labor argued that representation on the Board of Directors as outlined by the proposed law would be a mere farce and of no material benefit to the men. This change was made in the Act at the eleventh hour previous to which labor threatened dire results were their representation on the boards to be eliminated from the law. The real truth of the matter is that labor used this as a club over the railways to obtain further concessions as regards wages and working conditions.

Of the various important committees established during Sir Eric's administration only one has presented an official report. That is the Advisory Committee on the Electrification of Railways. This committee has established certain general regulations to be observed by the railway companies when electrifying their lines with a view towards standardization of methods and appliances. It advocates the direct-current system at 1,500 volts for those railways which have not as yet electrified any lines, as well as those which are using the direct-current system at present. Either overhead or third-rail system of power collection is permitted. Three-phase alternating-current is recommended for the power generating units at 50 cycles, except where other frequencies are used in a particular electrification district. A special ruling was made in the case of the London, Brighton & South Coast, which uses single-phase alternating-current, giving that road the privilege of using that system in the extension of its electrified lines.

No report has been rendered in the matter of standardization or automatic train control, nor is there any prospect of such reports being forthcoming. As regards standardization it is argued that by grouping the roads as outlined in the Act standardization will automatically take care of itself, particularly in the groups themselves.

The Rates Advisory Committee which has been working on a reclassification of traffic items is still in the midst of its work and the task is of such great proportions that a report is not expected in the near future.

As has been previously pointed out, the grouping proposed by the Minister of Transport and made into law is the most radical feature in the bill. Executives of the railways are now carefully considering the problem with a view of organizing the groups within the time specified by the law, namely, January 1, 1923. During the past year one large step has been taken in this direction in the amalgamation of the London & North Western with the Lancashire & Yorkshire, which goes into effect January 1, 1922. In previous years these two companies have been acting under various joint agreements.

Corollary to the proposed grouping, the manufacturers of locomotives, passenger coaches and freight cars have become more or less disturbed as to their future prospects for English business. The railways act empowers the railway groups to manufacture equipment for one another and the industries have made presentations to the Ministry of Transport with a view of securing that private enterprise have equal right of competing for railway supplies with the railway groups themselves. No action was taken in the matter, however, because any such competition would not be possible for some years.

In anticipation of a final formation of the groups, the

Eastern Group has entered upon an advertising campaign, both by bill posters distributed over the country and by circular matter, calling attention to the facilities offered the shippers by that particular group. This is indicative perhaps of the competition that will still obtain as regards through business, even after the groups have been formed.

Rates and Wages

Never before were rates and wages so much discussed on the British railways. The railways cannot get business under the present rates and they cannot pay wages without the present rates. Unfortunately the railways are bound by an Act of Parliament to maintain wages according to the schedule. There appears, however, to be a very conciliatory spirit on the part of the labor unions in this matter. Already a reduction of \$1,625,000 per week has resulted from the maximum wage in the conciliatory grades on account of the sliding scale which operates with the rise or fall in the cost of living. In 1913 railway wages amounted to \$3,862,500 per week. The maximum since that time was \$13,502,250 per week, or an increase of 250 per cent. At present the wage bill is \$11,877,250 per week, or slightly over 200 per cent of the prewar wage. The railway shopmen who come outside of what is known as the conciliatory grades are being reduced 12½ per cent, which was a government grant given them during the war to last until the termination of the war. A more detailed account of the manner in which wages have fluctuated is indicated in Table II for men other than those in shops, and Table III for the shop men.

TABLE II—WAR BONUS (NOW WAR WAGES) TO OTHER THAN SHOPMEN (ADULTS)

Date operative	Amount granted* (per week)	Total
February, 1915.....	50c or 75c war bonus	50c or 75c war bonus
October, 1915.....	75c or 50c war bonus	\$1.25 war bonus
September, 1916.....	\$1.25 war bonus	2.50 war bonus
April, 1917.....	1.25 war bonus	3.75 war bonus
August, 1917.....	War bonus converted into war wages	
November, 1917.....	\$1.50 war wages	\$5.25 war wages
April, 1918.....	1.00 war wages	6.25 war wages
August, 1918.....	1.25 war wages	7.50 war wages
November, 1918.....	.75 war wages	8.25 war wages
March, 1920.....	Wages and war wages were consolidated and the sliding scale agreement was put into effect.	
	\$1.25 (war wages not included in agreement)	\$9.50 war wages
April 1, 1920.....	Increase of \$0.25	9.75
April 12, 1920.....	Increase of .50	10.25
June 14, 1920.....	National Wages Board award gave increases ranging from:	
July 1, 1920.....	\$0.50 to \$2.12½	\$10.75 to \$12.37½
October 1, 1920.....	Increase of \$0.50	11.25 to 12.87½
July 1, 1920.....	Increase of .50	11.75 to 13.37½
January 1, 1921.....	Increase of .25	12.00 to 13.62½
April 1, 1921.....	Decrease of 1.00	11.00 to 12.62½
July 1, 1921.....	Decrease of 1.25	9.75 to 11.37½

*25 cents is taken as the equivalent of one shilling

TABLE III—WAGE INCREASE TO ADULT SHOPMEN (TIME WORKERS)

Date operative	Amount granted* (per week)	Total
February, 1915.....	\$0.50 or \$0.75 war bonus	\$0.50 or \$0.75
July, 1915.....	\$3.75 in lieu of \$0.50 or \$0.75 war bonus	\$4.25
April, 1916.....	\$0.25 increase in wages	\$1 wages
September, 1916.....	\$1.25 war bonus	\$1 wages, \$1.25 war bonus
April, 1917.....	\$1.25 war bonus	\$1 wages, \$2.50 war bonus
August, 1917.....	35 increase annualized to make—\$3.75 war wage	
October, 1917.....	12½ per cent bonus on earnings	
December, 1917.....	\$1.25 war wage	\$4.00 war wage + 12½%
September, 1918.....	\$1½ war wage	4.87½ war wage + 12½%
December, 1918.....	1.25 war wage	6.12½ war wage + 12½%
November, 1919.....	1.25 war wage	7.37½ war wage + 12½%
April, 1920.....	\$0.75 on basic rates	8.12½ war wage + 12½%
June, 1920.....	.75 on basic rates	8.87½ war wage + 12½%
August 15, 1921.....	\$0.50 decrease on basic rates	7.37½ war wage + 12½%
November 19, 1921.....	Decrease of 48 per cent on earnings	7.37½ war wage + 8½%
December 3, 1921.....	Decrease of 48 per cent on earnings	7.37½ war wage + 4½%
December 31, 1921.....	Decrease of 48 per cent on earnings	7.37½ war wage

*25 cents is taken as the equivalent of one shilling

The eight-hour day has been one of the most unreasonable and unjustifiable clauses in the new working conditions obtained on account of the war; particularly is this so in the outlying or branch line districts. There appears some hope

that a more rational view will be taken of this matter by the railwaymen themselves. In fact the number of men who have been discharged from some of the railways, which varies from 15 to 20 per cent, in an endeavor to cut down the wage bill has shown the men the impossibility of their position.

As has been previously pointed out in these columns, the machinery for handling all labor questions has been set up in the railway act and provides for a Central Wages Board with a National Wages Board as a last resort.

The railway labor unions have been particularly hard hit this past year. It is estimated that the National Union of Railwaymen will pay out approximately \$3,500,000 on unemployment alone during 1921. Furthermore, now that a law has been obtained for the handling of labor difficulties there is a strong disposition on the part of the men to allow their membership in the unions to lapse to the extent that it bids fair to embarrass them to a considerable degree.

The rates problem is now under consideration, conferences having but just begun. The shippers are insisting upon a reduction in order that they may do business. Assistance has already been given in the matter of raw materials for the manufacture of steel in a 25 per cent decrease on iron ore, limestone and ironstone. The coal operators are now after a reduction. That they need one is without question, for coal, the basic commodity of Great Britain, is being sold at prices which are altogether too high. The railways themselves are paying 100 per cent over prewar prices. It was anticipated that by the time the railways were turned back to the private

compensation) as against an expenditure of \$1,224,000,000, which gives an operating ratio of 98.8 per cent. The government compensation amounted to \$213,000,000. During 1920 important increases were made in rates and fares. The freight rates were increased by about 50 per cent on January 15, 1920, and again on September 1, 1920, bringing the average up to about 112 per cent over prewar rates. Passenger fares were increased on August 6, 1920, by 16 2/3 per cent, making an increase of 75 per cent over prewar rates. Season ticket rates were also advanced to 50 per cent above prewar level and for workmen's fares a mileage scale was adopted on September 1, 1920, with a maximum increase of 200 per cent, or 50 cents a week, whichever was less. During this time a high level of prices and wages prevailed throughout the country and the coal strike, during the autumn of 1920, together with the great depression in trade, have affected the results.

The total engine mileage of all railways in Great Britain in 1920 was 575,576,239 miles, or an increase of 8.03 per cent over that of the year 1919. Train mileage was 378-,070,430, as against 348,911,830 in the year 1919. The average receipts per train-mile from passenger train traffic fell from \$2.55 to \$2.40, but from freight train traffic they rose from \$2.48 to \$2.40.

The number of first-class passengers carried during the year 1920 was 37,675,085, or 15.62 per cent less than the previous year, but the average receipt per first-class passenger rose from 97 cents to \$1.09. There were 1,096,585,156 third-class passengers carried, or an increase of 1.21 per cent over

TABLE IV—MONTHLY RAILWAY STATISTICS FOR ENGLAND, SCOTLAND AND WALES

	Year	Sept. 12	Oct. 10	Nov. 7	Dec. 5									
		to	to	to	to	Jan.	Feb.	March,	April,	May,	June,	July,	Aug.	
		1920	1920	1920	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
Net ton-miles—revenue freight (millions).....	1920	.....	.....	.....	.....	1,610	1,512	1,735	1,511	1,580	1,623	1,646	1,516
	1921	1,497	913	1,412	1,264	1,370	1,213	1,216	567	471	489	1,031	1,241	
Average length of haul (miles).....	1920	.....	.....	.....	.....	56.89	57.04	58.05	58.00	58.15	58.55	58.60	58.41
	1921	57.88	63.00	55.73	55.02	57.58	56.97	56.14	68.00	71.89	71.29	58.60	57.43	
Gross freight train receipts per ton-mile (cents)*.....	1920	.....	.....	.....	.....	2.724	3.290	3.314	3.408	3.252	3.164	3.268	3.310
	1921	.....	.....	.....	.....	4.146	4.348	4.450	6.164	.....	6.348	4.444	.....
Gross freight train receipts per ton-mile less cost of collection and delivery (cents).....	1920	.....	.....	.....	.....	2.476	3.030	3.066	3.174	2.984	2.894	2.974	3.018
	1921	.....	.....	.....	.....	3.842	3.916	4.130	5.544	.....	5.710	4.148	.....
Average train load (tons).....	1920	.....	.....	.....	.....	131.50	123.14	136.06	133.34	134.42	133.79	133.00	132.35
	1921	134.45	113.48	133.61	130.46	128.48	126.02	123.52	94.06	103.68	101.43	123.52	123.30	
Net ton-miles per engine-hour.....	1920	.....	.....	.....	.....	404.27	407.91	424.84	426.32	435.51	441.44	438.81	432.92
	1921	426.82	360.39	415.18	35.37	415.59	414.85	417.91	322.02	359.86	355.27	421.00	423.12	
Percentage loaded car miles.....	1920	.....	.....	.....	.....	71.38	71.04	70.86	70.77	70.47	70.16	69.47	69.90
	1921	70.3	74.99	69.03	67.92	67.66	68.01	68.45	78.11	79.61	77.95	68.29	66.29	
Average freight car load (tons).....	1920	.....	.....	.....	.....	5.40	5.42	5.49	5.45	5.45	5.43	5.45	5.38
	1921	5.44	4.52	5.59	5.67	5.57	5.37	5.23	3.70	3.72	3.64	5.12	5.30	
Cars per train.....	1920	.....	.....	.....	.....	34.10	34.64	34.99	34.62	35.06	35.12	35.15	35.23
	1921	35.21	33.47	34.67	33.87	34.11	34.52	34.53	32.57	35.04	35.78	35.34	35.10	
Average time per day cars in transit (hours).....	1920	.....	.....	.....	.....	1.45	1.46	1.51	1.30	1.30	1.35	1.33	1.25
	1921	1.41	.88	1.32	1.23	1.11	1.08	.95	.51	.40	.46	.84	1.02	

*1 Cent = 1/2 pence.

owners it would be possible to reduce the rates which were put into effect by the Ministry of Transport in an endeavor to wipe out the deficit, but as has been already stated the economic conditions and the coal strike made it impossible to accomplish this end.

Railway Statistics

The Ministry is to continue to compile the statistics in accordance with past practices. Table IV gives the twelve months from September, 1920, to September, 1921, the statistics for the current year being compared with 1920. The serious effect of the coal strike on railway traffic is clearly shown. Likewise the effect of the increased freight rates is shown in the receipts per ton-mile. Otherwise there is but little variation in the figures.

In addition to these monthly records the Ministry of Transport publishes yearly statistics, those for the year 1920 having recently been issued. These show gross receipts for Great Britain of \$1,240,000,000 (without the government

the year 1919, and the receipt per passenger was 30 cents as against 27.4 cents for the year 1919. In second-class passengers there was an increase of 6.90 per cent over the previous year. For all ordinary passenger journeys the average receipt increased from 30.22 cents to 32.74 cents.

Total tonnage carried was 323,971,117, or an increase of 4.21 per cent as compared with 1919. In coal, coke and patent fuel there was an increase of .65 per cent, and in other minerals an increase of 20.81 per cent. The total receipts per ton for all railways were \$1.89 as against \$1.05 in 1919.

Motor-Lorry Competition

In certain districts, particularly in the Midlands around Manchester, motor lorry competition has cut into railway earnings to some extent, although there is not much anxiety on the part of the railways as a whole on this account. In an endeavor to forestall any undue losses in this respect an attempt was made on the part of the railways to incorporate

in the Railway Act a section giving the railways power to operate and maintain motor transport in connection with the railway services. Owing to the opposition of the operators of motor transport lines, and to a certain extent shippers themselves, this was not allowed, the chief argument being that it would give the railways an undue monopoly of transport and perhaps entirely kill future development in road transport.

There are a few railway companies, however, which under previous Acts of Parliament are given authority to carry goods by motor lorry. Motor lorries can handle small parcels cheaper than the railways and they have a certain financial advantage over railways in that they are not subjected to the heavy property tax the railways have to pay. The whole problem of motor transport, however, is more or less in an embryotic state, for it has not been given the trial of years to determine whether or not it can be maintained as a paying proposition. After the war a large number of motor lorries used in connection with war transport were thrown on the market and purchased at a low figure. With the capital expenses thus small to start with, it has been possible to show satisfactory results, but whether or not this will continue is a question.

The motor char-a-banc for the conveyance of passengers, has during the past summer season proved remunerative. But there the conditions had a lot to do with it. England has never experienced such a stretch of settled and fair weather for 30 or 40 years. This gave the motor char-a-banc a wonderful opportunity of doing business. Furthermore, the novelty of this means of transport did much to swell the receipts. Except in long distance runs, such as from London to various seaside resorts, the motor char-a-banc should prove an asset rather than a liability to the railways for a large number of these services have sprung up in the pleasure resorts and have done much to attract visitors; to some extent the railways have benefited.

It is impossible to state definitely, due to the newness of this means of transport, as to just how much it will cut into the railways' business. The extraordinary growth of road transport for both freight and passengers has, however, been sufficiently large to cause some anxiety.

Railway Excursions

Perhaps the most outstanding feature from the public's point of view of the return of the railways to the private owners has been the large increase in the number of railway

excursions offered by the railways to attract traffic. Day excursions at the rate of a single fare for the double journey and cheap period excursions at the rate of a single fare and a third for the double journey were introduced in August. The general public has shown great appreciation of these facilities. Opportunities were given to travel to all holiday resorts and even the continent. The railways have been quick to take advantage at any occasion to give special excursion attractions such as football games, midsummer sales in the London stores, horse races, etc. The latest excursion is being offered to Irishmen in England desiring to go to Dublin to celebrate the settlement of the Irish question.

The Coal Strike

The three-months coal strike was a severe blow to the railways, but coming as it did before the roads were passed back to their private owners, the government was called upon to stand the heavy financial losses it entailed. The railways themselves, however, were not wholly freed from its disastrous results for it so crippled England's trade as to have made itself felt even up to the present time. The situation was such that coal had to be imported into Great Britain from France and even from America for the operation of trains.

Passenger traffic was greatly reduced much to the discomfort of travelers; of freight traffic there was practically none, for the strike was so all-inclusive in its effects that industries could not operate. One interesting development was the rapid and extended use of oil fired furnaces both on locomotives and in stationary plants.

During the strike the threat to call a general strike, including the railwaymen and transport workers, provided a very delicate and dangerous situation, and it was only the unreasonableness of the miners themselves that prevented such a possibility. The action of the railway workers at that time in refusing to join with the miners when the miners refused to meet the government halfway indicated an awakening of labor in general to the futility of maintaining a high-handed policy in endeavoring to extract from the nation that which economic conditions would not allow. If the more conciliatory spirit that has recently shown itself amongst the laboring classes is at all due to the lesson learned during the coal strike some benefit has resulted from it. It at any rate proved that unionism, no matter how strong it may be, cannot hope to win against economic conditions.

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Great Northern Railway (England) Three-Cylinder Locomotive for Fast Freight Service



A Viaduct in Southern France Made Necessary by Sharp Curve—Photo by Kadel & Herbert

High Lights in the French Railway Situation

Devastated Lines Restored—Deficits Still Heavy But
Decreasing—New Railway Act

By M. Peschaud

Secretary, Paris-Orleans, Paris, France

THERE ARE, in round figures, about 24,855 miles of French railroads, divided into seven railway systems. Five of these railways (Paris-Orleans; Paris, Lyon & Mediterranean; Nord; Est, and Midi) are conceded to private companies by the state, which remains the owner.

These concessions expire between 1950 and 1960. The two other railways are the State Railway, founded in 1878 and enlarged in 1908 by the repurchase of the Ouest Company, and, since the end of the war, the Alsace-Lorraine railways, which are also operated by the state. The new convention for the reorganization of the railways, which was passed by parliament on October 29, 1921, provides that the Minister of Public Works may, at any time, decide that the Alsace-Lorraine railway shall join the joint organization.

Physical Condition

The war imposed a considerable strain upon the French railways. The wear and tear of the permanent way and equipment was considerable, and above all there had to be taken into account the havoc caused by the Germans on the Nord and Est railways. There were 1,802 miles of line destroyed or damaged, besides 3,480 miles of single line (namely a third of the total length worked by these two railways in 1913); also 1,510 bridges, 12 tunnels, 590 buildings and 150 water tanks were demolished. The shops at Hellemmes, Lens, Tergnier, Epernay, Roye, Mohon and all the engine houses in the zone of occupation had to be rebuilt. At present everything is restored and working as it did in 1914.

The other railways did not have such a heavy task in repairing their plants. They were obliged, nevertheless, to re-lay about 746 miles of track which had been taken up during the war so that the rails could be used at the front. It was necessary also to renovate the tracks whose upkeep

had been neglected on account of the war, renew the ballast, ties and rails. This work is now, at the end of the year 1921, almost complete. At the same time the railways have carried out certain improvements which experience has proved to be valuable. The dispatching system has been adopted in various places. In addition trials of new signal systems are being actively conducted.

The reconstruction of the rolling stock, which has been very rapid, is also nearly completed. As a result of purchases, and also delivery of equipment which the terms of the armistice required from Germany, the railways possess about 1,000 more locomotives than before the war (an average increase of 6 per cent). They have also

an addition of 50,000 freight cars (an average increase of 15 per cent). A great effort was made to repair the equipment. The railways went chiefly to private firms for their supplies, and in spite of the strikes of 1920 and the strict application of the eight-hour act, the situation can be regarded as fairly satisfactory.

For example, one of the principal French railways repaired, during the period from November 1, 1918, to June 30, 1921, both in its own workshops and those of private firms, 2,720 passenger cars and 863 baggage cars, and, in its own repair shops alone, nearly 200 passenger cars and

THE FRENCH RAILWAYS

are fast returning to normalcy. Their deficits are still large and wages high but with the new railway act in force and a modification of the eight-hour day it is anticipated a great improvement will be made in 1922. Wages are to be reduced with a reduction in the cost of living. The state under the new law will assist the railways with capital.

177 baggage cars. Over 200,000 freight cars have been repaired.

As for the locomotives, the percentage laid aside for repairs, which was 18.4 per cent on this line on December 1, 1918, is now 16.6. (It was 13.5 in 1913.)

The situation is thus normal again on almost all the French railways as regards freight cars; and will soon be so as regards passenger cars. If the locomotive situation is not quite so good, the reason is that private firms were not able to give the same help in this respect as in the case of the cars; also because the eight-hour act necessitated an increase of about 17 per cent in the number of locomotives. The locomotive situation is expected to become normal again by the end of 1922.

Traffic

Transport of Passengers. On the P. L. M., P. O. and Midi, the passenger train miles have increased from 87,611 miles in 1918 to 146,648 in 1921, being an increase of 67 per cent. At present they are 70 per cent of the pre-war runs. The trains are running regularly again, although the expresses, being fewer, are heavier than before the war. Mishaps en route have decreased in the following proportions:

	Breakdowns	Loss of time	Total	Average per 100,000 miles
July, 1913.....	29	138	164	4.45
Oct., 1918.....	72	259	361	13.60
May, 1921.....	19	48	67	2.48

The situation is therefore even better than in 1913. The same can be said as to train delays. In the matter of speed, it has not yet been possible to return to the pre-war standard, owing to inexperience on the part of the new staff, the bad quality of fuel and the condition of the tracks. But there has been an improvement over 1918, as the following examples show:

	Pre-war	At the armistice	In 1921
Paris-Bordeaux.....	8 hr. 35 min.	9 hr. 41 min.	9 hr. 3 min.
Paris-Nantes.....	6 hr. 7 min.	7 hr. 0 min.	6 hr. 58 min.
Paris-Montluçon.....	5 hr. 34 min.	6 hr. 55 min.	5 hr. 45 min.

It should be noted that these improvements have been attained in spite of the considerable increase in the number of passengers carried. On the five private lines this number rose, in spite of increased fares, from 334 million in 1919, to 380 million in 1920.

Freight Traffic.—The freight traffic has been normal again for a year, in spite of the terrible transport crisis which oppressed the country so heavily in 1919 and the first half of 1920. All restrictions on freight, the system of priorities in particular, have completely disappeared, and the railways now accept all freight.

The daily car shortage is normal. In consequence, the daily average car loadings have increased. On all the railways it was 27,000 in November, 1919, and it reached 37,000 in November, 1920. It would be higher at present if the amount of traffic had not decreased because of trade conditions. The number of freight trains in use is near the pre-war figure. On one of the principal railways, for instance, it is 852 (885 in 1913). These trains, moreover, run longer distances than in 1913 and draw more tonnage, which shows that the rolling stock is being more extensively used than before the war. On one railway, the daily mileage is 34,554 as against 29,827 in 1913, and the tonnage carried is 20 million tons as against 17 millions before the war.

The carrying of freight by express trains has proved very satisfactory. These trains run regularly and ensure the satisfactory transportation of early vegetables and fish, in spite of the very great increase of tonnage. On the P. L. M. the dispatches were particularly large in May, June and July, 1921, during which months the Paris station received 50,000 tons of goods for the markets, as compared with 45,000 in 1920 and 32,000 in 1913.

Electrification of New Lines

The problem of the electrification of the railways has been under consideration for a long time. The fuel crisis, resulting from the war, has hastened its consideration. The most extensive electrification program which has ever been prepared has been drawn up by the companies who were most favorably placed for using "white coal." It applies to about 5,592 miles of lines, distributed as follows: Orleans 2,082, Midi 1,988, and P. L. M. 1,429. The cost of equipment will be over \$500,000,000 at the normal rate of exchange. It will allow the traffic to be increased, and effect a saving of 1,500,000 tons of coal per year, compared with the 1913 traffic.

The Orleans Company, by a decree of March 11, 1921, was given permission to use the Haute-Dordogne and its two tributaries for water power. According to the terms of former agreements, the state is responsible for the hydraulic section and the company for the electrical section. Moreover, the company has drawn up a scheme by which it will be able to obtain on favorable terms electric power on the Paris-Orleans and Chateauroux line, and later, as far as Montauban. The company has already given orders for a large part of this program to be put into execution. Normally, electrification as far as Orleans will be completed in about five years.

As regards the Midi Company, the work which was commenced in 1920 is proceeding quickly. If the times stated for the execution of the work and the supply of equipment are adhered to, electric traction between Toulouse and Dax will commence at the end of 1922.

The P. L. M. will commence soon carrying out its program with the Culoz-Modane line and the Cevennes line.

The State Railway is continuing the electrification of the suburban lines west of Paris. The work has been put in hand and there is reason to expect that by 1923 the whole of this suburb will be served by electric lines.

New Construction

The following new ordinary lines are in course of construction:

- On the Midi: the trans-Pyrenees lines
- On the P. L. M.: the lines from Nice to the Italian frontier by Sospel (39 miles).
- On the Est: the line from Saint-Dié to Saales.

The latter is designed to give better connections between the Est railway and the Alsace-Lorraine railway. It is being carried out by the Est Company on behalf of the state. Part of the line will probably be open to traffic at the beginning of 1922.

Art. 10 of Section I of the new Agreement, ratified by parliament, states that a line not yet conceded cannot be constructed without the permission of the Higher Railway Council. The railways undertake to accept any concessions which may be made to them, beyond the maximum already fixed by previous agreements, up to the amount of:

310 miles in the case of the State railway.
112 miles in the case of the Est railway.
93 miles in the case of the Midi railway.
126 miles in the case of the Orleans railway.
64 miles in the case of the Nord railway.
319 miles in the case of the P. L. M. railway.

The exact amount is to be fixed by the Minister of Public Works after agreement with the railway concerned. Except in the case of special agreements, the state will bear 80 per cent of the cost of constructing new lines and the railway concerned 20 per cent.

The Deficit in Round Figures

The disastrous effects of the war on railway finances are still being felt. Nevertheless the situation has improved since last year and the forecast of the result of the 1921

statement of account, compared with the 1920 statement, is encouraging.

If the deficits on branch lines and capital charges are taken into account, the running of the lines in 1920 showed a total deficit of \$601,400,000, distributed as follows:

	Result of running	Capital charges	Total deficit
Private companies	\$263,420,000	\$183,780,000	\$447,200,000
State railway	119,080,000	35,220,000	154,300,000
General total	\$382,500,000	\$219,000,000	\$601,500,000

The exceptional war time indemnities were not included in this figure nor the bonuses for dependents paid by the state in accordance with the Act of January 10, 1919. If these expenses are taken into account, the 1920 deficit should be fixed at \$706,000,000.

The deficits expected in the 1921 statement of account are much less. They are valued, per railway, at the following amounts:

Nord	\$56,000,000
Est.	35,000,000
P. L. M.	58,200,000
P. O.	70,000,000
Midi	46,200,000
State	102,800,000
Total	\$368,200,000

In order to arrive at the exact situation of the railways, the amount of the cost of living allowances, namely, \$64,800,000 should be added to this figure. The exceptional allowances for dependents were paid in 1921 by the companies and are included in the \$368,200,000. There will, therefore, be a very definite reduction of the deficit compared with the preceding statement of account.

The approximate deficit for 1922 should be \$230,400,000, not including the allowances for cost of living which it has not yet been decided to continue.

Increases of Rates

The rates have not been increased since last year, and the railways have remained satisfied with the two increases of 1918 and 1920.

On March 31, 1918, the passenger and freight rates were raised 25 per cent. This increase was soon found to be quite inadequate because of the continual rise in the cost of wages and of raw materials. Therefore the government, in agreement with the companies, brought in a bill on December 23, 1919, to authorize a further increase. This Act

which came into force on February 15, 1920, sanctioned an increase which was to be added to the 25 per cent increase, without, however, affecting the latter. This increase was 45 per cent for the third class passengers, 50 per cent for second class passengers, 55 per cent for first class passengers, and 115 per cent for freight. Since then there has been no alteration in the rates, so that at the present time the increases above pre-war prices are in round figures:

140 per cent for freight (to an average maximum of 180 per cent if the unification of the rates resulting from the abolition of special rates is taken into account).

- 80 per cent for first class passengers.
- 75 per cent for second class passengers.
- 70 per cent for third class passengers.

There are reduced fares for large families, disabled soldiers and parents of soldiers who have been killed in defending their country. Families in which there are three or more children under 18, receive on a request from the head of the family, a strictly personal untransferable identity card for the father, mother and each child under 18, which entitles them to the following reduction of fares:

- 30 per cent for families of 3 children
- 40 per cent for families of 4 children
- 50 per cent for families of 5 children
- 60 per cent for families of 6 children
- 70 per cent for families of 7 children and upwards.

The companies and the State railway grant a second class pass to the widows, ancestors and descendants of the first and second degree, or in default of these, the brother or sister of a soldier who has died for his country, allowing them to make a journey free of cost from their home to the burial place provided by the military authorities.

Special season tickets, called workers' three class season tickets are given to every worker, employee or laborer who can show that he is obliged to travel backwards and forwards every day between his home and place of business.

Present Wage Situation

The increase in the wages which commenced in 1918 has continued during 1921. These have reached \$644,200,000 for the six railways (excluding \$104,600,000 of cost-of-living bonuses paid by the state), being an increase of 340 per cent compared with 1913. This increase is explained by the increase of staff, due principally to the application of the eight-hour Act, and to the introduction of a new scale of wages in 1920.



Photo by Kadel & Herbert

St. Lazare Station, Paris

For the whole of the railways, the cost of the eight-hour day has been rated by the Minister of Public Works at a total of \$220,000,000 a year. The financial burdens resulting from this Act are all the heavier because of the fact that the eight-hour act was applied on terms which do not sufficiently take into account the special nature of the employees' duties, which consist in the greater number of cases, more of attendance than of actual work. Owing to this new regulation, there has been a decrease of 30 to 40 per cent in the output of work, to make up for which the number of employees has had to be increased by 103,000.

Since 1920 new scales of salaries have been imposed on the company by an official commission. These scales fix the minimum wage at \$760, and have considerably raised, as regards the majority of the employees, the salaries they were drawing at the beginning of 1918. Various supplementary allowances are added to the actual salary (such as gratuities, work bonuses, residence indemnities, allowances for dependents), the rate of which has itself been considerably raised, without mentioning the cost-of-living indemnity of \$144 borne by the state. The results are, therefore, that the minimum salary of a new employee in the lowest grade of the service is \$1,144 if he has no children, \$1,276 if he has two children, or about $3\frac{1}{2}$ times the pre-war salary.

Therefore, the average expenditure per employee, which was \$434 in 1913 for the whole of the railways, is at the present time \$1,528, an increase of 205 per cent. The increase is much larger for new employees, reaching, according to the railway, 280 to 470 per cent for porters and 280 to 580 per cent for track-layers.

Here is, for example, a table of the salaries now being paid by the principal railways to certain classes of employees (married men with three children):

	Track Layer	Porter	Driver	Shop Laborer
Present salary (All railways)	\$1,372	\$1,372	\$1,902	\$1,477
Salaries by railways on June 30, 1914				
	Increase (per cent)	Increase (per cent)	Increase (per cent)	Increase (per cent)
Est.	\$260 426	\$360 281	\$670 281	\$345 183
State	360 281	360 281	696 173	360 316
Midi	202 579	252 444	624 204	267 453
Nord	340 303	360 281	...	...
P. L. M. ...	240 471	240 471	...	270 447
P. O.	242 466	280 386	630 201	267 445

The pensions were increased at the same time as the salaries were raised, in a proportion varying between 25 per cent and 100 per cent according to the amount of the pension, by an agreement arrived at on September 13, 1920, between the state and the railways. The financial burden

of the pensions has therefore increased, and is made still greater because of the liquidation of a large number of pensions which had been postponed during the war. Finally, the payments made by the railways to the pension funds have increased on account of the rises in salaries and the fact that these were retroactive in character.

Conclusion

The general railway situation has, therefore, definitely improved compared with last year, but it still leaves much to be desired. The deficit has been reduced, and in some directions expenses are beginning to decrease, particularly as regards construction work and fuel.

Apart from a reduction of wages, which has not yet been made on the French railways, but which the government has announced for the next statement of account, it seems possible that a saving of \$20,000,000 to \$40,000,000 can be made. This calculation is based on the somewhat optimistic forecasts of wages costs owing to the alterations which the railways, in agreement with the Minister of Public Works, have decided to make in the application of the eight-hour Act. Greater economy on this head can only be attained by a less strict observance of the Act and by reducing the wages of the staff in proportion to the fall in the cost of living. But this depends much more on the government than on the companies. It is possible to save on repairs because of the general fall in prices, and also because the number of machines to be repaired will shortly be at normal again.

There is reason to hope that the P. L. M. will soon be able to balance its receipts and expenditures again. The restoration of the devastated districts will provide increased traffic for the reconstructed Nord and Est lines.

But any improvement in the railway situation depends chiefly on the reorganization of the railways approved by parliament. The new agreement will enable the railways to obtain, on much better terms than at present, the large capital they require to improve their plant, increase their stock, carry out the electrification of their lines and secure financial stability until the return of normal conditions. The agreement is a conciliatory measure putting an end to all difficulties of a legal nature between the companies and the state, arising from the war. It strengthens the understanding between the railways and general interests of the country, and brings about a close co-ordination between the railways and their various departments. Further it ensures a certain amount of unity in management, and although the next financial statements will necessarily still present difficulties, the future can be confidently faced.



Catenary Construction and Supporting Bridges in Stations (Switzerland)



The Station at Rome

A Review of the Italian Railway Situation

Heavy Deficits—Poor Track—Dilapidated Equipment—
Ambitious Program for Electrification

By Antonio Giordano

THE TOTAL MILEAGE of the Italian railways was—in December, 1920, the last time when data on this subject were published—11,749 miles. In the recently annexed regions, Venesia Giulia and Venesia Tridentina, there are about 528 miles and 326 miles, respectively, which are owned by the Austrain Railway Company "Sudbahn Gesellschaft" but are operated by the Italian State Railway Administration. The question of transferring the shares owned by the Austrain capitalists to the Italian State Administration is under consideration. The Italian State in 1905 took over the railways in Italy and Sicily, with the exception of only very few secondary lines which are still under private ownership, the Sardinian railways being acquired in 1915.

Permanent Way and Equipment Situation

During the war practically no repairs were made to the track or the equipment. The large amount of equipment purchased in the United States was used almost entirely for war purposes and is practically ruined. The old equipment was used for passenger and freight services which were reduced to a minimum. Therefore, the track and equipment require a large amount of repair to bring them back to their pre-war physical condition. The Railway Administration has been so thoroughly occupied with the rehabilitation and repair of the railways in the de-

vastated regions in the north and in the recently annexed regions that it has not been able to give the attention required for the repair of the track in other parts of the state. Furthermore, it is severely handicapped by the lack of finances.

When the armistice was signed the conditions were such that the government found it more feasible to buy new equipment, than to repair the old, in order to meet its needs.

The following is the list of the new equipment ordered:

LOCOMOTIVES AND CARS ORDERED IN THE U. S. A.	
December 20, 1918..	150 locomotives (already delivered).
December 20, 1918..	10,000 cars (already delivered).
December 8, 1919..	150 locomotives (already delivered).

LOCOMOTIVES AND CARS ORDERED IN ITALY	
December 20, 1918..	24 electric locomotives.
August 30, 1919..	610 passenger cars.
August 30, 1919..	250 baggage cars.
August 30, 1919..	2,960 freight cars.
August 30, 1919..	486 locomotives (steam).
December 4, 1919..	78 locomotives (electric).
January 10, 1921..	59 tank cars.
April 12, 1921..	183 locomotives (steam).
April 23, 1921..	450 passenger cars.
April 23, 1921..	300 baggage cars.
April 23, 1921..	1,678 freight cars.
June 3, 1921..	100 tank cars.

A large number of old cars which were used in local services during the war are now lying idle in the repair shops awaiting repairs.

Financial Situation, Rates and Fares

The critical financial condition of the railways is the subject of examination by the government at the present moment. Since 1915 the balance sheet has been showing a loss and

THE ITALIAN railways came out of the war in a sad plight. Excessive labor troubles have not permitted a return to anywhere near pre-war conditions. Equipment is badly needed. There is no money to be spent there—in large amounts—for rehabilitation, extensions and in electrification.

Mr. Giordano's invitation to American capital to invest in the Italian railway supply industries is tempting when the potential market both in and around Italy is considered.

it is reported that for the year 1920-1921 the loss will be \$280,000,000, the revenues being about \$600,000,000 and the expenses \$880,000,000. The freight and passenger rates were increased with a view of reducing the 1920-1921 deficit and eliminating any possibility of a deficit in 1921-1922, but instead of accomplishing its purpose these increases caused a reduction in traffic. During January and February, 1921, the passenger traffic decreased from 23 to 58 per cent as compared to the traffic of November and December, 1920; during the same period freight traffic decreased by about 50 per cent.

Another factor responsible for the poor showing for the past year was the large increase in the number of employees. In round figures the number has increased from 150,000 on June 30, 1914, to 211,000 on March 31, 1921, or an increase of 41 per cent. At present the increase is about 67 per cent. In the year 1913-14 there were 1,243 employees per million train-kilometers and at the present time there are 1,878.

A special committee made up of members of the House of Representatives and members of the Senate, as well as representatives of the government employees, appointed by the government to reorganize the railway administration with a view to reducing expenses, is endeavoring to make a large reduction in the number of railway employees.

The freight rates have been increased by 400 per cent above the rates of 1915 while the passenger fares have been increased, for first-class, 350 per cent; second-class, 250 per cent; and third-class, 120 per cent. A law has just been passed for the reorganization of the freight railway tariff. The old tariff, approved in 1884, had 770 items for the classification of the freight, while the new tariff has only 77. The new schedule follows the Belgian system.

The commercial and industrial organizations of Italy have called the attention of the government several times to the fact that the increase of rates is not having the effect of increasing railway revenue, but on the other hand it does encourage the merchants not to ship by train and the people to restrict their traveling as much as possible. The shippers are using motor lorry routes, which sprang up after the armistice throughout the whole of the Italian peninsula to a large extent as their rates are some 50 per cent lower than those of the railways.

New Requirements of the Railways

The political and economic consequences of the war have changed the currents of traffic in Europe and these changes, as well as the importance the Italian peninsula has acquired on account of its geographical position as a trade link between the western and eastern countries of Europe, makes it imperative to improve Italy's railway facilities. Furthermore, the impetus given the wood, mining and general manufacturing industries as a result of the war can only be maintained and developed by improving the railway facilities. Then there are certain districts of Italy which on account of the increased population require the construction of new lines, additional tracks and facilities.

The Italian Parliament has voted \$400,000,000 for the improvement of railway facilities, but even this is not enough to carry on all the necessary work. To assist in the rehabilitation of the railways the government has decided that Germany be called upon to send to Italy, on the reparation account, as much railway materials as possible for these improvements and for the electrification of the most important lines. The Italian industries have strongly objected to this plan of the government and demand that Germany supply the raw materials only, allowing the Italian industries to manufacture the finished product. Otherwise, they say, the iron and the engineering industries will have to shut down.

The industrial organizations are now taking advantage of

the large deficit of the Italian railways to point out the necessity of denationalization of the railway system. They claim that if the railways are properly managed they will become the best customer of the Italian industries, and that under private management they will develop more rapidly and grow hand-in-hand with the industries. Furthermore, they claim the treasury cannot continue to meet the heavy railway deficits. By selling the railways to private companies, the national debt would be greatly reduced and the available railway securities would offer a splendid source of investment for the Italian banks and would thus strengthen their position. In the meantime steps should be taken to put both the banks and the treasury in a position to check the invasion of foreign capital which is taking possession of the great Italian firms and industries.

New Construction Needed

Italy is sadly in need of new lines, the most important of which are the following:

Northern Italy:

Cunco-San Dalmasso di Tenda-Ventimiglia
Aosta-Chamberg
Milan-Genoa (direct line)
Mals-St. Moritz (Switzerland)
Calabso-Cortina d'Ampezzo
Verona-Bologna (direct line)

This will total about 1,200 miles.

In the Venesia Giulia the changed political conditions render necessary the construction of a new line between Goivsia and Klagenfurth, avoiding the Yugoslav territory, and thus rendering the traffic between the port of Trieste and German Austria independent from eventual restrictions of the Yugoslav government. Furthermore, a new line will be built between Trieste and Fiume, as well as one between Fiume and Pola totaling about 310 miles in length.

During the recent conference of Portorose the attention of the governments of the countries of the former Austrian-Hungarian monarchy was drawn to the necessity of improving the communications between Dalmatia and Central Europe and it has been suggested to connect Fiume with Zara by a ferryboat service to the islands of Cherso-Veglia-Arbe and Pazo and with a line from Zara to Kuin. The cost of such project would amount to over \$100,000,000.

Central Italy.—The requirements in this section are a line between Rimini and Urbino; the construction of a faster line between Florence and Bologna and between Rome and Ancona and Rome and Naples, a total of 932 miles.

Southern Italy.—Here over 1,000 miles are required to connect the interior of the peninsular to the various ports, and the interior of the island of Sicily with the most important commercial centers, Messina and Catania.

Sardinia.—In a government report it is stated that the island of Sardinia has sufficient mineral wealth to cover most of the whole demand of Italy, but its development is rendered impossible by the lack of proper communications. The government plans to establish a new communication between Lombardy and Sardinia through Leghorn and Corsica, which will shorten the route between Italy and Sardinia by 93 miles. Moreover, 621 miles of roadways will be built in Sardinia to connect the interior of the country with the ports.

These are the projects which the government intends to carry out in connection with the construction of new lines and it is expected that they will cover the requirements.

Rolling Stock Requirements

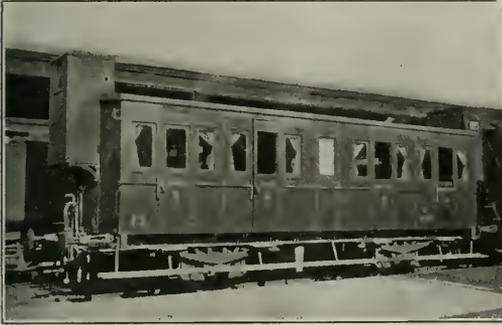
As regards double tracks, it is stated that the Railway Administration has been authorized to build about 3,169 miles of double track, although the needs of the country are estimated to be over 4,970 miles.

The railways are sadly in need of new equipment. The

following table indicates the requirements and the purchases authorized for 1922:

	Requirements	Purchases to be made
Steam locomotives.....	1,000	576
Electric locomotives.....	500	298
Passenger cars.....	1,000	640
Baggage cars.....	500	250
Freight cars.....	3,500	2,960

While the large amount of equipment purchased in the United States during the war has given satisfaction there is at the present time but little likelihood of further purchases being made in that country. In the first place, the Italian industries are seeking to obtain the monopoly for the supply of the railway rolling stock to the Italian railways, and in second place the cost of the home product is cheaper than the American equipment because of the rate of exchange. Furthermore, the industries developed during



An "Old Timer" for Second-Class Passengers Still in Service

the war need business to keep them going. While there is not a direct possibility for the sale of American railway rolling stock and supplies in Italy it may be stated that there is the possibility of Americans participating in this business by investing capital in the Italian enterprises.

American capital would be welcomed in the Italian industrial circles, particularly as it would mean Italo-American economic collaboration. With proper development Italian railway industrial plants would be in a position to supply all the countries of Central Europe and the Balkans without heavy transportation costs; at present this market has untold possibilities.

In consequence of the crisis in the shipping industry, especially in Venesia Giulia, the recently annexed regions of Italy, it has been suggested to transform certain of the large shipyards of Trieste (Cantieri di San Marco e San Rocco and the Cantiere of the Stabilimento Tecnico Triestino) into plants for the manufacture of locomotives and cars for exportation to Jugoslavia, Roumania, Austria, etc.

Electrification

A comprehensive electrification program is being developed for the purpose of relieving the fuel situation. Italy having no coal is dependent on foreign countries for her supply; this during the war was a great handicap. The present plans involve some 3,000 miles of line. This work is in a measure dependent upon the development of the hydro-electric power stations. In 1915 there were 329 hydro-electric plants of over 300 hp. each, which produced 935,000 hp. This number was increased to 383 in 1920, with a total capacity of 1,152,120 hp. There are now in process of construction 54 additional plants which will have a capacity of 359,210 hp. This, with the capacity of the smaller plants, will give Italy a total hydro-electric capacity of 1,811,330 hp. Plans have been developed for additional plants to the

extent of about 950,000 hp. The government has been delayed in developing the hydro-electric program because of the poor financial condition of the country.

In August, 1920, there were 235 miles of line under electric operation; in June, 1921, there were added 56 miles; it is expected that by June, 1922, another addition of 213 miles will be made, making a total of 504 miles. On January 1, 1922, work involving 521 miles of line will be started in northern Italy, connecting Genoa, Pisa, Florence, and Bologna; recently the electrification of the line between Bologna and Milan (134 miles) was authorized.

Plans are in process of completion for still further large electrification schemes. That which will be in operation by July, 1922, it is estimated, will effect a saving of 1,000 tons of coal per day.

In Northern Italy the system to be used is three-phase at 16 cycles, whereas in Central Italy the system will be three-phase at 46 cycles. In Southern Italy, on the other hand, continuous current will be used.

Competition Between Railways and

Other Means of Transport

The government is planning to establish mail and passenger air services but seeks to avoid, as much as possible, the competition with the railway services. These plans for the present are restricted to services between Naples and Sicily and Tripoli and between Brindisi and Corfu.

Competition between sea transportation and railway transportation is limited only to certain Adriatic lines of local importance which do not materially affect the traffic of the railways.

What has hurt the railway traffic most is the automobile services established after the armistice, especially in connection with the transportation of freight. In the Italian peninsula there are 600 automobile lines for passenger service and 200 lines for freight service. The Fiat Auto Company has requested the permission of the government to establish 410 additional automobile lines for passenger service.

The passenger services compete especially with the secondary railway lines connecting large centers, such as Turin, Bologna, Trieste, Rome, and Naples, with the small villages of the respective districts, while the freight services connect the large cities, such as Turin through Milan to Trieste, Milan and Trieste to Rome, Naples with Rome, etc. Being fast and less expensive than the railway services they are preferred by the shippers.

Labor Organization

There are three organizations of railway workmen in Italy—namely, the Socialist Workmen Organization (Sindacato Italiano dei Ferrovieri) with headquarters in Bologna, the Catholic Workmen Organization (Sindacato Bianco dei Ferrovieri Italiani) with headquarters in Milan, and the National Association of Railway Workmen (Associazione Nazionale dei Ferrovieri Italiani) with headquarters in Milan.

In consequence of the strikes of last year the parliament passed a law authorizing the increase of the wages 400 per cent, establishing a new base between the salaries of the clerks and the wages of the workmen which cut down the great disparity between the two which existed previously.

Railway labor has found the futility of continuously striking and is beginning to realize the true economic condition of the country. At the recent strike in Rome members of the Socialist Workmen Organization remained at work and operated the trains. The government has also taken strong measures against the agitators so that now the labor situation is far better than it was immediately following the war. The government will reduce the number of employees instead of salaries in the endeavor to economize.



The Beautiful Station at Lausanne, Switzerland

The Swiss Railways in the Year 1921

Loss of Traffic Brings Deficits—Complete Electrification Planned—Effect of High Exchange Rate

By Julian Grande

ALTHOUGH Switzerland's population, according to the census of last May, is only 3,883,700, including foreigners, her state or federal railways at the end of 1920 had a total working length of 1,895 miles. Besides the federal railways, Switzerland has the following company-owned lines:

Nature of Railway	Miles
35 standard-gage lines (mainly electric)	549
67 narrow-gage lines—total working length	945
17 cogwheel lines—total working length	73
37 tramways—total working length	303
49 cable railways—total working length	31

The total amount of capital, share and bond, invested in all these different non-state Swiss railways and in tramways amounts this year to \$154,860,000. On the federal railways alone last year 39,410 persons were employed—a figure which has just been reduced, for economy's sake, to 35,832, which will mean a saving of \$2,000,000 in wages and salaries—a reduction from \$45,600,000 to \$43,600,000.

The financial situation of both the federal and private lines in Switzerland is serious. For the federal railways the deficits are as follows:

Deficit remaining over from the war and the period immediately succeeding it	\$18,747,600
Estimated deficit for 1921 (The original estimate was \$9,777,658)	16,000,000
Estimated deficit for 1922	6,071,000
Probable total deficit at the end of 1922	40,818,600

Rate Increases Do Not Bring Increased Earnings

The Swiss railway receipts for the first seven months of 1921 compared with those for the corresponding period of 1920, show that the passenger traffic receipts, despite greatly increased fares, which have driven more than 90 per cent of passengers to travel third-class, rose only about 3 per cent (from \$26,780,000 to \$27,600,000). This increase applies

to all lines: the increase for the federal railways is still less. The following figures show the position of the Swiss federal railways from January to the end of October in 1920 and 1921:

	1921	1920
Passenger receipts (January-October)	\$21,361,285	\$21,139,959
Freight receipts (January-October)	34,833,968	43,542,240
Total receipts (January-October)	\$56,195,253	\$64,682,199
Total operating receipts (January-October)	\$58,397,800	\$66,670,143
Total operating expenses (January-October)	55,945,863	57,154,564
Net operating revenue (January-October)	\$2,451,937	\$9,515,579

BECAUSE of the high rate of exchange for Swiss money neighboring countries route traffic around that country to escape paying rates in Swiss currency. For the same reason the tourist travel, which before the war was a large source of revenue, is greatly reduced. Swiss rolling stock and road bed are in excellent condition compared with the neighboring countries. Electrification is progressing despite the difficult financial condition.

The results, therefore of the first ten months' working of the Swiss federal railways in 1921 are worse than those of the corresponding period of 1920, which was considered such an unfavorable year from the railway receipts standpoint. The returns of the federal railways per mile are less up to October, 1921, than they were during 1920.

Bad as is the financial situation of the Swiss federal railways, however, it is not relatively so bad as that of many other European railways. Indeed, it is better, as the following table will show:

Railway	Mileage	Deficit at end of 1920
Paris, Lyon & Mediterranean (France)	6,027	\$120,000,000
State railway (France)	5,592	154,000,000
State railways (Italy)	9,371	210,000,000
State railways (Belgium)	2,734	36,000,000
German railways	54,175	3,250,000,000

The Privately Operated Lines

As regards the private-owned lines in Switzerland the situation is not much more satisfactory. The following were

the decreases or increases in receipts during the first eight months of 1921 as compared with the corresponding period of 1920:

PRIVATELY-OWNED LINES	
Standard-gauge lines, decrease.....	4.8 per cent
Narrow-gauge lines, decrease.....	.6 per cent
12 cogwheel lines, increase.....	34.5 per cent
40 tramways, increase.....	.1 per cent
46 cable lines, increase.....	5.8 per cent

The main reasons for the general decrease in the receipts of Swiss railways are, besides the high cost of materials, and especially coal, the increases in wages and salaries found necessary because of the rise in the cost of living, the unsettled state of Europe, and the introduction of the eight-hour working-day. Rails, for instance, rose greatly in price, making it harder to keep the lines in good working order. Rails cost \$34 per ton, f. o. b. Basel, in 1913, but during the war the cost increased to \$100 and even \$120. During the war Switzerland had to carry her own freight from Mediterranean ports, and consequently had to add considerably to the number of her freight cars. These numbered 19,300 in 1913, and 25,000 in 1920. Before the war a steam locomotive cost 14.5 cents per pound. During the war this rose to 72.5 cents. Coal and railway material generally are now falling considerably in price here, but are still much dearer than before the war.

Decrease in International Traffic

What, however, has really caused the Swiss railways in general so much loss is the enormous decrease of international traffic, due to unsettled conditions. Switzerland is a natural European railway junction, and, under normal conditions, a highway of trade across Europe in all directions. Freight between Belgium and Italy, Germany and Italy, and to a great extent also between Northern France and Italy used to be carried over the St. Gotthard line. Now, with the decrease of commerce and the abnormally low value of the money of Germany, France, Belgium and Italy, these countries find it more advantageous to transport their merchandise by a much more circuitous route, or even by sea, thus avoiding having to pay Swiss railway freights in Swiss francs.

Again, a very large amount of passenger traffic used to pass through Switzerland, besides which the Swiss inland trains used, especially in summer, to carry very considerable numbers of passengers. It is estimated that, before the war, some 4,000,000 tourists annually visited Switzerland. Now only a very small proportion of this number are able to visit the country, mainly because of the high exchange.

Motor Car Competition Serious

Before the war the average American visitor to Switzerland traveled first-class, and he could, and often did, buy a fortnight's first-class ticket, available on all the Swiss federal railways and on the lake steamers, for only \$20, and a monthly ticket for \$30. During the war these general season tickets, as they were called, were abolished, and they have not since been reintroduced, except for a minimum period of three months, and at a cost of \$120, which is almost exactly double the pre-war price.

The result of the greatly increased fares and the much reduced and much less convenient train services is that Americans travelling three or four together have lately often found it cheaper and far pleasanter to buy a motor car in France and tour through Switzerland in it, thus avoid using the railways.

But it is not in passenger traffic alone that the results of the war have affected the receipts of Swiss railways. The competition of motor vans and motor lorries with the railways for the conveyance of heavy freight in Switzerland has become very serious. In 1914 there were only 751 such vans in the country; at the end of 1920 there were 3,331, and the number of motor vehicles of all sorts is greatly and con-

stantly increasing. Most of the railways and nearly all the lines of commercial importance being state-owned, it has not been so easy for them to introduce their own railway motor van services as it would have been in the case of privately-owned lines because of the red-tape involved. Consequently, private companies have introduced motor van transport into Switzerland, and these companies are already of considerable importance, with much capital behind them.

All that the State Railways Department has done hitherto is to ask the government to prevent motor van companies from competing with them, but it naturally can hardly do that. At present the railways cannot compete with the motor van transport companies if only because they have to maintain, not merely freight offices at every railway station of any size, but also because they have to keep the permanent way in order, and motor vans do not have to keep the roads in order nor maintain such a large staff of clerks, etc. Finally, they are not, as are the railways, bound by the eight-hour working day law.

The Swiss postoffice is also inaugurating a motor van service for the transport of mails and parcels within certain areas formerly served by the railways. An aerial mail service has been tried in Switzerland, but it was abandoned as being too expensive. On the other hand a passenger and mail service between Paris and Lausanne has just begun. Finally, petroleum was during the war and until a few weeks ago a Swiss government monopoly, which made it much more expensive than it would have been if sold privately. This will also cheapen transport by motor vans, motor cars and aeroplanes.

Electrification

The Swiss federal railways hope electrification will enable them to put their finances upon a sounder basis. Switzerland has no coal mines, and has always bought coal from her immediate neighbors, mainly Germany and Belgium, although during the war she perforce bought it often from England and even from the United States, but at prices which rose from \$5.40 a ton in 1913 to \$38 per ton in 1920. The 1913 federal railway coal bill was \$3,507,400, but the estimated expenditure on coal (which has almost certainly been exceeded) for 1921 amounted to \$21,060,000, and yet coal has greatly fallen in price.

For this electrification work Switzerland was obliged, in 1920, to raise a loan in the United States of \$60,000,000 at 9 per cent interest. At the time of raising the loan it was stated that this sum was to be spent solely on the purchase of electric plant in the United States, on building electric power stations, and generally on continuing the work of electrification of the Swiss federal lines. A good deal of copper wire and certain electric cables were bought in the States, but since the German mark has fallen so much in value Switzerland has naturally turned to Germany to purchase there such of her railway requisites as she cannot produce herself.

The first of the federal railways to be electrified was the St. Gotthard line, 139 miles long, running from Lucerne to Chiasso, on the Swiss-Italian frontier, and traversing the St. Gotthard tunnel, 9¼ miles long. This line, it is expected, will be entirely electrified by April next, and already trains with electric traction are running from Erstfeld to Bellinzona. The locomotives, which have been built in Switzerland, cost \$200,000, or exactly twice as much as they would have cost before the war.

At present about 33 per cent of the entire network of the Swiss railways, federal and other, is electrified, or about 1,200 miles altogether. Single-phase alternating current is used in most every case. The cost of transforming a railway from steam to electric traction, however, is very considerable. The original estimate for the cost of electrifying the St. Gotthard line from Erstfeld to Bellinzona, through the tun-

nel, was \$7,700,000, plus about \$400,000 for repair shops; but the sum hitherto expended can hardly be less than \$20,000,000. It is difficult to estimate what the electrification of the entire St. Gotthard line will ultimately cost because the iron bridges have all proved too weak for the heavy electric locomotive and trains, and 60 of the smaller bridges have accordingly been reinforced by reinforced concrete, with a layer of ballast; the large iron bridges have to be either strengthened by arches underneath or be replaced by stone bridges, as has already been done in the case of nearly 20 bridges.

The number of electric locomotives at present used on all the electrified Swiss railways is about 50, but there are still 1,100 steam locomotives in use. The electrification of all the Swiss railways, broad and narrow gage, is expected to be completed within 12 years.

What it will mean to the federal railways alone to be able to use electric traction on all other lines may be gaged from the fact that in 1919 about \$13,800,000 out of the total expenditure of \$58,178,400 (or about 24 per cent) was for coal alone, and that with a still reduced train service. The total capital required for the electrification of the entire Swiss railway system, including power generating stations, is difficult to estimate, and will depend very much upon the waterfalls selected for the production of electric current; an outside estimate is \$100,000,000.

The question whether it will be cheaper to run the Swiss railways electrically than by steam is somewhat disputed; but since 1911 it has been proved that the cost of the electric energy used by the Lötschberg line was about two-thirds of what steam power would have cost.

Private Lines in Difficulties

The Lötschberg line, a privately-owned company, is also in financial straits, due to the war. On December 31, 1920, its total debit balance was \$4,349,514. Although a link between Eastern France and Italy, via the Simplon Tunnel, it depends much on local business and tourists. The original capital for its construction was mainly subscribed by France, but the Swiss government took advantage of the low-value of the French franc in 1920 to buy back 40 out of 44 million francs worth of Lötschberg bonds to Learer from the French. The ordinary share has been reduced 50 per cent and the preference share capital 20. Very badly hit by the war, this line began again in October, 1920, to pay some interest on its bonds. A misfortune with which it has to contend is that on the south side traffic has been frequently disturbed by avalanches and landslides. Experts consulted could only advise constructing two additional tunnels, one nearly two miles long, the other about 1,180 yards long, besides which a number of barriers and other constructions are necessary to hold up stones and rocks from the slopes above and generally prevent the line being blocked.

One of the Tragedies of Railway History

As for Swiss private mountain railways, the Bernese Oberland lines, which come largely within the category of tourist lines, have been electrified since 1914. The story of the Jungfrau Railway, the highest mountain railway in Europe, is one of the tragedies of railway history. Before the war it paid 5 or 6 per cent, but now it has become so deeply involved in financial difficulties that the share capital of \$900,000 is being reduced to \$460,000 by writing off, and various proposals are being made to the bondholders (bond capital \$1,400,000)—proposals which may perhaps save the railway from bankruptcy but will not fill the bondholders' pockets.

Another semi-tourist line which is virtually bankrupt this year is the Furka Line, with debts exceeding \$6,000,000, and share capital amounting to \$1,600,000.

A privately-owned line, the Rhaetian railways, which runs

to St. Moritz and Davos and the Engadine generally, is already partly electrified, and it is hoped that by June 1, 1922, the entire line of 173 miles will be in electric operation. The total cost of the electrification of this line will probably be about \$1,800,000.

The development of electrification work in Switzerland is hindered by the increased cost of material and labor. Before the war all the canalization and blasting as well as masonry work were done by Italians, who used really to be the tunnel builders of the Alps; but now the emigration of foreign labor into Switzerland is severely restricted, and instead of Italians, Swiss have to be employed, who are less skilful at this kind of work.

Nationalization Does Not Pay

The construction of most of the power stations intended to supply electric current to railways has to be done by the federal railways, and experience has shown, at any rate in this country, that government management is the most expensive management. The war has revealed to the Swiss—what they were already suspecting—that nationalization does not pay. No country has given nationalization so thorough a test as Switzerland, and nowhere is there now so powerful a movement on foot towards denationalization. At the beginning of 1921 Switzerland actually had 171,623 federal and federal railway officials. In other words, almost exactly one in every 22 of the country's population, including foreigners, was either a civil servant or a state railway official.

Campaign Launched

So profoundly disgusted have the Swiss public become with the results of state railway management, that a campaign was recently launched, asking Parliament to hand back the state railways to a private company. A special parliamentary committee has been appointed to consider Swiss federal railway re-organization. It was not long before it decided to reduce the number of members of the Board of Management of the federal railways from 55 to 11, and the number of railway districts and district managerial offices from five to three. The result will be that Switzerland will be rid of a great many superfluous officials, and it is estimated that salaries amounting to no less than \$1,000,000 will be saved.

New Work

It is doubtless owing to Swiss federal railway indebtedness that the 1922 estimates, just published, include only \$230,000 for new lines, of which about \$200,000 is for the second Simplon tunnel. The following are the other principal items on the 1922 federal railway estimates:

New rolling stock	\$5,277,800
(Nearly \$2,500,000 less than in 1921)	
Electric locomotives	4,182,000
Six motor vans	60,000
Sixty third-class passenger cars	518,800
170 freight cars	391,000
Constructions account generally	22,547,168
(About \$1,400,000 less than in 1921)	

Despite the general outcry about lack of capital for embarking on any new enterprises, engineers have been studying the question of piercing yet another great Alpine tunnel through the Splügen, which would greatly shorten the distance between Central Europe and the Adriatic and Italy. Naturally those interested in the Simplon and Gotthard lines are much alarmed at this new project, especially as the second Simplon tunnel is now completely masoned over and the electric installations are being fitted up.

Although the Swiss railways were severely tried financially by the war, nevertheless in one sense they have not come out of it badly. The rolling stock, generally speaking, has deteriorated little, if at all, and the permanent way is in good condition. The Swiss railways, however, cannot fully recover financially until Europe recovers.



A Bolshevik Propaganda Train—Photo by Kadel & Herbert

Soviets Demoralize Already Inadequate System

Russia's Railway Mileage Has Decreased Since Revolution
—Equipment in Sorry Condition

By Dr. J. M. Goldstein

Professor of Economics, Institute of Industry and Trade and University of Moscow

UP TO THE BEGINNING of 1890 the railroad mileage of Russia developed slowly, as can be seen from the fact that up to the middle of 1890 the whole mileage of European Russia, including the Caucasus, hardly reached 26,700 versts (17,800 miles). By comparing the mileage of Russia of those days with the mileage of the United States at the same period we find that the mileage of Russia was hardly equal to one-ninth of the railroad mileage of the United States, notwithstanding the fact that Russia's area was about two and one-half times greater than the area of the United States.

Show Growth in Mileage

Because of a change in the financial and economic policy of Russia, chiefly due to S. V. Witte's taking charge of the finances, the country's mileage quickly rose, as can be seen from the fact that at the end of 1907, i. e., during a period of 17 years, the railways of European Russia, including the Caucasus, increased 85 per cent—to 49,000 versts. The amount of railroad freight traffic had increased still more by that time, as can be seen from the following computations:

Years	Railway mileage	Metric tons carried one mile (billions)	Tons carried one mile per mile of line (millions)	Tons carried one mile per inhabitant
1880	14,070	5.0	0.36	60
1890	17,800	9.3	0.52	92
1895	21,000	14.0	0.66	130
1906	31,870	26.7	0.84	200
1913	35,000	41.9	1.20	283

The density of traffic thus increased from the beginning of the eighties by 3½ times, and the number of ton-miles

per inhabitant increased approximately 5 times in 17 years.

Still faster grew the mileage for that period in Asiatic Russia, as may be seen from the fact that the mileage increased there from about 900 in 1890 to about 10,000 miles in 1914 (not including Russian Chinese Railway).

For the whole of Russia (excluding Finland) the increase in mileage during the following five years' period amounted to:

Years	Total increase of mileage, miles	Annual average increase, miles
1860-64	1,378	276
1865-69	4,445	889
1870-74	4,962	992
1875-79	2,290	458
1880-84	2,028	406
1885-89	2,874	575
1890-94	3,892	778
1895-99	9,924	1,985
1900-04	5,482	1,096
1905-09	4,156	821
1910-14	2,310*	462

*Approximately.

The railroad construction reached its maximum during the decade from 1895 to 1904. During that period about one-third of all the mileage existing in European and Asiatic Russia at the beginning of the World War was built and opened for traffic. How relatively small these maximum figures were in comparison with the railroad building in the United States, or even Canada,

is sufficiently shown by the fact that in the United States in the single year 1887 there were 12,800 miles of new railroads opened for traffic, and in Canada in the single year 1915, about 4,800 miles of new railroads.

The Situation When the War Began

At the beginning of the war, of the total of 46,600 miles of railroads existing in Russia (excluding Finland), the state owned about two-thirds and private companies about

one-third. Besides this, at the beginning of 1915 there were under construction about 9,400 miles of private and state trunk lines, 3,800 miles of which were in Asiatic Russia. At that time there were further outstanding franchises for the building of 6,200 miles of new roads. Most of these were to have been built immediately. Furthermore, there were under construction more than 310 miles of feeders and about 40 miles of small local lines.

Thus, had there been no war and revolution the mileage of Russia's railways, including those of the new formed border states, would have reached at the end of 1921 at least the 60,000 or 65,000 mark.

Formation of Border States Has Decreased Mileage

The formation of a series of independent border states, such as Latvia, Esthonia, Lithuania, Poland, etc., has greatly diminished the mileage of Soviet Russia, because in these areas the density of railroads was greatest. No wonder therefore that, according to official figures of the Soviet government, the mileage of European Russia comprised only about 32,000 miles in 1920, i. e., it had *decreased* 25 per cent since the beginning of the war. At the end of 1921, in view of the fact that there was no new construction, the mileage remained probably, at least nominally, the same. However, not having replaced the old worn-out rails by new ones, the mileage actually in working condition should be much smaller.

The Equipment Situation

Still worse is the situation of the railroad equipment. The American Relief Administration having sent railroad experts to Russia in connection with shipping of foodstuffs to the famine stricken areas, has received a report to the effect that water transportation is used wherever available for shipping food supplies to points in the famine districts, particularly along the Volga and Kama rivers. In the same report the American Relief Administration, quoting official papers of the Soviet government, states the following about the railroad equipment:

"Out of a total of 19,106 locomotives in Russia in good condition before the war, there were last August from 5,500 to 7,650 reported in working order by different authorities, or a decrease in motive power of from 60 to 75 per cent. Of that number about 1,000 were idle owing to lack of fuel. Serviceable cars were reported at from 150,000 to 286,000, a decrease of from 48 to 70 per cent of the pre-war number.

"The roadbeds were stated to be in very bad condition, necessitating extensive repairs if large sections were not to be closed to traffic. According to one estimate at least 25,000,000 ties had to be replaced with a program that called for only 5,000,000 replacements. Considerable mileage of branch lines had been removed and used for repair material.

"A decrease in production of coal by 80 per cent and the deterioration of the mines rendered the fuel situation serious and forced the railways to depend much more upon wood. This wood comes from the forests of northern Russia—a long haul to supply southern railways. An effort was made to change locomotives on the southern railways into oil burners, but the gradual decline of oil production retarded this.

"On August 10 last," according to Economic Life, official paper of the Soviet government, "out of 437,152 freight cars listed, 122,007 were 'sick' cars, i. e., utterly unfit for any use, and only 195,595 cars registered as in working order.

"But of this latter number," it is explained, "no more than 30,000 were really first-class cars, i. e., in a condition to carry loose grain and potatoes. At the most conservative estimate, at least 60,000 such cars would be required for transport during the ensuing season."

"The situation had been growing worse up to August, 1921. It was shown that in January, 1921, there were 463,397 cars registered, of which 96,960 were 'sick' and 294,124 in working order.

Later communications in the Economic Life of September 25, 1921, do not picture the situation in brighter colors:

The results of repair work completed on railway engines during August, states the official paper, fell considerably short of the program; the quality of the work done and the speed of production at the railway workshops has been constantly going from bad to worse. This decrease in production was caused by the same usual reasons: Lack of food supplies, materials, tools, and machinery, etc. The laborers because of lack of food fail to come to workshops, and the number of absentees has increased to such an extent that the problem is becoming more complex every day. To judge by the data furnished by 12 railways for the month of July, this absenteeism reaches only the average 30 per cent. This tendency has been more manifest on the South-Eastern Rail-



One of the 500 Tank Cars Built by the Canadian Car and Foundry Company for the Russian Soviet Government

way, where non-attendance of workmen amounted to 57 per cent; on the Tashkent Railway, 40 per cent; on the Syzran-Vjazma Railway, 39 per cent; Moscow-Kursk Railway, 32 per cent; Northern, 31 per cent; Moscow Baltic, 30 per cent.

Antique Locomotives the Rule

Speaking of the causes which make the efficient functioning of the railroads of Russia difficult, it is necessary to mention here the following important facts. The majority of locomotives existing in Russia in 1921 were very old, as may be seen from the following data. According to age, all locomotives in Russia can be divided in the following groups:

Over 45 years..	10 per cent
30 to 45 years..	11 per cent
15 to 30 years..	50 per cent
Less than 15 years	30 per cent

About 50 per cent have thus been in use for 25 years or more. It is not strange, therefore, that at the beginning of 1921 about 61 per cent of the locomotives needed more or less extensive repairs, which could not be fully realized due to the insufficient number of workers, as well as to the lack of supplies.

Rehabilitation and the Opportunity

for American Enterprise

The complete breakdown of the railroad system of Russia outlined above and the Soviet government's lack of means or credits shows clearly that the restoration of the functioning of railroads can take place only after the appearance in Russia of a more stable government, which, having obtained through an election the support of the whole nation, will be able to secure recognition and financial aid from foreign governments. Splendid prospects will then be opened to American manufacturers of locomotives, cars, rails and other supplies, as well as for American capital in general.



Railway Bridge Over the River Elbe, Germany—Photo by Kadel & Herbert

German Railways Operating Under Difficulty

Heavy Deficits Still Obtain—Physical Conditions Are Improving,
Although Far from Pre-war Standards

By G. Reder

WITH FEW EXCEPTIONS all German railways are owned by the state. Till April 1, 1920, they were operated by the different federal states of the former empire but they are now operated as one unit by the state and are known as the "Reichsbahn." This includes 92.2 per cent of the mileage of the country. Of the important companies only the Luebeck-Beuchen Railway, which operates the double track from Hamburg to Luebeck and Beuchen and which owns about 85.75 miles of line, retains its old form. The smaller railways are to a great extent in the hands of private companies, but the state, municipalities and districts are also strongly interested in them.

The state railways are controlled by a Ministry of Transport which is under the direction of the former general manager of the military railways during the war. The ministry is divided into ten sections: Administration, personnel, transport, exploitation, rates, finances, rolling stock and maintenance, machinery and electrification, construction and inspection of other railways.

The total length of the German railways is about 36,000 miles, of which 69.5 per cent have double tracks or multiple tracks. As in all the countries of Central Europe, a great increase in this mileage is not to be expected. The loss of territories through the peace treaty led to a reduction of 2,500 miles in the pre-war mileage.

The latest figures available (1919) show that the total capital investment was 21,320,000,000 marks (\$5,330,000,000). The total revenues and expenses (in millions of dollars) for the seven years ending with 1919 are given in the table.

Before the war the net receipts from the railways were an important item in the state budget. Although the revenues fell in 1914, due to the diminution of traffic following the mobilization, in the following years they increased with the reopening of the train service. But the deficits came with 1918 and have continued ever since.

GERMAN railways have experienced most astounding deficits since 1918. Some believe that private ownership is the only solution of the present problem. It is argued that whereas they were successful under an iron-clad monarchy that in a democratic government, such as now obtains, they are doomed to failure.

The railways have all been grouped under one head and considerable progress has been made in improving their physical condition.

The greater part of the locomotives and freight cars were turned over to war purposes. The conquered railway material did not begin to meet the needs of the traffic behind the front. Economical operation was impossible with the reduction in the number of locomotives for home use because of the demands from the front. The quality of coal decreased and where only 7 to 10 per cent ash in the coal obtained before the war it was necessary to accept coal with 25 to 30 per cent ash. Steel fireboxes were used in place of copper, which is foreign to German practice. Shut off from the mineral oil fields it was necessary to use inferior lubricating oil made from tar which increased the number of hot boxes to over 20,000 per month at the beginning of 1920. In 1920, 60 per cent of freight cars were in need of repair.

The labor troubles at the time of the revolution in 1919 and the beginning of 1920 had also

REVENUES AND EXPENSES IN MILLIONS OF DOLLARS				
Year	Revenues	Expenses	Surplus	Deficit
1913	712.64	499.48	213.16	.....
1914	638.04	503.16	124.88	.....
1915	688.18	497.04	191.14	.....
1916	802.3	578.66	223.64	.....
1917	938.22	778.28	159.94	.....
1918	941.48	1,203.14	.....	261.66
1919	1,602.62	2,413.34	.....	810.72
1921 (estimated)	.....	.....	.....	3,750.00
1922 (estimated)	.....	.....	.....	2,700.00

serious effects on the condition of the equipment. After the war the number of employees on the railways increased to a marked degree. In 1913 there were 740,000 employees and in 1919 this had been increased to 1,121,000; it was reduced to 1,091,000 in 1920. Of course the eight-hour day is responsible for some of this increase. However, with the great reduction in traffic there are far more employees than are necessary.

The depreciation of the mark has had its influence on the increase in expenses, increasing the cost of raw materials from 39 per cent of the total expenses in 1913 to 47 per cent in 1920. One ton of coal cost 13 marks in 1912 and

introduced. Standard rolling stock has been designed to permit of greater production and there has been no hesitancy in the application of improved devices such as superheaters, feedwater heaters, etc., which will reduce the cost of operation.

Present Conditions

The situation at present is improving. The trains are running more regularly and the passenger service has materially improved as compared with two years ago. The speeds have increased but are still under what they were in 1913. For instance from Berlin to Frankfort the express-train time in January, 1921, was 10 hr. 37 min. instead of 11 hr. 26 min. as in 1919, and which corresponded to an average speed, including stops, of 33 m. p. h. and 30.5 m. p. h., respectively. In 1913 it was 7 hr. 8 min. (corresponding to 49 m. p. h.).

Future Development

There has been considerable talk concerning a return to private management for the German railways because of the huge deficits that have been experienced and Hugo Stinnes, it is rumored, is seeking control. There is not much likelihood of this being done, however, for it is believed that the new railway finance law now in preparation, which will separate the railway affairs from the general state budget and the influence of parliament, will produce results comparable to those secured under private-ownership.



Photo by Keystone

Station at Cologne, Germany

330 marks in October, 1921, or 26 times more; one ton of rails cost 118 marks in 1913 and 2,277 marks in October, 1921, or 20 times more. One ten-wheel locomotive cost 94,000 marks in 1913 and 1,580,000 marks, in the summer of 1921, or 17 times more.

Restoration of German Railways

The first step taken to replenish the depleted rolling stock after the war was to place orders for repairs with the idle industries and ship yards to keep the workmen busy. The amount of work involved cost some 20,000,000,000 marks (\$4,000,000,000 at the normal rate of exchange) and included more than 2,800 locomotives, 3,600 passenger cars and 54,500 freight cars in 1920. This year (1921) there will be delivered about 1,870 locomotives, 3,300 passenger cars and 45,600 freight cars.

To cover the rapid increase in operating expenses several increases in freight rates have been made, the averages being shown below.

Date	Percentage Increase
October 1, 1918, cumulative increase of	4 per cent
April 1, 1919, cumulative increase of	7 per cent
October 1, 1919, cumulative increase of	195 per cent
March 1, 1920, cumulative increase of	301 per cent
December 1, 1920, cumulative increase of	380 per cent
April 1, 1921, cumulative increase of	532 per cent
December 1, 1921, cumulative increase of	571 per cent

Regardless of this increase it has not been possible to meet expenses and endeavors are being made to reduce expenses by increasing the capacity of shops. To this end time studies are being made and detailed cost accounting



A Typical Third-Class Coach in Italy



Photo by Keystone

Vienna from the Air



The Most Northern Railway Station in the World, in Norway—Photo by Key stone.

Railway Situation in Other European Countries

Comments on the Problems and Present Conditions of the Railways in Norway, Sweden, Spain and Belgium

By Robert E. Thayer

THE RAILWAYS of the smaller European nations, whether they be state-owned or not and even though they were not involved in the war, have been severely hit by the war. The following brief notes will give an idea of the situation in Scandinavia, Belgium and Spain.

Norway and Sweden

The principal railways of Norway and Sweden are of 4 ft. 8½ in. gage. In Norway practically all of the standard gage lines and 80 per cent of all lines (1,850 miles) are operated by the state, whereas in Sweden the state operates 3,425 miles of line which is about one-half of the standard gage mileage and 38 per cent of the total mileage of the country. In both of these countries railway expenses have increased to an abnormal degree even though they were not direct participants in the war. The following figures give the net results (surpluses or deficits) of gross revenues and expenses for a period of eight years from 1914 to 1921, inclusive.

In Sweden the freight rates are now from 100 per cent to 250 per cent (according to the nature of the commodity) higher than the 1913 rates

and are some 50 to 100 per cent (of the pre-war rates) lower than the rates in effect during 1920. It is believed that the present rates, with the general decrease in the cost of materials and labor, will be adequate to meet the expenses for the coming year. The passenger rates have been increased (above the 1913 rates) some 238 to 330 per cent, according to the distance traveled, for first-class passengers; 181 to 260 per cent for second-class passengers, and 141 to 207 per cent for third-class passengers. These are the maximum rates since 1913 but a reduction is expected early in 1922.

In Norway the freight rates have been increased twice since 1913 and are now 200 per cent higher for all merchandise, with the exception of certain foodstuffs, fodder, manure and fuel, for which the increase is 160 per cent. An attempt has been made by the shippers to obtain a decrease because of the depressed business conditions but the government would not permit it as the railways are still operating with a deficit. The passenger rates are 180 to 190 per cent (first-class) and 140 to 150 per cent (second- and third-class) above the 1913 rates and are at a maximum

except for the second-class rates, which have been as much as 180 to 190 per cent above the 1913 rates.

The wages in Sweden are about 200 per cent higher than in 1913, the maximum increase since that time having averaged about 290 per cent. The present wages are subject to a reduction with the cost of living. The eight-hour day is in effect which, with the increase in wages, has been largely responsible for the great increase in operating expenses. A

THE RAILWAYS of Europe, whether or not they are in the countries which participated in the recent war, have not been immune from the serious effects of the war. Deficits are the rule, with increased wages and shortened working hours as the principal causes. Nowhere has the economic balance been struck—the high transportation charges required to meet the greatly increased wage bill and material costs threaten to stifle industrial development.

NET FINANCIAL RESULTS OF GROSS EARNINGS FOR THE RAILWAYS OF NORWAY AND SWEDEN

Year	Norway	Sweden
1914	\$8,180,000	\$6,290,000
1915	10,780,000	7,380,000
1916	12,100,000	6,610,000
1917	5,630,000	2,155,000
1918	-25,710,000	-14,770,000
1919	-14,570,000	1,370,000
1920	-14,080,000	7,930,000
1921	.....	1,500,000

similar condition exists in Norway, where wages have advanced by 200 to 250 per cent.

The equipment of both countries has increased as shown in the following table; as regards maintenance the condition is on the whole about the same as in 1913. Sweden has purchased some of its new equipment from foreign countries.

EQUIPMENT SITUATION ON THE STATE RAILWAYS OF NORWAY AND SWEDEN

Year	Norway			Sweden		
	1913	1921	Per cent increase	1913	1921	Per cent increase
Locomotives (steam)	385	530	38	890	1,083	22
Passenger cars	855	1,041	22	1,697	2,003	18
Freight cars	8,714	11,685	34	22,943	27,556	12

In view of the general shortness of money and also because of the poor business conditions throughout the world there are no heavy railway capital expenditures to be made in either of these two countries.

Spanish Railways

That the Spanish railways are in a precarious condition is evident to anyone who has traveled in that country. Passenger trains are consistently late and because of the depressed finances of the country and the great amount of work to be done the companies themselves find it financially impossible to undertake the necessary work. There is a movement in government circles to nationalize the railways but the government finances will not permit of even this being done at present. The rates are not high enough to meet the increase in expenses and it has been proposed to increase them by an additional 35 per cent—the one and only increase of 15 per cent was made on January 1, 1919—making a total of 50 per cent above pre-war rates. The Spanish senate has approved this increase but the government has not seen fit to put it into effect because of the critical condition of the nation's business.

There are four principal lines in Spain; the Northern; the Madrid, Zaragoza & Alicante; the Madrid, Caceres & Portugal, and the Andalusian, all of which serve individual territories with practically no competition. The total mileage of the railways is 9,430 miles, most of which has a gage of 5 ft. 5¾ in. The lines are operated under concessions similar to the French railways and these will expire within some 25 years.

The latest figures available (1920) show an operating ratio of 77.5 per cent but this must be discounted by the poor physical condition of the track and equipment. While there were some 200 more locomotives in the year 1920, as compared with the year 1913 (2,100 in 1913 and 2,300 in 1920), the condition of these locomotives was such as to render the

number of available locomotives much less than in 1913. In January, 1921, the Spanish government ordered over 100 locomotives from Germany at prices some 40 per cent lower than those of any other foreign country, including England and the United States. Spain imports most of its railway material and the United States has always had a large share of the car wheel and axle business, but with the depreciation of European currencies the real prices of European products are much lower than those from the United States.

The labor situation is by no means settled. Wages have increased to a large degree but even with the high rates strikes are not uncommon.

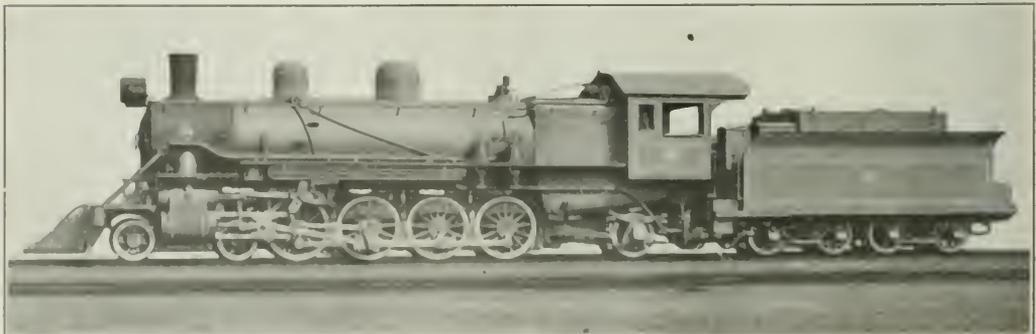
Belgium

The railways of Belgium have been occupied, chiefly, since the war, in the rehabilitation of their lines, equipment and structures. The manner in which they have entered upon this great task has already been discussed in these columns and while it cannot be said that they are back to pre-war conditions they have made very marked progress. Belgium has taken advantage of the great amount of reconstruction work that was required to rebuild their lines with a view to greater transportation efficiency and to ultimate electrification. The signaling system has been entirely renovated and a new system, which is a combination of American and English practice, has been installed under the direction of the late L. P. A. Weissenbruch.

Complete plans for electrification have been evolved and are ready for execution as soon as the financial conditions of the state permit (all of the main line railways are state-owned and operated). For this electrification the direct-current system at 1,500 volts with the third-rail has been adopted with three-phase power at 45,000 or 50,000 volts at power stations.

Belgium has found it necessary to go outside of the country for locomotives, orders for which have been placed in the United States and England. In addition there is a very marked determination to improve the operating efficiency of the locomotives. Extended tests are now in progress with feedwater heaters and exhaust injectors particularly. Much has been accomplished in improved fuel economy (Belgium imports most of its locomotive coal) by an excellent system of locomotive operation supervision with premiums or bonuses for the best performances.

Naturally the financial situation is and has been very bad and due to the fact that a large amount of reconstruction work has had to be done it is not possible to give accurately a proper idea of the finances. Suffice it to say, there have been heavy deficits.



Built by the Baldwin Locomotive Works for the Argentine State Railways

Railway Chaos Central Europe's Greatest Problem

Petty Jealousies and

Endless Custom-House Formalities

an

Effectual Barrier to Prosperity

CENTRAL EUROPE, by which is meant primarily those countries which were carved out of the old Austro-Hungarian empire, has a greater distance to travel toward restoring pre-war efficiency on its railways than any other part of the continent, with the exception of Russia. The extent of the disorganization of the railroads in that part of Europe was described in considerable detail in two articles by Colonel W. B. Causey, American Technical Adviser to Austria, which appeared in the *Railway Age* of October 15 and November 12. In view of the thoroughness with which the situation has been treated by Colonel Causey and the fact that there have been few developments of any special significance since that date, the present article will be restricted to a brief summary of the principal points brought out by Colonel Causey.

The economic standstill of Central Europe, with that of Russia, is admittedly one of the principal factors delaying the return of normal business conditions in the rest of the world. Furthermore, the breakdown of the railways in Central Europe is the primary cause of the productive inefficiency of these countries. The first step toward reviving prosperity in Central Europe must be the restoration of the effective functioning of the rail carriers.

The inability of the railways to perform their work properly, while partly due to the undermaintenance of the physical property, such as roadway and equipment, is chargeable principally to unwarranted political restrictions. Before the war traffic moved with freedom through the whole Austro-Hungarian empire and, with only few hindrances, over international boundaries. With the breaking up of the old empire into a number of independent states all this freedom has gone.

The nations are for the most part intensely jealous of each other and are chary of permitting the movement of traffic over their borders. The principal railway line between Vienna and Budapest passes through what is now Czecho-Slovakia. This line formerly handled an extremely heavy business. When the empire was dissolved this was changed. The Czecho-Slovaks would not permit the movement of Austrian and Hungarian trains through their territory. Consequently this main line fell into disuse except for local trains in Czecho-Slovakia and traffic between the two great cities, Vienna and Budapest, was restricted to a roundabout single-track line which led through the mountains.

Vienna is a great railroad center. Through it all main



Bratislava (Pressburg), the Czecho-Slovak Port on the Danube—Photo from *Underwood & Underwood*

routes from the west to the east and south of Europe pass. After the war some of the secession states found all their railroads centering in Vienna, a foreign city which could be reached only by undergoing troublesome customs formalities.

PROSPERITY throughout the world lingers, to some extent at least, because of Central Europe's economic breakdown. Renewed productive activity in Central Europe awaits a return by the railways to pre-war efficiency. These railways must be freed from the artificial barriers to the free movement of traffic which the new Central European states have set up. The problem is to secure co-operation between the various states and bring about physical rehabilitation of the roads.

Let us think an analogous situation in terms of our own country. Suppose that each of our states was an independent nation, intensely jealous of all the rest. Let us imagine, if we can, how traffic on the Lackawanna would be affected if there were customs boundaries between New York and New Jersey, New Jersey and Pennsylvania and Pennsylvania and New York, and if none of the states desired to admit traffic from another. The situation would be further aggravated if the Lackawanna were the only through line to the west. Yet exactly such a situation prevails in some parts of Central Europe. Under such conditions in this country Kansas could get few of the products of Chicago's factories and Chicago would suffer for lack of Kansas wheat. Production would be at a standstill as far as all practical purposes are concerned. A part of the nation would starve and the other would freeze. Disaster would be general. The world at large would suffer from the lack of those goods which it is accustomed to purchase from us and we would suffer from the lack of the commodities which the rest of the world could not afford to send to us without payment in kind. Thus economic conditions not only in this country, but in the entire world, would be affected.

Similarly the whole world is waiting for a revival of business; for Central Europe this means first of all a return of railway efficiency. The return of efficiency means that co-operation must replace the petty jealousies on the part of the new nations.

Central Europe is bound by universal economic laws. If transportation and the free interchange of goods is needlessly hindered, then business and prosperity must languish—particularly where the transportation tie-up takes place, but also in the rest of the world insofar as its productive activity depends upon exchanging commodities with the country affected.



Flood Protection for the Peking-Kalgan, China—Photo Used by Courtesy American Locomotive Company

Chinese Railways Experience Normal Year In 1921

New Construction Greatest Since 1916—Railways in
General Earning Substantial Returns

By Railway Age's Correspondent in China

PEKING, China.

RAILWAYS IN CHINA are classified under three categories: government, private, and "concessioned." Of the last named there are 2,294 miles, consisting of the Chinese Eastern, the South Manchurian, the Shantung, the Yunnan, and the British portion of the Canton-Kowloon lines. Private lines aggregate 477 miles and, except for two or three provincial efforts, are mostly mining auxiliaries. The government lines comprise about 4,030 miles.

None of the "concessioned" or private lines publishes statistics to an extent sufficient to yield an intelligent impression of their operations. It is known, however, that the chaos on the Chinese Eastern has been considerably reduced, and that under the guidance of John Stevens improved operating methods are gradually being introduced. The South Manchurian has felt the general slump in business sufficient to induce sweeping reductions in forces, and common report has it that a large American loan is being sought. The Shantung Railway is believed to be prosperous, but it is a fact that the strawbraid industry has been dead, the hair net industry has shifted its capital from Tsing Tau to Chefoo, and that there has been little doing in the peanut trade. The line is being boycotted as much as possible by the Chinese and it is difficult to see how a line can be prosperous when the principal industries in the territory served are stagnant and the natural patrons are hostile. Mining developments

under Japanese direction, however, may be sufficient to overcome the handicap.

The only effect of the war on Chinese railways was to bring about a shortage of rolling stock, a reduction in interest charges and higher costs of operating supplies. The road-bed suffered no change. During the years of 1920 and 1921 the shortage of rolling stock has been quite adequately corrected. The favorable rates of exchange by which Chinese railways paid interest charges and loan instalments to foreign creditors swung back to about normal in 1921, and will mean an increase in annual requirements of about six or seven millions of dollars, Chinese currency, compared with 1919. Materials in stock during the war were charged out of expenses at pre-war prices largely, although they had to be replaced at war prices. This left apparently large net revenue funds, when as a matter of fact the managements were not particularly flush with money. Now that the stores are stocked with the higher-priced materials, their gradual consumption will swell operating expenses and create an impression of hard times on the lines, when the lines will actually have larger free supplies of cash than they have had in recent years.

It is difficult to predict any "free supplies of cash," however, for the treasury of the Ministry of Communications has been "raided" several times during the past year. The first to get public recognition were the school teachers, who went

CHINA with a population of 300,000,000 has but 6,800 miles of railways. Manifestly this country offers a fertile field—offset somewhat by political conditions, it is true—for railway expansion. Steps have been taken toward standardization during the past year—in specifications for equipment, in rates and in accounting.

Keen competition by various foreign manufacturers for the equipment and supply business. Track and bridge materials should constitute major purchases in immediate future.

out on strike because of non-payment of salaries. The Ministry of Communications put the teachers back in the schools. The military chieftains, also, have undoubtedly had their share. During the latter half of the year Wu Pei-fu, in command of the armies about Hankow, placed his representatives in the stations on the southern half of the Peking-



Courtesy American Locomotive Company

The Peking-Kalgan, China, Traverses a Rugged Country

Hankow line, and these have remitted the station receipts direct to his headquarters. Care has been taken to keep clear accounts and to give receipts, so that these earnings will enter the statistics of the line and proper credit can be claimed by the line from the Ministry of Communications and by it from the Ministry of Finance, which in turn will

credit the Ministry of War. Thus does China progress in junction of the Cheng-tai and the Peking-Hankow railways, cutting "red tape" to a minimum.

sions of service, the usual advancement in the standardization program, and the usual increase in revenues. There has been an unusual amount of new construction. The year began with north China in the grip of the worst famine in 45 years. In the spring came an area of pneumonic plague, in the summer Wu Pei-fu's military movements around Hankow, and in the fall the floods along the southern end of the Tientsin-Pukow. The official figures for 1920 have not been published yet, due, it is said, to the "unscrambling" of the Peking-Hankow and Peking-Suiyuan lines, causing a delay in closing the accounts of those lines, but it is pretty well known that the operating revenues for 1920 were about \$90,000,000. If remaining months keep up the record of these earlier months, 1921 will overtop 1920 by fully five million. From the standpoint of railway revenue, the famine was not as disastrous as expected. Due in considerable part to funds contributed from America, no great loss of life occurred. Although famine-grain was carried free and other grain at 75 per cent of normal rates, the increased tonnage of grain and the longer average haul actually increased railway revenue from grain.

Increasing New Construction

The year 1921 saw more construction work underway in China than any year since 1916, when the war interrupted all foreign activities. The most important single piece was the completion of the section from Fengchen to Suiyuan, on the Mongolian border, and the immediate beginning of a further extension to Paotow, on the northern bend of the Yellow river. A beginning has been made also on a branch line of 80 miles extending from Chinchow on the Peking-Mukden to Chaoyang, a coal mining region.

The Japanese have under active construction the extension of the Ssipingkai-Chenchiatun to Taonan. With famine sufferers as laborers paid out of surcharges on the various railway revenues, the Ministry of Communications has constructed the earthwork of a line from Shihchiachuang, the



Track Laborers on the Peking-Kalgan, China

debit the Ministry of War. Thus does China progress in junction of the Cheng-tai and the Peking-Hankow railways, cutting "red tape" to a minimum.

1921 a Normal Year

The year 1921 may be summarized as being typical of general conditions during a series of years. There have been the inevitable military manoeuvres, the usual pests and calamities, and the usual changes in administrative chiefs of the highest grades. There have been also the usual exten-

cutting "red tape" to a minimum. The Lung-Hai has work underway at its western end, and the American Red Cross, as a means of famine relief, has constructed 850 miles of highway, much of which can be

Deliveries of Equipment

The Lung-Hai has work underway at its western end, and the American Red Cross, as a means of famine relief, has constructed 850 miles of highway, much of which can be

easily converted into roadbed for desirable branch lines or extensions when it is desired to do so. The preliminary work has been undertaken for the double-tracking of the Peking-Mukden line from Tongshan to Chingwantao.

A considerable number of locomotives and cars have been delivered during the year. English firms secured the orders from the Shanghai-Nanking and Belgian makers part of the order on the Peking-Hankow. But all of the remainder, the Peking-Hankow, the Peking-Suiyuan, the Tientsin-Pukow and the Peking-Mukden, received their deliveries from American sources. With the conclusion of a contract with American interests for a large order of locomotives and goods wagons by the Peking-Suiyuan a few weeks ago, it would seem that the Chinese requirements along this line would be nearly met. At least the great shortage which accumulated during the war will be relieved. On the other hand, not much has been done toward an addition or replenishment of passenger cars, except on the Tientsin-Pukow, which has ordered five complete all-steel Pullman trains for the Shanghai-Peking run.

Progress Toward Uniformity

The standardization program of the government railways has continued. A uniform classification of goods, with weights and distances reckoned in the metric system, has been put in force on the contiguous lines, together with through-billing of freight. The clearing house in the Ministry of Communications has charge of the auditing. A uniform system of car reports and standard rules for car distribution has also been put in force. Perhaps the most drastic step yet taken in the improvement of the service, however, was the assumption of risk of damage to goods in transit by the government railways, beginning February 1. Railway risk rates are 10 per cent higher than owner's risk rates, and

any of the other pieces of earthwork which could be converted into rail lines. The line just mentioned is the connecting link between the Shansi coal fields and the port of Tientsin. The traffic of the Cheng Tai railway pays a re-



Courtesy American Locomotive Company

High Standards of Track Maintenance on the Peking-Kalgan, China

turn of nearly 9 per cent on that line, and the bulk of this traffic would be immediately turned over to the new line. It would seem, therefore, that the producers would be justified in offering very liberal terms of security to the management in return for a contract to equip the line. If negotiations



A Junction on the Peking-Kalgan, China

the shipper has his option as to which plan he wishes to use. Uniform stores accounts also went into effect during the year and uniform rules to govern public tenders for materials were promulgated a few weeks ago.

Opportunities for Exporters of Track Material

Perhaps the most promising field for American manufacture in connection with Chinese railways is to be found for track and bridge material. Undoubtedly the requirements of the Peking-Mukden line are covered already, but at this writing nothing has been done towards the rail and bridges of the Shih-chuachuang-Tangchow line of 170 miles, nor

were successful on the first line, the others would be worth looking into.

The "spiciest" event of the year was the opening of tenders for the Yellow river bridge. A jury of five had been selected to make the award and it soon developed into a quarrel between the French, English and Belgian members on the one hand, and the American member, supported by the Japanese member, on the other. After a series of charges and counter-charges from these members, the Chinese management concluded to hold up the award which had been made to a Belgian firm. The latest rumor is that new tenders will be called for, to be opened by a new jury.



A Recent Session of the Japanese Imperial Railway Association

Some Observations on the Japanese Railroads

2000 Miles of Private Lines Operated in Close Harmony with
6000 Miles of Nationalized Lines

By B. B. Milner

THE NATIONALIZATION of the railway lines in Japan effected in 1906-7 did not represent so much a change in the plan of administration in the nation's railways as it did an expansion of a nucleus already state-owned by incorporating therewith a large number of important privately-owned and operated lines. At that time, to the state-owned nucleus of 1,500 mi. were added 3,000 mi. of previously privately-owned and operated lines. To this combination of 4,500 mi., there have been subsequently added some 1,500 mi. of lines, built or purchased, so that the present nationalized mileage approximates 6,000 mi. This, with 2,000 mi. remaining in the hands of private owners and operators, constitutes the connected lines of the Island Empire.

A Japanese government loan built the first railroad lines in Japan and, as in the case of many other large enterprises, the state has always played a large role in the development of transportation. The co-operation of private capital and enterprise was encouraged from time to time, essentially because no other means could be commanded for providing promptly the mileage for which urgent demands had rapidly developed. The right of state purchase has been always reserved in case of any grant of permission for private construction.

The first lines, Tokyo to Yokohama and Osaka to Kobe, 18 and 20 mi. respectively, were completed in 1870 by a

British engineering corps to 3 ft. 6 in. gage, which was made, and has remained, standard upon the islands. The widening of this gage to 4 ft. 8½ in. has been advocated

NATIONALIZATION represents a prearranged development logically following state encouragement afforded the construction and operation of private lines.

Unified operation incident to nationalization carried with it standardization in all phases of operation, service, equipment and maintenance practice. The introduction of employees' welfare, insurance and relief benefit work began promptly.

Natural and economic conditions, cheap hydro-electric current, expensive and limited coal supply stimulates the replacement of steam by electric operation.

from time to time but the probability of this being undertaken within any reasonable period, if indeed at all, is very remote. The matter, it seems, was espoused by one of the political parties but has recently suffered defeat in the Diet. It is generally believed that the probable cost was greatly underestimated for those who advocated the change and that greater returns may be obtained for the Japanese shippers and travelers in the cost and character of service, by the expenditure of smaller sums and effort in other channels, particularly those bearing directly upon increases in the capacity of existing lines of the present gage. For the 700-mi. dense traffic line between Tokyo and Shimonoseki, one estimate of the cost of the gage change, \$110,000,000, was certainly a very low figure.

From State Aid to Nationalization

State encouragement—in some cases financial aid—stimulated private line construction and gave to Japan from this source more than 1,000 mi. of line within one ten-year period.

Mileage having been provided, the question next demanding attention was how these private lines, mostly short, disconnected and scattered about the country might be extended and organized into a single through-line system

insuring uniformly efficient service. This question was answered by the large nationalization project under which the purchase of 17 private lines was accomplished in 1906-7 by the issue of five per cent domestic loan bonds. In the case of nine properties, the price of purchase was determined upon the basis of previous operating profits. With the eight properties remaining the price was amicably arranged between the contracting parties so that in not one case was it necessary to make use of the arbitration committee provided for in the law authorizing the purchases.

The work of 1906-7, and consequent removal of many and various difficulties incident to the previous independent management of the many lines, indeed marked an epoch in the history of Japanese railroad operation. The Imperial Government Railway accounts are maintained separate and apart from other branches of governmental activities and all disbursements, construction, operation, and improvement costs are met from the profits accruing from traffic and a few closely related activities.

From the standpoint of utility, the results of government ownership and operation have been satisfactory. The service has been greatly improved, lines have been extended to remote quarters wherein private lines could not hope to succeed, passenger and freight rates have been lowered in spite of the general advances in the cost of labor and materials. The capitalization of the lines was in 1918, \$594,956,867, and the profits from operation amounted to 5.8 per cent over a term of years including the years ending in 1914, 15, 16, 17 and 18, within which years the profits amounted to

been divided into six grand divisions having headquarters at Sapporo, Sendai, Tokyo, Nagoya, Kobe and Moji respectively.

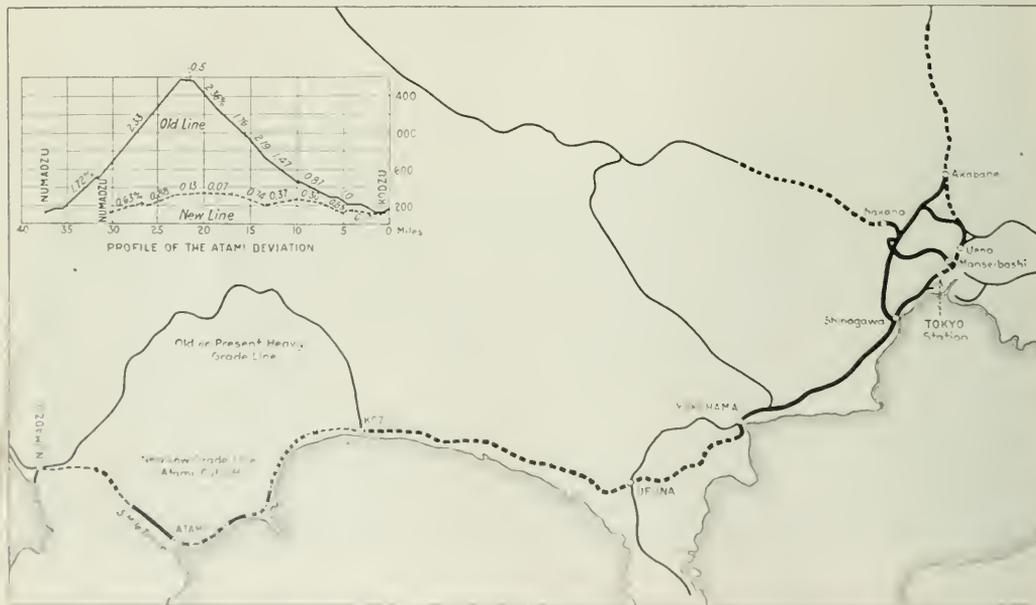
Tracks and Construction Work

The excellent condition of tracks, grade, alinement and ballast, is striking, particularly in view of the heavy rainfall



Typical Railroad Shop Bath House

and the amount of water to be contended with generally; it is only fair, however, to call attention to the maintenance advantages enjoyed by reason of the relatively low wheel loads and speeds. The latter average, for passenger trains,



Japanese Government Electrified Lines Near Tokyo and Projected Extensions

0.1, 5.5, 6.2, 7.2 and 8.3 per cent respectively. During the ten-year period following 1906-7, earnings per train mile increased \$0.13 while corresponding expenses fell \$0.0115. The proportion of freight traffic has increased to the point of exceeding passenger traffic since 1915, though by quite small margins.

With the consolidations effected, the organization was changed from departmental to divisional and the lines have

from 25 to 30 m. p. h. and for freight trains, from 15 to 20 m. p. h. on the more level sections. The excellent character of the large amount of retaining wall and other masonry to be found upon all the lines is very noteworthy.

On the main line, south of Tokyo and Yokohama, very important reconstruction work, known as the Atami low grade short line between Kozu and Numazu, is under way. This includes a five-mile tunnel, work upon which has pene-

trated a distance of one mi. from each end. This undertaking was originally estimated to cost \$12,000,000, but some \$17,500,000 has already been expended and a further like sum will be required for its completion. This increased cost is practically all due to the increased cost of labor and materials and therefore does not affect the ratio value of savings and operating advantages over those of the old line. By the time this new line is ready for use, the replacement of steam with electric operation will have been extended south and west from Tokyo and Yokohama to Numazu (79 mi.) or further.

Development of Electrified Lines

The line between Manseibashi station in Tokyo to Nakano in the suburbs (8 mi.) was electrified in 1905 before



Japanese State Railway System

the Koku Railway, of which this section formed a part, was taken over by the government in 1906-7 and is now known as the Central Line. Then came the electrification of the Yamate Line from Shinagawa around through the suburbs of Tokyo to Ueno station and Akabane which was completed in 1910. The crossing of Usui pass west of Tokyo presented great engineering difficulties and on what continues to be the best location possible there is a vertical lift of 1,817 ft. in the 6.9 mi. from Yokogawa to Karuizawa and a total of 26 tunnels of length aggregating 2.8 mi. The obvious discomforts and difficulties incident to steam operation were eliminated in 1912 by the use of electric locomotives. On 5.2 mi. of this line the grade amounts to 1 in 15 or 6.7 per cent. Rack rails continue to be used and such an operation as part of a through line railroad remains unparalleled in the world.

The operation of a new double track electric suburban passenger service line between Tokyo and Yokohama (18 mi.) followed in 1915. This line, except for a short section between Tokyo station and Shinagawa, is operated at 1,200 volts instead of 600 volts, in view of contemplated extension of electric service over the present steam lines to Yokosuka,

and the extension of suburban electric service from Sakuragicho (present terminus of suburban service within the city of Yokohama) to Ofuna, thence to Kozu and ultimately to Numazu and beyond over the Atami low grade cut-off.

The power sources provided for all of these electric operations were steam plants but more recently much attention has been given to possibilities of hydro-electric development in Japan generally, which is naturally suggested by the available water power and the economic necessity of conserving Japan's limited coal supply for such industrial purposes as cannot be served by electricity. In the *Railway Age* of December 10, reference was made to large orders for hydro-electric apparatus recently placed in this country. The Government Railways have now on order with three builders six electric locomotives for experimental use in lieu of steam locomotives on the lower grade lines about Tokyo as an initial step in an electrification program which spreads over three five-year periods and contemplates the replacement of steam on some 500 mi. of the more dense traffic sections of the lines around and south of Tokyo.

Standardization of Equipment

The extension of government ownership and operation brought with it standardization in many particulars and



Imperial Railway Association Club House at Tokyo

extensive investigations of various subjects and phases of railroad operation along broad lines, many of which have become the foundation of definite policy. The standardization of passenger car equipment was accomplished by the end of 1910. In the meantime little equipment was built save that possible with the materials on hand and taken over with the old private lines by the government. The lengths of the new standard cars became 55½ feet for four-wheel truck cars and 66 feet for six-wheel truck cars, against the prevailing 26 feet for the ordinary four-wheel cars replaced. The passenger car equipment of Japan is now electrically

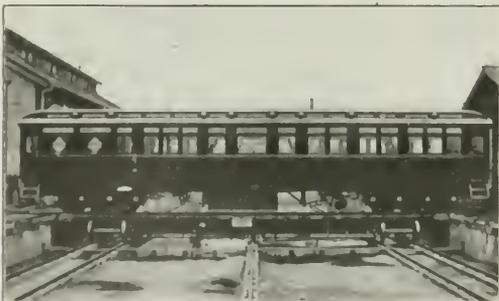
lighted (axle generator system), steam heated (pressure system) and equipped with vacuum or air brakes and English hook couplers. The latter are scheduled for replacement with automatic couplers as used in America in accordance with a carefully arranged program which will be pursued more or less rapidly as funds become available.

Corresponding organized standardization work was undertaken with regard to freight car equipment. The capacity of the larger cars at the time was seven tons and 1911-12 saw the completion of designs for standard nine-ton cars and standardization of two-axle designs for seven and ten-ton capacities respectively, which replaced more than 100 designs then on hand and in use. The link and pin couplers found in the northern island (Hokaido) lines were promptly replaced with American automatic couplers. By 1915 the capacity of standard cars on the main and southern islands became 15 tons, that of the Hokaido lines, handling a large coal business, 25 tons, and within ten years this capacity and 30 tons will doubtless be standard upon all the lines.

Economic factors and the preservation of a proper ratio between the weight of carload shipments offered by Japanese shippers and the capacity of cars supplied therefor, renders inexpedient too rapid introduction of high capacity cars such as currently used in America. The progressive disposition of the Japanese will push these capacities ahead just as promptly as operating conditions will warrant. Complete replacement of the hook coupler is programmed along with the introduction of the compressed air brake, there having been already shipped from America some 200 locomotive sets, 250 passenger car sets and 350 freight car sets.

Four types of locomotives were promptly standardized; a heavy grade 0-10-0 type, a Consolidation, an American (4-4-0) and a Mogul. A Pacific type passenger locomotive has subsequently been developed. All locomotive equipment has for some eight or nine years, been manufactured at plants developed at Osaka and Kobe.

A complete reorganization of repair shops was planned and undertaken. Ten leading plants were closed, eight developed and some 25 are now operated, 15 of which handle both car and locomotive work, one exclusively locomotive work, and nine exclusively car work. As in the case of



Exterior of Formosa Government Railway Private Car

locomotives all new car equipment is now being built in the Empire, the higher class passenger cars, viz., diners, sleepers and first-class coaches, in the government railroad shops at Omiya and Oi, the third-class coaches generally and a part of the new freight car equipment, as well as a part of the new second-class coaches, at an outside car building plant located at Nagoya.

Imperial Railway Association

The Imperial Railway Association, constituted of railroad officers from all over the Empire, is a thriving institution which holds annual meetings at varying points such as does

the American Railway Association and its branches. The association occupies the unique position, however, of having provided itself with a well appointed club house at Tokyo, which constitutes a most convenient and comfortable rendezvous for members living in and visiting the capital.

Research Bureau

The testing and research work of the lines was organized in a railway research bureau well equipped with physical and chemical laboratory facilities, a locomotive testing plant and a most complete dynamometer car which was purchased in the States. The reports of the bureau's work are issued in printed form from time to time in a manner suggesting the



Tracks and Signals Near Yokohama

practice of those lines in the United States which have spent the most time and funds on the matter of tests and reports.

Railway Institute

The Railway Institute, which was organized in 1909, for training railway men, is especially noteworthy. At the Central Institute, located in Tokyo, about 200 students are quartered, much as in a boarding school, for two years of training in either a railway business, mechanical or an electrical course. The students are selected from the ranks of young employees in accordance with aptitude and fitness developed in their service, and their regular compensation is continued during the term of their schooling. A special language course covering English and the elements of Russian is provided for those who elect it. The 1,000 students who have been graduated since the opening of the Institute in 1909 are scattered in railroad service all over the Empire. Of these about 150 have availed themselves of a training in the language course referred to. There have been also established upon each grand division, district institutes providing less complete business and technical courses, also special training courses for conductors, stationmen, enginemen, firemen, car inspectors, telegraph operators, etc.

Welfare Work

Employee's welfare work has been given a prominent place in the activities of the administration. Four hospitals have been established besides some 15 dressing rooms and dispensaries at shops and some 20 at other points. Treatment includes internal as well as injury and other surgical cases. All expenses are paid from the railroad treasury. A large corps of railroad physicians covering the entire lines has been organized and these attend to the physical examinations now required for employment and the medical treatment of employees, their families and passengers in the sections individually assigned them. An insurance institution designed to furnish sickness and death benefit relief to members and families affords such relief under three classifications to about 125,000 employees. The subscriptions from members have been amounting to about three-fifths of the cost.



The Circuitous Darjeeling Himalayan Railway, India

The Indian Railways Face a Serious Problem

New Equipment and Plant Needed—Country Hampered by the Lack of Facilities

By Robert E. Thayer

THE PRESENT PROBLEM of the Indian railways is physical rather than financial. For the past 45 years the net earnings of the capital invested in the railways has never been below four per cent and for the past 20 years it has been below five per cent only three times. Notwithstanding this favorable showing, the railways have been allowed to deteriorate so that at present there are scores of bridges which are unfit to carry the modern train loads and there are many miles of rails, hundreds of engines and thousands of freight cars in service that should have been replaced some time ago.

Government Starves Railroads

It has been the policy of the government in the past to appropriate the bulk of the railway's earnings for general governmental expenses with the result that the development of the railways has been sadly neglected.

For the fiscal year ending March 31, 1920, the revenue receipts from the railways was \$266,500,000 as against \$585,000,000 of other receipts, or nearly half as large as all the other receipts in the budget put together. The money that should have been available for improved railway facilities was appropriated to relieve the taxpayer. In 1907 the Mackey Committee, which was investigating Indian railway conditions, recommended a yearly capital expenditure of some \$60,000,000 as necessary for keeping the railways up to the proper standard of development and improvement. It is interesting to note that for the eight fiscal years (1908-

1916) an average of only about \$50,000,000 was spent and for the three following years only \$17,500,000. During the last three years—1919-1922—the capital appropriations have averaged about \$72,000,000. The time has come when it is

impossible to restrict further capital expenditures for improvements, for maintenance and renewals are sadly in arrears.

Not only has the lack of sufficient capital appropriations hampered the development of the Indian railways but the fact that these appropriations are only good for one year with no assurances of renewal has made it impossible, in many cases, to use the sums appropriated to the best possible advantages.

General Business Suffers

This lack of proper maintenance and development has had a serious effect on Indian business. Large new coal areas remain undeveloped and new industries are being held up because of the lack of railway facilities. There has been a serious shortage of freight cars, and passenger travel, particularly the third-class, has been crowded.

Frequent embargoes have resulted from insufficient track capacity at classification junctions. Shippers have been forced to use road transport both by truck and camel trains. In one case the European oil seed market was lost owing to lack of railway transport. The situation has become so bad that the Associated Chambers of Commerce of India and Ceylon has gone on record for drastic revision in the present railway policy.

INDIAN railways are financially prosperous, but under control of the state and having their finances mixed in with the general budget, the surplus earnings are taken for general state expenses, thus reducing taxation.

Their physical condition is such that they cannot properly take care of the present traffic requirements, to say nothing of the anticipated requirements.

Heavy expenditures must be made to improve the railway plant.

The opportunities of development in India are well indicated by the fact that with an area of 1,800,000 square miles—almost as large as the United States—and a population of 300,000,000—three times as large as the United States—there are only 36,735 route miles of railways. Coupled with this is the very apparent prospects in the improvement of trade. Of the 36,735 miles of railroad about 49 per cent is of 5 ft. 6 in. gage and 41 per cent 3 ft. 3 3/8 in.; the rest is 2 ft. 6 in. and 2 ft. gage.

The Indian railways may be divided into five general classes:

1. State lines worked by the state.
2. State lines worked by guaranteed or independent companies.
3. Company lines worked by companies.
4. Lines belonging to Indian states.
5. Miscellaneous.

The first two classes comprise about two-thirds of the entire mileage in India.

TABLE I.

Route Mileage of Principal Indian Railways (March 31, 1920)

	5 ft. 6 in. gage		3 ft. 3 3/8 in. gage		2 ft. 6 in. gage		2 ft. gage	
State lines worked by state	5,863	1,141	333	7,369				
State lines worked by companies	9,741	8,306	927	46				
Branch line companies under rebate terms and worked by main lines	1,160	122	298	108				
Companies lines subsidized by the government of India								
Indian state lines worked by Indian states		206	1,729	234				
Indian state lines worked by main lines				2,123	171		302	
Companies lines guaranteed by Indian states		632	804	386				
		330	391	39				

Note—The grand total route mileage of all railways in India is 36,735 miles.

Table I gives an idea of the distribution of the mileage as between the different gages. The broad gage (5 ft. 6 in.) was chosen in 1851 when the railways were first built in India for the greater stability it offered as compared to the 4 ft. 8 1/2 in. gage. The 3 ft. 3 3/8 in. gage was adopted for auxiliary lines to the broad gage lines but they have expanded to such an extent that they now serve large areas, as indicated by the mileage figures. Even the real narrow gage lines, which are only feeder lines, have developed rapidly in the past ten years.

At the close of the fiscal year 1919-1920, the open mileage increased to 36,735 from 32,099 of ten years ago; it is now made up as follows:

Gage	Present Mileage	Increase in 10 Years	
			Per Cent
5 ft. 6 in.	17,990	7,71	
3 ft. 3 3/8 in.	15,181	12.2	
2 ft. 6 in.	2,926	10.4	
2 ft.	638	47.6	

At the close of the year there were 1,822 miles under construction, or sanctioned for construction, of which there was 665 miles of 5 ft. 6 in. gage and 805 miles of 3 ft. 3 3/8 in. gage

Revenue and Expenses

As has already been stated, the Indian railways are in a good financial position. At the end of the financial year in 1920 there was a capital of some \$2,000,000,000 invested in the Indian railways and even in that year the return on that capital was 6.8 per cent.

TABLE II
Earnings, Expenses and Mileage of All Indian Railways (Five Years)
Fiscal Year Ending March 31

	1916	1917	1918	1919	1920
Open route mileage	35,833	36,286	36,333	36,616	36,735
Total capital (millions)	\$1,722	\$1,741	\$1,765	\$1,785	\$1,840
Gross earnings (millions)	\$210	\$230	\$251.5	\$280.5	\$290
Total working expenses (millions)	\$107	\$108.5	\$114.8	\$136	\$164.8
Operating ratio (per cent)	50.91	47.26	45.72	48.45	56.81
Return on capital (per cent)	5.99	6.96	7.75	8.09	6.80
Tram mileage (millions)	159	163.6	157	158.6	162.2
Gross earnings per train mile	\$1.32	\$1.40	\$1.60	\$1.77	\$1.79
Working expenses per train mile	\$.67	\$.66	\$.73	\$.86	\$ 1.02
Net earnings per train mile	\$.65	\$.74	\$.87	\$.91	\$.77
Freight ton-miles (millions)	17,158	19,826	21,015	22,141	20,402
Passenger miles (millions)	16,529	17,846	16,204	18,040	20,615
Average miles one ton was carried	307.98	230.08	245.87	242.88	232.33
Average rate per ton-mile (cents)	.735	.68	.691	.721	.75
Average passenger journey (miles)	35.59	36.82	37.66	39.24	39.64
Average rate per passenger mile:					
First-class (cents)	2.315	2.255	2.8	2.585	2.715
Second-class (cents)	.931	.858	1.145	1.21	1.351
Intermediate class (cents)	.535	.531	.68	.705	.713
Third-class (cents)	.388	.392	.47	.484	.48
Season or commutation (cents)	.24	.242	.254	.252	.26
Total (cents)	.412	.419	.505	.516	.519

Table II gives an excellent idea of the financial performance of these roads for the past five years. It will be noted that even through the war the operating ratio was very low and the last year it was only 56.81 per cent. And with it all the rates were exceedingly low. It seems a pity, therefore, that with this excellent showing as an operating unit the railways should be in such a poor physical condition.

Reorganization Planned

Such has been the service rendered by the Indian railways to the public. Because of the large number of complaints received from the shippers the British government through the Secretary of State for India caused a searching inquiry to be made by a special committee, headed by Sir William M. Acworth, into the administration and working of the Indian railways. This committee has recently made its report and while it was unanimous in its decision that the railway budget should be kept separate from the state budget, it was divided in its opinion as to the administrative policy. Sir William headed the group favoring state management, as opposed to the recommendation of the other group recommending private companies with a board of directors. In commenting on his discussion in the matter Sir William has said that although he has been and is a thorough believer in private management he was forced in this particular instance, by the facts as he found them, to recommend the state management. No definite decision has yet been made, but one thing is sure—something must be done immediately.



New York Central Yards and Elevators at Weehawken, N. J.



Central Railway Station at Sydney, Australia

Unifying the Railway Gages of Australia

Exchange of Traffic Between the Different States of the Commonwealth Now Greatly Hampered

By F. M. Whyte

IN FEBRUARY, 1921, a commission was appointed by the Commonwealth Government of Australia, in agreement with the five continental states of the Commonwealth, to recommend a standard gage of track for the railways on the continent; to give the reasons for such recommendation; to estimate the cost of providing between the capital cities the gage of track recommended and any new lines necessary to accomplish this desire; the estimated cost of converting all lines to the gage recommended; the methods by which the work should be executed and controlled; and whether any third-rail or other mechanical device should be used, if so, what one. In order to give to the commission plenary powers, it was made a Royal Commission. Its personnel was to be an Australian outside of the railway service (John J. Gavan, of Sydney, was appointed as such and was also appointed chairman); a civil engineer from England (Rustat Blake, of London, was appointed); and a mechanical engineer from America (for this assignment the writer was appointed).

The railways of the sixth state, the Island of Tasmania, were not included in the investigation; these have no physical connection with those on the continent.

It will be noted that the questions submitted to the Commission refer in no way to improvement of present tracks,

structures, and equipment, nor to taking up deferred maintenance.

It is desirable, before considering the report of the commission to present some data and general information about Australia because a great many persons in America have rather hazy ideas of that distant country and there seems to be a general desire to know more about it.

The area of the continent of Australia, disregarding Tasmania, is greater, by an area of that of New Hampshire and New Jersey combined, than the land area of the continental United States. This area of Australia had in 1921 a population, aside from aboriginals, of, roundly, 5,200,000, and about 44½ per cent of these were in the capital cities of Sydney, Melbourne, Adelaide, Brisbane and Perth. The maps will indicate that these are sea-port cities or have sea-ports nearby.

In the year 1920-1921, the imports, for the continent and Tasmania, were valued at £163,000,000; the exports were valued at £132,000,000; and the total trade at £295,000,000. The

value of the imports from the United States was £23,826,000, or 24 per cent of the total and the value of the exports to the United States was £11,130,000, or 7.4 per cent of the total exports.

The Commonwealth was proclaimed in 1901; for various

THE five continental states of Australia built their railroads independently and without regard to interchange of traffic. Several different track gages were used.

Recommendations of a special commission were accepted early in November last, and work will doubtless be started shortly, looking toward the final standardization to a 4 ft. 8½ in. gage. The more important changes can be made by 1930 if work is started promptly.

periods of time previous to that year the different states had been separate colonies of the Crown. It is now a Dominion within the British Empire.

Different States Build Railways Independently

The first railway built in Australia extended west from Sydney, New South Wales, and the gage approved for it was 4 ft. 8½ in. At about the same time the same gage was approved for a short line at Melbourne, Victoria. Soon after this, New South Wales changed to 5 ft. 3 in., possibly because locomotives with inside cylinders were considered to be desirable at that time. The then colony of Victoria also changed to 5 ft. 3 in., but not by agreement with New South

that gage. The Commonwealth built the Trans-Australian Railway from Kalgoorlie, in Western Australia, to Port Augusta, in South Australia, to connect the western state with the eastern states. This road, 1,051 miles long, was opened for traffic in October, 1917. It is thoroughly up-to-date in its equipment.

There is a small mileage of gages of less than 3 ft. 6 in., but these railways are not of importance.

There is considerable mileage of privately-owned railways and these are generally of the same gage as the state-owned railways with which they connect. These were not considered in the scheme of unification of gages.

The policy of the Commonwealth and the states of con-

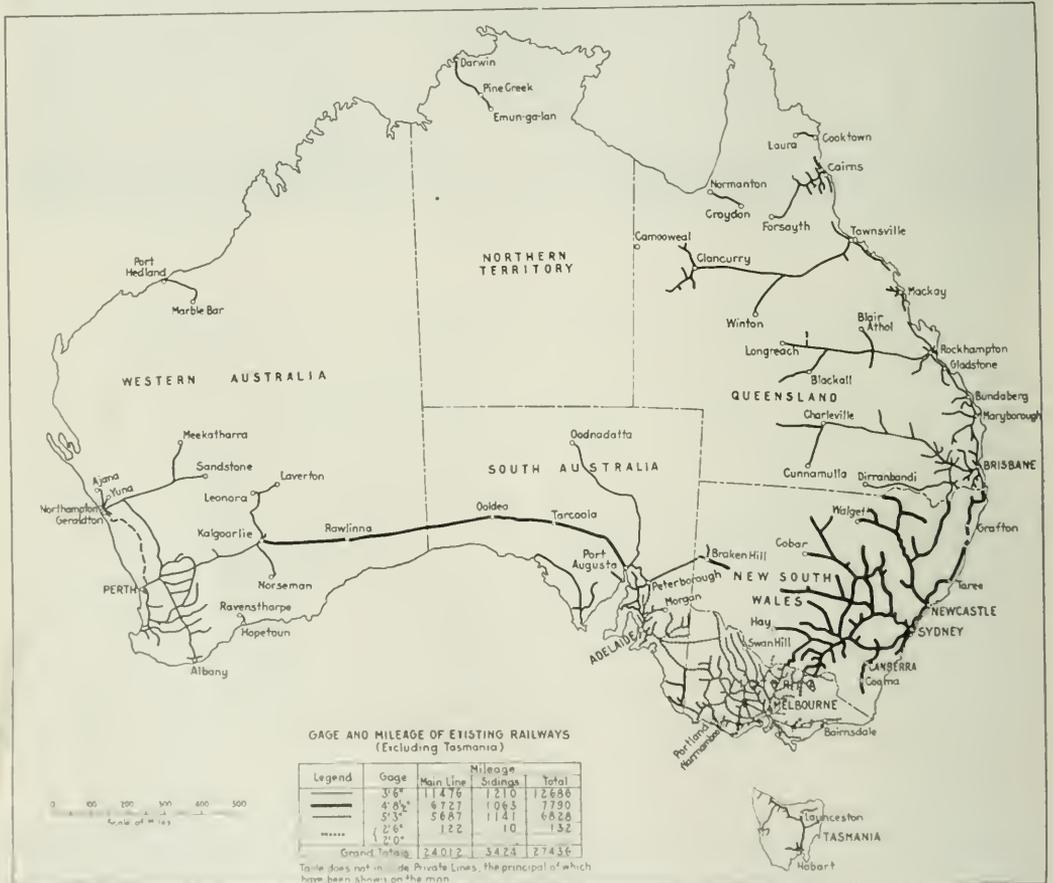


Fig. 1. Map of Australia, Showing Present Railway Systems

Wales. Still later, New South Wales returned to the 4 ft. 8½ in. gage, but this time Victoria did not follow, and the two states continued to the present time to build railways of the respective different gages.

South Australia, joining Victoria on the west, adopted 3 ft. 6 in. for the important south-eastern portion of the state and connecting with Victoria. But used 3 ft. 6 in. gage for the northern line because this gage was considered to be ample for the needs and cheaper to construct. Queensland and Western Australia used the 3 ft. 6 in. gage from the beginning for the same reason that South Australia used

structing and operating railways independently of each other had resulted, to the time of the investigation, in the building of 23,890 miles of main line, 3,414 miles of siding, a total of 27,304 miles, of three different gages, distributed as follows:

Gage	Mileage		Total
	Main Line	Sidings	
ft. 6 in.	11,476	1,210	12,686
ft. 8 in.	6,727	1,063	7,790
ft. 3 in.	5,687	1,141	6,828
Total	23,890	3,414	27,304

These totals indicate that, on a population basis, Australia has about $2\frac{1}{2}$ times the railway mileage of the United States. Compared on the basis of area, the situation is quite different.

It is apparent from the maps, that the railway development in Australia has been carried out by the separate colonies and, later, by the respective states, with the main idea of developing the particular colony or state irrespective of any other colony or state and while the state jealousies still exist, there are indubitable evidences that these jealousies are disappearing gradually.

The harbors which have been developed most extensively are at the state capitals, and it will be noted how the railways of each state radiate from the respective capitals. Such an arrangement will certainly burden the transcontinental and a considerable part of the interstate traffic. The proper solution of this condition seems to be that, if private enterprise is to be barred, the Commonwealth should take an interest in the railway development of the states to the extent, at least, of determining locations of lines to meet, and to develop, interstate communication.

The Present Gages

The railways as they are at present are shown in Fig. 1; the track gages are indicated by the forms of the lines. It

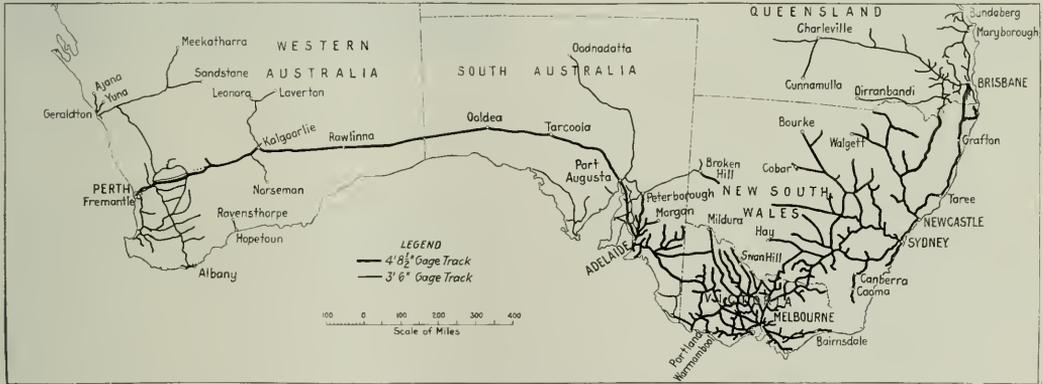


Fig. 2. Showing Changes in Gage Recommended by the Royal Commission

will be seen that the entire railway mileage of the extreme northeast state, Queensland, and of the extreme western state, Western Australia, are of 3 ft. 6 in. gage; and about one-half the mileage in South Australia is of the same gage. All the lines in Victoria and about one-half of those in South Australia are 5 ft. 3 in. gage and these are located between the 4 ft. $8\frac{1}{2}$ in. lines of New South Wales and the Trans-Australian Railway of the same gage, except that for 130 miles east of the latter railway the gage is 3 ft. 6 in., connecting with the 5 ft. 3 in. gage of South Australia. In the present line connecting Brisbane and Perth there are five breaks of gage, the distance by the present route being 3,488 miles. Under the present system of operating there are three other places where passengers must transfer and where mail, baggage and express are generally transferred, these being Sydney, Melbourne and Adelaide.

At present the heaviest transfer of traffic is between Victoria and New South Wales. Such traffic is passengers, baggage, mail and express at all times; coal from New South Wales to Victoria and beyond, when there is difficulty with the coastwise shipping; and livestock fodder in the reverse direction, when conditions demand.

Those persons in Australia who have understood more

clearly the possibilities of the continent and who have been interested in its development have agitated for some years the desirability of unifying the gages of the railways, and since the Commonwealth was proclaimed in 1901, various estimates of the cost for doing the work have been made by railway officials of the Commonwealth and the states, but without, apparently, mutual understanding as to what improvements and deferred maintenance costs should be included in the cost of unifying the gages. The Commonwealth officials thought that many items, not directly chargeable to unification, had been included in the estimates, therefore the Commonwealth and the states agreed to the appointment of a disinterested commission and to abide by the recommendations of such commission.

It was further agreed that when the work was done, one-fifth of the cost should be borne by the Commonwealth and the remainder to be apportioned to the five states on a population basis.

Changes Recommended

The commission recommended the adoption of the 4 ft. $8\frac{1}{2}$ in. gage as standard. It was considered that any gage greater than 5 ft. 3 in., the maximum in Australia, would not be justified and that any difference in the results to be obtained with the 5 ft. 3 in. over the 4 ft. $8\frac{1}{2}$ in. would

not justify any materially greater cost for the former. It will cost considerably less to install the 4 ft. $8\frac{1}{2}$ in. gage because a very large percentage of the axles of locomotives and rolling stock can be saved, as can the 7 ft. ties now in place on a large mileage of the 3 ft. 6 in. gage track.

The Prime Minister and the premiers of the five states interested met in early November last and agreed upon the 4 ft. $8\frac{1}{2}$ in. gage as standard. They are to meet early in 1922 to decide what part of the work is to be undertaken and when it should be begun.

Distance to Be Cut Between Brisbane and Sydney

The commission recommended for the main trunk line connecting Brisbane and Perth that a new line be constructed from Brisbane to the Queensland-New South Wales border; the north coast line of the latter state be extended northward to meet the new line, thus shortening the distance between Brisbane and Sydney by 101 miles and obtaining decidedly more favorable gradients; that all of the 5 ft. 3 in. lines in Victoria and in South Australia be converted and the new line along Spencer's Gulf from Adelaide to Port Augusta be constructed, thus reducing the distance 70 miles and providing much more favorable gradients; and the converting of

about 510 miles of 3 ft. 6 in. track, some of it to be changed in location, and the construction of about 70 miles of new track in Western Australia. The estimate for doing this work and providing the necessary locomotives and rolling stock, some of it to be new and some to be converted, was £21,600,000 or, at normal exchange, about \$105,000,000.

This expenditure would provide from Brisbane to Fremantle (Perth) by the revised route, rails weighing not less than 80 lb. per yard and roadbed, including bridges, in keeping with that weight of rail, together with the necessary high-grade locomotives and rolling stock. A considerable part of the present mileage making up the revised route is laid with 80 lb. rails and in some places there are 90 lb. and 100 lb. rail.

Can Be Completed by 1930

The map, Fig. 2, shows what the situation will be with respect to the gages when such main trunk line is provided; practically 54 per cent of the present total main line and sidings will then be 4 ft. 8½ in. gage. The work can be completed by 1930 if started promptly, and present indications are that it will be started soon. The necessary financing can be provided and the labor and materials can be procured in Australia.

The remaining 46 per cent of the trackage is 3 ft. 6 in. gage and the commission recommended that these lines be changed less rapidly, that 25 or 30 years might be a reasonable time in which to accomplish the entire undertaking, so that rolling equipment may be worn out without being converted, that wider bridges may be provided when renewals are necessary, that fills and cuts may be widened as conditions permit, and that new alignments may be provided through rugged country where the radii of curves are too short for the broader gage. The more important lines should be converted first and the others to be converted in sections of such length and at such times as conditions may justify.

The commission recommends that, in changing the 5 ft. 3 in. lines, one rail be moved in 6½ in., the total difference in the gages; at station platforms, which are very generally elevated, at tunnels and other structures the rails and ties be slewed 3¼ in. so as to maintain the present location of track center. Also, that the rail be moved in long lengths, possibly 100 miles, or more, in two or three days after necessary preparatory work has been done. The rails are T-section, very similar to the sections used in America, and rest directly upon the ties, or tie plates, and a complication in connection with moving one rail on these lines is the fact that the rails are now canted inwardly, nominally 1 in 20 and 1 in 26; however, actual measuring of the canting disclosed that the canting varied from 1 in 12 to 1 in 40. Similar checking of rails laid, normally, flat on the ties, disclosed the fact that these varied from 1 in 60 outwardly to 1 in 70 inwardly. No effort was made to find the extremes of canting and it is probable that the foregoing data do not show the extremes.

With such facts in mind, it was considered to be entirely safe to move one rail in and place it flat on the ties, even where the opposite rail was canted. Eventually, the canted rail can be straightened up by degrees. However, to convince the responsible officials who might doubt the wisdom of this, it was suggested that 25 miles of track, subject to heavy and fast traffic be arranged with a flat and a canted rail and observation be made.

None of the 5 ft. 3 in. gage locomotives having inside cylinders will be converted, for the others which are suitable for conversion the main frames will be moved inwardly, thus making necessary narrower fire-boxes, front-end spacing castings and cross-frame connection; the wheels spaced on present axles, new journals machined and, when outside collars are necessary, the welding on of these collars. For locomotives and rolling stock having trucks the axles will

be treated similarly and the cross members of the trucks shortened. A very large percentage of the freight equipment is of the four-wheel type, without trucks, and the axles for these will be treated as the other axles and the location of the pedestal attachments to the body will be changed to give the desired spacing crosswise. It will be a rather easy undertaking to change a large percentage of the equipment.

7 ft. Ties May Be Retained

It was recommended that, when the 3 ft. 6 in. gage is changed, each rail be moved outwardly 7¼ in., one-half the difference in the gages. A large mileage of the narrow gage



Uniform Gage Commission of Australia

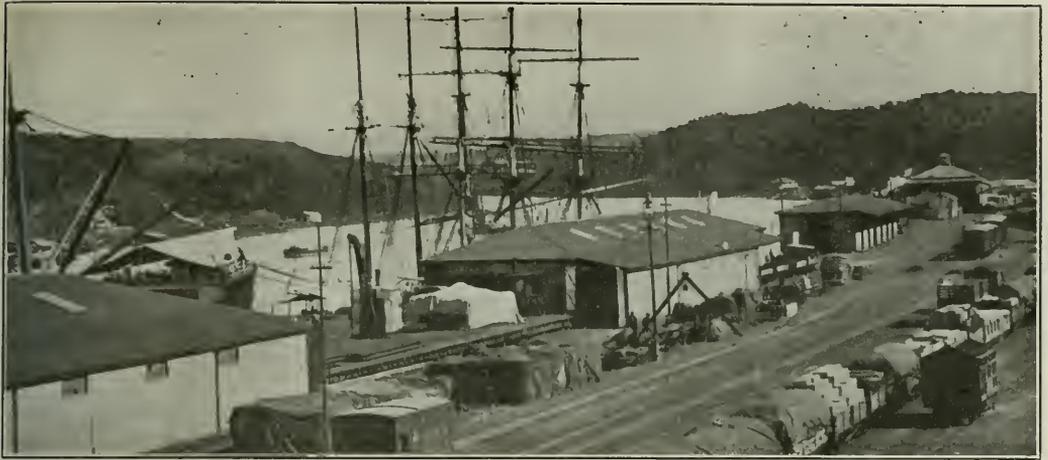
Left to Right: F. M. White and Eustat Blake, Members of the Uniform Gage Commission, Littleton E. Groom, Federal Minister for Works and Railways, and N. G. Bell, Commissioner of the Commonwealth Railways

is on ties 7 ft. long, and for the present wheel loads these ties are sufficiently long for the 4 ft. 8½ in. gage, but it was recommended that ties 8 ft. long be placed two at each rail joint and two intermediate where joints are opposite, or two at each rail joint where joints are staggered. If wheel loads are to be increased to such an extent as to make necessary ties longer than 7 ft., then improvement is involved and makes necessary an adjustment in costs between the owning state and the other parties, the Commonwealth and states, to the agreement. It was the possible saving of these 7 ft. ties which determined, to a great extent, the recommendation of the 4 ft. 8½ in. gage. Under the plan proposed, none of the 3 ft. 6 in. rolling equipment would be converted for use on the broader gage.

It was recommended that the work in each state should be executed under the supervision of the same offices as have charge of the corresponding work now, but that there be placed in general control of the entire undertaking a director who will have almost absolute authority in determining what shall be done, and when, and in the accounting.

Positive recommendations were made against the use of a third rail or a mechanical device and emphasis was placed upon the desirability of centering attention upon the problem of actually changing the gage of track and rolling equipment.

IN NOVA SCOTIA AND NEW BRUNSWICK the railroads celebrated New Year's day by a big snowstorm. On Sunday night five Canadian National trains were reported snow-bound in the Folleige mountains section. There was a complete tie-up of traffic between Springhill Junction and Truro. One train was covered with huge snowbanks. Four were stalled near Londonderry. Crews of snow shovellers were sent out from Moncton and Truro to dig out the trains. The night expresses out of St. John and Halifax were blockaded



Railway Terminal and Harbor, East London, South Africa—Photo by Underwood & Underwood

South African Railways Progress Despite Deficits

Electrification and Other Projects Advancing Regardless of Unfortunate Earnings Position

By M. T. Griffin

THE PRESENT unfortunate position of the South African Railways, the government lines, was epitomized recently in a statement by the famous South African statesman, General Jan C. Smuts. He said:

"The railway situation is most grave, revenue having fallen approximately £500,000 during the past six months below the amount estimated. During the past year £28,348,000 was the total railway expenditure, being an increase of £13,800,000, or 95 per cent, over (the fiscal year) 1913-14. Of this increased expenditure over £10,000,000 was accounted for in increased salaries, wages, allowances and war bonus. At the present time depression is weighing like an intolerable load on this country—but I do not despair of the future. The conditions in South Africa are sound, the country not being handicapped, as so many others are, by huge war debts."

Extent of the Railways

The government of the Union of South Africa owns and controls practically all of the railroads of the country. These government lines have a total mileage of 9,559, of which there are 4,254 miles in the Cape of Good Hope, 1,319 miles in the province of Natal, 2,644 miles in the Transvaal and 1,342 miles in the Orange Free State. There is also a mileage of 1,292 in Southwest Africa which is being operated at present by the South African Railways. There are 651 miles

additional of privately owned railways throughout the Union. Railway construction in South Africa began in 1859, when a two-mile line was built at Durban on the east coast. Progress was slow. In 1873 the railways in Natal, totaling 63 miles, were taken over by the government. After the Boer War the state railways of the various states which make up the Union of South Africa were consolidated but it was not until 1910 that they all came under unified control. The earlier railways were built to standard gage, i. e., 4 ft. 8½ in., but this gage was reduced later to 3 ft. 6 in., which is now the standard gage for South Africa. There is also a considerable mileage of narrow gage, 2 ft. 6 in. and 2 ft. lines.

THE GOVERNMENT of the Union of South Africa operates 11,478 miles of railways. These lines connect with other lines to the north and, because of the extent of their development, set the standards as to gage, equipment and practices for the future railway development of the southern part of the continent.

They are suffering from the unfortunately too well-known malady, deficits. High costs, largely wages, and inadequate income are the outstanding causes.

The Effect of the War

During the war the South African Railways were fairly well maintained and, indeed, a considerable mileage was relaid with heavier steel imported from the United States. Freight rates were advanced considerably during the war and now in the period of depression, when the railways are losing heavily, shipping interests are much agitated on the subject of high freight rates and are clamoring for reductions. Passenger rates were increased only by the application of a 2½ per cent surcharge on regular and suburban fares and a 5 per cent on trip, bearer, mileage, coupon and season tickets. Wage payments were increased tremendously, as shown by

the statement of General Smuts. These increases were due not only to increases in actual money payments to individual employees but also to the larger numbers of workers made necessary by the application of the eight-hour day. The eight-hour day has, however, recently been modified to include only those employed continuously and does not apply to workers whose work-day may include periods of idleness. Some saving will doubtless be effected by this change.

Employees of the South African Railway at the end of the last fiscal year totaled 89,858, something less than half of whom were of European extraction. During the war a cost of living bonus was added to the wage payments of employees. This bonus was first applied to native workmen and, naturally, it is from them that it was first removed. This bonus was, therefore, reduced in the case of native employees by 25 per cent on April 1 and further similar reductions each three months thereafter.

Union labor on the South African Railway is mostly European and it is said that, while they oppose wage reductions to some extent, they nevertheless realize the position of the railways and the necessity for reducing operating costs.

The Financial Situation

The financial position of the railways is unhappy. The deficit for the fiscal year ended March 31 was \$6,186,644. The accumulated deficit of the government railways, harbors and steamships on that date was \$12,630,576. During the first six months of the present fiscal year a further deficit of \$4,860,000 was piled up by the railways.

All this looks rather discouraging, but there are one or two matters that make the outlook less unpleasant. One is that the monthly deficit of the railways has shown a tendency to decrease of late months and, furthermore, that operating expenses in the first five months of the current fiscal year showed a decrease of 29 per cent over the same period of last year.

Other Railways of South Africa

North of the Union of South Africa lies Rhodesia, which is also British. Its principal railway, which has a mileage of 1,406, is also of 3 ft. 6 in. gage and connects with the South African Railways, working in close co-operation with them.

The South African railway authorities are exercising jurisdiction for the time being over the railway lines of what was German Southwest Africa. These lines have direct connections with the South African Railways and total some 1,400 miles, of which about 1,000 miles is of the standard 3 ft. 6 in. gage. They will probably, now that the German yoke has been shaken off, be brought into increasingly close co-operation with the South African Railways.

British South Africa has roughly the shape of an inverted V. At the apex is the Belgian Congo; to the west is Portuguese West Africa and to the east is Portuguese East Africa. Through Portuguese East Africa there are two railways which connect the railways of the British territory with the

east coast: One of these lines terminates at the port of Laurenço Marques and the other at Beira. A railway beginning at the seaport of Benguela, in Portuguese West Africa, is being pushed eastward to a connection with the Rhodesia Railway in the southern part of the Belgian Congo.

Thus is the Dark Continent being opened up. There is yet a considerable distance between the rail head on the upper Nile and that in the Belgian Congo. A part of this intervening country can be crossed in steamers on the lakes, but the completion of a through all-rail Cape-to-Cairo route probably still lies some distance in the future.

Railway Activity in the Union

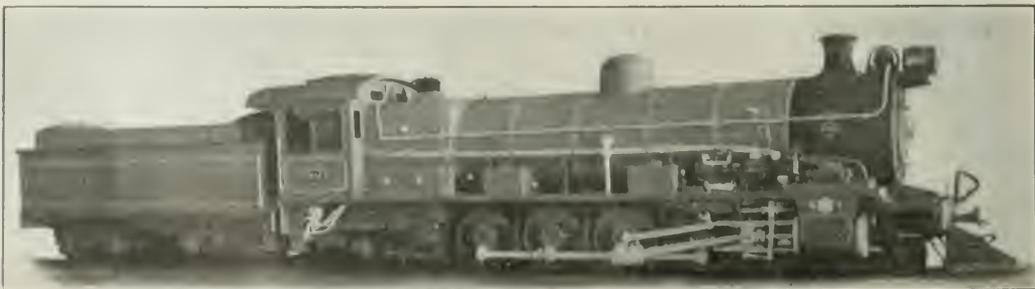
The South African Railways have of late entered rather extensively into the construction of grain elevators. At the end of the last fiscal year contracts had been let for the erection of large terminal elevators at Durban and Capetown and for 34 at various interior points. The purpose of this construction is, naturally, to encourage the raising of wheat and to increase the traffic of the railways. The railway administration has installed a few road motor lines to supplement the activities of the railways.

The government has recently floated successfully an issue of \$24,300,000 six per cent bonds in the London market the proceeds of which are to be used for rivers, harbors and irrigation. The most important project in the way of capital expenditures on foot is the electrification of two sections of the railway—one between Glencoe Junction and Pietermaritzburg and the other from Capetown to Simonstown. The former is a single-track line 171 miles long with heavy gradients. The latter is a suburban passenger proposition exclusively. The cost of this work is estimated at \$21,313,044.

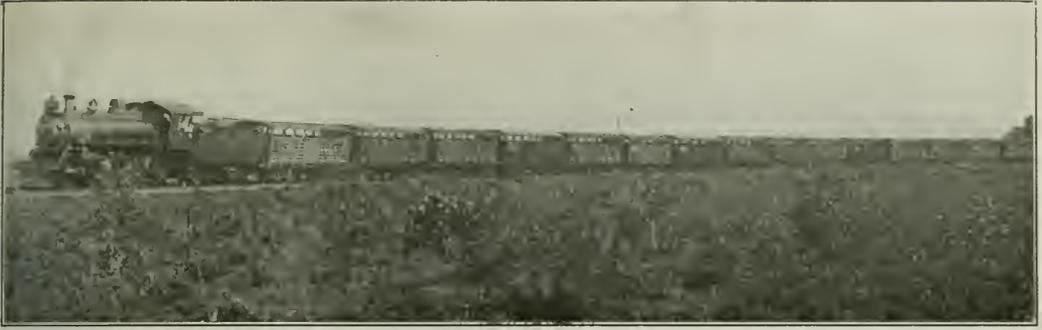
There has been considerable agitation recently about extending the railways and linking them up to a greater extent with other roads in South Africa, but the general manager in a recent conference expressed the opinion that in the present state of the money market and conditions generally, any considerable activity along these lines is financially impracticable and commercially unwarranted.

Opportunities for American Goods

South Africa is primarily British insofar as its railways are concerned even in those sections under control of another foreign power. Consequently as long as British manufacturers are able to compete in point of price and speed of delivery with American concerns, British goods are likely to be favored. There have, however, been a number of purchases made in recent years in this country. The surest way for America to secure a foothold on the continent as an exporter of railway equipment and supplies would seem to be by financing and building some of the railway lines which are projected or which naturally suggest themselves in some of the relatively undeveloped country lying between Rhodesia on the south and the mouth of the Nile on the north.



Mountain Type Locomotive for the Railways of South Africa, Built by Baldwin Locomotive Works



A Stock Train on the Paulista Railway, Brazil

Nor Do South America's Roads Escape Adversity

High Costs and Inadequate Revenue Seemingly a World-wide Epidemic—Future's Outlook Bright

By James G. Lyne

IN EXAMINING the railway situation in South America attention will naturally focus on the three countries having the greatest mileage, and railway systems comparable to our own in length and importance, viz., Argentina, Brazil and Chile. In these countries the situation of most of the carriers will be found in most cases to be the same as of the railways the world over, viz., unhappy, because of high costs, low rates, business depression and resultant decreased earnings. The physical aspects of South America's railways were described in considerable detail in a series of articles by John P. Risque, which appeared in the *Railway Age* during the last part of 1920 and the early months of 1921. The present article will be limited to a general discussion of the situation that has arisen since the publication of these articles.

Argentina

Argentina's railways, which total some 23,000 miles, are owned, for the most part, in England and are operated by Britons. There is one state-owned line of considerable importance and one line owned in France. These roads vary greatly in gage and in standards generally. None of the companies has improved its financial position of late. In their annual reports for the fiscal year ended June 30, two of the British companies, the Buenos Ayres Great Southern and the Buenos Ayres Western, declared that the year was the most unsatisfactory in their history. Both had to dip into reserve to pay 4 per cent dividends on their common stock. The Central Argentine, one of the strongest systems in the country, paid no dividends on its deferred common stock, whereas it paid 6 per cent the previous year.

Perhaps the most noteworthy development during the

year in Argentina, however, was the clash between the British railways and the government over increases in freight rates. Because of high wages and high cost of materials combined with a heavy slump in traffic, several of the companies during the early part of the year sought government

TROUBLE in the form of high wages, low rates, scanty traffic and limited credit be-sets South America's carriers. Where new railways are needed so urgently, however, starvation of existing roads cannot conceivably be long permitted. Additional effort on our part toward supplying these countries with their urgent requirements of capital for additional railway development, railway equipment, trained personnel and assistance in adopting more efficient methods would redound to their benefit and ours as well.

sanction for increased rates. Anticipating the granting of this authority they advanced their rates. After months of delay the government on August 21 refused to sanction the increase and forced the companies to return to shippers the amounts collected in excess of the prescribed rates. This action came as a complete surprise. Ten days later, however, on August 31, a new decree was issued allowing an increase of some 30 per cent. Then, on October 4, the government again reversed its decision and suspended the increases. Here the matter stands. The question will probably come before the Supreme Court of Justice before it is finally settled.

The companies are basing their case on what is known as the Ley Mitre (Mitre Law) which limits the net returns of foreign owned railways to 6.8 per cent of invested capital. The companies hold that, since they are not earning this 6.8 per cent, they have a right to raise their rates. They are

offering ample evidence of their precarious financial situation.

As a Market for Railway Equipment

The government, on the other hand, takes the view that prevailing economic conditions are a burden on the whole community and that the railways should assume their losses as the agricultural interests and business generally are assuming theirs.

There is but one important market in Argentina for

American railway equipment and supplies and that is the State Railways. These railways are for the most part in the northern section of the country and do not run into Buenos Ayres. In fact, traffic from the State Railways has to pass over the rails of two private lines to reach the capital. The State Railways have 3,226 miles of line and are of meter gage. That they offer an excellent market for American equipment is proved by the order for 85 locomotives and some 2,000 cars, which was placed in this country recently in the face of strong foreign competition. The bulk of the railways, however, as has been noted before, are British, and inclined to do all their purchasing in the mother country regardless of any consideration.

Argentina lends itself to railway development because of its freedom, speaking generally, from physical barriers and its rich agricultural lands. A number of projects toward further expansion are contemplated or under-way, two of them to connect up with the Chilean State Railways and one with the railways of Bolivia. The great obstacle toward a really comprehensive system is the diversity in gage and other standards, and in the rather intense competition of the several railways which makes co-ordination difficult.

Fuel presents a perplexing problem to the railways of Argentina, as it does to those of practically the whole continent. Wood is at present the principal fuel used, but with the development of the country's oil fields, oil will probably come into more general use.

British railways, of course, dominate in the design of equipment and the methods of operation—this in spite of the fact that Argentina is strikingly like the United States from a railroad point of view. The conclusion is inescapable, therefore, that any opportunity which may exist for American enterprise to enter the field and show the relative superiority under such conditions of American practices and American equipment should be taken advantage of. Unless some such action is taken the great bulk of Argentina's railway purchases will in the future, probably, as they have in the past, be made in England.

Chile

From a railway point of view Chile is unique. It occupies a strip along the Pacific almost 3,000 miles in length and of an average width of 90 miles. The railways are state-owned, with the exception of some British lines serving the nitrate fields of the desert north. A north and south line is provided for practically the entire length of the country, but mainly for strategic reasons—sections of this line to the north and south, particularly to the north, of the population center around Santiago and Valparaiso are practically without traffic.

The railways of Chile, and indeed the whole continent, have suffered from the general economic depression. The state, which finances the railways, has been particularly hard hit because of the decline in value of nitrate, the country's chief stock in trade. Wages and other expenses are higher proportionately.

Owing to the scarcity of fuel and, in many cases, water, and to the mountainous character of the country, the Chilean railways naturally lend themselves to electrification. The outstanding action taken in this direction was the granting of a contract to the Westinghouse Electric & Manufacturing Company for the electrification of the line from Valparaiso to Santiago and of the branch to Los Andes (connecting with the Trans-Andine Railway). If this installation proves successful other work along the same line will doubtless be undertaken which will provide further opportunities for American enterprise. An order for 20 steam locomotives placed in this country during the year bears additional proof of the satisfaction which former purchases in this country have given. The Nitrate Railway (the British railway in the North) also plans some work along this line. Chile's

railways, like those of Argentina, also suffer to some extent from lack of uniform gage, large capacity cars and anything approaching uniformity.

Brazil

Brazil, with a territory larger than that of the United States, has only some 17,000 miles of railway and this is largely concentrated relatively near the coast in the southern part of the country. A large portion of this mileage is foreign-owned, although there seems to be a tendency in the direction of greater activity on the part of the federal and state governments in railway building and extension; in view of the tremendous field for further development it would not seem strange if the state-owned lines some day completely dominated the situation. At any rate a country so grossly underdeveloped from a point of view of transportation offers a prospective field of tremendous importance to railway genius as well as to manufacturers of the things that go to make up railways.

The capacity of many of the country's railways has been heavily taxed in the past by inadequate facilities. These roads suffered from under-maintenance during the war, as did the railways throughout the world. Now necessary additions to rolling stock and other facilities cannot be undertaken because of inadequate returns resulting from a decline in traffic caused by the slump in foreign trade and from rates not sufficiently high to provide for increased costs, and because of the decline in exchange value of the country's currency in terms of those countries from which suitable railway equipment can be obtained.

In such times government railways are practically the only ones which, because of no obligation to earn a profit and because of more extensive credit, can afford to bring about improvements. Consequently the Paulista (owned by the state of Sao Paulo), which brought some 28 miles under electrical operation during the year, was one of the few roads which was able to progress greatly.

There are any number of projects on foot in the country for the extension of railway lines. The return of favorable times alone is awaited. Brazil is another country like Argentina where American extensive methods of railroading would probably be more effective than European intensive practices. Furthermore there is not the same extent of European domination in railway ownership in Brazil that there is in Argentina and the present development of transportation facilities is much less extensive. It would seem, consequently, that by a sincere attempt to help Brazil solve her railway problems both by advancing capital and by lending our technical skill, our opportunities for supplying equipment and trained men to the railways of the country should tend to increase greatly.

Bolivia

Bolivia is interesting from a railroad point of view not so much because of her present railway facilities but because of developments during the past year which point to the importance of the railways of that country in the development of the southern part of the continent. Bolivia is connected with the Pacific by three rail routes but these are not at present of any great importance because traffic between the interior and the coast is relatively light.

The significant development of the past year has been the awarding of a contract by the Bolivian government to an American company for the construction of a line 126 miles in length connecting the Bolivian railways with those of Argentina. When this line is completed, Buenos Ayres will be connected with the Pacific coast through Bolivia by a railway system of uniform meter gage. The distance between New York and Buenos Ayres will be reduced materially and Bolivia thus placed on a transportation route which is



Locomotives Built by the American Locomotive Company Arriving at Calootan Sheds, Manila Railway

Commerce Bureau Improves Service to Exporters

Many Valuable Services Offered Exporters of Railway Supplies—
Work in Hands of Experts

By James G. Lyne

“WE ARE ONLY BREAKING into the exporting business and without your help we should not have known how to start.” Thus an American manufacturing concern wrote to the Bureau of Foreign and Domestic Commerce. With some 900 consuls and other representatives scattered over the face of the earth in every important city and country, this Bureau has a foreign organization which is greater than that of any private industry. This great body of men, with the home organization at Washington, is today offering to American exporters a foreign service which no single industry could afford to maintain.

For a number of years the Bureau has been of great service to American exporters in giving them information of value regarding foreign markets for their products. During 1921, however, under the stewardship of Secretary Hoover, the Bureau has been reorganized in a manner which should increase its service many fold.

Commodity Divisions With Experts in Charge

Prior to the reorganization the activities of the Bureau were subdivided on a territorial basis—that is to say, the Latin American division collected and co-ordinated reports from representatives in Latin America, the Far Eastern division performed a similar service insofar as the Far East was concerned, and so on. Now superimposed upon these geographical divisions are commodity divisions. In charge of each commodity division is an expert in the marketing of that commodity.

A man, expert in, say, commercial geography, may be in a position to assemble some information of value to an exporter of railway equipment and supplies, but an engineer with experience in car manufacturing and in foreign marketing will be in most cases of infinitely more service to the business. A man with such training and with foreign experience knows the nature, the advantages and disadvantages and the possible foreign market for American equipment and he also knows something of the peculiarities of railroad practice abroad which affects design and business methods. Just such a man is in charge of the Bureau's Industrial Machinery Division, which is looking after the exports of railway supplies.

An investigation has disclosed the fact that 17 per cent of America's production of industrial machinery, including railway supplies, is normally exported. This 17 per cent is sufficient to represent profit or loss in the industry and would seem well worthy of being maintained and increased even at the expense of considerable effort. It is the business of the Industrial Machinery Division of the Bureau to assist in directing this effort along the most intelligent channels.

Service of Value to Large and Small Companies Alike

Some of the important car and locomotive companies of the country are today pretty well organized in the foreign field and they, speaking generally, do not have as great a need of the services of the Bureau as some of the smaller companies or houses which are new in the foreign field. It

A NEWLY ORGANIZED division of the Bureau of Foreign and Domestic Commerce at Washington has as one of its particular duties the fostering of America's foreign trade in railway equipment and supplies. This division is headed by men who know the supply business and who have traveled widely abroad investigating markets for American goods. Nine hundred representatives of the Bureau throughout the world will make any reasonable investigation requested by the division.

must not be supposed, however, that the Division cannot be of service even to the largest companies. An officer of an American concern manufacturing railway equipment, coming from Australia not long ago, met in China a repre-



Photo from Underwood & Underwood, N. Y.

American Supplies for Russia at Riga

sentative of the Bureau of Foreign and Domestic Commerce. While in Australia, the manufacturer said, he had happened upon a publication called *Markets for American Railway Supplies and Equipment in Australia*, a report by Trade Commissioner Frank Rhea, which report, had he seen it before, would have saved him his trip to Australia.

Two conclusions naturally suggest themselves after hearing this anecdote—one is that the Bureau is in possession of some information of the greatest value to manufacturers of railway equipment and the other is that there must be the closest contact on the part of these manufacturers with the representatives of the Bureau in this country in order to make sure that the government's free service is utilized to the utmost.

Expert Advice From Those Who

Have Studied Foreign Railroads

One of the Bureau's trade commissioners traveling in Java recently found a railway there busily engaged in breaking

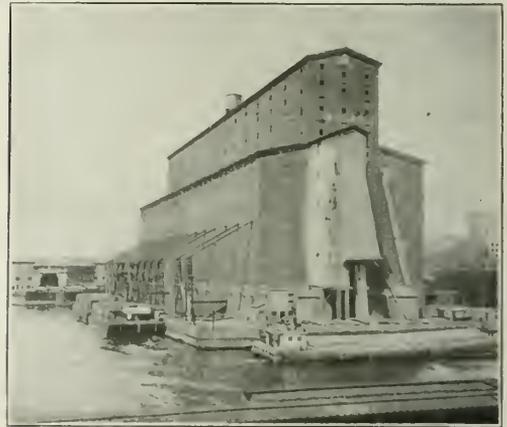


Loading Freight from Train to Steamer at N. Y. C. Piers, Weehawken, N. J.

up American chilled cast iron wheels which had been purchased during the war. Upon investigation it developed that the country was extremely mountainous and that there were no airbrakes. The method of braking on mountain grades

was to set the brakes on four or five cars as tightly as possible and to slide the wheels all the way down. Chilled cast iron wheels are not meant for such service and naturally were unsatisfactory. This representative who has traveled widely and knows of the peculiarities of many countries and their railways is in a position to advise American concerns just what matters must be considered in designing and selling railway equipment abroad. Only by being so informed can American houses export equipment and supplies designed to meet the operating conditions in foreign countries and only by sending abroad equipment so designed can American goods hope to compete favorably with European equipment built by those who have studied local conditions.

The Bureau's representative who told of Java's experience with chilled iron wheels has traveled extensively in the Far East investigating the markets for industrial machinery. Prior to that time he spent a number of years in China. He is well acquainted with American and foreign railway supplies. His opinions on foreign markets for our equipment are those of an expert and yet he has an office in Washington where at any time he is prepared to meet American manufacturers and help them solve their export problems—and these services are given free of charge. Further than that he can call upon any or all of 900 commercial attachés,



Huge Grain Elevator at New York for Loading Direct to Ocean-Going Vessels; Sixtieth Street Yards, New York Central

trade commissioners and consuls to furnish information which he cannot give himself.

Reference Material at Washington

The Bureau has also a vast amount of information on hand at Washington which is ready for instant reference. An example of such material is an up-to-date report from all foreign representatives on railway conditions in their countries which is now being compiled. This report will contain the following information concerning the railways of every country: Mileage; number of locomotives, number of each kind of cars; capacity of cars and trains; clearances; signal systems used; shop facilities, freight and passenger traffic during a recent given period; revenues and expenses; number of each class of employees; proposed additions, extensions, improvements and new construction, and an estimate by the representative on the ground as to what the chances are that American houses may be able to obtain a share of this business and how they should proceed to do so.

Will Make Special Investigation When Desired

If any American concern requests it, the Bureau will instruct one of its experts to make any reasonable investigation along the lines of its business in the country for which the information is desired. An instance of this has come to our notice in the form of a copy of a long letter describing the requirements as to signals of a Chinese railway which was on the point of asking for bids. This letter was written by the American trade commissioner at Peking and addressed to a signal company in this country. It goes into such matters as: The method of operating trains in China, wherein it differs from our train dispatching system and why it is probably better suited to Chinese conditions than is the American system; the fact that the saving of a few employees by the adoption of certain methods of signaling would not be a deciding factor because of the relatively low wages; the physical condition of the railway; the probabilities of the adoption of the most modern signals as opposed to older forms. In fine, the company could not have expected to have received a more comprehensive and helpful report from a paid representative—yet this and similar services the Bureau is offering to American business without charge.

Reference is made above to an extensive survey of the potential markets for American machinery (including railway supplies) in the Far East. Studies of a like nature have been made before. When there is a demand by business for additional investigations, they will be made again. If—merely for example and not as a suggestion or a report of fact—a number of American concerns manufacturing draft gear should require detailed information prior to launching a sales campaign in South America the Bureau would, if it were satisfied of the advisability of such action, detail an expert to make an exhaustive study of the probabilities for the success of such a campaign and the course of action which would likely bring the desired results.

Advice on Tariff and Legal Matters

Further than giving information concerning design and related matters the Bureau also offers the experience of its expert staff regarding sales problems, customs duties, legal difficulties, matters of financing and shipping. Through co-operation with the Department of State difficulties with customs authorities are being straightened out with a celerity which would be impossible for an agency not directly connected with the government.

One or two instances of what the bureau is doing for other industries, but which it would just as readily do for railway equipment manufacturers, may be of interest to show in how many ways it may be of service:

An American concern manufacturing a measuring device was endeavoring to do business in Sweden. Efforts to obtain a sale for its product were well-nigh frustrated by a competing German concern which, in true German style, circulated propaganda to the effect that the American device had not been approved by our Bureau of Standards. Now it happens that in this country approval by the Bureau of Standards is not required. This authority is vested in the sealer of weights and measures of the several states. The manufacturer appealed to the Bureau of Foreign and Domestic Commerce. A statement was obtained from the Bureau of Standards to the effect that its approval was not required and from the sealer of weights and measures of the state of New York to show that the device in reality did have official approval. Thus the Bureau enabled the American manufacturer to set at naught the unworthy efforts of his German competitor.

Forced to Do \$20,000,000 of Business

Representatives of the Bureau in China several years ago saw what they believed to be a vast field for the sale of a certain line of machinery. They endeavored to interest American manufacturers, but to no avail. They persisted. Finally one concern which they had been trying to interest in the matter consented to try the Chinese market to avoid the continual importuning of the Bureau's representatives. To date more than \$20,000,000 of this machinery has been sold in China.

An American coal salesman in Madrid recently was introduced to local business men by the American commercial attaché. He secured orders totaling \$200,000.

Specifications which were furnished through the activity of the Bureau's representative resulted recently in the sale of \$2,500,000 of electric equipment in Australia. Countless cases of this kind could be instanced.

Personal Contact With Manufacturers Necessary

No one familiar with the work of the Bureau can fail to realize the importance of its work to America's foreign trade. The Bureau's potentialities as a builder of trade, however, are utilized in very small proportion. The Bureau needs contact with business. It needs this contact not only that it may impart information it already has but, in addition, that it may have a broader conception of what information business needs. It must know from the manufacturers themselves that they are interested in selling their products abroad if there is a promising market. Its agents must know more about the qualities of American products with which their past experience has not familiarized them.

Nor Do South America's Roads Escape Adversity

(Continued from page 114)

practically assured of popularity, should benefit materially. A railway connection with the Brazilian coast to the east, moreover, seems a not far distant probability.

In Conclusion

Detailed reports concerning the present situation of the railways in all the South American republics would be a task beyond the scope of our present limitations. The railways in the northern part of the continent, with the exception of Peru, are relatively unimportant and afford no proper basis for comparison with the railways of the south. Many of them are narrow gage lines of light traffic which belong in the category of tramways rather than railways. Others are

little more than industrial lines. Doubtless in a few instances there have been developments worthy of notice which have escaped attention here. Most of these can be covered, however, by the following general statement: As a whole the railways of South America are meeting with difficulties because of high costs and low rates; by-and-large they are at present in need of increased maintenance allowances, new equipment and new facilities; they need a greater degree of standardization; they could probably adopt in larger measure American methods and American equipment and could employ larger numbers of American railroad men to their advantage as well as ours; and, when all is said and done, the opening up of South America by railroad has only begun.

Statistical Section

An Analysis of the Railway Statistics for 1921. By
Julius H. Parmalee.

Locomotive Market in Quiescent State During 1921. By
F. W. Kraeger.

Freight Car Orders During 1921 Lowest Record. By
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Passenger Car Purchases Small During 1921. By F. W.
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Dividend Changes on Railroad Stocks in 1921. By Charles
W. Foss.

Receiverships and Foreclosure Sales During 1921. By
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Signal and Interlocking Work Shows Slight Gain. By
K. E. Kellenberger.

Railroad Telegraph and Telephone Activities. By J. H.
Dunn.

Railway Lines Abandoned During the Year 1921. By
Milburn Moore.

Not Much Activity in New Construction in 1921. By
Milburn Moore.



An Analysis of the Railway Statistics for 1921

Extent of General Business Depression Reflected in the Decline in Traffic for the Year

By Julius H. Parmelee

Director of the Bureau of Railway Economics

DECLINE IN TRAFFIC was the outstanding feature of the railway year 1921. It was perhaps the most important of several features of the year which were a distinct disappointment. Following upon the heels of a year in which the railways of the United States broke all records for service rendered, the fact that in 1921 they were called upon to furnish a much lessened service is a matter of serious regret not only to them, but to the nation as a whole. No criticism rests upon them, however, for the level of railway service in any year is gaged solely by the amount of freight and passenger traffic offered.

As to the financial results of operation, the railways fared much better than in 1920. During eight months of 1920, however, they had the United States government to fall back upon, in the form of a guaranteed net income, whereas in 1921 they were upon their own resources; that is, their earnings were limited to their actual receipts from operation. Adding the government guarantee of 1920 to the net operating income of that year, the total net income for 1920 was greater than in 1921 by more than \$200,000,000.

In brief, the railways in 1921 handled a freight traffic about 22 per cent less than in 1920, and a passenger traffic about 19 per cent less. Their gross revenues declined \$600,000,000 from the high point reached in 1920, in spite of the fact that in 1921 the increased rates were in effect the whole year, compared with only four months in 1920. By exercising the strictest economy, however, the railways reduced their operating expenses nearly \$1,200,000,000. Net operating income was thus increased from a bare \$62,000,000 in 1920 to approximately \$616,000,000 in 1921. This represented a rate of return on railway value of 3.3 per cent.

Statistics Up-to-Date

In looking over the results of railway operation in 1921, from the statistician's point of view, it is interesting to note how much more completely and currently the statistical record of railway activity is now maintained than in the past.

Every year during the past few years has represented an advance in this direction, so that today it is possible to secure statistics as to weekly freight car loadings within 15 days, as to monthly financial results within 30 days, as to the number of employees, wages, and general statistics of physical operation within from 30 to 60 days, and as to commodity movements every quarter. Contrast this situation

with that existing as little as five years ago, when no statistics were reported for less than annual periods except financial results only, and six months to a year elapsed after the close of any annual period before the results of that period were in hand. In other words, the statistical record of railway operation, as spread out before the present-day student of railway activity, offers him a most interesting and significant series of pictures which portray both the level and the trend of railway affairs, and keeps him supplied with current information.

Financial Results

The year 1921 was the first complete calendar year, since the United States entered the war in 1917, during which railway operation was in the hands of the companies. It was the first year, since 1917, of operation without government guarantee of any kind. It was, furthermore, the first complete year since the passage of the Transportation Act, since the establishment of the Railroad Labor Board, and since the present freight and passenger rate levels became effective. For the first

TABLE I

	1921	1920
Total operating revenues.....	\$5,625,000,000	\$6,225,403,000
Total operating expenses.....	4,650,000,000	5,826,197,000
Taxes.....	288,000,000	281,350,000
Net operating income.....	616,000,000	62,254,000

time in several years, no general changes in the rates occurred, although many local and regional rate adjustments were made throughout the year.

All the statistics contained in the several tables here presented apply to railways of Class I. Table I is a condensed

comparison of the financial results for 1921 with those for 1920. As this article is necessarily prepared before the end of December, the entries for 1921 are partially estimated and are, therefore, subject to revision.

Operating Revenues

Operating revenues in 1921 stood at \$5,625,000,000. This was a decline of \$600,000,000, or 9.6 per cent, from 1920, but was some \$441,000,000 greater than in 1919. With the single exception of 1920, railway revenues in 1921 were the greatest in American railway history.

In comparing the revenues of 1921 with those of 1920, it should always be borne in mind that the present increased level of rates was in effect during the whole of 1921, while in 1920 it was effective only from August 26, or a little more than four months. This fact emphasizes the decline in the revenues of 1921. The general freight and passenger rate increases, made effective by the Interstate Commerce Commission on August 26, 1920, was estimated at about 33 1/3 per cent for freight, and something over 20 per cent for passengers, allowance being made in the latter case for the Pullman surcharge of 50 per cent. Had the traffic of 1921 been maintained at the level of 1920, the operating revenues would have been greater than in 1920 by some \$700,000,000, instead of being \$600,000,000, less. The difference between the actual revenues of 1921 and what those revenues would have been on the basis of the 1920 traffic is the sum of these two amounts, or \$1,300,000,000. The great bulk of this decline of \$1,300,000,000, from what might have been to what actually was, resulted from the decline in traffic, only a small proportion—probably not more than \$100,000,000—being due to the rate readjustments, many of which were not in effect for the whole of the year.

This \$1,300,000,000 strikingly represents the cost to the railways of a poor, as compared with a good, traffic year. It furnishes also a dim idea of what the country at large loses—potentially, of course—in a period of business depression. If the railways lose \$1,300,000,000 in revenues, how many times greater are the losses of the farmers, the manufacturers, and other producers of consumption goods?

Table II gives the comparative statistics for 1921 and 1920 of the several classes of railway revenue, freight, passenger, etc., the entries for 1921 being partially estimated.

TABLE II

	1921 (millions)	1920 (millions)
Freight revenue	\$3,940	\$4,325
Passenger revenue	1,185	1,289
Mail revenue	95	150
Express revenue	105	143
All other revenue	300	318
Total	\$5,625	\$6,225

It will be seen that freight revenues declined \$385,000,000, or 9 per cent. Passenger revenue fell off \$104,000,000, or about 8 per cent. The decline of \$55,000,000 in mail revenue is more than accounted for by the fact that that revenue in 1920 was inflated by approximately \$60,000,000 of back mail pay, actually earned in earlier years but not taken into the accounts until 1920. Deducting this inflation in 1920, the mail revenue for 1921 was slightly greater than for 1920, indicating an increase in the amount of mail handled for the government. Incidentally, it was the only revenue item to show an increase in 1921.

Express revenue declined \$38,000,000, or about 26 per cent, whereas "all other" revenue fell off \$18,000,000.

Operating Expenses

Operating expenses in 1921 amounted to \$4,650,000,000. This was a reduction of \$1,176,000,000, or 20 per cent, below the expenses of 1920. They were greater than in 1919 by \$231,000,000, and like the revenues were the greatest on record save only for the year 1920.

Table III shows how the operating expenses of 1921 and 1920 were distributed as between the general classes of expense. The entries for 1921 are, of course, subject to revision.

TABLE III

	1921 (millions)	1920 (millions)
Maintenance of way	\$780	\$1,034
Maintenance of equipment	1,280	1,584
Traffic	85	74
Transportation	2,300	2,907
General	165	171
All other expenses	40	56
Total	\$4,650	\$5,826

The expense of maintaining way and structures was reduced by \$254,000,000 in 1921, or 25 per cent. Maintenance of equipment expenses were cut \$304,000,000, or 19

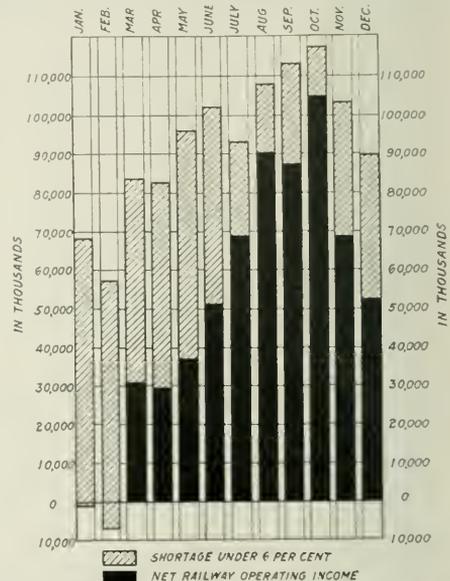


Chart A—Net Railway Operating Income in 1921, By Months. Compared With Six Per Cent On Valuation

per cent. The total maintenance cost—roadway and equipment—was reduced from \$2,618,000,000 in 1920 to \$2,060,000,000 in 1921, a decrease of \$558,000,000 or 21 per cent.

Transportation expenses, the cost of operating trains and carrying on the activities collateral thereto, were reduced \$607,000,000, or 21 per cent. General and "all other" expenses showed declines, while traffic expenses increased \$11,000,000.

Net Operating Income

The first important stopping place in the railway income account is net operating income. This is what is left of revenues after operating expenses have been met, taxes have been paid, and the net balances of equipment and joint facility rentals have been settled. Net operating income is the gage by which the success of railway operation, speaking financially, must be measured. If in amount it proves insufficient to cover fixed charges, necessary reserves, and a margin for moderate dividends and surplus, railway operation has not been successful, and the credit and financial future of the railways are seriously threatened.

Net operating income formed the basis of the compensation paid the railways by the government during the 26

months of federal control. It was the basis of the guarantee, provided in the Transportation Act for the six months of the guaranty period in 1920. Further, and far more important for the present discussion, the relation of net operating income to railway value determines the rate of return as defined in the Transportation Act, indicates whether or not the railways are earning the 5½ per cent, 6 per cent, or other percentage that may be fixed as a fair and reasonable rate, and finally fixes the point at which the government steps in to share the net earnings of the individual companies, if the rate rises above 6 per cent. Net operating income is, therefore, the most important item in the income account, and the showing it makes is eagerly watched from month to month, and from year to year.

The net operating income of 1921 is estimated at \$616,-

poses. For the year 1921, this 6 per cent was equivalent to \$1,116,000,000. The net operating income actually earned was \$616,000,000, or \$500,000,000 less than the amount anticipated under the rate decision. Instead of earning 6 per cent in 1921, the railways actually earned 3.3 per cent. This was sufficient to meet their interest requirements by a comparatively narrow margin, but was inadequate to meet all their fixed charges (including rentals), leaving nothing for reserves and dividends. Here again the effect of the decline in traffic on railway results stands out as perhaps the most significant element in the railway record of 1921.

The Story by Months

The story by months in 1921 is most interesting. Beginning with operating deficits in January and February, there was a slight improvement, to June, then a considerable improvement from July to October, and finally a recession in November and December. The improvement following the midyear was due partly to an improvement in traffic, and partly to decreased costs of operation, growing out of the wage reduction effected by the Railroad Labor Board on July 1, and also the declining costs of material and supplies. The effect of the drive of the railways for economy and efficiency, combined with a cut in maintenance work and consequent reduction in force and utilization of materials, was also apparent.

Table IV gives the rate of return in 1921, distributed by months. The rate earned in each month is reduced to an annual basis, representing what the annual rate would have been had the net operating income for a period of one year been proportioned to the net operating income of the particular month. In arriving at the proper proportion for each month, due allowance was made for seasonal fluctuations in traffic and earnings; that is, October is expected to earn more than February, and the rate for that month has been computed with an eye to such expectation. The entries for November and December are estimated in part.

TABLE IV

	Rate of return— per cent (Annual basis)
January, 1921	Deficit
February	Deficit
March	2.2
April	2.1
May	2.3
June	3.0
July	4.5
August	5.0
September	4.6
October	5.4
November	4.0
December	3.5
The year	3.3

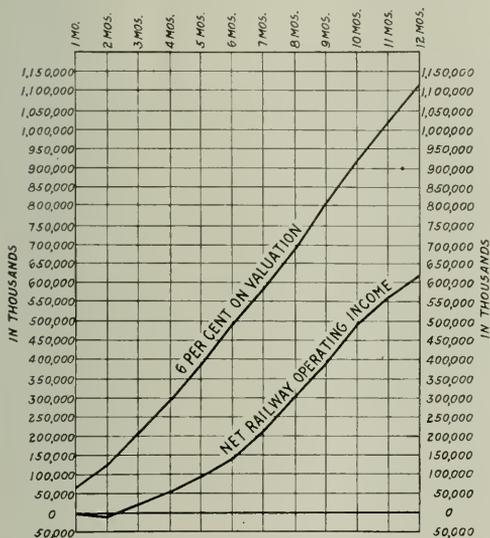


Chart B—Cumulative Net Railway Operating Income in 1921, Compared With Six Per Cent Valuation

000,000, or almost exactly 10 times what it was in 1920. It was greater in 1921, too, than in the second year of the federal control period, namely, 1919. It was smaller in amount, however, than in any year of private operation prior to 1918 back to the fiscal year 1908. In other words, net operating income was smaller in 1921 than in 13 years, not counting the period when the government was either operating the railways or guaranteeing their net income. During this period of government operation or guaranty, little effort was made to adjust the revenues to the expenses by raising rates sufficiently to meet the increase in operating costs, and to the railway corporations it was of no immediate concern whether the policy was to keep revenues even with expenses or not, as they were held safe against loss by the government guarantee. For the years preceding 1918, however, and again in 1921, it was a matter of very grave concern to the railways whether their net operating income was adequate or not, for inadequacy spelled financial stress and continued inadequacy meant impending disaster.

With this point in mind, let us see what the results in 1921 really mean. Under the increased rate decision of the Interstate Commerce Commission in 1920, the railways as a whole were expected to earn 6 per cent on their tentative valuation as fixed by the Commission for rate-making pur-

Charts A and B show these monthly rates of return in graphic form. Chart A consists of upright bars for each month in 1921, the black portion of which represents the net operating income actually earned, and the shaded portion the shortage as compared with six per cent on the tentative valuation. As the results for January and February were net deficits, the shaded portion extends below the zero line. It will be noted that the bars as a whole are of varying length, due to the seasonal fluctuations already referred to.

Chart B shows the same thing cumulatively, the trend from month to month being compared by two lines, the upper one of which indicates six per cent on valuation, while the lower one shows the actual net operating income. The spread between the two lines is, of course, the shortage under six per cent.

Receipts Per Traffic Unit

Interesting comparisons are afforded by the showing of average receipts per ton-mile and per passenger-mile in 1921 and 1920. These are given in Table V, for each month of

1920 and for the months of 1921 to the latest available date.

TABLE V

Month	Average receipts per ton-mile (cents)		Average receipts per passenger-mile (cents)	
	1921	1920	1921	1920
January	1,210	0,969	3,116	2,614
February	1,254	0,985	3,089	2,594
March	1,335	0,986	3,175	2,613
April	1,334	0,981	3,190	2,608
May	1,251	0,954	3,139	2,614
June	1,278	0,970	3,093	2,575
July	1,254	0,960	2,987	2,561
August	1,288	0,936	3,006	2,643
September	1,288	1,154	3,070	2,949
October	1,276	1,276	3,002	3,002
November	1,263	1,263	3,019	3,019
December	1,209	1,209	3,142	3,142

In studying the comparative figures of Table V, it should be noted that a considerable increase in freight and passenger rates became effective toward the close of August, 1920. The effect of such increase was barely discernible in the passenger-mile average for August, 1920, and not at all discernible in the ton-mile average. Not even in September, 1920, did the rate increases seem to have full effect, partly because much traffic was on the rails in that month that had been billed (or passenger tickets purchased, as the case might be) at the lower rates, also because state commissions had not in some cases made effective intrastate rates to correspond to the increased interstate rates. Beginning with October, 1920, however, the effect of the rate increases on the average receipts per ton-mile and passenger-mile, respectively, can be traced from the record shown in Table V. In making comparisons of 1921 with 1920, only corresponding months should be compared, because the seasonal changes in traffic cause the average receipts to vary considerably from month to month. Thus January should be compared with January, February with February, and so on.

Employees and Their Wages

Beginning with 1920, the Interstate Commerce Commission required railways of Class I to file their reports of number and compensation of employees quarterly, instead of annually as theretofore. In these quarterly reports the number of employees at the middle of each month was reported, but compensation for the quarter as a whole. The classification consisted of the 68 groups into which the Commission classified the employees, beginning in 1915.

Although this was a distinct advance in railway labor statistics, the data secured from these quarterly reports did not prove sufficiently detailed and were not available at sufficiently frequent intervals to satisfy either the Interstate Commerce Commission or the Railroad Labor Board, the latter being a new entry in the field of labor statistics. Accordingly, beginning with July, 1921, the Commission and the Labor Board jointly inaugurated a new system of railway labor reports, the principal features of which are a classification into 148 groups—instead of 68—and the requirement that the returns be made monthly instead of quarterly.

At the date of this writing the Commission has made public only two monthly summaries based on the new reports—those for the months of July and August, 1921—although individual returns are wholly or largely in hand for the months of September and October. From preliminary summaries by the Bureau of Railway Economics, however, a fairly accurate picture of labor conditions may be set forth down to and including October.

First, as to the number of employees on the payrolls of the railways of Class I. This has been subjected to such great fluctuations that it is worth while to turn back to 1920 and trace the story down to October, 1921. This is done in Table VI. The entries for September and October, 1921, are based on preliminary tabulations, and are subject to revision. This is especially true of October.

It will be noted from Table VI that railway employees numbered 2,000,105 and 1,970,525, respectively, during January and February, 1920, the final months of federal control. The railways came back to their owners in March with 2,009,948 employees. From April the number gradually rose to a maximum of 2,197,824 in August, 1920, which was the largest number of railway employees ever recorded. At that time it will be recalled, the railways of

TABLE VI

	Number of employees	
	1921	1920
January	1,804,822	2,000,105
February	1,676,543	1,970,525
March	1,593,068	2,009,948
April	1,542,716	1,952,446
May	1,575,509	2,005,483
June	1,586,143	2,056,381
July	1,634,872	2,111,280
August	1,679,927	2,197,824
September	1,721,000	2,164,880
October	1,745,000	2,136,259
November	.....	2,068,454
December	.....	1,976,429

the United States were handling the largest traffic in their history, the traffic of the respective months from August to December being heavier than in any previous corresponding months.

From October, 1920, and more or less paralleling the sharp decline in traffic after the middle of December, the number of railway employees showed a consistent decline to April, 1921, when the lowest point was reached since 1915. After April, when the trend again turned upward, there was a steady, although rather gradual recovery, so that in October of 1921 there were 200,000 more railway employees at work than in April. Even making full allowance for the seasonal difference between April and October, the record shows partial recovery.

The second consideration is wages. Here a clear distinction must be made between wages (used in the sense of rates of pay) and earnings, or compensation. One represents the rate at which a man works, per hour, day, month, or mile, while the other is the total amount of money he earns in a given period, being the result of multiplying the rate of pay into the number of hours, days, months, or miles with which he is credited.

As to the rates of pay, or wages, a general decrease was authorized by the Railroad Labor Board on July 1, 1921, which has been estimated as averaging from 11 to 12 per cent. This cut off about half of the increase granted by the Railroad Labor Board in 1920.

Looking at the average wage throughout 1920 and 1921, the curious fact develops from a mathematical calculation that the average for each year was virtually the same. That is, assuming that a man was on duty the same number of hours in the two years, his total compensation would be virtually the same for each year. This is speaking of the average man, and would not hold true of any of the individuals actually at work. For example, assume that a man received \$100 a month at the beginning of 1920, and was given the same increase on May 1 of that year as the average for all employees, or 21 per cent. He received \$100 a month for four months (January to April) and \$121 a month for the remaining eight months, a total for the year of \$400 plus \$968, or \$1,368. In 1921 he received his \$121 for six months (January to June), and was then cut 11 per cent to \$107.69, which was his rate during the remaining six months. His total for the year 1921 was therefore \$726 plus \$646.20, or \$1,372.20, or within \$4.20 of his 1920 earnings.

This is a purely hypothetical case, of course, and the figure of \$100 per month with which we started is not offered as typical, but merely as an easy figure to handle mathematically. Furthermore, it was assumed that hours on

duty remained constant throughout the two-year period, whereas the truth is that they declined somewhat in 1921, in sympathy with the decline in traffic.

The bearing of the example is this: If average wage rates were the same in 1921 as in 1920, then any reduction in the total payroll in 1921 must be due chiefly to one or both of two factors, namely, reduction in force or reduction in hours per man, especially the hours of overtime. Investigation of the facts indicates that both forces were at work in 1921.

Let us look first at aggregate compensation in the two years. In 1920 the railways paid their employees more than \$3,700,000,000, or more than 2½ times as much as in 1916. There was some increase in force between 1916 and 1920, it is true, but the bulk of the increase in compensation was the result of increased wage rates.

In 1921 the payroll was approximately \$2,718,000,000, a reduction of over a billion dollars from the very high level of 1920. The reduction in total payroll was more than 25 per cent, while the reduction in average number of employees was nearly 20 per cent. The average wage rate in the two years being practically the same, as we have seen, the remaining proportion of the reduction in payroll must have been due largely to reduction in overtime and other hours.

The average annual compensation per employee has shown considerable variation during the past two years. In 1919, the final year of federal control, it was \$1,486 (annual basis). For the first quarter of 1920 it was \$1,596. For the second quarter of 1920, which contained one month under the old and two months under the increased wage rates, the annual average was \$1,812. During the final two quarters of 1920 the annual averages were \$1,952 and \$1,908, respectively. The average of \$1,952 for the third quarter represented the peak of earnings for railway employees. The fourth quarter began to show the effect of the decline in traffic, which reduced overtime work and affected the average in other ways as well.

For the year 1920 as a whole, two-thirds of which was under the increased wage scale, the annual average compensation was \$1,820. The first quarter of 1921 dropped to \$1,792, and to \$1,784 for the second quarter. This brings the record to July 1, when the 11 per cent reduction in average wage rates became effective. Complete wage statistics are available only for two months since the reduction, the records for which show an annual average of \$1,573 in July and \$1,627 in August.

Traffic in 1921

Emphasis has already been laid upon the serious decline in railway traffic in 1921, as compared with 1920. Net ton-miles (revenue and non-revenue ton-miles) broke all records in 1920, being as much as seven billions greater than the previous record year, the strenuous war year of 1918. The total for 1920 was 447 billions. Indications are that for 1921 the corresponding total did not exceed 350 billions, a decline of approximately 100 billions, or 22 per cent.

This is one of the most remarkable traffic declines in American railway history. Every month of the year showed a falling off of from three to twelve billions. The level for the year as a whole is below that for any of the six years next preceding; that is, we must go back to the year 1915 to find a traffic situation that was even approximately as poor as in 1921.

The story by months in 1921, compared with 1920, is presented in Table VII. Entries for the final two months of 1921 are estimated in part.

Revenue passenger-miles had progressively broken the record in every year from 1915 to 1920. In 1921, however, there was a recession of 19 per cent from the 1920 total, bringing the level for the year below that for 1917. In

other words, we must go back to 1916 to find a smaller amount of passenger travel than in 1921. The total for 1920 was 46.8 billions, but fell in 1921 to 38.0 billions, every month in the year showing a recession. In fact, the percentage of decrease seemed to grow as the year wore on,

TABLE VII

	Net ton-miles (millions)	
	1921	1920
January	29,824	34,765
February	24,913	32,695
March	26,826	37,991
April	25,579	28,531
May	28,219	37,902
June	28,141	38,158
July	28,412	40,450
August	30,382	42,707
September	30,822	41,000
October	36,507	42,563
November	28,800	37,459
December	31,600	34,722
The year	350,000	447,278

the worst months being July and August, with decreases of 24.0 and 27.4 per cent, respectively, whereas January declined only 4.1 per cent and February 10.0 per cent.

The comparative monthly statistics for 1921, compared with the months of 1920, are shown in Table VIII. The entries for October, November, and December, 1921, are partially estimated.

The reason for these declines in freight and passenger traffic is not far to seek. All business activities in 1921 were in the throes of a revolutionary transition period, the inevitable aftermath of a war so prolonged and so extensive as that waged from 1914 to 1918. The railways create

TABLE VIII

	Revenue passenger-miles (millions)	
	1921	1920
January	3,358	3,501
February	2,857	3,174
March	3,056	3,530
April	2,833	3,552
May	2,969	3,761
June	3,215	4,189
July	3,637	4,785
August	3,623	4,988
September	3,291	4,294
October	2,900	3,762
November	2,900	3,518
December	3,300	3,641
The year	38,000	46,848

little traffic of their own; they handle the traffic that is produced for them by the economic activities of the country. As a barometer of business conditions, the level of railway freight traffic is almost unexcelled. When business is good, freight moves in large volume; when it is depressed, freight suffers accordingly. The recession in railway traffic indicates in most significant fashion the extent to which business in general was on the rack in 1921.

It has already been pointed out that the financial results in October showed decided improvement, followed by a slump in November and December. Temporary influences were at work in these last two months, which it is hoped will not long continue in 1922. In the first place, the threatened coal and railway strikes hurried much traffic onto the rails in October which would normally have been spread over one, or even two, succeeding months, with the result that October was above normal and November and December below normal. Second, the knowledge, in November and December, that the transportation tax would be abolished at the end of the year, under the new revenue act, probably held back some traffic and travel in those months that will be released after January 1. Third, and in some respects most important, the uncertainty as to the level of

(Continued on page 146)



100 of These Locomotives Were Built by the Lima Locomotive Works for The Illinois Central

Locomotive Market in Quiescent State During 1921

Domestic Orders Make New Low Record—Largest Buyer Is National Railways of Mexico

By Frank W. Kraeger

THE ORDERS placed for locomotives for domestic service in the United States in 1921 totaled, according to the compilations of the *Railway Age*, 239. This compared with 1,998 in 1920. In other words, it was but one-eighth the business of that year. In 1919, the second year of federal control, the locomotives ordered for domestic service in the United States totaled 214; the 1921 figure, poor as it was, luckily succeeded in bettering slightly that ignominious record.

Orders placed by railroads in Canada with Canadian builders totaled 35, as compared with 189 in 1920 and 58 in 1919.

The export locomotive orders for 1921 aggregated 546, inclusive of the orders placed by lines in Mexico. This compared with 718 in 1920 and 898 in 1919. The Mexican lines signalized their rehabilitation and return to normalcy by placing in 1921 the largest order for any system in North America, the National Railways of Mexico having ordered a total of 142 locomotives.

Production in 1921 totaled 1,121 locomotives for domestic service and 587 for export. The 1,121, although it was sev-

numbers of serviceable locomotives stored and a high percentage of unserviceable locomotives.

On December 1, according to the A. R. A. Car Service Division reports, there were 5,308 serviceable locomotives stored and 12,170, or 18.8 per cent, held for repairs requiring over 24 hours. At various times during the year the "bad order" locomotives approached 20 per cent. It is an interesting fact that this is a matter which received but small attention during the year. The contrast as between the publicity given the bad order car figure and that given the unserviceable locomotive per cent is especially striking. The reason for the failure to pay attention to the locomotive condition situation is quite evident. In a period when expenses

TABLE II—ORDERS FOR LOCOMOTIVES SINCE 1901
Domestic orders only

Year	Loco- motives	Year	Loco- motives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,643	1913	3,467
1907	3,482	1914	1,265

Domestic and Foreign

Year	Class I railroads	American railroads	Domestic industrials	Total domestic	Foreign Canadian	Total
1915	1,612	850	2,462	2,462	5,801	8,263
1916	2,210	883	3,093	3,093	6,143	9,236
1917	2,704	3,138	5,842	5,842	6,143	11,985
1918	3,518	7	38	3,553	1,086	4,639
1919	3,518	7	38	3,553	898	4,451
1920	1,668	101	17	1,786	718	2,504

TABLE I—LOCOMOTIVE ORDERS IN 1921

For Class I railroads	191
For other American Railroads	20
For domestic industrials	29
Total domestic	240
For service in Canada	35
For export to other countries	846
Grand total	1,121

eral times the number of new locomotives ordered during 1921, was the lowest total the American locomotive manufacturers have experienced for many years. It compared with 1,857 (exclusive of Canada) in 1920. One has to go back to 1897 to find a lower figure than the 1921 performance.

With these facts at hand, it must be admitted that 1921 found the locomotive market in a quiescent state. It is true that a fair number of locomotives were sent to the builders for heavy repairs or rebuilding and that this helped the situation to some extent. The reason for the poor business done, insofar as concerns domestic orders, was, of course, the sharp decline in traffic and the weak and anemic character of the figures of net railway operating income. During a large part of the year the reports showed considerable

had to be cut to the bone, one would hardly have expected the operating officer to over exert himself about his per cent of unserviceable locomotives while he had a sizable number of serviceable locomotives in white lead. It was hardly to be expected either that a period which was characterized by that sort of thing would be productive of large orders for new locomotives. However, even at that, the 1921 total is rather disappointing. One can find consolation at least in the fact that this condition cannot last. The American railroads have got to make up their deferred motive power requirements some time.

With further reference to the domestic orders, the only

systems which placed contracts of any size—and even their orders were not large—were the Atchison, Topeka & Santa Fe, the Southern Pacific, the Seaboard Air Line, the Central of New Jersey and the Rock Island. All the additional orders were of small size, being only of from one to eight locomotives. In the small total there is noticeable a comparatively large proportion of Santa Fe and Mountain type locomotives, which is what one would naturally expect. Brick arches and superheaters have now been so generally

tions were at times below those of the successful American bidder. In such cases the American reputation for prompt deliveries was frequently a deciding factor.

The orders from Argentina were principally from the State Railways. The Japanese business is of interest because Japan has a considerable locomotive production of its own. The Chilean State Railways, which ordered 30 steam locomotives, merit attention because they placed the largest electric locomotive order of the year—35 locomotives for the new electrification out of Santiago.

In looking over the foreign specifications it is evident that the railroads in other countries are appreciating the economic advantages to be obtained from the use of considerably heavier power than that which they have hitherto purchased, although naturally the locomotives are lighter than those used on American roads. It is interesting to note that whereas only one Mallet locomotive was ordered in 1921 by an American railroad, a number were ordered for use in China, these being the heaviest locomotives built for use on any road outside of the United States. The tabulated data indicate that the American locomotive builders did well in China in 1921.

An interesting point in connection with the export trade is the paucity of orders from European countries this year and the absence of Cuba—due to the ill-fortunes of the sugar industry—from the list of purchasers. In the foreign field, as well as in the domestic field, the controlling factor was the difficulty, at times insurmountable, of obtaining either the necessary capital or credit. In a number of instances the locomotive builders were obliged to arrange for the necessary financing.

Production

As previously noted, the number of locomotives built during 1921, as distinguished from orders, was record-breaking—very small. The domestic production was the lowest since 1897—the foreign is back to pre-war records.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. Some few omissions of small unimportant orders doubtless occur. The data presented were supplied by the railways and the industrial companies in response to inquiries from the *Railway Age*. They were checked against similar lists furnished through the co-operation of the builders and with the weekly reports in the Equipment and Supplies column of the *Railway Age*.

TABLE III—LOCOMOTIVES BUILT IN 1921

	United States		Canada	Total
Domestic	1,121	64		1,185
Foreign	587	51		638
Total	1,708	115		1,823

Year	Comparison with Previous Years		Year	Domestic	Foreign	Total
	Domestic	Total				
1896	866	309	1908	1,886	456	2,342
1897	865	386	1909	2,596	291	2,887
1898	1,321	554	1910	4,441	314	4,755
1899	1,951	514	1911*	3,143	387	3,530
1900	2,648	505	1912	4,403	312	4,915
1901		3,384	1913	4,561	771	5,332
1902		4,070	1914	1,962	273	2,235
1903		5,152	1915	1,250	835	2,085
1904		3,441	1916	2,708	1,367	4,075
1905	4,896	595	1917	2,585	2,861	5,446
1906	6,232	720	1918	3,668	2,807	6,475
1907	6,564	798	1919	2,162	1,110	3,272
			1920†	2,022	1,650	3,672

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

adopted that it is a rare thing for a new locomotive to be built without them. Stokers and power reverse gear also are usually applied to all heavier power and the past year has evidenced a growing tendency to the more extended use of feedwater heaters and boosters.

Foreign Business

The number of locomotives ordered in 1921 for export was small, even if it was double the domestic orders. The largest order, as already noted, was from Mexico—that is, if it is proper to include in the foreign orders, locomotives to be delivered to a road which subscribes to the A. R. A. Code of Interchange Rules, as do the National Railways of Mexico. The other countries which furnish sizable business were Argentina, Chile, China, Brazil and Japan. Much of this business was obtained in spite of the keenest competition, considerable of it from German builders whose quota-

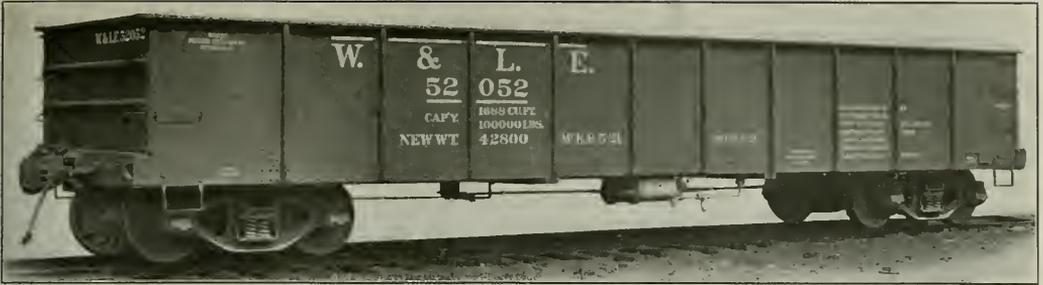
Locomotive Orders in 1921

Class I Roads

Purchaser	No.	Type	Service	Weight	Cylinders	Mechanical stoker	Builder
Atchison, Topeka & Santa Fe	15	2-8-2	Freight	315,300	27 x 32	No	Baldwin
	10	2-10-2	Freight	375,000	30 x 32	No	Baldwin
	8	4-8-2	Passenger	354,000	28 x 28	Yes	Baldwin
	7	4-8-2	Passenger	340,000	28 x 28	No	Baldwin
	10	4-6-2	Passenger	298,500	25 x 28	No	Baldwin
Atlantic Coast Line	1	4-6-0	Passenger	206,000	23 x 26	No	Baldwin
Brooklyn Eastern Dist. Term.	1	0-6-0	Switching	125,000	19 x 24	No	Baldwin
Central of New Jersey	25	2-8-2	Freight	337,000	27 x 32	Yes	American
Chicago, Rock Island & Pacific	14	2-8-2	Freight	333,100	28 x 20	No	American
Green Bay & Western	2	2-6-0	Freight	200,400	22 x 28	No	Baldwin
International & Great Northern	4	2-8-2	Switching	274,900	25 x 30	Yes	Baldwin
	4	0-6-0	Freight	147,840	21 x 26	Yes	Baldwin
Mississippi Central	4	2-8-2	Freight	177,000	20 x 28	No	American
Pittsburgh & West Virginia	2	4-6-2	Freight	298,500	27 x 28	Yes	American
Seaboard Air Line	10	4-8-2	Freight	315,000	27 x 28	Yes	American
	15	2-8-2	Freight	284,000	27 x 30	Yes	American
Southern Pacific	50	2-10-2	Freight	394,160	29½ x 32	No	Baldwin
Tulledo, St. Louis & Western	2	2-6-0	Freight	200,400	22 x 28	No	Baldwin
Union Pacific	1	4-8-2	Freight	350,000	26 x 28	Yes	American
Virginian	1	2-8-8-0	Freight	505,000	28 & 44 x 32	Yes	American
	1	2-8-2	Freight	298,000	26 x 32	Yes	Baldwin

Other United States Railroads

Ala., Tenn. & Northern	2	2-8-0	Freight	158,400	20 x 24	Yes	Lima
California Western R.R. & Nav. Co.	1	2-6-2	Pass. & Freight	140,000	18 x 24	No	Baldwin
Campbell's Creek	1	2-8-0	Freight	154,000	20 x 24	No	Baldwin
Cumberland & Manchester	2	2-8-0	Freight	154,000	20 x 24	No	Baldwin
Dayton-Goose Creek	1	4-4-0	Passenger	89,000	15 x 24	No	Baldwin
Greenbrier & Eastern	1	2-8-2	Freight	241,000	23 x 28	No	Baldwin
Hunt & Bread Top Mt.	1	4-6-0	Passenger	175,000	21 x 26	No	Baldwin
La Crosse & Southeastern	1	4-6-0	Passenger	175,000	21 x 26	No	Baldwin
Laurinburg & Southern	1	4-6-0	Pass. & Freight	126,500	15 x 26	No	American



Built by the Pressed Steel Car Co. for the Wheeling & Lake Erie

Freight Car Orders During 1921 Lowest on Record

Attributed to Small Net Income, Decreased Traffic, Large Car Surplus and Bad Order Situation

By Frank W. Kraeger

FREIGHT CARS ordered for domestic service in the United States during 1921 totaled 23,346, the lowest except 1919. The orders compared with 84,207 in 1920; in other words, they were one-fourth the 1920 totals. During the second year of federal control, 1919, practically the only orders placed in North America were those for private car lines and industrials; the total including Canada was 25,899 cars; the 1921 figure succeeded in lowering that unenviable record.

Export orders in 1921 totaled 4,982; this is half the total for 1920, in excess of the figure for 1919, but less than one-third the averages for the years 1917 and 1918.

The number of freight cars ordered in 1920 was not large. It did, however, permit the car builders to start 1921 with a fair amount of uncompleted business on their books. The 1921 orders were so few that the year was primarily spent in cleaning up the hold-over 1920 business. The result was minimum production—the totals for the year reaching 40,292 cars built for domestic service and 6,412 for export. For all the fact that the production for freight cars for the past several years has been at a low average, the 1921 total

1921 succeeded in making 1921 a record-breaker of the wrong sort.

It is hardly necessary to discuss the factor of net railway operating income inasmuch as it is receiving considerable attention in various other articles in this issue.

Concerning net ton-miles, attention is directed to the article entitled, "Five Years of Freight Traffic Growth Is

TABLE II—ORDERS FOR FREIGHT CARS SINCE 1901

Domestic orders		Domestic and foreign					
Year	Freight cars	Year	Freight cars				
1901.....	193,439	1908.....	62,669				
1902.....	195,248	1909.....	189,360				
1903.....	108,936	1910.....	141,024				
1904.....	136,561	1911.....	133,117				
1905.....	341,315	1912.....	234,758				
1906.....	310,315	1913.....	146,732				
1907.....	151,711	1914.....	80,264				
Year	Domestic	Foreign	Total				
1915.....	109,792	18,222	128,014				
1916.....	170,054	35,314	205,368				
1917.....	79,367	53,191	132,558				
Year	Class I railroads	Other American railroads	Private car lines and industrials	Total domestic	Canadian	For export	Grand total
1918.....	101,053	964	12,146	114,113	9,657	53,547	177,317
1919.....	22,062	3,837	3,994	29,893
1920.....	51,250	1,044	31,913	84,207	12,406	9,056	105,669

For Class I railroads.....	21,003
For other American railroads.....	923
For private car lines and industrials.....	1,420
Total domestic.....	23,346
For service in Canada.....	30
For export to other countries.....	4,982
Grand total.....	28,358

succeeded in being less than that for any other year for an indefinite period. Fortunately, there was a reasonable amount of work in the form of freight car repairs to alleviate the situation; but it can hardly be said that repair business went very far in that direction.

The reason for the small quantity of new orders for domestic service in 1921 is due to several factors—the abbreviated net railway operating income; the decreased net ton-miles; the large proportion of idle cars; and the percentage of bad order cars. These factors were more or less interrelated. In a poor year of rather more ordinary poorness, the existence of any one of them could have been blamed for acting as a drag on freight car business. The combination of them in

Lost," wherein appears a chart showing net ton-miles on the Class I carriers by months from 1916 to October, 1921. The point plotted for 1921 in nearly every month is the lowest for that month. Large orders for new freight cars are naturally not to be expected under such conditions.

The net freight car surplus varied during the year between 68,984 on October 31 to 507,274 on April 8. On December 15 it was 371,044. The year 1921 is the only year on record in which idle cars climbed over the 500,000 mark. The years during which at any time the surplus has gone over even 300,000 are very few. They include 1908, when the highest figure was 413,338; possibly 1914, during a portion of which the total got so large that the compilation of figures was abandoned; in 1915, when 327,084 was reported; and in 1919, when the peak was reached of 448,864.

Large car surpluses and declining totals of net ton-miles are not unusual. Such a large percentage of bad order cars, however, was a feature more or less singular to 1921. The

bad order cars on January 1 totaled 191,254, or 8.5 per cent. They increased during the early part of the year, until on August 15 they totaled 382,440, or 16.6 per cent. On December 1 this had been reduced to 320,292, or 14 per cent. This is not the place to discuss the reasons for the high bad order totals—it is the place, however, to indicate that the effect on new freight car business was potent, to say the least. A railroad worrying each month whether its net railway operating income would be shown in black or in red figures could hardly be expected to buy new cars at high,

showing improvement. This is said with due recognition of the decreased business which is a natural factor at this time of the year.

Sizable orders were reported in 1921 by but few roads. The Atchison, Topeka & Santa Fe ordered 1,300 gondola and 2,500 refrigerator cars. The Baltimore & Ohio contracted for 3,000 hopper and box car bodies to be used for replacements. The Chicago, Milwaukee & St. Paul placed orders for 2,500 gondola cars. The Lackawanna reported 1,500 hopper and 500 box cars. The Illinois Central secured 1,000 refrigerator cars. Other large orders are reported for the Louisville & Nashville, 2,800 cars, and the Minneapolis, St. Paul & Sault St. Marie, 1,300. The absence of the New York Central and Pennsylvania from the lists is noticeable; these roads, however, received large allocations of U. S. R. A. standard equipment, and the former also placed large orders in 1920.

Another interesting but disappointing factor was the small amount of orders for private car lines and industrials. Canadian orders were likewise conspicuous by their absence.

The export orders for the year were not large. Such business, however, has apparently been brought to a more stable basis than was the case when the larger part of the business was placed by European countries which had car-building plants of their own but which were used for other purposes during the war. The Argentine State Railways purchased 2,000 cars; the Chilean State Railways, 320; China also purchased a fairly large number. The order given a Canadian company for 500 tank cars for the Russian Soviet Government merits more than passing attention. The Chinese orders and those from South America—in the latter case from the state owned railways—prove the contentions made in the recent past that it was among such purchasers that our foreign business was most likely to be found.

The list of orders which follows is compiled from information furnished the *Railway Age* by railroads, private car lines and car manufacturers. It was checked and amplified by comparison with the items appearing each week in the Equipment and Supplies column of the *Railway Age*. The railways, private car lines and manufacturers gave us their usual co-operation not only as to new orders but as to production and it is with pleasure that the editors of the *Railway Age* draw the reader's attention to that fact. The *Railway Age* is especially indebted to Dr. W. F. M. Goss, president of the Railway Car Manufacturers Association, for the courteous and valuable assistance given us in securing the reports from the members of that association.

TABLE III—FREIGHT CARS BUILT IN 1921

	United States	Canada	Total
Domestic	40,292	8,404	48,696
Foreign	6,412	745	7,157
	46,704	9,149	55,853

Comparison with Previous Years

Year	Freight		
	Domestic	Foreign	Total
1899	117,982	1,994	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,061	3,200	72,161
1912†	148,357	4,072	152,429

* Includes Canadian output.

† Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand Total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1913	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914	97,626	462	98,088	6,453	.....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	5,580	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919	94,981	61,783	156,764	6,391	30	6,421	163,185
1920	60,955	14,480	75,435	.....	.....	.....	75,435

even if not at peak prices, while it had large numbers of both unserviceable and idle serviceable cars. There was, of course, a fair amount of repair business but, as noted, not exactly a large amount of it.

Fortunately, the gradually declining percentage of bad order cars indicates an improvement in the situation. In fact, all four of the factors which we blamed for the disappointing 1921 business are, looking at it in the larger way,

Freight Car Orders in 1921

Class I Roads

Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft gear	Trunks	Builder
Atchison, Topeka & Santa Fe	300	Gondola	100,000	46 ft. 0 in.	Steel Frame	46,500	Friction	St. Side Fr.	Haskell & Barker
	1,000	Gondola	100,000	40 ft. 0 in.	Steel Frame	42,000	Friction	St. Side Fr.	Am. Car & Fdy.
	1,250	Refrig.	70,000	33 ft. 2 in.	St. Und'frame	55,300	Friction	St. Side Fr.	Haskell & Barker
	1,250	Refrig.	70,000	33 ft. 2 in.	St. Und'frame	55,300	Friction	St. Side Fr.	Am. Car & Fdy.
Atlanta & West Point	6	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Atlantic Coast Line	30	Caboose	.....	29 ft. 8 in.	St. Und'frame	43,000	Friction	Arch Bar	Company Shops
Baltimore & Ohio	500	Box Bods.	80,000	40 ft. 4 in.	St. Und'frame	45,000	.....	.....	Standard Steel
	500	Box Bods.	80,000	40 ft. 4 in.	St. Und'frame	45,000	.....	.....	Am. Car & Fdy.
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	40,000	.....	.....	Standard Steel
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	40,000	.....	.....	Cambria
	500	Hop. Bods.	100,000	30 ft. 0 in.	Steel	40,000	.....	.....	Standard Steel
	500	Hop. Bods.	100,000	40 ft. 0 in.	Steel	40,000	.....	.....	Pressed Steel
Bangor & Arctostook	200	Box	80,000	37 ft. 7 in.	Steel Frame	40,000	Friction	St. Side Fr.	Standard Steel
	30	Ballast	100,000	40 ft. 0 in.	Steel Frame	42,000	Friction	.....	Am. Car & Fdy.
Central of New Jersey	75	Hopper	110,000	33 ft. 0 in.	Steel	41,400	.....	St. Side Fr.	Standard Steel
	50	Hopper	80,000	40 ft. 0 in.	St. Und'frame	41,200	Spring	St. Side Fr.	Standard Steel
	1	Box	100,000	40 ft. 6 in.	St. Und'frame	46,000	Spring	St. Side Fr.	Standard Steel
	1	Box	100,000	40 ft. 6 in.	St. Und'frame	46,000	Spring	St. Side Fr.	Standard Steel
	17	Refr.	80,000	36 ft. 0 in.	St. Und'frame	46,500	Spring	St. Side Fr.	Standard Steel
	83	Gondola	100,000	40 ft. 0 in.	St. Und'frame	43,900	Spring	St. Side Fr.	Standard Steel
	6	.....	.....	.....	.....	.....	.....	.....	Company Shops
Chesapeake & Ohio	1	Box	100,000	40 ft. 6 in.	Steel Frame	45,200	Friction	.....	St. Louis
Chicago, Indianapolis & Eastern	1	Gondola	100,000	41 ft. 6 in.	.....	.....	.....	.....	Haskell & Barker
Chgo. Ind. & St. Paul	1,000	Gondola	100,000	40 ft. 10 in.	Steel Frame	.....	Friction	.....	Haskell & Barker
Chgo. & St. Paul	1,000	Gondola	100,000	40 ft. 0 in.	Steel Frame	.....	Friction	.....	Bettendorf
Chgo. Rock Island & Pacific	50	Gondola	100,000	40 ft. 0 in.	Steel Frame	44,000	Friction	.....	General American
Chgo. St. Paul, Mon. & Omaha	125	Stock	80,000	36 ft. 6 in.	St. Und'frame	40,400	Friction	St. Side Fr.	General American
Del., Lackawanna & Western	500	Hopper	100,000	33 ft. 3 in.	Steel	43,500	Friction	St. Side Fr.	Standard Steel
	500	Hopper	100,000	33 ft. 3 in.	Steel	43,500	Friction	St. Side Fr.	Standard Steel
	500	Hopper	100,000	33 ft. 3 in.	Steel	43,500	Friction	St. Side Fr.	Am. Car & Fdy.
	500	Box	80,000	26 ft. 5 in.	St. Und'frame	41,000	Friction	St. Side Fr.	Am. Car & Fdy.
	40	Carb.	.....	.....	Steel Frame	43,300	Friction	.....	Mt. Vernon

Purchaser	No	Class	Capacity	Length	Construction	Weight	Draft gear	Trucks	Builder
Grand Trunk	699	Auto	80,000	40 ft. 6 in.	Steel frame	46,000	Friction	Arch Bar	Am. Car & Fdy.
General	2	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
.....	4	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Great Northern	500	Refrig.	60,000	39 ft. 2 in.	Wood	33,800	.....	St. Side Fr.	General American
Gulf, Mobile & N. O. Ry.	50	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Illinois Central	650	Refr.	60,000	40 ft. 0 in.	St. Und'frame	58,400	Friction	St. Side Fr.	General American
.....	250	Flat	100,000	40 ft. 0 in.	St. Und'frame	34,400	Friction	.....	Bettendorf
.....	25	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Indiana Harbor Belt	6	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Louisiana & Arkansas	25	Hart Conv.	100,000	42 ft. 0 in.	Steel frame	38,900	.....	.....	Am. Car & Fdy.
Louisville & Nashville	1,533	Box	80,000	36 ft. 0 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
.....	100	Stock	80,000	38 ft. 0 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
.....	500	Box	80,000	36 ft. 0 in.	St. Und'frame	43,500	Friction	.....	Mt. Vernon
.....	300	Caboose	80,000	.....	.....	.....	.....	.....	Chickasaw Ship
.....	300	Gondola	110,000	.....	.....	.....	.....	.....	Chickasaw Ship
.....	100	Caboose	.....	.....	.....	.....	.....	.....	Company Shops
Minn., St. Paul & S. Ste. Marie	650	Box	80,000	40 ft. 0 in.	St. Und'frame	41,300	.....	.....	Haskell & Barker
.....	400	Stock	80,000	39 ft. 1 in.	St. Und'frame	38,900	.....	.....	Haskell & Barker
.....	250	Refr.	60,000	36 ft. 0 in.	St. Und'frame	54,400	.....	.....	Haskell & Barker
Missouri, Kansas & Texas	25	Caboose	60,000	28 ft. 1 in.	St. Center Sills	36,000	Spring	Arch Bar	Company Shops
.....	9	Box	60,000	36 ft. 0 in.	St. Und'frame	37,700	Friction	St. Side Fr.	Company Shops
Mo., Kan. & Tex. of Texas	1	Scale Test	60,000	18 ft. 2 in.	Steel	.....	Spring	Arch Bar	Company Shops
N. Y., Chicago & St. Louis	6	Caboose	60,000	28 ft. 1 in.	St. Cent. Sills	6,000	.....	.....	Company Shops
Perc Marquette	500	Box	80,000	40 ft. 6 in.	St. Und'frame	44,600	Friction	St. Side Fr.	Company Shops
Pittsburgh & West Virginia	300	Hop. Bods	110,000	.....	.....	.....	.....	.....	Pressed Steel
St. Louis Southwestern	322	.....	.....	.....	Wood	.....	.....	.....	Cambria
Southern Pacific	200	Box	80,000	.....	.....	.....	.....	.....	Company Shops
Toledo & Ohio Central	1	Caboose	.....	.....	Wood	.....	.....	.....	Company Shops
Western Pacific	700	Gondola	140,000	46 ft. 3 in.	Steel	58,000	.....	.....	Pressed Steel
.....	25	Dump	100,000	32 ft. 2 in.	Steel	57,000	Friction	Arch Bar	Clark
Wabash	6	Box	80,000	40 ft. 6 in.	St. Und'frame	45,400	Friction	St. Side Fr.	Am. Car & Fdy.

Other United States Railroads

Abilene & Southern	2	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Alabama, Tenn. & Northern	250	Gondola	100,000	40 ft. 8 in.	St. Und'frame	36,700	Friction	Arch Bar	Mt. Vernon
Buffalo Creek & Gauley	13	Flat	100,000	41 ft. 0 in.	St. Und'frame	.....	Friction	.....	Mt. Vernon
Col. Western R. & Nav.	50	.....	40,000	.....	.....	.....	.....	.....	Koppel
Duluth & Northeastern	24	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Cumberland & Pennsylvania	90	Hopper	110,000	30 ft. 6 in.	Steel	42,300	Friction	St. Side Fr.	Company Shops
Gulf & Sabine River	1	.....	.....	.....	Wood	.....	.....	.....	Company Shops
Gulf, Texas & Western	1	Flat	.....	.....	.....	.....	.....	.....	Company Shops
Kellys Creek & Northwestern	1	Caboose	.....	49 ft. 0 in.	Wood	.....	Spring	.....	Am. Car & Fdy.
Louisiana & North West	2	Caboose	.....	.....	.....	.....	.....	.....	Company Shops
Northwestern Pennsylvania	1	Box	40,000	38 ft. 0 in.	Wood	24,000	.....	Arch Bar	Company Shops
St. Louis & O'Fallon	1	Coal	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Tennessee Coal, Iron & R. R.	140	Hopper	150,000	.....	.....	.....	.....	.....	Chickasaw Ship
.....	300	Ore	.....	.....	Steel	.....	.....	.....	Chickasaw Ship

Private Car Lines and Industrials

Am. Refrig. Transit Co.	*100	Steel Und'frames	.....	.....	.....	.....	.....	.....	General American
Associated Oil Co.	8	Tank	8,050	.....	.....	.....	.....	.....	Penn. Tank Car
Barnes Circus	4	Flat	80,000	70 ft. 0 in.	St. Und'frame	43,400	Friction	.....	Mt. Vernon
.....	2	Stock	80,000	70 ft. 0 in.	St. Und'frame	5,600	Friction	.....	Mt. Vernon
.....	2	Stock	80,000	70 ft. 0 in.	St. Und'frame	56,700	Friction	.....	Mt. Vernon
.....	3	Flat	80,000	70 ft. 0 in.	St. Und'frame	43,500	Friction	.....	Mt. Vernon
Beacon Oil Co.	20	Tank	100,000	34 ft. 5 in.	All Steel	48,600	Friction	Arch Bar	General American
Clemmons Logging Co.	6	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
.....	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
.....	4	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Coates Driving & Boom Co.	1	Ballast	80,000	34 ft. 0 in.	Wood	.....	Spring	.....	Haskell & Barker
Cudahy Refrig. Line	500	Refrig.	60,000	39 ft. 1 in.	St. Und'frame	40,000	Spring	.....	Mt. Vernon
Dist. of Columbia	3	Gondolas	100,000	40 ft. 9 in.	All Steel	39,800	Spring	.....	Mt. Vernon
.....	4	Gondolas	100,000	40 ft. 0 in.	All Steel	41,800	Spring	.....	Mt. Vernon
Easton Car & Const. Co.	1	Hopper	100,000	44 ft. 0 in.	All Steel	.....	Spring	.....	Fac. Car & Fdy.
Fatenville Lbr. Co.	1	Flat	200,000	44 ft. 0 in.	All Steel	.....	Spring	.....	Fac. Car & Fdy.
Industrial Lumber Co.	25	Logging	80,000	42 ft. 0 in.	St. Und'frame	.....	Spring	.....	Fac. Car & Fdy.
.....	1	Caboose	60,000	21 ft. 0 in.	St. Und'frame	.....	Spring	.....	Fac. Car & Fdy.
Ferro Construction Co.	1	Flat	110,000	47 ft. 10 in.	St. Und'frame	29,000	Friction	.....	Standard Steel
Green River Lbr. Co.	1	Logging	80,000	50 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Ireland Steel Co.	20	Gondola	140,000	40 ft. 0 in.	Steel	47,600	Friction	.....	Bettendorf
Insular Lumber Co.	12	Logging	60,000	40 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Jeddo-Highland Coal Co.	4	Dump	30 cu. yd.	32 ft. 2 in.	Steel	57,000	Friction	.....	Clark
Live Poultry Transportation Co.	200	Poultry	60,000	36 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
McCoy Lassic Logging Co.	100	Poultry	60,000	36 ft. 0 in.	Steel Frame	.....	Friction	.....	Am. Car & Fdy.
Mahoning Ore & Steel Co.	10	Dump	30 cu. yd.	32 ft. 2 in.	Steel	57,000	Friction	.....	Clark
Massack Timber Co.	1	Logging	80,000	42 ft. 0 in.	All Wood	.....	Spring	.....	Fac. Car & Fdy.
Mathison Alkali Co.	20	Special	60,000	42 ft. 5 in.	Steel	38,000	Friction	.....	Standard Steel
Merrill & King	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Morris & Co.	18	Logging	80,000	42 ft. 0 in.	St. Und'frame	.....	Spring	.....	Company Shops
Mud Bay Logging Co.	15	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Nemah River Lbr. Co.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Pennsylvania Tank Line	200	Tank	10,000	.....	.....	.....	.....	.....	Fac. Car & Fdy.
Phoenix Logging Co.	1	Flat	200,000	44 ft. 0 in.	Steel	.....	Spring	.....	Penn. Tank Car
Poinsett Lubricating Co.	5	Logging	80,000	37 ft. 0 in.	Steel	31,100	Spring	.....	Bettendorf
River & Rail Trans. Co.	1	Flat	100,000	42 ft. 0 in.	St. Und'frame	43,900	Friction	.....	Mt. Vernon
Rutledge Timber Co.	2	Flat	80,000	41 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Saddle Mt. Logging Co.	1	Flat	120,000	40 ft. 0 in.	Steel	.....	Spring	.....	Fac. Car & Fdy.
.....	6	Logging	100,000	.....	Steel	.....	Spring	.....	Fac. Car & Fdy.
.....	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Schafer Bros.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Shell Co. of Calif.	20	Tank	10,000	.....	.....	.....	.....	.....	Fac. Car & Fdy.
Simpson Logging Co.	1	Flat	200,000	44 ft. 0 in.	Steel	.....	Spring	.....	Fac. Car & Fdy.
Skelly Oil Co.	20	Tank	8,000	.....	All steel	.....	.....	.....	Gen. Am. Tk. Car
Stauffer Chemical Co.	1	Tank	8,000	.....	.....	.....	.....	.....	Gen. Am. Tank
U. S. Engineers	3	Flat	50,000	30 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Vancouver Equipment Co.	30	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
.....	2	Ballast	80,000	34 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Venece, J. A., Lbr. Co.	4	Logging	100,000	.....	.....	.....	.....	.....	Fac. Car & Fdy.
Washington Iron Works	1	Flat	170,000	44 ft. 0 in.	Steel	.....	Spring	.....	Fac. Car & Fdy.
Waterbury Gas Light Co.	1	Coal	100,000	.....	.....	.....	.....	.....	General American
Webb Logging Co.	10	Logging	80,000	42 ft. 0 in.	Wood	.....	Spring	.....	Fac. Car & Fdy.
Various purchasers	83	Cars not otherwise reported	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.

Railroads and Other Companies in Canada

Canadian Pacific	3	Flat	47,720	37 ft. 6 in.	Steel	162,000	Friction	.....	Can. Car & Fdy.
.....	3	.....	.....	.....	Steel	.....	Friction	.....	Can. Car & Fdy.
Imperial Oil	8	Dump	60,000	33 ft. 0 in.	Steel	39,000	Spring	.....	National
Quebec Central	5	Flat	60,000	36 ft. 0 in.	Wood	24,400	Spring	Arch Bar	Company Shops
.....	5	.....	80,000	36 ft. 0 in.	.....	26,500	.....	.....	Company Shops
Temiskaming & Northern Ontario	6	Caboose	.....	29 ft. 0 in.	.....	.....	Spring	.....	Canadian Brill

* Not included in totals.

Orders for Export

Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft gear	Trucks	Builder
Argentine State Rys.	1,500	Box	66,000	33 ft. 3 in.	St. Und'frame	29,000	Spring	.....	Standard Steel
	400	Gondola	66,000	33 ft. 10 in.	St. Und'frame	26,000	Spring	.....	Standard Steel
Baldwin Locomotive Works	100	Box	80,000	30 ft. 6 in.	St. Und'frame	34,000	Spring	.....	Standard Steel
Atlantic Fruit Co.	100	Cane	40,000	.....	.....	.....	.....	.....	Magor Car Co.
	4	Flat	40,000	.....	.....	.....	.....	.....	Magor Car Co.
Chilian State Rys.	200	Box	66,100	32 ft. 7 in.	.....	.....	Friction	.....	Am. Car & Fdy.
	20	Refrig.	66,100	25 ft. 7 in.	St. Und'frame	.....	Friction	.....	Am. Car & Fdy.
	101	Gondola	100,000	.....	.....	.....	.....	.....	Pressed Steel
Chinese Government Rys.	300	Box	80,000	40 ft. 0 in.	Steel	.....	Friction	.....	General American
	300	Gondola	80,000	40 ft. 0 in.	Steel	.....	Friction	.....	General American
Companias Unias	6	Tank	6,575 g.	33 ft. 9 in.	Steel	38,000	Spring	.....	Standard Steel
Cuba Northern	5	Box	60,000	37 ft. 0 in.	Steel Frame	.....	Friction	.....	Amer. Car & Fdy.
Japanese Gov't Rys.	50	Dump	.....	.....	.....	.....	.....	.....	Kilbourne & Jac.
Java State Rys.	50	Box	26,500	19 ft. 0 in.	Steel Frame	.....	Spring	.....	Am. Car & Fdy.
	50	Gondola	26,500	18 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
Gold Coast Colony	100	Dump	5 yards	9 ft. 9 in.	Steel Frame	39,000	Spring	.....	National
Katanga Railroad	25	Gondola	70,000	39 ft. 4 in.	Steel	37,400	.....	.....	Pressed Steel
Mex. Light, Heat & Power Co.	1	Tank	6,500 g.	.....	.....	.....	.....	.....	Penn. Tank Car
Monterrey Iron & Steel	20	Hopper	100,000	30 ft. 5 in.	Steel	49,610	Friction	Arch Bar	General American
National Rys. of Mexico	100	Tank	100,000	32 ft. 0 in.	Steel	.....	Friction	.....	Am. Car & Fdy.
Republic of Colombia	12	Box	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	20	Flat	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Flat	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Stock	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	6	Stock	33,600	20 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
	10	Gondola	40,000	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Gondola	44,800	30 ft. 0 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	6	Dump	4 cu. yd.	12 ft. 6 in.	Steel	.....	Spring	.....	Am. Car & Fdy.
	20	Box	33,600	30 ft. 0 in.	St. Und'frame	.....	Spring	.....	Am. Car & Fdy.
South Manchurian Ry.	40	Dump	20 cu. yd.	.....	.....	.....	.....	.....	Kilbourne & Jac.
Russian Soviet Gov't	504	Tank	8,000 g.	30 ft. 7 in.	Steel	40,001	Friction	.....	Am. Car & Fdy.
St. Louis Refr. Car Co.	3	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Tientsin-Pukow	300	Gondola	80,000	.....	Steel	.....	.....	.....	Am. Car & Fdy.
Uganda Railways	2	Gondola	60,000	39 ft. 11 in.	Steel	30,000	Spring	.....	National
United Fruit Co.	50	Box	40,000	.....	.....	.....	.....	.....	Gregg
	40	Flat	40,000	.....	.....	.....	.....	.....	Gregg
	50	Ballast	.....	.....	Steel	.....	.....	.....	Magor
	50	Cane	.....	.....	.....	.....	.....	.....	Magor
Wah Chang Trading Corp.	26	Flat	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Various Foreign Purchasers	340	Cars not otherwise reported.	.....	.....	.....	.....	.....	.....	.....
	58	Tank	8,000 g.	25 ft. 10 in.	Steel	20,200	Spring	.....	Chicago Steel Car

FROM 1873, when the first two Washington navel trees were imported into the State of California, the citrus fruit industry has grown in size and importance until today approximately 180,000 acres in California are devoted to the growing of oranges, and 50,000 acres to lemons. The fruit which is shipped annually from the state averages from 25,000 to 30,000 carloads of navel oranges, 10,000 to 15,000 carloads of Valencias and about 9,000 carloads of lemons and grapefruit. In recent years, owing to the growing demand for Valencias, the fruit is shipped during the entire year, navel oranges moving from November to May, and Valencias from May to November. It is predicted that when the acreage now planted comes into full bearing, approximately 20,000 more cars of citrus fruit will be shipped annually.

During the season of 1919, 42,443 cars, loaded with citrus fruit,

were moved from California. This is equivalent to 849 trains of 50 cars each.

Further, taking an average of 448 boxes per car for the oranges, and 392 boxes per car for the lemons, there was a total of 14,822,528 boxes of fruit or 746,804 tons.

The rate to Eastern points during 1919 was \$1.44 per 100 lb. on oranges and \$1.25 on lemons. This would yield a total of \$17,492,290 in freight earnings. The shipper fared well during the 1919 season, receiving \$3.75 a box for oranges and \$3.50 a box for lemons or a total revenue of \$68,422,283. The by-products are important. The factories are now annually producing approximately 50,000 lb. of lemon oil, 1,500,000 lb. of citric acid and orange marmalade, citrate of lime and vinegar in large quantities.



Built by the Pressed Steel Car Co. for the Wheeling & Lake Erie



Built by the American Car & Foundry for the New York Central Lines

Passenger Car Purchases Small During 1921

Fewest Orders in Any Year on Record Except 1918—Sizeable Foreign Buying

By Frank W. Kraeger

THE PASSENGER CARS ordered for service in the United States totaled in 1921 but 246. This is the smallest number in any year on record for at least 20 years, with the exception of the year 1918, when every energy was bent towards war-time activities. Foreign orders in 1921 totaled 155. Several important orders were included. The figure compares with 38 cars ordered for export in 1920 and 143 in 1919.

continue into 1921. The reason can only be laid at the door of decreased net railway operating income. In the article on locomotive business during 1920, which appears elsewhere in this issue, evidence is presented that orders for new locomotives could hardly have been expected while the roads were not in a position and did not find it necessary, while they had engines in white lead, to reduce their percentage of unserviceable locomotives. This is not the case with passenger equipment. The railroads need passenger cars. They

TABLE I. THE PASSENGER CAR ORDERS OF 1921

For Class I railroads.....	207
Other domestic.....	39
Total domestic.....	246
For service in Canada.....	91
For export to other countries.....	155
Grand total.....	492

TABLE III. PASSENGER CARS BUILT IN 1921

	United States	Canada	Total
Domestic.....	1,275	361	1,636
Foreign.....	39	...	39
	1,314	361	1,675

The passenger car production, as distinguished from orders, was 1,275, as compared with 1,272 in 1920. Cars built for export totaled only 39.

The review of the orders for passenger cars in 1920, which appeared in the *Railway Age* of January 7, 1921, page 141, said: "The totals for orders of passenger cars during the past year give proof of the upward trend which was noted in the statistical report on passenger car orders last year." Unfortunately the upward trend did not con-

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Year	Domestic orders only		Passenger cars
	Passenger cars	Foreign	
1901.....	2,879	1909.....	4,514
1902.....	3,459	1910.....	3,881
1903.....	2,310	1911.....	2,623
1904.....	2,213	1912.....	3,642
1905.....	3,289	1913.....	3,179
1906.....	3,402	1914.....	2,002
1907.....	1,791	1915.....	3,101
1908.....	1,319		

Comparison with Previous Years

Year	Passenger cars		Total
	Domestic	Foreign	
1899.....	1,201	104	1,305
1900.....	1,513	121	1,636
1901.....	1,949	106	2,055
1902.....	From 1902 to 1907 passenger car figures in these two columns included in corresponding frt. car columns.		1,948
1903.....			2,007
1904.....			2,144
1905*.....			2,551
1906*.....			3,167
1907*.....			5,457
1908*.....	1,648	71	1,716
1909*.....	2,698	151	2,849
1910*.....	4,136	276	4,412
1911*.....	3,938	308	4,246
1912*.....	2,822	238	3,060
1913.....	2,556	220	2,779
1914.....	3,316	56	3,366
1915.....	1,852	14	1,866
1916.....	1,732	70	1,802
1917.....	1,924	31	1,955
1918.....	1,480	92	1,572
1919.....	266	85	351
1920.....	1,272	168	1,440

*Includes Canadian output.

†Includes Canadian output and equipment built in company shops.

Year	Domestic and Foreign			Canadian	For export	Grand total
	Class I railroads	Other domestic	Total domestic			
1916.....	2,544	100	2,653			
1917.....	1,124	43	1,167			
1918.....	5	104	109	22	26	157
1919.....	.....	292	292	347	143	782
1920.....	1,115	666	1,781	275	38	2,094

have purchased but few in the last five years in spite of the greatly increased business developed during these years. The result is shown in the statistics of passengers carried per car or per train and in the fact that passenger service at present,

even with its improvement over war and after-armistice federal control conditions, is by no means as satisfactory as railroad men would like to see it.

The tendency for many years has been towards steel passenger train equipment. The Interstate Commerce Commission in its latest annual report repeats its previous recommendation that the use of steel cars in passenger service be required. The progress in the direction of replacing wooden cars in the past few years has been disappointing. The lack of such progress will only increase the difficulties of the carriers, should the Commission's recommendation ever be adopted and put in the form of an act of Congress.

Only two roads placed fair-sized orders for passenger

train equipment during 1921. The New York, Ontario & Western ordered 32 cars and the Reading, 50. The latter is expected shortly to order additional cars. The Missouri, Kansas & Texas ordered 54 cars, but 50 of these were express refrigerator cars and are included in the passenger car list only because they will presumably be operated in passenger trains.

South America and China were the largest foreign buyers. The Argentine Government ordered 53, the Chilean State Railways ordered ten, and railways in Colombia, 28. The Tientsin-Pukow of China gave us an order for 45. It is noteworthy that in the case of the Chilean and Tientsin-Pukow cars, all-steel construction was specified.

Passenger Car Orders in 1921

Class I Railroads

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Lighting	Builder
Baltimore & Ohio	2	Dining	81 ft. 7 in.	St. Und' frame	36	161,800	6	Electric	Pullman
Delaware, Lack. & Western	2	Bagg. & Mail	74 ft. 1 in.	Steel	76	128,000	6	Electric	Am. Car & Fdy.
Florida East Coast	6	Coach	70 ft. 0 in.	Steel	76	144,000	6	Electric	Pullman
Grand Trunk	10	Horse Exp.	76 ft. 9 1/2 in.	St. Und' frame	..	143,000	6	Electric	Osgood Bradley
Gulf, Mobile & Northern	1	Passenger	..	Wood	..	..	..	..	Company Shops
Louisville & Nashville	5	Coach	78 ft. 7 in.	Steel	80	..	6	Electric	Am. Car & Fdy.
..	5	Coach	78 ft. 7 in.	Steel	80	..	6	Electric	Am. Car & Fdy.
..	4	Baggage	73 ft. 7 in.	Steel	..	..	6	Electric	Am. Car & Fdy.
Missouri, Kansas & Texas	4	Dining	79 ft. 6 in.	Steel	36	162,000	6	Electric	Am. Car & Fdy.
..	50	Exp. Refr.	42 ft. 11 in.	St. Centr. Sills	..	70,600	4	..	Company Shops
N. Y., New Haven & Hartford	8	Motor	70 ft. 7 in.	Steel	84	175,000	4	Electric	Osgood Bradley
..	14	Trailer	70 ft. 7 in.	Steel	84	105,000	4	Electric	Osgood Bradley
New York, Ontario & Western	20	Coach	78 ft. 10 1/2 in.	Steel	88	120,000	4	Electric	Osgood Bradley
..	4	Pass. & Bagg.	75 ft. 9 in.	Steel	52	118,000	4	Electric	Osgood Bradley
..	4	Baggage	63 ft. 4 in.	Steel	..	110,000	4	Electric	Osgood Bradley
Philadelphia & Reading	30	Bagg. & Mail	63 ft. 4 in.	Steel	..	115,000	4	Electric	Osgood Bradley
..	4	Passenger	72 ft. 4 in.	Steel	78	115,500	4	Electric	Bethlehem Ship.
..	5	Comb.	73 ft. 4 in.	Steel	51	112,000	4	Electric	Bethlehem Ship.
..	15	Passenger	73 ft. 4 in.	Steel	78	115,500	4	Electric	Standard Steel
Union Pacific	14	Dininc	83 ft. 11 in.	Steel	36	158,000	6	Electric	Pullman

Other Domestic Purchasers

L. Tenn. & West. N. Carolina	1	Bagg. & Mail	46 ft. 8 in.	St. Und' frame	..	..	4	Electric	Am. Car & Fdy.
..	2	Coach	44 ft. 4 in.	St. Und' frame	24	..	4	Electric	Am. Car & Fdy.
Hagerston & Frederick	1	Combination	48 ft. 4 in.	Steel	60	51,500	4	Electric	Brill
Hudson & Manhattan	25	Car Bodies	..	Steel	..	..	4	..	Am. Car & Fdy.
Hunt & Broad Top Mt.	5	Passenger	72 ft. 2 in.	Steel	78	120,000	4	Electric	Bethlehem Ship.
..	2	Pass. & Bagg.	72 ft. 2 in.	Steel	51	111,000	4	Electric	Bethlehem Ship.
..	3	Bagg. & Mail	66 ft. 8 in.	Steel	..	110,000	4	Electric	Bethlehem Ship.

Railways and Other Companies in Canada

Canadian Pacific	75	Passenger	..	..	..	..	..	..	Company Shops
..	15	Mail	80 ft. 0 in.	Steel	..	..	6	Gas	Can'dian Car & Fdy
Grand Ryer	1	Bagg. & Exp.	63 ft. 8 in.	Steel	..	..	4	..	Canadian Brill
Quebec Central	3	Baggage	73 ft. 6 in.	Wood	..	76,700	4	Electric	Company Shops
..	2	1st Class	79 ft. 9 in.	..	82	91,600	4	..	Company Shops

Orders for Export

Argentine Govt. Rys.	53	Various Types	..	..	..	..	..	..	Osgood Bradley
Canton-Kowloon	1	Motor	..	..	..	..	..	..	Hall-Scott
..	1	Trailer	..	..	..	..	..	..	Hall-Scott
Cheichiu Rys. of Japan	3	Motor Pass.	..	..	..	..	..	..	Westinghouse
Chilean State Railways	10	Sleeper	44 ft. 9 in.	Steel	16	..	4	Electric	Am. Car & Fdy.
..	2	Diners	44 ft. 9 in.	Steel	31	..	4	Electric	Am. Car & Fdy.
..	2	1st Class	44 ft. 9 in.	Steel	46	..	4	Electric	Am. Car & Fdy.
..	2	3rd Class	44 ft. 9 in.	Steel	69	..	4	Electric	Am. Car & Fdy.
Columbia, Republic of	6	1st Class	40 ft. 0 in.	St. Und' frame	48	..	4	Oil	Am. Car & Fdy.
..	6	3rd Class	40 ft. 0 in.	St. Und' frame	61	..	4	Oil	Am. Car & Fdy.
..	9	Bagg. & Mail	38 ft. 3 in.	St. Und' frame	..	..	4	Oil	Am. Car & Fdy.
..	4	1st Class	40 ft. 0 in.	St. Und' frame	48	..	4	Oil	Am. Car & Fdy.
..	4	2nd Class	40 ft. 0 in.	St. Und' frame	50	..	4	Oil	Am. Car & Fdy.
..	6	3rd Class	40 ft. 0 in.	St. Und' frame	61	..	4	Oil	Am. Car & Fdy.
..	2	Bagg. & Mail	38 ft. 3 in.	St. Und' frame	..	..	4	Oil	Am. Car & Fdy.
Mechino Rys of Japan	4	Motor Pass.	..	..	..	..	..	..	Westinghouse
Peru, South America	1	Combination	30 ft. 0 in.	St. Und' frame	60	20,000	8	Oil and Elect.	Wagon
..	1	Combination	30 ft. 0 in.	St. Und' frame	40	20,000	8	Oil and Elect.	Wagon
Tientsin Pukow	10	1st Class Sleeping	72 ft. 6 in.	Steel	16	..	4	Electric	Am. Car & Fdy.
..	10	2nd Class Sleeping	72 ft. 6 in.	Steel	28	..	4	Electric	Am. Car & Fdy.
..	10	3rd Class Sleeping	72 ft. 6 in.	Steel	48	..	4	Electric	Am. Car & Fdy.
..	5	Sleeping	72 ft. 6 in.	Steel	24	..	4	Electric	Am. Car & Fdy.
..	5	Dining	72 ft. 6 in.	Steel	36	..	4	Electric	Am. Car & Fdy.
..	5	Private	72 ft. 6 in.	Steel	11	..	4	Electric	Am. Car & Fdy.
Various Foreign Purchasers	3	Bagg. & Mail	48 ft. 7 in.	St. Und' frame	42	..	4	Electric	Am. Car & Fdy.
..	1	Pass. & Bagg.	46 ft. 6 in.	St. Und' frame	42	..	4	Electric	Am. Car & Fdy.
..	1	1st Class	41 ft. 3 in.	St. Und' frame	76	..	4	Electric	Am. Car & Fdy.
..	1	3rd Class	44 ft. 4 in.	St. Und' frame	61	..	4	Electric	Am. Car & Fdy.

C. H. MARKHAM, PRESIDENT OF THE ILLINOIS CENTRAL, replying to an open letter of W. H. Johnston, president of the International Association of Machinists, exposes the misleading nature of statements issued by Johnston concerning the valuation of the railroads made by the Interstate Commerce Commission. "Since you use miles of track in arriving at your estimated value per mile, of the 24 railroads, you should also have used miles of track, instead of miles of line in making your estimate of the value of all the railroads

If you had used the correct figures your estimate of the total valuation in the United States would have been \$4,640,000,000 (over 50 per cent) more than the estimate you actually made which shows the utter fallacy of the comparison. The railroads whose tentative valuations you and Mr. Plumb cite have only about seven per cent of the total trackage in the country. These are not representative roads. The valuation of all the railroads cannot be fairly or intelligently estimated upon any such unrepresentative basis."

Dividend Changes on Railroad Stocks in 1921

Apprehension of Early Months Not Borne Out— Lackawanna and Burlington Increase Rate

By Charles W. Foss

APPREHENSION as to whether the railroad boards of directors would or would not declare the regular dividends of their respective companies was an ever-present feature in financial centers throughout the better part of 1921. The apprehension at times was directed at good roads and bad, because during the early part of the year even the more fortunate roads were unable to show promising figures of net railway operating income.

The year is now behind us. It develops that the apprehensions, while they were amply justified by the contemporaneous conditions, were by-and-large not borne out in the final results. Realizing the manner in which nerves were kept on edge during the earlier and middle parts of the year, it is somewhat surprising to see how few changes really did take place during 1921 in the matter of dividend payments or changes in the rates of dividends declared. The record of the year was not good, but it was much better than many of the most optimistic would have hoped for, say, eight months ago.

The outstanding feature, of course, was the reduction in the Pennsylvania Railroad dividends from 1½ per cent quarterly to 1 per cent. Next we may put the deferring of the Southern Railway 2½ per cent semi-annual dividend on the preferred. The action of the Chesapeake & Ohio directors in deferring the 2 per cent semi-annual dividend on the common was also serious, but the C. & O. has since restored its former rate.

On the other hand, there were the Chicago, Burlington & Quincy and Lackawanna. The former declared a 54 per cent stock dividend and has since paid 25 per cent dividends on the increased capitalization. The Delaware, Lackawanna & Western, which formerly paid 5 per cent quarterly dividends, declared a 100 per cent stock dividend and is now paying at the rate of 3 per cent quarterly on the doubled capitalization and has recently declared an extra of 5 per cent.

The Interstate Commerce Commission, in its annual report issued recently, has a table covering dividend payments for the past ten years. The table shows that whereas in 1911 67.65 per cent of the stock of the railroads was paying dividends, but 57.24 per cent paid dividends in 1920. The amount paid in dividends in 1911 was \$460,195,376; in 1920, but \$328,989,492. The average rate on dividend paying stock declined from 8.03 per cent in 1911 to 6.51 in 1920; the rate on all stock from 5.42 to only 3.72. It would be difficult to indicate what has taken place with railway stocks in these years in a more striking manner. The figures given in the report follow:

CAPITAL STOCK AND DIVIDENDS, 1911-1920

Steam Roads, Excluding Switching and Terminal Companies

Year ended	Proportion of stock paying dividends, per cent	Amount of dividends	Average rate on:	
			Dividend paying stock per cent	All stock per cent
June 30, 1911	67.65	\$460,195,376	8.03	5.42
June 30, 1912	64.73	400,315,313	7.17	4.64
June 30, 1913	66.14	369,077,546	6.37	4.22
June 30, 1914	64.39	451,653,346	7.97	5.13
June 30, 1915	60.45	328,477,938	6.29	3.80
June 30, 1916	60.38	342,109,396	6.48	3.91
Dec. 31, 1916	62.02	366,561,494	6.75	4.19
Dec. 31, 1917	63.32	381,851,548	6.81	4.24
Dec. 31, 1918	58.09	339,185,658	6.60	3.83
Dec. 31, 1919	59.64	335,241,935	6.33	3.77
Dec. 31, 1920	57.24	328,989,492	6.51	3.72

The important changes in dividend rates which took place in 1921 are shown in the following table:

Name of road	Per cent declared 1921	Per cent declared 1920	Per cent rate at present	Annual rate 1920
Chesapeake & Ohio, common	2	4	4	4
Colorado & Southern, common	3	4	4	4
Chicago, Burl. & Quincy, old capitalization	25	8	10	8
Chicago, Burl. & Quincy, new	25	10	10	10
Chicago, St. Paul, Minn. & Omaha, preferred	6	7	5	7
Del., Lack. & Western, old capitalization	10	20	20	20
Del., Lack. & Western, new	11	12	12	12
Hocking Valley, common	2	4	4	4
New York, Ont. & Western	2	1	1	1
Pennsylvania Railroad	4½	6	4	6
Pittsburgh, Cincinnati, Chicago & St. Louis	4	4	4	4
Southern Railway, preferred	5	5	5	5
West Jersey & Seashore	5	5	5	5

Pennsylvania Railroad. The Pennsylvania's action in reducing the dividend rate from 1½ per cent quarterly to 1 per cent was taken on April 27. This was the first time in 22 years that the Pennsylvania had reduced the annual dividend rate below 6 per cent. Since 1899 it has paid 6 per cent annually with the exception of 1906 when the rate was 6½ per cent and 1907 when it was 7 per cent. All of the stock of the Pittsburgh, Cincinnati, Chicago & St. Louis with the exception of about 1 per cent is owned by the Pennsylvania Company; the road had been paying 2 per cent semi-annually but action on this dividend was deferred at a meeting held June 22. The Pennsylvania owns \$6,747,900 of the \$11,586,250 stock of the West Jersey & Seashore. The latter deferred its semi-annual dividend of 2½ per cent in March. The road had been paying dividends since 1896, most of the time at 5 per cent. In 1906 the rate was raised to 8 per cent; in 1908, reduced to 4 and has been 5 per cent since 1910.

Southern Railway. The directors at a meeting on May 12 failed to take action on the regular semi-annual dividend of 2½ per cent on the preferred stock, usually paid June 30. The dividends on the preferred stock have varied considerably, ranging since 1897 from none to 5 per cent. In 1915 and 1916 no dividends were paid; on November 20, 1917, 2½ per cent was declared; April 30, 1918, 2½ per cent; November, 1918, 2½ per cent; 1919, 5 per cent, and 1920, 5 per cent.

Chesapeake & Ohio. On May 20, 1921, the directors of the Chesapeake & Ohio deferred action on the regular semi-annual dividend of 2 per cent due June 30, 1921. In November, however, a dividend of 2 per cent was declared payable January 3 to stockholders of record December 2. The Chesapeake & Ohio from 1899 to 1908 paid 1 per cent annually. In 1909 it paid 3 per cent; from June, 1910, to June, 1913, at the rate of 1¼ quarterly. In 1914, 3 per cent was paid. No dividends were paid between December, 1914, and December, 1916, at which time a rate of 2 per cent semi-annually was established.

The Hocking Valley's rate of 2 per cent semi-annually on the common goes back to December, 1915. As in the case of the C. & O., the dividend was deferred in June but restored in November.

Chicago, Burlington & Quincy. This company declared a stock dividend of 600,000 shares, or 54.132 per cent, to stockholders of record March 31. Inasmuch as the details were given prominence in the *Railway Age* at the time, it is not necessary to repeat them. The Burlington, on its former capitalization, paid quarterly dividends at the rate of 8 per

cent annually; this rate began in 1908 and was paid to March this year, except in September, 1917, when an extra dividend of 10 per cent was paid. Following the declaration of the stock dividend, or on May 26, a dividend of 5 per cent was declared without reference to any annual rate. On December 1 additional dividends were declared, including a semi-annual dividend of 5 per cent and an extra dividend of 15 per cent. The proceeds nearly all go to the Northern Pacific and Great Northern and will assist the two latter roads materially in maintaining their own dividends, which in 1921 were paid from surplus rather than from current earnings. The Burlington dividends in 1921 included 2 per cent on its old capitalization and 25 per cent on the new capitalization.

The Colorado & Southern paid a dividend of 3 per cent on its common stock in December. This was the first divi-

dend on this issue since 1912, when 1 per cent was paid. The Burlington owns \$23,667,500 of the C. & S. \$31,000,000 common stock.

Delaware, Lackawanna & Western. The Lackawanna stock dividend of 100 per cent, or about \$45,000,000, represented a capitalization of about one-half the company's surplus. The company has been paying dividends of 20 per cent annually since 1910. The 100 per cent stock dividend was declared July 28, payable August 20. The directors, on September 29, declared a quarterly dividend of 3 per cent payable October 20. This is at the rate of 12 per cent annually on the new capitalization, or 24 per cent on the former capitalization. On December 29, in addition to declaring the regular quarterly dividend of 3 per cent, they declared an extra dividend of 5 per cent, to be paid out of surplus, payable January 20 to stock of record January 7.

Receiverships and Foreclosure Sales During 1921

Mileage Operated by Receivers Now Totals 14,324, as Compared with 17,197 Miles at End of 1920

THE MILEAGE OF ROADS in the hands of receivers at the end of 1921 was, according to the compilations of the *Railway Age*, 14,502. This represents the smallest mileage in the hands of receivers since 1912. It compares with 17,197 miles in receivership at the end of 1920 or with the total of 37,353 on June 30, 1916. During the year two large roads were reorganized and taken out of receiver's hands. One of these was the Denver & Rio Grande, operating 2,485 miles of line, and the other was the Chicago & Eastern Illinois, operating 1,131 miles.

The Missouri, Kansas & Texas Lines, operating a total of 3,807 miles, are about to be taken from the receivership lists. The plan of reorganization was announced in November and will presumably be made effective within a short time. The road must be shown in the 1921 totals of roads in the hands of receivers, but it must be borne in mind that the 1921 total mileage of 14,380 is about to be reduced in the amount of the Katy system mileage of 3,807.

The roads that went into the hands of receivers during 1921 totaled 14 with a mileage of 1,744. But one important road was included, the Atlanta, Birmingham & Atlantic, which has been in receivership on various previous occasions. The 1921 figure compares with 10 roads having 541 miles of line which went into the hands of receivers during 1920.

The year 1921—until recent months at least—was an exceedingly poor year from the standpoint of both gross and net earnings. Under former conditions it might have been expected that more roads would have gone into the hands of receivers than did so. The Transportation Act, however, has given an entirely different aspect to the situation as it has in the case of many other things. The new feature, insofar as the matter of receiverships is concerned, is the loan fund administered by the Interstate Commerce Commission. The commission, in both 1920 and 1921, has

made loans to several carriers for the purpose of assisting them in meeting maturities. Presumably, in the majority of cases, other methods of meeting these maturities would have been worked out, had this method not been available, but there can be little question that in a few cases, at least, receivership was made considerably less of a possibility.

It is fortunate that the money markets are much easier than they were, but it must be realized that during much of the period we have just passed through the financial

RECEIVERSHIPS ESTABLISHED IN 1921

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Alabama & Mississippi	78	\$184,000	\$10,000
Atlanta, Birmingham & Atlantic	640	9,592,407	30,000,000
Colorado, Wyoming & Eastern	111	2,390,000	4,300,000
Columbus & Greenville	226	200,000	50,000
Dayton, Toledo & Chicago	95	389,950	300,000
Delaware & Northern	50	50,000	1,250,000
Gainesville Midland	74	1,009,726	550,000
Gulf, Texas & Western	99	2,000,000	500,000
Hampdens Railroad Corp.	15	.....	1,400,000
Knoxville, Sevierville & Eastern	28	500,000	500,000
Muscogee, Burlington & Southern	53	569,900	750,000
Savannah & Atlanta	147	3,365,000	2,250,000
Tennessee Railroad	61	1,376,900	229,700
Wichita Falls, Ranger & Fort Worth	67	67,500	150,000
	1,744	\$11,662,413	\$42,209,700

centers were in far from a receptive mood. There is also a new element in the situation in that the country now has an entirely new attitude towards receiverships from what it used to have. It can hardly be denied that with our new regulation and the increased amount of it, to put a railroad company into the hands of receivers is a much more serious matter than it used to be. This deterring influence is a potent one.

Another entirely different angle of the situation is the matter of abandoned lines. As is pointed out in an article on that subject which appears elsewhere in this issue, the

FORECLOSURE SALES IN 1921

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding	Remarks
Chicago & Eastern Illinois	1,131	\$55,419,150	\$18,267,800	Turned over to new company Jan. 1, 1922
Chicago & North Western	37	.....	.....	To be dismantled
Denver & Rio Grande	2,485	33,738,000	87,775,670	Sale in Nov., 1920, confirmed March 28, 1921.
Fla. Florida & Alabama	143	4,146,000	4,660,000	Sale not yet confirmed.
Home Association	140	3,398,000	5,000,000	Operated now as Missouri Illinois
Knoxville, Sevierville & Eastern	28	500,000	500,000	
Missouri, Kansas & Texas	10	812,300	86,000	
Tennessee, Alabama & Georgia	95	364,683	1,446,577	Has asked court's permission to scrap line.
V. Texas, Missouri & Western	43	.....	.....	May be dismantled; 3½ miles already taken up.
Washington & North Branch	44	545,000	1,374,662	Reorganized May 16, 1921
Wyoming & Missouri River	18	.....	500,000	
	4,173	\$186,213,131	\$119,910,809	

Interstate Commerce Commission has been overwhelmed with requests for authority to abandon operation of lines or sections of lines. This is reflected in the list of roads in the hands of receivers. Nine roads in the hands of re-

RAILROAD MILEAGE IN THE HANDS OF RECEIVERS

(Figures to 1919, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1919)

Years ended	Miles of road operated by receivers at close of year	Net change during the year in miles of road operated	Number of roads in charge of receivers at close of year
June 30, 1894.....	40,819	.....	192
1895.....	37,856	-2,963	169
1896.....	30,476	-7,380	151
1897.....	18,862	-11,614	128
1898.....	12,745	-6,117	94
1899.....	9,853	-2,892	71
1900.....	4,178	-5,675	52
1901.....	2,497	-1,681	30
1902.....	1,475	-1,022	27
1903.....	1,185	-290	27
1904.....	1,323	+138	26
1905.....	796	-527	24
1906.....	3,971	+3,175	34
1907.....	3,926	-45	39
1908.....	9,529	+5,603	52
1909.....	10,530	+1,001	44
1910.....	5,257	-5,273	39
1911.....	4,593	-664	39
1912.....	3,353	+5,193	44
1913.....	16,286	+6,500	49
1914.....	18,608	+2,322	68
1915.....	30,223	+11,615	85
1916.....	37,353	+7,130	94
Dec. 31, 1916.....	34,804	-2,549	82
1917.....	17,376	-17,428	84
1918.....	19,208	+1,832	74
1919.....	16,590	-2,618	...
1920.....	17,197	.....	...
1921.....	14,502	.....	...

*Represents decrease for six months.

ceivers are shown as having abandoned the operation of their lines. The Alabama & Mississippi, which went into the hands of receivers in March, 1921, has since been granted authority by the Interstate Commerce Commission

SUMMARY OF FORECLOSURE SALES 1876 TO 1921

Year	Number of roads	Miles	Bonds and stocks
1876.....	40	3,840	\$217,848,000
1877.....	54	3,875	198,984,000
1878.....	38	3,906	131,631,000
1879.....	65	4,909	243,288,000
1880.....	31	3,775	263,882,000
1881.....	29	2,617	137,923,000
1882.....	16	867	65,426,000
1883.....	18	1,354	47,100,000
1884.....	15	710	23,504,000
1885.....	12	3,156	278,394,000
1886.....	45	7,687	374,109,000
1887.....	31	5,478	328,181,000
1888.....	19	1,596	64,555,000
1889.....	25	2,930	293,000,000
1890.....	29	3,825	182,495,000
1891.....	21	3,223	169,069,000
1892.....	28	1,922	95,898,000
1893.....	25	1,613	79,924,000
1894.....	42	5,643	318,999,000
1895.....	52	12,831	761,791,000
1896.....	58	13,730	1,150,377,000
1897.....	47	6,674	86,467,000
1898.....	47	6,054	252,910,000
1899.....	32	4,294	267,534,000
1900.....	24	3,477	190,374,000
1901.....	20	1,139	85,808,000
1902.....	693	6,933	39,728,000
1903.....	13	555	15,885,000
1904.....	13	524	28,266,000
1905.....	6	207	20,307,000
1906.....	8	262	10,400,000
1907.....	6	114	13,777,000
1908.....	3	138	2,547,000
1909.....	13	2,633	250,033,000
1910.....	17	1,100	93,660,109
1911.....	13	1,386	40,741,543
1912.....	12	661	25,910,990
1913.....	6	1,159	86,163,850
1914.....	9	1,470	83,815,500
1915.....	11	3,914	285,258,782
1916.....	26	8,355	703,444,855
1917.....	30	10,963	557,846,348
1918.....	11	763	24,735,187
1919.....	8	459	15,479,587
1920.....	7	380	7,676,200
1921.....	11	4,173	306,123,942

to abandon 67 miles of line. The Missouri & North Arkansas—in the hands of receivers since 1912—has had, primarily because of labor troubles, to cease the operation of its 365-mile line. The Louisiana & Northwest—in receivership since 1912—has already taken up 22 miles.

Several of the roads which went through the experience of a foreclosure sale during the year were bought up by the dealer in second-hand material. The Collins & Ludowici is one. The Tennessee, Alabama & Georgia, owning 95 miles of line, has asked permission of the court to scrap the line. The fate of the Valdosta, Moultrie & Western, 42 miles, is, according to latest reports, still in the balance. At one time it was destined to be taken up but more recently some interests have proposed the possibility of restoring operations. Some of the line, however, has already been taken up.

Railroads shown in the lists of receiverships in former years have for the most part been removed from that list by reorganization. The increasing proportion of those elimi-

ROADS GOING INTO RECEIVERSHIP, 1876 TO 1921

Year	Number of roads	Miles	Bonds and stocks
1876.....	42	6,662	\$467,000,000
1877.....	38	3,637	220,294,000
1878.....	27	2,320	93,385,000
1879.....	12	1,102	39,167,000
1880.....	13	885	140,265,000
1881.....	5	110	3,742,000
1882.....	12	912	39,074,000
1883.....	11	1,900	90,318,000
1884.....	37	11,038	714,758,000
1885.....	44	8,836	385,460,000
1886.....	13	1,799	70,346,000
1887.....	26	2,159	84,479,000
1888.....	22	3,270	186,814,000
1889.....	22	3,803	99,664,000
1890.....	26	2,963	105,007,000
1891.....	26	2,159	84,479,000
1892.....	36	10,598	357,692,000
1893.....	74	29,340	1,781,046,000
1894.....	38	7,025	395,791,000
1895.....	31	4,089	369,075,000
1896.....	34	5,441	275,597,000
1897.....	18	1,537	92,909,000
1898.....	18	2,069	138,701,000
1899.....	10	1,019	52,285,000
1900.....	16	1,165	75,234,000
1901.....	4	73	1,627,000
1902.....	5	278	5,835,000
1903.....	9	229	18,823,000
1904.....	8	744	36,479,000
1905.....	10	3,593	176,321,000
1906.....	6	204	55,042,000
1907.....	7	317	13,585,066
1908.....	24	8,009	182,112,497
1909.....	5	859	78,095,000
1910.....	7	735	51,427,500
1911.....	5	2,606	210,606,882
1912.....	13	3,784	182,112,497
1913.....	17	9,020	477,880,200
1914.....	22	4,222	199,571,446
1915.....	12	20,143	1,070,808,628
1916.....	9	4,439	208,919,000
1917.....	19	2,486	61,169,962
1918.....	8	3,519	242,090,800
1919.....	7	244	11,886,779
1920.....	10	511	21,667,150
1921.....	14	1,744	63,872,113

nated because of their being dismantled is a factor which naturally will be watched with great interest.

The three most important roads involved in the receiverships and foreclosure sales during 1921 were the Denver & Rio Grande, the Chicago & Eastern Illinois and the Missouri, Kansas & Texas.

The Denver & Rio Grande is shown in the list of foreclosure sales during 1921. That road was actually sold in November, 1920, but was not included in the 1920 foreclosures, because of the litigation pending at the time, and because the sale had not been confirmed at the time the list was made up. The sale was finally confirmed in the federal court in Denver on March 28, 1921. J. H. Young was elected president of the new Denver & Rio Grande Western in April. The formal transfer to the new company was to have taken place May 30 but further difficulties intervened and the transfer was not completed until about July 31.

The Chicago & Eastern Illinois reorganization plan was dated March 31, 1921. The plan reduced the fixed charges of the old company from \$3,759,996 to \$2,327,051 for the new. Two portions of the old company's line—the Chicago & Indiana Coal Railway and the Evansville & Indianapolis—were not acquired by the new company. The foreclosure

sale took place at Danville, Ill., on April 5. Announcement was made in November by Kuhn, Loeb & Co. reorganization managers that the plan and agreement were operative. Further announcement was made in December that the new securities would be ready for distribution on and after

December 27. The Chicago & Eastern Illinois was turned over to the newly reorganized company on January 1, 1922.

The Missouri Kansas & Texas reorganization plan was announced November 23. Details concerning it were given in the *Railway Age* of November 26, pages 1043 and 1044.

RAILROADS IN THE HANDS OF RECEIVERS

Name of Road	Mileage	Date of Receivership	Bonds of old company	Stock of old company	Total old company securities	Remarks
Alabama & Mississippi	78	March 17, 1921	\$184,000	\$10,000	\$194,000	Authorized to abandon line.
Altona Northern	16	August 8, 1919	370,000	675,000	1,045,000	
Atlanta, Birmingham & Atlantic	640	February 25, 1921	9,592,407	30,000,000	39,592,407	
Birmingham & Southeastern	48	July 26, 1920	747,600	1,475,000	2,222,600	
Birmingham, Columbus & St. Andrews	38	December 25, 1918	250,000	4,000,000	4,250,000	
Cape Girardeau Northern	104	April 14, 1914	1,156,000	110,000	1,266,000	
Chicago, Peoria & St. Louis	247	August 1, 1914	3,850,000	4,000,000	6,850,000	
Colorado Midland	338	July 19, 1921	9,532,000	10,000,000	19,532,000	Operation discontinued.
Colorado Springs & Cripple Creek District	74	May 2, 1919	2,640,000	2,000,000	4,640,000	Operation discontinued.
Colorado, Wyoming & Eastern	111	November 30, 1921	2,390,000	3,300,000	6,690,000	
Columbus & Greenville	226	June 4, 1921	200,000	50,000	250,000	
Dansville & Mount Morris	15	June 7, 1894	150,000	50,000	200,000	
Dayton, Toledo & Chicago	95	April 29, 1921	386,980	300,000	686,980	
Delaware & Northern	50	March 16, 1921	20,000	1,270,000	1,290,000	
Denver & Salt Lake	255	August 16, 1917	12,731,000	583,515	13,314,515	
Eagles Mere	30	March 22, 1920	7,200	49,000	56,200	
Eastern Kentucky	36	March 31, 1919	3,455,900	3,455,900	6,911,800	
Fort Smith & Western	254	October 9, 1915	6,240,000	5,000,000	11,240,000	Reorganization approved by I. C. C.
Gainesville Midland	74	February 15, 1921	1,009,726	550,000	1,559,726	
Georgia & Florida	405	March 27, 1915	9,052,000	8,750,000	17,802,000	
Gulf, Florida & Alabama	143	May 9, 1917	4,446,000	4,660,000	9,106,000	
Gulf, Texas & Western	99	January 24, 1921	2,000,000	500,000	2,500,000	
Hampten Railroad Corp.	96	July 17, 1920	586,000	100,000	686,000	Not operated.
Hawkinsville & Florida Southern	96	July 17, 1920	586,000	100,000	686,000	Abandoned, but not taken up.
Helena, Parkin & Northern	16	July 3, 1919	65,000	100,000	165,000	
Houston & Brazos Valley	30	October 27, 1915	420,000	24,000	444,000	
International & Great Northern	1,169	August 10, 1914	26,315,000	4,822,000	31,137,000	
Kansas City, Kansas & Texas	272	April 16, 1915	33,500,000	20,000,000	53,500,000	
Kansas City Northwestern	171	February 23, 1917	.....	1,400,000	1,400,000	Operation discontinued.
Louisiana & Northwest	121	August 22, 1913	2,250,000	2,300,000	4,550,000	22 miles taken up.
Macon & Birmingham	214	February 1, 1908	500,000	2,000,000	2,500,000	
Manistee & North Eastern	121	December 24, 1918	1,035,000	1,000,000	2,035,000	
Mempbis, Dallas & Gulf	130	September 10, 1920	2,052,000	2,052,000	4,104,000	Operation discontinued.
Midland & Northwestern	65	March 1, 1920	213,666	10,035	223,701	Operation discontinued.
Missouri & North Arkansas	365	April 1, 1912	8,340,000	8,340,000	16,680,000	Operation discontinued.
Missouri, Kansas & Texas Lines	3,807	September 27, 1915	143,411,824	76,309,557	219,721,381	Reorganization plan announced.
Morgantown & Wheeling	26	February 26, 1916	343,000	343,000	686,000	
Muscateine, Burlington & Southern	53	May 20, 1921	569,000	750,000	1,319,000	
Northwestern Terminal	5	January 21, 1920	2,273,000	3,000,000	5,273,000	
Ocala Southern	69	June 30, 1918	416,000	1,000,000	1,416,000	
Ocklawaha Valley	54	January 21, 1918	.....	250,000	250,000	
Paris & Mt. Pleasant	54	February 26, 1920	600,000	75,000	675,000	
Pine Bluff & Northern	8	February 9, 1916	.....	160,000	160,000	
Pittsburg, Shawmut & Northern	200	August 1, 1905	14,527,600	15,000,000	29,527,600	
Rome & Northern	23	February 28, 1911	1,000,000	1,000,000	2,000,000	
St. Louis, I. R. & Western	42	October 9, 1915	817,000	970,800	1,787,800	
Salina Northern	81	July 28, 1917	1,500,000	1,143,000	2,643,000	
San Antonio, Valde & Gulf	315	August 12, 1914	4,130,000	4,693,000	8,823,000	
Savannah & Atlanta	147	March 4, 1921	3,365,000	2,250,000	5,615,000	
Sharpsville Railroad	18	January 21, 1897	.....	250,000	250,000	
Tennessee Railroad	61	January 22, 1921	1,376,900	229,700	1,606,600	
Tennessee Central	393	January 1, 1913	12,220,900	8,000,000	20,220,900	I. C. C. to investigate proposed reorganization as Tennessee Midland.
Texas & Pacific	1,953	October 27, 1916	54,876,000	38,755,110	93,631,110	
Toledo, Peoria & Western	230	July 2, 1917	4,895,000	4,807,600	9,702,600	
Toledo, St. Louis & Western	454	October 22, 1914	97,622,000	19,927,600	117,549,600	
Tulsa & Brazos Valley	303	June 16, 1914	9,357,014	304,000	9,661,014	
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000	
Waupaca-Green Bay	10	September 1, 1917	69,000	61,400	130,400	May be merged with Green Bay & Western.
West Virginia Midland	46	May 20, 1920	600,000	500,000	1,100,000	
Wilmington, Roanoke & Port Worth	67	December 26, 1921	67,500	120,000	187,500	
Total	4,501		\$ 425,589,023	\$ 299,460,517	\$ 725,049,540	

St. Paul Wants to Acquire C. M. & C.

The Chicago, Milwaukee & St. Paul has applied to the Interstate Commerce Commission for authority to purchase the Chicago, Milwaukee & Gary and thus gain a direct connection with the Chicago, Terre Haute & Southeastern, which road has been operated by the St. Paul since July, 1921, when it was acquired by lease, and purchase of its capital stock. The Chicago, Milwaukee & Gary has a total mileage of 141.86 miles, 96.83 miles of which are main line between Rockford, Ill., and Aurora, and between Joliet and Delmar. It also has trackage rights over the Elgin, Joliet & Eastern between Aurora and Joliet, a distance of 22.49 miles, and recently applied to the Interstate Commerce Commission for authority to build between these points. The St. Paul will make connections with the Gary line at Delmar, Ill., and Rockford. Should the St. Paul acquire the line it will be able to transport coal and other freight originating on the Chicago, Terre Haute & Southeastern to its own lines and the northwest on its own tracks. The purchase would also give the St. Paul the ad-

vantage of an outer belt line around the Chicago terminal district.

The Chicago, Milwaukee & Gary was incorporated March 3, 1908, in Illinois, to acquire by purchase and construction a line of road from Milwaukee, Wis., to Gary, Ind. The company acquired the railroad and property of the Illinois, Iowa & Minnesota, with its subsidiary lines and the Illinois, Indiana & Gary. Extensions were projected from Delmar to La Crosse, Ind., 36 miles, and from Rockford, Ill., to Milwaukee, Wis. The assets of the company in 1920 were \$10,381,869, as against a capital stock of \$1,000,000, a funded debt of \$5,798,000, current liabilities of \$2,718,540, and unadjusted credits and deferred liabilities of \$865,329.

During the year 1920 the road operated with a combined federal and corporate deficit of \$278,078.

The St. Paul plans to acquire from the St. Louis Trust Company, \$1,000,000 par value in stock and \$5,700,000 par value in first mortgage bonds, the entire securities issue of the road and to return to the trust company, \$3,000,000 of bonds after guaranteeing their payment, interest and principal.

Signal and Interlocking Work Shows Slight Gain



On the Santa Fe in Texas

Construction Activities Show
a Little Improvement Over
1920, Which Was the
Lowest Since 1905

By K. E. Kellenberger



In the California Mountains

SIGNAL CONSTRUCTION has been spoken of as the barometer of the railroad field because authorizations for such work generally are the last to be approved and the signal budgets are among the first to be cut. Thus, the financial conditions of the railroads are reflected through this department's activities. On this basis it is interesting to note that the block signal mileage (manual and automatic) installed, increased rapidly from 1906 to 1915. The construction curve flattened out materially during 1908 and again, although not to the same extent, in 1913. Construction work was carried on actively in 1914 but has slumped decidedly from that date to the present. In 1919 statistics indicated that railway signaling was on the decline, while in 1920 construction activities were lighter than during any period since 1905. Conditions improved but slightly during 1921.

Taking the progress in automatic signal construction for the 10 years preceding 1915 as normal and comparing it with that for the seven years from January 1, 1915, to January 1, 1922, we find that the progress in the latter years has been far from satisfactory. The average mileage installed for the 10-year period preceding 1915 was 2448.4, while for the seven-year period to date the average has been 1291.1 miles. The difference between the two leaves a net deficiency per year of 1157.3 miles, or a total for the seven years of 8101 miles. In order to get back to what we have taken as the normal rate of installation it would be necessary in a period of five years for the roads to install a total of 4068 miles each year. The diagram illustrates the tendencies in signal construction since 1906.

Block Signaling Completed in 1921

A total of 824 miles of road in the United States and Canada was equipped with block signals during the past year. Part of the mileage represents new construction, a portion represents reconstruction and a part consists of automatic block signals installed in place of the manual system. Where automatic signaling was in use previously, the

changes were due largely to signaling certain tracks for running trains in either direction on the same track. Other changes consisted of replacing one type of signals with another or new signals for additional main tracks. One notable feature about our tables is the very short stretches of automatic signals installed. Station and curve protection, shortening of block sections, better facilities for approaches to yards, and small sections of dense traffic territory were the occasions for the majority of the signals installed; which naturally means a small mileage at each location.

Thirty roads built new interlocking plants or made changes in existing ones, affecting a total of 59 plants. Canada is represented by six plants.

ONLY 824 miles of road in the United States and Canada were equipped with block signals during the past year; 174.9 miles under construction in the two countries and 613.6 miles are known to be proposed for 1922.

Fifty-nine interlocking plants are completed; 24 are under construction; 30 are proposed for 1922.

The tendency is toward the operation of trains by signal indication without written train orders.

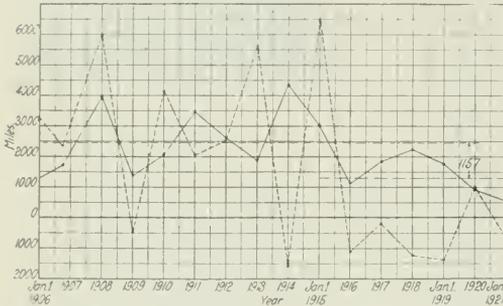
Comparing the figures for 1921 with those for 1920, published in the January 7, 1921, issue of the *Railway Age*, it is seen that there has been a slight increase in construction work of this character, as the total block signal mileage completed in the United States and Canada during 1921 was 824 as compared to 523.5 miles of road in 1920. Of this 824 miles, 209.8 represents manual blocking installed, which leaves 614.2 miles of road on which automatic block signals were placed. This figure, however, is likely higher than the actual additional mileage installed because in some cases additions have been made to installations already in service. A slight increase is thus noted in the additional mileage of automatic signaling constructed, as this is 90 miles more than in 1920. Comparing this mileage with that reported by the Interstate Commerce Commission as of January 1, 1921, and which is recorded in the table showing block signals installed in the United States since January 1, 1907, there appears to have been 10.8 miles more automatic block signaling completed during 1921 than in 1920. In each year shown in that table the mileage of automatic block signals installed was more than double that reported for the years 1920 and 1921.

In comparing the total mileage of block signals under construction in the United States and Canada on December 31, 1921, with that under construction on the same date in

1920, it is seen that there is now a decrease of 42.2 miles. The total mileage under construction on December 21, 1921, was entirely in the United States, no Canadian roads having reported any work in progress. The work in progress consisted of automatic block signaling exclusively, there being no manual block under construction at the end of the year. Some of the work going in replaces manual blocking, while in other cases it consists of the replacement of one type of apparatus with another.

Work Proposed for 1922

The proposed block signal work for next year represents 613.6 miles of road to be equipped with automatic block signals. It will be noted that this is but half a mile less than was installed during 1921. The plans of many of the



Signal Construction Since 1905. Dotted Line, Manual Block; Solid Line, Automatic. Average Deficiency in Automatic Block Signal Mileage Installed Is 1,157 Miles a Year Under That for Period, 1905-1914

roads, however, are very indefinite as they have not as yet decided on their budgets. Expressions received from a number of the roads tend to indicate that at least twice this mileage is to be installed unless there is a decided change in the conditions affecting the finances of the railroads. In making a comparison of the block signal mileage proposed for next year with that proposed one year ago it is seen that there is an increase over that of a year ago of 103.8 miles of road. The proposed new work reported is for 577.6 miles of automatic block signals in the United States and 36 miles of the same type in Canada. No manual block signaling is proposed at the present time.

Interlocking Construction in 1921

There has been a slight increase in the number of interlocking plants built or rebuilt, as compared with 1920, when a total of 43 were built or rebuilt in the United States, and two in Canada as compared to 53 in United States this year, and six in Canada. The number of plants under construction in the United States on December 31, 1920, was 18 and one in Canada as compared to 24 this year, none of which are in Canada. A total of 22 plants was proposed a year ago none being in Canada, in comparison with a total of 21 for the coming year in the United States and nine in Canada.

Signal Construction Data

The figures so far available, together with the data covering the work now under construction and in respect to plans for 1922, are shown in the accompanying tables under nine heads as follows:

- F—Manual Block Signaling Proposed for 1922 (None).
- G—Interlocking Completed in 1921.
- H—Interlocking Under Construction.
- I—Interlocking Proposed for 1922.

	New Block Signals Completed in 1921						Both, total miles
	Automatic (Table A)			Manual (Table D)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	293.0	264.7	557.7	209.8	...	209.8	767.5
Canada	56.3	...	56.3	...	...	...	56.5

	New Block Signals Under Construction Dec. 31, 1921						Both, total miles
	Automatic (Table B)			Manual (Table E)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	119.3	55.6	174.9	...	...	...	174.9
Canada	...	...	...	...	...	...	...

	New Signals Proposed for 1922						Both, total miles
	Automatic (Table C)			Manual (Table F)			
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	348.	229.6	577.6	...	...	...	577.6
Canada	30.	6.	36.0	...	...	...	36.0

Table G Completed in 1921	No. of plants	Number of levers	
		Mechanical	Electric
		United States	53	501	429
Canada	6	57	...

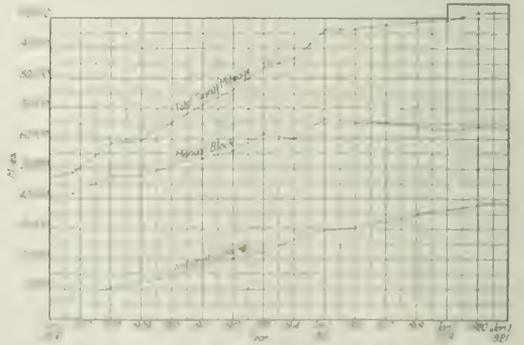
Table H Under Construction Dec. 31, 1921	No. of plants	Mechanical	Electric				
				United States	24	223	241
				Canada	...	...	...

Table I Proposed for 1922	No. of plants	Mechanical	Electric				
				United States	21	182	378
				Canada	9	86	24
Total United States	98	906	1,048				
Total Canada	15	143	24				
Grand total	113	1,049	1,072				

TOTAL CONSTRUCTION—THIRTEEN YEARS—I. C. C. REPORTS

Year	Miles of road		Total
	Automatic block	Manual block	
1908	1,387.6	-517.6	870.0
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	4,623.4	2,517.2	7,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	-1,563.4	2,787.1
1914	3,030.7	6,511.5	9,542.2
1915	1,113.1	-1,112.0	1.1
1916	1,843.5	-196.9	1,646.6
1917	2,242.2	-1,214.9	1,027.3
1918	1,794.9	-1,392.4	396.5
1919	979.4	1,007.1	1,986.5
1920	575.1	-575.7	-0.6

From the reports received, the largest mileage of automatic signals installed on any one road was on the Missouri,



Curves Showing Mileage of Block Signals Installed

Kansas & Texas, which put in service 153.75 miles of single track, using 253 signals. The next largest installations were made on the Cleveland, Cincinnati, Chicago & St. Louis, which put in service 68.1 miles of double track, using 121 signals, and the Great Northern which installed 58 miles of single track, using 111 signals. The Canadian National Railways installed 52 miles of single track and 4.5 miles

A—Automatic Block Signaling Completed in 1921
 B—Automatic Block Signaling Under Construction.
 C—Automatic Block Signaling Proposed for 1922
 D—Manual Block Signaling Completed in 1921
 E—Manual Block Signaling Under Construction (None).

of double track automatic block signaling, using a total of 111 signals. Signals installed on other roads consisted mostly in the protection of short stretches of track or new multiple tracks or for curve and station protection purposes.

But nine roads report automatic block signals under construction at the end of the year, the greatest mileage reported being by the Missouri, Kansas & Texas, which has 63.5 miles of single track signaling under way, using 98 signals. The Chesapeake & Ohio has under construction 40 miles of single track, A. P. B. color-light automatic signals, using 88 signals, while the Pennsylvania is installing 19.4 miles of double track and 15 miles of four-track position-light automatic signals, using a total of 96 signals for this purpose.

Of the 10 roads reporting work proposed for 1922, the Northern Pacific contemplates the construction of 155 miles of single track and 48 miles of double track signaling, using 378 signals. This road also contemplates replacing d. c. track circuits with a. c. track circuits on 68 miles of road. The Great Northern has in view the construction of 165 miles of single track automatic signaling, while the Atchison, Topeka & Santa Fe contemplates 6.8 miles of single track and 57.6 miles of double track automatic block signaling, using 80 signals. The reports from the various roads on proposed work are rather incomplete as many have not as yet prepared their programs or had their budgets approved for 1922. The Canadian National Railways propose to install 30 miles of single track and six miles of double track automatic block signaling during the coming year.

The manual block signaling installed during 1921 consisted of 204.6 miles of single track, 141 miles of which was on the Fort Worth & Denver City, a total of 16 two-arm signals being used. The Chicago & North Western installed 61 miles, using 9 two-arm signals, while the Los Angeles & Salt Lake put in service 2.6 miles of controlled manual block, using the staff system. No manual signaling was under construction at the end of the year, or proposed for the coming year.

Automatic Train Control

An installation of automatic train control is under construction on the Chesapeake & Ohio, between Charlottesville, Va., and Staunton, a distance of 40 miles. An a. c. power transmission line is being built over this territory and color-light signals are to be used in connection with the train control. This installation is in single track territory. The Chicago, Lake Shore & South Bend reports 1½ miles of automatic train control placed in service.

Interlocking Construction Data

Thirty roads report interlocking plants as completed or reconstructed during the past year. Table G gives this list in detail. It is necessary that this be considered more as an exhibit of the work done than as showing the precise amount of the increase of such apparatus in use in the country as some of the figures represent reconstruction or enlargements; and, also, some duplications necessarily occur as a plant may be reported by two or more roads. The same remarks apply also to Tables H and I.

Aside from the small amount of work completed, under construction or contemplated, it is interesting to note that the plants are all of comparatively small size. A number of electro-mechanical plants appear in the tables as do additions of electric units to existing plants, thus obviating the necessity of enlarging existing towers. Considerable work has been done in replacing mechanical detector bars with detector locking.

An analysis of the plants shows that the largest electric plant completed during the year is one of 57 working levers at Carlton, Minn., on the Great Northern, while the next largest is one of 44 working levers at Richmond, Ind., on the Pennsylvania. The third largest plant of this type had 23

working levers and was installed at Myerstown, Pa., on the Philadelphia & Reading. The largest electro-pneumatic machine completed was one of 45 levers at Phillipsburg, N. J., on the Central of New Jersey.

Two electro-pneumatic push-button machines were reported as completed in 1921, both on the New York, New Haven & Hartford. These are for hump yard operation, one (36 push buttons) at New Haven, Conn., and the other (23 push buttons) at Providence, R. I.

Seven electro-mechanical plants were reported as completed; one on the Cleveland, Cincinnati, Chicago & St. Louis having 50 mechanical and 12 electric working levers and another on the same road having 41 mechanical and 10 electric working levers.

The largest mechanical plant installed was on the Baltimore & Ohio at Tates Point, Ohio; it had 34 working levers. The next largest plant consisted of 29 working levers and is on the Illinois Central at Ramsey, Ill. Other plants range in size from one of three levers up to the largest mentioned above. One plant is of the cabin-door lock type, while others are equipped with a. c. track circuits, time locks, electric and detector locking; power distant signals and position light signals.

Interlocking Plants Under Construction

The largest electric interlocking plant under construction on December 31, 1921, was at Schoharie Junction, N. Y., on the Delaware & Hudson and consists of 25 working levers. The next in size is one having 21 working levers at Altamont, Wyo., on the Union Pacific.

The Interborough Rapid Transit, New York City, has under construction two electro-pneumatic plants, one of 44 working levers at 180th street and the other with 10 working levers at New Lots avenue, on the East Parkway line (Brooklyn).

The largest electro-mechanical plant under construction, as of the above date, is one of 43 working levers at Mountain Lake Park on the Baltimore & Ohio, while the Chesapeake & Ohio is building one having nine mechanical and 11 electric working levers at Hinton, W. Va.

The largest mechanical plant under construction is one having 24 working levers at Pontiac, Mich., on the Grand Trunk; the next largest being one of 20 working levers at Finch, N. Y., on the New York Central.

Proposed Interlocking Work

Of the plants proposed for 1921, the largest electric plant is one of 56 working levers to be located at Sierra Vista, Calif., on the Pacific Electric; the next largest being one of 22 working levers at Charlotte, Mich., on the Grand Trunk.

The Interborough Rapid Transit, the Chesapeake & Ohio and the Philadelphia & Reading report proposed installations of electro-pneumatic plants during the present year. The first named road is planning on three plants of 52, 50 and 32 working levers, respectively; the second road proposes to build a 28-lever machine, while the P. & R. contemplates installing one of 53 working levers and one of 42 working levers.

The largest electro-mechanical plant in prospect is one of 10 mechanical and 19 electric working levers at Atlantic City, N. J., on the P. & R. The second largest will consist of eight mechanical and 19 electric working levers at St. Albans, W. Va., on the C. & O.

The Philadelphia & Reading proposes to install a 35-working lever mechanical interlocking at Schuylkill Haven, Pa., while the Missouri, Kansas & Texas contemplates one of 18 working levers at Mound City, Kan.

The General Outlook

The general outlook a year ago appeared favorable for increased signal construction, but instead work during 1921

has been largely in a state of coma as compared to that during normal periods. For the coming year, returns indicate that prospects in general are not bright for signal construction work in the eastern and southeastern sections of the country, while in the central, northwestern and southwestern sections, indications point to a renewal of signal work. Returns indicate that 8000 miles of automatic block signals and 95 interlocking plants should be installed to meet the traffic conditions adequately. The extent to which these needs will be met in 1922 depends on business conditions.

The maintenance work in practically all cases is up to standard and it is the expectation to keep it in this condition, although a few roads report maintenance as being from six months to three years behind.

One condition which appears to have influenced signal construction to a certain extent is the price of signal materials. On the one hand the railroads are waiting until a more extensive reduction is made in the prices of such equipment, while the manufacturers find that their actual costs are as high or higher than during the war, because the small volume of business is not sufficient to pay for the labor and material and to take care of the overhead; and the actual cost of production is greater than the selling price in many instances. When production takes place on an extensive scale to fill increased orders prices should descend accordingly.

Developments of the Past Year

A review of the conditions during the past year shows that the tendency is towards better train operation by signaling selected stretches of double-track lines for movements in either direction on either track. The movement of tonnage trains has also been facilitated in some localities by the installation of grade signal aspects. Railway men in general have shown a keener appreciation of the value of automatic signaling with reference to its use in effecting economies in train operation. In this connection, the elimination in automatic signal territory of the train order form requiring conductors' signatures has been put into effect to a limited extent on some roads, while others are considering such a step. Studies have been made looking toward operating trains on single track by signal indication without written train orders.

The elimination of the derail is a subject which has also been receiving serious consideration, as has the development

of automatic signaling at railway grade crossings with a view of eliminating the use of an interlocking tower and the necessary attendants. The use of low voltage switch movements for the remote operation and control of switches at passing sidings, junction points, etc., is a live question and installations are being made.

Automatic train control is being given serious consideration, not only by well-informed and progressive railroad officers but by the Interstate Commerce Commission and by the Joint Committee on Train Control of the American Railway Association. An extension of automatic train control is being made on one road, while arrangements have been made for testing several devices under actual railway service on other roads.

In the engineering end, the electric lighting of signals has proved economical and has made rapid advances in the past year; and there is a greater use of the primary battery. A study of track-circuit conditions has pointed out ways of effecting other economies in signal maintenance. The color-light and position-light signals (for daylight signaling) are being used more extensively than ever before. The use of the mechanical rectifier for charging storage batteries for operating automatic signals and highway crossing warnings is receiving careful consideration and some installations already have been made. The use of portable power units for operating tools and for signal bonding has been another development of interest. At interlocking plants, many mechanical detector bars have been eliminated and replaced by electric detector locking. The reason for this is explained largely by the use of heavier rails. Highway crossing protection has received careful study by signal department officers.

Future developments of signaling will continue along the line of expediting train movements. Means will be provided for controlling the movement of trains by signal indication and greater use will be made of remote controlled switches which will be operated from the nearest interlocking tower or station. Greater use will be made of light signals and the installation of light signals, with automatic train control as an adjunct, with the elimination of the derail promises to be a development of the near future. Train operation by signal indication without the use of written train orders should make rapid progress, while automatic signals for controlling train movements at outlying crossings will likely be installed at certain locations during the present year.

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1921

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control system	Remarks
	Single	Double-track						
A T & Santa Fe	11.5		Plymouth, Kan.	Strong City, Kan.	15	Union Style T-2	Neutral track and line.	
	5.1		Ft. Worth, Tex.	Saginaw, Tex.	11	Union Style T-2	Neutral track and line.	
B & Ohio	1.2		3rd St.	Milvale	5	Union Style T-2		
	7.1		Bakerstown, Pa.	Gallery Jet.	15	Union Style T-2		
	4.5		Bakerstown, Pa.	Wildwood	14	Union Style T-2		Relaid track.
Canadian Nat'l								
Extension Lines	20.0		Hampton	Coldbrook	35	Union Style T-2	A. P. B.	Changed from overlap.
	30.0		Panouse Jet.	Sackville	60	G. R. S., 2-A	A. P. B.	
	4.5		Charry		12	G. R. S., 2-A	Selective automatic	
	1.0		Hervey Jet		4	G. R. S., 2-A	Selective automatic	
C B & Quincy	33.2		Oscola, La.	Creston	100	Motor	Straight automatic	
C & N. West'n	1.4		Belt Line Jet, Wis.	Hurley Jet	2	General, 2-A		D. C., 3-pos., U. O.
C Lake Shore & S B	1.5		Griffin, Ohio	Ire House	7	Color light		A. C., 60-cycle, 3 color
Ch. R. I. & P.	0.7		M. P. 291		2	Semaphore, motor		D. C., 3-pos., U. O. bot post.
C C & C. St.	63.3		Berea, Ohio	Crestline	109	Hall, Style I		D. C., 3-pos., U. (L), bot post.
	4.9		Beech Grove, Ind.	Indianapolis	12	Hall, Style I		D. C., 3-pos., U. O., top post.
D I & W	0.7							both directions between
Three-track	4.4		Hickensack River	Newark, N. J.	41	Color light, 4 unit	D. C. neutral track J. A. C. polar line	Hickensack River and Harrison. Track 2 signaled in eastward direction only.
Egn. J. & F.	0.5		Yard		2	Union Style B		On suburban line, three-track.
Illinois Central	1.7		Lasley, Ky.	Princeton	36	Hall, Style L, U. O.		On Ninth Ave; three-track.
Interurb. R. T.	1.0		118th Street	174th Street	11	Color Light 6 Electro p. sem. 5		Second Ave.; three-track.
	1.1		17th Street	155th Street	23	Color light		On suburban line, three-track.
	1.6		91st Street	135th Street	21	Color light		Second Ave.; three-track.
G. Northern	58.0		Leavenworth, Wash.	Skyokmish	111	General, 2-A	Polarized line	D. C., 3-pos., U. O., top post.
					10	Color light		Light signals used in snow sheds.
G. Trunk (New England)	11.5		Oxford, Me.	Danville Jet	2	General, 2-A	A. P. B.	
	1.5		Komoka	Danville Jet	3	General, 2-A	Station protection	
	1.5		Port Hope	Danville Jet	2	Federal	Station protection	

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control system	Remarks
	Single track	Double track						
Kensington & E.	1.5	...	Kensington, Ill.	Cross-over	7	Union Model "L" light.		
M. K. & Texas.	.07	...	Dallas	Yards.	5	3 Style S, 2 Lt., Union light		Electric lights, continuous.
	2.0	...	San Antonio, Tex.		2	Style L Light.	Automatic	Electric lights, app. control.
	1.5	...	Colbert	Red River	4	Style S Union	Automatic	Electric lights, app. control.
	38.0	...	McAlester, Okla.	Springtown	62	Style S Union	Automatic	Electric lights, app. control.
	66.0	...	McAlester, Okla.	Wybark	109	Style S Union	Automatic	Electric lights, app. control.
	44.0	...	Labette, Okla.	Vinita	67	Style S Union	Automatic	Electric lights, app. control.
	1.5	...	Oklahoma City	Yards	4	Style S Union	Automatic	Electric lights, app. control.
L. & Nashville	4.0	...	Mayton, Tenn.	Brentwood	9	A. C. semaphore.	Polarized track	
N. Y. N. H. & H.	1.2	...	New Haven, Conn.		4	2 Union light, 2 G.R.S., semaphore		For reverse traffic signaling, tracks 1 and 2.
N. Y. Connecting	8.1	...	Fresh Pond, N. Y.	Oak Point	4	1 Union sem, 3 G.R.S., semaphore		To replace manual block, U. O. left hand.
P. & R.	3.1	...	Fifth St., Reading, Pa.	Wyomissing	7	Union T-2		A. C., 3-pos., U. O., top post.
(Three-track)	.09	...	Lebanon, Pa.	Front St.	3	Union T-2		A. C., 3-pos., U. O., top post.
(Four-track)	4.6	...	Myerstown, Pa.	Lebanon, Pa.	16	Myion T-2		1 Hall disk, A. C., 3-pos., U. O., top post.
Pennsylvania System:								
Eastern Region	4.7	...	Mt. Vernon	Hollins	11	9 Pos. Light, 2 motor.	A. C. polarized	Replaced manual block
Central Region	16.0	...	Altoona, Pa.	Gallitzin	32	Grade signal aspect		To permit tonnage freights to pass automatic signals.
	21.6	...	Conemaugh, Pa.	Gallitzin	50	Grade signal aspect		
U. Pacific	34.8	...	Leroy, Wyo.	Wahsatch, Utah	143	U. S. & S., Style B. L.		Two-arm home and dist., without overlaps.
L. A. & S. Lake	2.6	...	Crestmore, Calif.	Ormand	2	U. S. & S.	Line control	Absolute staff, hand operated.
O. S. L.	...	...	Various Points		27	Motor semaphore	Neutral	Added to existing installation, for new passing tracks.
St. Louis-S. Fraa.	6.8	...	Eureka	Pacific	15			S. T. changed to D. T.
	9.2	...	Sleeper	W. Lebanon	20			S. T. changed to D. T.
	4.3	...	Globe	Monett	10			S. T. changed to D. T.
	9.6	...	Olathe	Spring Hill	10			S. T. changed to D. T.
S. Pacific:								
Texas & La. Lines	2.0	...	El Paso, Tex.	Rio Grande R.	6	Union Style B.	Neutral track and polarized line	D. C., L. Q.
	0.7	...	Englewood, Tex.	Baer Jct.	6	Union Style B.		
Pacific System	6.3	...	Hornberg, Ore.	Gregory, Ore.	22	Union		
	10.3	...	Portland, Ore.	Beaverton	19	Light		A. C., color.
	...	...			31	Union		Color light.
Wash., Balt. & An.	18.2	...						
W. Maryland	2.4	...	Williamsport, Md.	Pinesburg	9	Union Style S.	Track	U. Q., 3-pos. Change from single to double track.
Totals	349.5	264.7			1,336			

¹Inherboro R. T. Co., New York.—On three-track lines the inside track is signaled for both directions; outer (local) tracks, signaled only at curves. Electro-pneumatic stops at signal locations.

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION ON DECEMBER 31, 1921

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control system	Remarks
	Single track	Double track						
B. & Ohio	10.0	...	Wildwood, Pa.	Fine Creek	22	Union, Style T-2		
C. & Ohio	40.0	...	Charlottesville	Stantunton	88	Union light.	Line A. P. B.	Color light.
C. & Alton	4.0	...	Manchester, Ill.	Rodhouse	2			Track
Ill. Central	3.5	...	Paduach, Ky.	Yards	11	Hall, Style L.	Overlap	2-pos. L. Q.
Interborough R. T.	3.7	...	143d Street	Fordham Rd.	53	Color-light		On suburban line; three-track
D. & Hudson	13.0	...	Schenevus, N. Y.	E. Worcester	14	Motor semaphore	Track and line	U. Q., 3-pos., normal danger.
Pennsylvania:								
Eastern Region	15.0	...	Atglen	Downingtown	57	General; pos. light.	A. C. polarized	Fourt track; replace electro-pneumatic and motor.
	19.4	...	Egg Harbor	Atlantic City	39	Union pos. light.	D. C. polarized	Approach lighting.
M. K. & T.	56.5	...	Vinita, Okla.	Wybark	87	Union, Style S, U. Q.	Automatic	Approach electric lights.
	7.0	...	Lamar, Tex.	Buna	11	Union, Style S, U. Q., A. P. B.		Approach electric lights
W. Pacific	2.8	...	Niles, Calif.		5	Union, Style B.		D. C., 3-pcs., U. Q.
Totals	119.3	55.6			389			

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control system	Remarks
	Single track	Double track						
A. T. & S. F.	10.2	...	Nerska, Ill.	Willow Sps., Ill	13	Union, Style T-2	Neutral track	
	8.9	...	New Boston, Mo.	Dumas, Mo.	12	Union, Style T-2	Neutral track	
	23.9	...	Olathe, Kan.	Le Loup, Kan.	25	Union, Style T-2	Neutral track	
	14.6	...	Neva, Kan.	Cedar Pt., Kan.	28	Union, Style T-2	Neutral track	
	6.8	...	Walton, Kan.	Newton, Kan.	2	Union, Style T-2	Neutral track	
Canadian Nat.								
Eastern Lines	4.0	...	Sevis	Chandiere	24		A. P. B. on S. T.	
	26.0	...	Sault Ste. Marie	Springhill	54		A. P. B.	
C. & O.	4.0	...	Stollings, W. Va.	Rum Creek Jct.	3		A. P. B.	
C. & A.	6.0	...	Godfrey, Ill.	Brighton	4	Motor semaphore	Track circuit	2-pos., L. Q.
Great Northern	165.0	...						
Ill. Traction Co.	16.0	...	Stanton, Ill.	Edwardsville	37	Motor semaphore	Track circuit	
N. P.	155.0	...	Daunth, Minn.	Mandan, N. D.	378	G. R. S., Model 2A,		
	68	...	Garrison, Mont.	Missoula		3-pcs.	A.P.B. on single track.	
Pacific Electric	3.0	...	Indian Village	Sierra Vista	20	Color light		Change from D. C. to A. C. track circuits. Four track.
Pennsylvania:								
Central Region	18.3	...	Ingram	Bulger	87	Position light	Track and line	
	6.8	...	Collier, W. Va.	Wheeling Jct.	45	Position light	Track and line	
	21.9	...	Jewett, O.	Dcnmison, O.	90	Position light	Track and line	
W. P.	1.2	...	Marysville		5	Union, Style B.	A. C. track circuit	D. C. operated.
Totals	378.0	235.6			749			

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1921

Name of road	Miles of road		Fr. m.	To	No. of signals	Type of signal
	Single track	Double track				
Can. Nat'l—						
East Lines			Tofre			
C. & N. W.			New Ulm, Minn.	Tracy	2	pos. L. O.
P. & W.			Wichita Falls, Tex.	Fr. Worth	16	2 arm
St. Louis, S. F.			Marion			Train staff
Total	200.8				30	

TABLE G—INTERLOCKING PLANTS COMPLETED IN 1921

Name of road	Location	Layout crossing, junction, terminal, etc.	Number of working levers		
			Mechanical	Electrical	Electro pneumatic
A. T. & S. F.	Newkirk, Okla.	Junction	15		
A. C. L.	Allenhurst, Ga.	Crossing	6 ^a		
B. & O.	Tates Point, O.	Crossing	34		
Boston & Maine	So. Lawrence, Mass.	Enginehouse	24		
Can. Nat'l—					
Last Lines	Joliette	Crossing	131		
	Washago, Ont.	Draw	12		
	North Bay, Ont.	Crossing	5 ^b		
G. T. Pacific	Saskatoon	Crossing	5 ^b		
	Saskatoon	Crossing	5 ^b		
C. P.	Watson, Sask.	Crossing C. N. R.	13		
C. R. R. of N. J.	Phillipsburg, N. J.	King & Junction		45 ^b	
C. & O.	Big Sandy Jet., Ky.	Junction	5	5 ^c	
C. & N. W.	Hurler, Wis.	Junction	8		
C. C. C. & St. L.	Burt-Galion, Ohio	King & Junction	50	124	
	Ansonia, Ohio	King C. N. Div.	41	10 ^d	
	Briar (Acton, Ind.)	End Double Track	10	6 ^d	
	Beech Grove, Ind.	Terminal	10	10	
	Winchester, Ind.	King, G. R. & I.	32	10 ^d	
	Greenville, Ohio	King, D. & U.	14		
D. L. & W.	Ilackensack	Drawbridge	4	11 ^b	
	Kearney	Junction	4	11 ^b	
	Harrison	Switches	7	15 ^b	
	Newark, N. J.	Begin Third Track	5	8 ^b	
	Newark, N. J.	Drawbridge	8		
	Newark, N. J.	Drawbridge	11		
I. C.	Rosemy, Ill.	Crossing	29		
G. N.	Carlton, Minn.	King & Junction	57		
G. T.					
Western Lines	Pontiac, Mich.	Crossing	22 ^f		
	Pontiac, Mich.	Crossing	131 ^f		
	Battle Creek, Mich.	Crossing	8		
K. C. Southern	De Queen, Ark.	Crossing	12 ^b		
	Worland, Mo.	Crossing	13 ^b		
Pacific Electric	Wisburn, Calif.	Crossing	81		
Pennsylvania					
S. W. Region	Richmond, Ind.	Switching	44		
Eastern Region	Lantern, Md.	Crossing	15 ^a		
P. & R.	Maverston, Pa.	Switching	25		
I. & N.	Milton, Tenn.	Junction	8		
	Brentwood, Tenn.	Junction	4 ^m		
	Bayton, Miss.	Drawbridge	8 ⁿ		
M. K. & T.	Pt. Worth, Tex.	Yards, Crossing	23 ^o		
N. Y. C.	Rotterdam Jct.	Junction	50 ^p		
Michigan Cent'l	Detroit, Charlevoix St.	Crossing	16		
	Detroit, Buchanan St.	Crossing	7		
	Detroit, Palmer Ave.	Crossing	10		
N. Y. N. H. & H.	Providence, R. I.	Turn Yard	10	23 ^r	
	New Haven, Conn.	Turn Yard	12	36 ^r	
	New Haven, Conn.	Terminal Yard	12		
N. Pacific	Sauk Center, Minn.	Crossing & Jet'n	8 ^s		
	Helerade, Mont.	Crossing	2		
Southern	Tenbridge, Tenn.	Drawbridge	2	7 ^t	
	Warrior River, Ala.	Drawbridge	2	6 ^t	
	Dennipolis, Ala.	Crossing	3 ^u		
S. Pacific					
Texas & La.	El Paso, Tex.	Junction	7 ^v		
	El Paso, Tex.	Crossing	11 ^w		
	Englewood, Tex.	Junction & Yard	5		
T. St. L. & W.	Ramsey, Ill.	Crossing	29		
U. S.					
D. S. L.	Salt Lake City	Terminal		4 ^x	
Total	59		558	232	197

¹ Rebuilding only.
² Addition.
³ Additions.
⁴ Door locked.
⁵ V. C. track circuit.
⁶ Union electro-mechanic.
⁷ Electro-mechanical machine, detector and route locking.
⁸ Switch has electro-pneumatic signals 4 unit color light, D. C. track circuit, route locking and check locking between towers, all functions a c power.
⁹ Trolley contact controls locking on electric line.
¹⁰ Four electric signals controlled by clockwork time release operated by gate timer.
¹¹ Detector circuit, power instant signals.
¹² A. C. track circuit on P. E. line on Santa Fe. Time locks and power signals.
¹³ T. R. S. electric route and detector locking; position-light dwarf signals.
¹⁴ Electro-mechanical position-light signals.
¹⁵ Entry.
¹⁶ Trolley lever.
¹⁷ Electro-mechanical; rebuilt.
¹⁸ Approach and approach locking.
¹⁹ Renewal route and approach locking.
²⁰ Addition to existing machine.
²¹ G. R. S. electric model.
²² Circuit lever.
²³ Approach and detector locking.
²⁴ Approach detector and route locking.
²⁵ Levers added.

TABLE II INTERLOCKING PLANTS UNDER CONSTRUCTION DECEMBER 31, 1921

Name of road	Location	Layout crossing, junction or terminal	No. of working levers			Total
			Mechanical	Electrical	Electro pneumatic	
A. C. L.	Ashley River	Drawbridge	4			4 ^a
B. & O.	Mt. Lake P., Md.	Junction	43			43 ^a
Boston & Maine	Concord, N. H.	Enginehouse	6			6 ^a
C. & O.	Hunt, W. V. (MX)	Terminal	9	11		20 ^b
D. & H.	Scholarie, Jct.	Junction	25			25 ^c
I. C.	W. Water, Pa.	Crossing	15			15 ^d
Interboro R. T.	180 D Street	Crossing				44 ^e
	New Lots Ave.	Crossing				10 ^f
Grand Trunk:						
Western Lines	Pontiac, Mich.	Crossing	24			24 ^g
	Detroit, Mich.	Crossing	18			18 ^g
Pennsylv. System:						
Eastern Region	Caln, Pa.	Switching			18	18 ^h
	Parkesburg, Pa.	Switching			27	27 ^h
	Thordale, Pa.	Switching			21	21 ^h
Lchigh & N. E.	Bath, Pa.	Crossing	6			6 ⁱ
	Nazareth, Pa.	Cross. D. L. & W.	6			6 ⁱ
	Nazareth, Pa.	Cross. D. L. & W.	5			5 ⁱ
N. Y. Central	Syracuse R. N. Y.	Junction	35			35 ^j
	Finch, N. Y.	Crossing	20			20 ^j
U. Pacific	Aspen, Wyo.	Tunnel, & E. D. T.	20			20 ^k
	Altamont, Wyo.	Tunnel, & E. D. T.	21			21 ^k
	Cum B'fs, La.	Terminal & Jct.	12			12 ^k
	Cum B'fs, La.	B. Terminal & Jct.	16			16 ^k
Wabash	Detroit, Mich.	Draw and Jet. D.				
	T. & J.					
W. Pacific	San Jose	Crossing	17			17 ^l
Total	21		223	121	120	464

^a Electro-mechanical.
^b Federal; electro-mechanical.
^c Electric; concrete trucking.
^d Trolley contactor controls locking on electric line.
^e Reconstruction; position-light signals replace semaphores.
^f Power signals; electric time locks.
^g Renewal; route and approach locking.
^h Route locking.
ⁱ G. R. S., model 2A; check locking through tunnel.
^j G. R. S., model 2A; check locking through tunnel.
^k Added to G. R. S., model 2.
^l U. S. & S.; style F.
^m Union, D. C., type F.

TABLE I—INTERLOCKING PLANTS PROPOSED FOR 1922

Name of road	Location	Layout crossing, junction or terminal	No. of working levers			Total
			Mechanical	Electrical	Electro pneumatic	
Can. Nat'l—						
East Lines	Charry, P. Q.	Junction			16	16
	Tweed	Crossing				Rebuilding
	St. Cloud	Crossing				Rebuilding
	Harrowsmith	Crossing	20			20
	Washago	Junction	21			21
	Alenby Jct.	Crossing	5 ^f			5
G. T. Pacific	North Edmonton	Crossing & Jct.	40 ^g			40
	Alix	Crossing & Jet'n		8 ^h		8
	Portage La	Prat-Crossing in bridge				
A. C. L.	Bvdsville, Ga.	Crossing	6			6 ^a
C. & O.	Cincinnati, Ohio	Terminal		28		28
U. & E. I.	St. Albans, Va.	Junction	8	19		27
		Crossing	16			16
Grand Trunk:						
Western Lines	Charlotte, Mich.	Crossing	22			22
Interboro R. T.	240th Street	Crossing			52	52
	Jerome Ave.	Yard			50	50
	New Lots Ave.	Yard			32	32
M. K. & T.	Hallett, Okla.	Crossing	12			12 ^b
	Mound City, Kan.	Crossing	18			18 ^b
Kansas City So.		Crossing	13			13
		Crossing	13			13
		Crossing	14			14
Pacific Electric	Neitos, Calif.	Crossing	15			15 ^c
	Sierra Vista, Calif.	Junction		56		56 ^d
P. & R.	Eastington, Pa.	Drawbridge		57		57
	Atlantic City, N. J.	Drawbridge	10	19		29
	Allentown, Pa.	Junction		53		53
	Harrisburg, Pa.	Junction		42		42
W. Pacific	Schuykill Haven	Switching	35			35
	San Jose, Calif.	Crossing	20			20
Totals	30		268	145	257	670

^a Door locking.
^b Approach and detector locking.
^c V. C. track circuit on P. E. and d. c. on Santa Fe; detector locking.
^d Approach and detector locking.
^e Addition.
^f Route and approach locking. 3 pos. distinct signals.
^g Adding 8 electric levers to mechanical plant. Route and approach locking.
^h Double switch operated by low voltage machine.

THE GREAT NORTHERN has tendered to the department of public works of the state of Washington, its right of way from Northport, Wash. to the Canadian line, a distance of about 10 miles, for conversion into a public highway. The line includes a bridge across the Columbia river, which cost about a half million dollars.

Railroad Telegraph and Telephone Activities

Construction a Minimum in 1921—Considerable Increased Use of Composite Circuits

By J. H. Dunn



A Heavy Wire Lead

PRELIMINARY to making this second annual survey of the activities in the railroad telegraph and telephone field, the *Railway Age* sent questionnaires to 214 representative roads asking for certain data with reference to their outside plant equipment. As this feature of our annual review number was only inaugurated last year it is difficult to draw any comparisons with the amounts of work done in previous years. However, it is evident that construction has been at a minimum during 1921.

Small Amount of Work Completed in 1921

Thirty-one of 115 roads replying reported telegraph and telephone construction work completed during 1921. Of the 393 miles of railroad-owned pole line built in the United States, the Louisville & Nashville constructed 237 miles, and the Nashville, Chattanooga & St. Louis 135 miles, both installations being replacements of equipment removed because of the termination of contracts with the Western Union. The Canadian National installed 158.4 miles of pole line, 1,637.2 miles of iron wire and 2,998 miles of copper. The reports show that 1,190.4 miles of iron wire was installed and 1,104.9 miles of copper was added to existing plant equipment in the United States.

Some 913 miles of road was equipped with telephone train dispatching circuits, the largest installation being that of 489 miles on the Western Pacific Railroad. A total of 244 miles of metallic telephone circuits for block signaling was placed in service and 1,689 miles of metallic message and conversation circuits was installed; the largest installation was 518 miles on the Lehigh & New England and the second largest, 454 miles on the Chicago, Burlington & Quincy.

It is interesting to note that only 24.4 miles of telegraph dispatching circuits have been reported as installed during 1921, whereas telephone train dispatching circuits were placed in service on 913 miles of road during this period. The tendency to utilize existing wires to the limit is shown by the installation of 1,269.6 miles of simplex circuits, 336.6 miles of duplex and 842 miles of phantom.

Some Work Under Construction

The amount of cable construction was limited, the largest installation of overhead cable for telegraph purposes being 10 miles on the Chicago, Burlington & Quincy. Twenty-two miles of overhead cable was installed for electrical trans-

mission on the New York Central. Eighty-two telephone booths or boxes were reported placed in service during the year 1921.

Thirteen roads reported work under construction as of December 31, 1921. Only 68 miles of pole line is reported as under way, 33.2 miles of this being on the Western Pacific and 18 miles on the Canadian National. The installation of 531.4 miles of iron wire and 2,506.4 miles of copper is now under way. Construction work under way also includes 49.3 road miles of telegraph dispatching circuits and 183 miles of telephone dispatching.

The total of circuit miles of telephone equipment reported under construction includes 131 miles of metallic dispatching, 128.8 miles of metallic block, and 70 miles of message and conversation circuits. A total of 2.9 miles of overhead cable and 3 miles of underground cable is under construction at this time.

Work Contemplated for 1922

As budgets have been held up or cancelled so often in the past few years a number of roads refuse to offer an estimate of the future construction activities. However, it is illuminating to note that in spite of adverse conditions considerable telegraph and telephone work is planned, and authority for commencement of work has been granted in several cases.

Only 60 miles of pole line is contemplated on the 25 roads reporting new work. However, it is the intention to add 700 miles of iron wire and 7,409 miles of copper. Definite plans are under way for the addition of telegraph train dispatching circuits on nine different roads, the largest proposed installation being that of 453 miles on the Ft. Worth & Denver City. Metallic conversation circuits to the extent of 2,798 miles are contemplated, 1,418 miles of which is on the Pennsylvania, southwestern region.

General Outlook

The amount of telegraph and telephone construction on the railroads during 1921 will no doubt stand as one of the lowest records. In contrast to this, it is interesting to note that over 50 per cent of the officers in charge of the telegraph departments indicated in their reports that the prospect for new work in 1922 is hopeful; and some few have definite authority to proceed.

On many railroads the maintenance of pole lines has been, of necessity, somewhat neglected during the past few

MINIMUM amount of construction in recent years, thus taxing existing facilities to the limit. Many important developments have been made in apparatus, placing the roads in a position to expand their facilities to better advantage at this time. Pole line maintenance is from two to five years behind schedule.

Widespread application of telephones for train dispatching and long distance conversation circuits is an important part of contemplated construction program.

TABLE I—TELEGRAPH AND TELEPHONE WORK COMPLETED IN NINETEEN TWENTY-ONE

Name of road	Total miles of pole line owned exclusively by railroad		Pole line owned jointly by R. R. and telegraph co.		Total miles of wire owned by railroad, 2/3 of joint wires included				Road miles operated by railroad	Road miles used by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block
	Signal and electrical		Miles	Miles used jointly by signal department	Telegraph and telephone		Signal and electrical						
	Transmission	Service			Iron	Copper	Transmission	Service					
Canadian National	158				1,637.0	2,598.0							
B. & O. Ohio					98.8	90							
B. & L. Erie					126								
C. & B. & Quincy													
C. & O. Ohio													
D. M. & Northern													
D. & Hudson	20								20		20		
D. L. & Western						169							
D. & I. Range		15											
Florida East Coast													
Ill. Central											68.6		
Gulf, Mobile & N.					83								
N. Y. Central						122							
M. C.						150							
L. E. & Western						37					37		
L. Valley						180							
L. & Nashville	237				536								
Lehigh & N. E.													
M. K. & T. Tex.		55							275			55	
Munising, Marquette & S. E.					72.2								
N. Pacific													
N. C. & St. Louis	135				162	633					135		
N. Y., N. H. & H.	1												
P. & Reading													
Pennsylvania Central Region						46.4			4.1				
Southern Pacific						44.1					156		
Lines in Texas													
U. Pacific				14.1		15.2				14.1	6.4	7.7	
O. W. R. R. & N.						4.3							
O. S. L.						12							
Western Maryland													
Western Pacific				18		18				18	18	489	
Totals	551	15	55	32.1	2,746.4	4,802.9			279.1	52.1	24.4	913.3	55

Name of road	Circuit miles of telephone circuits railroad owned				Total miles of superimposed circuits			Telegraph circuits		Telegraph offices		Telephone offices		Miles of cable in line exclusive of drops to offices and signals, etc.						
	Metallic		Vandal circuits, all kinds		Grounded discharging	Simplex	Composite	Phantom	No. duplex	No. quad	No. printer	Gen. office and relay	Division or terminal	Way station	Telephone block	Telephone booth	Overhead	Underground	Overhead	Underground
	Dispatching	Block	Conversation or message	Block																
Canadian National																				
B. & O. Ohio																				
B. & L. Erie																				
C. & B. & Quincy						165	187	104												
C. & O. Ohio				120																
D. M. & Northern				13																
D. & Hudson	20																			
D. L. & Western				84.5		6.4	133		76											
D. & I. Range																				
Florida East Coast							696													
Ill. Central	75.7																			
Gulf, Mobile & N.																				
N. Y. Central				26	25		140			3	1				2	12		2	25	
M. C.				75			75										1.5	5		
L. E. & Western				37														.2		
L. Valley																				
L. & Nashville	18.6			518														0.6		
Lehigh & N. E.						6.4														
M. K. & T. Tex.																				
Munising, Marquette & S. E.																				
N. Pacific																				
N. C. & St. Louis	178			42	135		135													0.2
N. Y., N. H. & H.																				
P. & Reading				1.5			58.6	2.5	78.1											
Pennsylvania Central Region				15.5					101.6											
Southern Pacific				131																
Lines in Texas	483																			
U. Pacific	7.7				2.8			14.1							1					
O. W. R. R. & N.				17	1.1											5				
O. S. L.																				
Western Maryland																				
Western Pacific	979															39				
Totals	1,762	244	1,669.1	40.3	6.4	1,269.6	336.6	842.7	80	1			3	3	82	19.5	2.7	23	0.2	

years. Of the 22 roads estimating the status of their maintenance programs four roads consider that this work is from four to five years behind schedule, ten roads are from six months to two years back and eight roads report their maintenance up to date. Evidently there must be considerable reconstruction of pole lines in the near future in order to maintain satisfactory service. About 26,000 miles of wire is

considered as a minimum to meet the requirements of these 22 roads within the near future. Several roads evidently prefer automatic printers for long distance message service with the telephone for block and local work. Of the 32 roads reporting on the item, 17 indicate that telephone train dispatching circuits are to be installed as soon as conditions permit.

TABLE 2—TELEGRAPH AND TELEPHONE WORK UNDER CONSTRUCTION ON DECEMBER 31, 1921

Name of road	Total miles of pole line owned exclusively by railroad			Pole line owned jointly by R. R. and telegraph co.		Total miles of wire owned by railroad, 1/2 of joint wires included					Road miles operated by railroad	Road miles dispatched by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block	
	Signal and electrical			Miles	Miles used jointly by railroad and telegraph co.	Telegraph and telephone			Signal and electrical							
	Telegraph	Transmission	Service			Iron	Copper	Transmission	Service							
Canadian National	18					432.0	1,760.0									
D. & H.																13
D. L. & W.								366					183			
Grand Trunk								66								
Illinois Traction								10								
L. & Nashville	5							174								
Lehigh & Hudson R.								24								
N. Y. Central								24								
N. Pacific								128.8								
P. & Reading										275						55
M. K. & Texas			55					16.6				33	33			
Western Pacific								6.8				16.3	16.3			
U. Pacific								17								
L. A. & St. L.								37								
Totals	23		55	49.5		531.4	2,508.8			275	49.3	49.3	183		68	

Name of road	Circuit miles of telephone circuits railroad owned				Total miles of superimposed circuits		Telegraph circuits			Telegraph offices		Telephone offices		Miles of cable in line exclusive of drops to offices and signals, etc.							
	Metallic dispatching	Metallic block	Metallic conversation or message	Yard circuits, all kinds	Grounded dispatching	Simplex	Composite	Phantom	No. duplex	No. quad	No. printer	Gen. office and relay	Division or terminal	Way station	Telephone block	Telephone booth	Overhead	Underground	Overhead	Underground	
																					Signal and electrical
Canadian National																					
D. & H.								68													
D. L. & W.																					
Grand Trunk	1																				
Illinois Traction	33		33																		
L. & Nashville	10																				
Lehigh & Hud. R.	87																				
N. Y. Central				12													2.6	0.5			
N. Pacific																					
P. & Reading		128.8															0.3	1.3			
M. K. & Texas																					
Western Pacific							16.3														
U. Pacific																					
L. A. & S. L.				37																	
Totals	131	128.8	70	12			16.3	68				2	2	3		2	2.9	3.5			

TABLE 3—TELEGRAPH AND TELEPHONE WORK CONTEMPLATED FOR NINETEEN TWENTY-TWO

TABLE CONTINUED ON NEXT PAGE

Name of road	Total miles of pole line owned exclusively by railroad			Pole line owned jointly by R. R. and telegraph co.		Total miles of wire owned by railroad, 1/2 of joint wires included					Road miles operated by railroad	Road miles dispatched by telegraph	Road miles dispatched by telephone	Road miles of automatic block	Road miles of manual block	
	Signal and electrical			Miles	Miles used jointly by railroad and telegraph co.	Telegraph and telephone			Signal and electrical							
	Telegraph	Transmission	Service			Iron	Copper	Transmission	Service							
Chi. Rock Is'd & Pacific																
C. & Ohio	25															
Colorado & S.								117					233			
D. L. & W.													453			
Pt. Worth & D. C.																
Florida East Coast																
Grand Trunk							22	86.2					431			
K. C. Southern								129								
Lehigh & N. E.																
N. Y. Central								560								
P. & L. Erie				3.5				6.6								
N. C. & St. Louis													247			
N. Pacific								229								
P. & Reading								189.8						94.9		
Pennsylvania:																
Southwest Region								136	2,836				123			
Central Region					7.4				458.4		15		14.8			
Rich'd F. & Potomac																
S. Pacific:																
Lines in Texas																
Wabash																
U. Pacific				25.2				255	224			13.2		127		
O. S. L.									767					111.2		
O. W. R. & N.								281	629					229		
L. A. & St. L.									918							
Totals	25				35.9		694	7,405.8			15	18.2	2,062.9			

TELEGRAPH AND TELEPHONE WORK CONTEMPLATED FOR 1922—Continued

Name of road	Circuit miles of telephone circuits railroad owned					Total miles of superimposed circuits		Telegraph circuits		Telegraph offices		Telephone offices		Miles of cable in line exclusive of drops to offices and signals, etc.						
	Metallic dispatching	Metallic block	Metallic conversation or message	Yard circuits, all kinds	Grounded distat-ling	Simplex	Compsite	Phantom	No. duplex	No. quad	No. primer	Cable office and relay	Division or terminal	Way station	Telephone block	Telephone booth	Overhead	Underground	Overhead	Underground
Chi. Rock Is'd & Pacific...	75.0					75.0														
C. & Ohio			147																	
Colorado & S.																				
D. L. & W.			58.5																	
Ft. Worth & D. C.						156														
Florida East Coast																				
Grand Trunk	3																			
K. C. Southern			129			129								17	11					
Lehigh & N. F.			26.2					19.6												
N. Y. Central			280			297		297	1	1					50					
P. & L. Erie					6.6															
N. C. & St. Louis			247			229		229												
N. Pacific						394		394	1											
P. & Reading	189.8					64.4		55						35	22					
Pennsylvania																				
Southwest Region	123		1,418			1,042		55	8									1		
Central Region	14.8	35.4	310			419		160												
Rich'd F. & Potomac								116.0												
S. Pacific																				
Lines in Texas	282																			
Wabash	350						100		2											
U. Pacific	103							13.2					2	1	26			0.2	5	
O. S. L.	133														11					
O. W. R. & N.	259		183			190.9		190.9							28					
I. A. & S. L.																				
Totals	1,642.6	35.4	2,798.7	26.6		2,602.3	494	1,529.7	12	1			2	1	52	148	1.2	5		

Recent developments of the telephone repeater have removed the limit from long distance telephone communication. Late experiments on electrified roads have demonstrated the success of the carrier current system of communication over the trolley wire to or from a moving train. In certain con-

gested districts or in localities where the physical conditions prevent the economical construction of a pole line, it is evident that wireless telegraph and telephone apparatus will produce economies, and railroad installations of this nature are being watched with interest.

An Analysis of the Railway Statistics for 1921

(Continued from page 123)

rates in the near future undoubtedly dammed up the current of traffic to some extent near the close of 1921—a condition which in the public interest should not be allowed to extend many weeks into the year.

The Coming Year

Three elements of uncertainty exist in the railway situation as it will project itself into the 12 months of 1922, namely, the level of rates, the level of wages, and the level of traffic.

The rate question is now under investigation by the Interstate Commerce Commission in the form of a general inquiry into the subject. That the Commission appreciates the vital importance—not only to the railways themselves, but to the whole business world as well—of moving promptly in this matter is clear from the record already made in the inquiry, and a speedy decision in the matter may be expected with confidence.

The wage question will shortly come before the Railroad Labor Board, on appeal from virtually all the railways and in respect to virtually all classes of employees. The complexity of the issues involved is so great that a decision may not be reached so promptly as in the matter of rates, but that the question will be thoroughly examined in 1922, and that a determination of some sort will be reached, seems beyond doubt.

What the traffic will be in 1922 is a matter of conjecture, of course, but I feel that we may expect an improvement over 1921 much more confidently than we may anticipate a reduction either in rates or wages. A tone of optimism per-

vades the business world which is not wholly psychological, but is based on actualities, and in any general improvement in business the railways are bound to share. The effect of even a 10 per cent increase in traffic would be most heartening, and would translate itself into a real improvement in the financial position of the railways.

Without venturing even a guess as to the rate and wage probabilities, therefore, I strongly believe in a better railway year for 1922 than we experienced in 1921.



Engine House and Water Tower at Lausanne, Switzerland



Some Typical Views of Abandoned Lines

Railway Lines Abandoned During the Year 1921

Difficulties Facing Roads Through the Year Clearly Indicated by
Mileage Discontinued

By Milburn Moore

THE YEAR 1921 was one of the most difficult, from practically every angle, that the railways of the United States have had to face in, perhaps, their entire history. By the first of the year it had become fairly evident that many of the roads were going to have a serious struggle if they were to come through without disturbing financial troubles, if not bankruptcy. It is not surprising, then, that operation was suspended or discontinued on 1,626.38 miles of line. To this amount there should be added 51 miles of line upon which operation was suspended or discontinued altogether during the latter part of 1920, notice of which was received too late to be included in the last annual compilation of statistics. This brings the total up to 1,677.38 miles, or over a thousand miles more than were constructed in about the same period.

Of the total mileage abandoned for operation, 217.09 miles, or slightly less than the corresponding figure for 1920, were abandoned entirely, the track being taken up and the equipment sold. A large part of the remaining 1,460.29 miles consisted of lines upon which operation was discontinued because of conditions peculiar to the year, such as light traffic and heavy operating expenses. It is not unlikely that some of this mileage will again be placed in service when conditions become more favorable.

The past year is the first full year in which it has been necessary for the Interstate Commerce Commission to decide whether the "present and future public convenience and necessity permit the abandonment" of railway lines. It has reported upon a large number of cases during the year. This introduces another point of interest in connection with lines abandoned which helps to give a clearer picture of the year's changes. It concerns the applications for abandonment presented to the commission, which are not included in the main compilation of miles abandoned, etc. In addition to the 1,677.38 miles mentioned, there were authorizations by the commission for the discontinuance of 191.01 miles and applications for the abandonment of 575.17 miles, regarding which no action has as yet been reported publicly.

With the exception of a few states, the major portion of the mileage upon which operation has been discontinued,

plus the mileage included in the applications before the commission, lies in the southern states from coast to coast, with Arkansas outstanding, with about 223 miles upon which track was taken up or operation discontinued.

Of the entire country, the state of Colorado suffered the most, including, as it did, practically one-fourth of the total miles abandoned for the country. Some of the more important roads of this state which are no longer operating are the Colorado Midland and the Colorado Springs & Cripple Creek District.

The mileage for Michigan was high also and is represented almost entirely by short sections and small branches of the Pere Marquette of which only a small part has been abandoned to date, the remainder being covered by applications before the commission and not yet authorized.

The largest of the roads which found it impossible to keep its wheels turning was the Missouri & North Arkansas and the experience of this road and the cause for the cessation of operation is but a repetition of the story of light traffic and heavy operating expenses.

Some of the smaller lines which have ceased operation because of their unprofitableness and their ability to run up large deficits as common carriers, and which show little justification for resumption of operation as common carriers, do contain some possibilities as private lines or plant facilities. An example of this is the Sugar Pine Railway, which was released during 1921 by both the California Railroad Commission and the Interstate Commerce Commission as a common carrier but which is now being operated under lease by a large lumber company as a plant facility.

While there is a reasonable possibility that some of these roads will again resume operation under more favorable circumstances, there is considerable mileage which is more likely to be discontinued permanently and the lines junked. It is an interesting fact that much of the mileage abandoned, or to be abandoned for operation shortly, was constructed primarily for logging purposes and, so long as the timber held out and the market was good, they were a profitable investment. With the removal of most of the timber, there has not been sufficient traffic to justify the continuation of

the lines or branches as common carriers. For instance, on one southern road only three carloads of other than lumber traffic originated on the line during the entire year. It has only taken the severity of a year like 1921 to hasten to a conclusion what would have been the outcome anyway.

The permanent abandonments of the past few years have, in a way, been indicative of the gradual tightening up of the country's railway lines and the consequent elimination of the lines that are poorly and uneconomically located, without any particular hardship to the surrounding territory. Although 1921 was the fifth year that the miles of line abandoned exceeded the miles of new line constructed, this fact cannot be construed as meaning that the country is overbuilt with railways. In fact, there is still need for much railway construction and the clearing away of these lines should in the end prove beneficial, if not even stimulating, when there is more money available and the subject of extensions to existing lines and the building of new ones is once again under consideration.

United States	Lines abandoned permanently	Lines abandoned and taken up, not taken up,
	Miles	Miles
Adirondack & St. Lawrence	7.00	
Ashley, Drew & Northern—		
Near Ozmont, Ark.	0.85	1.46
Ashland, Odonah & Marou—		
Odonah, Wis., to end of track.	20.00	
Atchison, Toney & Santa Fe—		
Barnwell, Calif., to South Ivanpah	8.34	
Atlanta & St. Andrew Bay—		
St. Andrew's branch in Florida.		2.64
Bennettsville & Cheraw—		
Brownsville, S. C., to Sellers.		10.44
Big Falls Railway—		
In Wisconsin, not specified.		10.00
Boston & Maine—		
Bethlehem Junction, N. H., to Profile House.		8.33
Cherry Mountain, N. H., to Jefferson.		3.49
Profile House, N. H., north.		1.14
Caro Northern—		
In Texas.		17.00
Central New England—		
Feeding Hills, Mass., to Apawam Junction.	1.90	
Charlotte Harbor & Northern—		
Tiger Bay branch in Florida.		9.00
Colorado Midland—		
In Colorado		338.00
Colorado Springs & Cripple Creek District—		
In Colorado		71.00
Delta Southern—		
Percy, Miss., to Richey.		10.45
Elizabeth, Miss., to Kerg's Junction.		14.47
Ita Bene, Miss., to Belzoni.		27.19
Georgia & Florida—		
In Georgia.		2.80
Great Northern—		
In Chisholm, Minn.		0.51
Greenville & Northern—		
In Texas.		11.83
Gulf, Mobile & Northern—		
Ellisville, Miss., to Ellisville Junction.		6.56
Hawkinsville & Florida Southern—		
Hawkinsville, Ga., to Worth.		42.33
Ashburn, Ga., to Camella.		49.93
Jonesboro, Lake City & Eastern—		
McFerren, Ark., to Osceola.		9.42
Midway, Ark., to Luxora.		1.60
Kentwood, Greensburg & Southwestern—		
Kent's Mill, La., to Freiler.		13.21
Lake Charles Railway & Navigation—		
Louisiana.		12.00
Leesville East & West—		
From Leesville, La., east.		10.00
Leotonia Railway—		
Leotonia, in Cushman Junction.		12.17
Lehigh & New England—		
In New York.		0.77
Lehigh Valley—		
End of Andover branch.		0.22
Little Rock, Maumelle & Western—		
Becker, Ark., to Coal Springs.		25.00
Louisiana & Northwest—		
Natchitoches, La., to Chestnut.		22.00
Memphis, Dallas & Gulf.		154.00
Middle Tennessee—		
Franklin, Tenn., to Mt. Pleasant.		44.50
Midland & Northwest—		
Midland, Tex., to Semple.		65.14
Missouri & North Arkansas		365.00
Missouri, Kansas & Texas—		
In Oklahoma City, Okla.		2.17
New Orleans Great Northern—		
Pearl River, La., to Hill's Switch.		3.55
St. Tammany, La., to Flouville.		3.43
Northwest Oklahoma—		
In Oklahoma.		0.66
Northern Pacific—		
Berlin, Minn., to Haynes.		1.87
Oregon, Washington Railroad & Navigation—		
Pritchard, Idaho, to Paragon.		11.25
Pacific Electric—		
In Long Beach, Calif.		1.12
Panama Railroad—		
Las Cascadas Canal Zone, to Pontoon Bridge.		6.34
Las Obispo to Las Cascadas.		2.00
Pearl River Valley—		
In Mississippi.		2.62

Pere Marquette—		
Rapid City, Mich., to Kalkaska.	11.40	
Clary, Mich., to Carters.	4.45	
Philadelphia & Reading—		
Near Shamokin, Pa.	0.31	
Potato Creek Railroad—		
Keating Summit, Pa., to four-mile post.	4.00	
Reynoldsville & Falls Creek—		
Rathmel Junction, Pa., to David Mine.	1.37	
St. Louis & Ohio River—		
Rebs Station, Ill., to Belleville.	2.00	
St. Louis Southwestern—		
Lufkin, Tex., to Kennard.	30.30	
Shreveport, Alexandria & Southwestern—		
Longville, La., to Vandercook.	9.50	
Sugar Pine Railway—		
In California.	14.15	
Texas Pacific—		
In Dallas, Tex.	0.72	
Texas, Arkansas & Louisiana.	7.70	
Union Pacific—		
Evanston, Wyo., to state line.	3.53	
Wynua, Utah, to Wahsatch.	1.84	
Union Traction—		
In Summerville, Ind.	0.52	0.37
Valdosta, Moultrie & Western—		
Valdosta, Ga., to Moultrie.	42.00	
Watuga & Yadkin River—		
In North Carolina.	30.50	
Wisconsin & Northwestern—		
In Wisconsin.	18.30	
Yakima Valley Transportation Company—		
In Yakima, Wash.	0.72	
	217.09	1,409.29
Canada		
Alberta & Great Waterways—		
In Alberta.	11.40	
Great Northern—		
In vicinity of Cloverdale, B. C.	0.90	
International boundary to Rossland, B. C.	9.47	
	12.30	9.47

LINES NOT INCLUDED IN 1920 STATISTICS

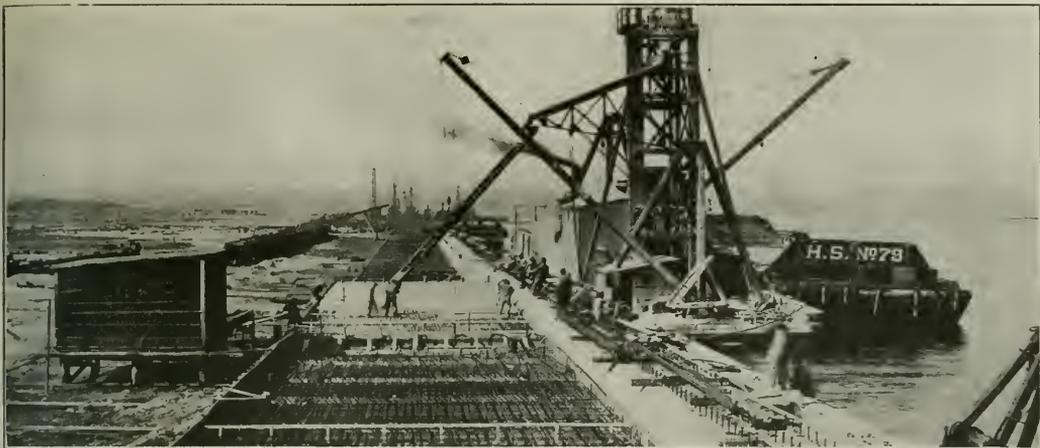
United States

	Lines abandoned permanently and taken up, not taken up,	Lines abandoned and taken up, not taken up,
	Miles	Miles
Bucksport & Elk River		8.00
Crystal River & San Juan—		
In Colorado		11.00
Cumberland Northern—		
In Tennessee.		10.00
Newport & Sherman's Valley—		
In Pennsylvania.		22.00
		51.00

APPLICATIONS MADE TO ABANDON, DURING 1921

Railroad	Applied for, miles	Authorized, miles
	Alabama & Mississippi—	
Vinegar Bend, Ala., to Pascagoula.		67.00
Atchison, Toney & Santa Fe—		
Burnett branch, Okla.		4.67
Bangor & Aroostook—		
Brownsville Junction, Me., to Catahdin Iron Works.	9.40	
Chicago & Eastern Illinois—		
Chicago & Indiana Coal Railway.	179.41	
Colorado Southern—		
Buena Vista, Colo., to Romley.		29.42
Duluth & Northern Minnesota—		
Knife River, Minn., to Cascade.	99.25*	
Flint Belt (Pere Marquette)—		
Genesee County, Mich.	13.50	
Franklin & Pittsylvania—		
Rocky Mount, Va., to Pittsville.	29.90	
Green Bay & Western—		
Onalaska, Wis., to La Crosse.	6.00†	
Great Northern—		
Branch in Stevens County, Wash.		7.49
Portland, N. Dak., to Portland Junction.		3.50
Kinder & Northwestern—		
Kinder, La., to Bullard.		16.00
Liberty White—		
Liberty, Miss., to South Macomb.		24.20
Liveoak, Perry & Gulf—		
In Taylor County, Fla.		2.00
Minneapolis, St. Paul & Sault Ste. Marie—		
Ironhub, Minn., to Deerwood.	3.90	
Mississippi Central—		
Branch line from Hattiesburg, Miss.		11.74
Northern Pacific—		
Washburn branch in Wisconsin.	33.78	
Boulder Elkhorn branch in Minnesota.	19.60	
Norfolk Southern—		
Carthage, N. C., to Pinehurst.	12.20	
Patterson & Western—		
Patterson, Calif., to Jones Station.		23.60
Pere Marquette—		
Ereoport branch in Michigan.	6.23	
Benton Harbor, Mich., to Buchanan.	25.69	
Haynor, Mich., to Sheridan.	19.64	
Big Rapids, Mich., to White Cloud.	19.67	
Harroon, Mich., in Leota.	10.00	
Seaboard Air Line—		
In Nassau County, Fla.		1.39
Tennessee, Alabama & Georgia.	88.00†	
Totals	575.17	191.01

*Authorized to abandon, but case recently reopened.
 †Authority refused.
 ‡Application made to Federal court.



The Claremont Terminal of the Lehigh Valley

Not Much Activity in New Construction in 1921

Mileage of New Lines Shows Increase Over 1920, but Other Projects Were Small and Restricted

By Milburn Moore

ONE ENCOURAGING FEATURE of a most difficult year for the railroads was the greater activity in the building of new lines in the United States. During 1921 there were completed 475.10 miles of new line, which in comparison to the low record for 1920 of 313.71 miles is an increase of about 45 per cent. It is, however, far below the mileages built previous to the World War and from about two-thirds to one-half of that built each year during the four years previous to 1920.

Total mileage (first, second and other multiple main track) also increased, reaching 642.22 miles, of which 143.07 and 25.26 miles were second and third track respectively. This multiple track construction is an encouraging increase over 1920 when but 414.35 miles of all track were completed, of which 90.87 and 1.89 miles were second and third track. Other railway construction was concerned almost entirely with the completion of a few large projects and a number of small ones started in previous years. Little new work of any size was inaugurated during 1921.

In Canada there was a considerable decrease in total mileage constructed as compared with 1920 and almost no building of second and other multiple track work. With 251.48 miles of first track and 6.57 miles of second, Canadian mileage came close to its low record of 1918. Since 1914 the building of new lines in Canada has been at a low point and it is doubtful whether there will be much done in the future until Canada gets nearer a solution of her railway problem.

The longest stretch of line was that constructed by the Government Railroad of Alaska—81.95 miles. This marks the completion of the building program of the Alaskan project as it now stands and no new construction in the way of additional mileage is in progress. It is expected that the Government Railroad of Alaska will be formally opened to operation with elaborate ceremonies at Anchorage early in February. The remaining first track mileage was, in the

main, divided approximately among seven states, with Texas leading with 63.60 miles and Florida next with 59.90 miles. The other states which had any considerable mileage of first track, comparatively speaking, were North Carolina with 48 miles, Oklahoma with 44.92 miles and West Virginia with 44.90 miles. West Virginia also had 21.52 miles of second track or a total of 66.42 miles, the greatest mileage of all track constructed within any one state.

The most important reason for West Virginia's track expansion is the development of that state's coal territories much of which has not, as yet, even been tapped. The growth of coal traffic has in some instances been far greater than the expansion of railway facilities to handle it. This is particularly true of the Chesapeake & Ohio during the past few years and, of the 21.52 miles of new second track, 18.8 miles are the work of that road in carrying out its plan of double-tracking the line up the Guyandot river into the Logan coal fields. The completion of these 18.8 miles in addition to what has already been finished makes this line 50 per cent double track.

The development in Texas, with a total mileage of 65.77 is, in a manner, similar, if oil be considered instead of coal. Each year sees an expansion of the oil field activities in that state with an accompanying need for more railway facilities.

Florida with 59.90 miles, all first track as stated previously, is the result of entirely different needs, which are presumably not that of expansion because of commercial necessity in a direct sense, but rather an expansion to fill pioneering agricultural needs. Florida for its size is one of the least, if not the least, developed of the states from a railway standpoint. Immense tracts of land are as yet idle and unsettled. The drainage work in and around the Everglades made available a considerable acreage of rich land, with a consequent growth of towns and settlements, the further growth of which was dependent upon transportation. It is only a few years ago when the principal and, in fact,

practically the only product from this section of lower Florida, was catfish, caught in Lake Okeechobee, brought out by boat and shipped to St. Louis, Mo. With the opening up of this section of the state, a variety of important agricultural products were produced, the quantity increasing each year as more land was developed and more settlers came in.

of the roads which were able financially, in comparison to the average, to carry forward projects of magnitude did little beyond what was absolutely necessary to tide them over.

Many roads which previous to government control had commenced work on large projects designed to effect future rather than immediate operating economies have been forced

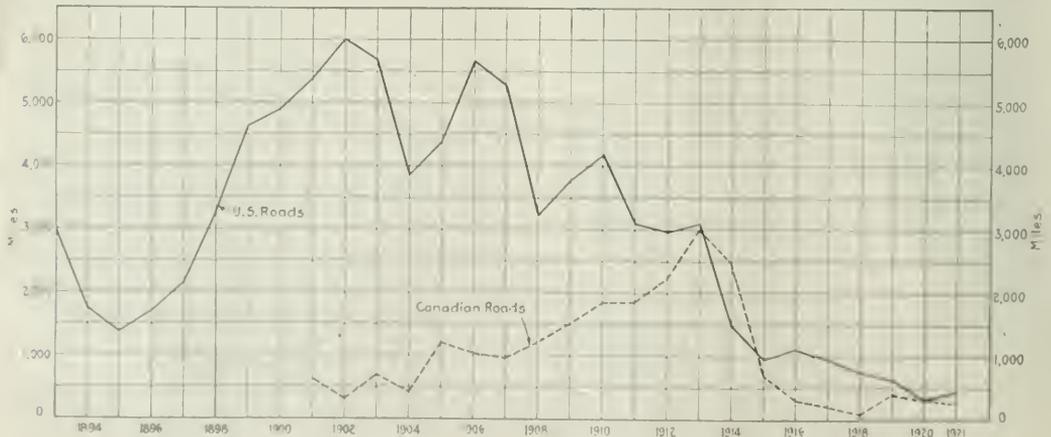
NEW TRACK BUILT IN 1921						NEW TRACK BUILT IN 1920					
Miles						Miles					
	Number companies building	First track	Second track	Third track	Fourth or more track		No. Cos. building	First track	Second track	Third track	Fourth or more track
United States						Total	United States—				
Alaska	1	81.95				81.95	Alaska	1	37.00		
Arkansas	4	13.59	2.00			15.59	Arizona	1	5.00		
California	4	5.27	1.19			6.46	Arkansas	2	9.00		
Florida	4	59.90				59.90	California	5	54.74		
Georgia	2	4.80				4.80	Colorado	1		1.10	
Hawaii	1	10.00				10.00	Florida	2	12.20		
Idaho	1	7.54				7.54	Georgia	2	5.00		
Illinois	1	4.77	3.30			8.07	Illinois	1	2.00	36.54	
Indiana	2	4.77	33.80			38.57	Kansas	1	0.50		
Kansas	2	0.75	9.65			10.40	Kentucky	4	19.87		1.80
Kentucky	3	1.57	5.50	10.60		17.67	Louisiana	3	31.15		
Louisiana	1	7.81				7.81	Maryland	1	2.72		
Maryland	1	2.30	2.90			5.20	Michigan	1		0.50	
Minnesota	1	3.00				3.00	Mississippi	1	9.52		
Mississippi	3	7.90	0.80			8.70	Missouri	2	0.86	11.85	
Missouri	4	4.09	8.77	0.06	0.11	13.03	New Jersey	2	1.97	2.24	
Montana	1	2.90				2.90	New Mexico	1	9.00		
Nebraska	1	14.06				14.06	New York	1	1.46	1.46	
New Jersey	1	1.90				1.90	Ohio	1	1.35	27.24	0.09
New York	1			13.30		13.30	Oklahoma	2	18.00		
North Carolina	2	48.00				48.00	Oregon	4	8.60		
Ohio	2		8.83	0.95	0.68	10.48	Pennsylvania	4	6.12	0.39	0.15
Oklahoma	5	44.92				44.92	Tennessee	1	2.50		
Pennsylvania	3	5.52		0.35		5.87	Texas	3	54.90	1.70	
Tennessee	1	6.40				6.40	Utah	1	3.60		
Texas	4	63.60	2.17			65.77	Virginia	1	0.20		
Utah	3	12.82	11.19			24.01	West Virginia	3	16.45	1.75	
Washington	1	3.50				3.50	Wisconsin	1		6.10	
West Virginia	5	44.90	21.52			66.42					
Wyoming	1	16.94	29.13			46.07					
Total	66	475.10	143.07	25.26	0.79	642.22	Total	53	313.71	90.87	1.89
Canada	19	151.28	6.57			157.85	Canada	7	305.39	31.60	

This Florida work, like that in Alaska, resembles somewhat the railway development in the pioneer days of the past.

In general, the year's construction has but emphasized what was indicated strongly last year, namely, that intensive development was more imperative than extensive and that any money to be spent must necessarily be spent along those lines. That has kept such building as there was strictly to projects which would improve the operation of trains at a minimum of expense. The marked decrease in traffic at the beginning of 1921, the heavy operating expenses, the state of general business, and numerous other factors created undoubtedly an uncertainty as to the outcome of the railway year financially that caused much needed work to be held up pending the return of more stable conditions. Even many

either to curtail the work greatly or to abandon temporarily all work. A notable example of this case is the Pennsylvania, which during the past three or four years has had a large number of projects under way involving the expenditure of millions of dollars, yet only a small part of it has ever been completed and nothing was carried forward during 1921 except the building of one line in West Virginia to be about 12.66 miles long when completed.

A substantial proportion of the projects listed this year under the different roads are small ones covering improvements to engine terminal and yard facilities, an indication, in itself, of the direction which construction took for the year. Among the few large projects upon which work was performed in 1921 there is only one which may be said to have



Curves of Mileage Built in the United States and Canada Since 1893

been started during that period. This project is the grade separation work of the Delaware, Lackawanna & Western through East Orange, N. J. The remainder consists of work carried over or continued, examples of which are the Claremont terminal of the Lehigh Valley, and the St. Paul, Minn., union passenger station. In general, good progress has been made on these and the other few large items.

At the close of the year there are some factors which look encouraging for 1922. One of these is the apparent revival of the building of branch lines, extensions and even new short lines. Many of the items show references to lines either

under survey or projected and, in other instances, under construction. Traffic is tending to increase and expenses have decreased; general business is on the upgrade and the prices of materials and labor are tending to grow less, all of which are important and controlling influences on the amount of construction which can be done in the future. Nearly all the roads have much work in prospect, which is vital to their future—how much of it will be done is, of course, practically dependent altogether on 1922 earnings. As the prospects for increased net returns look brighter, there are hopes for a healthier construction year in 1922.

Railroad Construction in the United States in 1921

Abukini Terminal & Railway

First Track: From Abukini, Kanaii, to Kealia, Kanaii, in territory of Hawaii, 10 miles.

Other Important Work Under Construction: New line under survey from Kealia to Molokai, 10 miles. Construction of breakwater across mouth of Bay at Abukini, cost \$100,000, 50 per cent completed. Building reinforced concrete wharf at Abukini, cost \$150,000, completed.

Americus & Atlantic

First Track: In Georgia, not specified, 2 miles.

Other Important Work Under Construction: Surveys made for new lines from Horns Siding, Ga., to Americus, 11 miles.

Ashley, Drew & Northern

First Track: In Arkansas, not specified, 2.23 miles.

Other Important Work Under Construction: Building in the vicinity of Ozmont and Fountain Prairie, Ark., 2.31 miles.

Atchison, Topeka & Santa Fe

Second Track: At San Bernadino, Calif., 2.91 miles.

Other Work Under Construction: New power house at Albuquerque, N. Mex., cost \$100,000, 15 per cent completed. Machine shop and facilities at Albuquerque, \$1,200,000, 98 per cent completed. Extension to Alvasado hotel, Albuquerque, cost \$400,000, contract awarded.

Atlantic & Carolina

First Track: From Kenansville, N. C., to Chiquapin, 13 miles.

Atlantic Coast Line

First Track: From Goodno, Fla., to Immokalee, 25.8 miles.

Baltimore & Ohio

Other Important Work Under Construction: Renewal of tunnel work at Philadelphia, Pa., cost \$275,000, completed. Construction of two joint industrial tracks in Philadelphia, Pa., cost \$260,000, 65 per cent completed. Track elevation through South Philadelphia, and east side yard to the Delaware river, \$1,000,000 initial appropriation, 20 per cent completed. Extension of this track and connection, etc., at Bay View Junction, Md., cost \$113,000, 50 per cent completed. Revision of Locust Point, Md., branch and yard, cost \$795,000, completed. Building new yard at Mt. Winans, Md., cost \$700,000, completed. Renewal of bridges at Savage and College, Md., cost \$118,000, 50 per cent completed. New shop facilities, Cumberland, Md., cost \$120,000, completed. Bridge renewals at Mt. Savage Junction to Ellerlie, Pa., cost \$308,900, completed. Renewal of bridge at Pittsburgh, Pa., over Allegheny river, cost \$3,475,350, completed. Extension of this track and connection, etc., at Bay View Junction, Md., cost \$117,000, 40 per cent completed. Bridge renewal at Foxburg, Pa., cost \$125,000, completed. Bridge renewal at W. Alexander to Elm Grove, W. Va., cost \$126,000, 50 per cent completed. Construction of branch industrial line and revision of branch line, Norton, W. Va., cost \$235,000, completed. Track revision from Grafton to Fairmont, W. Va., cost \$135,000, completed. Renewal of bridge over Hocking river at Guysville, Ohio, cost \$253,200, completed. Rebuilding bridge over Great Miami river at Lawrenceburg, Ind., cost \$2,197,000, completed. Renewal of bridge at Rossford, Ohio, cost \$110,000, completed. Side track for industrial development at Defiance, Ohio, cost \$238,000, 55 per cent completed.

Bartlett Western

Other Important Work Under Construction: Survey of new line from Bartlett, Tex., to Cameron, 32 miles.

Bessemer & Lake Erie

Other Important Work Under Construction: Conversion of Culmerville tunnel into an open cut, with relocation of highways and bridges, Culmerville, Pa., cost \$300,000, 15 per cent completed.

Boston & Maine

Other Important Work Under Construction: New 28-stall engine house and other engine terminal facilities at Concord, N. H., \$1,065,000, 50 per cent completed. Strengthening bridge over Merrimack river, Newburyport, Mass., cost \$405,200. Additional tracks and extension of existing tracks at Rotterdam, N. Y., cost \$261,000, 90 per cent completed. Renewal of messenger wires in electric zone at Hoosac Tunnel, Mass., cost \$120,000, completed.

Central of Georgia

Other Important Work Under Construction: Building from McCombs, Ala., to Overtown, 6.78 miles; new engine terminal, including concrete engine house and repair shop, turntable, etc., at Columbus, Ga., cost \$500,000, completed.

Central of New Jersey

First Track: From Bridgeton Junction, N. J., to Seabrook Farms, 1.9 miles.

Other Important Work Under Construction: Renewal of bridge 214, East Rahway, N. J., cost \$450,000, 99 per cent completed; bridge 217, Maurer, N. J., cost \$312,000, 99 per cent completed. Construction of a new bridge over Delaware river at Easton, Pa., and the widening of another bridge including track changes and interlocking, cost \$1,118,647, 99 per cent completed. Renewal of bridge 58 at Coalport, Pa., cost \$500,000, 99 per cent completed.

Central Pacific

Other Important Work Under Construction: General store building and oil storehouse at Sacramento, Calif., cost \$210,000, completed. Additional ferry slip and roadway for additional ferry service between Oakland Pier and San Francisco, cost \$121,700, completed.

Chesapeake & Ohio

First Track: From Mud Junction, W. Va., to Argonne, 3.3 miles. From Whitman Junction, W. Va., to Whitman, 0.8 mile; from Edwight, W. Va., to end of line, 1.8 miles. From Cow Creek, W. Va., to Conley Creek, 2 miles. From Strirt, W. Va., to Little Creek, 1 mile.

Second Track: From Clover Valley, W. Va., to Salt Rock, 10.1 miles. From Big Creek, W. Va., to Pecks Mills, 8.7 miles.

Third Track: From Big Sandy Junction, Ky., to Russell, 10.6 miles. *Other Important Work Under Construction:* Building new line from Wylo, W. Va., up Elk Creek, 3 miles. New line under survey from Olive Hill to Russell, Ky., 40 miles. Extension of 11 tracks in east-bound yard and new westbound yard at Gladstone, Va., cost \$400,936, completed. Installation of automatic train control, Charlottesville to Staunton, Va., cost \$248,649, 26 per cent completed. Improvements to shops, etc., at Clifton Forge, Va., cost \$837,600, 95 per cent completed. New east-bound yard at Hinton, W. Va., cost \$342,300, completed. Change of grade and line at St. Albans to Ferrell, W. Va., cost \$1,402,325, 99 per cent completed. New engine-dispatching and yard tracks at Peach Creek, W. Va., cost \$368,580, 86 per cent completed. New water station at Stevens, Ky., cost \$173,000, completed. New freight station at Logan, W. Va., cost \$150,000, completed. Renewal of bridge over Licking river at Covington, Ky., cost \$296,500, sub-structure 99 per cent completed. New engine house, boiler washing plant, etc., at Ashland, Ky., cost \$170,000, installation of turntable only completed.

Chicago & Alton

Second Track: Nilwood, Ill., to Bied, 3.3 miles.

Other Important Work Under Construction: Large freight terminal and office building at Chicago, cost \$3,000,000, 98 per cent completed.

Chicago, Burlington & Quincy

Other Important Work Under Construction: Elevation and realignment of main tracks through Aurora, Ill., to Montgomery, cost \$5,000,000, 80 per cent completed. Additional yard tracks, roundhouse, power plants, etc., at Centralia, Ill., cost \$600,000, completed.

Chicago, Indianapolis & Louisville

Other Important Work Under Construction: Freight car repair shop at Lafayette, Ind., cost \$160,000, completed.

Chicago, Milwaukee & St. Paul

Other Important Work Under Construction: Renewal of Skykomish river crossing, Monroe, Wash., cost \$141,780, completed. Renewal of Ebey Slough draw near Everett, Wash., cost \$102,639, 40 per cent completed. Renewal of Snohomish river draw, near Everett, Wash., cost \$191,169, 80 per cent completed.

Chicago, Rock Island & Pacific

Second Track: Little Rock, Ark., to Biddle, 2 miles.

Other Important Work Under Construction: Three-story brick office building at Chicago, cost \$100,000, completed.

Cleveland, Cincinnati, Chicago & St. Louis

First Track: In vicinity of Zionsville, Ind., 4.5 miles.

Second Track: Augusta, Ind., to Whitestown, 10.2 miles; Briar, Ind., to Beech Grove, 9 miles; Winchester, Ind., to Farmland, 8.6 miles; Templeton, Ind., to Swannington, 6 miles.

Other Important Work Under Construction: Engine terminal and facilities at Ansonia, Ohio, cost \$177,000, 30 per cent completed. Engine terminal at Sheff, Ind., cost \$198,000, 30 per cent completed. Grade reduction from Templeton to Swannington, Ind., cost \$635,000, 90 per cent completed.

Cowlitz, Chehalis & Cascade

First Track: From Lacamas, Wash., east, 3.5 miles.

Delaware & Hudson

Third Track: From Schenevus, N. Y., to Summit, 13.3 miles.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Track elevation and grade separation work at East Orange, N. J., including the enlargement of two passenger stations and the construction of two new ones, cost \$4,000,000, 35 per cent completed. The elimination of two grade crossings at Paterson, N. J., cost \$100,000, 60 per cent completed. Elimination of one grade crossing at Mountain Lakes, N. J., \$125,000, 50 per cent completed. Changing present third track on Hackensack meadows from slow freight to high-speed passenger track in connection with substitution of color signals for semaphore signals on lines between Harrison, Newark and Hackensack river, cost \$483,479, 95 per cent completed. Elimination of grade crossings, near Cortland, N. Y., cost \$104,000, 75 per cent completed.

De Queen & Eastern

First Track: From Oklahoma-Arkansas state line to De Queen, Ark., 8.86 miles.

East Erie Commercial

Other Important Work Under Construction: Building connection in Pennsylvania, 0.65 mile; grade separation work, cost \$125,000, 99 per cent completed.

East Texas & Gulf

First Track: Hyatt, Tex., to Wurtsbaugh, 9.6 miles.

Other Important Work Under Construction: A line projected from Hyatt, Tex., to Hicks, 7.8 miles.

Erie Railroad

Other Important Work Under Construction: Renewal of drawbridge over Passaic river at Newark, N. J., 98 per cent completed.

Galesburg, Rockford & Northern

Other Important Work Under Construction: New lines from Hoopole, Ill., to Geneseo, 15.98 miles under survey; 85 per cent of the right-of-way secured.

Galveston, Harrisburg & San Antonio

Second Track: In Texas, from mile post 829.26 to 832.03, 2.17 miles.

Genesee & Wyoming

Other Important Work Under Construction: New classification yard and track at Retsof, N. Y., cost \$200,000, 30 per cent completed.

Georgia & Florida

First Track: In Georgia, mile post 224 to 226 1/4—2.25 miles; mile post 234 1/4 to 234.3—0.55 mile.

Other Important Work Under Construction: Building from mile post 227 to mile post 237—10 miles. From Padgett, Ga., to Allene, 2.08 miles. New line under survey, 2.75 miles.

Goshen Valley

First Track: Dividend, Utah, to Pearl Junction, 11 miles.

Government Railroad of Alaska

First Track: In Alaska, 81.95 miles.

Other Important Work Under Construction: Construction of a modern coal washing plant at Sutton, Alaska, cost \$600,000, 65 per cent completed.

Great Northern Railway

Other Important Work Under Construction: The construction of outer half of ore dock and renewal of pile and trestle approach to another ore dock at Alhough, Wis., cost \$1,558,000, completed. Construction of new highways on each side of Grand View cut to eliminate several bridges at Vancouver, B. C., cost \$156,800, 50 per cent completed. Removal of draw span over Snochmish river and new foundations, cost \$260,000, to be completed in 1922. Widening under-crossings and renewal of steel bridge at Como and Tenth avenue, Minneapolis, Minn., cost \$160,400, completed. Grade separation and construction of steel and concrete bridge at East Hennepin avenue, Minneapolis, Minn., cost \$411,700, completed.

Gulf Coast Lines

First Track: From Albert, La., to Jefferson Island, 7.81 miles.

Other Important Work Under Construction: Rebuilding and enlarging shops, etc., at Kingsville, Tex., cost \$100,000, completed.

Hocking Valley

Second Track: Marion, Ohio, to Mineral, 8.85 miles.

Indianapolis Union Railway

Other Important Work Under Construction: Grade separation work at Indianapolis, Ind., cost \$4,000,000, 90 per cent completed.

Interstate Railroad

Other Important Work Under Construction: Building new tracks from Norton, Va., south of Gooch river, 16 miles, and from mouth of Gooch river to Miller yard in Virginia, 19 miles. Machine shop and foundry at Andover, Va., cost \$1,000,000, completed.

Jackson & Eastern

First Track: From Southeast, Miss., to Harshehoe, 5.5 miles.

Other Important Work Under Construction: Building from Harshehoe, Miss., to Walnut Grove, 19 miles. Surveyed and under project from Walnut Grove to Jackson, 17 miles.

Jonesboro, Lake City & Eastern

First Track: Victoria, Ark., to Golden Lake, 2.5 miles.

Kanawha & Michigan

Other Important Work Under Construction: Building low grade north-bound line for through freight service from Hobson, Ohio, to Meigs, 5.5 miles, cost \$677,000, 66 per cent completed.

Kansas & Oklahoma

First Track: In Oklahoma, near Forgan, 1 mile. In Kansas, near Liberal, 0.75 mile.

Kansas City Terminal

Third Track: In Kansas City, Mo., 0.06 mile.

Fourth Track: In Kansas City, Mo., 0.11 mile.

Other Important Work Under Construction: Steel and concrete viaduct at Holmes street, cost \$261,000, 60 per cent completed. Structural steel and reinforced concrete viaduct at Seventh street, over yards and tracks, cost \$400,000.

Kentucky & Tennessee

First Track: Stearns, Ky., to Gregory, 1.57 miles.

Lehigh Valley

Other Important Work Under Construction: Building of first unit of a new rail and deep-water terminal, also dredging a 35-ft. channel to deep water at Claremont, Jersey City, N. J., 65 per cent completed. One-story pier and bulkhead for merchandise freight on East river, New York City, completed.

Lewisville, Neperce & Eastern

Other Important Work Under Construction: Building from Tammany, Ida., to Waha, 11 miles.

Liveoak, Perry & Gulf

First Track: In Florida, not specified, 4 miles.

Los Angeles & Salt Lake

Other Important Work Under Construction: Building machine shop and equipment at Provo, Utah, \$27,110, completed. Construction of reinforced concrete addition to tank car repair shop with necessary machinery and trackage at Los Angeles, Calif., cost \$315,198, completed. Building new freight terminal at Long Beach, Calif., cost \$195,000, 38 per cent completed. Construction new freight terminal at Los Angeles, Calif., cost \$431,000, 23 per cent completed.

Louisville & Nashville

Second Track: In Kentucky, from Ravenna to Millers Creek, 3 miles; from Typo to Domino, 1.6 miles; from North Hazard to Hazard, 0.9 mile.

Other Important Work Under Construction: Second track and grade reduction on Cumberland Valley division including elimination of 725 ft. of tunnel, cost \$1,255,000, 90 per cent completed. Construction of yard, 9-stall enginehouse, machine shops, coaling station, other facilities, etc., at Loyal, Ky., cost \$593,000, 98 per cent completed. Storage yard at Typo, Ky., cost \$407,000, 85 per cent completed. Construction of 9-stall enginehouse, machine shop and other facilities at Hazard, Ky., cost \$478,000, 80 per cent completed. Construction of new freight facilities and passenger station, second track, etc., at Hazard, Ky., cost \$157,000, 40 per cent completed; 2,500,000-gallon pumping plant and piping, etc., at Dortha, Ky., cost \$275,000, 95 per cent completed. Renewal of Alabama bridge at Montgomery, Ala., cost \$600,000, 90 per cent completed.

Maine Central

Other Important Work Under Construction: Reconstruction of bridge and abutments at Norridgecock, Me., cost \$176,500, completed.

Michigan Central

Other Important Work Under Construction: Grade separation at Detroit, Mich., cost \$200,000, completed.

Midland Valley

Other Important Work Under Construction: Enlargement of terminal facilities at Pawhuska, Okla., cost \$110,000, completed.

Missouri, Kansas & Texas

First Track: Oklahoma City, Okla., cut-off, 1.26 miles.

Other Important Work Under Construction: New engine terminal and yard extension at Oklahoma City, cost \$630,000, completed. New inbound freight house and yard rearrangement at Dallas, Tex., cost \$358,000, completed. Raise of grade across San Gabriel river bottom, Circleville, Tex., cost \$105,000, 40 per cent completed. Renewal of three bridges and strengthening of others on Neesho division, cost \$150,000, 60 per cent completed. Installation of fuel oil storage and delivery facilities on Kansas and Oklahoma lines, cost \$333,000, 80 per cent completed.

Missouri Pacific

Other Important Work Under Construction: Building new concrete and reservoir pipe line and other facilities at Wagstaff, Kan., cost \$128,000, completed. Reconstruction of yard tracks to replace those destroyed by flood at Pueblo, Colo., cost \$112,000, completed. Filling in of bridge 160 at Yellville, Ark., cost \$225,500, completed. Filling in bridge 138 at Trickett, Ark., \$158,000, 60 per cent completed. Construction of a 100-ft. turntable, addition of two stalls and extension to eight in roundhouse, and other facilities at Coffeyville, Kans., cost \$112,000, 50 per cent completed. Construction of river bank protection at Myrick, Mo., cost \$10,000, completed.

Mobile & Ohio

Other Important Work Under Construction: New freight office and warehouse at East St. Louis, Ill., cost \$151,898, completed.

Moore Haven & Clewiston

First Track: Moore Haven, Fla., to Clewiston, 14.5 miles.

Nashville, Chattanooga & St. Louis

Other Important Work Under Construction: Engine terminals, improved passenger and freight facilities at Hollow Rock Junction, Tenn., cost \$580,000, 90 per cent completed.

Newburgh & South Shore

Third Track: In Ohio out of Cleveland, 0.95 mile.
Fourth Track: In Ohio out of Cleveland, 0.68 mile.
Other Important Work Under Construction: Car repair shops and facilities at Cleveland, cost \$275,000, completed.

New Holland, Higginsport & Mt. Vernon

First Track: Wenona, N. C., to New Holland, 35 miles.

New York Central

Other Important Work Under Construction: Renewal of stokers at Yonkers power station, Glenwood, N. Y., cost \$125,000, completed. Mail service and office building at New York, cost \$4,144,190, 93 per cent completed. Coaling plant and ash conveyor at Wayneport, N. Y., cost \$177,000, completed. Thirty-stall engine house and terminal facilities at Solvay, N. Y., cost \$1,700,000, completed. Reinforced concrete arch highway under crossing at Marston, N. Y., cost \$136,000, completed. Depot road subway at Harter Creek, Pa., cost \$110,000, 75 per cent completed. Subway at Water street, Wesleyville, Pa., cost \$225,285, 90 per cent completed. Grade separation at Detroit, Mich., cost \$263,621, 60 per cent completed.

New York, New Haven & Hartford

Other Important Work Under Construction: Installation of pipe flume at power house at Cos Ceb, Conn., cost \$100,000, completed. Westbound running track from Bradford to Westerly, R. I., cost \$120,000, 93 per cent completed. Relocation of track, East Providence, R. I., cost \$108,985, 90 per cent completed. Rearrangement of yard tracks at Hartford, Conn., cost \$132,403, 46 per cent completed. Construction of 3-mile telephone line, yard offices, signal towers, miscellaneous buildings and yard tracks, etc., in Cedar Hill freight terminal, New Haven, Conn., cost \$309,228, completed. Enlargement of machine shop, rearrangement and installation of machinery at Cedar Hill, cost \$152,700, completed. Miscellaneous yard track and other facility extensions, including land requirements for Northrup avenue terminal, Providence, R. I., cost \$394,015, completed.

Norfolk Southern

Other Important Work Under Construction: Grade and line revision at various points along the line, cost \$400,000, completed.

Northeast Oklahoma

First Track: Near Picher, Okla., 3 miles.

Norfolk & Western

First Track: From Lenore, W. Va., to terminus, 18 miles.

Other Important Work Under Construction: Installation of 2,000,000-gallon water supply, reservoir and pumping unit at Roanoke, Va., completed. Construction of timber preserving plant at Radford, Va., completed. Additional passing tracks at Bluefield, W. Va., completed. Renewal of bridge across Pennsylvania yards at Columbus, Ohio, completed. Improvement and betterments to coal property for fuel purposes near Williamson, W. Va., cost \$262,000, work now under way.

Northern Pacific

Second Track: Helena, Mont., to Great Northern crossing, 2.9 miles.

Northern Pacific Terminal of Oregon

Other Important Work Under Construction: New engine terminal and other necessary facilities at Portland, Ore., cost \$400,000, 15 per cent completed.

Oklahoma-Southwestern

First Track: Bristow, Okla., to Nuyaka, 24 miles.
Other Important Work Under Construction: Building from Nuyaka, Okla., to Okmulgee, 12 miles; projected, Okmulgee to Shawnee, 50 miles.

Omaha, Lincoln & Beatrice

Other Important Work Under Construction: New lines projected from Lincoln, Nebr., to Beatrice, 40 miles, cost \$2,000,000, and from Lincoln, Nebr., to Omaha, 55 miles, cost \$2,500,000, 20 per cent completed.

Oneida & Western

First Track: From Stockton, Tenn., to Doss Spur, 6 miles.

Oregon & California

Other Important Work Under Construction: Construction of single track tunnel to eliminate curves and trestle near Willamette river at Elk Rock, Oregon, cost \$219,000, completed.

Oregon Short Line

First Track: From Strachan, Idaho, to Conda, 7.54 miles.
Other Important Work Under Construction: Installation of tie and timber treating plant at Pocatello, Idaho, cost \$326,000, 80 per cent completed.

Oregon-Washington Railroad & Navigation

Other Important Work Under Construction: Extension of Albina yard at Portland, Ore., cost \$168,000, 99 per cent completed. Renewal of bridge at Chatcolet, Idaho, cost \$136,800, 99 per cent completed. Reconstruction of yard tracks and building of new depot yard office and other facilities at Reith, Ore., cost \$167,000, completed. Building new yard tracks and office at Huntington, Ore., cost \$113,000, completed. Renewal of main line bridges between Gibbon and Cayuse, Ore., cost \$110,000, completed.

Pacific Electric

First Track: In Long Beach, Calif., 1.53 miles.

Pearl River Valley

First Track: In Mississippi, between mile posts 14 to 17, 2.4 miles.

Pennsylvania Railroad

Other Important Work Under Construction: Building from Chester, W. Va. to Raccoon Creek, Pa. (Central region), 12.66 miles.

Perce Marquette

Other Important Work Under Construction: Building Flint Belt railroad in Michigan, 8.2 miles. Engine terminal and yard facilities at New Buffalo, Mich., cost \$700,000, completed. Engine terminal at Plymouth, Mich., cost \$400,000, completed. Engine terminal at Saginaw, Mich., cost \$980,000, completed. Storehouse at Grand Rapids, Mich., cost \$125,000, 90 per cent completed.

Philadelphia & Reading

Third Track: East of Womelsdorf, Pa. 0.35 mile.
Other Important Work Under Construction: Concrete arch bridge over Schuylkill river at Philadelphia, Pa., cost \$1,100,000, completed. New county bridge at Cnshohocken, Pa., cost \$240,000, completed. Double track bridge over Susquehanna river at Harrisburg, Pa., cost \$1,703,000, 52 per cent completed. Opening Tulip and Emerald streets in Philadelphia, under tracks of Richmond Branch, cost \$350,000, 97 per cent completed. Installation of double track bascule bridge at Darby Creek, \$222,000, 55 per cent completed. Construction of 11 bridges at Harrisburg, Pa., cost \$1,107,000, contracts awarded. Grade elimination and new station facilities at Swatara, Pa., cost \$169,000, work started. Double track through truss draw span with 5 deck plate girder approaches at Atlantic City, N. J., cost \$328,100, contract awarded.

Pittsburgh & Lake Erie

First Track: Shaw Junction, Pa., to Walford, 3.29 miles.

Pittsburgh & West Virginia

Other Important Work Under Construction: Building new branch line into coal field from Virginia, W. Va., to Bellfield, Pa., 3.2 miles, cost \$382,000, 50 per cent completed.

Port Bolivar Iron Ore

Other Important Work Under Construction: New line under survey from Ero, Tex., to junction with the Missouri, Kansas & Texas, 8 miles.

Potato Creek

First Track: Keystone, Pa., to Hamlin, 2.23 miles.

Richmond Belt

First Track: In Richmond, Calif., 0.83 mile.

Roaring Fork

Other Important Work Under Construction: Building from Blackwood, Va., to Black Creek mines, 0.5 mile.

St. Louis, Kennett & Southeastern

First Track: From Kennett, Mo., east, 3.5 miles.
Other Important Work Under Construction: Building new line from Kennett, Mo., to Dearing, 9 miles.

St. Louis-San Francisco

Second Track: Sleeper, Mo., to Lehanon, 8.7 miles; Olathe, Kans., to Spring Hill, 9.65; Amory, Miss., to Aberdeen Junction, 0.8 mile.

St. Louis Southwestern

Other Important Work Under Construction: New yard and engine terminal at Hodge, Tex., cost \$235,000, completed.

St. Paul Union Station

First Track: In St. Paul, Minn., 3 miles.
Other Important Work Under Construction: New union station in St. Paul, Minn., cost \$15,000,000, 50 per cent completed.

San Francisco Oakland Terminal

Second Track: In California, not specified, 1.19 miles.

Sewell Valley

First Track: From Rainelle Junction, W. Va., to Rupert, 8 miles.
Other Important Work Under Construction: Building from Rupert, W. Va., to Glencoe, 4 miles. New line under survey from Rupert, W. Va., to Duo, 11 miles.

Sierra Company of California

Other Important Work Under Construction: Completion of connecting lines in the Turlock and Modesto irrigation districts, California, of 7.75 miles at one location, and 2 miles on another now operated by this road, and ultimately to be taken over.

Southern Pacific

Other Important Work Under Construction: Renewal of bridge over Willamette river, Albany, Ore., cost \$198,000, completed. Construction of concrete reinforced warehouse and tracks to serve at San Francisco, Calif., cost \$1,620,000, completed. Line changed near Tehachapi Pass in the Coast Range mountains to eliminate two tunnels between Marcel and Cable, Calif., cost \$115,000, completed. Enlarging and lining with concrete, 16 tunnels under Tehachapi mountains between Bakersfield and Tehachapi, Calif., cost \$1,000,000, completed. Texas lines: New coach and paint shop at Houston, Tex., and extension to transfer table, cost \$217,700, completed. Rein-

forced concrete storehouse and office building at Houston, Tex., cost \$150,000, completed. Reconstruction of Pier A and part of Pier B, conveyor gallery and sheds at Galveston, Tex., cost \$150,000, 85 per cent completed. Replacing wooden floor and wooden bulkhead on Pier B with concrete floor and retaining walls, also replacing water mains in bay at Galveston, Tex., cost \$150,000, completed.

Tampa Southern

First Track: From Ellenton Belt Line in Florida, 15.6 miles.

Terminal Association of St. Louis

First Track: At Big Bend Quarry, Mo., 0.59 mile.

Texas & Pacific

Other Important Work Under Construction: Renewal of draw span over Bayou Plaquemine with double track single leaf lift span, cost \$225,000, 25 per cent completed.

Texas Midland

First Track: From Commerce, Tex., to Greenville, 14 miles.

Texas, Oklahoma & Eastern

First Track: From Broken Bow, Okla., to Oklahoma—Arkansas state line, 15.66 miles.

Utah Railway

Other Important Work Under Construction: New line under survey from Watson, Utah, to Bonanza and Cowboy, 24.96 miles.

Union Pacific

First Track: From Haij, Nebr., to Nebraska—Wyoming state line 14.06 miles. From Nebraska—Wyoming state line to near Yoder, Wyo., 13.57 miles. From Evanston, Wyo., to Wyoming—Utah state line, 3.37 miles. From Wyoming—Utah state line to Wahsatch, Utah, 1.82 miles.

Second Track: LeRoy, Wyo., to Wyoming—Utah state line, 29.13 miles. From Wyoming—Utah state line to Wahsatch, Utah, 7.69 miles.

Other Important Work Under Construction: Building new road from near Yoder, Wyo., to end of track, 2.75 miles, and from near Yoder, down Cherry Creek Valley, 13.2 miles. Installing concrete lining and extending concrete portals at Hermosa tunnel, Wyo., cost \$372,500, completed. Additional yard tracks at Council Bluffs, Iowa, cost \$324,515, completed.

Union Traction

First Track: At Muncie, Ind., 0.27 mile.

Virginian Railway

First Track: From Mabon, W. Va., to Polk Gap, 5 miles.

Second Track: In West Virginia, 2.72 miles.

Other Important Work Under Construction: Building new line from Polk Gap, W. Va., to Glen Rogers, 9.45 miles. Extensions and alterations to engine house at Elmore, W. Va., cost \$133,000, completed.

Washington, Brandywine & Point Lookout

Other Important Work Under Construction: Building from Mechanicsville, Md., to Hollywood, 12 miles.

Waterloo, Cedar Falls & Northern

Other Important Work Under Construction: Building new concrete arch bridge and relocation of track at Waterloo, Iowa, terminals, cost \$100,000, 85 per cent completed.

Western Maryland

Second Track: Charlton, Md., to Clearspring, 2.3 miles.

Other Important Work Under Construction: Dredging 32 ft. channel to new government channel at Port Covington, Md., cost \$160,000, 70 per cent completed. Extension and improvements to grain elevator at Port Covington, Md., cost \$1,000,000, 35 per cent completed. Conveyor loading equipment at Port Covington, cost \$432,000, 98 per cent completed. Reconstruction of coal pier at Port Covington, cost \$700,000, completed.

Wheeling & Lake Erie

Other Important Work Under Construction: New yards, roundhouse and flatstalls, etc., including steel and frame viaduct at Gambrians, Ohio, cost \$540,750, 81 per cent completed. New yards, roundhouse, turntable and other facilities, etc., including highway change at Jewett, Ohio, cost \$494,800, 80 per cent completed.

Wichita Falls, Ranger & Ft. Worth

Other Important Work Under Construction: Building from Breckenridge, Tex., to Jopkins, 9.3 miles.

Wichita Falls & Southern

First Track: Newcastle, Tex., to Jopkins, 40 miles.

Winchester & Western

First Track: Between Intermediate and Wardsville, W. Va., 5 miles.

Other Important Work Under Construction: Building from Wardsville, W. Va., to Baker, 12 miles.

Railroad Construction in Canada in 1921

Alberta & Great Waterways

First Track: In Alberta, under mile post 272.1 to 282.8, 10.7 miles.

Other Important Work Under Construction: Reconditioning of track, right-of-way and drainage; new water supplies, etc., \$2,000,000, 90 per cent completed.

British Columbia Electric

First Track: In Vancouver, B. C., 0.55 mile.

Canadian National Railways

First Track: In Manitoba, Amaranth north, 17.7 miles. In Saskatchewan, Thunderhill extension, 13.9 miles; Milfort northeast, 23.7 miles; Luck Lake, 15.02 miles; Jackfish Lake, 15.06 miles. In Alberta, Onoway branch, 11.9 miles and in British Columbia, Vancouver Island, 3.1 miles.

Second Track: In Alberta, between Munson and Wayne, 6.57 miles.

Other Important Work Under Construction: Canadian Northern: New terminal facilities and buildings at Nutana, Saskatchewan, \$411,050, completed; steel bridge at Saskatoon, Saskatchewan, six 157-ft. spans, cost \$330,000, completed; steel bridge across Red Deer river, in Alberta on Medicine Hat branch, cost \$326,000, sub-structure, completed; steel bridge across Assiniboine river at Pleasant Point, Manitoba, cost \$160,000, 15 per cent completed. Grand Trunk Pacific: new reservoir, dam and pipe line at Melville, Saskatchewan, cost \$320,000, completed; salmon wharf and warehouse at Prince Rupert, B. C., cost \$750,000, wharf completed, warehouse 15 per cent completed.

Canadian Pacific

First Track: Langdon, Alberta, north (Acme-Empress), 17.3 miles; Weyburn, Alberta (Altawan West), 17 miles.

Other Important Work Under Construction: Building from Russell, Manitoba, northerly, 5.5 miles; Langdon, Saskatchewan, northeasterly, 0.5 miles; Bassano, easterly, 56 miles, of which 35 miles are graded; Rosetown, southeasterly, 45 miles, of which 41 miles are graded; Archie-Weymark, 25 miles, of which 21 miles are graded; Moose Jaw, southwest (Consul East), 60 miles, of which 31 miles are graded; Leader, southeasterly, 29.5 miles.

Central Canada

First Track: In Alberta, 23 miles.

Dominion Atlantic

First Track: Near Weymouth Mills, Nova Scotia, 2.5 miles.

Esquimalt & Nanaimo

First Track: In Province of British Columbia, 4 miles.

Other Important Work Under Construction: New line under survey from Courtenay to Campbell river, 30 miles; renewal of railway and highway bridge at Victoria, B. C., a joint bridge with the city of Victoria, cost \$750,000, foundations about completed.

Grand Trunk—Lines East

Other Important Work Under Construction: Renewal and widening of overhead bridge at Main Street, Toronto, cost \$120,000, 80 per cent completed.

Kettle Valley

First Track: South Penticton, B. C., to Dog Lake, 2.4 miles.

Other Important Work Under Construction: Building from Dog Lake to government experimental farm, 16.7 miles.

Pacific Great Eastern

First Track: In British Columbia, from Australian creek to Cottonwood river, 35 miles. From Ft. George to Red Rock creek, 18 miles.

Other Important Work Under Construction: Building new road from Red Rock creek to Cottonwood river, 46 miles. Also projected new lines from Ft. George to Provincial boundary, Peach river district, 426 miles. Main line of this road is now under operation from Squamish to Quesnel, 348 miles, with steel laid to mile post 304, and line graded to mile post 428. Steel has also been laid for 18 miles south of Ft. George, cost of all work, \$40,000,000, 90 per cent completed.

Quebec Central

First Track: From Scott Junction, in Province of Quebec, to Diamond Junction, 19.33 miles.

Reid-Newfoundland

First Track: Irvine, N. F., to Topsail, 13 miles.

Temiskaming & Northern Ontario

Other Important Work Under Construction: Building new line from Torchre to Abitibi Canon, 70 miles.

Railroad Construction in Mexico in 1921

First Track: In the state of Durango, from Llano Grande to El Salto, 23.61 miles, and from Los Baños to Cerro de la Cruz, 17 miles; in the state of Coahuila, from Zaragoza to Santo Tomas, 31.67 miles, and from La Vibora to El Oro, 30.14.

Other Important Work Under Construction: Building new line from El Oro to Sierra Mojada, Coahuila, 9.32 miles; and from Santo Tomas to Villa Arana, Coahuila, 28 miles, new line under survey from El Salto to Maratlan, 165 miles; reinforced concrete passenger station at Durango, cost \$330,000, 85 per cent completed, reinforced concrete passenger station at Saltillo; reduction of grade between Saltillo and Carreones, in the line between Mexico City, Mex., and Laredo, Tex., old grade 2 per cent, new grade 1.05 per cent, cost \$860,470, 35 per cent completed.

Concerning the Contributors in This Number

Co-operation Required From Many Sources to Cover Railway Activities Throughout the World

THIS NUMBER of the *Railway Age* contains several times the amount of material which would be included in the average size technical book. Besides discussing the important developments of an important year on our own railways, the Annual Review Number, this year, for the first time covers practically all of the important countries throughout the world. Articles in a number of this nature require the most extended and painstaking preparation and study.

This year for the first time, also, practically all of the articles are signed. Most of the articles were prepared by the members of the *Railway Age* editorial staff. In not a few cases, however, especially as concerns the foreign railways, it was necessary to go outside of the staff. A few words may not be out of place, therefore, as to why the respective special contributors were selected as being best fitted to discuss the subjects which were assigned to them.

Railway Executives

It would be superfluous to say anything about the four chief executives who have contributed to the opening article entitled, "Railway Executives Review Prospects for 1922" (page 5), **Thomas DeWitt Cuyler**, chairman of the Association of Railway Executives; **Julius Kruttschnitt**, chairman of the Southern Pacific Company; **C. H. Markham**, president of the Illinois Central, and **A. H. Smith**, president of the New York Central, need no introduction to our readers in this country or abroad.

Roberts Walker, in his article on "The Regulation of Security Issues Under Section 20-a" (page 21), has taken what might otherwise be a somewhat heavy subject and has treated it in an unusually interesting manner. Mr. Walker is familiar with the subject because of his relations in a legal capacity with the trust company field. He is also vice-president and a director of the Chicago & Alton. For the purposes of the present study he engaged in a careful investigation of the dockets and procedure in many of the important or typical decisions which have been rendered by the Interstate Commerce Commission in this important new work.

Railway Economists

Dr. Julius H. Parmelee has been a regular contributor to the Annual Review Numbers of the *Railway Age* for several years. Last year his article was entitled "Railway Revenues and Expenses in the Year 1920." This year it is headed "An Analysis of the Railway Statistics for 1921" (page 119). The change in title is significant, for one of the many interesting points brought out in the present article is that relating to the increased and improved railway statistical data which have become available in recent years. Dr. Parmelee, as the director of the Bureau of Railway Economics, is doubtless as close a student of railway economics as any man in the country. For three years after his graduation from Yale he was an instructor in economics at

Yale, and since that time he has been engaged in work closely related to that subject.

J. L. Payne, who writes under the head "The Canadian Railways Are in a Bad Way" (page 70), may be presumed to know whereof he speaks. Mr. Payne has his office at Ottawa, Canada, and was formerly comptroller of statistics, Department of Railways and Canals for the Dominion of Canada. He has been a keen student of railway affairs in Canada. For several years he has furnished special articles for our Annual Review Number and on other occasions he has discussed in the columns of the paper the performance of the Canadian railways and the tendencies in the Canadian railway situation. Mr. Payne has a happy way of developing the salient features and presenting them in a most readable manner.

Opinions About Mexico

Our plans for an article on Mexico were slightly upset at almost the last minute, but with the aid of Messrs. Titcomb, Pyeatt and Fay we were able to make up the deficiency—in a commendable manner, we should say, if we thought our readers would pardon such a departure from editorial modesty. The article entitled "Mexico Makes Progress Toward Rehabilitation" (page 73), discusses less the actual conditions within Mexico than the restored relationships between the Mexican and United States lines. This very important angle of the situation is "covered" with the assistance of the three railway executives above named who are closely in touch with the Mexican roads.

H. B. Titcomb recently succeeded the late Epes Randolph as president of the Southern Pacific of Mexico and the Arizona Eastern. He is naturally much interested in the Mexican situation and has made a study of it as a part of his new work.

J. S. Pyeatt has been at the head of the Gulf Coast lines for many years. During the period of federal control, he was federal manager of the St. Louis-San Francisco and also various lines in Texas.

Thornwell Fay, executive officer for the receiver of the International & Great Northern may, like Mr. Pyeatt, be expected to be informed concerning our Mexican railway relationships, because his line, like the Gulf Coast Lines, interchanges freight with the National Railways of Mexico and operates a through passenger service in connection with the Mexican system.

Our European Writers

M. Peschaud, who points out the "High Lights on the French Railway Situation" (page 81), is secretary of the Paris-Orleans Railway. He has had a broad experience in railway affairs and has written a number of articles for French, English and American papers on the French railways. He has also written a book on the French railways during the war which has been very well received.

The article on Italy, "A Review of the Italian Railway Situation" (page 85), is written by **A. Giordano**, the *Railway Age's* special news correspondent at Rome, Italy. He follows railway and industrial conditions closely.

Julian Grande, who discusses "The Swiss Railways in the Year 1921" (page 88), is a railway news specialist with headquarters at Geneva, Switzerland. He is a correspondent for several very important newspapers and publications, among them the *Railway Age*.

Dr. J. M. Goldstein, who says that the "Soviets Demoralize Already Inadequate Systems" (page 91), was formerly professor of economics at the Institute of Industry and Trade at the University of Moscow. Before the war he served as an economic adviser to various branches of his government. He was a member of Kerensky's railway mission to the United States. Since the triumph of the Bolsheviki he has devoted himself continuously to a study of American railways. In the *Railway Age* of November 5 was published an article by him showing the important part played by the railways in increasing the population and wealth of the United States.

G. Reder, whose article is entitled "German Railways Operating Under Great Difficulties" (page 93), is associated with the Verein Deutscher Ingenieure, the principal engineering society of Germany, with headquarters at Berlin. His work keeps him in close touch with the railway and engineering conditions in Germany.

American Ideas About Japan's Railways

B. B. Milner, who makes "Some observations on the Japanese Railways" (page 101), received his early training on the Pennsylvania Railroad. He later went with the New York Central, finally becoming chief mechanical engineer of that system. On the Pennsylvania Railroad, in particular, he received an experience covering not only mechanical but engineering and operating matters; he also gave considerable attention to questions of operation while he was with the New York Central. A little more than a year ago he went Tokyo, Japan, to become associated with the Frazar im-

porting and exporting interests. Recently he returned to this country for a few months, but expects shortly to again return to Japan. Mr. Milner is a keen observer. He is not satisfied with noting practices and performances which differ from our own but insists upon determining the reasons for the difference, and in a country like Japan this feature of an observer's attitude is of no slight importance.

Writers on Australia and South Africa

F. M. Whyte, who writes the article on "Unifying the Railway Gages of Australia" (page 107), was for many years connected with the New York Central as chief mechanical engineer and later with the Hutchins Car Roofing Company as vice-president. He went to Australia about a year ago to act as a member of the Uniform Gage Commission, the function of which was to study conditions on the Australian railroads and to make recommendations for a plan looking to the standardization of gages. This is a very important problem in Australia and a solution of it is desired that traffic might be interchanged more efficiently and economically across the boundary lines of the several states of Australia. The findings of the Commission were approved and work will undoubtedly be started shortly to make them effective. Mr. Whyte has only recently returned to this country.

M. T. Griffin, who covers the subject "South African Railways Progress Despite Deficits" (page 111), is one of the staff of the National Bank of South Africa. His headquarters are in New York. His time is devoted to the study of economic conditions in this country and in South Africa, in connection with which he has paid particular attention to railway problems.

Many Furnished Statistical Material

The *Railway Age* must also take this opportunity to thank hundreds of others of its friends in the railway and railway supply fields who have assisted it in furnishing material in order to make its statistics for the year complete. It is only through such co-operation that an issue of this kind is made possible.



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The Railway Station at Lourenço Marques, Portuguese East Africa

General News Department

The Savannah (Ga.) Local Committee of the Signal Section of the American Railway Association will hold its next meeting on January 19, 1922, at which it is expected that the principal speaker will be H. S. Balliet (N. Y. C.), New York City, secretary of the Signal Section.

L. A. Downs, vice-president and general manager of the Central of Georgia, and chairman of Division IV of the American Railway Association, has been appointed a delegate of that association to attend the Congress of the International Railway Association at Rome, Italy, in April next.

A preliminary compilation of the reports of 193 Class I railroads to the Interstate Commerce Commission of revenues and expenses for the month of November shows a net railway operating income for these roads of \$65,741,000, as compared with \$50,502,000 for November, 1920. The operating revenues were \$462,000,000, as compared with \$589,000,000, while the operating expenses were \$366,000,000, as compared with \$511,000,000.

A rear collision of southbound local passenger trains on the Ninth Avenue Elevated line of the Interborough Rapid Transit Company, New York City, near Fortieth street, Manhattan, on the evening of December 30, resulted in the fatal injury of one passenger and less serious injury to 35 passengers and two employees. The leading train was at a standstill; and two cars of the following train were badly crushed.

Labor Board Files Motion to Dismiss

Pennsylvania Injunction

Hearings in the jurisdictional dispute between the Pennsylvania and the Railroad Labor Board, scheduled for January 3 in the United States District Court at Chicago, were again postponed by mutual agreement until January 18. The progress of this dispute was described in the *Railway Age* of December 17, page 1216, and December 24, page 1267. On January 3, John V. Clininn, assistant United States district attorney, acting as counsel for the Board, filed a motion to dismiss the case, and the arguments on this plea will be heard on January 18.

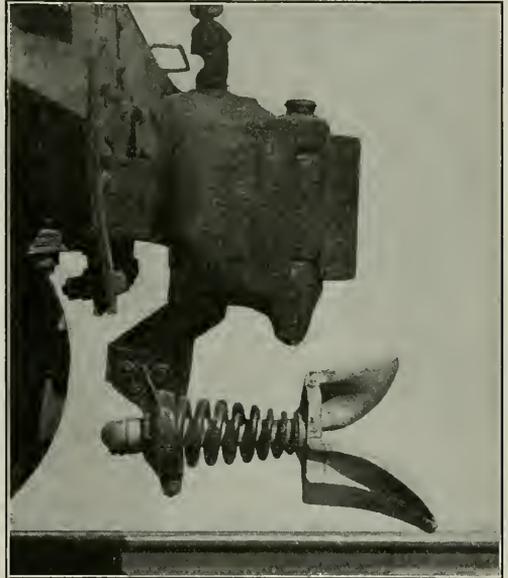
I. C. C. Authorizes Common Officers

and Directors Temporarily

Because it has not been able to act by the last day of the year on all the applications filed with it under paragraph 12 of section 20-a of the interstate commerce act, by officers and directors of more than one railroad for authority to retain their positions, the Interstate Commerce Commission on December 31 issued a blanket order applying to the applications filed, but on which no order had been issued by the commission, authorizing the persons involved to hold their positions as described in the applications until the further order of the commission, on the ground that it appears that neither public nor private interests will be adversely affected thereby. The law provides that no person shall hold positions as officer or director of more than one railroad after December 31, 1921, except upon the authorization by the commission. The commission has already issued orders in a large number of cases, in most of which it has given the authority asked for, but a very large number of applications were received during the last days of the year. The orders heretofore issued have specifically authorized common officers and directors among subsidiary and affiliated companies, but in a few cases of directors of a number of competing roads, the commission has required them to elect which directorships they will retain. The commission also made public on December 31 an order authorizing common officers and directors among the subsidiary and affiliated companies of the Chicago, Burlington & Quincy system.

The Robinson Connector

Our attention has been called to an error in the article entitled "The Development of the Robinson Connector" which was published in the *Railway Age* of December 24, 1921, page 1259. This article referred to the pin and funnel type as the first design of the Robinson connector. In



The First Design of the Robinson Connector, Type A

reality the first design was the type A with wing type gathering arrangement, as illustrated. This was applied on the lines of the Washington Terminal Company and was also tested by the Interstate Commerce Commission on the Great Northern, the trial of the pin and funnel design being incidental thereto. The conclusions in the report of the commission referred to the type A and not to the pin and funnel type as the article indicated.

Meetings and Conventions

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

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 9-12, 1922, Hotel Washington, Washington, D. C. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontius, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.
- AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.

- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchert, 202 North Hamlin Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.
- Division I—Freighting.
- Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
- Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.
- Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association). J. C. Caviston, 75 Church St., New York, N. Y.
- Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Next meeting, March 21-23, Richmond, Va. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.
- Safety Section. J. C. Caviston, 75 Church St., New York.
- Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III—Traffic. J. Gottschalk, 143 Liberty St., New York.
- Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next convention, March 14-16, Chicago. Exhibit of National Railway Appliances Association, March 13-16.
- Construction and Maintenance Section. E. H. Fritch.
- Electrical Section. E. H. Fritch.
- Signal Section (including former activities of the Railway Signal Association). H. S. Baller, 75 Church St., New York, N. Y. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.
- Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). J. H. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
- Equipment Painting Section (including former activities of the Master Car and Equipment Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Store Keeper, New York Central, Collingwood, Ohio.
- Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichten, C. & N. W. Ry., 200 S. Baller, 75 Church St., New York, N. Y. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in cooperation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 14-16, Chicago. Exhibit by National Railway Appliances Association, March 13-16.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittlesey, Union Trust Bldg., Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisman, 4600 Prospect Ave., Cleveland, Ohio. Annual convention, September 25-30, 1922, Detroit, Mich.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June, 1922, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- Railroad Division, James Partington, American Locomotive Co., 30 Church St., New York.
- AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—L. Darling, Northern Pacific Ry., Spokane, Wash.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis. Next meeting, January 24-26, Hotel Sherman, Chicago.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morley, Northern Pacific R. Ry., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucci, C. & N. W. Ry. 411, C. & N. W. Sta. Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cusler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 165R McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Meter Company, 11 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—W. A. Potts, 51 Rennie St., Montreal, Que. Car Foremen's Association.
- CAR FOREMEN'S ASSOCIATION.—Charles W. Kline, 616 North Pine Ave., Chicago. Regular meetings, 2d Friday in month, except June, July and August, New Market Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—H. M. Dumas, P. Koenke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Iroquois, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.
- CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.
- EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.
- FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Radway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1922, Chicago. Exhibit by International Railway Supply Men's Association.
- INTERNATIONAL RAILWAY TOOL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.
- INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Association of Railway and Utilities Commissioners.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R. Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.
- MASTER BODY PAINTERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1922, Hotel Sherman, Chicago.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division 5.)
- MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)
- NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo. Annual meeting, January 26 and 27, Hotel Sherman, Chicago.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition, March 13-16, Chicago, at convention of American Railway Engineering Association.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Nixon, 600 Liberty Bldg., Head and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria Hotel, New York.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Corway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—F. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.
- RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)
- RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Corway, 1864 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.
- RAILWAY TELEGRAPH AND TELEPHONE ATTILIANE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.
- RAILWAY TRAFFIC AND DEPARTMENT ASSOCIATION.—L. W. Con, Commercial Trust Bldg., Philadelphia, Pa.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Annual convention, September 12-14, 1922, Cleveland, Ohio. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.—H. W. Frauchenthal, Union National Ry., St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—P. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Mettall, P. O. Box 15, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, West City Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.
- TRACK SFLA ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.
- TRAINING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.
- WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

The Chicago, Rock Island & Gulf will open an office in the Central Trust Building, San Antonio, Tex., with D. O'Leary in charge as general agent.

The San Antonio Traffic Club has been organized at San Antonio, Tex., and the following officers have been elected: President, R. H. Schultz, traffic manager, San Antonio, Uvalde & Gulf; vice-president, Wallace Carnahan; and secretary and treasurer, R. L. Gohmert; directors: S. B. Weller, F. L. Orr, J. E. Pennington, Fred E. Jones, and U. S. Pawkett.

At the annual meeting of the Traffic Club of Lansing, Mich., held on December 14, the following officers were elected: President, H. E. McGiverson, traffic manager, Motor Wheel Corporation; vice-president, E. L. Jennings, agent, Michigan Central; secretary-treasurer, J. I. Ross, traffic commissioner, Lansing Chamber of Commerce; executive committee, W. G. Davis, traffic manager, Anto Body Company; W. K. Andrews, agent, Pere Marquette; C. R. Morris, secretary, Michigan Screw Company; and J. T. Van Nordstrand, agent, American Railway Express Company.

Coal Production

A feeble increase during the week of December 24 failed to lift production of soft coal out of the state of profound depression which has persisted since mid-November, says the weekly bulletin of the Geological Survey. The total output is estimated at 7,468,000 net tons, an increase of 5 per cent over the week preceding. The average daily output for December has been 1,210,000 tons, barely 60 per cent of that in December, 1920. It is even 12 per cent below the daily average in December, 1914, the lowest in any winter of the eight years over which records of current output extend.

Differential Fares, New York-Chicago

The Erie Railroad announces that the Interstate Commerce Commission has accepted tariffs filed by it, and already in effect, establishing differential fares of \$2 between New York and Chicago, Cincinnati and Indianapolis; between New York and St. Louis, \$2.50, and between New York and Cleveland \$1 less than the fares over the Pennsylvania, the New York Central, and other roads. This reduction, added to that resulting from the elimination of the transportation tax, brings these fares down from \$2.61 to \$5.51 below those charged before January 1.

National Conference on Agricultural Problems

At the request of President Harding, Secretary Wallace, of the Department of Agriculture, is to call a national conference to consider the agricultural problems of the American people, to be held probably in Washington at an early date as yet to be fixed. The President said he was convinced that such a conference may be made a very helpful agency in suggesting practical ways of improvement, particularly if brought into co-ordination with the investigation which has been begun by the Congressional committee committed to a related work. He said that such a conference might divide itself into two parts, one to give consideration to present day difficulties, and the other part a survey of the future in an effort to determine upon general policies, having in view the maintenance of production, the greatest possible use, and at the same time the conservation of agricultural resources, and the more complete co-ordination of agricultural, manufacturing and general business interests. The President suggested that those invited to the conference shall not only include the ablest representatives of agricultural production, but also those who are engaged in industry most intimately associated with agriculture. It is understood that the relations of transportation to agriculture will constitute an important topic to be discussed and that representatives of the railroads will be invited to attend.

Equipment and Supplies

Freight Cars

THE NATIONAL RAILWAYS OF MEXICO are inquiring for 1,000 narrow gage box cars of 30-ton capacity.

THE CENTRAL VERMONT, in the near future, expects to have repairs made to 1,000 box cars and 200 coal cars.

THE PACIFIC FRUIT EXPRESS, in the near future, expects to ask for prices on from 2,500 to 3,000 refrigerator cars.

THE SEABOARD AIR LINE reported in the *Railway Age* of December 17, as inquiring for prices on 1,500 ventilated box cars of 40 tons capacity; 200 flat cars with steel underframes of 40 tons capacity, and 300 steel phosphate cars of 50 tons capacity, has given an order to the Chickasaw Shipbuilding Company for some of these cars, the exact number to be determined later.

THE ILLINOIS CENTRAL is expected to place contracts for 2,000 gondola cars during the first part of the week of January 8, and the Great Northern and the Chicago, Burlington & Quincy, it is expected, will let contracts for other equipment during the latter part of the month. The Burlington is in the market for 7,300 freight cars of various types, but it is anticipated that orders will not be placed for all of them at once. The Great Northern is expected to award contracts for 3,500 cars about the middle of the month.

Passenger Cars

THE STATEN ISLAND RAPID TRANSIT RAILWAY, in the near future, expects to ask for prices on 50 steel cars for passenger service.

Iron and Steel

THE NEW YORK CENTRAL LINES' order for 125,000 tons of rail, reported in the *Railway Age* of December 10, was distributed as follows: Illinois Steel Company, 34,000 tons; Carnegie Steel Company, 16,500 tons; Lackawanna Steel Company, 51,500 tons; Inland Steel Company, 8,000 tons; Bethlehem Steel Company, 6,000 tons, and Algoma Steel Corporation, 9,000 tons.

THE PENNSYLVANIA RAILROAD has placed orders for 80,000 tons of rail, most of which will be in 130 lb. sections, for 1922 delivery as follows: Carnegie Steel Company, 40,000 tons; Bethlehem Steel Company, 18,000 tons; Cambria Steel Company, 18,000 tons; Lackawanna Steel Company, 4,000 tons. In addition the company has unfilled orders from 1921 and rail on hand totaling 74,000 tons and this with the new orders gives the company a total of 154,000 tons available for use in 1922. The company also has some used rail which will be available for branch line or for less important track service.

Signaling

THE MISSOURI, KANSAS & TEXAS has ordered the materials required for the installation of automatic block signaling between Vinita, Okla., and Wybark, 60 miles, consisting of 80 style "S" and 2 style "T2" signals, with the necessary relays, circuit controllers, etc., for a complete system of block signaling within this territory. Installation will be made by the railway company's forces.

Machinery and Tools

THE WESTERN MARYLAND is inquiring for machine tools for a rail reclaiming plant.

THE GREAT NORTHERN is inquiring for 1 Niagara (or similar) 12 ft. squaring shears, motor driven and 1 Chicago (or similar) 12 ft. break, motor driven.

Supply Trade News

Charles R. Robinson, until about a year ago vice-president in charge of sales of the Lackawanna Steel Company, Buffalo, N. Y., has been elected vice-president in charge of sales of the rail division of the **Inland Steel Company, Chicago**. Mr. Robinson was formerly with the Inland Steel Company in a sales capacity but resigned 15 years ago to join the Lackawanna company as division manager of sales at Chicago. **Edward M. Adams**, vice-president of the Inland Steel Company, Chicago, has been appointed first vice-president and general manager of sales succeeding G. H. Jones who retired on December 31, and **Walter C. Carroll** has been appointed vice-president in charge of sales' sheet division.

Burton Mudge, president of Mudge & Co., Chicago, dealers in railway specialties, Chicago, has been elected vice-president and a director of the **Pilliod Company, New York City**, manufacturer of Baker locomotive valve gear, which duties he will assume in addition to those with Mudge & Co. Mr. Mudge was formerly connected with the operating departments of the Atchison, Topeka & Santa Fe, the Chicago & North Western, the Fort Worth & Denver City, and the Rock Island. He resigned as assistant to the general manager of the last named road in 1908, to enter the railway supply business and in September of that year organized the firm of Burton W. Mudge & Bro., representing the Commonwealth Steel Co., this company later becoming Mudge & Co.

David T. Hallberg, assistant general sales agent of the **P. & M. Company**, with headquarters at Chicago, has been promoted to general sales agent, effective January 1, 1922. The

duties of general sales agent of the company heretofore had been handled by Fred N. Bayles, vice-president of the company. Mr. Hallberg was born at Ottumwa, Ia., on September 11, 1885. After completing his education in the public schools, he went to Chicago in 1901, and was there employed in the printing industry until he entered the passenger and advertising department of the Santa Fe, in 1905. Later he was appointed western representative of the Santa Fe Employees' Magazine and remained in that position until he entered the service of the P. & M. Company as material inspector in May, 1910, shortly afterward becoming western representative. In January, 1918, he came to Chicago as sales representative, and in June, 1918, he was promoted to assistant general sales agent



B. Mudge



D. T. Hallberg

Railway Construction

CENTRAL BUILDING COMPANY.—This company will construct two additional stories to its office building in Seattle, Wash., at an estimated cost of \$175,000. This construction work is to be undertaken in connection with the arrangement made by this company and the Northern Pacific which intends to move its western headquarters from Tacoma, Wash., to Seattle, as soon as the additional office space is provided for.

IBERIA & VERMILLION.—This company has been ordered by the Louisiana Public Service Commission to enlarge its station at Abbeville, La., to repair the same structure, and to construct a passenger waiting shed of not less than 30 ft. in length by the width of the present station, all of which must be commenced by the middle of March, 1922.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of December 24 (page 1286), as receiving bids for the construction of a car repair shed at McComb, Miss., has awarded the contract for this work to Ellington-Miller Company, Chicago. The building will be 600 ft. by 176 ft., with concrete foundation and steel superstructure, and with a cement tile roof. The entire cost is estimated at \$140,000. The same company, also noted in the above-mentioned issue as accepting bids for the construction of a frame viaduct over its tracks at Fulton, Ky., estimated to cost \$15,000, awarded the contract for the work to Ellington-Miller Company.

ILLINOIS TERMINAL.—This company has been granted permission by the Interstate Commerce Commission to extend its line from Formosa, Ill., to O'Fallon, a distance of 14 miles. The work is estimated to cost \$641,964.

MISSOURI, KANSAS & TEXAS.—This company has given a contract to the Graver Corporation, Chicago, for the construction of a type "K" ground operated water treating plant at Parsons, Kan. The plant will have a treating capacity of 50,000 gal. of water each hour and a storage capacity at top of main settling tank capable of holding 200,000 gal. of treated water.

PACIFIC FRUIT EXPRESS.—This company has awarded a contract to D. W. Wagner, San Francisco, for the construction of a reinforced concrete addition to its ice plant at Calwa, Cal.

TAMPA SOUTHERN.—This company contemplates the extension of its line from Bradentown, Fla., to Sarasota, a distance of approximately 12 miles. It is expected that work will be started as soon as financial conditions warrant the construction.

TEXAS-MEXICAN.—This company contemplates the construction of a station at Mirando City, Tex., to take care of the recently developed oil traffic at that point.

UNION PACIFIC.—This company, in conjunction with the United States Department of Agriculture and the State of Utah will soon construct a large viaduct over its tracks and the Weber river at Riverside (Ogden), Utah, at an estimated cost of \$200,000. The structure will be of reinforced concrete, except over the tracks and the Weber river where through truss spans will be built. The cost of the work will be divided among the three parties, the railroad paying one-half of the entire cost of the viaduct, excluding the span across the Weber river. It is expected that bids for this work will be called for during the first part of the coming year, and that the construction will be completed during the summer.

WABASH.—This company contemplates the construction of a station at Centralia, Mo. No definite building plans have as yet been prepared.

INSTRUCTION IN TRAFFIC MANAGEMENT for the benefit of large shippers and their traffic men, or clerks, is offered in the "Vocational Department" of the H. G. Williams Company, 25 Beaver street New York City. One evening a week, for eight months, is the course advertised and the cost is \$41; with a cheaper course for \$45 for junior employees. Mr. Williams is editor of the Freight Traffic Red Book.

Railway Financial News

ARIZONA & NEW MEXICO.—Acquisition.—See El Paso & Southwestern.

CAROLINA, CLINCHFIELD & OHIO.—Loan Authorized.—The Interstate Commerce Commission has approved a loan to this company of \$6,000,000 to enable it to pay off a loan of \$1,000,000 from the United States and \$5,000,000 of its Elkhorn first mortgage gold notes which mature on January 1, 1922. The commission has also authorized the extension of the maturity date of \$6,000,000 of the Elkhorn first mortgage gold notes from January 1, 1922, to January 1, 1923, and to pledge them, together with \$1,000,000 of first mortgage 5 per cent, 30-year gold bonds with the Secretary of the Treasury as collateral security for the loan. In order to make the Elkhorn gold notes available as collateral it was necessary to extend the maturity date.

CHICAGO & EASTERN ILLINOIS.—Election for Reorganized Company.—At a meeting of the provisional board of directors of the Chicago & Eastern Illinois Railway Company in Chicago the following directors were elected for the newly organized company: Gordon Abbott, William H. Coverdale, Frederick H. Ecker, Henry Evans, T. D. Heed, William J. Jackson, F. J. Lisman, William H. McCurdy, George Welwood Murray, John W. Platten, H. H. Porter, John J. Pulley, John W. Stedman, Melvin A. Traylor and Edwin W. Winter.

On January 1, 1922, W. J. Jackson, as receiver of the property of the old Chicago & Eastern Illinois Railroad, turned the same over to the new Chicago & Eastern Illinois Railway Company, except the Chicago & Indiana Coal Railway Company, which was not acquired by the reorganized corporation. Mr. Jackson is president of the new corporation.

For the convenience of participants in the reorganization of the Chicago & Eastern Illinois Railroad Company, arrangements have been made whereby the United States Mortgage & Trust Company will purchase and sell scrip certificates for Chicago & Eastern Illinois Railway Company general mortgage 5 per cent bonds, preferred stock and common stock.

CHICAGO, MILWAUKEE & ST. PAUL.—Asks Authority for Acquisition of Chicago, Milwaukee & Gary.—This company has applied to the Interstate Commerce Commission for an order approving the acquisition of the Chicago, Milwaukee & Gary by the purchase of its capital stock, also an order authorizing the purchase of the stock and the assumption of liability as guarantor of its bonds, and a certificate of public convenience and necessity for the acquisition of control of the road. The St. Paul is to take over the stock, amounting to \$1,000,000, and to guarantee the principal of \$5,700,000 first mortgage 5 per cent gold bonds and the interest after January, 1924.

CINCINNATI, INDIANAPOLIS & WESTERN.—To Operate Part of C. & E. I. Division.—Beginning January 1, 1922, the Cincinnati, Indianapolis & Western will operate that part of the former Chicago & Eastern Illinois, Brazil branch, between West Union and Brazil, about 29 miles, until January 16, the date set for the sale of the entire Brazil branch at Danville, Ill.

DELAWARE, LACKAWANNA & WESTERN.—Declares Extra Dividend of 5 Per Cent.—The directors have declared an extra dividend of 5 per cent and the regular quarterly dividend of 3 per cent, both payable January 20, to stock of record January 7.

See also article in this issue entitled "Dividend Changes on Railroad Stocks in 1921."

EL PASO & SOUTHWESTERN.—Authorized to Acquire Control.—The Interstate Commerce Commission has authorized the acquisition of the Arizona & New Mexico by purchase of its capital stock. It has also authorized the El Paso & Southwestern to issue \$3,500,000 of promissory notes for two years at 6 per cent, to be delivered directly at par or to be sold at par and the proceeds used in part payment for the stock and bonds of the Arizona & New Mexico. The purchase price is \$4,500,000, of which \$1,000,000 is to be paid in cash. Acquisition of control of the road by lease is also authorized.

GRAND TRUNK.—May Appeal Award.—The Judicial Committee of the Privy Council has granted Sir John Simon, on behalf of the Grand Trunk Railway of Canada, leave to appeal from the recent decision of the Board of Arbitration as to the value of the railroad's property. The Board of Arbitration, of which Chief Justice William Howard Taft was a member, declared in its findings that the common and preferred stocks of the company were valueless. The award was noted in the *Railway Age* of September 10, 1921, page 511.

NORTHERN PACIFIC.—Asks Authority to Abandon Line.—This company has applied to the Interstate Commerce Commission for authority to take up and abandon its Boulder-Elkhorn branch in Montana, 19.6 miles.

NORFOLK SOUTHERN.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the line of the Carthage & Pinehurst from Pinehurst to Carthage, N. C., 12.22 miles.

ST. LOUIS SOUTHWESTERN.—To Pay Bond Interest.—Interest amounting to 2 per cent will be paid on January 1, 1922, on the second mortgage 4 per cent gold income bond certificates, due 1989, for the six months ending December 31, 1921, on presentation of coupons. The Committee on Securities of the New York Stock Exchange has ruled that said certificates be quoted ex-interest 2 per cent on Tuesday, January 3, 1922, and that thereafter said certificates, to be a delivery, must carry the July 1, 1922, and subsequent coupons.

SUSQUEHANNA RIVER & WESTERN.—Proposed Acquisition.—The Interstate Commerce Commission has issued a decision holding that the proposed acquisition and operation by this company of a line of narrow gage railroad extending from its main line at Bloomfield Junction to Blain, Pa., a distance of 17 miles, is not within the scope of paragraph 18 of section 1 of the Interstate Commerce Act, and the proceeding has been dismissed. No application was filed under section 5 of the act relating to consolidations. The property is now operated by the Susquehanna River & Western.

TENNESSEE CENTRAL.—Proposed Reorganization.—See Tennessee Midland.

TENNESSEE MIDLAND.—Investigation of Reorganization Ordered.—The Interstate Commerce Commission has ordered an investigation for the purpose of inquiring into all matters involved in the petition filed by Caldwell & Co., reorganization managers, in behalf of the Tennessee Midland, a corporation about to be formed for the purpose of acquiring the Tennessee Central, for approval of a proposed plan of reorganization, a proposed loan from the government and other things. A hearing is to be held at Washington before Examiner J. F. Gray on January 16. Notice of the hearing was ordered sent to the receivers of the Tennessee Central, the officers of various railroads interested in its affairs, attorneys for junior stockholders, the director general of railroads, the chairman of a special committee of the Nashville Transportation Board of Trustees, the mayor of Nashville and the Association of Railway Executives.

WATERLOO, CEDAR FALLS & NORTHERN.—Asks Loan From Revolving Fund.—This company has applied to the Interstate Commerce Commission for a loan of \$381,347 for 10 years to enable it to meet maturing indebtedness.

WICHITA FALLS, RANGER & FORT WORTH.—Receivership.—Frank L. Ketch, of Ardmore, Tex., president of the road and executor of the Hamon estate, and J. W. Mitchell, of Fort Worth, were on December 26 appointed receivers by Judge James C. Wilson, of the United States District Court of the Northern District of Texas, on the application of J. W. Meany, who is seeking a foreclosure of a contractor's lien on the railroad.

Dividends Declared

Achison, Topeka & Sante Fe.—Common, 1½ per cent, quarterly, payable March 1 to holders of record January 31.
Atlanta & West Point.—Common, 2 per cent, quarterly; preferred, 1½ per cent, quarterly; both payable January 1.
Delaware, Lackawanna & Western.—3 per cent, quarterly; extra, 5 per cent; both payable January 20 to holders of record January 7.
Pittsburgh & West Virginia.—1½ per cent, quarterly, payable February 28 to holders of record February 1.
Western of Alabama.—5 per cent, payable December 31 to holders of record December 19.
Woodstock Railway.—2 per cent.

Railway Officers

Executive

John D. McCartney, assistant general passenger agent of the Central of Georgia, with headquarters at Savannah, Ga., has been promoted to assistant to the president, with the same headquarters. He will have charge of all work connected with public relations and such other duties as may be assigned to him. A photograph and sketch of Mr. McCartney were published in the *Railway Age* of March 18, 1921 (page 741).

John W. Platten, president of the United States Mortgage & Trust Co., New York, has been elected chairman of the board of directors of the Chicago & Eastern Illinois, with headquarters at New York. This action became effective following a meeting held by the board on December 31, 1921, for the purpose of completing the reorganization of the railroad. Other officers elected were: **William J. Jackson**, president; **Will. H. Lyford**, vice-president and general counsel; **Frank G. Nicholson**, vice-president and general manager; **Thomas D. Heed**, vice-president; **Frank Austin**, secretary, and **Jonathan P. Reeves**, treasurer. The board also appointed three additional officers, namely, **Robert F. Brown** and **William A. Ragel**, assistant secretaries, and **Frederick W. Krohn**, assistant treasurer. With the exception of Mr. Platten, all the officers will have their headquarters at Chicago.

Financial, Legal and Accounting

A. J. Raynes, whose appointment as comptroller of the Maine Central was announced in the *Railway Age* of December 24, (page 1291), was born on November 18, 1873, at Yarmouth, Maine. He was educated at high school and business college and entered railway service in December, 1888, as a freight clerk and telegraph operator for the Maine Central. In August of the following year he became a clerk in the office of the auditor of freight accounts. In July, 1904, he was promoted to accountant in the office of the comptroller. Six years later he became chief clerk to the auditor of disbursements. The following year he was appointed auditor of disbursements and, in 1913, to auditor in charge of disbursements and traffic accounts. He served as federal auditor under the Railroad Administration and in March, 1920, became assistant comptroller, in which position he was serving at the time of his recent appointment.

Operating

J. G. June has been appointed superintendent of the Marion division of the Erie, effective January 1.

E. I. Bowen has been appointed superintendent of the Buffalo division of the Erie succeeding J. G. June, transferred, effective January 1.

Traffic

W. W. Schoff has been appointed general agent of the El Paso & Southwestern with headquarters at Cleveland, O.

E. M. Rebard has been appointed assistant traffic manager of the Tonopah & Goldfield with headquarters at Goldfield, Nevada.

E. C. Hoag has been appointed industrial agent of the Union Pacific with headquarters at Omaha, Nebr., effective January 1, 1922.

C. E. Jefferson has been appointed general freight agent of the Canadian Pacific, Western Lines, succeeding W. C. Bowles, promoted.

J. D. Prewett has been appointed commercial agent of the Seaboard Air Line with headquarters at Oklahoma City, effective January 1.

S. G. Reed, whose appointment as assistant to the traffic manager of the Southern Pacific, Texas lines, with headquarters at Houston, Tex., was announced in the *Railway Age* of December 17 (page 1234), was born at Franklin Parish, La., on March 26, 1867. He completed two years work at Colgate University in 1886, and on January 1, 1889, entered railroad service in a local freight office of the New York, Texas & Mexican (Southern Pacific, Atlantic System). On January 1, 1892, he was appointed chief clerk to the general freight and passenger agent at Victoria, Tex., which position he held until November 1, 1905, when he was promoted to division freight and passenger agent of the Louisiana division, with headquarters at Lake Charles, La. He was transferred to Dallas, Tex., on October 1, 1906, and on September 1, 1912, he was promoted to assistant general freight and passenger agent, with the same headquarters. He was appointed land and tax agent on September 1, 1918, with headquarters at Houston, Tex., and on March 1, 1920, he became assistant general freight agent, with the same headquarters, which position he was holding at the time of his recent promotion.

Mechanical

J. E. Stevens has been appointed master mechanic of the Mobile & Ohio, with headquarters at Murphysboro, Ill., succeeding B. A. Orland, assigned to other duties.

Engineering, Maintenance of Way and Signaling

J. B. Emerson, assistant engineer of tests of the rail committee of the American Railway Association, with headquarters at Chicago, has been promoted to engineer of tests, with the same headquarters, succeeding M. H. Wickhorst, resigned.

Alvin Chase Harvey, whose appointment as assistant chief engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was announced in the *Railway Age* of December 24 (page 1292), was born at Mansfield, New York, on December 24, 1883. After graduating from Purdue University in June, 1908, he entered the service of the New York, Chicago & St. Louis as a rodman on station ground surveys between Cleveland, Ohio and Buffalo, N. Y. In March, 1909, he was promoted to assistant engineer in charge of the east side grade crossing elimination work at Cleveland. One year later he was given charge of double track survey between Brocton, N. Y., and Erie, Pa., and in May, two months later, he was put in charge of the track elevation work at Grand Crossing, Chicago, Ill. In June, 1916, he was appointed assistant engineer in charge of the field work on the Ivanhoe Road grade crossing elimination at Cleveland. In January, 1917, he was made field engineer in charge of the field work on the west side grade crossing elimination at Cleveland. He was promoted to engineer of grade crossing elimination, with headquarters at Cleveland, in September, 1918, having charge of both the field and office work, which position he was holding up to the time of his recent promotion.

Purchasing and Stores

W. A. Summerhays, purchasing agent of the Illinois Central, with headquarters at Chicago, has been promoted to lumber and tie agent, with the same headquarters, and he will be succeeded by **J. J. Bennett**, assistant purchasing agent, with the same headquarters.

E. Griffiths, division storekeeper of the Chicago, Milwaukee & St. Paul, with headquarters at Perry, Iowa, has been transferred to Mobridge, S. D., succeeding **G. L. Juel**, who has been transferred to Malden, Wash., succeeding **H. R. Meyer**, who has been transferred to Perry to succeed Mr. Griffiths.

Obituary

F. E. Haff, assistant treasurer of the Long Island, died in New York City on January 2 at the age of 59.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Business is looking up in the supply field. The railways have greeted the arrival of the new year with an order placed

**An Order
for
4,500 Cars**

by the Seaboard Air Line for some 1,500 to 2,000 cars. The Union Pacific, not to be outdone, has gone on record for 4,500 cars, the orders for which were placed the latter part of

last week. The Illinois Central has ordered 2,000 gondola cars in addition to the refrigerator cars recently placed. Orders for additional freight cars are expected to be placed in the near future by the Burlington, which is talking about 7,000 cars, by the Great Northern, which is expected to contract for 3,500 cars, etc. Passenger car optimism is represented in the consideration being given new equipment by the Long Island, 50 cars; the Philadelphia & Reading, 50 additional to orders already placed; Burlington, 127; Union Pacific, 63, etc. The Staten Island Rapid Transit is talking about 50 cars. The Pennsylvania has issued inquiries for 20 dining cars and later may come in the market for a much larger quantity of passenger train cars. A long period has elapsed since the last occasion when there was so much prospective business in sight in either freight or passenger cars as there is at this moment. The situation, to put it mildly, looks good. It may be said, moreover, that there is a special significance in the placing of the Union Pacific order at this time outside of the size of the order. The Union Pacific has a reputation of being a good buyer of cars and locomotives. Its orders are usually placed at opportune times. In other words, we apparently have it on the Union Pacific's authority, as indicated by the placing of an order for 4,500 cars, that the present is an opportune time for equipment purchases.

The English railways are showing real appreciation of the advantage to them of promoting passenger business in every possible way. Their method is an old

**Excursion
Rates Build
Traffic**

one—the sale of tickets at reduced rates when and where such reductions are likely to attract passengers who otherwise would not travel. At the same

time care is taken to assure that most of the ordinary traffic will be carried at the full legal rate. The extent to which these reduced rates are applied is remarkable—for example: "shopping" tickets good on suburban trains in non-rush hours; special excursion rates and special trains to athletic contests, fairs and industrial shows; special rates to seaside resorts; daily excursion rates available only on certain trains to and from all large industrial centers; reduced rates for round-trip tickets good over the week-end; special excursions to France and Belgium allowing passengers a few hours in either country. One company runs an excursion to a seaside resort, tickets for which include not only the rail trip but also food and hotel accommodations. By arranging for this service for a large number of excursionists the railway is enabled to secure for them satisfactory accommodations at reduced rates and at the same time assure a profit to itself. In sum, reduced rates are offered in practically every quarter where they would tend to bring additional passengers to the railways. Professor W. J. Cunningham in an article appearing recently in the New York Evening Post called attention

to the relatively higher profit of passenger business now in comparison with pre-war days. This, coupled with the obvious fact that additional traffic would entail nothing like proportionate expense, suggests the advisability of some study of these activities in England by our railroad traffic men. Many well advertised excursions not only bring revenues to the railways, but they tend to create a favorable attitude in the minds of the public as well.

The railroads are today depending more and more on their communication systems to expedite train movements, to

**The
Communication
Situation**

facilitate business between their various offices and to handle transactions with the public. During the past few years the demand for communication, especially by telephone, has increased

rapidly, while during this same period the construction of new facilities has been, of necessity, held down to the minimum. These circumstances have, in many cases, resulted to the advantage of the railroads by forcing them to make message traffic studies and to develop priority systems of filing messages and the extensive superimposing of line circuits; all of which has tended to utilize the existing outside plant equipment more intensively. It is interesting to note that during this same period marked improvements in telegraph, telephone and wireless apparatus have been made, not only by the manufacturers and the commercial communication companies, but also by the army and navy. Several improvements have been made in telephone train dispatching selectors and loud-speaking apparatus, while the telephone repeater has been developed with such success as to remove the limit for long distance telephone conversation. For long-haul heavy message traffic the printer telegraph has proved economical. Using the trolley on an electrified road, the carrier-current system was recently demonstrated successfully as a means of communication with a moving train or between a locomotive and a caboose. Where physical conditions prevent the construction of a pole line, the wireless telephone will no doubt find a field. A summary of the situation brings out the fact that the railroads in many cases have urgent need for increased communication facilities and that as various newly-developed apparatus become available it would seem advisable that they should investigate the application of this equipment to determine its advantages for their service.

When Kipling penned the lines of his immortal "Recessional," it was a timely moment for the thought the verses

**"Lest
We
Forget"**

bores. From that time on the three words, "Lest We Forget," though tempered in meaning by the varied circumstances calling them forth, however, when expressed, exercised a sobering influence upon thought; drawing the attention, as it were, to the importance of things likely to be or actually forgotten. This being so they might well be reiterated now. A new year has come. Whatever "tumult and shouting" attended the event is past, and in automatic conformity with

the established order of things men have taken up their work as though from a starting point. And there is much to be done—and undone. As usual, trains must be run—in sufficient numbers, at sufficient speeds, and according to a sufficiently flexible system to accommodate the country's varied pleasures and fluctuating business, yet economically enough to pay. The intricate system of tracks which binds us so effectively into a national entity must be altered here and there and maintained everywhere. Locomotives and cars must not suffer from inattention. Records must be kept, and among a thousand other things equipment must be bought and repaired. Thus, there is much to be done. But let us remember, in doing it, that the railway business after all is very much a human one. Let us remember that the passing of nearly a century of amazing development in equipment and system still finds intelligent co-operation of the worker and loyalty of the man among the indispensable of railway economic assets. And in keeping with this, let those men having charge over other men remember particularly that loyalty, while it may often be found under such conditions, does not thrive in an environment characterized by arrogance and conceit on the part of officers which cause them seldom or never to proffer the praise they are so ready to receive; that loyalty and enthusiastic service do not flourish where officers show want of that appreciation of commendable work which spurs men on to better work; and that criticisms wrongly made but establish more securely the unfortunate condition of a "house divided against itself." Let them remember rather, that in general, men of all classes are responsive to kindness and consideration, and that fair play on one side usually begets fair play on the other. How much better must the new year be, if only this much we do not forget?

"Propaganda" Regarding the Railroads

THE *Railway Age* recently published an editorial, entitled "The Railroads Must Defend Themselves Better." We asserted that an extensive propaganda of misrepresentation is being carried on, chiefly by leaders and spokesmen of the railway labor unions; that its purpose is to poison the minds of railway employees and the public regarding private management, and that it will have this effect unless more vigorously combated.

This editorial has been commented on by several newspapers. The Springfield (Mass.) Republican, which comes as near to being always intelligent and fair in its editorial comment as any newspaper published, has deprecated what we said. It states that there is little evidence of propaganda against the railways in New England. It raises the question "whether the propaganda already employed in behalf of the railroads is convincing," and concludes, "The railroads had better meet hostile propaganda not with propaganda but with full and authentic information." The Des Moines Register, a very able paper, which, however, shows bias against the railways in every comment it makes on them, says "if there were not something behind the propaganda of the men it names, these men would not create a ripple on the surface of public opinion." It implies that the trouble is with the railroads themselves, they having "been negligent in not facing the railroad situation honestly as it is."

That two such newspapers can thus express themselves indicates how little appreciation there is among even well informed men of what is going on in the railroad field. The leaders of the railway labor unions and their various spokesmen are energetically carrying on a nation-wide propaganda to mislead employees and the public regarding railway matters which has all the appearance of being the expression of a deliberate and well-conceived conspiracy to promote the Plumb plan by destroying confidence in private management. The Springfield Republican very properly calls for facts

We shall give some, and let it draw its own conclusions. We have a right, of course, to draw our own conclusions also.

Ever since the Plumb plan was launched by its author the heads of the railway labor unions and other spokesmen of these unions, including especially Glenn E. Plumb, W. Jett Lauck and Frank J. Warne, have been disseminating among railway employees throughout the country, and, so far as they have been able among the public, numerous gross perversions of the facts regarding railway matters. All of them have been worked up in the same way. The method invariably used is to take some of the facts regarding a particular phase of the railroad business, disregard all of the other facts bearing upon that phase of it, and then build upon the small foundation of facts used a gigantic superstructure of propaganda which is false because based upon only a small part of the pertinent facts.

The Firemen's Magazine, published by the Brotherhood of Locomotive Firemen and Enginemen, recently published statistics compiled by an anonymous "leading economist" in which it was sought to show by market quotations published in the New York *Analyst* of October 17, 1921, that the "maximum estimate of the market value of railroad securities" was \$14,000,000,000. It drew from this estimate the conclusion that the valuation placed on the railroads by the Interstate Commerce Commission was \$5,000,000,000 too large. Slason Thompson gave the answer at once. He made similar computations based on the market quotations of railway securities on June 30, 1916, and showed that the total market value of railroad securities at that time was \$17,830,000,000. The investment made in railroad properties since then has been \$2,800,000,000, which, added to the market value of securities in 1916, would give a valuation of over \$20,600,000,000. If this method of valuation is fair, why was it not used in 1916? The enormous depreciation of the prices of railway securities since 1916 has been largely due to government operation, which increased the expenses out of all proportion to the earnings, and to the aftermath of government operation and of the war. The article in the Firemen's Magazine was propaganda deliberately intended to deceive railway employees as to the valuation the railways were entitled to have made.

A more astounding example of the same kind of misrepresentation is afforded by a recent performance of Glenn E. Plumb and William H. Johnston, president of the International Association of Machinists. Plumb and Johnston found that the tentative valuation of 24 railroads made by the Interstate Commerce Commission averaged \$32,700 per mile of track. They took this average valuation of these railroads' per mile of track, applied it to the 265,000 miles of line of all the railroads, and reached the remarkable conclusion that the valuation of all the railroads should be only \$8,610,000,000. This was \$5,400,000,000 less than the "valuation" in the Firemen's Magazine, which shows how widely the labor "experts" disagree.

Messrs. Plumb and Johnston gave their "valuation" to the press and disseminated it among railway employees. It was entirely false in its implication for two reasons, as has been pointed out by President Markham of the Illinois Central in an open letter to Mr. Johnston. First, a mile of line may consist of several tracks, and the present trackage of all the railroads of the country is estimated at about 405,000 miles. They had used miles of track in computing the average valuation of the 24 railroads, and if they had used miles of track for all the railroads they would have got on their own basis of computation a valuation \$4,640,000,000 more than the one that they spread broadcast. Second, their estimate was based on only seven per cent of the country's total trackage, while the Interstate Commerce Commission's valuation in the rate case in 1920 was based on information it had gathered regarding all the railroads. In other words, Plumb and Johnston had the effrontery to use information the commission

had reported regarding seven per cent of the trackage of the country to discredit a valuation made by the commission itself which was based upon information it had gathered regarding all the railways.

On November 27, 1921, Glenn E. Plumb made a characteristic public address in St. Louis to an audience composed largely of railway employees. Among other things he said the railways were physically bankrupt and unsafe for travel. The public, he added, should know that they were so run down as to jeopardize the lives of all who rode over them. The Interstate Commerce Commission had just made public its statistics of accidents for the year 1920; and they showed there has been a steady decline in railway accidents, and that the total number of persons killed on the railways in 1920 was the smallest since 1898, or for 22 years, although in these years the number of men employed by them increased over 400,000, the passenger business handled by them over 44 per cent, and the freight carried by them 64 per cent.

In testimony before the Railroad Labor Board and in recent public statements W. Jett Lauck, "consulting economist" of the Railway Employees' Department of the American Federation of Labor, has sought to convince railway employees and the public that by economies in operation which are practicable the railways could reduce their operating expenses \$2,000,000,000 a year without reducing wages. The method used by him is that already described as being used by the leaders and spokesmen of the labor unions. He went through the files of the *Railway Age* and the Railway Mechanical Engineer for a long period and extracted hundreds of pages of material which they had published regarding means which it is desirable to adopt to promote efficiency and economy. In getting his material he necessarily passed in review a great many times more material published in the same papers describing improvements in equipment and methods, and increases in the efficiency of operation which actually had been made, and also showing why the inadequate earnings of the railroads had rendered it impracticable for most of them to do more along these lines than they had done.

All this voluminous material regarding what had been done he left out of his exhibits and based all his argument and conclusions on what had not been done. The record he thus made up was almost as false as if there had not been a word of truth in it. When, a short time ago, the propaganda being carried on by him and others was attacked by President C. H. Markham in a letter to employees of the Illinois Central Railroad, Mr. Lauck hypocritically replied by censuring Mr. Markham and his colleagues because, as he said, they did not "sincerely attempt to answer the facts which were submitted against them!" He knew better than any one else how he had misused and perverted the facts and the enormous exaggerations to which he had resorted. Furthermore, he knew that Daniel Willard, president of the Baltimore & Ohio, in testimony a few months ago before a Senate committee had presented detailed facts in reply to him which have never been answered.

The Transportation Act directs the Interstate Commerce Commission as nearly as it can to so fix railway rates until March 1, 1922, that the railways will be able to earn an average return of 5½ to 6 per cent. The labor leaders are chiefly responsible for the dissemination among railway employees and the public of the statement that this constitutes a "guarantee" to the railways; and they continue to disseminate it, although the authors of the Transportation Act and the Interstate Commerce Commission itself have expressly stated that it does not constitute a guarantee. If the railways had had a six per cent guarantee their net operating income in 1921 would have exceeded \$1,100,000,000. It actually amounted to about \$600,000,000, or about \$500,000,000 less. This is all they got. The labor leaders know this, and yet they continue in their addresses and public

statements to assert that the railways are "guaranteed" six per cent.

There are a few railway officers who are paid high salaries. Every man of sense knows that able men would not enter or stay in the railroad business if they could not earn incomes in it somewhere near as large as those paid in other businesses for work requiring equal ability and involving equal responsibility. The salaries of railway officers are, however, only an extremely small part of total railway earnings and expenses. In 1920 the salaries of all the general and division officers were only 2.5 per cent of the total pay roll, only 1.7 per cent of operating expenses, and only 1.5 per cent of total earnings. The salaries of the general officers, including all the so-called "fancy" salaries, were only three-fourths of one per cent of the total earnings, while the salaries of all officers paid over \$20,000 a year were only one-fourth of one per cent of the total earnings. Nevertheless, labor leaders and other spokesmen of the unions incessantly represent to employees and the public that vast salaries paid to officers prevent employees from getting reasonable wages, and make it necessary for the public to pay unreasonable rates.

These are but a few examples of the misrepresentations constantly being made by spokesmen of the unions. The purpose of all this propaganda is to create unjustified sentiment among employees and the public against the railways. The creation of this sentiment increases the difficulty met by the railways in maintaining adequate freight and passenger rates. All the wages of the employees must be paid out of the earnings of the railways. Therefore, whatever tends to cause reductions of their rates and earnings necessarily tends to reduce the amount of wages they can pay. From this point of view the propaganda seems directly contrary to the interests of the employees. Why, then, is it carried on?

The labor leaders want the Plumb plan of government ownership and employees' management. If they cannot get that they want government ownership and government management because they believe that under government ownership they can get easier conditions of work and higher wages than under private ownership. They are not saying much about the Plumb plan now because they know it is unpopular. What they are trying to do is to make private management so unpopular that the public will revolt against it, and they hope that then the Plumb plan will have a chance.

What are the managements of the railways to do in the face of this widespread, selfish and deliberately misleading propaganda? The Des Moines Register says, in effect, that they should ignore it and run their business right and then all will be well. And yet the Des Moines Register itself recently made a statement in an editorial which showed that it had been misled by this propaganda. It stated Clifford Thorne had said that the market value of the railways never exceeded \$13,000,000,000. What Mr. Thorne did was to present figures to the Interstate Commerce Commission in the rate advance hearing in July, 1920, in an attempt to show that the market value of railway securities at that time was only \$12,300,000,000. He knew as well as anybody that the prices of securities in previous years were much higher than when he made his calculation. It should be noted that the commission had all his figures before it when it made its valuation. The Springfield Republican says the railways should present the facts and let the public draw its own conclusions. With that the *Railway Age* agrees. But suppose the labor leaders present their misrepresentations in a highly sensational way, as they did in the hearings on national agreements, and spokesmen of the railways reply merely by calmly presenting the truth. The Springfield Republican well knows whether the sensational charges of the labor leaders or the cold facts as presented by the railways are likely to receive the wider dissemination.

The problem presented by this labor union propaganda is

not merely that of the railways. It is that of the public. It is being carried on deliberately to destroy all possibility of the prosperity and credit of the railways being re-established under private management. If it is allowed to attain its object those who have invested in railway securities will lose heavily. But the public will be a very much larger loser, because the break-down of private management will force government ownership on the nation.

The *Railway Age* urged the railways to defend themselves better because it believes this is necessary not only in the interest of the railways, but of the public. We shall continue to urge them to do so. And, meantime, we urge the press of the country as a duty to itself and to the public to investigate thoroughly who is making the greater efforts, even in the excitement and under the temptations of partisan controversy, always to tell the truth about railway matters—the spokesmen of the labor unions, or the spokesmen of the railways. We know what the press will find if it will investigate.

If private ownership and management cannot stand the test of having the truth told about it, it ought to be destroyed; but private management should not be allowed to be overthrown and some Soviet scheme such as the Plumb plan erected in its place by such a campaign of wholesale misrepresentation and downright, deliberate falsification as is being carried on by the labor leaders.

Red Automobile Tail-Lights

AT FIRST GLANCE it would appear that the use of red for tail-lights on automobiles would be of slight interest to railroad officers and that this is the logical color to use as a marker. But it is of interest to railway managements and it is questionable if red is the logical color. Red is the universal color for danger, consequently it would appear logical to use it as a rear light. However, unlike the Missouri mule, there is nothing dangerous about the rear end of an automobile, provided the driver behind knows its location, and it would appear that some other light, as for example, a yellow light having the same photometric value as that used for a "caution" warning in railway signaling would be the logical color to use.

One riding on a boulevard at night is impressed with the confusing vista of red lights presented to an automobile driver. The result cannot do otherwise than to depreciate the value of this color as a danger indication. There is a certain psychological effect on a driver following a vista of red lights mile after mile, which tends to nullify its use as a danger signal. Illustrative of this, an accident occurred recently in which an automobile was struck by a train at a railroad crossing. The driver, who escaped, said that he had been following the red lights of cars ahead for some distance, and that on approaching the railroad crossing where the gates were down, he took for granted that the red lights on the gates were on the rear of a car ahead. He turned out to pass the supposed car, ran through the gates and was struck by a train. Had yellow or white been in use as a tail-light, instead of red, the driver would have realized immediately that he was approaching a dangerous location.

It is, of course, necessary that a driver be warned of his approach to a preceding machine, but it is even more important that he be warned of his approach to an opposing one and this latter is adequately arranged without the use of this color. From a safety first standpoint it would appear that this is a question which should well receive the serious consideration, not only of the railroads, but of automotive clubs, automotive manufacturers, state public service commissions and the public. There may be laws in some states requiring a red tail light on automobiles, and if so, it might be well to consider a change. As long as other colors can be

used to as good advantage for markers, it would appear well to retain the red for use at extra dangerous locations, such as railroad crossings, boulevard crossings, and at places where material is piled in the streets. With the number of automobiles increasing rapidly, the value of red as a danger signal decreases accordingly.

Standardizing Grain Doors by Law

A BILL HAS RECENTLY been introduced in the United States Senate by Senator Lenroot of Wisconsin, authorizing the Interstate Commerce Commission to investigate existing types of grain doors and empowering it to order the type or types approved to be installed in freight cars on or before a fixed date, provided it is not earlier than December 31, 1926. The bill, known as S. 2691, it is understood, was introduced at the request of the proprietor of a patented grain door who, having received some commendation for his device but little encouragement to hope for its adoption by the railroads, has joined the ranks of the reformers who believe that anyone is more competent to manage the affairs of the railroads than railroad men themselves.

A number of patented grain doors have been developed that are undoubtedly superior in themselves to the usual type of loose grain door which is really only a part of the cooping of cars placed for grain loading. Most of these doors are designed to be permanent fixtures of the cars to which they are applied, and, indeed, unless they are permanent, would have not even the shadow of justification in seeking compulsory standardization. Although permanent doors might not be inconvenient for the shipper, their advantages, if any, would be largely of benefit to the railroad.

But let us see whether the railroads are so blind to their own interests as the reformers would have us believe. More than 50 per cent of all loading of grain and grain products originates on 11 western railroads. Add to these 11 roads 12 roads in the central, eastern and southern parts of the United States and more than three-quarters of all grain loadings are accounted for. On the 11 heaviest grain shipping roads in the west grain loading probably does not constitute an average of more than one-third of the demand for box cars and during the heaviest movement following the harvest in few cases does it exceed half of the box car demand.

It is evident, then, that even on the roads most vitally interested there might be some hesitation about going to the expense of providing their own cars with complete permanent grain door equipment subject to abuse and perhaps destruction while in other than grain service, even if all grain were loaded in home cars. But it is doubtful if more than 50 per cent of the grain loading is handled by cars owned by the loading lines, and if permanent doors were provided to care for the movement of grain it is evident that every box car in the country suitably designed for grain loading would have to be equipped. With the heavy grain movement originating on a comparatively few lines it is evident that a heavy burden of expense of equipping box cars for grain loading would fall on many roads whose interest in grain traffic is slight. The total annual grain loadings probably do not require an average of more than three loads per car per year and it is not probable that more than 50 per cent of all the box car equipment is ever in condition for grain loading at one time.

The maintenance of permanent grain doors on all of the equipment, therefore, involves an expenditure much of which is of doubtful utility, and the cost of maintaining such doors on cars only occasionally placed for grain loading, as compared with the cost of maintaining temporary grain doors, is problematical. Furthermore, the responsibility of providing temporary grain doors rests on the loading lines where it justly belongs, these roads having recourse to a pro-rata

distribution of the expense with intermediate and delivering lines by mutual agreement. Just what excuse Congress will find to justify itself in being used to serve the individual ends of any inventor or group of inventors, by the passage of this bill is difficult to see. Indeed, the wonder is that it has been introduced at all.

Ford's November Net Approaches Vanishing Point

HENRY FORD, famous among other things as the owner and press agent of the Detroit, Toledo & Ironton, it will perhaps be remembered was the gentleman who recently had some correspondence with the Interstate Commerce Commission relative to a possible simplification of the commission's accounting requirements. While the discussion was under way, he temporarily postponed the filing of the monthly reports of revenues and expenses and the operating statistics for his road. He finally softened his heart, however. He relented and filed his September and October figures. He filed them late. The September figures were particularly late.

According to the impression which had been given the press, and through the press to the public, Mr. Ford had been holding up his figures because of the discussion he had been carrying on with the commission relative to the simplified accounting requirements. The figures, when they were finally filed, gave a somewhat different impression, however. They seemed to indicate that Mr. Ford took first rank as a publicity man when he had something good to say but that he excelled as a censor when he had something poor to admit.

Apparently Mr. Ford or else the Interstate Commerce Commission has decided that the discussion as to simplified accounting requirements has now been brought to a close. The Detroit, Toledo & Ironton figures for November have been filed on time. They do not look sufficiently favorable to indicate that Mr. Ford can have filed them with any great degree of pleasure or satisfaction. Whereas, in April, the road's best month in 1921, the D. T. & I. had a net railway operating income of \$276,452, and whereas in June the operating ratio was 52.75 per cent, in November, the net railway operating income was only \$5,335 and the operating ratio was 82.3. The figures for November and the 11 months follow:

REVENUES AND EXPENSES, NOVEMBER, 1921, AND 11 MONTHS	November	11 months
	1921	1921
Operating revenues		
Freight	\$658,290	\$6,360,024
Passenger	10,292	149,185
Total (inc. misc.)	681,052	6,634,658
Operating expenses		
Maintenance-of-way and structures	165,438	1,307,161
Maintenance-of-equipment	98,340	982,041
Traffic	6,831	79,115
Transportation	270,877	2,272,154
General	19,343	213,485
Total	560,829	4,852,796
Operating ratio	82.3	73.1
Net from railway operations	120,686	1,781,874
Operating income	104,088	1,637,821
Net after rentals, November, 1920	5,335	892,931
Net after rentals, 11 months, 1920	def. 212,136	def. 1,309,401

It will have to be granted that the Detroit, Toledo & Ironton has come far from making a failure of 1921. The fact that it has had in the first 11 months of 1921 a net operating income of \$892,931 as contrasted with a deficit of \$1,309,401 in the same period of 1920, indicates no small measure of improvement. Nor does an operating ratio of 73.1 for the 11 months look so bad. But, Mr. Ford's road when its publicity was at its best, was showing a net railway operating income of over \$260,000 monthly—in April, May and June—and an operating ratio of from 52.75 to 56.75. In August the net railway operating income was but \$70,643 and the operating ratio had risen to 71.77, which change was so marked that Henry decided to quit filing such evidence. His judgment was justified by the September results, which showed a net after rentals of but \$46,749 and a ratio of 75.3 per cent, and still more by the October returns with a net after rentals of but \$15,191 and an operating ratio of 78.9. Mr. Ford had in mind the deleterious effect such figures would have upon his publicity when they were examined by the eagle-eyed students of railway affairs. Unfortunately he forgot that the Interstate Commerce Commission was also interested, but interested less in Mr. Ford's publicity than in the legal requirements of giving the facts to the public.

The attention which, because of the previous favorable and wide-spread publicity, will be given the November net of only \$5,335 and the November operating ratio of 82.3 is even more unfortunate. There are other factors of interest such as the gross earnings or the operating expenses. Most of us have been expecting that if Mr. Ford shipped fewer automobiles his road's earnings would suffer accordingly. They have actually suffered much worse than "accordingly." The sad details are given in the table.

The months in 1921 in which Mr. Ford's road had the greatest net railway operating income were April, May and June in each of which months the figure was over \$260,000. The gross earnings in these months were respectively \$697,490, \$774,405 and \$713,527. In July, he increased the gross earnings to \$744,498; the net was reduced to \$187,395. A further increase took place in gross in August to \$763,840; the net was reduced to \$70,643. September gross earnings were not quite so good, but they were still good—\$759,757; the net after rentals had become \$46,749. In October there was a real slump in gross—due to lessening flivver production; gross earnings were \$652,438; net fell to but \$15,191 and the operating ratio climbed to 78.9. The November gross was greater than that for October. It was \$681,052; the net after rentals narrowly escaped being put in red figures. It was but \$5,335 and the operating ratio continued on its climb to 82.3 per cent.

Now a very interesting fact develops as to the reason for the decreasing net and the progressively poorer operating ratio. There have been sizable increases in the past several months in maintenance expenses both for maintenance of way and for equipment. But the place where the real increase have come has been in the transportation expenses. Whereas in April, May and June the transportation expenses averaged in the neighborhood of \$185,000, in November they were \$270,877.

OPERATING RESULTS OF THE D. T. & I. TO NOV., 1921

Month	Revenues	Maint. of way	Maint. of equip.	Trans.	Total expenses	Op. ratio	Net from railway operation	Net after rentals	Net ton miles
Jan.	\$248,425	\$103,589	\$80,932	\$159,225	\$370,006	\$148.94	def. \$121,580	def. \$183,519	16,543
Feb.	190,171	72,249	74,728	126,740	294,093	155.17	def. 236,502	def. 127,851	12,075
Mar.	430,051	78,838	81,555	170,183	330,569	80.99	85,083	71,985	27,959
Apr.	697,490	97,088	87,626	183,381	395,815	56.75	301,675	276,452	37,760
May	744,405	127,791	84,502	189,236	422,327	56.73	322,077	263,293	49,467
June	714,527	82,221	80,793	188,517	376,382	52.75	337,144	261,259	46,001
July	744,498	118,289	74,706	222,206	444,794	59.74	299,704	187,395	46,826
Aug.	763,840	154,616	114,069	246,017	548,246	71.77	215,594	70,643	45,555
Sept.	759,757	161,425	142,897	237,336	522,728	75.3	187,479	46,749	*
Oct.	652,438	145,314	61,889	277,970	514,504	78.9	137,934	15,191	*
Nov.	681,052	165,438	98,340	270,877	560,366	82.3	120,686	5,335	*
11 months	6,634,658	1,307,161	982,041	2,272,154	4,852,784	73.1	1,781,874	892,931	*

*Figures not yet available.

There were those who smiled when Mr. Ford first began making his broad claims about what he was going to do with his D. T. & I. Where are these skeptics today? An easy query to answer, they are everywhere and what is worse, they are smiling. Mr. Ford may be expected, because of his tremendous capital and because of the business which he has to ship, to make a real railroad out of the D. T. & I. We shall be disappointed if he does not do so. So far, however, his ability as a publicity man has somewhat exceeded his ability as a railroad owner.

Mr. Ford, in fact, is a wonderful—we use the word advisedly—publicity man. He really ought, however, to have been a wee bit surer that his facts were going to stay with him, especially when his facts were railway earnings. Any railroad executive could have told him that.

Lesson of the Last Collision

THE GOVERNMENT REPORT on the Woodmont (Bryn Athyn) collision, noticed on another page, exposes bad practice in a half-dozen different features, and it ought to be widely read; for similar weaknesses exist, no doubt, on many roads. This may seem a harsh thing to say, but the Bureau of Safety during the past five years has, in numerous reports, set forth many and varied weaknesses in block signal practice and other vital features of safe train operation, and *nothing is known* as to how far and how intelligently the salutary advice given in these reports has been followed. The time seems opportune to renew the demand that the Bureau of Safety prepare to make its recommendations more constructive by finding out the true condition of things, generally, throughout the United States, as regards safe train operation, and making a comprehensive report thereon. Reporting the faults in specific cases—perhaps one per cent of the cases in which radical reform is called for—and publishing these reports month after month with nothing to tie them together but a perfunctory annual report to Congress, which congressmen do not comprehend, holds little promise of working any real improvement.

Government intervention in railroad operation is not a thing to be lightly recommended; it has, during the past 30 years, done much harm as well as much good, and leading public-spirited citizens are by no means agreed as to how far it is wise to go; but surely the point which we now stress is one of the least controversial in this field. The securing and publishing of information is one of the most legitimate functions of government (this is not to be taken as approval of dividing bodily injuries in the accident records into 183 classes for the statistical bureau and 100 other and equally unnecessary classes for the surgeons), and a strong and business-like policy in this direction would doubtless prove economical. A thousand superintendents, working through 2,000 trainmasters, might be expected to leave a percentage of loose threads in their discipline; and the government reports are reminding us constantly that this is fact, not mere theory. To what extent the weakness exists, only the government can find out.

All of the foregoing can be said without in the least ignoring the records which show a remarkable decrease in deaths and injuries of passengers, employes and trespassers during the past ten years. Train accident records can be looked at from two viewpoints. We can concentrate attention on the totals for a year, or a series of years, which include tens of myriads of casualties, mild or severe, that seem to be almost inevitable, or we can make prominent the spectacular disasters. *Neither viewpoint can be neglected.* Great wrecks always agitate the public, and all concerned, whatever may have been our success in reducing annual totals.

Again, the present problem must not be confused with the gains or the work or the triumphs of the "Safety First"

committees. That great work deals primarily with the problem of the workman who desires to keep his own skin whole and to avoid doing anything to injure his comrade. It has branched out somewhat from that simple scheme, but the fact remains that it cannot do much that is definite toward the prevention of collisions. Prevention of collisions was an important feature of safety-first long before the so-called safety-first movement was started; though it must be confessed that in collision prevention the actual practice has frequently belied the ideals most sadly.

The lessons of this latest collision are all too familiar to experienced railroad officers. We shall not repeat them in this place. The only thing any competent superintendent or manager needs to do is to read the facts and then search his own organization. Shall we say search his own heart? Some critics have a feeling that there is such a need. The report is a severe indictment of all concerned—officers, sub-officers, trainmen and station men—and a study of it will not only suggest important inquiries that ought to be made on almost every road, but will explode some false notions; for example the notion, much too prevalent, that old conductors and enginemen, with good records, need no supervision.

New Books

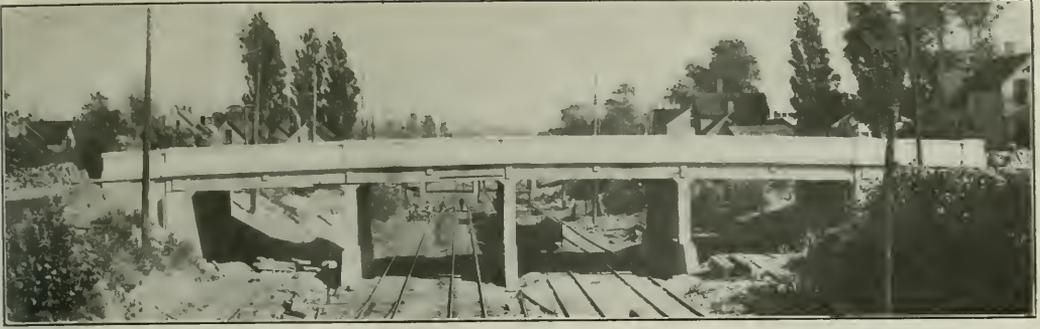
Bullinger's Postal & Shippers' Guide 1240 pages, 7½ in. by 10¼ in. Published by New England Railway Publishing Company, 67 Federal street, Boston, Mass. Issued annually, in January at \$5 a copy.

This is the fifty-first number of this well-known handbook and, as will be noted from the foregoing paragraph, it is now published in Boston. E. W. Bullinger, the veteran publisher, who began this book in 1872 and who has published it in New York City these 48 years, announces that he is now 79 years old and that he has deemed it proper to retire. The New England concern, of which N. E. Weeks is president, has been a publisher of guides for 70 years and has been agent for Bullinger's Guide for 30 years.

This guide, which contains every post office and railroad station in the United States, with shipping directions for either freight or express; and which now covers Canada and New Foundland, as well as the United States, including Hawaii, scarcely needs an introduction to any railroad man, certainly not to any up-to-date freight agent; and to those who are not acquainted with the book we may say that it is as nearly perfect as a book of that kind can be made. In fact, it is perhaps open to criticism as giving information in too much detail. For example, the list of railroads gives the terminal points of every little branch; the Louisville & Nashville, for example, being entered under 102 items. The Boston & Albany, operating less than 400 miles, is divided into 16 items.

The book now weighs over four pounds. We cannot say that it has increased in merit at the same rate that it has increased in size, for it was too good in the beginning to admit of any such rate of progress. The editor prints prominently a request for advice of errors found by users of the book, and intimates that the people in the tombs along the banks of the Nile are the only people in the world who are able to beat him, year after year, in making a record free from mistakes. He is doing everything within his power to equal those Egyptians' records.

FREIGHT RATES on road-building material have been reduced in Texas by order of the railroad commission 15 per cent, but the decrease applies only on the Southern Pacific, Gulf, Colorado & Santa Fe, Missouri, Kansas & Texas, Panhandle & Santa Fe; Houston & Brazos Valley and the Texas Midland, and only when the county or state pays the freight charges. The reduction is not applicable for private contractors or for municipal work.



A Typical Street Viaduct Over the Cut

Nickel Plate Is Completing Grade Separation Work

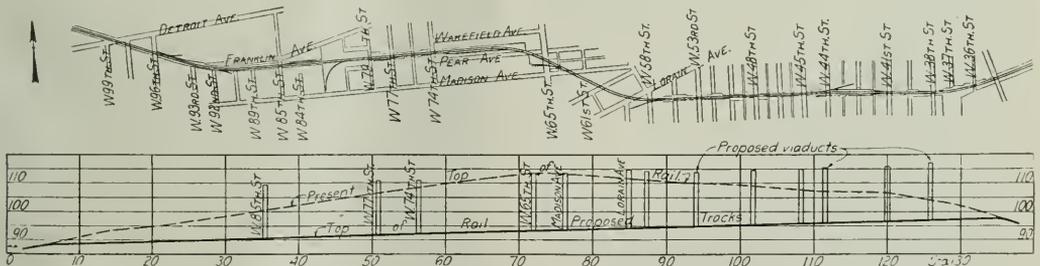
Large Cut Requires Special Drainage—Concrete Viaducts Being Built by Company Forces

ONE OF THE FEW large grade separation projects now under way in this country is being carried through the last stages by the New York, Chicago & St. Louis at Cleveland, Ohio. This is a depression project, involving 800,000 cu. yd. of excavation on a relatively flat gradient, and presented a formidable problem in the disposal of the drainage; in fact, provision for drainage entailed an expenditure even greater than that required for the work of excavation and also exerted a pronounced influence on the manner in which the other features of the work were carried out.

Another feature of no little interest in connection with this project is the fact that the street viaducts are designed to

eastern portion of the city of Cleveland, created a demand for considerable filling material. As a consequence, it was deemed advisable to excavate the track depression cut in the dry in order that the material thus obtained might be used in embankments on the other projects.

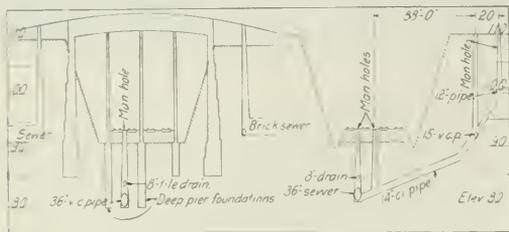
This track depression work is known as the "west side grade crossing elimination" and extends from Fulton road, where the Nickel Plate tracks leave the valley of the Cuyahoga river and enter a closely built-up resident section in which the railroad is crossed by two important street car lines. The present work extends to the vicinity of Detroit avenue, a busy thoroughfare on which grade separation was



No masonry work was carried on in connection with this part of the project except as required for retaining walls at a few points to protect the buildings of adjacent property holders. The street crossings were taken care of as the work progressed by the construction of temporary trestle viaducts across the depression prism and the principal work on this project subsequent to the completion of the excavation has been that of replacing the temporary structures with permanent concrete and steel viaducts.

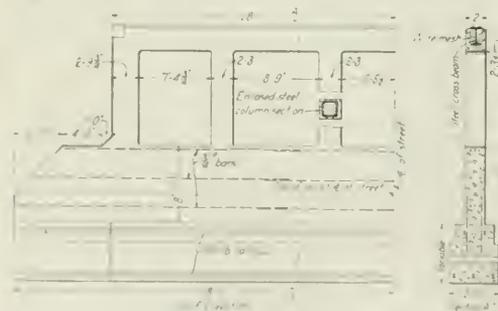
Serious Drainage Problem

Any cut $2\frac{1}{2}$ miles long, 15 to 20 ft. deep and with an average grade of only 0.075 per cent, in a country of average



Two Sections (Distorted) of the Track Depression Cut Illustrating the Drainage System

rainfall and in a sandy soil will impose a serious problem on those who undertake its excavation. If in addition it becomes necessary to intercept sewers at each street, carrying both sanitary and surface flows, the problem assumes much greater magnitude. These were the conditions imposed on the engineers of the Nickel Plate and called for the construction of a large sewer for nearly the whole length of the cut, supplemented by a system of sub-soil drains. The main sewer varies from 15 in. to 36 in. in diameter and was constructed of vitrified sewer pipe. It was located on the center line between two of the tracks, but in certain places where it was necessary to pass directly under one of the tracks, cast iron pipe was used. Manholes were constructed at intervals of about 300 ft. for the junction of sub-soil drains and

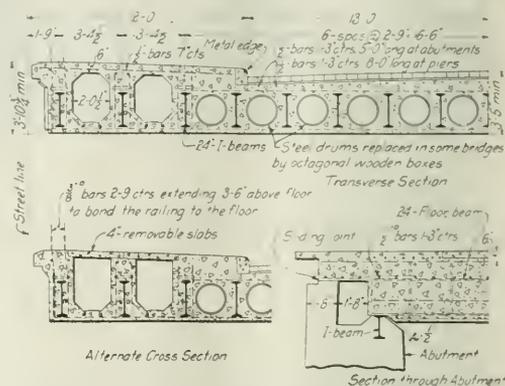


Typical Details of a Pier for the Street Viaducts

the interception of the city sewers. Fortunately, it was possible to secure an outfall for this sewer at West Fifty-fifth street, or not far from the midlength of the cut, and thus drain the water both ways toward the center. But even with this arrangement it was necessary to place the sewer at a maximum depth of 18 ft. below grade in order that a sufficient gradient might be obtained.

The outfall consisted of a brick sewer four feet wide by five feet high, built by tunneling and open cut along West

Fifty-fifth street to a main sewer in Walworth avenue, this portion of the work being done by the city of Cleveland. At West Fortieth, West Seventy-fourth and West Eighty-fifth streets, the sewers were very large and deep, and to have constructed the intercepting sewer large and deep enough to care for the drainage from these streets adequately would have involved an excessive expenditure. It was therefore deemed advisable and economical to construct concrete sewers in West Fortieth and West Eighty-fifth streets to care

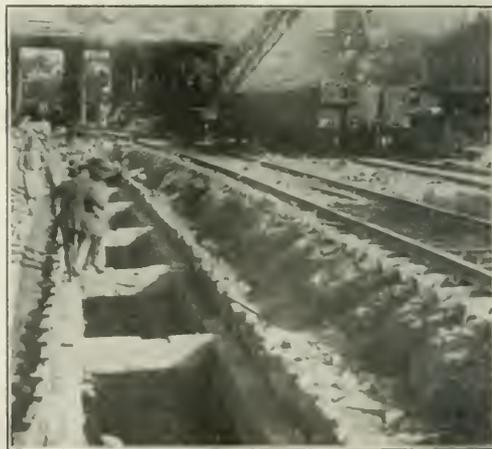


The Weight of the Bridge Floors Was Reduced by Introducing Steel or Wooden Drums Between the I-Beams

for the drainage from these two streets. At West Seventy-fourth street the drainage was carried under the roadbed in the cut by means of an inverted syphon.

Street Viaducts All One Type

A standard plan of viaduct construction was developed and applied to all of the streets where it was possible to do



Deep Excavation for Pier Footings Required Sheet Piling

so. Of the 13 bridges to be placed, 9 will follow the one type of construction, with slight variations to conform to the angles of the crossings. In addition to the 13 concrete overhead bridges, two of which carry street railway tracks, there

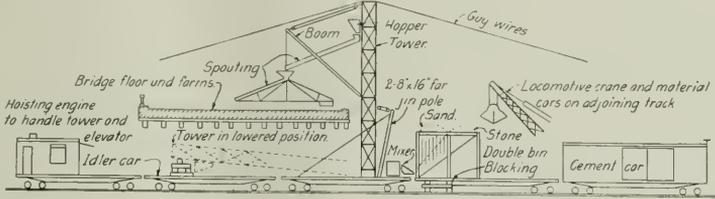
will be foot bridges, not to exceed five in number, erected at streets designated by the city of Cleveland.

The design of the concrete bridge structures is simple, being comprised of a four-span structural steel bridge encased in concrete, each span opening being wide enough for two tracks. The substructure consists of mass abutments with piers of concrete encasing steel columns. The superstructure comprises longitudinal I-beams encased in concrete to form the floor. In the sidewalk structure the I-beams are encased separately with reinforced concrete slabs at both the top and

amount to avoid any appreciable changes in the street grades, but at a number of the crossings it was necessary to provide elevated approaches to the viaducts. This was done by building embankments supported by concrete retaining walls along the street lines.

Concrete Work Handled by Company Forces

The construction of the permanent viaducts was started in 1919 and has been carried on almost continually since that time. All of the work has been done with company forces



Layout of the Concrete Plant in Operation

bottom to provide public utility galleries. A concrete banister on each side of suitable design completes the viaduct. Under the original plan, at five of the bridges, viz., West Forty-first, West Fifty-third, West Sixty-fifth, West Seventy-fourth and West Eighty-fifth streets, steel drums were introduced into the

except the erection of the structural steel for the viaducts which was done under contract by the King Bridge Company of Cleveland, Ohio. The most troublesome feature of the work was the construction of the footings for the viaduct piers on either side of the sewer since it was necessary to carry these down below the bottom of the sewer, or about 17 ft. below subgrade. The footings for the other portions of the substructure were placed on natural foundations about 6 ft. below subgrade, but danger of undermining in close proximity to the sewer made the deeper foundations for the piers necessary.

Pile foundations were impractical owing to the fact that the running sand encountered precluded the driving of piles.



The Mixer Plant at Work, Vacant Track on the Right Reserved for Material Cars and Locomotive Crane

floor between the beams. These drums reduced the volume of concrete and thus not only aided in relieving the weight of the floor, but they also effected a decided decrease in cost. Later developments, however, showed that drums constructed of wood, which, needless to say, would be less expensive than the steel drums, could be used with just as good an effect as the steel drums. Consequently, this type of drum is being used on the additional eight bridges.

Most of the structures cross the tracks at an angle of nearly 90 deg., thus affording opportunity for standardization of design, but four of the streets cross the cut at considerable skews and two of them, West Fifty-eighth street and Lorain avenue, intersect within the limits of the excavation prism. As a consequence, the structures for these particular crossings involve some interesting departures from the standard design.

For the most part the tracks were depressed a sufficient

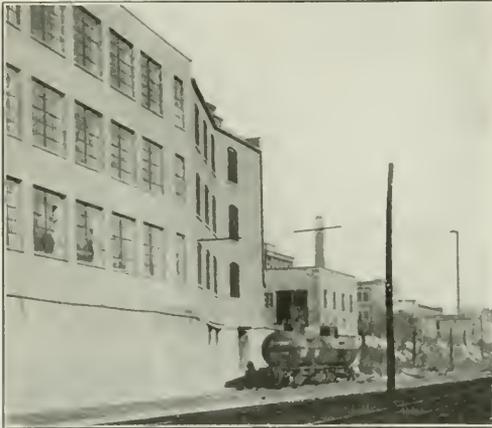


Industrial Building Supported by Timber Cribbing with Service Track Carried on the Old Grade by a Trestle

The deep excavation in sandy soil containing large quantities of water necessitated the use of steel sheet piling heavily timbered. The conditions which precluded the use of pile foundation also militated against the ready driving of the sheet piles. In fact, it was necessary to jet some of the sheet piling into place. This work was facilitated to a certain extent, however, by the development of a ready means for pull-

ing the piles which effected a considerable saving and made it possible to use some of the piling as many as 20 times. This pile-pulling rig consisted of a gin pole or strut composed of two 18-in. by 9-in. stringers, bolted together and fastened to the end of the boom of a locomotive crane, with two independent drums, so that the reaction of pulling was transferred directly to the top of an adjacent sheet pile instead of to the crane boom.

As the masonry work on this project entailed the mixing and placing of 36,000 cu. yd. of concrete, considerable thought was given to the development of a concrete plant that would be thoroughly adapted to the conditions imposed. As the track depression prism is wide enough so that it was possible to provide two tracks for the operating department and still leave space for two tracks for the construction equipment, the concreting plant was designed to take full advantage of two tracks and the fact that it would not often be disturbed by the operation of trains. As a consequence, the concreting plant is, in effect, a fixed plant except that it is mounted on cars so that it may be moved readily from one



Industrial Building Underpinned by a Retaining Wall. Service Track Provided on the Depressed Level

viaduct to the next one. The arrangement of the plant will be readily understood from the drawing and consists essentially of an Insley tower and spouting outfit mounted on a flat car adjacent to a concrete mixer with a gallows frame arrangement to permit of lowering the tower on an adjacent idler car whenever a shift is being made. The fine and coarse aggregates are supplied to a double material hopper by a locomotive crane from material cars standing on the adjacent track. Cement is wheeled from the cement car to the mixer over a temporary runway erected alongside. The car containing the hoisting engine for elevating the concrete is set far enough away from the tower car so that the smokestack will clear the edge of the viaduct.

This concreting outfit will deliver concrete to any part of the viaducts crossing the tracks at right angles from a single position of the plant. In the case of the longer structures required at some of the skew crossings, it is necessary to supplement the spouting delivery with the use of concrete buggies to reach the more remote portions of the structures. This concrete plant can be dismantled readily, moved to another structure and again set up ready for use in a day's time.

One of the interesting features of this work is the arrangement made to take care of service tracks. The grade separation area includes two team yards which have been constructed on a level generally coincident with the streets with

access to the track depression level by means of decline tracks. There are only a limited number of industrial developments within the grade separation territory, but several different methods were devised in supplying trackage to these industries under the new grade arrangement. Two photographs illustrate two methods in which this has been accomplished. In one case the building walls have been underpinned and an industry track provided on the new grade line. In the other case, an incline trestle has been provided so that the industry is afforded trackage on essentially the old level.

This work has been handled under the direction of A. C. Harvey, until recently engineer of grade crossing elimination, now assistant chief engineer, and under the general direction of E. E. Hart, chief engineer, Cleveland, Ohio. The grade crossing elimination work has been handled by a complete organization for both field and office work, all roadway and structural drawings being handled under the direction of a chief draftsman and all construction work under a field engineer who has direct supervision over the various construction foremen.

The estimated cost of the project is \$4,400,000. The city of Cleveland pays 35 per cent of all that portion of the total expense of this work, including property damage, that is required in providing the railway company the same facilities on the new level as it had before the work was undertaken. All expense entailed in providing additional facilities is borne entirely by the railroad company. The total outlay for this project is subdivided approximately as given in the table below:

Land and property damage	\$1,000,000
Excavation	323,000
Drainage, sewers and water pipes.....	480,000
Viaducts and streets	1,270,000
Tracks	227,000
Miscellaneous	600,000

Some Further Data on Federal Valuation

SINCE THE PUBLICATION of the résumé of the work of Federal valuation, which appeared in the issue of January 7, page 36, the following data have been received, showing the amount of this work now completed.

ENGINEERING SECTION		
	Mileage	Percentage
Road mileage assigned.....	247,882	100.0
Field work entirely completed	247,882	100.0
Field notes collected.....	224,800	90.5
Prices applied	168,959	68.2
Reports assembled	149,730	60.4
Reports completed on 635 corporations covering..	143,879	58.1
LAND SECTION		
Road mileage assigned.....	247,882	100.0
Mileage appraised	245,752	99.2
Mileage computed	222,948	90.0
Mileage compiled	133,294	53.8
Reports completed on 591 corporations covering..	131,857	53.2
ACCOUNTING SECTION		
Road mileage assigned	247,882	100.0
Field work completed except verification of returns to valuation orders.....	245,394	99.0
Verification of returns to valuation orders	242,841	98.0
Reports rough drafted	153,275	62.1
Reports completed on 471 corporations covering ..	84,091	33.9

The commission itself has published final value figures on 230 corporations, representing approximately 25,700 miles of road.

Due to the centralization of the work the personnel of the bureau has been greatly reduced, particularly in the overhead organizations. The higher officials are now as follows:

- Acting Director, C. F. Staples.
- Executive Assistant and Supervisor of Land Appraisals, T. P. Artaud.
- Solicitor, Dr. Charles W. Needham.
- Supervising Engineer, Howard M. Jones.
- Supervisor of Accounts, J. M. Willey.

Government Reports Promptly on Reading Collision

Conductor Believed Train Order Gave Authority to Disregard the Manual Block Signal

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated December 23, and signed by W. P. Borland, chief of the Bureau of Safety, on the collision between eastbound and westbound passenger trains on the Philadelphia & Reading near Woodmont (near Bryn Athyn), Pa., on December 5 last, when 27 persons—20 passengers, 5 employees on duty and five off duty—were killed, and 35 passengers and five employees were injured.

The main facts are substantially as given in the *Railway Age* of December 10, page 1163. The eastbound train (No. 51) was superior by direction. The first manual block section is from Bryn Athyn to Churchville, 5.7 miles, but there is an intermediate non-block station, Southampton, where trains frequently meet. The switch at Bryn Athyn is 515 ft. east of the semaphore signal; and 175 ft. farther east is automatic block signal No. 716, governing westbound trains. Automatic signal No. 713, for eastbound trains, is at Huntingdon Valley, nearly a mile west of Bryn Athyn, and is controlled by a track circuit extending to a point 1,500 ft. east of signal 716. Westbound train 154 stopped at signal 716 because there was not time to go to Huntingdon Valley to clear train 151, and also because signal 716 was in the stop position. The flagman was sent ahead and, after a few minutes, the train moved forward to the station, where it received an order to "disregard signal 716 and run carefully." The train was then set back to wait for train 151, the side track not being long enough for 154.

Eastbound train 151 was in charge of Conductor Evans and Engineman Yeakel. At Huntingdon Valley this train obeyed automatic signal 713 in the stop position and sent a flagman ahead; and after waiting a few minutes the train allowed him to Bryn Athyn, arriving there, according to the record, at 7:42 a. m. Conductor Evans sent word to the engineman to move the train forward and back in on the siding (train 154 being at rest on the main track beyond the switch), but the engineman insisted that to do so he must first have a dispatcher's order. The conductor soon after received the order to meet No. 156 at Bryn Athyn and gave a copy of it to the engineman; and the train was then started. A stop was made at Paper Mills, 0.7 mile east of Bryn Athyn, and the train then proceeded about half a mile farther before colliding with train 156. The employees on duty who were killed were the fireman of each train.

Conductor Evans, at the hearing, said that he received order No. 11 (to meet No. 156), read it in a low tone of voice and "was under the impression that it was an order to meet train 154." He walked to the engine and delivered a copy of the order to the engineman, neither of them reading it to the other, or making any comment whatever. He claimed that a train order was sufficient authority for a train to pass a block signal or a train order signal in the stop position, without a clearance card. He did not show his copy of the train order to the trainmen. He put the order under the baggage master's box in the baggage car, as was his custom, so that the baggage master might see it.

Engineman Yeakel said that he glanced at the order and got the impression that it was to meet train 154.

Operator Clayton, at Bryn Athyn, made conflicting and vacillating statements. The conductor read the train order to himself, but Clayton said that he overheard the reading and that it was read correctly. He said that he gave Churchville permission to send forward train 156, considering that the block for westbound trains ended at automatic signal 716 which was east of train 151, standing on the side track.

If he had waited until train 154 had passed his station before giving a clear block to Churchville, he probably would have discovered that train 151 had departed contrary to orders.

The entries on the block record at Bryn Athyn were found to have been altered, and Clayton explained that, being busy selling tickets, he made the entries an hour after the train had left; and at that time he was very much excited and disturbed.

Operator Tomlinson, at Churchville, also made conflicting statements and the record produced by him, purporting to be the original block record at the station, proved to have been made by him probably on the following day. Operator Tomlinson said that he seldom received standard time, his office being closed at the hour when time is transmitted.

Train dispatcher Rich, on receiving the report from train 154 that signal 716 was in the stop position, assumed that the circuit was out of order; and he directed the train to disregard that signal so as to obviate the necessity of flagging to Huntingdon Valley.

The report, in conclusion, lays the main responsibility on Conductor Evans and Engineman Yeakel for disobeying the train order and for leaving Bryn Athyn with the block signal in the stop position without securing a clearance card; but the failure of the operators contributed to the disaster. The inspector believes that the conductor and engineman at fault anticipated the contents of the order, and thus acted upon an impression. Engineman Yeakel, having said that he would not move the train forward until he received an order, evidently assumed, when he did receive an order, that it was the one which he had asked for. Going away without a clearance card, when the block signal was at stop, was not an oversight, says the report; it was due to a wrong understanding of the rules.

The inspector feels sure that 156 left Churchville under a clear block signal while train 154 still stood on the main track at signal 716. Statements of the operators are so conflicting and their records so faulty that their statements are held to be of little value; and it cannot be determined whether or not Tomlinson, operator at Churchville, allowed 156 to go before he had authority from Bryn Athyn.

The investigation disclosed a general laxity in the observance of block signal rules. The block system is regularly suspended at Churchville from 2:35 p. m. to 3:35 p. m. There was no uniform understanding as to whether the siding at Bryn Athyn was within the limits of the station or whether it was in the block section between Bryn Athyn and Churchville; or whether it was necessary for 151 to have a clearance or caution card before being moved forward to be set back into the siding. Employees are not regularly re-examined on the rules and some of them have not been examined since 1914. The train dispatcher had never been examined. Trains appear to be authorized frequently to disregard automatic block signal indications on trivial occasions, merely to prevent delay.

The report recommends that measures be taken promptly to insure that employees understand and obey the rules and that "the carrier be required to install on this line a complete automatic train control system."

The report discusses the fire, aggravated possibly by the illuminating gas in the cars, and observes that with steel cars the casualties would no doubt have been fewer; but the Reading has not bought any wooden cars for a number of years. At the present time the road has 205 steel passenger

cars, 90 with steel underframes and 289 wooden coaches in service.

Conductor Evans had been a passenger conductor since 1912 and was examined on the rules in 1919; Engineman Yeakel had run passenger trains since 1904. There is no record of his last examination on the rules. Both these men had been on duty more than nine hours (at 7:45 a. m.). Operator Clayton had been station agent since 1902 and Tomlinson since 1907.

Labor Board Considers New Rules for Clerks

AFTER A SHORT HOLIDAY vacation the Railroad Labor Board has again swung into action, taking up consideration of new rules to govern the working conditions of railway clerks and to supersede provisions of the clerks' national agreement over which the carriers and their employees cannot agree. In addition the board has been hearing several disputes between individual carriers and various classes of their employees, particularly a group of disputes over wage scales between a number of short lines and their employees.

The board, in taking up consideration of the disputes between various carriers and their clerical forces resulting from the attempt to negotiate new rules to govern the working conditions of these employees, has summarized the principal points on which an appreciable number of the carriers have been unable to agree with representatives of the employees. This summary indicates that the disagreements, in general, have been confined to 25 rules of the old national agreement. On all other points the carriers and their employees have either reached agreements or the submissions to the board indicate that the points can easily be settled between the carriers and the employees. Seven of the rules, according to the board's summary of the submissions, involve vital points on which agreements could not be reached by a large number of carriers. The board's summary of the more important rules follows:

Rule 48. Disagreed to by 29 carriers, agreed to by 25. The present rule provides for an eight-hour day. The carriers seek to have exception from the eight-hour day made for employees in light employment and also at stations where but few employees are employed and the train service is infrequent. Other carriers seek a nine-hour and some a ten-hour day.

Rule 49. Disagreed to by 35 carriers, agreed to by 13. This rule provides for paying a monthly salary to cover all services rendered to employees whose work is of an intermittent character, and not requiring continuous application. This would eliminate the payment of overtime to employees covered by the rule. It is sought to apply to such classes as baggage men, train crew callers, gatemen, announcers, etc.

Rule 57. Provides for time and one-half after eight hours. Agreed to by only 8 carriers and disagreed to by 44. The eight which have agreed in this instance have not agreed to pay time and one-half, but some of them have agreed with the employees to pay pro-rata for the ninth and tenth hours. The carriers are asking in some cases for no overtime until after ninth hour, and then pro-rata until the tenth hour has expired and time and one-half thereafter. Other carriers seek to have pro-rata time paid for the ninth and tenth hours and time and one-half thereafter.

Rule 58. Disagreed to by 25 and agreed to by 25 carriers. Provides for three hours pay for two hours work performed on call also time and one-half for time prior to and after the regular work period. Carriers seek pro-rata pay for calls and time up to ten hours. Other carriers seek a rule providing for time and one-half for calls, but object to time and one-half for overtime premiums with the work period.

Rule 64. Disagreed to by 36 carriers, agreed to by 18. This rule provides for paying time and one-half for service performed on Sundays and holidays when the entire number of hours constituting the regular week-day assignment are worked. The carriers seek to have all time and one-half payments for Sundays and holidays eliminated, except work over ten hours.

Rule 65. Disagreed to by 24 carriers, agreed to by 16. This

rule provides for the payment of three hours pay for two hours work for calls and time and one-half thereafter where the hours constituting the regular weekly assignment have not been worked. The carriers seek the elimination of punitive payments in this rule.

Rule 66—Disagreed to by 32 carriers, agreed to by 17. This rule provides for all employees being paid on a daily basis. Some carriers seek a monthly basis of payment, others weekly and still others object to the method of computing the daily rate as outlined in this rule. Decision 426 of the board removes considerable objection to this rule.

Other points on which there have been disagreements on an appreciable number of carriers include seniority and promotion, seniority districts, the payment of laborers and others around freight houses on an hourly basis, arbitrary payments for reporting, etc., and meal periods.

Short Lines Deferred Wage Reductions

Hearings were held on January 9, in a number of disputes between several short line railroads and various classes of their employees regarding wages. The employees in practically all of these cases charged that the carriers in question had reduced wages without the authority of the Board or in compliance with the provisions of the Transportation Act. Representatives of the carriers involved either denied that they had violated the Transportation Act in putting into effect reduced wages comparable to the reductions made in the wages of the larger carriers last July, or contended that the Labor Board had no jurisdiction.

The carriers involved in these hearings were the Tremont & Gulf, the Litchfield & Madison, the Peoria Railway Terminal Company, the Detroit, Bay City & Western, the Susquehanna & New York, the Toledo, St. Louis & Western, the St. Joseph Union Depot Company, the Mobile & Ohio, the Mississippi River & Bonne Terre, and the Interstate Railroad. The organizations involved include the train service brotherhoods, the dispatchers' association and the maintenance of way, clerks and telegraphers' organization.

In many cases the inability of the carriers to pay the standard rates of pay fixed for larger and more prosperous carriers was cited. In one dispute, that between the Mississippi River & Bonne Terre and the Order of Railroad Telegraphers, in which the carrier was charged with reducing wages without complying with the formalities of the Transportation Act, it developed that while this carrier was not included in the proceedings which ended in the wage increase of July, 1920, it had later granted these increases and that when the decreases of July, 1921, were announced it had made reductions, although not to the same extent as was ordered by the Labor Board at that time. The wage scales for employees of this carrier are still above the level ordered in the Board's decision No. 147 last July.

Shopmen Consider New Rules

A committee of 100 representatives of shop employees met in Chicago on January 9, to consider and pass upon the new rules governing the working conditions of shop employees, announced several weeks ago by the Labor Board. This committee is to take up each of the 180 rules to consider its relation to other rules and its effect on the individual worker. On the decision of this committee will depend whether the shop crafts will again threaten to strike in protest over both the rules and wage reduction of last July. It will be recalled in this connection that a strike vote, taken immediately after the wage reduction last July, authorized the general council, composed of the international presidents of the shop crafts organizations and B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, to call a strike. The call was deferred, however, until the rules controversy, which had been before the Labor Board for many months, was acted upon. Union leaders declared that a more effective fight could be made on the rules and wage questions together than on the wage cut alone.

The Webb Automatic Train Stop Tested on the Erie

Mechanical Contact Train-Stop Which Checks Its Own Integrity

—Interesting Tests on the Erie

AS HERETOFORE noted in the *Railway Age* (July 2, 1921), experiments have been going on for some time on the Erie Railroad with an automatic train stop; and these have now been completed to the extent that arrangements have been made by the manufacturer of the apparatus, the International Signal Company, of New York City, for testing the stops extensively between Englewood,

the lifting of the shoe is to exhaust enough air to sound a blast of about one second on a whistle in the cab. In other words, there is a proceed indication at each ramp approaching a clear signal. If no electric current is received from the roadway (indicating that the road is not clear to proceed), the exhaust of air sounds a blast on the cab whistle, which continues until the brakes are set, or until the engineman closes the valve, as he may do when he sees that his speed is sufficiently reduced.

There have been but few changes made in the detail of this apparatus since the description given in the issue of April 13, 1917. The cam shaft 1 and the main cam, 2, have been made hollow and connected with the train line air. The plunger head, 3, with its contacting projection, 4, have also been made hollow and connected with the train line air so that now each portion of the apparatus that is used in the valve-opening operation is so designed that its breakage



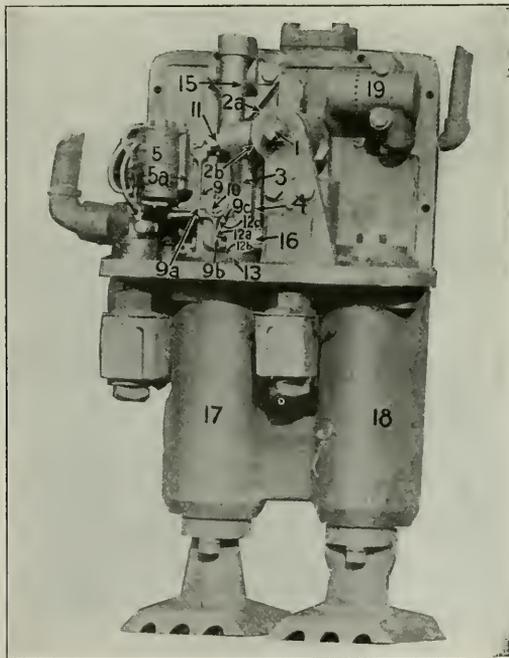
Automatic Stop Apparatus on Locomotive 955

N. J., and Fairview. This is on the Northern Railroad division, about 10 miles from New York City.

Under this arrangement with the railroad company, the signal company is installing additional fixtures on both the eastbound and westbound tracks and has equipped locomotives No. 955 and No. 957, which are used on local passenger trains regularly between Nyack, N. Y., and Jersey City, N. J.

Preparatory to equipping the additional locomotives and additional block sections, an exhibition of the operation of the stop was made recently for the benefit of a party of officers of the road; and a summary of these runs is given below.

This apparatus, which was described, with illustrations in the *Railway Age Gazette* (April 13, 1917), after it was tested on the New York, New Haven & Hartford, is of the intermittent contact type, the ramp, 34 ft. long, being fixed 17 in. outside the running rail. The shoe on the locomotive, supported on the frame behind the driving wheels (or on the trailing truck if there be one) is lifted, and causes the opening of the air brake train line, at every ramp, but if the block section to be entered is clear and its track relay closed, an electric circuit, controlled by this relay, and extending through the ramp and the shoe, actuates an electro-magnet on the locomotive which immediately closes the air valve, before the triple valves have been affected; and the only effect of



Webb Automatic Brake-Setting Machine

or removal would exhaust the train line air to the atmosphere. The armored hose has been superseded by a stationary piston, 15, for connecting the train line air with the plunger head, plunger and shoe. The magnet bracket 5a, is now made an integral part of plunger head 3. The path-clearing plunger 18 has now been made an integral part of the box design. The manual reclosing operation is now accomplished through cylinder 19 and its piston, instead of the slide formerly used.

As the train-carried fixture passes over the ramp, the

operating plunger is lifted vertically and projection *4* engages cam projection *2-1* oscillating the main cam, *2*, with its shaft, *1*; opening the air valve by means of the valve cam which is also fixed on shaft *1*, so that the train line is vented to the atmosphere. If the track relay is in the stop position no further action takes place; and as the plunger resumes its normal position, after passing the ramp, the air valve remains open and the train is brought to a stop in the usual manner.

If, however, the indication is clear, the electric current controlled by the track relay energizes magnet *5* and causes the bolt lever, *9*, to project the bolt, *11*, so that in the downward movement of the plunger the bolt restores the main cam and air valve to their normal positions and no braking action takes place. Both the opening and closing of the air valve are direct mechanical operations.

In this installation on the Erie Railroad, there is no distant signal or line relay. The circuit to the ramp, which is located approximately 1,600 ft. in the rear of the signal, is controlled by the track relay and a circuit breaker operated by the signal itself.

Details of Tests

The tests referred to were nine in number, eight as scheduled and the ninth to take the place of the fourth, as explained below. They were made with locomotive No. 955



Local Passenger Train, Erie Railroad

and eight steel coaches, some of the runs being made, however, with a five-car train.

Test No. 1—Semaphore at stop; ramp passed at full speed as if the engineman were dead. Speed at ramp 40 miles an hour; train stopped, against steam, 1,113 ft. after passing ramp and 493 ft. short of the semaphore.

Test No. 2—Semaphore at stop; ramp passed at full speed. Brakes automatically applied, but before the train came to a stop the engineman, with the optional release, re-closed the air valve, this to save time and to avoid unnecessary stopping and starting, as would be the case with a long freight train. The engineman closed the valve about 800 ft

from the ramp and coasted to the semaphore, where he stopped by using his brake valve.

Test No. 3—Eight-car trains; speed at ramp 37 miles an hour; train stopped automatically 419 ft. short of the signal.

Test No. 4—Semaphore at stop; ramp passed at full speed. As soon as the audible indication in the cab showed that brakes were being applied, the engineman made an emergency application with the engineer's valve.

Speed of train at ramp 40 miles an hour; train stopped automatically 974 ft. from the ramp and 632 ft. short of the semaphore. In this test both of the contact shoes were broken off when they came in contact with the ramp rail, evidently because of imperfections in the castings and their worn condition due to previous use. On account of the shoes breaking before they had reached a point on the ramp rail sufficiently high to raise the operating plunger, no audible signal was given in the cab. The train, however, came to rest automatically, as stated above, the breaking of the casting serving to exhaust the air from the train line. New shoes were put on and the tests continued. During the preparation of the program for the tests, the advisability of interposing an obstruction that would break the contact shoes was freely discussed, but it was finally decided to omit such a test, because of the possibility that the obstruction might result in damage other than the breaking of contact shoes. Therefore, this breaking of the shoes under normal service conditions provided a specially interesting demonstration.

Test No. 5—This was simply to demonstrate the audible "proceed" indication.

Test No. 6—In this the semaphore was left at proceed, but the roadside battery was disconnected; speed at ramp 45 miles an hour; train stopped automatically 448 ft. short of semaphore.

Test No. 7—Semaphore set in proceed position; magnet wire disconnected from binding post on plunger-head of engine apparatus. Speed of train at ramp 45 miles an hour; train stopped automatically 431 ft. short of semaphore.

Test No. 8—Semaphore held in the proceed position by mechanical means, and track relays de-energized. This was to illustrate the case of a false clear visual signal.

Test No. 9—Repetition of test No. 4 as originally planned.

All of the tests were satisfactory. Both the railroad and the manufacturers had special inspectors on the train, and on the ground to make detailed written notes of each test.



Photo. by Ke. St. n.

A Railway Scene in Ireland

Essentials of Progressive Motive Power Policy*

Recent Improvements in Locomotives Afford Opportunities for Reducing Transportation Costs

By G. M. Basford

LOOK BACK a bit. Only a short time ago—only a lifetime—people were 20 days on the road from New York to Buffalo if lucky, if wheels lasted and oxen or horses did not break legs and if food held out. It is different today, when a few hours of luxurious comfort brings us over these few miles with speed and security.

But I am going to say that we do not use our transportation blessings as well as those pioneers used theirs. We have the wonderful steam locomotive. It was here when those pioneers really began to build our great West. But now we have a new steam locomotive. It has been made new in our time, but we are not taking advantage of it. From an efficiency and economy standpoint the new one is as far ahead of that of 1835 as the one of that date was ahead of oxen and horses. If this appears to you to be an exaggeration you must lose no time to learn what has happened in our generation.

Those pioneers had "engine failures" with their Prairie Schooners; they were family tragedies. We have them now. We should not. The Prairie Schooner was not "bought on price." Quality and performance was the thing. When you place performance ahead of price you may have locomotives that will save the railroads.

How often important contributions to the solution of problems, if not the actual solutions, lie so near us that they are overlooked. How often we seek a panacea when what we need is something we already have but do not appreciate! Of this there is no better example than that of the steam locomotive of this wonderful, resourceful country. One of our most vital needs today is the application of good American common sense in allowing the locomotive to play the part it is completely ready to play in the reduction of the cost of transportation, providing we establish suitable locomotive policies.

With respect to the locomotive "policy" means a charted course using all established and safe aids to bring the craft to its logical destination. That destination is "the most tons moved for the least money." After "policy" there must be a plan based upon the fundamental principles of the policy and then a program to execute the plan.

Engineering Improvements Should Be Utilized to Cut Costs

No matter what else we do ours will be a sorry sort of railroading if we fail to find in the treasurer's office the results of the efforts of those who have spent the past 20 years in showing how to increase locomotive power per pound of metal and per pound of coal and who have proven their ability to do it. I say 20 years but it is more than 30 years since this work began. Some of the men who inaugurated this development builded better than they knew. I am thinking particularly of David L. Barnes, George S. Strong, M. N. Forney and H. F. Shaw.

They have many able successors who have worked with factors unknown or undeveloped in the days of engineers who lived a generation ahead of the rest of us and two generations ahead of their own contemporaries. These successors have produced big powerful locomotives, both freight and passenger, that surpass the highest flights of imagination of the men mentioned. For example, a passenger locomotive

that will produce at the rate of a cylinder horse power per hour from 16.5 lb. of water and 2.20 lb. of coal and that weighs 121 lb. per cylinder horse power. This was done ten years ago. Lots of engines have been built since that time that cannot do as well. Another example is a magnificent big freight engine with 90,000 lb. tractive effort that will produce one cylinder horse power from 15.4 lb. of water and 2.00 lb. of coal and that weighs 90 lb. per cylinder horse power. This has been done. Do those to whom they mean most know these facts? Do they make full use of them? These are isolated cases showing possibilities, but, current practice is far behind them. Every new engine on every railroad ought to be designed and built to equal and surpass the records just referred to.

It is most important to all of us to know the reason why the locomotive on most of our railroads falls so far short of what it may be, should be and must be if American railroads are to "make good" in the present emergency.

Locomotive Improvements Have Far Reaching Effects

Right now railroad officials are striving to increase efficiency and reduce cost as they never did before. Results in car loading and train loading have been great. But no matter what else is done to increase efficiency and reduce cost, bear in mind that improvement of the locomotive augments the effect of every other improvement that can be made. Everything done to make an engine pull more tons per ton of its own weight and per pound of fuel burned helps everything else you do to improve the efficiency of transportation. These facts are not as prominent in the minds of operating officials and of executives as they should be. Why? The locomotive today at its best is not understood by those officials as it should be. Why? Locomotives in everyday service may be made to produce at the rate of less than three pounds of coal per indicated horsepower. Why are so few of them doing this? Can they be made to do it? By co-operation, yes!

Motive power matters must be presented, discussed and decided on a new and appropriate basis. A man of wide experience has said "Whatever the locomotive can do, the railroad can do." As the business of the road is moving trains, that business will be most successful when the mover of trains, the locomotive, is what it should be, is designed, built, operated and maintained to the best advantage.

One of our difficulties is that we are so close to the locomotive as to tend to regard it as we always have regarded it—as a machine that we know all about. We did know all about it as it was in our boyhood but unless we have kept step with the improvements of recent years in locomotive matters we are far behind the times.

We are slow in taking advantage of money making improvements. Forney used to say "The human mind resents the intrusion of a new idea." This is true. The slow progress of locomotive improvements in this country proves that he was right. Europe and Canada led us in the introduction of the greatest improvement that the locomotive ever enjoyed. Europe has 14,000 applications of another improvement that is only just starting in this country, and what country needs these things more than we do?

We need to bring our locomotive problem to the front. We need to elevate it to its proper place in railroading. We need

* A paper presented before the Central Railway Club, January 12, 1922.

to give it the attention it deserves. We need to discuss it and decide the questions it presents by and with men who know and who should and must be heard. Let me ask a few simple but important policy questions that call for answer on every railroad, that are being answered in part by some roads but not as a whole by any road.

Pertinent Questions Concerning Motive Power Policy

What is your policy with respect to locomotive improvements, those factors that collectively give you, according to speeds, from 30 to 80 per cent more power per pound of fuel than you can get from a plain engine? What are you doing about these things when you order new engines and what are you doing about applying them to old ones?

What is your policy with respect to locomotives that for the next 20 or 30 years will be in these services: heavy freight, fast freight, way freight, fast passenger, slower passenger, branch line passenger and freight, yard switching, transfer?

What is your policy and plan with respect to the design of new engines for these widely varying duties? Who decides their earning ability for their working life of 20 or 30 years?

What is your policy with respect to assignment of locomotive power to meet varying conditions of traffic, seasonal or emergency conditions? If this is not done by those who ought to know most about power matters there must be a reason for it.

How do you know just how many new engines to order and what type and capacity to order? Is there a plan for this that looks ahead to that which is coming and is framed on experience of the past?

How do you know that the latest new engines are making good? Do you test them and keep records to show whether your locomotive engineering policy is correct and whether you are making the money from your new engines that you ought to make?

What is your attitude toward locomotive improvements as to application to older engines? Are the applications scheduled after careful, complete surveys of the power and are the improvements applied by program, systematically? Then do you organize to educate the men in the best use of the modernized engines to get the utmost returns for the investment? When you apply a locomotive improvement that is good for 25 per cent greater economy are you sure that you get that economy?

What is your policy with respect to scrapping old power and also obsolete shop machinery? Is it done systematically to take advantage of improvements as Andrew Carnegie did? Did it pay Carnegie to do it?

Do you have and follow an engineering or business policy with respect to your locomotives as a manufacturer does with respect to his investment in his expensive machinery?

How do you know that the enormous investment in locomotives themselves and in the facilities for repairing them are employed to the best advantage? Do you, as one railroad official does, hire a man, a specialist, to organize the use of every locomotive item on which he spends \$100,000 a year or more?

Do you know that the mileage engines are making is what it should be and may be? Are you hampering operations by the old time idea that each division is a separate railroad? A passenger engine recently made a run of 1,000 continuous miles without uncoupling from the train. Regular continuous runs of 400 to 600 miles are being made. Are your engines making above the average of 60 miles per day? Herein lies a gold mine.

Are you sure that shops, shop equipment locomotive terminals and terminal equipment are adequate to get the power back into service promptly and keep it in service continuously until time for the next shipping.

Do you know whether the internal friction of the 2-10-2 type locomotive is greater than the formulae of the locomotive designers indicate?

Do you know that new locomotives can be built with improvements in design that will permit of safely deferring increases in weight of rail and strength of bridges for years to come?

Are you aware of the fact that the biggest, most powerful passenger engines in the country can be replaced by others that will stress the track and bridges less than the present engines and yet give enough increase in pulling power to reduce double heading and that improved engines will start and pull heavier trains than have ever been put behind any engine yet constructed? I refer to usual main line traffic.

What policy are you following with respect to signaling in relation to locomotive improvements that permit of more rapid acceleration in starting out of sidings, out of yards and across-crossovers? The entire question of block signaling, siding locations and location of water and coal stations is opened up anew by the ability to accelerate trains faster and to make longer runs for coal and water. Our railroads were built for the saturated steam locomotive without the vitalizing factors of today. Is your road coming up to date in its use of these epoch making operating factors? If you consider these as mechanical matters and if you regard signaling as a safety measure alone you are missing something. Operating officers—ask signal engineers and mechanical officials to help you operate the road. They are in position to help as they never have been before.

Do you establish a definite plan covering the next three or five years with respect to your locomotive program? Do you keep in mind the fact that new locomotives will last 25 or 30 years and that your record of intelligent grasp of railroading is to be read by others after you are gone?

In the matter of water stops—have you thought of the effect on operating cost of the capacity of tender tanks on freight engines? Do you realize that applying new design tender tanks carrying 15,000 gallons of water would beyond question save more money in direct operating results on some railroads than anything of equal cost that you can do to a freight engine on congested track today with the possible exception of the application of a booster?

Of all these questions the most important today in long range results are the ones that involve the locomotive in its relation to track and bridges and the locomotive in its relation to the use of fuel, but all of these items are important. They are not referred to critically but constructively. There is a way to answer all of them. Some of them already have been answered on some roads. There are men who know the answers. The thing to do is to make it easier for these men to be heard.

Improved Locomotives Demand

Changes in Operating Methods

Our railroads were built for the locomotive of the past. They were and are operated in accordance with the locomotive of the past. But the locomotive has changed faster than the methods of using it. A new, refined, efficient power plant is available to take the place of the one that was merely big and heavy. Those who operate our railroads must learn what has happened. For their own sake, the sake of the properties and of the people they serve they must take advantage of the locomotive as it may be, not as it is, to solve the greatest problem they ever faced.

Mechanical men must prepare the case of the improved locomotive and that of the refined locomotive that is ready but has not yet been built. They must be ready to recommend improvements on the new basis—that of their effect on operation and operating costs. They must be ready to present the possibilities of the new locomotive in helping solve track and operating problems. This is merely a matter of preparing for presentation facts that they know thoroughly, but have not been encouraged to present. Mechanical men—perhaps a change in status of the locomotive is coming. Be

prepared. Your part in it is vital. Your preparation for it will hasten the change.

Then a way to insure not only the presentation but consideration, discussion and decision of the power problem must be found. The locomotive must be viewed from a new angle. We have been deficient in our conception of it, and of its proper place in operation of the road and in the transportation of the country. Some of us have considered it from the standpoint of a mere pulling unit, not thinking deeply as to anything but drawbar pull. Some regard it merely as a machine that they must take care of and have ready for call. Others have considered it from the standpoint of a power plant very much like any other power plant, as a unit by itself, built and therefore fixed as to improvements. To others the first expense involved seems to be most important. Some look at the expense of maintenance, and these are prone to regard the bookkeeping of the locomotive as satisfactory without a real bookkeeping balance that shows maintenance in terms of the tons the engine hauls. Its effect on track and bridges is the vital matter in the minds of others.

Many Cost Factors Affect Locomotive Policies

We must get people together to talk these things over and show that not one of these opinions taken alone is correct. When engines were small, rates high and wages low these various points of view were natural and were not dangerous, they are nothing less than dangerous now. We must wake up to the great necessity of a locomotive policy that will bring all views into line to permit the use of the best possible transportation machines, because the locomotive pulls everything that goes over the railroad. It must be designed, operated and maintained in accordance with broader business, engineering principles in view of the requirements and the known possibilities of achievement.

Coal formerly cost 90 cents and now costs \$4.00. Rails formerly cost \$21.00 per ton and recently \$47.00 was the price. An engine "simple as a grindstone" is a mighty expensive article to operate today but thousands of them are running that may and should be made efficient by improvements that everybody knows about and everybody accepts as satisfactory. Why don't we use these to the limit?

These improvements have revolutionized the locomotive art. They will revolutionize locomotive operation. Let us hasten the day when the locomotive is considered as a real part of the great transportation machine. It is a big part of the transportation machine. Above all other things every part of a machine must fit each other part. Otherwise a machine is impossible. The locomotive must fit track, tunnels, terminals and other factors, the least change in which means prohibitive cost where bigness and weight and the increased power that go therewith must give place to improvements and refinement that render greater weights unnecessary. It is time to disregard first cost and think of ultimate cost, to forget the limitations of the past and to build anew for the future. It is time to build every new engine on a new plan—to build it for high power with efficiency. Nothing that is known to be worth while and that increases real efficiency should be omitted from a new engine.

An improvement costing \$10,000 to buy and even as much as that to maintain each year is a good investment if it nets a saving of \$50,000.00 a year. You know what it costs. You do not know what it saves. It is good policy to double the first cost and the cost of maintenance if thereby locomotives will haul enough more tons or make enough more miles to show figures on the right side. This is one way to cut out red figures. How really absurd it is to live as we do in "comparative" figures instead of in constructive figures.

How Shall Recent Improvements Be Utilized?

In its 50,000th locomotive the American Locomotive Company in 1911, over ten years ago, set a pace for Pacific type

passenger engines. That engine has proved the success of careful design, use of improvements then available and incidentally of cast steel cylinders and light parts that saved nearly nine tons of weight. But this engine, today among the very best of its class, can be given 25 per cent more power in starting and at high speeds without excessive weight addition.

In its class IIs the Pennsylvania Railroad set a pace for heavy freight engines. Those railroads which have applied capacity increasing factors to their older engines have set a swift pace toward reducing the cost of pulling trains.

How shall the improvements that rendered these two efficient designs possible and also vitalized so many older engines be used to bring the locomotive to "its own" in the possibilities of the future?

To answer—Put the officials who know most about these matters, those who are closest to their progress, those who know most about the difference between the best locomotives of today and those of only a few years ago, put them in position to be heard. Let them understand that they will be heard and tell them to prepare their case accordingly. Today they are on the defensive. Change their status. Let the operating officers who depend upon the roadway and the power, present their problems that relate to both of these factors and then the great operating factors—power, signaling and operation—may be considered as a whole. Nothing new is needed, but a new way of tying these together is imperative.

Power matters are not the only ones that call for new methods. Operating, purchasing, mechanical, accounting, legal, traffic, track and personnel questions, all would benefit by a new deal in organization. If each of these broad divisions of policy on a large road were presided over by a vice president, if these vice presidents or on a small road the equivalent worked regularly and consistently together as a cabinet of highly trained specialists, if every important matter affecting operation were discussed by all these men—leaving to a senior vice president final decision, the thing now lacking would be supplied. The cabinet form of working together is the essential thing.

For example—one official is convinced that heavier rail sections are needed, or that certain bridges need reinforcement. He is probably of the opinion that locomotives will become heavier and heavier and that he must keep pace with the increase in weight. The officer in charge of power will show that for the immediate future increase in locomotive weight is not necessary, in fact, is wrong, and that he can build new engines more powerful but lighter and less destructive to the track than present ones. Operating men want more drawbar pull. To appreciate the possibilities of more power without excessive weight they should take part in discussions that reveal these possibilities. Some officers believe that with a certain amount of money to spend, the largest possible number of new engines should be bought. They may be shown that a smaller number of more efficient engines is the better and financially safer plan. Some officers find it difficult to see the necessity for investing liberally in shop tools, labor saving cranes and hoists, in ash pits and coal handling equipment. They would be quick to see the need and would give their support if they were shown how these factors affect operation. No officer considers first cost when "safety" is at stake. No officer would consider first cost as the real cost if he was a member of the cabinet, whose deliberations formed the basis for the broad policies for the future.

Factors That Will Improve the

Economy of Locomotives

To be specific here are some of the factors that will come into the plan that a policy will compel:

Improved cylinder operation, higher superheat and improvements in cut off such as cut off control. Ask the officials

of the Big Four about their cut off control as a factor in operation and in saving. Are we to wait years before getting the benefit of what they have done? Why not get it now when we need it most?

Increased boiler efficiency through feed water heating using waste heat and by improvements that compel greater boiler power through improved boiler circulation.

Increased starting power by means of the booster applied to trailing wheels.

Increased starting power and higher power at speeds by means of increased weights on drivers made possible by reduced dynamic augment. Alloy steel parts and refined design render this improvement available.

Improved conditions of combustion by application of the latest developments of the locomotive firebox as a furnace. This means improved fireboxes, more extended use of firebrick arches and mechanical stokers.

Weight per cylinder horsepower may be materially reduced by locomotive designers who are given the order to do their best in this direction. Up to this time they have never had a chance to show what they can do. They have much to offer.

The time has come for these refinements and for many others that are very important but which are not specifically mentioned for lack of space. The time has come for the "free hand" to bring prevailing locomotive practice up to the economically high plane that a few isolated cases have shown to be easily attained.

Savings Will Justify Increased First Cost

The able engineers of the electrical companies long ago learned that the electric locomotive required facilities for its operation and its maintenance that however needed had never been given to the steam locomotive. They spoke. Operating officers and executives listened. They listened because electrification was new, interesting and mysterious. Furthermore, the necessary words had power behind them to compel attention. When trains were stopped by fuses blowing, the fuses being located in a signal tower with no night attendant, the president of the electric company called the president of the railroad on the phone next morning and the thing was fixed. Does the steam locomotive have such attention?

At present the electrical people are making good use of the prevailing oversight of the possibilities of steam. Is this to continue? Is the country to pay the price of this oversight? Are the electrical propagandists to be allowed to get away with even misrepresentations of the efficiency of the steam locomotive?

Consider the high regard in which marine men and manufacturers hold their power plants. They know their dependence upon the power that drives their business. They understand that the power plant that is driving all the time or most of the time must be of the highest type and the most economical, that it is a big investment and must be used accordingly, that ultimate cost, not first cost, is the real cost.

Recent years have brought to the steam locomotive improvements that are comparable with those in marine and stationary development. Marine and manufacturing operations have been rebuilt because of power plant and power distribution improvements. New operating methods must come as a result of the locomotive improvements we are talking about.

It remains to do on railroads the thing manufacturers have done—to build better locomotives, improve old ones and to operate them according to the new conditions these improvements themselves have created. In short, to save fuel and lots of money.

Our locomotive builders are the best in the world. They are building and will build what you want. Why not wake up to what you need and get it? Not only our builders but the engineers that have developed locomotive improvements that are so important have engineers at home and abroad preparing the best, the latest, and more than that, the practical

plans needed for the future. One of the builders sent its highest engineering authority to Europe where he spent more than a year in the study of locomotive design and operation under high priced fuel conditions. Then he designed No. 50000, which ten years ago was a milestone in locomotive progress and for ten years has been a leader in locomotive practice in several ways. But nobody wanted it. That cornerstone has been allowed to be obscured by bushes. Other cornerstones have been laid. Are they to go the same way?

Let it no longer be said with truth that there is not a single steam locomotive today on the rails of our country that embodies and represents the best, and all the best locomotive improvements that are available and that have proved their ability to reduce the cost of American railroad operation, of which we are so proud.

Its expense is the most prominent feature of the locomotive. The cost of everything about it is the thing that counts. This is the reason why it is impossible today to build the most economical engine. Of course it costs more to build and to maintain an economical machine than a crude or wasteful one. But cost is only one side of the question. The performance is the real side. Ton miles per locomotive dollar is wanted and no one is getting that figure. "What does it cost?" is the question asked. Change this question. Ask—"What will it do?"

If I were a railroad man I would put on my engines every single improvement I could find that would net a clear 25 per cent on the investment, and there are lots of them that I believe will double that return. Then I would make sure that all concerned understood the construction, maintenance and operation of the locomotive under the new conditions. Next I would see that the improved locomotive was loaded up to and operated to the limit of its economy and saving capacity. Remember that locomotive improvements give the best returns the harder they are worked. I would ask the operating officer how fast he wanted to go and then tell him how much load to give the engine. It would be all the engine could handle in order to pile up ton miles per ton of coal.

Supervision Needed to Get Results

This improved locomotive is different from the old "plain" ones. It will do more work or it will save fuel. To get these results requires more care, better handling by engineers, better supervision and better operation. A few active young men could accomplish all this on any railroad and make every trip an engine runs a fuel test.

Talking "costs" without considering performance is a monumental mistake. It is my opinion that if the performance, in capacity and economy, of locomotive improvements were known, if individual locomotive fuel records were kept in parallel with ton-mile records, also for individual engines, the entire railroad organization would see a great light. "Acres of diamonds" lie at your feet.

Latent, potent, completely developed and successful but too little understood possibilities for the solution of one of our great problems lie at our very feet. To solve the problem of more tons moved for less money a policy is called for. Then there is no escape from the necessity for a plan followed by a program for its execution.

OBSERVERS at BUFFALO predict a heavy eastward freight movement this month, believing that an enormous amount of freight was held back until after the end of the year to avoid payment of the federal tax. Certain shops of the Erie resume work this week.

SWEDISH RAILWAYS are using peat briquettes as fuel for locomotives. The Railway Board has acquired plant at Hlathagen bog, near Vislanda with a capacity of 30,000 tons per annum, and a new method for treating peat on a large scale has been adopted. The Times (London) Trade Supplement

Chicago & Eastern Illinois Ends Receivership

Reorganized Property Left Hands of the Court on December 31,
with W. J. Jackson as President

DECEMBER 31, 1921, witnessed the end of an 8½-year receivership for the Chicago & Eastern Illinois, thus marking the close of the interesting chapter in the history which began 20 years ago when it was brought under the domination of the St. Louis & San Francisco. The Frisco regime was one of expansion. An entrance into St. Louis was obtained through construction and lease, the Evansville, Indianapolis & Terre Haute was purchased, the 62-mile Villa Grove-Woodland cut-off was constructed and plans were laid for a line from the southern Illinois coal fields into Peoria. The receivership period, which began in May, 1913, was one of contraction and concentration. Weak, unprofitable lines were lopped off and the good ones strengthened. Eight years ago the C. & E. I. had a secondary line, paralleling its main line for the 239 miles from Mokense, Ill., to Evansville, Ind. Today the property is no longer encumbered by this superfluous route. The lower leg of this, the Evansville, Indianapolis & Terre Haute, was disposed of finally by sale to the Cleveland, Cincinnati, Chicago & St. Louis during the past year. The northern portion, the Chicago & Indiana Coal Railway, extending from Mokense, Ill., to Brazil, Ind., with a branch to La Crosse, Ind., was eliminated by omitting it from the parcels of property purchased by the new Chicago & Eastern Illinois Railway Company at the foreclosure sale on April 5, 1921, and application has been made to the Interstate Commerce Commission for the abandonment of this line.

As now constituted the Chicago & Eastern Illinois consists of about 960 miles of line, comprising a main stem from Chicago to Evansville, Ind., a line to St. Louis branching from the Evansville line at Woodland, Ill., and a line into southern Illinois leaving the St. Louis line at Findlay, Ill. Branch lines and connections make up about 260 miles in addition. Approximately 50 per cent of the traffic handled by this road is coal from the southern Illinois and southern and western Indiana coal fields. The lines also handle a heavy through passenger business between Chicago and Evansville and between St. Louis and Chicago.

The elimination of unprofitable lines is by no means the only advantage accruing through the reorganization which was completed at the end of the past year. Although the capital liabilities have been reduced only from \$94,204,448 to \$91,033,750, there has been a marked reduction in the fixed charges—from \$3,759,996 to \$2,327,051. The securities now outstanding consist of fully 51 per cent of stock,

whereas under the old status only 21 per cent was in stock. The property is also in a much better physical condition as a consequence of a conservative yet consistent improvement of the revenue producing lines. Approximately \$7,000,000 was expended in additions and betterments during the course of the receivership. A large mileage of 90 lb. and 100 lb. rail has been laid, passing tracks have been extended and minor additions have been made to yards. Considerable additions and improvements have been made to shop and engine terminal facilities, principally at Danville, Ill., and at

Salem, and a new outbound freight house and a general office building were built at Chicago. Extensions to double track have been of rather small mileage but one of those in the vicinity of Okaw creek involved the building of a \$275,000 concrete arch bridge and closed the gap in double track between Chicago and Findlay, the junction of the St. Louis and the southern Illinois lines. A program of bridge strengthening was also carried out, permitting the operation of new Santa Fe and heavy Mikado locomotives. Train operation has been expedited by an increase in automatic block signals and an installation of automatic train control from yard center (Chicago) to Danville.

The credit for the progress which this property has made during the past 8½ years must be placed primarily with William J. Jackson, who was elected president of the new corporation on December 31, 1921, for he has been executive head of the

road ever since the receivership—as receiver and president of the corporation, except for the period from April 27, 1918, to March 1, 1920, when he served as federal manager. Not only has he evinced prudence in directing expenditures for improvements with the modest funds at his disposal but, possessed of an aggressive personality, he has developed the railway's coal traffic to its financial advantage and has placed the Chicago-St. Louis passenger business on a thoroughly established basis in spite of strong competition.

One element which has accrued to Mr. Jackson's advantage in obtaining favorable results on the C. & E. I. has been an aptitude in handling men. His thoroughly democratic character and manner combined with a prestige that comes to him through a 30-years' service with this property has served to make him very popular with his men. A hard worker himself, he requires good service from those working for him, but he does it with a consideration that inspires loyalty. His intimate knowledge of labor matters was recognized outside railway circles in his appointment by former



W. J. Jackson

Governor Deneen as a member of the Employers' Liability Commission of the State of Illinois.

William John Jackson, was born at Toronto, Ont., on December 28, 1859, the son of a hardware merchant. His education was limited to that obtained in the grammar and normal schools of Toronto and he entered railway service in 1877 as a machinist's helper in the Grand Trunk shops at that place. After a few months he was transferred to the freight department and for three years was a freight clerk at Toronto and for the following three years, chief claim clerk of the Chicago & Grand Trunk at Chicago. From August, 1885, to November, 1890, he was general freight foreman and from November, 1890, to August, 1891, he was assistant agent for the same road at Chicago. The beginning of his career with the Chicago & Eastern Illinois came in August, 1891, when he entered the service at Chicago as assistant local freight agent. He was promoted to agent in January, 1893, and to assistant general superintendent in 1899. On February 1, 1903, he was promoted to general superintendent, a position he occupied until November 15, 1906, when he was advanced to general manager. On December 3, 1909, at the time of the separation of the Rock Island and the Frisco systems he was made vice-president and general manager of the C. & E. I. and of Evansville & Terre Haute, which was later absorbed by the C. & E. I. In this position he was the active head of the properties for a little more than three years prior to the receivership.

Outside of the work for his own company, Mr. Jackson is well known among railway men through his work as chairman and member of the Special Committee on Relations of Railway Operation to Legislation, former chairman and member of the General Managers' Association of Chicago, and former chairman of the Association of Western Railways.

Free Life Insurance on D. & H.

L. LORRE, president of the Delaware & Hudson Company, in a circular to employees dated January 1, announces a contract between the D. & H. and the Metropolitan Life Insurance Company, of New York, under which all employees who have been in the service of the road two years or more and who make application on prescribed forms, may have free life insurance to the extent of \$500; and may take, at very low rates, additional insurance, up to an amount equal to their respective annual salaries (but not over \$5,000).

The Delaware & Hudson operates 900 miles of railroad and employs about 15,000 men. The circular offering this very substantial bonus is given below practically in full:

President Loree's Announcement

1. The Delaware & Hudson Company has entered into a contract with the Metropolitan Life Insurance Company by which it has insured the lives of all employees who have been continuously on its payrolls for more than two years, and who are actually and actively in its service on or after the 1st day of January, 1910, and who are earning for each employee having such minimum length of service, irrespective of the nature of his work, his age at the date of his health, and without cost to himself, a policy payable at death in the sum of \$500.

2. In case of total and permanent disability, the sum of \$500 will be paid to the insured employee in monthly installments. In case of death, payments will be made immediately to the beneficiary named by such policy. The contract also permits groups of employees who wish to do so, to take additional insurance, without medical examination and without reference to age, at the exceedingly low rates herein set forth.

3. To all such employees, who have been continuously in its service two years or more, wishing such additional life insurance, or protection against sickness or accident, the Company makes the following offer:

1. If any group of employees take, under this plan, more than \$500 additional life and total disability insurance, for each member, the company will pay the balance of the monthly premiums above the amount stated below, on such additional insurance in excess of \$500. A group, under this plan, must consist, under the life insurance law, of not less than three-fourths of the employees in any class; application therefor must be made before March 31, 1922; no employee can be insured for more than \$5,000, nor for more than the multiple of \$200 nearest his average compensation for the preceding two years. A group may consist of employees of the same class; as, for example, locomotive engineers, station agents, boilermakers, etc.; or, it may consist of those employed at the same place or within the same area.

Under this plan every employee with two years' length of service receive \$500 life and total disability insurance without cost. By co-operation with a sufficient number in his class, and the aid of the company, he can have a total of \$1,000 for 60 cents per month; \$2,000 for \$1.20 per month; \$3,000 for \$1.80 per month; \$4,000 for \$2.40 per month; or \$5,000 for \$3 per month; subject to the maximum limit above indicated. The cost in excess of these amounts will be paid by the company. Not only is the full amount of each policy payable to the beneficiary in case of death, but it is also payable in case of termination, total disability, whether from accident or sickness. In case of total and permanent disability, the life insurance company undertakes to pay the full amount of the policy in sixty monthly installments beginning within not more than six months.

2. A policy covering loss of work by sickness is provided for, under which the benefits are at the rate of \$15 per week for a period of 26 weeks, beginning with the eighth day of incapacity. The premium on this insurance is \$1.26 per month, or \$15.12 per year, and must be borne entirely by the policyholder. Application must be made, before March 31, by a group, as previously described.

3. A policy covering loss of work by accident, exclusive of injury covered by workmen's compensation laws, is provided under which benefits are at the rate of \$35 a week for a period of 26 weeks, beginning with the eighth day of incapacity. The premium for this insurance is 24 cents a month, or \$2.88 a year, to be paid by employees. Employees under 60 years of age may also obtain accident insurance covering death or dismemberment from any accident cause, including accidents covered by workmen's compensation laws, at the rate of \$4 a month, to be paid by employees. The total of such insurance may not exceed the amount of life insurance carried under the plan; application to be made before March 31, by a group, as previously described.

4. The company will undertake directly to insure employees against unemployment resulting from dismissal for any cause, providing payments of \$15 (employees whose average annual wages during the preceding two years do not exceed \$1,000) will be paid \$30 per week for the same period) per week for six weeks, or for so much of that time as a discharged employee may be unable to find employment, continuing until such employee having subscribed for and contributed toward the cost of at least two of the three forms of insurance provided under the group plan, as above outlined.

This provision for unemployment insurance is prompted by the desire of the company to provide continued employment under conditions as favorable as possible, to promote greater ease in the conditions of employment by freeing the employee from anxiety and to secure and maintain the most highly successful operation of the property, which is obtainable only through interested co-operation.

5. The company proposes to continue its present system of pensions, under which, in its discretion, pensions are granted to employees who have been in service of the company 25 years or more, and who have reached the age of 70, or who, upon reaching the age of 65, are incapacitated for service, and under which a monthly sum to be paid to the pensioned employee is determined equal to one per cent of the average monthly earnings of the employee during his preceding ten years' service multiplied by the number of months of service over the age of 65.

Those employees who have not been in the service of the company the full two years, will be included in this insurance plan, and entitled to all the benefits thereof, as soon as they have completed two years of continuous service.

Employees leaving the service of the company for any reason will be able, upon notice, to the life insurance company within 30 days, to exchange their certificates without medical examination for policies in the same amount, but will thereafter pay the regular rate for the ages at which such new insurance is subject to.

Employees who have been with the company as long as six months, but not for two years, will receive identical life and disability insurance, without expense to them, in the sum of \$250 and may take not more than \$250 additional, in groups, at a monthly cost to them of 18 cents. On attaining two years of service such employees will become entitled to all the benefits of the plan.

The within plan and offer are wholly voluntary on the part of the company, which reserves the right to discontinue or modify the plan and these offers, at any time. In case of the discontinuance of the plan the life insurance company undertakes to issue, to any employee requesting the same, provided individual application therefor is made within 31 days of the date of such discontinuance, a new policy or policies, upon plans applicable to the character of the risk, in equal amount or amounts, without medical examination, but at the ordinary rate for insurance at the age of the applicant.

I. C. C. Members Appear in Capper Bill Hearings

Explain Action in Ex Parte 74 and Urge That Rate-Making Law Be Given a Fair Trial

WASHINGTON, D. C.

THE SENATE COMMITTEE on Interstate Commerce on January 5 brought to an end the hearings which have been going on intermittently since October 24 on the Capper and other bills to amend the rate-making provisions of the transportation act. The final witnesses were three members of the Interstate Commerce Commission, who appeared at the request of the committee and expressed the opinion of the commission that it would be a serious mistake to amend the law as proposed. The committee will now proceed to a final determination as to whether a bill shall be reported, but it is understood that it proposes to wait for a time before taking definite action, for a decision of the United States Supreme Court in one of the cases involving orders of the federal commission requiring advances in intrastate rates, so that it seems very unlikely that there will be any legislation by Congress before the 5½ per cent provision of Section 15-a expires on March 1.

Commissioners Hall, Esch and Campbell Appear

H. C. Hall, who has been reappointed as a member of the commission, although the appointment has not yet been confirmed by the Senate, outlined in detail just what the commission did in advancing rates in Ex Parte 74 and in the subsequent proceedings involving intrastate rates, to show the committee that there was no foundation for many of the statements that had been made before it by witnesses representing the state commissions and western shippers of agricultural products who were advocating amendments to the act. He was followed by Commissioners Esch and Campbell, who made brief statements urging that the rate-making provisions of the law be given a fair trial.

How the \$18,900,000,000 Valuation Was Reached

Mr. Hall gave some hitherto unexplained details of the method by which the commission arrived at a tentative valuation of \$18,900,000,000 for the railroads. He denied the assertion frequently made that the property investment accounts of the railroads were taken as a basis and said that the equivalent of the work of one person for four years was required in its bureaus of valuation and statistics in assembling the figures in the possession of the commission from which the figure was finally arrived at. Before the hearing on the rate advance began, Mr. Hall said, Commissioner Aitchison was designated to take charge of the compilation of the data to be used in fixing the value.

Mr. Hall read from a statement prepared by Mr. Aitchison outlining the methods used in preparing the voluminous tables and schedules which were placed before the commission for its decision. This work represented 572 days of service of employees in the Bureau of Valuation and 494 days service of clerks in the Bureau of Statistics. The commission, he said, felt called upon to use to the fullest extent the results of the investigation made under the valuation act since 1913 in so far as it was deemed available. This was largely in the form of working papers and all results produced by the years of work by the bureau were utilized both as to particular roads and as to general principles. The facts taken into consideration were the original cost, the cost of reproduction, depreciation, amount of investment, corporate history of the property, the value of lands, and other values or elements of value. The commission also had before it the property investment accounts, which had been under the supervision of the commission since 1907, although it had not been possible to thoroughly police these accounts during

that time and a thorough study was made of the results of such inspections of the accounts and corrections of errors as had been made in particular investigations by the commission. There was also an investigation of the amount and distribution of additions and betterments that had been made since the date of valuation and of the amounts of working capital, materials and supplies, etc., on hand. The commission also had the earning power of the carriers under different levels of rates and the results during the three-year test period. Consideration was given to all these matters and the resulting sums were capitalized at various percentages.

The value finally determined, Mr. Hall said, happens to be the capitalization of the standard return on which the guaranty for the period of federal control was based, at 5¼ per cent, with due regard for additions and betterments, working capital, etc. "We had all these things before us and our minds finally settled on a figure," he said. "We didn't take \$18,900,000,000 and then distribute it; we worked up to it. We took all the testimony and considered it and our judgment in weighing it represents the composite of many minds." He pointed out that the carriers had claimed as their property investment, \$20,040,000,000.

In reply to a question Mr. Hall said that compilations based on the present market value of stocks and bonds are "not dependable." Testimony on that was offered the commission but no special study on that point was made by it.

Intrastate Rates

Mr. Hall said that the commission would have had to increase rates immediately regardless of the provisions of section 15-a. He denied the statements of advocates of the Capper bill that the commission had ordered state rates raised merely because they were lower than the interstate rates and without proof of specific discrimination. "We in no case," he said, "have regarded disparity alone as establishing either undue prejudice or unjust discrimination. If we had there would have been no occasion to hold any hearings. The disparity was obvious, but we proceeded to investigate each case in the same method that was followed in the Shreveport case. We received detailed evidence to show that the interstate rate was reasonable and in case of some particular rates we reserved our decision because we were not fully convinced that the interstate rate was a reasonable criterion for the intrastate rate. We found that the maintenance of the lower intrastate rate resulted in a manifest and unjust discrimination against interstate commerce and then we had to consider whether the surrounding circumstances and conditions were the same. We found that they were substantially the same. We took the same steps as were taken in the Shreveport case and found not only a difference in rates but unjust discrimination against persons and localities.

"There then remained the question as to how the discrimination should be removed. In the Shreveport case we did not have power to prescribe the intrastate rate. We required the carrier to maintain no higher rates for intrastate traffic than for interstate traffic. But here we followed section 13, paragraph 4, and prescribed the rate to be charged. That gave a short cut to the same result that was effected in the Shreveport case under the old law. The new law is the Shreveport doctrine pure and simple, modified only as to form. The effect was precisely the same."

Mr. Hall also defended the provisions of the Transportation Act which provide for making rates by groups, saying that experience has demonstrated that in large rate cases it

is necessary to consider the carriers in groups because different rates cannot be made for separate lines serving the same communities. "Congress has merely given a legislative sanction," he said, "to what has long been the usage."

Mr. Hall pointed out that only four states, except those that were controlled by state fare laws, had not adopted the increase in passenger fares as prescribed by the Interstate Commerce Commission and only three of the states declined to authorize any increases at all. He denied the repeated statements that had been made that the action of the federal commission had "frozen" the intrastate rate structure in 24 states. At the outside, he said, statements that state rates had been "frozen" could be true only of 13 or 14 states and then only as to particular rates, and the commission's order provided specifically that readjustments could be made in such a way that they did not result in discriminations against interstate commerce, and thousands of such readjustments have been made. He also said he did not recall a case where a state commission has applied to the Interstate Commerce Commission for a modification of the order, except that Kansas asked for a modification as to certain features of the law. Instead they have elected to go to the courts. The commission had received copies of a resolution adopted by the Chamber of Commerce of Aberdeen, S. D., protesting because state rates could not be changed except by order of the Interstate Commerce Commission but, Mr. Hall said, the commission had not made any order whatever as to South Dakota.

He said there is great misunderstanding on that point and in the states where there was no necessity for an order by the Interstate Commerce Commission there is nothing to prevent the state authorities from changing local rates. This question has been so grossly exaggerated, Mr. Hall said, that it is difficult to speak of it with moderation. He also referred to the reductions in hay and grain rates in the west, pointing out that corresponding reductions are being made in the intrastate rates without the necessity of any order by the federal commission. The commission's orders all contain a paragraph pointing out that the orders are without prejudice to any request for a modification in instances where the intrastate rate is not related to the interstate rate and Mr. Hall said that practically there have been no applications for such modification. The commission hopes soon to be able to vacate all of its orders and to put all the states in the same condition as California and other states that "followed suit" when the federal commission raised the interstate rates and thereby retained control of local adjustments.

Majority of Shippers Satisfied With Law

"I believe that the law is functioning," he said, "to the satisfaction of the majority of the shippers of the country and also to the satisfaction of a majority of the state commissions, because most of them have not been interfered with. Some have joined in complaining of our action, but it is largely in the nature of a sympathetic strike for the good of the order."

Senator Cummins referred to the frequent statements that if rates were reduced the net income of the carriers would be increased by reason of increased traffic. Mr. Hall said that is being constantly said and the commission is always open to proof on that point. The commission is now conducting a general rate investigation which will go into that subject. Mr. Hall said that the commission's orders in Ex Parte 74 and the state rate cases are a sufficient answer to all the complaints that have been made before the committee. However, the record in Ex Parte 74 is not before the Supreme Court in the Wisconsin case. In reply to Senator Pomerene, Mr. Hall said that the same questions which have been raised since the rate advance would undoubtedly have been raised if the Transportation Act had contained no new rate making provisions and he agreed with Senator Cummins, who re-

marked that much of the difficulty grew out of necessity for making rate changes in a wholesale way after the war.

Section 15-a Needed to Encourage Investment

Commissioner Esch said he wished merely to remark that Section 15-a was put into the law largely for the purpose of encouraging investment in railroad securities and that he still believes that the section has a function to perform and that its repeal would have an unfortunate effect. Senator Cummins remarked that if it had not been put into the law he believed half of the railroads would now be in the hands of receivers. Senator Pomerene said it is amazing that shippers are so ready to attribute all their ills from any cause to the fact that the law contained a definition of a fair return.

"Based on Public Interest"

Commissioner Campbell said that he was expressing his views as an individual rather than as a member of the commission and he read from notes that he had taken for the purpose of a speech giving his views as to how the law would affect the interests of shippers before he became a member of the commission. "I believe," he said, "that the Transportation Act is the most progressive piece of transportation legislation ever put on the statute books. It recognizes that transportation is a governmental function and that it is the duty of the government to see that proper and adequate transportation is furnished. It is based upon the public interest from beginning to end and it would be the gravest mistake to tamper with it in any way until it has been given a fair trial. The primary object was to stabilize railroad securities and restore the confidence of the investing public in the securities of the railroads. The law enacts into statutory form what the courts have invariably held, that the carriers are entitled to a fair return."

He added that he thought that the time has come when there should be co-ordination of rail and water facilities so that neither form of transportation should be allowed to force the other out of business. This can only be done, he said, by giving to the Interstate Commerce Commission control of water carriers similar to its control of rail carriers. "We are going to wake up some morning," he said, "to find that transportation is clogged and we will need both rail and water facilities."

Mr. Campbell said that he may differ from Congress somewhat in regard to the value of competition because competition and control by the government cannot consistently go hand in hand. It can only mean the survival of the fittest, but all transportation facilities which are serving the public must be allowed to survive and prosper because they are all necessary.

While the Capper bill and the Nicholson bill have been the ones most frequently referred to during the hearings, various modifications of these bills have also been suggested by representatives of the state commissions. Senator Capper has stated on the floor of the Senate that his bill was drafted by Chairman Reed of the Kansas Public Utilities Commission and John E. Benton, solicitor for the National Association of Railway and Utilities Commissioners.

REPORTS OF AUTOISTS running into the sides of trains, breaking down crossing gates and running down crossing flagmen come to one's attention constantly, but one does not often hear of railroad tracks being used for a highway. However, the Southern Pacific reports that at Barnard, Cal., two machines occupied by 8 people turned off the county road at a crossing because of snow and started down the tracks, which had been cleaned by a snow plow. One of the machines stuck in a frog and the other slipped from the ties to one side when the Shasta Limited came along, the engineer stopping the train only two car lengths from the first machine.

"M-V All Weather" Train Control on Raritan River

Induction Apparatus with Limited Speed Control Exhibited Near South Amboy, New Jersey

NEAR PARLIN, N. J., four miles west of South Amboy, on the Raritan River Railroad, on December 15, the M-V All Weather Train Controller Company, of Newark, N. J., gave an exhibition of its automatic train control before four or five hundred spectators, the party having been taken to Parlin in a special train over the Central of New Jersey and the Raritan River. A locomotive and five coaches were used and five tests were carried out satisfactorily.

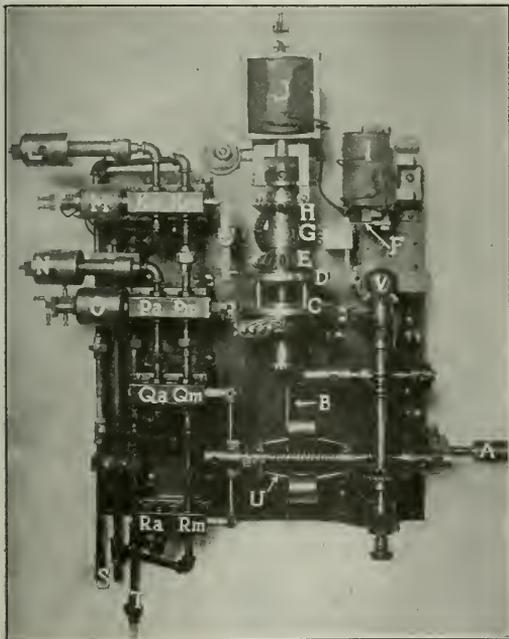
This device is of the induction type with no contact between the locomotive apparatus and the roadway, and no moving parts in the roadway member. The valves control-

stopping, or for slackening speed, the cam, by the influence of a magnet controlled from the roadway, is released, and before causing a brake application is reset at its starting point, to begin a new revolution, preparatory to causing a stop (if a stop shall be required) at the next point.

The air valves, controlling magnets and centrifugal governor (by which latter the speed of the train is made to control the setting of the brakes) are contained in a box fixed on the front of the locomotive and the half-tone illustration is a front view of these parts, the front cover of the box being off.

The collecting coil on the train is hung about 9 in above the level of the top of the rails, being supported on a longitudinal beam beneath the center of the tender. The track magnet is placed midway between the running rails, and the top of the box containing it is flush with the tops of the ties. The arrangement of the magnets of successive sections is shown below.

The scheme contemplates the use of blocks of a length which (including a suitable margin of safety) will correspond to the braking distance for the fastest trains; and the brakes of such trains, for stopping at the entrance of block B C will be applied at A (see diagram). Assuming the presence of a train in section B C, the track relay at B, being open, holds open the wire circuit which energizes the track magnets at sx and at ca. A following train, if moving at more than 30 miles an hour, has its brakes applied at A;



Brake-Setting Apparatus—M-V All-Weather Train Control System



and at sx, if block B C is still occupied, another application of the brakes is made, to bring the train to a stop before it reaches B. The second brake-applying point (sx) is fixed at a sufficient braking distance short of B to stop trains traveling at restricted speed (30 miles an hour). Further details are not made public at this time; but Dr. Charles W. Burrows, consulting engineer of the controller company, has favored us with the description, given below, of the valve-actuating apparatus by means of which the train brakes are set.

The track equipment, taking, for example, block B C, consists of the caution magnet ca, the stop magnet sx, the track circuit relay at B, the track circuit relay at A, and the power line. The roadway circuit which energizes ca and sx (in series) includes these two track magnets, the back contact of the track circuit relay at A, and the front contact of the track circuit relay at B. Each track magnet is virtually the primary of a transformer. This circuit is normally open, due to the fact that the track circuit relay at A is normally closed. When this is opened by the approaching train and that at B is closed (no train in block B C) the track magnets are both energized, preventing the application of brakes.

If a train passing A finds the track magnet at that point (ca) dead, the fact indicates that there is a train in block B C; no magnetic impulse being received from the roadway, the cam causes the application of the brakes until the speed is reduced to the restricted rate (30 miles an hour). If the second magnet (sx) is dead (block B C being still occupied) the valve to cause a full stop is opened. To stop a train the track magnets must be dead; and to allow

ling the setting of the brakes of the train are automatically opened at the approach to each block section, and the brakes are set, unless the valves are held closed, at that point. by what is equivalent to a proceed indication conveyed by induction from the roadway element. This periodical operation of the brake apparatus is accomplished by means of a cam which is revolved, slowly, by gearing actuated through a suitable connection to one of the front truck wheels of the locomotive. The scheme involves the division of the line of road into block sections of equal length, the gearing connecting the truck wheels and the cam or cams being so proportioned that the cam, in its revolution, will have reached its brake-setting position when the locomotive has reached the point on the road where it is desired that the brakes should be applied. If there is no reason for

it to proceed—to prevent the setting of the brakes—must be energized.

The electromagnets on the roadway are of the horseshoe type, consisting of two cores arranged vertically, and a yoke of laminated silicon steel. This yoke is about 30 in. long and of 2 in. x 2 in. section. The vertical members are about 8 in. x 8 in. The magnetizing coils, surrounding the cores, are energized by a 60-cycle alternating current. A magnet consumes, when operating, 30 watts.

The locomotive collecting coil is fixed on a bar of laminated steel fastened under the tender, and it constitutes the secondary of a transformer, the winding of the roadway element being the primary.

In the photographic illustration of the cab mechanism, A is the connection to the wheels of the locomotive and U is the centrifugal governor operating the two sets of valves, Qa-Qm and Ra-Rm. The continuously rotating element is indicated by V at the top of the vertical shaft at the right. The armature of the relay is indicated by F, shown resting against the detent of the lever; and the magnetizing solenoid is indicated by I; this is in series with the coil beneath the tender. The clutch member and the rotating switch are directly behind the miter gear A. The two cams, C and D, are driven, as shown, through a train of gears.

At the top of the picture is shown the cam-resetting magnet J; this is energized from a storage battery, the current of which is controlled by relay I; and when energized pulls up its armature, and with it the miter gear H. This gear rotates continuously whenever the locomotive is in motion, and is free to slide upon its shaft. Normally, H engages the gear G which in turn drives the gear E. This latter is rigidly attached to both cams so that whenever the gears are in the position shown and the locomotive is in motion, the cams are rotated.

When the magnet disengages I from G, the cams cease to revolve and the spring B restores them to normal position. In this position the cam system remains at rest until the re-setting magnet is de-energized and the gear H again engages G.

On the left of the photograph are four pairs of air valves, Ra-Rm; Qa-Qm; Pa-Pm and Ka-Km. Each controls two passages; one, designated by *a* is between the atmosphere and the engineer's valve reservoir (through the pipe T); the other *m*, connects the two sides of a differential air valve (through the two pipes S). The action of this differential air valve is such that the equalization of the pressure in the pipes shuts off communication between the main reservoir and the engineer's brake valve.

The valves Ra-Rm, Qa-Qm are for speed control only and are actuated by the governor U. The valve Ra-Rm is to prevent the maximum allowable speed being exceeded. The centrifugal governor pulls the valve stem to the right, opening pipe T to the atmosphere, making a reduction of pressure in the engineer's brake valve reservoir. Valve Rm connects pipes S, cutting off connection between the main reservoir and the train line. This valve is controlled entirely by the speed of the locomotive.

The valve Ka-Km is controlled by the cam D, as shown. The air passage at the left (Ka) opens into the atmosphere through the reducing valve L, thus connecting the engineer's brake valve reservoir and the atmosphere through the pipe T. The opening at the right (Km) connects the two pipes S and disconnects the main reservoir.

A similarity between the action of the valves Ra-Rm and Ka-Km is obvious. The former is controlled by the rate of the speed and the latter by the distance of travel of the locomotive and each one is independent of the other. While the latter two valves have functions similar to those just described, they differ in this important respect—the application of the air brakes requires the co-operative functioning

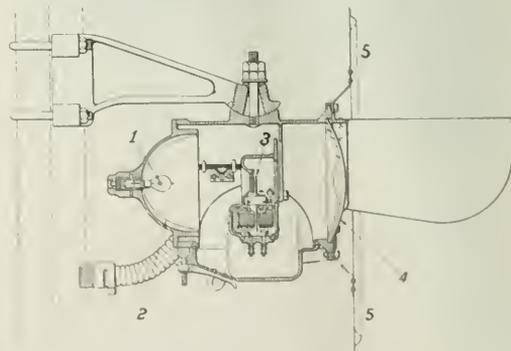
of both valves. Valve Qa-Qm is operated by the centrifugal governor, moving at lower speed than when it operates Ra-Rm. Valve Pa-Pm is operated by the distance of travel of the train but by a shorter distance than is required for Ka-Km. When the centrifugal governor has caused the ports of Qa-Qm to open, connection is made with the corresponding ports of Pa-Pm. If the ports of this valve are closed there is no resultant action on the brake. Valve Pa-Pm through the motion of cam C is open after the train has traversed the prescribed distance. The opening of the passage Pa of this valve connects the atmosphere, through the reducing valve N, to Qa. Consequently, it requires the co-operative action of these two valves to open up a continuous passage between pipe T and the atmosphere. Pm opens a passageway between the pipes S only when Qm is open.

The lower valve is entirely independent of all the other valves and has for its sole function the prevention of excessive speed. The upper valve is entirely independent of all other valves and when operated produces an absolute stop. The co-operating action of the other two valves permits a train to proceed, but at restricted speed.

Valves Pa-Pm and Ka-Km having been opened, there are no mechanical means for restoring them to their normal position. This is accomplished through the energization of the electromagnets M and O. Magnet M restores to its normal position the valve which has brought the train to a stop, but such a full stop will not occur if the engineer has been alert; and the key for closing this circuit is placed where he must descend to the ground to operate it. In the solenoid controlling the other valve, conditions are different; O may be energized from the inside of the cab. In addition, this latter magnet is always operated automatically whenever relay I is energized from the roadway.

The Hall Color-Light Signal

THE RARITAN RIVER RAILROAD, in connection with experiments being conducted with automatic train control, has installed automatic block signaling on a short section of its line, about four miles west of South Amboy, and uses for the visual indication the color-light signal re-



Hall Color-Light Signal

cently brought out by the Hall Switch & Signal Company. This signal, designed to give both day and night indications, consists of a single light, with a reflector, and three indications—red, yellow and green—are given by means of a moveable roundel which is brought into the proper position

for focusing the light on the roundel in accordance with the action of the controlling track relay.

As shown in the illustration, the electric bulb is mounted in the elliptical reflector, 2, the filament being so located as to concentrate the rays of the light on the colored roundel, 3; and these rays diverge again to fill the clear glass lens, 4. The colored roundels, which are one-sixteenth inch thick and one inch in diameter, are fixed in the vane of the operating mechanism. When the actuating relay is energized by current in one direction, the vane swings up and gives the green indication; when energized in the other direction, the vane swings down, showing yellow. In the neutral position (no current flowing) it shows red; and, of course, red would be displayed if the power should fail. The time required for a movement from yellow to green is less than one-sixteenth of a second. The lens, of the Fresnel type, is 10 1/2 inches in diameter.

For long range indications, the lamp is a 10-watt, Argon gas-filled bulb.

The lamp has two filaments looped one within the other, with which arrangement the light will continue to glow notwithstanding the burning out of the main filament.

The lamp has a hood extending in front, as shown, and also a circular disk, indicated by 5, 5, painted black, which serves as a daytime background. A polyphase vane relay movement is employed, but d c relays can be used, the member carrying the roundels being directly connected to a simple iron armature. The armature and its counterweight are the only moving parts.

THIRTY CARLOADS of "cars"—automobiles—were moved recently in a solid train from the plant of the Durant Motor Company, Long Island City, New York, through Canada (over the Canadian Pacific) to the Pacific Coast.

Freight Car Loading

WASHINGTON, D. C.

APPROACH of the holidays resulted in a reduction in freight traffic during the week ended on December 24, according to reports compiled by the Car Service Division of the American Railway Association. These show that 665,927 cars were loaded with revenue freight during that week compared with 727,003 cars the week before, or a decrease of 61,076 cars. This was an increase, however, of 17,521 cars as compared with the corresponding week of 1920 which included Christmas Day but a reduction of 18,857 cars compared with the corresponding week in 1919.

Reductions, compared with the previous week, were reported in the loading of all commodities except coal, which totaled 135,852 cars or 1,010 cars more than the week before. Compared with the corresponding week last year, a decrease of 42,335 cars was reported.

Loading of grain and grain products amounted to 36,793 cars, 10,590 less than the week before but 7,539 more than during the same week in 1920 and 3,501 more than the same week in 1919. Livestock with 22,958 cars was 10,903 less than the previous week but 2,340 more than the corresponding week last year. It was, however, 4,804 cars less than were loaded during the corresponding week in 1919.

Coke totaled 7,140 cars, five less than the week before, while ore declined 46 cars to a total of 5,489. There were 45,518 cars loaded with forest products, 3,172 cars less than during the week before. This was, however, 7,000 cars more than were loaded during the same period in 1920 and 3,598 more than during the corresponding week in 1919.

Loadings of merchandise and miscellaneous freight, which includes manufactured products, totaled 412,177 cars. While this was 37,370 cars below the total for the week before it

REVENUE FREIGHT LOADED—WEEK ENDED SATURDAY, DECEMBER 17, 1921

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded		
										This year, 1921	Corresponding year, 1920	Corresponding year, 1919
Eastern	1921	9,469	3,951	37,282	1,762	5,043	852	59,396	60,690	178,445	.....	.....
	1920	5,888	3,837	60,479	2,144	6,359	3,629	48,263	61,883	.....	192,482	198,836
	1919	3,019	3,799	41,273	3,606	2,574	2,378	45,696	47,141	.....	149,486	.....
Allegheny	1921	1,810	3,453	67,617	6,521	2,862	4,382	36,770	53,707	.....	177,122	168,678
	1920	251	92	14,794	159	1,331	24	5,453	3,174	.....	23,278	.....
	1919	104	116	21,720	758	1,593	136	4,692	2,696	.....	31,815	36,268
Poahontas	1921	4,211	2,152	16,423	454	18,338	605	38,023	35,412	.....	115,618	.....
	1920	2,805	1,800	33,545	1,002	14,930	2,102	33,110	36,670	.....	124,964	127,235
	1919	13,398	9,678	6,137	841	9,824	308	25,088	23,535	.....	89,629	.....
Southern	1921	11,043	8,701	8,876	1,409	9,424	1,204	24,658	26,446	.....	91,761	97,337
	1920	12,485	11,402	15,566	193	4,903	739	30,617	34,088	.....	109,967	.....
	1919	9,884	10,568	26,600	395	4,553	2,491	28,835	35,954	.....	119,280	118,979
Northwestern	1921	4,376	2,787	3,367	130	6,677	629	16,600	24,344	.....	58,580	.....
	1920	3,697	1,997	7,222	111	7,027	545	16,393	27,853	.....	64,847	59,411
	1919	47,383	33,861	134,842	7,145	48,690	5,335	221,163	228,384	.....	727,003	.....
Central Western	1921	35,231	30,472	225,059	12,340	46,748	14,489	192,921	245,211	.....	802,271	.....
	1920	37,544	38,497	188,907	11,009	51,748	11,181	199,771	317,877	.....	.....	806,734

REVENUE FREIGHT LOADED—WEEK ENDED SATURDAY, DECEMBER 24, 1921

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded		
										This year, 1921	Corresponding year, 1920	Corresponding year, 1919
Eastern	1921	8,373	2,305	33,538	1,587	4,491	1,221	37,873	53,561	.....	162,884	.....
	1920	4,905	2,682	49,112	1,603	5,623	1,253	41,689	52,899	.....	159,771	167,054
	1919	2,611	2,351	38,522	3,653	2,542	2,037	43,319	41,953	.....	136,568	.....
Allegheny	1921	1,674	2,787	52,390	5,603	2,883	1,984	33,961	43,865	.....	145,147	144,245
	1920	185	50	16,812	138	1,204	21	5,165	2,720	.....	26,295	.....
	1919	79	96	16,728	583	1,273	118	3,988	1,879	.....	24,746	22,327
Poahontas	1921	2,889	1,299	17,969	423	17,334	499	30,600	32,195	.....	108,668	.....
	1920	2,348	1,735	23,940	717	12,507	1,540	28,921	28,035	.....	99,843	106,618
	1919	9,324	6,919	7,172	967	9,322	336	23,745	21,086	.....	78,882	72,497
Southern	1921	8,600	5,303	8,099	1,328	7,711	1,204	20,624	19,893	.....	97,860	.....
	1920	9,776	8,354	18,223	240	4,137	710	20,887	27,039	.....	97,860	.....
	1919	6,611	6,907	22,737	315	3,448	2,182	24,516	27,618	.....	96,334	105,995
Northwestern	1921	3,726	1,600	3,626	132	6,458	665	15,379	22,714	.....	54,410	.....
	1920	3,037	1,108	5,181	90	4,065	468	13,166	14,065	.....	50,068	51,162
	1919	36,793	22,958	135,852	7,140	45,518	5,489	210,929	201,248	.....	665,927	.....
Central Western	1921	29,254	20,618	178,187	10,246	38,510	8,594	166,739	196,258	.....	648,406	.....
	1920	33,202	27,762	165,876	8,836	41,920	9,326	131,423	266,439	.....	.....	684,784

Week ended:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded	Corresponding year, 1920	Corresponding year, 1919
December 24	1921	36,793	22,958	135,852	7,140	45,518	5,489	210,929	201,248	665,927	648,406	684,784
December 17	1921	47,383	33,861	134,842	7,145	48,690	5,535	221,163	228,384	727,003	802,271	806,734
December 10	1921	48,680	31,159	137,836	6,638	49,744	6,128	225,718	236,023	742,926	837,953	761,940
December 3	1921	47,227	31,955	137,293	6,345	48,403	5,317	227,906	243,008	747,454	882,660	769,286
November 26	1921	35,081	25,866	137,432	6,307	43,843	5,541	200,000	219,757	673,827	803,701	739,197

was 49,180 cars more than were loaded during the corresponding week last year, which included Christmas, and 14,315 cars more than were loaded during the corresponding week in 1919.

Compared by districts, reductions in the loading of all commodities under the week before were reported by all except the Pocalontas, which showed a slight gain but, with the exception of the Allegheny district, all reported increases over the corresponding week last year.

The summaries for the weeks of December 17 and December 24 are given on the preceding page.

The car surplus continues to increase. For the period ending December 23 the total was 404,214 cars, classified: Box cars, 157,695; gondolas, 197,232, and miscellaneous cars, 49,287. The total increase of 32,993 cars is 8.9 per cent over the figure for the week ended December 15.

The bad order cars, however, showed a decrease during the period ending December 15 to 308,556 or 13.5 per cent, as compared with 14 per cent on December 1.

Invariably during a period of rapidly increasing surplus of freight cars, such as exists at present, there arises discussion of the relation of the car hire or per diem rate between railroads and the trend of empty mileage. The Car Service Division has given very careful consideration to this question and has reached the following conclusions.

1. That the per diem rate is a comparatively minor factor in the per cent of empty mileage.

2. That the per cent of empty mileage is influenced primarily by fluctuations in traffic.

3. That sudden decreases in traffic always result in an immediate increase in the per cent of empty mileage, which, however, may vary according to the changes in the relation of the tonnage moved of one class of traffic to another.

For the period ended December 23 the surplus increased to 470,516 cars, of which 191,707 were box cars and 221,614 were coal cars.

Senate Delays Confirmation of I. C. C. Appointments

WASHINGTON, D. C.

PRESIDENT HARDING'S recent action in reappointing Commissioners Aitchison and Hall to the Interstate Commerce Commission upon the expiration of their terms on December 31 has caused a row in the Senate because of protests by Southern senators on the ground that the South was not given additional representation on the commission; this may delay confirmation by the Senate for some time.

The failure of the Senate to confirm the appointments before the holiday recess left two vacancies in the commission on January 1 although the two men were retained by the commission temporarily as special examiners. They did not sit during the arguments in the valuation cases heard by the full commission on January 4, 5 and 6, although Mr. Hall testified on behalf of the commission before the Senate committee on interstate commerce on January 5 in the hearing on the Capper bill.

Action by the Senate was also postponed partly because of the absence of Senator La Follette, who had announced his intention of presenting a minority report dissenting from the action of the Committee on Interstate Commerce which had approved of the nominations. The delay in confirmation also prevented Mr. Aitchison and Mr. Hall from sitting at the hearings in the general rate investigation which were resumed on January 11. They, with Commissioners Esch and Lewis, had been designated by the commission to hear the testimony in that case before the reappointments of Commissioners Aitchison and Hall had been sent to the Senate by the President.

Opposition to Mr. Aitchison's reappointment was voiced by Senator Trammell of Florida in open session of the Senate on January 5, when he introduced a bill providing that members of the Interstate Commerce Commission shall be appointed from 10 different sections of the United States, with one at large, and that not more than one member shall be appointed from any one state. Mr. Trammell said he had been informed by a man connected with the lumber industry of the South that Mr. Aitchison, after encouraging a reduction in lumber rates from the Northwest made voluntarily by the railroads, had tried to influence the commission against deciding in favor of a reduction in hardwood lumber rates from the South in the case now pending before the commission which has not been decided.

Senator Trammell said he had introduced the bill because it does not seem to be the policy of the President to appoint the membership of the commission from different sections. He said the great Southern part of the country has no representation upon the commission, while the Northwest has had three representatives, Mr. Hall from Colorado, Mr. Aitchison from Oregon, and Mr. Campbell from Washington. Wisconsin has two members, Mr. Meyer and Mr. Esch, and New Jersey has two, Mr. Daniels and Mr. Cox. The senator said he did not mean that the members of the commission would not feel disposed to represent the United States in general, but that unquestionably in dealing with problems with which they are more familiar they are in a better position to pass upon them and make equitable adjustments than if they have only the information that is brought to them when the particular rate question is pending.

Senator Simmons asked if the states of Colorado, Oregon and Washington are not in the same classification territory, but Senator Cummins pointed out that the railroad problems are not centered around or confined by classification territory. For instance, the problems of the Pacific Coast, which are said to be represented by Mr. Aitchison, are entirely different from the problems of the intermountain country from which Mr. Campbell comes, while Mr. Hall may be said to be familiar with the problems arising in the territory east of the Rocky Mountains. He pointed out that Commissioner McChord of Kentucky comes from the Southern classification territory, but he agreed that that does not meet the suggestion made by the senator from North Carolina and the senator from Florida, because the country extending southeast along the Atlantic Ocean in which land transportation must meet the competition of ocean transportation, has its big problems as well. He thought it would not be amiss if there were some member of the commission from that country.

Senator Ransdell asked if he would not extend it to the Gulf and take in Louisiana, Mississippi and Texas, to which Senator Cummins replied that the same suggestions could be made about that territory, but he was simply trying to explain that the difference in problems is not represented by classification territories.

In charging Mr. Aitchison with discrimination in favor of the Northwest against the South, Senator Trammell declared that while Mr. Aitchison was heartily in sympathy with the railroads making a voluntary reduction of about 16 per cent in the rates on lumber from the West to the Central West and the East, when the question of a reduction from the Southern states was raised, "Mr. Aitchison, instead of trying to assist in bringing about a voluntary reduction or a forced reduction, if necessary, in freight rates, balked in every way possible, I am informed, the plan to secure a reduction in the rates upon lumber especially from the South."

Senator Cummins immediately asked whether the senator had before him the record of the case to which he referred. Senator Trammell said he did not understand that the case had been decided, but that the information had been given him by a man familiar with the case. He said that it was

understood that the railroads had promised that if the hardwood case resulted in a reduction they would make similar reductions in the rates on yellow pine from Southern territory. He said he had been informed that "a few days ago, with nine members of the commission present, with five members probably against reducing the rates on hardwood lumber from Southern territory, Mr. Aitchison, who was against the rate reduction, attempted to force a decision in the case."

Senator McNary of Oregon rose to the defense of Mr. Aitchison, saying he believed it is unfair for any one to affirm he has not acted fairly and justly toward all sections and pointing out that for Western lumber the railroads came into competition with water carriers. Senator Overman of North Carolina said he knew of no reason why Mr. Aitchison should not be confirmed, but if what the Senator from Florida says is true, he ought not to be confirmed. He said he had held up the appointments before the holidays as a protest because the great Southern territory had been absolutely ignored, not only by President Harding, but by President Wilson. He said the South had had no representative since the death of Judge Clements and that he had heard

that when a question of rates on cotton recently came before the commission it developed there was not a member who knew what lint cotton was.

Senator Fletcher of Florida also joined in the debate and asked if the hardwood case has not been pending for some time and if the whole question of reducing the rates on yellow pine and other timber from the South is not dependent upon the decision in the hardwood case in which Mr. Aitchison was said to have opposed a reduction. Senator Cummins pointed out that there is no competition between the West and the South on hardwood and said it seemed to him to be very far-fetched to charge that because Mr. Aitchison may be opposed to a reduction in the rates on hardwood, he is doing the South an injustice. "I do not know that he is," he said. "I think that one ought to be pretty careful with respect to his facts before he makes a charge that an officer holding the position Mr. Aitchison does, is consciously influenced because of the interest he may have in the locality from which he comes."

The matter was considered in executive session later in the day, but no action was taken.

I. C. C. Proposes to Order Automatic Train Control

49 Roads Ordered to Show Cause Why Installation Should Not Be Required by July 1, 1924—Specifications

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on January 10 served upon 49 railroads an order to show cause by March 15 why it should not adopt a report and enter an order requiring them to install by July 1, 1924, between designated points in their main lines, automatic train stop or train control devices complying with specifications and requirements set forth in the order which the commission has determined upon as the result of its investigation conducted pursuant to section 26 of the interstate commerce act.

The device, according to the proposed order, is to be applicable to or operated in connection with all road engines running on or over at least one full passenger locomotive division included in the part of the main line between the points named. It further provides that each carrier named shall submit to the commission complete and detailed plans and specifications prior to the installation and that by July 1, 1922, they shall file complete and detailed plans of the signal systems in use and a report of the number and type of locomotives assigned to or engaged in road service on the designated portions of line and shall proceed diligently and without unnecessary delay to select and install the devices as specified. They are also to file with the commission on or before July 1, and each three months thereafter full and complete reports of the progress made with the preparation for and the installation of the devices, which together with the manner and details of the installation shall be subject to the approval of the commission or the division of the commission to which the matter may be referred.

Report of the Commission

The report of the commission says:

This is a proceeding initiated by us under Section 26 of the interstate commerce act under which we are authorized after investigation to order any carrier by railway subject to the act to install automatic train-stop or train control devices or other safety devices.

Under Public Resolution No. 46, approved June 30, 1906, the Congress directed us to investigate and report on the use of and necessity for block signals for automatic control of railway trains in the United States. The sundry civil appropriation act,

approved May 26, 1908, contained a provision directed to the same end and appropriated some fifty thousand dollars for the purpose. Under the above resolution the Block Signal and Train Control Board was created and was employed by the commission from 1907 to 1912 to study the subject and to investigate numerous automatic train-stop and train-control devices presented by various designers and patentees. Reports of these investigations have been made to us with recommendation as to specifications and requirements. Since 1912 the commission's Bureau of Safety has continued these investigations. Under the United States Railroad Administration investigations were made by a special Automatic Train-Control Committee and further specifications and requirements were recommended. The records and files of this committee have been transferred to this commission.

Investigation Has Proved Worth

The conclusions arrived at as a result of these several investigations conducted from 1906 to 1920, were identical in substance, namely, that automatic control of trains is practicable; that the use of automatic train control devices is desirable as a means of increasing safety and that the development of automatic train-control devices had reached a stage warranting installation and use of such devices on a more extended scale. The results of these investigations and the conclusions thereon were published from time to time and attracted widespread attention commensurate with the importance of the subject. The successive investigations with their satisfactory results, and the recognized obvious need for some such device resulted in the inclusion in the transportation act of 1920 of a section which places upon us the duty after investigation of ordering the installation by the carriers, in locations designated by us, of automatic train-stop or automatic train-control devices which comply with prescribed specifications and requirements.

Since that section was passed we have been urged to require the installation of various automatic train-control devices. We were not disposed, however, to issue an order requiring the installation by any carrier of any such device without further investigation and a review of past investigation and performances together with a thorough check under our own supervision of the actual performances of these devices as installed and in operation.

To that end and in order to carry out the provisions of Section 26 in the most effective and expeditious manner, we invited the co-operation of the American Railway Association. A joint committee on automatic train control consisting of representatives of the signal section and the operating, engineer and mechanical divisions of that association was appointed in November, 1920.

The joint committee has been engaged in connection with our Bureau of Safety, since November, 1920, in studying the perform-

ances of train-control devices under varying service conditions and has rendered us valuable aid. We have had the advantage of the specifications and requirements developed from these practical demonstrations.

Record has been kept by our Bureau of Safety of service operations on portions of the lines of the Chesapeake & Ohio, the Chicago, Rock Island & Pacific, and the Chicago & Eastern Illinois railroad companies, equipped with different automatic train-stop and train-control devices, each of which shows a high degree of efficiency. Data have been gathered upon the effect of the devices upon railroad operating conditions, upon problems of installation and maintenance on an extended scale, upon installation, operating and maintenance costs and upon the revisions made or required in the several devices.

Savings From Safety

The matter of cost is the basis upon which the carriers have raised objection to an order requiring the installation of automatic stop or train-control devices. Like objection has been made to the installation of all other safety devices which are now in use and which have long since demonstrated their practicability and necessity. This objection has been raised in prosperous as well as in non-prosperous years. Yet the compensation from a financial standpoint, which will result from the securing added safety in train operations should not be overlooked. In the hearings before the Committee on Interstate and Foreign Commerce when Section 26 was under consideration certain statistics gleaned from our accident reports were presented showing that from 1909 to 1917, both inclusive, there were 13,339 head-on and rear-end collisions resulting in damage to railroad property alone of over nineteen million dollars. These collisions resulted in death to 2,454 persons and injury to 37,724. In other words, the annual average of these collisions amounted to 1,482, the average number of killed to 272, and of injured to 4,191. During the two and one-half years from January 1, 1918, to June 30, 1920, inclusive, there were 3,226 such collisions, resulting in the deaths of 635 persons and injury to 6,240. The damage to railroad property amounted to over seven million dollars. If to the large property loss there be added the death losses and the damages paid for persons injured the total rises to enormous figures. If these vast sums which represent total losses to the carriers had been expended in the installation of block signal systems or automatic train-stop or train-control devices many thousands of miles of road could have been equipped.

In the report of the chief of the Bureau of Safety for the fiscal year ended June 30, 1921, it is shown that during the fiscal year 97 train accidents were investigated consisting of 62 collisions and 35 derailments. The collisions resulted in the death of 194 persons and the injury of 849 persons. The derailments resulted in the death of 77 persons and the injury of 518 persons, a total of 271 killed and 1,367 injured. Twenty-six of the collisions occurred on lines operated by the block signal and of these 17 occurred where automatic signals were used. Of the 17, 8 were rear-end collisions, 4 were head-end collisions, and 3 were side collisions. Of these 17 collisions occurring in block signal territory there were 13 cases in which engineers, pilots or motormen failed properly to observe or obey signal indications. These undoubtedly would have been prevented had an adequate automatic train control system been in use.

Recent Accidents

Since the above report was made several accidents resulting in large loss of life and property have occurred. A rear-end collision between two passenger trains on the Pennsylvania Railroad near Manhattan Transfer, New Jersey, in which 46 persons were injured could doubtless have been prevented had the automatic train control system in use from the Pennsylvania Terminal, New York City, to the Hackensack River been extended to the Manhattan Transfer, a distance of some two miles. In December, 1921, a wreck occurred on the Philadelphia & Reading road a few miles out of Philadelphia, resulting in the death of 23 persons and injury to many others. Had there been an adequate automatic train control device on that road this wreck would not have occurred.

Our investigations have shown that automatic train control has not only passed the experimental stage. In fact, no safety devices, such as the automatic coupler, the air brake and the automatic train signal, were perfected to as high a degree as the automatic train control before they were either ordered installed or were voluntarily adopted.

Practicable and Necessary

The thirteen years of investigation and study, the service tests under varying conditions and the results obtained in the actual implementation of the device, over periods of years upon some of the roads, have clearly demonstrated the practicability of and the necessity for automatic train-stop or train-control. The time has now arrived when the carriers should be required to select and install such device or devices which meet our specifications and

requirements. Under the act our order cannot be made effective before the expiration of two years from the date thereof. The fixing of a time limit must be based upon a consideration of the time which has already run since the passage of the act, and the progress and present state of automatic train control. There must be considered also the time reasonably required to enable the carriers to select suitable devices from among those available, to develop them and to meet their operating conditions and requirements in the designated locations and to provide for the manufacture and installation of the apparatus.

The definitions, functions, requirements and specifications which we have adopted are set forth in the appendix. They are based upon the facts developed in our investigations and upon the requisites laid down by the Block Signal and Train Control Board report in 1912, the requisites of the Railroad Signal Association adopted in 1914, and those of the Automatic Train Control Committee of the United States Railroad Administration in 1919, together with the definitions and functions reported by the Joint Committee on Train Control of the American Railway Association in March, 1921.

The railroads hereinafter designated which are required to install upon the designated portions of their roads, automatic train control devices in accordance with our specifications and requirements, have been selected with regard to the measure of the risk of accident in connection with traffic conditions thereon.

We have decided not to limit by our order the installation of these devices to roads or parts of roads already equipped with automatic block signals, because we have no desire to discourage efforts for automatically controlling trains without the aid of the fixed wayside signals. The statement, therefore, as to the primary function of automatic train-stop or train-control devices recognizes the possibility of establishing such a device without the use of automatic block signals in conjunction therewith.

The Roads Affected

The list of railroads to which the order was issued and the parts of their lines designated is as follows:

Atelison, Tonala & Santa Fe, between Chicago and Newton, Kan.
Atlantic Coast Line, between Richmond, Va., and Charleston, S. C.
Baltimore & Ohio, between Baltimore and Pittsburgh.
Boston & Albany, between Boston and Albany.
Boston & Maine, between Boston and Portland, Me.
Buffalo, Rochester & Pittsburgh, between Rochester and Lutter, Pa.
Central Railroad of New Jersey, between Jersey City and Scranton.
Chesapeake & Ohio, between Richmond, Va., and Clifton Forge, Va.
Chicago & Alton, between Chicago and Springfield, Ill.
Chicago & Eastern Illinois, between Chicago and Danville, Ill.
Chicago & Erie, between Chicago and Salamanca, N. Y.
Chicago & North Western, between Chicago and Omaha.
Chicago, Burlington & Quincy, between Chicago and Omaha.
Chicago, Indianapolis & Louisville, between Chicago and Louisville, Ky.
Chicago, Milwaukee & St. Paul, between Chicago and St. Paul.
Chicago, Rock Island & Pacific, between Chicago and Rock Island, Ill.
Chicago, St. Paul, Minneapolis & Omaha, between Minneapolis and Omaha.
Cincinnati, New Orleans & Texas Pacific, between Cincinnati and Knoxville, Tenn.
Cleveland, Cincinnati, Chicago & St. Louis, between Cleveland and St. Louis.
Delaware & Hudson Company, between Wilkes-Barre, Pa., and Albany.
Delaware, Lackawanna & Western, between Hoken and Buffalo.
Erie Railroad, between Jersey City and Buffalo.
Galveston, Harrisburg & San Antonio, between El Paso, Texas, and Houston.
Great Northern, between St. Paul and Minot, N. D.
Illinois Central, between Chicago and Menasha.
Kansas City Southern, between Kansas City and Texarkana, Texas.
Lehigh Valley, between Jersey City and Buffalo.
Long Island, between Jamaica and Montauk.
Louisville & Nashville, between Louisville and Birmingham.
Michigan Central, between Chicago and Detroit.
Missouri Pacific, between St. Louis and Kansas City.
New York Central, between Albany and Cleveland.
New York, Chicago & St. Louis, between Chicago and Cleveland.
New York, New Haven & Hartford, between New York and Providence, R. I.
Norfolk & Western, between Roanoke, Va., and Cambridge, Ohio.
Northern Pacific, between St. Paul and Minot, N. D.
Oregon Washington Railroad & Navigation Company, between Portland and Portland.
Pennsylvania Railroad, between Philadelphia and Pittsburgh.
Peru, Monticello, between Grand Rapids and Detroit.
Philadelphia & Reading, between Philadelphia and Hauppauge.
Pittsburgh & Lake Erie, between Pittsburgh and Youngstown, Ohio.
Pittsburgh, Cincinnati, Chicago & St. Louis, between Pittsburgh and Indianapolis.
Richmond, Fredericksburg & Potomac, between Washington and Richmond, Va.
St. Louis & San Francisco, between St. Louis and Springfield, Mo.
Southern Railway Company, between Oakland and Sacramento.
Southern Railway Company, between Washington and Atlanta, Ga.
Union Pacific, between Omaha and Cheyenne.
West Jersey & Seaside, between Philadelphia and Atlantic City.
Western Maryland, between Baltimore and Cumberland, Md.

Specifications and Requirements for Automatic Train-Stop or Train-Control Devices

The definitions, functions, requirements and specifications governing the installation and operation of automatic train-stop or train-control devices prescribed are given in the appendix as follows:

Purpose.

The purpose of this general specification is to define automatic train-stop or train-control devices and to outline essential features involved in their design, construction and installation on railroads.

Definition of Automatic Train-stop or Train-control Devices.

A system or installation so arranged that its operation will automatically result in either one or the other or both of the following conditions:

First—Automatic Train-stop—The application of the brakes until the train has been brought to a stop.

Second—Automatic Speed Control—The application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined and prescribed rate.

Functions.

In prevailing practice the primary function of automatic train-stop or train-control devices is to enforce obedience to the indications of fixed signals; but the feasible operation of essentially similar devices used without working wayside signals may be regarded as a possibility. The following features may be included, separately or in combination, in automatic train-stop or train-control systems:

1. Automatic Train-Stop.

Without manual control by the engineman, requiring the train to be stopped; after which the apparatus may be restored to normal condition manually and the train permitted to proceed.

2. Automatic Train Control or Speed Control.

(a) Automatic stop, after which a train may proceed under low-speed restriction until the apparatus is automatically restored to normal or clear condition by reason of the removal of the condition which caused the stop operation.

(b) Low-speed restriction, automatic brake application under control of the engineman who may, if alert, forestall application at a stop indication point or when entering a danger zone and proceed under the prescribed speed limit, until the apparatus is automatically restored to normal or clear condition by reason of the removal of the condition which caused the low-speed restriction.

(c) Medium-speed restriction, requiring the speed of a train to be below a prescribed rate when passing a caution signal or when approaching a stop signal or a danger zone in order to forestall an automatic brake application.

(d) Maximum-speed restriction, providing for an automatic brake application if the prescribed maximum speed limit is exceeded at any point.

General Requirements.

1. An automatic train-stop device shall be effective when the signal admitting the train to the block indicates stop, and so far as possible when that signal fails to indicate existing danger conditions.
2. An automatic train-control or speed-control device shall be effective when the train is not being properly controlled by the engineman.
3. An automatic train-stop, train-control or speed-control device shall be operative at braking distance from the stop signal location if signals are not overlapped, or at the stop signal location if an adequate overlap is provided.

Design and Construction.

1. The automatic train-stop or train-control device shall meet the conditions set forth under general requirements applicable to each installation.
2. The apparatus shall be so constructed as to operate in connection with a system of fixed block or interlocking signals, if conditions so require, and so inter-connected with the fixed signal system as to perform its intended function:
 - (a) In event of failure of the engineman to obey the signal indications; and
 - (b) So far as possible, when the signal fails to indicate a condition requiring an application of the brakes.
3. The apparatus shall be so constructed that it will, so far as possible, perform its intended function if an essential

part fails or is removed, or a break, cross or ground occurs in electric circuits, or in case of a failure of energy.

4. The apparatus shall be so constructed as to make indications of the fixed signal depend, so far as possible, upon the operation of the track element of the train-control device.
5. The apparatus shall be so constructed that proper operative relation between the parts along the roadway and the parts on the train will be assured under all conditions of speed, weather, wear, oscillation and shock.
6. The apparatus shall be so constructed as to prevent the release of the brakes after automatic application until the train has been brought to a stop, or its speed has been reduced to a predetermined rate, or the obstruction or other condition that caused the brake application has been removed.
7. The train apparatus shall be so constructed that, when operated, it will make an application of the brakes sufficient to stop the train or control its speed.
8. The apparatus shall be so constructed as not to interfere with the application of the brakes by the engineman's brake valve or to impair the efficiency of the air brake system.
9. The apparatus shall be so constructed that it may be applied so as to be operative when the engine is running forward or backward.
10. The apparatus shall be so constructed that when two or more engines are coupled together, or a pushing or helping engine is used, it can be made operative only on the engine from which the brakes are controlled.
11. The apparatus shall be so constructed that it will operate under all weather conditions which permit train movements.
12. The apparatus shall be so constructed as to conform to established clearances for equipment and structures.
13. The apparatus shall be so constructed and installed that it will not constitute a source of danger to trainmen, other employees or passengers.
14. The apparatus shall be so constructed, installed and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement.

Railroads Reducing Their Debt to the Government

WASHINGTON, D. C.

THAT THE RAILROADS are beginning to make some headway in reducing their indebtedness to the federal government, incurred during the war period and in connection with the transition from federal control to private management, is indicated by recent reports by various branches of the government.

A statement issued by the Treasury Department on January 3 shows that while a total of \$270,740,217 had been loaned to 72 companies from the revolving fund of \$300,000,000 created by Section 210 of the Transportation act, on certificates issued by the Interstate Commerce Commission, 17 of the railroads had made repayments amounting to \$32,423,360.65. Of the \$300,000,000 fund, \$40,000,000 was served by the commission for claims, judgments, etc., against the Railroad Administration arising out of federal control, but the fund has been considerably increased by interest payments by the roads which received loans, and by repayments. Under the law the time within which applications for loans may be made is limited to February 28, 1922.

The annual report of the War Finance Corporation also shows that of \$204,794,520 loaned to railroads since April 5, 1918, all but \$26,733,210 had been repaid. According to a report by the director general of railroads to the Senate (as of December 1) the railroads still owed the Railroad Administration \$507,628,508 on account of the \$1,144,000,000 of capital improvements made by the government while it was in control of the railroad properties, the balance having been taken care of partly in cash and partly in railroad securities which are gradually being

sold by the Railroad Administration to private investors. The sale of these securities has provided the Railroad Administration with funds with which to settle gradually its indebtedness to the railroads, amounting to \$750,670,588 on December 1, as the balance of the rental guaranteed during federal control, and on account of cash taken over when the railroads were taken, under-maintenance, materials and supplies, depreciation, and other accounts, including interest. In some cases the indebtedness of a road to the government is offset against what the government owes the company, in making final settlement, but in some other cases the amount owed by the road for additions and betterments is funded for a period of years and not used as an offset.

The bill proposed by the President to authorize the War Finance Corporation to purchase railroad securities from the Railroad Administration up to \$500,000,000 and thus enable it to effect its settlements with the railroads more rapidly, failed of passage in the Senate.

The repayments on loans made during 1920 and 1921 from the revolving fund have been as follows:

Ann Arbor	\$ 60,000.00
Atlanta, Birmingham & Atlantic	20 000.00
Bangor & Aroostook	4,000.00
Carolina, Clinchfield & Ohio	2,000,000.00
Chicago Great Western	240,000.00
Chicago, Indianapolis & Louisville	45,000.00
Chicago and Western Indiana	89,000.00
Great Northern	15,134,000.00
Illinois Central	296,000.00
Kansas City, Mexico & Orient	2,500,000.00
Long Island	219,000.00
Missouri Pacific	4,362,000.00
National Railway Service Corporation	388,660.65
New York Central	990,000.00
Northern Pacific	6,000,000.00
Salt Lake & Utah	15,700.00
Waterloo, Cedar Falls & Northern	60,000.00
	\$32,423,360.65

Since the last announcement on December 1 payments on loans certified by the Interstate Commerce Commission have been made as follows:

Alabama, Tennessee & Northern	\$ 399,000.00
Carolina, Clinchfield & Ohio	6,000,000.00
Chesapeake & Ohio	1,334,300.00
Chicago Great Western	240,000.00
Evansville, Indianapolis & Terre Haute	50,000.00
Kansas City, Mexico & Orient	2,500,000.00
Seaboard Air Line	139,500.00
Western Maryland	300,000.00
	\$10,963,000.00

Commission Resumes General Rate Inquiry

Carriers Present Additional Statistical Testimony—Willard Says Rate of Return Should Not Be Less Than 6 Per Cent

WASHINGTON, D. C.

HEARINGS in the rate inquiry being conducted by the Interstate Commerce Commission were resumed on Wednesday, January 11, before Commissioners Esch and Lewis. Later Commissioner Campbell joined them. Commissioners Hall and Aitchison were unable to sit because their reappointment as members of the commission have not been confirmed by the Senate. At the opening of the hearing, Richard Waterman, secretary of the Railroad Committee of the Chamber of Commerce of the United States, presented a letter from Joseph H. DeFrees of the chamber, asking the commission to invite Secretary Hoover of the Department of Commerce to appear as a witness before the commission as the official representative of American commerce, saying that it would add a great deal to the testimony to have the information at his disposal added to record. Commissioner Esch said that this plan would be carried out. Additional statistical testimony from the railroads in the various groups which had been requested by the commission, but which the railroads had been unable to furnish completely at the previous hearing, was then introduced by statistical witnesses.

Statistical Testimony

D. S. Brigham, assistant to the president of the Boston & Maine, presented an exhibit for the New England roads, excluding the Boston & Albany, showing that for the year from September, 1920, to October, 1921, these roads had had a deficit of \$7,913,789, a shortage of \$57,370,953 under a 6 per cent return. For the four months, July 1 to October 31, 1921, these roads had earned a net return at the rate of 2.3 per cent, or \$7,176,532. Mr. Brigham also presented an exhibit, as requested by representative of the shippers, showing the operating results of the year ended October 31 adjusted to meet present rates and costs. This showed a constructive net railway operating income of \$22,530,193 or at the rate of 2.61 per cent.

Only 13 Roads Earn Over 6 Per Cent

Exhibits presented by George M. Shriver for the Eastern roads, L. E. Wetling for the Western roads, and G. W.

Lamb for the Southern roads, showed that only 13 of the Class I railroads in the United States earned an excess over 6 per cent on their property investment during the year ended September 30, 1921. In the Eastern district there were seven such roads, the Cincinnati Northern; Delaware, Lackawanna & Western; Detroit & Toledo Shore Line; Lehigh & New England; Michigan Central and Perkiomen, while 14 roads in the Eastern district had actual deficits for the year. In the Western district 6 roads had an excess over 6 per cent, the Beaumont, Sour Lake & Western; Fort Worth & Denver City; Gulf, Colorado & Santa Fe; Louisiana Western; St. Louis, Brownsville & Mexico and Union Pacific, while 17 had deficits. In the Southern district all of the roads had a shortage under a 6 per cent return and 12 had deficits. For the Eastern roads the shortage under a 6 per cent return was \$321,671,713; for the Western roads it was \$267,130,827, and for the Southern roads it was \$187,643,605. These figures for the Eastern and Western districts are exclusive of certain roads which failed to report.

The exhibits for the three districts were compiled on the same basis and gave the percentage earned for each month since September, 1920, for the 12 months ending September 30 and for the available months since the wage reduction on July 1. The Eastern roads, which in the 12 months ending September 30 earned at the rate of 2.79 per cent during the five months from July 1 to November 30 earned at the rate of 4.40 per cent. The Western roads, which for the 12 months ending September 30 earned at the rate of 3.3 per cent during the five months since the wage reduction earned at the rate of 5.16, while the Southern roads, which for the 12 months' period earned at the rate of 1.95 during the five months' period earned at the rate of 3.81. The exhibits also gave a statement of the additions and betterments made during the year ended September 30 and an estimate of the amount required to be spent in 1922 chargeable to capital account. For the Eastern roads the amount required to be spent in 1922, based on the present volume of traffic, was estimated at \$458,280,327, with an addition of \$400,006,068 based on the volume of traffic under normal conditions. For the Western roads the requirement for 1922 based on present

volume of traffic was \$248,256,502 and the additional amount for a normal volume of traffic was \$128,534,845. For the Southern district the estimated requirement based on present volume of traffic was \$85,368,982 and the additional amount for a normal volume of traffic \$104,502,331.

Mr. Shriver had an exhibit based on reports of three railroads covering about 70 per cent of the total material purchases excluding fuel showing an increased cost at September, 1921, prices of 101.8 per cent over the test period but a decrease at October, 1921, prices of 28.6 per cent under the prices of September 1.

Efficiency of Operation

Testimony regarding the efficiency of railroad operation was given by R. H. Aishton, president of the American Railway Association, who described the organization and work of that association which through its various committees and divisions is constantly making studies of improved methods and practices for the benefit of all the roads.

"The association exercises no managerial functions," Mr. Aishton said, "and each railroad also has its own organizations of experts who are endeavoring at all times to find better methods, but this organization co-ordinates the best thoughts of the best railroad experts in the country and places the results where they may be used by the individual roads in their own way and applied to their own problems."

Mr. Aishton showed for example that progress has been made by the railroads in reducing the number of claims for loss and damage and the time required to adjust them. The average number of claims received by each road was reduced from 1,791 in September, 1920, to 907 in August, 1921, and the average time required to adjust claims has been reduced to about 20 days. Mr. Aishton also showed that the railroads had reduced their fuel consumption per train mile and per ton mile.

While the average mileage per car per day, the average car load and the percentage of empty car miles had shown decreases during 1921 he showed that this was the natural effect of the reduction in the volume of traffic. Excluding bad order and surplus freight cars, he showed, the average miles per freight car per day had increased in 1921 and the average train speed had increased from 10.3 to 11.6 miles per hour.

The Car Service Division, Mr. Aishton said, has given very constant study to the reduction of empty car mileage, but has found that this is very largely determined by the character and volume of business. For 15 years the average percentage of empty car mileage was 31.4. During the 26 months of federal control it was 31.6, although the cars were pooled, and for the 12 months ending September 30, 1921, it was 37 per cent.

Asked to make some general observations on the efficiency of railroad operation, Mr. Aishton said that it is difficult to find anything with which to make a comparison, but he said that in his 40 years of experience he had never seen any class of men that made greater efforts to bring about economy and efficiency than the railroad men. He was not prepared to say that any better results could be obtained by consolidation of terminals than are obtained today.

Mr. Aishton was followed by Daniel Willard, president of the Baltimore & Ohio, who gave a general statement reviewing the circumstances under which the transportation act was passed, the result which the framers of the act expected it to accomplish and the developments since with particular reference to the series of questions put to the carriers by the commission for the purposes of this inquiry.

Willard Says Rate Reductions Now Unwise

Mr. Willard said that the carriers are in no financial condition at present to make a general reduction in freight rates. Rates will eventually come down, Mr. Willard said,

but he added that to hasten the movement unduly would in his judgment be unwise and would not tend to promote the larger public interest.

"The carriers, unable to provide from earnings in the past reserves such as contemplated in the transportation act, are not now in position to make a general rate reduction in anticipation of possible lower operating costs to follow," said Mr. Willard. "While the present condition of affairs in the country and the rest of the world is difficult and trying, it is the logical sequence to the war and must be borne until by means of orderly and well considered processes a more normal condition can be brought about. I do not think the best interest of the public would be promoted at this time by action of any kind which would tend to immediately reduce the revenue of the carriers.

"High as railroad charges are, they are not higher relatively than other prices are or were and it is important to remember that railroad charges or prices were the very last to go up and in the nature of things can not be the first to come down. They can and will participate in the downward movement of all other prices."

Mr. Willard pointed out that even before the general freight increase went into effect on August 26, 1920, "the industrial and economic readjustments which were world wide and which were a natural outcome of the war had begun," only to be reflected some months later in this country by a sharp business decline.

"The carriers," he continued, "subject as they are to regulation by the governmental agencies of the states and nation were not able to promptly reduce their expenditures in keeping with their declining revenues and this in turn served to shrink the net earnings of the carriers so seriously that they were compelled, in order to maintain their financial integrity, to resort to forced economies in all directions, which in turn meant fewer men employed and less material used and purchased. This enforced policy on the part of the railroads contributed in a measurable degree towards accentuating the business depression."

Mr. Willard said the financial results already attained by the railroads have been accomplished "only by forced economies that are neither in the public interest nor can they be indefinitely continued."

"Railroad rates," Mr. Willard said, "are now and always have been subject to certain fundamental economic laws against which they can not prevail and the mere operation of such laws and influences will tend constantly to bring about lower rates just as has been the case not only during the last year but during all the years of railroad operation.

"I suppose the real question now is this—are railroad rates declining as rapidly as the public has fairly a right to expect? Are the railroad managers doing all that can be fairly expected of them to reduce the cost of transportation? My answer is 'yes.' In my opinion to accelerate the downward movement artificially at this time would injure the roads and would not benefit the public."

Mr. Willard proposed that not less than 6 per cent on the value of the property used for transportation purposes be adopted by the commission as constituting a rate of fair return after March 1 next when the percentages prescribed by the transportation act automatically expire under the law.

"When Congress," the witness said, "specified the rate of return now in the transportation act, it did so for the purpose of stabilizing railroad credit. Unfortunately because of conditions which were not foreseen—nor could they have been foreseen—by Congress, the results hoped for in this connection have not yet been realized. It is essential, however, that the credit of the railroads should be stabilized on a proper basis in order to restore the purchasing power of the railroads and put them in position not only to prop-

erly maintain their existing facilities, but to provide the additional facilities necessary in the public interest, and it is much more important to the public as a whole that there should be adequate transportation facilities with satisfactory service, than that there should be lower rates. Lower rates will come, but they should come only as and when the railroads are clearly in position to grant them without impairing their ability to render adequate and satisfactory service.

"Rate adjustments have already been made to correct disarrangements as to localities and some dislocations as to commodities, and in a few instances adjustments have been made for purely economic reasons as in the case of certain export rates revised in an effort to stimulate competition in world markets, and more recently with reference to agricultural products which perhaps have more widely and more completely been forced downward to a pre-war basis. More in this direction, however, the railroads cannot advisedly do at this time. Rates having generally been advanced on a uniform or percentage basis, it would seem desirable, in fact necessary, that when general reductions are made, they should be made in the same way. Adjustments, of course, must of necessity be made whenever it can be shown that existing relationships are clearly out of line. Certainly the carriers in the Eastern Region cannot make a general percentage reduction now of such an amount as to be definitely helpful, and it is doubtful if any substantial reduction could be justified with reference to any one commodity or class of traffic.

"With all this in mind I venture to think that this commission has ordered this inquiry not only for the purpose of determining what, if any, rate reductions may lawfully be

ordered at this time, but also what, if any, reductions may properly be ordered in harmony with the avowed purpose and spirit of the act. Mr. Shriver has shown that if the carriers in the Eastern region were to do over again the identical business that was done during the 12 months ending October 31st, but upon a basis of rates and costs for the entire period such as was actually in effect on November 1, 1921, the estimated net result so obtained would be \$473,914,000, or a return of approximately 5.4 per cent upon the property used, as tentatively valued by this commission, adjusted as has been explained in his presentation.

"I am inclined to think that Mr. Shriver's estimate is a very liberal one and might not be fully realized, but even if it could be realized it would be a mistake to view the situation so indicated as a satisfactory one, or one that would justify an immediate reduction in rates.

"Nevertheless, the railroads should be able to show substantial savings during the present year in the cost of material and fuel. They will also have the benefit for the full year of the wage reductions which were effective for only half of the last year, and it is believed that in harmony with the terms of the act and because of the lowered cost of living, as well as for other pertinent reasons, the Labor Board will feel justified in ordering still further wage reductions, particularly in connection with certain classes of railroad employees. It should be borne in mind, however, that such reductions, if made at all, will only be effective for a portion and not for the whole year."

Mr. Willard was to be followed by S. M. Felton, president of the Chicago Great Western; H. E. Byram, president of the C. M. & St. P.; W. L. Mapother, president of the L. & N., and Samuel O. Dunn, editor of the *Railway Age*.

Bureau of Accounts and Statistics, I.C.C.

Great Mass of Clerical Work, Incident to the Transition Period— Revision of Accounting Regulations

Parts of the annual report of the Interstate Commerce Commission were noticed in the *Railway Age* of December 10, page 1157, and December 31, page 1317; this present

article is an abstract of the annual reports of the Bureau of Accounts and the Bureau of Statistics of the Interstate Commerce Commission.

Bureau of Accounts

The reports of the Bureau of Accounts during the early part of the year were directed largely to implementing the adjustments of the railway operating income for the test period which were made necessary as a result of our examination of the accounts for the 3 years ended June 30, 1917, for the purpose of enabling us to make final certification to the President of the amount of average annual operating income of carriers under Federal control. The final certification for the year was made relatively small in number, but the adjustments were the subject of a considerable amount of the carriers affected.

Comments were made for the purpose of establishing the correctness of claims filed by carriers under sections 201 and 209 of the transportation act, and 194 of the regulations. The 194 of the regulations, which are such carriers, have been amended to read: "During the year we have received reports of 160 carriers. Examinations under section 204 of the transportation act and section 209 totaled 138. The examinations under section 204 disclosed a general lack of uniformity in the accounts of the carriers and the efforts to give its reports a uniformity have been greatly hindered by the carriers' accounting. These special examinations under sections 201 and 209 have disclosed the same lack of uniformity, especially in the accounts of the practical execution of the annual examinations which we deem necessary to be conducted during the accounts of carriers and to make that uniformity of ac-

counting prescribed by our regulations. General examinations are now being resumed.

In our last report, reference was made to the creation of a depreciation section of the bureau, for the purpose of carrying out those provisions of section 20 of the interstate commerce act which require us to prescribe as soon as practicable classes of property for which depreciation charges may properly be included under operating expenses and the percentages of depreciation which shall be charged. Much progress has been made in the work of this section. It has been occupied with the many preliminary studies and analyses which must be the foundation of any determination of depreciable classes of property and the related percentages of depreciation for the various classes of carriers.

During the year work was begun on the revision of our accounting regulations. Those now in effect were last revised as of July 1, 1914. A further revision is imperative to make them responsive to requirements imposed by new legislation and to improve them further in the light of the experience gained in their practical application during the past 7 years. It has, however, been found necessary to provide for certain features in advance of the contemplated revision. This we have done through several orders formally amending the existing regulations.

Since the approval of the federal control act we have certified in tentative form the average annual railway operating income of 588 carriers for the three years ended June 30, 1917, amount-

ing in the aggregate to \$943,428,123. The sum stated does not represent the exact standard return of the carriers taken under federal control, because it has been necessary to make corrections on these tentative certifications and because it may yet be determined that some of the carriers whose income was so certified were not taken under federal control. During the year we made 3 tentative certifications, 137 corrected certifications, and ascertained that the income certified in 19 tentative certifications was computed in accordance with the accounting regulations.

Bureau of Statistics

The annual reports section receives and examines annually reports from more than 3,000 corporations, classified in 1920 as follows:

Stream railway companies	Number of annual reports
Class I	192
Class II	319
Class III	397
Switching and terminal	236
Lesser	456
	1,600
Electric railway	318
Sleeping car companies	1
Express companies	4
Telephone companies	1,070
Water lines	115
Telegraph and cable companies	15
Pipe lines	33
Total	3,156

General News Department

The Associated General Contractors will hold their annual convention at the Hotel Winton, Cleveland, Ohio, on January 17 to 19, inclusive.

Bullinger's Guide is now published in Boston, having been bought by the New England Railway Publishing Company. See notice under New Books.

The United States Supreme Court has ordered a reargument on March 13, of the Southern Pacific dissolution case involving the ownership by the Southern Pacific of the Central Pacific.

Representative Reece introduced in the House on January 5 a concurrent resolution authorizing the appointment of a joint Congressional commission to make another investigation of transportation.

The New York Section of the American Society of Civil Engineers held a meeting on January 11, at which the subject, "Traffic Handling—Its Engineering as Well as Regulatory Aspects," was discussed, the points brought out hinging chiefly on the problems that are found in the large cities such as New York.

The Air Mail Section of the Post Office Department reports for the last three months of 1921, that ten million letters were carried by airplane, and that all of them were delivered without injury. The distance traveled by the mail-carrying airplanes in that quarter was over 391,000 miles, and 87 per cent of the trips were completed on time.

A. F. Robinson, bridge engineer of the Atchison, Topeka & Santa Fe System, Chicago, will present a paper on the Santa Fe's Experience with Treated Timber in Bridges before a joint meeting of the Western Society of Engineers and the American Wood Preservers Association in the rooms of the former organization in Chicago on Wednesday evening, January 25.

The Savannah Sectional Committee of the Signal Section of the American Railway Association will hold its next meeting at the De Soto Hotel, Savannah, Ga., on Tuesday, January 17 (not January 19 as heretofore announced). At the morning session, the meeting will discuss maintenance of mechanical interlocking and rail bonding; and at the afternoon session H. S. Balliet, assistant terminal manager of the Grand Central Terminal, New York City, will give a historical lecture on signaling, illustrated.

Power Interlocking is to be the subject for discussion before the New York Sectional Committee of the Signal Section of the American Railway Association at its meeting in New York City on Thursday, January 19. The meeting will be at the Hotel McAlpin, Broadway and 34th street, beginning at 8 p. m. W. H. Reichard, consulting engineer of the Federal Signal Company, will give an illustrated address, and all signalmen are urged to come to the meeting and be prepared to discuss power interlocking in all its phases.

Regan Train Control Demonstration on the Great Eastern Railway of England

An official trial and demonstration of the Regan automatic train control appliances was made on the Great Eastern Railway of England at Fairlop, Essex, on November 1, 1921. A special train, consisting of an engine fitted with the device, five standard passenger cars and two private cars left Stratford at 10:05 a. m. A distinguished company was present, consisting of seven representatives from France, two representatives from Belgium, the military attache of the American embassy in London, a number of officers of the Great Eastern and other English railways, and

the Automatic Train Control Committee of the British Government, consisting of Col. Pringle (chairman); Sir Robert Turnbull of the North Eastern; Majors Hall and Edmonds of the Ministry of Transport; J. H. Thomas, M. P.; Mr. Afield, Superintendent of telegraph and signals, Midland Railway; and C. Tilden Smith (secretary). The demonstration received high commendation from Col. Pringle, Chairman of the Automatic Train Control Committee of England. The original installation on the Great Eastern was made in September, 1920.

Senate Railroad Inquiry to Be Concluded

The Senate committee on interstate commerce is planning to resume and conclude at an early date the hearings in its general railroad inquiry. Chairman Cummins has written letters to those who had asked for an opportunity to testify or those whose names had been proposed as witnesses, asking them when they can appear and how much time they desire. These include W. G. McAdoo, Walker D. Hines, W. Jett Lauck, H. T. Hunt, former member of the Railroad Labor Board; J. A. Emery, counsel for the National Association of Manufacturers, and various representatives of labor organizations. The railroads will also be given an opportunity for some further testimony.

Valuation Hearings

The Interstate Commerce Commission heard arguments at Washington on January 4, 5 and 6 in the valuation cases of the Kansas City Southern and the San Pedro, Los Angeles & Salt Lake, involving the protests of the former against the final value as reported by the commission and of the latter against the tentative valuation. In both cases the representatives of the roads contended that the commission should give a detailed analysis of the methods used in determining the "final value." S. W. Moore, for the Kansas City Southern, objected because the valuation had ignored the earning capacity of the road. A hearing in the case of the Elgin, Joliet & Eastern was begun on January 9.

American Society of Mechanical Engineers

The Executive Committee of the Railroad Division announces the following action taken at a meeting on December 28: James Partington, former secretary of the division, has been elected to the Executive Committee in place of George W. Rink, who has found it necessary to resign.

A. F. Stuebing has been elected secretary of the division in place of Mr. Partington.

W. H. Winterrowd was elected vice-chairman to succeed Mr. Rink.

William Elmer of Altoona, Pa., has been added to the Membership Committee of the division.

An invitation from the Metropolitan Section has been accepted to hold a joint meeting with them in the Engineering Societies' building, New York City, on May 16, 1922. The subject of this meeting will be Railroad Refrigeration—Natural and Mechanical.

Railroad Earnings for November

Reports to the Interstate Commerce Commission from 200 Class 1 railroads with a mileage of 235,556 miles show that in November the railroads had a net operating income of \$65,965,382, which would be at the annual rate of return of 3.8 per cent on their property investment.

Due largely to the fact that the volume of traffic decreased 20 per cent the net operating income in November was approximately \$39,488,000 below that in October. Compared with November, 1920, an increase of \$15,130,000 or 29.8 per cent was reported.

Forty-nine railroads suffered operating deficits in November.

20 in the Eastern, 8 in the Southern and 21 in the Western district compared with a total of 30 in October. The ratio of expenses to operating revenues in November was 79.06 per cent compared with 74.20 per cent in October.

The total operating revenues amounted to \$465,353,144 or 21.4 per cent less than during the same month of 1920 while operating expenses totaled \$367,912,287, a reduction of 28.4 per cent compared with November, 1920. The net operating income, which amounted to \$65,965,382, fell short \$37,168,618 of the amount contemplated by the Transportation Act.

During November the railroads of the United States expended \$166,321,423 for maintenance purposes, 25 per cent less than was spent during that month the previous year.

The net operating income of the carriers during the first 11 months in 1921 was \$561,411,608, which would be at the annual rate of return of 3.3 per cent on their tentative valuation fixed by the commission for rate-making purposes. During that period they failed by \$464,605,392 or by a little less than half, of earning the amount contemplated under the rates prescribed by the commission.

Annual Meeting of A. S. C. E.

to Discuss Transportation

The transportation problems of the country will be the feature of the annual meeting of the American Society of Civil Engineers to be held at the Engineering Societies building, New York, on January 18 to 20, inclusive. The first day will be devoted to the regular business meeting, followed by a luncheon and an inspection of the McGraw-Hill Company's printing plant in the afternoon and a reception and dinner dance in the evening.

The morning session of January 19 will cover the subject of water transportation and will be addressed by the following speakers: Emory R. Johnson, dean of the Wharton School of Finance and Economy, University of Pennsylvania, Philadelphia, Pa.; R. H. M. Robinson, president, United American Lines, New York; Winthrop L. Marvin, vice-president and general manager, American Ship Owners' Association, New York, and Samuel O. Dunn, editor of the *Railway Age*.

The afternoon session of the same day will be confined to railway transportation and will be addressed by the following speakers: Howard Elliot, chairman of the Northern Pacific, New York; George W. Simmons, vice-president, Simmons Hardware Company, St. Louis, Mo.; William F. Doak, vice-president, Brotherhood of Railway Trainmen, Washington, D. C.; F. A. Molitor, chairman, Board of Economics and Engineering, National Association of Owners of Railroad Securities, New York, and Edgar E. Clark, formerly chairman, Interstate Commerce Commission, Washington, D. C. There will also be an excursion on January 19 to include the New York Stock Exchange, the Hell Gate power station and other places. The evening will be given over to a smoker, before which Frank A. Vanderlip, formerly president, National City Bank, New York, will present an address on World Activities and Their Effect Upon the Engineer. On the last day, the subject of highway transportation will be the sole topic in a three session meeting. Among the speakers of this session will be Robert S. Parsons, general manager, Erie Railroad, New York.

Denial of Application to Hold Offices or Directorates with More Than One Railroad

The Interstate Commerce Commission has issued a large number of finance docket orders since the issuance of the blanket order on December 31, authorizing railroad officers and directors to hold positions with more than one carrier. It has also, however, issued a number of orders denying such authority. John G. Shedd was authorized to hold until further order the position of director of the Baltimore & Ohio and the Chicago, Rock Island & Pacific, but in so far as it relates to the further holding of the position of director of the Illinois Central, the application was denied. The application of J. Ogden Armour to retain office as director of the Illinois Central and of the Chicago, Milwaukee & St. Paul, was denied on the ground that "after due investigation it has not been shown that neither public nor private interests would be adversely affected."

An order was issued authorizing common officers and directors among the companies subsidiary to and affiliated with the Illinois

Central System, but with exceptions. W. Averell Harriman was authorized to hold the position of director of the Union Pacific and of certain named subsidiaries and the position either of director of the Illinois Central and certain named subsidiaries, or director of the Baltimore & Ohio. Cornelius Vanderbilt was authorized to hold the positions of member of the board of managers and member of the executive committee of the Delaware & Hudson, and the position either of director of the Illinois Central and certain subsidiaries, or director of the Missouri Pacific. They were given 30 days within which to report to the commission which of the alternative positions they will elect to hold.

A supplemental order was issued in the case of George F. Baker, authorizing him to hold the positions of chairman and director of the Central of New Jersey, president and director of the New York & Long Branch, and director of two other subsidiaries, and the position of director of the Erie and the New York, Susquehanna & Western, and director of either the New York Central and subsidiaries, or the Delaware, Lackawanna & Western or the Lehigh Valley. In the original order the Erie was made an alternative.

Among the other orders issued were those authorizing common officers and directors among the companies comprising the systems of the Carolina, Clinchfield & Ohio, the Kansas City Southern, Chicago, Rock Island & Pacific, Norfolk & Western, Atchison, Topeka & Santa Fe, El Paso & Southwestern and the Southern.

Administration Trying to Prevent

Railroad Labor Conflict

President Harding and Secretary Hoover have recently been interesting themselves in trying to find a way to avert any possible interference with transportation resulting from a conflict between the railroads and their employees growing out of the efforts of the railroads to reduce wages and effect some changes in working conditions which are about to be referred to the Labor Board. In pursuance of this purpose and at the request of the President, the Secretary of Commerce invited some of the principal railway executives and the heads of the "big four" train service brotherhoods to a dinner on Saturday, January 7, at which various aspects of the situation were discussed and it was disclosed at the White House that there are to be further conferences, although no information was given as to the details.

Those present at the dinner on Saturday included Thomas DeWitt Cuyler, chairman of the Association of Railway Executives; Daniel Willard, president of the Baltimore & Ohio; A. H. Smith, president of the New York Central; W. W. Atterbury, vice-president of the Pennsylvania; Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers; L. E. Sheppard, president of the Order of Railway Conductors; W. S. Carter, president of the Brotherhood of Locomotive Firemen and Engineers, and W. G. Lee, president of the Brotherhood of Railroad Trainmen. Nothing was made public about the conference and apparently some efforts were made to keep the fact quiet, because no information about it could be obtained at Mr. Hoover's office, although the fact that there had been a conference was confirmed later by President Harding. It is understood, however, that there have been some apprehensions among high officers of the administration as to the possibility of trouble with the railroad labor organizations this spring at about the same time that the controversy over coal mine wages becomes acute with the termination of the present wage contracts, and that a very serious situation might be created if the train employees and the miners were to threaten a strike at the same time.

Secretary Hoover some time ago made some efforts to bring about an amicable understanding between the coal operators and the mine workers, which have thus far proved unavailing and he is also trying to do what he can to smooth out the complicated railroad labor situation, but whether he has any definite plan has not been disclosed. It is understood that the brotherhoods have expressed more concern over the efforts of the railroads to change some of the rules and working conditions which the brotherhoods have won after many years of struggle than they have over the wage question; and it has been suggested that there may be a possibility of compromise along these lines; also that Mr. Hoover is trying, if possible, to bring about a settlement without the necessity of going before the Labor Board or at least without a strike threat.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1921

Table with columns: Name of road, Average mileage operated, Operating revenues (Freight, Passenger, Inc. misc.), Total, Maintenance of Way and Equip. ment, Traffic, Trans. portation, General, Total, Operating ratio, Net income from railway, Operating income (loss), Net rentals after rentals, Net rentals 1920.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated per month, Operating revenues (Freight, Passenger, Inc. misc.), Total operating revenues, Wainman's equipment, Traffic, Trans-shipment, General, Total, Operating ratio, Net railway operation, Operating (income or loss), Net after rentals, and Net after 1920.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1921 - CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Freight, Passenger, etc.), Maintenance of way and structures, Traffic, Trans., General, T. tal., Operating (cont. se), Net after rentals, Net after interest. Rows include Missouri Pacific, Mobile & Ohio, Memphis & Arkansas, etc.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.	Average mileage operated				Operating revenues				Maintenance of way and equipment				Operating expenses				Net after income taxes	Net after income taxes
	period.	Passenger.	Freight.	Other.	(inc. misc. structures.)	(inc. misc. structures.)	Tramway.	General.	Totals.	Tramway.	General.	Totals.	Operating ratio.	Net from operations.	Net from operations.	Net after income taxes.		
West Jersey & Seashore.	Nov. 359	\$667,417	\$380,242	\$2,902,665	\$18,821	\$196,653	\$13,950	\$465,896	\$83,920	\$872,726	\$88,300	\$1,330,010	106.20	-\$49,381	-\$49,410	-\$21,981		
"	11 mos.	3,579	3,648,214	7,774,944	12,954,942	1,841,421	2,285,211	134,022	6,098,922	286,799	1,072,964	88.30	1,433,010	277,292	315,860	\$20,981		
*Cumberland Valley & Martinsburg.	Nov. 33	90,000	5,623	95,466	9,124	24,178	23,785	669	33,441	2,118	69,230	72.50	26,236	21,152	15,475	-\$9,933		
"	11 mos.	33	1,167,300	69,994	1,256,896	126,813	231,785	7,826	403,942	23,589	793,955	62.94	462,941	408,182	344,335	-\$118,342		
Peoria & Pekin Unit.	Nov. 19	9,967	1,123	148,502	34,099	5,500	56	48,836	7,212	144,703	97.20	3,379	3,379	2,190	20,433			
"	11 mos.	19	154,268	22,216	176,484	374,365	1,161	781,506	78,252	1,458,512	94.70	80,056	72,116	172,840	275,235			
Pere Marquette.	Nov. 2,222	2,660,152	370,477	3,504,921	439,361	676,769	41,142	1,383,347	96,439	2,585,462	78.20	719,459	694,004	322,276	406,383			
"	11 mos.	21,231	27,334,383	5,907,507	35,517,191	4,289,477	7,515,022	529,004	14,381,151	1,170,001	27,869,342	78.70	7,567,278	6,045,013	5,023,106	165,170		
Philadelphia & Reading.	Nov. 1,127	6,276,331	819,019	7,393,366	70,123	1,846,092	64,401	2,815,396	138,712	5,564,337	75.30	1,828,529	1,679,340	1,508,833	1,061,288			
"	11 mos.	11,126	65,536,590	9,394,675	78,099,043	8,950,837	21,170,360	645,728	31,267,362	1,727,145	63,791,992	81.30	14,307,145	12,202,557	10,410,538	1,067,888		
Atlantic City.	Nov. 177	1,270,475	3,006,980	4,379,101	693,671	568,187	42,400	2,338,991	37,007	2,681,010	84.10	698,091	488,910	131,972	129,156			
"	11 mos.	177	1,270,475	3,006,980	4,379,101	693,671	568,187	42,400	2,338,991	37,007	2,681,010	84.10	698,091	488,910	131,972	129,156		
Perkiomen.	Nov. 41	109,337	7,533	1,204,226	7,368	3,816	107	43,129	892	55,646	45.90	65,380	55,688	50,764	49,618			
"	11 mos.	41	1,025,403	107,930	1,176,881	112,125	44,713	834	445,168	7,350	610,640	51.90	965,778	481,439	420,941	425,570		
Port Reading.	Nov. 21	1,500,212	1,025,403	2,525,615	439,361	676,769	41,142	1,383,347	96,439	2,585,462	78.20	719,459	694,004	322,276	406,383			
"	11 mos.	21	1,500,212	1,025,403	2,525,615	439,361	676,769	41,142	1,383,347	96,439	2,585,462	78.20	719,459	694,004	322,276	406,383		
Pittsburgh & Shawmut.	Nov. 102	115,476	5,509	122,371	27,616	40,635	1,345	36,848	5,282	95,226	77.91	27,005	25,403	36,957	81,348			
"	11 mos.	102	1,149,784	102,637	1,252,421	130,966	195,696	10,516	780,668	8,068	1,238,736	66.70	142,610	147,855	27,720	27,720		
Pittsburgh & West Virginia.	Nov. 63	149,478	10,974	1,024,637	37,343	216,905	1,345	36,848	5,282	95,226	77.91	27,005	25,403	36,957	81,348			
"	11 mos.	63	1,497,478	102,637	1,600,115	130,966	195,696	10,516	780,668	8,068	1,238,736	66.70	142,610	147,855	27,720	27,720		
Pittsburgh & Northern.	Nov. 210	80,863	77,526	1,085,618	315,388	16,158	1,168	49,667	5,409	101,739	138.50	71,177	71,177	330,750	225,653			
"	11 mos.	210	800,863	775,526	1,085,618	315,388	16,158	1,168	49,667	5,409	101,739	138.50	71,177	71,177	330,750	225,653		
Quincy, Omaha & Kansas City.	Nov. 252	83,709	233,534	1,116,998	29,217	17,370	814	18,652	2,110	63,278	54.50	51,520	49,269	43,154	37,511			
"	11 mos.	252	838,235	286,316	1,210,431	387,663	191,981	10,651	688,803	26,652	1,274,788	105.30	64,357	105,963	154,720	399,772		
Rich., Fredericksburg & Potomac.	Nov. 117	471,329	3,301,503	9,170,413	1,344,072	1,549,142	87,729	3,718,919	313,973	7,175,081	78.60	1,955,132	1,568,113	1,143,937	1,800,658			
"	11 mos.	117	4,713,259	33,015,033	91,710,413	1,344,072	1,549,142	87,729	3,718,919	313,973	7,175,081	78.60	1,955,132	1,568,113	1,143,937	1,800,658		
Rutland.	Nov. 415	2,990,511	1,498,309	6,731,067	985,805	1,192,569	94,208	2,404,059	153,880	4,869,403	90.20	524,356	260,920	392,641	2,479,417			
"	11 mos.	415	29,905,111	14,983,309	67,310,670	9,858,055	11,925,690	942,088	24,040,559	153,880	48,694,403	90.20	5,243,566	2,609,920	3,926,641	15,470,804		
St. Louis-San Francisco.	Nov. 4,760	51,849,707	18,934,757	75,684,284	9,006,699	13,998,691	918,678	29,122,607	2,501,978	35,153,944	72.90	20,540,337	17,128,217	16,726,394	8,392,811			
"	11 mos.	4,760	518,497,077	189,347,577	756,842,284	90,066,699	139,986,691	9,186,778	291,222,607	25,019,778	351,533,944	72.90	205,403,337	171,282,217	167,266,394	83,928,811		
Pt. Worth & Rio Grande.	Nov. 235	123,662	30,344	168,060	47,974	24,345	3,032	62,107	5,270	143,204	85.21	21,856	21,232	13,394	100,529			
"	11 mos.	235	1,041,718	438,667	1,618,889	418,860	282,110	34,210	835,802	73,916	1,642,449	101.66	23,560	63,758	190,349	980,422		
St. Louis, San Francisco of Tex.	Nov. 134	137,163	12,215	156,288	58,103	21,654	3,769	59,049	6,829	149,494	101.66	6,794	4,697	19,609	83,114			
"	11 mos.	134	1,371,630	122,155	1,523,980	188,118	1,722,281	439,599	318,123	37,365	844,305	75.331	171,437	35,988	281,903	815,085		
St. Louis Western.	Nov. 968	13,529,603	1,660,580	15,847,634	1,888,870	2,533,161	507,073	4,897,868	627,788	9,829,473	62.00	6,018,161	5,272,610	4,962,844	6,407,499			
"	11 mos.	968	135,296,030	1,660,580	158,476,344	18,888,870	25,331,661	5,070,733	48,978,868	6,277,788	98,294,473	62.00	60,181,161	52,726,610	49,628,844	64,074,999		
St. Louis Southwestern of Tex.	Nov. 807	555,238	95,898	683,396	171,747	135,569	18,792	336,528	30,734	691,706	102.00	110,200	102,000	142,132	121,132			
"	11 mos.	807	5,552,380	958,988	68,339,600	1,717,477	1,355,690	187,920	3,365,238	379,097	7,782,107	110.00	70,136	972,201	805,844	1,872,755		
San Antonio & Arkansas Pass.	Nov. 738	4,529,980	971,689	5,841,391	1,297,389	1,209,154	111,827	2,717,098	263,229	5,801,926	94.10	394,465	189,181	180,784	224,933			
"	11 mos.	738	45,299,800	9,716,889	58,411,391	12,973,889	12,091,154	1,118,227	27,170,980	2,632,229	65,801,926	94.10	3,944,665	1,891,207	1,607,784	2,249,333		
San Antonio, Uvalde & Gñif.	Nov. 317	47,392	7,629	217,686	26,776	24,181	2,351	24,740	5,799	84,977	117.20	12,361	15,176	25,850	40,176			
"	11 mos.	317	473,920	76,290	520,210	267,766	241,811	24,740	57,999	84,977	117.20	12,361	15,176	25,850	40,176			
Seaboard Air Line.	Nov. 3,563	2,604,909	666,776	3,688,174	275,726	725,726	185,791	3,364	408,218	1,403,338	6,755,511	80.40	219,509	181,688	67,645	40,576		
"	11 mos.	3,563	26,049,909	6,667,776	36,888,174	2,757,266	7,257,266	1,857,911	33,644	40,821,818	67,555,511	80.40	2,195,009	1,816,688	676,445	389,689		
Southern Ry.	Nov. 6,971	7,959,317	2,327,738	11,159,256	1,451,598	1,855,856	191,312	4,335,624	330,992	8,238,818	63.10	2,690,716	2,511,757	2,366,698	168,037			
"	11 mos.	6,971	79,593,317	23,277,738	111,592,256	14,515,980	18,558,560	1,913,120	43,356,624	3,309,992	82,388,818	63.10	26,907,616	25,117,557	12,165,834	4,538,713		
Alabama Great Southern.	Nov. 313	666,566	146,892	839,561	97,626	180,481	27,798	471,487	37,397	98,208,928	73.00	20,092,063	15,811,815	12,165,834	30,216			
"	11 mos.	313	6,666,566	1,468,920	8,395,561	976,266	1,804,811	277,980	4,714,877	373,979	98,208,928	73.00	200,920,663	151,811,815	121,658,334	30,216		
Chm., New Orleans & Tex. Pacific.	Nov. 338	1,062,998	259,324	1,393,571	187,147	420,864	37,477	563,804	48,273	1,262,722	90.90	126,299	62,928	101,164	143,248			
"	11 mos.	338	10,629,998	2,593,244	13,935,571	1,871,477	4,208,644	374,777	5,638,004	482,723	12,627,222	90.90	1,262,999	629,228	1,011,644	1,432,248		
New Orleans & Florida.	Nov. 403	1,193,452	322,445	1,564,003	197,143	397,866	32,239	662,015	459,860	13,700,722	86.70	2,103,310	1,524,786	1,709,593	3,899,689			
"	11 mos.	403	11,934,520	3,224,445	15,640,003	1,971,433	3,978,666	322,390	6,620,015	4,598,860	137,000,722	86.70	21,033,310	15,247,786	17,095,933	38,996,889		
Georgia Northern.	Nov. 207	2,811,631	919,218	4,122,626	881,935	857,638	101,978	2,370,351	411,018	4,313,307	104.60	190,681	376,356	619,718	270,891			
"	11 mos.	207	28,116,311	9,192,188	41,226,626	8,819,355	8,576,388	1,019,978	23,703,351	4,110,158	43,133,307	104.60	1,906,881	3				

Traffic News

The annual meeting and election of officers of the Transportation Club of Louisville, Ky., will be held on February 14.

The Texas Passenger Agents' Association will hold its annual convention at Corpus Christi, Tex., on January 21 and 22.

W. J. Ryan has been appointed assistant traffic manager of the American Tobacco Company at New York, and H. P. Hatfield, assistant traffic manager at Louisville, Ky.

The Traffic Club of Chicago held a memorial luncheon at the Hotel LaSalle on January 12, in honor of Henry C. Barlow, traffic director of the Chicago Chamber of Commerce, who died recently.

The Houston Traffic Club, Houston, Tex., has elected the following officers: president, A. Kimpbell (Houston Drug Company); vice-presidents, Blakely Smith, S. J. Westheimer and F. L. Salisbury (L. & N. R. R.); secretary, F. A. Moulton; treasurer, G. L. Thacker.

The Stark County (Ohio) Traffic Club has elected the following officers: president, A. J. Burns (Bonnot Company); vice-president, J. R. Ellis (Superior Sheet Metal Company); secretary, M. L. Underwood (Buckeye Cereal Company); and treasurer, W. E. Beamer (Penn. R. R.).

Managers of independent oil refineries in the Tulsa (Oklahoma), district met at Tulsa on January 6, to confer on their proposed action looking to the readjustment of tank car rates from Oklahoma to the east. This rate hearing has been scheduled for February 16, at Washington, D. C., before the Interstate Commerce Commission.

The Transportation Club of Decatur, Ill., has elected the following officers: president, T. C. Burwell (A. E. Staley Manufacturing Company); vice-presidents, Porter Milliken (Union Iron Works) and L. F. Boss (Wabash Railway); secretary, S. F. Coay (Leader Iron Works); treasurer, Miss Addie Hambleton, traffic manager of the Mueller Fountain Fixture Company.

The Minneapolis Passenger Traffic Club has been organized at Minneapolis, Minn., and the following officers have been elected: President, W. L. Hathaway, general agent, passenger department, Chicago, Rock Island & Pacific; vice-president, W. E. Gilson; treasurer, A. R. Woods, and secretary, J. J. Oslie; members executive committee: B. G. Benson, A. E. Hadley, H. F. Bostwick, G. H. Feyder, A. W. Saunders and L. P. Green.

At a conference of representatives of several of the intermountain states at Salt Lake City on December 30, initial steps were taken toward the organization of an association representing that territory which will present evidence at the approaching hearings before the Interstate Commerce Commission at Washington on the feasibility of reducing freight rates. H. W. Prickett, of Salt Lake City, was elected president of the association, and T. C. Gill, also of Salt Lake, secretary.

The New York Central reports the arrival in New York City on Monday morning, January 10, of the greatest number of through passengers on limited trains ever recorded at that terminal on a single morning. There were 21 through trains, in all, including The Twentieth Century Limited, four sections; the Fifth Avenue Special, three sections; The Wolverine, two sections; The Detroit, five sections; and The Beaver, two sections. Between Albany and New York, 143 miles, passengers on these trains were served with breakfast to the number of 1,875.

During a two weeks' campaign on the Chicago, Rock Island & Pacific along 150 miles of its lines in the state of Missouri, demonstrations were held by representatives of that road to promote pure bred stock, better poultry and fruit raising. The Missouri campaign followed like campaigns in eastern Colorado and Oklahoma. In all of these territories the representatives held meetings in which local merchants joined with the farmers, the

State Board of Agriculture and the railroad to make the campaign a success. In many cases the representatives visited the farms to hold their demonstrations.

The Great Northern and the Chicago, Milwaukee & St. Paul have declined to accede to the request of the United States Shipping Board that they abrogate their reciprocal traffic arrangements with Japanese steamship lines, which the board had declared detrimental to its efforts to establish freight and passenger service between the North Pacific coast and the Orient. Following a hearing before a committee of the Shipping Board at which all other railroads having contracts with foreign steamship companies practically agreed to abrogate them, the board asked the roads to give it definite advice by January 1 of their intentions, and all of the roads except the St. Paul and the Great Northern had agreed to cancel the contracts by that date.

Hon. Henry C. Wallace, Secretary of Agriculture, in an address before the Traffic Club of Philadelphia on January 9, declared that railroad deficits "must be met by reductions in operating costs rather than by advances in rates." Agriculture, he said, "urgently needs the adjustment of freight rates on farm products to a point at which they bear about the same ratio to the price the farmer received for those products as prevailed before the war." An efficient agriculture and an efficient transportation system, Mr. Wallace declared, are indispensable to the national welfare and are dependent upon one another. The relation between the two industries is so very intimate that neither can afford to acquiesce in a condition which seriously affects the other.

Coal Production

The year 1921 was one of prostration for the coal and coke industries, says the weekly bulletin of the Geological Survey. To match the 407,000,000 tons of soft coal produced, one must go back 10 years, to match the 26,000,000 tons of coke, it is necessary to go back 17 years. To match the completeness of the depression, one must go back to 1893, because the tonnage comparisons ignore the normal increase from year to year. Anthracite stands as an exception. Until late November the hard coal mines continued in active operation and the total output for 1921 fell not far behind the two years just preceding. Production of bituminous coal in the last week of the year, which included the Christmas holiday, is estimated at 5,960,000 net tons.

Railroads Refuse to Cancel Contracts

With Japanese Steamship Lines

The United States Shipping Board has asked for the co-operation of the Interstate Commerce Commission in dealing with the situation created by the refusal of the Chicago, Milwaukee & St. Paul and the Great Northern railways to cancel, at the request of the Board, their reciprocal traffic contracts with the Japanese steamship companies, the Osaka Shosen Kaisha and the Nippon Yusen Kaisha. The Seattle Chamber of Commerce and the newspapers of that city have been sending the board numerous protests against the cancellation of the contracts on the ground that contracts between the steamships and the Canadian lines may be substituted and the business diverted to the port of Vancouver. Members of the Shipping Board have been conferring with a committee of the Interstate Commerce Commission on matters in which both bodies are interested and after the Seattle protest had been laid before it the commission voted to meet with representatives of the Shipping Board, the railroads and the port of Seattle to explore the entire question. The meeting is to be held in Washington on January 24. At the hearing last month before members of the Shipping Board, Vice-Presidents R. M. Calkins of the Chicago, Milwaukee & St. Paul and W. P. Kenney of the Great Northern said that if they gave up their contracts with the Japanese lines there would be no assurance that the traffic would go to the Shipping Board boats in service between the Puget Sound and the Orient because it is largely controlled by the Japanese soliciting agencies and that it would very likely be transferred to the Canadian Pacific so far as the rail haul is concerned. Most of the other roads that had foreign steamship contracts readily agreed to give them up and at the request of the board this was confirmed in writing before January 1, but the St. Paul and Great Northern declined.

Commission and Court News

Interstate Commerce Commission

The commission has issued some modifications of the rules and regulations it recently issued prescribing forms of uniform domestic bill of lading and uniform live stock contract.

The commission, on the petition of the American Railway Express Company, has reopened its investigation of the issuance and use of passes, trunks and free passenger service.

The commission has suspended until April 25, the operation of schedules published by the Southern Pacific which propose increases in the rates on shingles from points in Oregon and Washington to destinations in Nevada and California.

The commission has suspended from January 11 until May 11 the operation of certain schedules which propose increases and reductions in rates on sugar from New Orleans, La., and points taking same rates to points in Illinois, Iowa, Wisconsin, Minnesota and Missouri.

The commission has suspended until April 23, the operation of certain schedules published by the Missouri Pacific which provide reductions in the rates on bituminous coal, from mines on the Missouri Pacific in Southern Illinois to destinations in Arkansas and Louisiana.

The commission has suspended from January 16 until May 16 the operation of items published by the Bessemer & Lake Erie which provide reduction in the rate on chrome ore from Bessemer, Pa., and other points to Gary, Ind., South Chicago, Ill., Youngstown, Ohio, Farrell and Sharon, Pa.

The commission has suspended until May 3 the operation of certain schedules published by the New York Central, which propose increases in charges for intermediate switching by the N. Y. C. at Toledo and Vulcan, Ohio, from \$3.50 to \$5.50 a car for loaded cars, and from \$2 to \$3 a car for empty cars.

The commission has suspended until May 1, the operation of certain schedules published by the Midland Continental, which propose to increase the switching charges from \$4 to \$5.50 per car on all non-competitive traffic at Jamestown, N. D., between connection of the Northern Pacific and industries on the Midland Continental tracks.

The commission has suspended until May 29 the operation of schedules published by the Louisville & Nashville, which propose reductions in the rates on bituminous coal, carloads, from mines on the Louisville & Nashville in southeastern Kentucky and Tennessee and Virginia to destinations on the Southern in Indiana and Illinois.

The receivers of the Denver & Salt Lake have filed a petition with the commission asking it to issue an order providing for increased divisions to be paid to it by its connectings lines, which, the petition says, are reasonably able to earn a net operating income greatly in excess of 5 1/2 per cent under existing conditions, while the Denver & Salt Lake cannot earn any return at all.

The commission has suspended from January 8, until May 8, 1922, the operation of schedules published by the Illinois Central, which provide reductions of 5 cents per ton on coal from Alabama, Kentucky and Illinois mines to Gulfport, Miss., when for bunkering, for export, or when for points in Florida and Texas accessible by water, but an increase of 20 cents per ton when handled through tippie for other purposes.

The commission has suspended until May 5 the operation of certain schedules, which propose increases and reductions in rates on prepared roofing, asphalt shingles, building and roofing paper, and related articles from Chicago, East St. Louis, Marseilles, Teoria, St. Louis and points taking same rates to Missouri river points, St. Paul and Duluth, Minn., and to interior jobbing points in Minnesota, the Dakotas, Nebraska, Kansas, Missouri and Colorado.

Foreign Railway News

Electrification in the Philippines

The Manila Railroad contemplates electrification by means of power from the Agno River in Central Luzon, which is believed to possess a potential capacity of from 12,000 to 15,000 h.p., according to the Times (London) Trade Supplement.

Australian Railway in Market for Signals

The Victorian Government Railways, Australia, are in the market for a considerable quantity of power signaling apparatus, including track and line relays, electric signal mechanisms, electro-mechanical interlocking apparatus and 50 miles of insulated copper wire, according to the Times (London) Trade Supplement. Bids for some of this material will be closed on February 15, for others on February 22 and for the remainder on March 1.

Amalgamation of the L. & N. W. and the L. & Y.

The Amalgamation Tribunal, the body set up under the English Railways Act to oversee the mergers of the companies into four territorial groups, has according to the Railway Gazette (London), approved the plans for the consolidation of the Lancashire & Yorkshire with the London & North Western. The amalgamation will take effect on January 1, 1922. Effective on that date the consolidated carriers will operate under a plan of organization embodying a number of changes from previous practice. Details of this plan will appear in these pages at a later date.

Bids for Electrification of Brazilian Railway

The long-expected notice for sealed bids for the electrification of the Central of Brazil was recently announced, according to Assistant Trade Commissioner Embry at Rio de Janeiro. The notice calls for proposals on the electrification of stretches of the line, the supplying of traction and transport material, the construction of substations and various other improvements. The proposals will be received on March 30, 1922, at 1 p. m. A bond of 200 contos (\$216,000) is exacted to guarantee the signature of the contract. After that day and following a judgment of the fitness of the competitors, a day will be set for the opening of the proposals, following which a selection will be made.

Only those competitors will be considered as fit who can prove in addition to sufficient financial capacity, that they have furnished and installed other large and complete equipment for electric traction including installations for large railway yards. In order to guarantee the execution of the contract, the bond will be raised to 500 contos of reis (\$540,000).

The work relating to the suburbs of Rio de Janeiro is to be concluded within a period of two years and the other works within a period of three years, both counting from the date of registry and approval by the Tribunal de Contas.

There will be three or four substations. Thirty locomotives will be furnished, 10 for freight and 20 for passenger service. For the suburban service, 60 electric cars (carros motores) will be acquired, composed of 60 first-class cars and 6 second class.

Railway Excursions in Great Britain

LONDON

With the handing back of the English railways to private ownership on August 20, last, a decided and most welcome advance has been made in the facilities provided by the various companies for the traveling public by the reintroduction of day excursions at the rate of a single fare for the round-trip and cheap period excursions at the rate of a single fare and a third for the round-trip. The general public has shown great appreciation of the facilities offered by the railways, and this appreciation is further greatly increased by the frank recognition that the restoration of all pre-war conditions at the present time is

not possible. Owing to the increased cost of labor and materials, ordinary fares and freight rates cannot be brought down to the pre-war level.

Evidence of the approaching return to pre-war conditions is shown by the manner in which the railway companies are doing all in their power to attract business to their lines by the inauguration of day and half-day excursions, special excursions to country fairs, football matches, industrial shows, and during the month of August special cheap tickets were issued from the outlying stations to London in order to give the public an opportunity of visiting the bargain sales held in London during that month. This was the first time this latter privilege had ever been offered and the railways consider that it was a very successful venture. Daily excursions are also run from London to seaside vacation resorts such as Southend-on-Sea, about 35 miles from London, at a fare of 4 shillings (approximately 97 cents at the normal rate of exchange) for the round-trip; Brighton, a distance of 50 miles, at the rate of 7 shillings 6 pence (about \$1.82) for the round-trip; to Margate, a distance of 74 miles, at the rate of 11 shillings (about \$2.70) for the round-trip; and to Bournemouth, a distance of 107 miles from London, at the rate of 15 shillings 9 pence (\$3.83). Daily excursions are also run to most of the large industrial centers throughout the different lines, and daily excursions are run from the principal stations to London and from various points on the various systems to neighboring towns. These daily excursion tickets are good only on specified trains both on the outward and homeward journeys at the rate of a single fare for the round-trip.

Cheap week-end tickets were also introduced on the first week-end after the "decontrol" of the railways to all the principal vacation resorts and industrial centers throughout the country at the rate of a single fare and a third for the round-trip, with a minimum of 10 shillings (\$2.43 at the normal rate of exchange) first class and 5 shillings (\$1.21) third class. These tickets are available by any train on the outward journey on the Saturday and for return by any train on the Sunday after 6 p. m. up to and including any time on Monday.

In addition to these arrangements, 8-day or 15-day third class excursions have been inaugurated. These excursion trains generally leave on Friday, and the tickets issued by these trains are available for return on the Friday following date of issue or on the Friday two weeks following date of issue. The ticket rates for these excursions like the week-end tickets, are based on a single fare and a third for the round-trip.

Daily and period excursions to the Continent have also been run.

The Great Eastern railway has inaugurated a special railway and hotel accommodation excursion to Harwich from London, a distance of about 71 miles, the fare being inclusive of rail fare and dinner and tea on day of arrival, breakfast, luncheon, tea and dinner on following day, breakfast on third day, and attendance and room for the whole time. The ordinary fare for this round-trip from London is 35 shillings (or \$8.50 at the normal rate of exchange), first class, whereas the round-trip first class excursion fare inclusive of hotel accommodations and meals is 59 shillings (about \$14.35).

The ordinary third class round-trip fare is 20 shillings 10 pence (\$5) and the excursion fare inclusive of accommodation and meals is 42 shillings (\$10.20).

The Great Western has inaugurated special day and half day combined rail and river trips from London and various suburban stations and has also organized a circular tour on the River Thames from Kingston to Oxford, a distance of 91 miles.

Further daily excursions have been inaugurated by various tourist companies on all railways throughout Great Britain, and in connection with these excursions the tourist companies are compelled to guarantee 300 passengers for each excursion.

It is stated by the railway companies that the re-introduction of this excursion traffic has met with great success. The companies generally consider these excursions as profitable, although it is too soon to estimate the actual increase due to their introduction. The advertising of excursion facilities is done by means of posters and handbills distributed throughout the various railway stations and advertisements inserted in all the principal local newspapers and in the London daily papers.

Special excursion departments have been organized on nearly all railways under the direction of the superintendents of the line, which take charge of all matters appertaining to excursion traffic.

Equipment and Supplies

Freight Cars

The BUFFALO, ROCHESTER & PITTSBURGH is inquiring for from 20 to 30 caboose cars with steel underframes.

The KIMBERLY-CLARK COMPANY, 51 Chambers street, New York City, is inquiring for 6 flat cars.

THE JOHN MORRELL COMPANY, Ottumwa, Iowa, has awarded the contract for 100 refrigerator cars to the American Car & Foundry Company.

The BENGAL & NORTH WESTERN (India), reported in the *Railway Age* of December 31 as inquiring for 25 cars has ordered 25 logging cars from Cravens, Ltd., England.

The ASSAM BENGAL (India), reported in the *Railway Age* of December 31 as inquiring for 100 cars, has ordered 100 open top cars from the Birmingham Railway Carriage & Wagon Company, Ltd., England.

The ILLINOIS CENTRAL, reported in the *Railway Age* of November 19, as inquiring for 2,500 gondola cars has placed orders for 2,000 gondola cars as follows: Haskell & Barker Car Company, 700; Western Steel Car Company, 400 and Standard Steel Car Company 400, all these cars to have 8 drop doors, and American Car & Foundry, 500 cars to have 12 drop doors.

THE UNION PACIFIC has awarded contracts for 4,500 cars as follows: 1,000 all-steel automobile cars to the Pullman Company; 1,000 steel frame automobile cars to the General American Car Company, and 500 of the same type to the Standard Steel Car Company; 1,000 box cars each to the Mount Vernon Car & Manufacturing Co., and the American Car & Foundry Company.

Passenger Cars

The PENNSYLVANIA RAILROAD will in the near future place orders for cars for passenger service to include 20 all steel dining cars.

Iron and Steel

THE LOUISVILLE & NASHVILLE is inquiring for 50,000 tons of rails.

THE KANSAS CITY SOUTHERN has awarded a contract for 6,000 tons of rails to the Illinois Steel Company.

THE LOUISVILLE & NASHVILLE has ordered 50,000 tons of rail from the Tennessee Coal, Iron & Railroad Company.

THE GOVERNMENT RAILWAYS OF JAPAN have ordered through Mitsui & Co., New York, 13,000 tons of 75-lb. and 60-lb. rail, from the United States Steel Products Company.

Machinery and Tools

THE SEABOARD AIR LINE has ordered a gap lathe from Manning, Maxwell & Moore; a vertical turret lathe from the Bullard Machine Tool Company; a horizontal turret lathe from Warner & Swasey; a wheel press, car wheel borer, engine lathe, 10-ton crane and a steam hammer from the Niles-Bement-Pond Company.

WILLIAM S. WOLLNER, general safety agent of the Northwestern Pacific, has been chosen secretary-treasurer of the San Francisco Engineering Council.

THE FREIGHT REVISION BUREAU of the New York Central at New York city has been transferred to and consolidated with the Freight Revision Bureau at Cleveland, Ohio. All waybill and waybill correction forms and merchandise waybilling instructions are under the jurisdiction of this office. The manager is W. E. Munger.

Supply Trade News

Walter Hasendahl, 1213 Fuller avenue, Los Angeles, Cal., has been appointed representative at Los Angeles of the Orton & Steinbrenner Co., Chicago.

Carl H. Peterson, has been appointed secretary, treasurer and general manager of the **Maier Engineering Company**, Peoples Trust & Savings Bank building, Chicago.

J. A. Connelly, manager of the Tampico, Mexico, office of the Petroleum Iron Works Company, Sharon, Pa., has been appointed sales manager with headquarters at Sharon.

S. F. Bowser, founder and president of **S. F. Bowser & Co.**, Fort Wayne, Ind., has retired from the presidency of the company and will be succeeded by **S. B. Bechtel**, general manager.

The **Pilliod Company**, manufacturer of the Baker locomotive valve gear, has opened a western office at 750 Railway Exchange building, Chicago, in charge of **Burton Mudge**, vice-president.

O. I. Eberhardt, Board of Trade building, Scranton, Pa., has been appointed a special representative of the **Roller-Smith Company**, New York City. His territory includes several counties in the northeastern part of Pennsylvania.

Albert J. Leonard has been appointed eastern sales representative of the **Handlan-Buck Manufacturing Company**, St. Louis, Mo. Mr. Leonard's headquarters are at the eastern office of the company, 52 Vanderbilt avenue, New York City.

The firm of **Black-Matthews Company, Inc.**, 25 Church street, New York City, has been organized by Edward J. Matthews and J. Nelson Black to transact business in iron and steel products, together with machinery and railway equipment.

The **Automatic Railway Gate Company**, Milwaukee, Wis., has been incorporated with a capital stock of \$5,000, to manufacture safety devices for railroad crossings. The incorporators are **Frank P. Mansfield**, 426 Thirty-first street and **Ottmar Kloetzner, Jr.**

Howard J. Charles, formerly with the purchasing and engineering department of the Union Pacific, at New York, who entered the service of the **Elvin Mechanical Stoker Company**, in June, 1921, has been appointed assistant treasurer of the latter company, with office at 50 Church street, New York City.

Robert C. Weller, formerly industrial agent of the New York Central Lines West, and more recently general sales manager of the **Lakewood Engineering Company**, Cleveland, Ohio, resigned on January 1. He has been elected president of the **Marsh-Capron Company**, Chicago, manufacturers of rail-track concrete mixers.

The **Ohio Structural Steel Company** has established a plant at Newton Falls, Ohio. **M. H. Stauffer**, formerly of the Niles Forge & Manufacturing Company, Niles, Ohio, has been appointed president and general manager and **J. S. Mitchell**, formerly with the **Kansas City Structural Steel Company**, Kansas City, Mo., chief engineer.

The **Missouri Tie & Lumber Company** has been organized with offices in the Railway Exchange building, St. Louis, Mo., with **C. O. Deabler**, formerly with the **Abeles & Taussig Tie Company** and prior to that tie and timber agent of the Southwestern region of the United States Railroad Administration, as president and **James J. Searey** as secretary treasurer.

W. H. Graul, department sales manager, and J. J. Hughes, manager of the order department of the **American Steel Foundries**, Chicago, have organized the firm of **Hughes &**

Graul, manufacturers representatives, with headquarters in the Peoples Gas Building, Chicago. The company will represent The Ohio Steel Foundry Company, Lima, Ohio, cast steel manufacturers, and The McConway & Torley Company, Pittsburgh, Pa.

The **Hall Switch & Signal Company**, Garwood, N. J., has arranged with the General Electric Company, Limited, of London, to manage the sales in foreign countries of the Hall Color-Light Signal and other signal apparatus of Hall manufacture. This arrangement includes France, Belgium, Holland, China, India, Siam, South Africa, New South Wales, Victoria, New Zealand, Western Australia, Argentine and Chili. It is also announced that the Hall products will be sold in Canada by the M. & S. Company, of Montreal.

The Interstate Commerce Commission on January 9, issued an order authorizing the **Pullman Company** to issue 165,000 shares of its capital stock for the purpose of acquiring all the assets of the **Haskell & Barker Car Company**. The company proposes to increase its authorized capital stock from \$120,000,000 to \$135,000,000 and to issue 150,000 shares, plus 15,000 shares held in its treasury. The commission expresses the opinion that it was not necessary for the company to apply to it for permission to issue the securities, but says that counsel for the applicant think otherwise and since there is room for doubt concerning the matter, it has decided to assume jurisdiction. Commissioner Eastman dissented, agreeing that it was not necessary for the applicant to come to the commission, but not agreeing that the commission should assume jurisdiction. Because the applicant is in part a common carrier and in part a manufacturing corporation, he said, the transaction in question has nothing to do with the performance of the applicant's functions as a common carrier.

Trade Publications

THAWING OUTFITS.—An eight-page booklet has been issued by the **Maclod Company**, Cincinnati, Ohio, on its extensive line of kerosene oil burning torches for use in thawing out switches, turntables, ash hoists, cars and other equipment susceptible to freezing during cold weather. Each of the several types of torches mentioned is described fully, with illustrations.

CRAWLING TRACTOR CRANE.—The **Industrial Works**, Bay City, Mich., has issued an eight-page booklet illustrating and describing the construction and application of the "Industrial" crawling tractor cranes. In addition to describing its line of cranes, some space is given to the history of the company as a manufacturer of industrial cranes, and particular attention is given to showing the advantages afforded by power operated cranes in railway and other industrial service.



Interior of Private Car Built in Formosa Under the Direction of Chief Mechanical Engineer, Government Lines

Railway Construction

CHICAGO, MILWAUKEE & GARY.—This company, which was noted in the *Railway Age* of December 24 (page 1286), as having applied to the Interstate Commerce Commission for authority to construct an extension between Aurora, Ill., and Joliet, a distance of approximately 29 miles, where the company now operates over the tracks of the Elgin, Joliet & Eastern, has received permission to build this line. The entire cost of this work is estimated at \$2,700,000.

CHICAGO, MILWAUKEE & GARY.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a line from a point 3.4 miles north of this company's terminals at Aurora, Ill., to a point 3.33 miles east of its terminals at Joliet, Ill., a distance of 29.2 miles.

CHICAGO UNION STATION.—A contract has been awarded to the Lamson Company, Boston, Mass., for the conveyors, chutes, and other mechanical handling equipment to be installed in the \$4,000,000 railway mail terminal now being constructed as a part of the Chicago Union Station project.

INTERMOUNTAIN COAL & LUMBER Co.—This company contemplates the construction of a railroad, to extend from near Poorfork, Ky., on the Cumberland Valley division of the Louisville & Nashville, into the Grassy and Bad creek territory, a distance of approximately 12 miles.

INTERSTATE.—This company has awarded a contract to the McClintic-Marshall Company, Pittsburgh, Pa., for the fabrication and erection of 15 deck plate girder bridges for its Guest river extension and seven deck plate girder and four half through girder bridges for replacing those in its main line between Appalachia, Va., and Norton.

MINERETS & WESTERN.—This company is receiving bids for the construction of a 35.5 mile standard-gage railroad extending from Fresno, Cal., into timber lands. This work is to include the grading, filling, excavating, trestle construction, masonry, etc. In addition the Sugar Pine Lumber Company will construct a 19.5 mile extension from the new terminus of the Minerets & Western into its timber property. The construction work of the entire 55-mile line is estimated to cost \$2,500,000.

MISSOURI, KANSAS & TEXAS.—This company, which was noted in the *Railway Age* of December 31 (page 1332), as contemplating extensive construction work in connection with a new freight terminal, including buildings, a yard and connections at Denison, Tex., has now prepared definite plans for the project. The work involves the acquiring of 400 acres of land; the laying of 57 miles of track; the construction of culverts aggregating 6,000 cu. yd. of concrete; 800,000 cu. yd. of grading; a 22-stall round-house and shop; a power house, a store house and other locomotive and car facilities, the entire cost of which is estimated at \$3,000,000. The necessary land has been purchased and a contract for the grading and the culverts has been awarded to C. R. Cummins Company, Cleveland, Ohio. It is expected that bids for the buildings and structures will not be called for before spring.

MISSOURI PACIFIC.—This company will receive bids until January 16 for the construction of a station at Nashville, Ark., estimated to cost \$12,000.

MOBILE & OHIO.—This company is now constructing coal and cinder handling facilities at Jackson, Tenn., estimated to cost \$25,000.

UNION PACIFIC.—This company, in conjunction with the city of Denver, Col., will construct a viaduct in that city, extending from Twenty-sixth and Market streets, north across the Union Pacific tracks. The work is estimated to cost approximately \$500,000, and will be handled by the city under a contract which has not yet been awarded.

Railway Financial News

CAIRO, TRUMAN & SOUTHERN.—*Authorized to Issue Notes.*—The Interstate Commerce Commission has authorized an issue of \$250,000 of five-year promissory notes at 6 per cent, \$172,000 to be used to cover floating debts and \$78,000 to provide funds for construction and repairs. The authorization is subject to the condition that to the extent that notes are used to cover indebtedness incurred on account of operating expenses or to provide funds for expenditures properly chargeable to operation, they shall be paid from earnings and not made a basis of any future capitalization.

CENTRAL OF NEW JERSEY.—*New Directors.*—The new board of directors consists of William G. Besler, Henry Graves, Jr., Ernest R. Ackerman and Howard W. Maxwell, who were re-elected, and Theodore W. Reath, A. H. Harris, George M. Shriver, Robert E. McCarthy and C. S. W. Packard, who were elected to succeed George F. Baker, former chairman, Robert W. de Forest, E. T. Stotesbury, Daniel Willard and Agnew T. Dice.

CHICAGO & EASTERN ILLINOIS.—*Ends Receivership.*—See article on another page of this issue.

CHICAGO & NORTH WESTERN.—*Company's Strong Position.*—President W. H. Finley is quoted as follows:

The Chicago & North Western has no floating debt and owes nothing beyond usual current bills. Cash stands at a higher figure than for some years and will be increased by settlement for the guaranty period, against which the company's claim is \$16,509,185.

The December business was not as large as November, loadings being 84,507 cars against 126,100 in November, but earnings in both months were seriously affected by shippers' disposition to hold off for lower rates where possible. Reductions are now effective and increased earnings are in prospect.

Improvement in the case of the Chicago & North Western may be predicted to occur about March, in anticipation of the reopening of lake navigation. In the event of a pronounced revival of business the road will be found ready to furnish ample service. The property has been fully maintained. While some shops are running four days a week, bad order cars average less than 6 per cent.

CHICAGO, MILWAUKEE & ST. PAUL.—*Acquisition of Chicago, Milwaukee & Gary.*—In regard to the proposed acquisition of the Chicago, Milwaukee & Gary, noted in last week's issue of the *Railway Age*, Dow, Jones & Co. quotes H. E. Byram, president of the Chicago, Milwaukee & St. Paul, as follows:

The acquisition of the Chicago, Milwaukee & Gary coal line operating over approximately 120 miles, forms a natural connection with the St. Paul's main line and the Terre Haute road. It affords easy access to 75 per cent of its territory in the West and Northwest where coal is consumed over a route shorter than via Chicago. Grades are more favorable and will expedite movement. Coal traffic on the road is increasing rapidly. Fifteen-mile savings is effected by diverting traffic destined to Northwest via Gary line and connecting with St. Paul's main line at Kirkland, Ill. There is also saving of two miles on business destined to La Crosse. The deal also gives the St. Paul direct connection with the New York Central, enabling it in times of congestion and embargoes in Chicago to transfer business for the East and save several days.

The St. Paul guarantees interest on \$3,000,000 bonds, guarantee to begin January 1, 1924.

CHICAGO, MILWAUKEE & GARY.—*Acquisition Sought.*—See Chicago, Milwaukee & St. Paul.

CHICAGO, ROCK ISLAND & PACIFIC.—*Statement on Valuation.*—The relation of the tentative valuation of the Chicago, Rock Island & Pacific and the Chicago, Rock Island & Gulf, as issued by the Interstate Commerce Commission in September, to the present capital liabilities of these properties, is made clear in a statement issued to the Rock Island stockholders on January 7. This shows that the commission's valuation exceeds the liabilities as of June 30, 1921, by \$9,801,315. An abstract of this statement follows:

After six years' work the tentative valuation of your company's properties was announced by the Interstate Commerce Commission in September at approximately \$335,500,000, as of June 30, 1915. This is for carrier property only.

In order to make a comparison of the value announced by the commission with the company's present capitalization, it is necessary to exclude the value of certain leased lines whose capital stock is not entirely owned by this company and to bring the

figures down to date by adding additions and betterments since the date of valuation. So stated, the comparison is as follows:

PHYSICAL PROPERTY AS OF JUNE 30, 1915, AS ANNOUNCED BY COMMISSION	
(a) Carrier property (C. R. I. & P. C. R. I. & G., and Morris Terminal).....	\$335,539,013
(b) Non-carrier property.....	5,745,895
Total.....	\$341,284,908
From the foregoing should be excluded the values of the following leased lines, which are not controlled through the ownership of entire capital stock:	
Keokuk & Des Moines.....	\$3,464,958
Peoria & Bureau Valley.....	1,650,000
White & Black River.....	700,000
	5,814,958
Balance, excluding these lines.....	\$335,469,950
There should also be deducted cash and materials on hand June 30, 1915, as found by the commission.....	9,022,288
Remainder, representing physical property owned directly or through stock ownership, as of June 30, 1915, as found by commission.....	\$326,447,662
Add: Additions and betterments July 1, 1915, to June 30, 1921.....	36,374,458
Cash and materials, June 30, 1921.....	25,455,222
Total, June 30, 1921.....	\$388,277,342
LIABILITIES JUNE 30, 1921, ACCORDING TO COMPANY'S BOOKS	
Long term debt.....	\$234,505,515
Loans and bills payable.....	14,930,000
Preferred stock.....	54,557,989
Total capital liabilities ahead of common stock.....	\$303,993,504
Common stock outstanding.....	74,482,523
Total capital liabilities.....	\$378,476,027
Amount by which value as found by commission exceeds total capital liabilities as of June 30, 1921.....	\$9,801,315
Amount of equity represented by common stock (difference between property values of \$388,277,342 and total of senior obligations).....	\$4,283,838
Same per share of \$74,482,523 of common stock.....	\$113.16

This valuation, officially determined by the United States Government, refuses for all time and for all purposes the suggestion sometimes made by the uninformed, that this company is over-capitalized. We regard the valuation established by the commission as being much less than the actual value of the property, and have filed the protest contemplated by law in the hope that, upon a hearing, the commission will substantially increase its valuation; but, even on the commission's minimum basis, this valuation must be taken as establishing a property value behind our stocks and bonds, much in excess of their par value.

Asks Authority to Issue Bonds and Hold Stock.—The Chicago, Rock Island & Pacific has applied to the Interstate Commerce Commission for authority to issue \$1,000,000 of general mortgage gold bonds to reimburse the treasury for expenditures out of income and to be deposited with the trustee of the first and refunding gold mortgage as the basis for an issue of \$1,000,000 of bonds, authority for which is also requested, to be held in the treasury as collateral security to be used from time to time for short term notes. The company has also applied to the commission for an order approving the owning and holding by the Rock Island of 35,120.5 shares of the preferred stock and 68,140.5 shares of the common stock of the Chicago & Alton, which ownership results from the litigation growing out of the ownership by the Rock Island of collateral trust bonds of the Toledo, St. Louis & Western.

ERIC—Surplus for 1921—In refutation of reports concerning reorganization and receivership resulting from the low quotations of all Erie stocks on January 9, Vice-President G. F. Brownell said that the Erie will be able to show a "comfortable surplus" for 1921, after allowing for fixed charges.

Mr. Brownell explained that no new financing was contemplated by the Erie in 1922, and added that he was at a loss to account for the movement. The common stock closed at 7 1/2, the lowest in more than twenty years. All of the company's interest charges and rentals, due on January 1, amounting to about \$2,000,000, were "promptly paid." Mr. Brownell said, "The \$1,000,000 mortgage for fixed charges April 1, as well as the \$2,000,000 for July 1, would be handled 'without difficulty.'"

Mr. Brownell explained that the matter of the Erie's \$15,000,000, three-year 7 per cent notes, falling due on April 1, 1922, "was receiving attention." Of this \$15,000,000 issue, the War Finance Corporation had already made \$9,000,000, and the balance of approximately \$2,500,000 will be paid by the Erie.

GAINESVILLE & NORTHWESTERN—Loan Authorized—The Interstate Commerce Commission has approved this company's application for a loan of \$75,000 and has granted authority to issue that amount of first mortgage bonds to be pledged with the Secretary of the Treasury as security.

MOORE, KANSAS & TEXAS—Plan Operative—J. & W. Selig-

man & Co. and Hallgarten & Co., reorganization managers, announce that the securities called for under the reorganization plan have been deposited in such volume that the plan will be declared operative at once. More than 85 per cent of all the bonds called for deposit have accepted the plan, exclusive of the first mortgage 4s. A substantial majority of the stock has also been deposited, but the figures are incomplete on account of foreign stock in transit.

The reorganization plan was outlined in the *Railway Age*, of November 26, 1921, page 1043.

NORFOLK SOUTHERN.—Asks Loan from Revolving Fund.—This company has applied to the Interstate Commerce Commission for a loan of \$1,000,000 for 10 years.

OREGON SHORT LINE.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$16,424,000 of consolidated first mortgage 5 per cent gold bonds to be sold at not less than 91, to retire maturing bonds.

RIO GRANDE SOUTHERN.—Protective Committee.—As a result of the default by this company in the payment of interest on its first mortgage 4 per cent bonds on January 1, a committee to protect the interests of the holders of those bonds has been formed. Its members are Arthur Coppell, of Maitland, Coppell & Co., chairman; Theodore G. Smith, vice-president, Central Union Trust Company; and F. J. Lisman, of F. J. Lisman & Co.

SEABOARD-BAY LINE.—Applies for a Loan for Equipment.—This company has applied to the Interstate Commerce Commission for a loan of \$4,679,892 for 15 years to enable it to acquire equipment for sale or lease to the Seaboard Air Line.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Peoria & Pekin Union.....	\$135,000
Union Depot Company, of Columbus, Ohio.....	50,000
Central of Georgia.....	1,000,000
Ocean Steamship Company of Savannah.....	2,275,000
Yazoo & Mississippi Valley.....	5,075,000
Illinois Central Paid Director General.....	7,750,000

SHORT LINES

Kentwood, Greensburg & Southwestern.....	\$17,000
San Joaquin & Eastern.....	10,000
Nez Perce & Idaho.....	6,000
Waterville Railway.....	3,000

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Dividends Declared

Nashville, Chattanooga & St. Louis.—3 1/2 per cent, semi-annually, payable February 1 to holders of record January 21.

Pittsburgh & Lake Erie.—\$2.50, semi-annually, payable February 1 to holders of record January 25.

BARNEY ODFIELD states that never in a road race or on any occasion did he cross a railroad at speed or with his car in first drive; he has always slowed down and shifted to second before crossing. He slows down to look and listen and crosses in second to eliminate the chance of a stalled motor.—B. R. & P. Circular.

THE TRINITY & BRAZOS VALLEY RAILROAD has asked the Texas Railroad Commission for permission to drill six oil wells upon its right of way in the Mexia field, the first application of its kind that ever came before the Commission. The question involved is whether or not under its charter the railroad company can legally engage in the oil production business, and the public hearing on the question brought forth strong opposition. This opposition came chiefly from Morris Frankel and associates who asserted that they had paid \$1,000,000 for a lease of ten acres of land, bordering the right of way of the railroad and that if the road should be permitted to drill for oil it would mean a heavy loss to him and his associates. The Trinity & Brazos Valley is owned jointly by the Colorado & Southern and the Rock Island companies.

Railway Officers

Executive

L. D. Gilbert has been elected president of the Lufkin, Hemphill & Gulf; **Arthur Temple**, first vice-president; **E. C. Durham**, second vice-president, treasurer and general manager; **C. M. McWilliams**, secretary, and **C. A. Jordan**, assistant secretary. This road has recently been acquired by the interests which control the Texas South Eastern and of the newly appointed officers Messrs. Temple, Durham and Jordan also hold positions with the latter company.

Frank G. Nicholson, whose election as vice-president and general manager of the Chicago & Eastern Illinois, with headquarters at Chicago, was announced in the *Railway Age* of January 7 (page 162), was born at Gonzales, Tex., on December 17, 1876, and was educated in the public schools, Austin College and at the University of Texas. He entered railroad service in 1899 as a clerk in the offices of the Missouri, Kansas & Texas. He left in 1904, to become secretary to the general manager of the Chicago, Rock Island & Pacific at Chicago, which position he held until 1905, when he entered the service of the Chicago & Eastern Illinois as secretary to the vice-president and general manager. He was promoted successively to chief clerk to the vice-president and general manager, assistant to the receiver and to general manager, which latter position he was holding at the time of his recent promotion.

Thomas D. Heed, whose election as vice-president of the Chicago & Eastern Illinois, with headquarters at Chicago, was announced in the *Railway Age* of January 7 (page 162), was born on March 19, 1873, at St. Louis, Mo. He entered railroad service in January, 1896, in the general auditor's office of the Missouri, Kansas & Texas, at St. Louis. Since that time he has been successively field paymaster for the construction department of the Standard Oil Company; cashier of the Southwestern Passenger Bureau; chief clerk in treasury department of the St. Louis-San Francisco at St. Louis; and assistant secretary and assistant treasurer of the same company with the same headquarters; from 1903 to 1913, assistant secretary and assistant treasurer of the Chicago & Eastern Illinois, with headquarters at Chicago; and from 1913 to 1915, assistant to the receiver of the same company, with the same headquarters. He left railroad service in 1916, but returned in 1918 as receiver and president of the Chicago & Eastern Illinois to act in that capacity during W. J. Jackson's term as federal manager. Upon the return of the railroads to their owners, Mr. Heed became financial assistant to the receiver (Mr. Jackson) which position he was holding at the time of his recent election.



T. D. Heed

Financial, Legal and Accounting

Charles Elsey, whose appointment as vice-president and treasurer of the Western Pacific, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of November 26 (page 1071), was born at Oakland, Cal., on September 18, 1880. He entered railroad service in November, 1907, as assistant treasurer of the Western Pacific, with head-

quarters at San Francisco. He has been successively treasurer, and secretary and treasurer, which latter position he was holding at the time of his recent promotion.

Oliver G. Browne has been appointed claims attorney of the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Michigan Central and the Toledo & Ohio Central, with headquarters at New York.

Operating

C. G. Stevens has been appointed superintendent of the new consolidated St. Louis division of the Baltimore & Ohio, with headquarters at Washington, Ind.

J. D. Fraser, acting superintendent of the Esquimalt & Nanaimo, with headquarters at Victoria, B. C., has been promoted to superintendent with the same headquarters.

O. F. Clark, superintendent of transportation of the Grand Trunk, with headquarters at Chicago, has been appointed car accountant with the same headquarters. He will be succeeded by **J. A. Clancey**, heretofore trainmaster, with headquarters at Battle Creek, Mich.

H. S. Smith has been appointed trainmaster of the Baltimore & Ohio with headquarters at Washington, Ind. **K. S. Pritchett** has been appointed to a similar position with headquarters at Flora, Ill., and **J. B. Purkhiser** has been appointed trainmaster with headquarters at North Vernon, Ind.

J. C. McPherson, assistant general superintendent of the Pacific Electric, with headquarters at Los Angeles, Cal., has been appointed superintendent of the newly created East Bay Electric division of the Southern Pacific, with headquarters at Oakland, Cal. This new division, which embodies the electric suburban lines in Oakland, Alameda, and Berkeley, was formerly a part of the Western division.

B. H. Hammer has been appointed trainmaster of the Fargo division of the Northern Pacific, with headquarters at Dilworth, Minn., succeeding **J. F. Tracy**, and **O. F. Ohlson** has been appointed trainmaster of the Montana division, with headquarters at Livingston, Mont. **F. L. Birdsall** has been appointed trainmaster, with headquarters at Duluth, Minn., succeeding **T. B. Quinn**, transferred, and **H. J. Councilman** has also been appointed trainmaster with the same headquarters, succeeding **D. E. Nichols**, transferred.

Traffic

R. M. Taliaferro has been appointed commercial agent of the Norfolk & Western with headquarters at Columbia, S. C.

C. J. Nelson has been appointed general agent of the Chicago, Burlington & Quincy with headquarters at Herrin, Ill., effective December 27.

W. P. Withers, general agent of the Gulf & Ship Island, with headquarters at Hattiesburg, Miss., has been transferred to Dallas, Tex., in charge of the newly-created traffic office there.

H. N. Stout, traveling freight agent of the Fort Dodge, Des Moines & Southern, with headquarters at Chicago, has been promoted to general agent, with the same headquarters, succeeding **C. E. Carson**, resigned.

F. C. Coley, assistant general passenger agent of the New York, New Haven & Hartford and the Central New England, has been promoted to general passenger agent, succeeding **A. B. Smith**, resigned to accept service with another company.

A. M. Thomas has been appointed commercial agent of the Atlantic Coast Line with headquarters at Jacksonville, Fla. **J. L. Moorman** has been appointed to a similar position at Orlando, Fla., and **M. A. Spooner** to a similar position at St. Petersburg, Fla.

Albert Cotsworth, assistant general passenger agent of the Chicago, Burlington & Quincy, with headquarters at Chicago,

has been transferred to Omaha, Neb., succeeding L. W. Wakely, general passenger agent, who has been granted a leave of absence due to ill health.

J. C. Willis has been appointed general agent of the Atlanta & West Point, the Atlantic Coast Line, the Georgia, the Louisville & Nashville, the Louisville, Henderson & St. Louis and the Western Railway of Alabama, with headquarters at San Francisco, effective January 1.

B. P. Stedman has been appointed general agent of the Louisiana Railway & Navigation, with headquarters at Alexandria, La. T. F. Wilder, commercial agent, with headquarters at Alexandria, has been transferred to New Orleans, La., succeeding John A. Smith, resigned.

William King has been appointed freight claim agent of the New York, New Haven & Hartford, the Central New England, the New England Steamship Company and the New Bedford, Martha's Vineyard & Nantucket Steamboat Company with headquarters at Boston, Mass., effective January 15.

Archibald Gray, general freight agent of the Western Pacific, with headquarters at San Francisco, Cal., has been promoted to assistant to the traffic manager, with the same headquarters. He has been succeeded by J. D. Mansfield, manager of the traffic department of the Seattle Chamber of Commerce, Seattle, Wash., who was formerly assistant general freight agent of the road.

The following appointments in the traffic department of the Canadian Pacific are announced, effective January 1: J. J. Morton, foreign freight agent, New York; W. I. Chudleigh, import freight agent, Chicago; W. C. Bowles, assistant freight traffic manager, Montreal; R. E. Larmour, general freight agent, Montreal; S. C. Hurkett, assistant general freight agent, Montreal; C. E. Jefferson, general freight agent, Winnipeg.

Mechanical

J. J. Herlihy, has been appointed master mechanic of the Baltimore & Ohio with headquarters at Washington, Ind.

W. G. McPherson, master mechanic of the Regina division of the Canadian Pacific, with headquarters at Regina, Sask., has been transferred to Moose Jaw, Sask.

C. H. Creager has been appointed road foreman of engines of the Baltimore & Ohio with headquarters at Washington, Ind., and S. A. Rogers has been appointed to a similar position with the same headquarters.

Engineering, Maintenance of Way and Signaling

J. Hewes, Jr., has been appointed division engineer of the Baltimore & Ohio with headquarters at Washington, Ind.

W. H. Coverdale, consulting engineer, with headquarters at New York, has been appointed consulting engineer of the Chicago & Eastern Illinois, with the same headquarters.

P. T. Robinson, assistant division engineer of the Southern Pacific, with headquarters at Oakland Pier, Cal., has been promoted to division engineer, with headquarters at Oakland, Cal.

A. N. Reece, division engineer of the Kansas City Southern, with headquarters at Texarkana, Tex., has been promoted to chief engineer, with headquarters at Kansas City, Mo., succeeding J. M. Weir, who has resigned to enter the service of the National Boiler Washing Company, Chicago. In connection with this change, Mr. Reece, who was also formerly chief engineer of the Texarkana & Fort Smith, will become the consulting engineer of that road. He will likewise succeed Mr. Weir as chief engineer of the Poteau Valley and of the Arkansas Western.

Purchasing and Stores

C. B. Tobey, assistant general storekeeper of the Lehigh Valley, with headquarters at Packerton, Pa., has been promoted to general storekeeper, with the same headquarters,

succeeding C. C. Huntington, who has left the service due to ill health.

W. A. Summerhays, whose appointment to the newly created position of lumber and tie agent of the Illinois Central, with headquarters at Chicago, was announced in the



W. A. Summerhays

Railway Age of January 7 (page 162), entered railroad service in June, 1898, as an engineering apprentice of the Illinois Central, and was assigned to track work on the Chicago division. He was promoted to section foreman in 1900, and the following year he was made general foreman on double track and construction work. The latter part of the same year he was promoted to assistant general storekeeper in charge of track materials in the newly created supply department. In 1910, he was

promoted to general storekeeper with headquarters at Burnside, Ill., and in 1917, he was promoted to assistant purchasing agent. Mr. Summerhays was in charge of the purchasing department during the period of federal control, at the end of which he was appointed purchasing agent, which position he was holding at the time of his recent appointment.

Joseph J. Bennett, whose appointment as purchasing agent of the Illinois Central, with headquarters at Chicago, was announced in the *Railway Age* of January 7 (page 162), was



J. J. Bennett

born at Centralia, Ill., on July 7, 1885. He entered railroad service in 1902, as an expense clerk in the local freight office of the Illinois Central at Centralia. In 1903 he left to enter the employ of the Centralia Coal Company, for which company he worked in various capacities at the mines, and was later promoted to top superintendent. In July, 1907, he re-entered the service of the Illinois Central as coal inspector at Centralia. He was promoted to traveling coal inspector, Southern lines, with headquarters at Princeton, Ky., in March, 1909, and to fuel agent, with headquarters at Chicago on October 10, 1910. On January 1, 1913, Mr. Bennett was promoted to assistant purchasing agent, with the same headquarters, which position he was holding at the time of his recent promotion.

Obituary

J. R. Walsh, pioneer railroad builder and financier and formerly president of the Southern Indiana, died on January 11 at his home in Chicago.

J. H. Collins, division storekeeper of the Southern Pacific, with headquarters at Los Angeles, Cal., died of pneumonia on December 4, at his home in that city. Mr. Collins had been in the service of the Southern Pacific since 1906.

EDITORIAL

Railway Age

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The orders placed for passenger cars in 1922 will exceed those for 1921. This is written the third week in January.

1922 Orders Exceed Last Year's

Rather early in the year, some will say, to make a prophecy of such far-reaching character. But not too early, because insofar as the Class I railroads are concerned the prophecy has already been fulfilled. The orders for passenger cars for service in United States placed during 1921 totaled 246, of which 207 were placed by the Class I roads. The passenger car orders placed by the Class I roads so far in 1922 total 222, already 15 more than last year's total. The orders represent one week's business and are reported in this week's Equipment and Supplies column. They include 127 cars ordered by the Chicago, Burlington & Quincy, 45 by the Chicago & North Western and 50 by the Long Island. But for the fact that the 1921 orders were so extremely small, one could say that the railroads in this country have placed the equivalent of a year's business in a single week. Unfortunately comparisons with 1921 do not mean much. Nevertheless, orders for 222 passenger train cars in one week set a good pace. It is as good as could be supplied when business was at its best in the good old times. Presumably, of course, the pace which January has set in passenger car business will not be kept up for the year, but that does not get around the fact that there are still a number of roads which have been asking prices on passenger cars and whose passenger car orders have not yet been let.

The Interstate Commerce Commission's proposed order for the installation of automatic train stops on prominent railroads throughout the country (printed last week, page 189) will be of value chiefly as a starting point for discussion. It aims to bring to an end a period of controversy and experiments which has extended over 15 years, an aim which everybody must approve; every progressive railroad officer must wish to see this period of uncertainty brought to an end. The delay of 15 years since this subject was first broached in Congress has seemed intolerable; yet everyone must recognize that the underlying cause of delay has been the same in every quarter; the large and uncertain cost of an improvement which aimed at just one danger. But much progress has been made in the last 10 years, and automatic train control is now recognized as having possibilities of economy in operation aside from the narrow question of safety. The Chicago & Eastern Illinois has been using automatic stops for over eight years; and the commission will no doubt now call upon other roads to explain the causes of the differences between their views, or their standards, and those of the C. & E. I. (The C. & E. I. system is of the intermittent electrical contact or ramp type.) The commission has taken a wise step in declaring that the stage of preliminary experiment must be brought to an end and in preparing to open the way for the testing of other types. There is another condition, however, which the commission is in duty bound to terminate; the condition of doubt as to how this costly improvement is to be paid for. Under the Transportation Act, 1920, the commission can, in theory, improve the railroads' incomes to match their increased ex-

The Call for Automatic Train Stops

penses, but no one knows, as yet, how this theory is going to work out. The commission virtually commands these 49 railroads to spend, each, a very considerable sum for a radical experiment in safety. This and the numerous technical questions which have long needed a thorough airing will have to be thrashed out in the hearings which the commission no doubt will hold.

F. V. Russell, superintendent of operation of the Great Eastern Railway of England, who has just returned after traveling some 25,000 miles inspecting the railways of the United States and Canada, is quoted by the Philadelphia Public Ledger as suggesting an interchange of railway operating men between the United States and England. Mr. Russell, the dispatch to the Public Ledger says, is of the opinion that England could learn from us in handling freight and that we could well study some of England's methods in transporting passengers. This conclusion seems logical enough. If some such arrangement could be worked out, much good might come of it. The proportion of our railway officers who seek to improve their knowledge of railroading by a study of methods in foreign countries is very small, perhaps smaller than that of any other country, and yet in some portions of the United States railroading has already become almost as intensive as it is in England. We should not, however, expect a group of American railway men to return from England with ideas which would revolutionize our methods overnight. We should rather expect that an inspection of English practices would provide information for the formulation of a far-seeing policy for future development in this country. The occasion of the International Railway Congress in Rome in April provides an additional incentive for American railway officers who are in a position to make the trip. At all events the matter is one worthy of consideration.

Learning Railroading Abroad

The railways have made extremely drastic retrenchments since the decline in business. Probably most of them have saved as much money as they could in most ways. The statistics indicate, however, that they have not reduced expenses in one way as much as they could. The decline in passengers carried one mile in the first ten months of 1921, as compared with the first ten months of 1920, was over 19 per cent. There was practically no reduction, meantime, in the amount of passenger service rendered. The decline in passenger trains run one mile in the country as a whole was only 1.5 per cent. There was some curtailment of the number of passenger cars run in each train, but the reduction of passenger train car miles was only about three per cent. In western territory the decline of passenger traffic was almost 25 per cent, and this actually was accompanied by a very small increase in passenger train service. The difficulties in the way of reducing passenger train service are much greater than those met in reducing freight train service. The public usually complains about almost every reduction of passenger train service and often the consent of railroad commissions

Passenger Traffic and Passenger Service

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to take off trains cannot be obtained. It is difficult to believe, however, that with such a large reduction of passenger business as occurred the railways could not have obtained the consent of the commissions to reduce passenger service substantially more than they have and satisfied the public that it was justifiable. It is true that during the war years there was much over-crowding of trains due to curtailment of the service accompanied by a large increase of travel, and that the railways since they were returned to private operation have been engaged in restoring the passenger service to normal. It seems plain, however, that during the last year more passenger service was rendered than general business conditions and the earnings of the railways warranted, and that this was largely due to competition between the railways. It is far better to reduce expenses by curtailing train service than by deferring maintenance. The former makes real savings, while the latter does not. Competition in service is desirable, but it ought not to be allowed to prevent real economies from being made at a time when maintenance expenses are being cut to the bone, and when, in spite of this, the net return being earned is wholly inadequate.

A newspaper which we had never seen before came to our offices last week. In size and subject matter it did not differ greatly from the average small town newspaper. But in the excellence of its cartoons, illustrations and general composition it was the equal of most of our large metropolitan dailies. This paper was the first issue of the Pennsylvania News, a publication for the employees of the Central Region of the Pennsylvania Railroad. Every two weeks from now on it will be published and distributed among the employees of that region and, if we are any judge of newspapers, it will be eagerly read: First, because it is devoted entirely to news about those for whom it is intended and, second, though just as important, because it shows the skill of an able editor in the manner in which it is made easy to read by the use of cartoons, illustrations, careful writing, well selected type and other devices known to the schooled newspaper man. The News is a welcome addition to the large family of railway periodicals. We predict its success. Meanwhile those interested in employees' magazines will watch it with interest.

The Pennsylvania News

One oft-heard commentary on the movement toward deflation is that the reduction in the costs of raw or basic materials is not adequately reflected in the prices of finished products. This complaint cannot be made with any degree of justice in the case of the steel fabricating industry. Inquiries for any appreciable tonnages in a form permitting of a fair amount of duplication in operations are sure to bring forth bids that represent an extremely small margin over current prices of the plain material. This may be explained only in part by unusually favorable arrangements between the fabricator and the mill. It must be accounted for very largely by minimum allowances for fabricating costs. Because of the relatively small amount of work being offered the shops have been compelled to make concessions to get the business. Obviously, this is a most favorable time for the contracting of steel bridge and building work and in the case of certain projects which have been dormant or only nominally in progress for a number of years, enormous savings have been accomplished through the deferment of this work until the end of the high price period. It is well known that the railroads have postponed a great many major railway bridge projects. In fact, very little work of first magnitude has been carried on for several years except such as had its inception early in the

The Conditions Are Most Favorable

war period. Work of this kind cannot be put off indefinitely and in view of the present favorable aspect of the structural steel market, a number of the railroads are reviewing their plans for the reconstruction of several large bridges.

The advantages of good light in railroad shops and engine-houses are readily apparent but in many cases seem to be overlooked. At least that is the impression gained by visiting a large proportion of existing locomotive terminals and repair shop buildings. The walls and ceilings are black; smoky winds admit feeble rays of light; and electric lamps of small candle power are located at infrequent intervals high above the floor. An inspection of almost any modern manufacturing plant on the other hand will show exactly the reverse of these conditions and prove how great importance is placed on adequate lighting facilities. Increased production and more accurate work are made possible; accidents are far less common, and workmen are not only able but willing to apply themselves more diligently in proportion to the light and cheerfulness of their surroundings. These facts explain why many shop and enginehouse employees do not feel an excess of either ambition or energy upon entering their places of daily employment. The work is often unavoidably greasy and dirty and this disadvantage, combined with poor light and gloomy surroundings, is bound to have a depressing influence. How can conditions be improved? The proportion of window to wall space in existing shops and enginehouses is fixed and, while usually less than called for by modern practice, cannot be increased except at a prohibitive cost. There are many things, however, which can be done at small expense to admit more light and brighten up the interiors. The first step is to provide means for carrying off as completely as possible gas and dust from locomotives, furnaces, forges, or what not. The walls and ceilings can then be whitewashed with the assurance that they will remain white for a reasonable length of time and reflect the light admitted through periodically washed windows. Brightening up machinery and other shop equipment by painting it a light color has also been tried in industrial plants with good results. With careful attention to these details the best light which it is possible to obtain during the daytime will be available. On dark days and at night artificial light must be used and many shops are poorly equipped in this respect. Great improvements can be made in the better location of existing lights, the cleaning and rearrangement of reflectors or the provision of more powerful lights when necessary. It has been demonstrated many times in industrial plants and in some railroad shops and enginehouses that time and money spent on improved lighting facilities is a most profitable investment.

Recently an important building in one of the large railroad terminals required painting. The expenditure was authorized, the money spent and after the paint was on the structure looked considerably more respectable than it had before. To all appearances a good job had been done economically. More recently, however, after only a few weeks in fact, it has come to light that neither was the job a good one nor an economical one. The building still appears to be painted, but what was initially paint now represents itself as powder, yielding to the touch. Manifestly something went wrong somewhere, but while inquiries, made for the purpose of finding out what the trouble was, are circulating about, this material must be removed and new paint applied—at a cost for removing of more than one-half that involved in the first

All That Glitters Is Not Gold

painting, together with an additional cost of repainting equal to that of the cost of the first painting. This, of course, is waste, not economy. Painting to be sure is a very ordinary occupation on every railroad and it is not surprising from the amount of painting done each year and the striking contrast which a freshly painted surface presents to the old surface, that men who are not painters themselves lose sight of the fact that anything at all will not do for paint and that any old way will not do for painting. The truth in the adage that "all that glitters is not gold" is particularly applicable to the painting problem. While railroads may ignore it they must eventually pay. Recognizing this, the officers upon whom any responsibility rests in connection with the painting on railroads should cultivate an interest in this work other than merely that of having it done, and will usually find it profitable to demonstrate occasionally by word or act an appreciation for whatever thought and skill the painters put into their work.

The Trend of Railway Construction

NUMEROUS INDICATIONS point to the resumption of construction work on a considerable number of roads next spring. Because of this fact it is pertinent to call attention to the gradual but steady transition from the extensive to the intensive development of the railway properties in recent years. This change will be particularly noticeable as work is resumed after the inactivity of the last three years. It is of special importance to the engineering officers of the railways, but hardly less important to those who sell construction equipment and to the contractors who specialize in railway work.

In the early days of American railway development, construction work was almost all of the extensive character—the construction of extensions and new lines. Even as recently as 15 years ago when the St. Paul and the Western Pacific were building to the Pacific Coast and other roads were constructing large mileages of branch lines, the work was principally of this character. This extensive work led to the formation of large contracting organizations which were prepared to handle the entire construction of lines several hundred miles long, including the grading, bridging and the laying of the track itself.

As the traffic has increased it has become necessary to revise the existing lines and to add to the facilities along them. While large areas still await railway facilities in this country, such widespread activity as was seen in 1906 has gone permanently. With the return of railway conditions to normal, branch line construction may be expected to increase materially. However, the great development of the future will be of an intensive character—the amplification of existing facilities. The trend of railway work in this direction is indicated by the following statement issued by the Atchison, Topeka & Santa Fe: "Railroad managements prefer to improve their plants for the efficient handling of the traffic offered, rather than to build new lines at this time to take care of business in various stages of development. A good deal of work will be done in the direction of improving roadbeds and terminal facilities, and possibly some short extensions will be made to round out certain properties, but virgin territory probably will have to wait awhile for transportation facilities."

In the conduct of intensive development work a new problem arises which is not present in the construction of new lines, namely, the necessity for the handling of traffic during the progress of the work. This necessitates a revision of methods. Much improvement work can be done most economically by making use of existing tracks and other facilities, and thus, potentially at least, disturbing regular traffic. The result is that the railways must of necessity exercise

much closer supervision over the construction work, and in many cases they are taking it over and performing it with their own forces, in order to avoid any division of responsibility. This tendency is increasing and it will bring the railways into the market for more construction equipment such as steam shovels, ditchers, dump cars, spreaders and concrete mixers, as well as a wide variety of auxiliary appliances.

Marked Improvements in the Railroad Situation

WHILE THE YEAR 1921 was the worst in railway history the changes in the railway situation which have been occurring within recent months afford grounds for optimism as to the future.

In spite of the fact that the total traffic moving is still abnormally small, the net financial results obtained by most railways within recent months have been better than they were a year ago, and much better than they were last spring. The net return earned by the railways is of the greatest importance not only to the railroads themselves, but also to the industries of numerous kinds from which they buy equipment and supplies. The record of many years shows that the volume of orders the railways place follows closely the net return earned by them, declining when it declines and increasing when it increases.

The traffic handled in November was smaller than in October, and the net return earned in that month was much less than in October. The net return earned in November, however, was almost \$70,000,000, or 30 per cent more than in November, 1920.

We have now complete statistics of earnings and expenses for 11 months of 1921. Probably the most outstanding feature of these statistics is the striking contrast presented by the net results of operation in the first six months of 1921, and in the next five months. In the first six months of the year the operating expenses consumed over 88 per cent of the total earnings, and the net operating income earned was only \$142,000,000, or at the annual rate of 1.8 per cent on the valuation made by the Interstate Commerce Commission. On the other hand, in the five months July to November, inclusive, the operating expenses consumed less than 76.50 per cent of the earnings, and the net operating income was over \$418,000,000, or at the annual rate of 4.72 per cent on the valuation.

The railways were making drastic retrenchments in maintenance in both periods. It follows that this marked improvement in the net results was due chiefly to real economies in operation. The statistics regarding the unit costs of labor, coal, materials, etc., support this conclusion.

The railway situation has been improved not only by the increase in the net return being earned, but by changes in general business conditions. There has been for months a steady increase in the amount of new capital seeking investment, and, in consequence, a decline in the general rate of interest. This decline in interest rates, as is always the case, is causing a rise in the market prices of stocks and bonds. The market prices of most railway stocks and bonds have largely advanced owing both to this improvement in underlying financial conditions and to the increases in net return being shown by most railways. Every increase in the market prices of railway securities brings nearer the time when the railways can market a substantial amount of new securities at reasonable prices. Their ability to market their securities at reasonable prices is, in turn, the main thing needed to enable them to increase the amount of equipment bought by them and the development work of other kinds done by them. One effect of the improvement in their financial condition which already has occurred is seen in the largely increased

orders for equipment and materials of all kinds which they have placed within recent months, and the additional large orders which are under consideration.

Whatever improves the railway situation is sure, by increasing the volume of purchases they make, to improve general business conditions because under normal conditions not only are their purchases vast, but they are made, directly and indirectly, from the producers of almost every class of basic commodities. Whether the railway situation will continue to improve will depend largely upon the policy of the Interstate Commerce Commission regarding rates and of the Railroad Labor Board regarding wages. It seems extremely doubtful, however, that the policies of these two government bodies will be such as actually to reduce the net returns now being earned. They must see that this would be contrary to the interest of the public itself. Furthermore, the net return now being earned, while much larger than in the first half of 1921, is still so small that probably the railways could defeat attempts to reduce it by appealing successfully to the courts upon the ground that it would involve confiscation.

On the whole, therefore, while the railway situation cannot yet be said to be satisfactory, it can be said that it is far better than it was a year ago and that all signs indicate that in respect to net return earned, to equipment and materials bought and to development work done by many railways, the record of the year 1922 will be far better than the record of the year 1921. The year 1921 was a year of positive retrogression in the railway field. The year 1922, in contrast, promises to be one of real progress. If, as appears probable, there shall be an increase in traffic and, therefore, in total earnings, the progress made toward normalcy will be not only real but substantial.

Probably the most significant feature of the general business situation is the large and general advance in the prices of securities of almost all kinds which recently has been shown on the stock market. A falling stock market almost invariably presages a decline in general business activity; while a rising stock market, such as the present one, almost invariably presages a general increase of production and commerce. A general increase of production and commerce would cause an increase of railway traffic; and a substantial increase of traffic in 1922 would do more than anything else could to restore the normal earning capacity and normal expenditures of the railways.

Many things remain to be done to make the railway situation what it should be; but the number of substantial reasons for hope regarding the future is greater now than for many months, and is constantly increasing.

New Books

Proceedings of the American Society for Testing Materials, 1198 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by the society, 1315 Spruce street, Philadelphia, Pa.

This volume contains the proceedings of the twenty-fourth annual meeting of the society which was held at Asbury Park, N. J., on June 21-24, 1921. It includes 32 reports on a wide variety of subjects, such as the heat treatment of iron and steel; the corrosion of iron and steel; preservative coatings for structural materials; coal and shipping containers. This volume also contains 93 tentative specifications which were submitted or revised at the 1921 annual meeting as well as five tentative revisions of A. S. T. M. standards. Following the reports and specifications there appear 24 technical papers including those on "A Proposed Method of Estimating the Density and Strength of Concrete and of Proportioning the Materials by the Experimental and Analytical Consideration of the Voids in Mortar and Concrete" by A. N. Talbot, and on "Wear Tests of Concrete" by D. A. Abrams.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

How to Reduce the Cost of Living

ALTOONA, Pa.

TO THE EDITOR:

One naturally hesitates to approach the unpopular and distasteful. As a member of that great body called "railroad labor" I am not entirely devoid of that hesitancy. We must, however, take the advice of the poet and

" . . . be up and doing
With a heart for any fate,"

fully realizing the important part we must take in the necessary industrial readjustment.

The railroads have said to labor: "We must reduce your wages in order to meet the demands of the public for lower freight rates."

Labor has replied: "We will accept no reduction," following its refusal with a few arguments and some threats. Its leading argument deserves the most frank criticism. It is this: "Reduce the cost of living first and then we will accept a reduction in our wages." The same reply to this demand will apply to the wage question in all forms of industry.

As I see it, to bring about a general and permanent reduction in the cost of living, without first reducing wages, is just about as feasible as making the cart run along in front of the horse.

Railroad labor has received one reduction and, it must be admitted, that was not very large. Other business has probably suffered more. A lowering of the cost of necessities has followed, as the following figures, taken from my household records, will show:

	Cost	
	September, 1920	December, 1921
Potatoes, per bushel.....	\$2.00	\$1.40
Bread, per loaf.....	.10	.08
Milk, per quart.....	.14	.11
Milk, per small can.....	.08	05½
Coffee, per pound.....	.45	.28
Bacon, per pound.....	.50	.25
Lard, per pound.....	.22	12½
Ham, per pound (whole).....	.55	.18

Many other items, showing like comparisons, are to be found in this record.

It is quite true that the lowering of these costs began before there was any actual reduction in the railroad wage, and continued without any reduction in freight rates at all. Wages in the productive industries, that is, those which produce the food, clothing and shelter, had already been lowered before there was any favorable change in the living costs. Other conditions possibly had some influence in this downward trend.

The last month in 1920 saw the beginning of the labor curtailment in this place; before the third month of the new year was spent the labor force was reduced to the point where only one man was working instead of three. This had the effect of reducing the public's buying power here to one-third of what it had been formerly.

This is true because here the railroad is the main source of employment. When it retrenches the other industries do likewise, because of their direct or indirect dependence upon it.

This sudden decrease in the people's buying power possibly had something to do with the reduction in the sales prices of our commodities, but it must be admitted that business

would not long survive with such forced methods alone. Any schoolboy can see that when goods are gotten ready for the market during the prevalence of high wages they must be sold at a figure that will pay for the labor of producing and getting them ready for and to the market, as well as paying interest on the money invested in the machinery and equipment used in producing and transporting them. If sold for less, someone loses. Then it follows that to reduce naturally and healthfully, there must first be a reduction in the cost of production. Labor is such a large factor in the production of every necessity, comfort or luxury that all other factors are comparatively dwarfed to nothing.

Take for example the coat I have on. It is made of wool and cotton. Labor housed the sheep, planted, cultivated, harvested their feed and fed them; labor sheared the wool from their backs, sorted, carded and spun it into threads; labor planted the cotton, cultivated, picked, sorted and drew it into threads; labor manufactured the dyes with which to color these woolen and cotton threads, and labor wove the two into cloth; labor cut and sewed this cloth into the garment; it was labor that produced the locomotives and cars with which to transport, and transported it over mountains and through valleys for hundreds of miles where I could get it. After labor, what else is there?

History will certainly point to the action of labor in this, the world's greatest readjustment period, and place the blame where it belongs, for these years' delay in the progress of civilized activities.

A. C. MYERS,
Clerk, Pennsylvania System.

Deferring Repairs a Costly Policy

NEW YORK

TO THE EDITOR:

Putting off the evil day—in no other terms can the deferred maintenance of roadway, structures, and equipment, now being practiced to an increasing extent by many railroads, be characterized.

The recent statistics of the principal railroads furnished by the Interstate Commerce Commission show that the net income is greater in most cases than for the corresponding period one year ago. In the face of a small reduction in wages and a very much greater reduction in gross earnings this is not exactly consistent, other things being equal. Right here is the point: other things are not equal, for there has been an enormous reduction in expenditures covering maintenance of roadway, structures, and equipment, and this answers the seeming paradox and explains the "improved" net income.

An analysis of the physical condition of passenger train cars operated by one of the larger railroads in December, 1921, as compared to December, 1920, clearly indicates the result of enforced savings due to deferred maintenance. The state of affairs indicated by the data shown in the following paragraphs is unquestionably typical to a greater or less extent of the situation in which many railroad managements now find themselves, not only in respect to passenger cars but more than probably in respect to freight cars, locomotives, buildings and structures, and roadway.

	1920	1921	Change 1921 Compared With 1920 Per Cent
Number of passenger train cars.....	880	865	.....
Average time out of general repair shop, as of Dec. 1.....	15.1 mo.	19.2 mo.	27.15 increase
Number of cars receiving classified repairs, for year.....	698	482	30.94 decrease
"Saving" due to deferred maintenance at \$650 per car.....		\$140,400	

Briefly the above data, based on 15 months between shoppings, which is considered about the correct length of time

by most mechanical officers and which was approximately in effect up to and including 1920 on the road in question, shows that the general mechanical condition of passenger equipment has deteriorated 27 per cent at the cost of a "saving" of 31 per cent due to deferred maintenance.

If there is no way found during the year 1922 to spend more money for maintenance than was spent in 1921 an analysis, as above, at the close of 1922 will show the following interesting conditions:

	1920	1922	Change 1922 Compared With 1920 Per Cent
Average time out of general repair shop, as of Dec. 1.....	15.1 mo.	23 mo.	52.3 increase

This shows a situation bordering on the absurd and it is obvious that there must be a decided change for the better and that it must be very soon.

To restore the physical condition of passenger cars during the year 1922 to that condition prevailing during 1921, all of the cars owned will have to be overhauled and the average cost will undoubtedly be 20 per cent higher per car than the estimated cost, \$650, shown for 1921, due to the general condition of cars being much worse than it was one year ago.

On this basis, the cost of one year's deferred maintenance on passenger cars would be:

Cost of overhauling cars for 12 months		
1920—698 cars at \$650 each.....		\$453,700
1921—482 cars at \$650 each.....		313,300
1922—865 cars at \$780 each.....		674,700

Deferred maintenance of passenger cars during 1921 made possible a "saving" of \$140,400, but to restore their physical condition to normal, if it is done during 1922, will mean an expenditure of \$221,000 more than that of 1920, and \$361,400 more than that of 1921.

This gives a fairly accurate index to what can be expected in the way of added cost due to putting off necessary repair work until some future time.

The sooner means can be found to enable the roads to catch up on deferred repairs, the less evil, of course, will be the day when the process starts.

Lurking in the shadows of the background of the present unfavorable maintenance situation is the haunting fear of possible accidents which might conceivably result from causes traceable to less-than-standard maintenance conditions of rolling stock or roadway, and it is not too much to say that conscientious railroad men are fervently looking forward to the time when the evil day will have to be postponed no longer.

M. S. ROBERTS.

A CONTRACT has been awarded by the Chicago region of the Erie to the A. S. Hecker Company, Cleveland, Ohio, for the maintenance of track and the protection of highway crossings on the Chicago, Marion and Cincinnati divisions. According to the plan provided in this contract all the track foremen, track laborers and crossing watchmen have been released from the service of the railroad company and are now employees of the A. S. Hecker Company. Circular issued by the railroad covering this arrangement is as follows:

"Effective January 1, 1922, the maintenance of track and protection of highways on the Chicago, Marion and Cincinnati divisions of the Erie Railroad Company will be handled by the A. S. Hecker Company, contractors, of Cleveland, to whom a contract has been awarded, covering all work incidental to track and crossing operation.

"All track foremen, track laborers and crossing watchmen will be released from the service of the railroad company, effective at midnight of December 31, 1921. All employees desiring to continue work in the employment of the A. S. Hecker Company will be given a chance to signify their intention to a representative of the A. S. Hecker Company on December 31, 1921."

The Chilean Railroad Problem and Its Solution

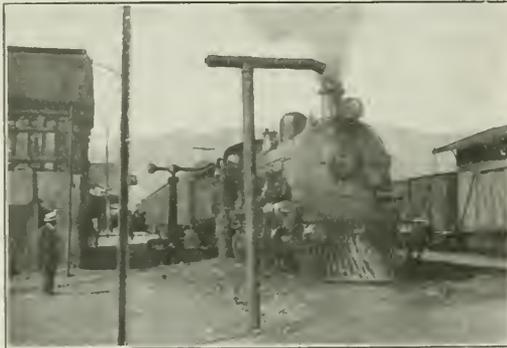
Electric Operation Will Increase Track Capacity, Lower
Operating Costs and Improve Service

By David C. Hershberger

General Engineer, Westinghouse Electric & Manufacturing Company

THE TRANSPORTATION system has a particularly vital influence on the development of Chile, because of the peculiar location of the natural resources of the country. Located between the summit of the Andes and the Pacific Coast, Chile occupies a domain 2,600 miles in length from north to south and varying in width from 60 to 280 miles. While there is considerable coastwise steamer traffic, especially in the northern part, the railroad system is the main artery of transportation serving the central and southern sections of the nation.

It is essential that this system be kept up to the most



Express Train at Til Til Drawn by a Baldwin Locomotive

modern standards in order to serve the country adequately and efficiently. To attain this objective, the government of the Republic of Chile has undertaken the most extensive electrification in progress at this time. This procedure is in strict accordance with the well known progressive policy of our southern neighbor.

The urgent necessity for electrification was brought to the attention of the government during the world war by the congestion of traffic in the first zone. This zone comprises the section of the line between Valparaiso and Santiago, and the branch from Las Vegas to Los Andes. The Valparaiso-Los Andes section forms a part of the transcontinental system to Argentina, the Transandine Railroad continuing eastward from Los Andes. During this congestion, which occurred in 1917, the steam locomotives used in this zone were of relatively small capacity, which necessitated the operation of a large number of trains in order to move the freight tonnage and handle the passenger traffic. The lack of adequate motive power caused a congestion of traffic which was rapidly approaching the capacity of the line. It was at one time considered necessary to lay a second track on a considerable portion of the line in addition to that which was already double tracked. The 1917 congestion was relieved to a considerable extent several years ago when 20 Mikado type steam freight locomotives were put in service in the first zone.

Chilean engineers and business men have recognized for many years that the tremendous amount of water power avail-

able could be used profitably not only for industrial purposes, but for the operation of the railroad transportation system as well.

In 1918 a commission consisting of Rafael S. Edwards and Ricardo P. Solar was appointed to prepare a report on the electrification of the broad gauge lines which extend from Valparaiso southward to Puerto Montt. These lines are divided into four zones. The first zone has been described, and the others extend southward in numerical order. The commission completed its report covering all four zones in 1918, and the decision to electrify the first zone followed, as a result of the economies and advantages set forth in this report.

The specifications required the bidders to supply not only the electrical equipment, but to execute the construction work as well, and to turn over to the government ready for operation the complete electrification. These stipulations make it necessary for the bidders to construct the substation buildings and erect the overhead contact lines complete.

The contract for this large undertaking was awarded to Errazuriz, Simpson & Company. This company will execute the construction work while the electrical equipment will be supplied and installed by the Westinghouse Electric International Company. The former company is a well-known Chilean firm which has completed important engineering work in Chile. In addition to conducting a large



View of the Double Track Section, Looking East from Ocoa

importing and exporting business, this company markets in Chile the electrical apparatus of the Westinghouse Electric International Company.

Track and Roadway

Electrification will change the complete status of the railroad as to track capacity, as the flexibility of electric transportation is such as to provide not only the possibility of trebling the traffic of the road, but of going to much greater limits if necessary.

The extensive electrification which has been undertaken comprises a complete steam engine division—a distance of

116 miles between Valparaiso and Santiago, and 28 miles between Las Vegas and Los Andes. From the port of Valparaiso the railroad skirts the bay of the same name nearly to Miramar, and then passes through Vina del Mar, a famous summer resort and exclusive residence district. After crossing a low coast range the line follows the Aconcagua River to Las Vegas through the fertile valley in the Quillota district.

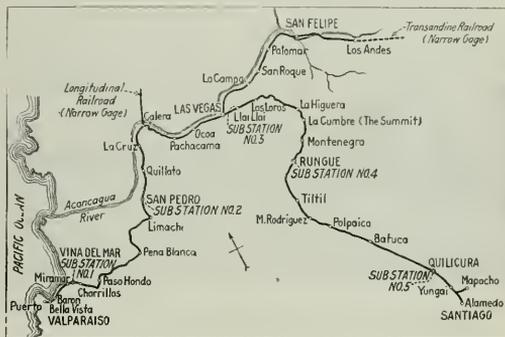
At Calera, the Longitudinal Railroad starts northward to Antofagasta and Iquique, while at Las Vegas the Los Andes branch leaves the main line. Llai Llai, located approximately half way between Valparaiso and Santiago, is the meeting point for all passenger trains making connections with the Los Andes branch trains. At this point the heavy grade section over the mountain begins, and ends near Batuco on the eastern side of the mountain range.

The curvature, considering the entire line, may be considered to be of medium severity. Starting from Puerto, the line circles the bay to Miramar and has considerable curved track over the low coast range and along the Aconcagua River. The most severe curves are located on the section of the line between Llai Llai and Til Til. The maximum curves are ten degree and are located near Los Loros. On the eastern slope the maximum curve is 9.5 degrees located near San Ramon. The line between Batuco and Quilicura is practically level tangent track.

The road is double tracked between Valparaiso and Limache, a distance of 27 miles; between Ocoa and Llai Llai, 8 miles, and between Yungai and Mapocho Station, a distance of 1 1/2 miles, making a total distance of 36 1/2 miles of double track line. The track is 5 ft. 6 in. gauge, laid on Chilean oak ties and is rock ballasted for practically the entire length of the line in the first zone. Eighty-five pound rails are used between Llai Llai and La Cumbre and between Calera and Ocoa. The rest of the line between Valparaiso and Santiago is laid with 80 pound rails, while the branch to Los Andes is laid with 75 pound rails.

The track is well maintained. Due to the absence of severe cold weather, the sub-grade is not subject to alternate freezing and thawing. This condition contributes to the low track maintenance costs. The wheel loadings will be such

the six tunnels. The first three tunnels are located on the Tabon or maximum grade section between Llai Llai and La Cumbre. All the tunnels are dry except San Pedro, so that the problem of corrosion of overhead material is not serious. The clearances from rail to roof do not seriously interfere with the design of the overhead material or the locomotives. The smoke conditions in these tunnels are a detriment to providing the best working conditions for the train crews and traveling service to the public. The elimination of these con-

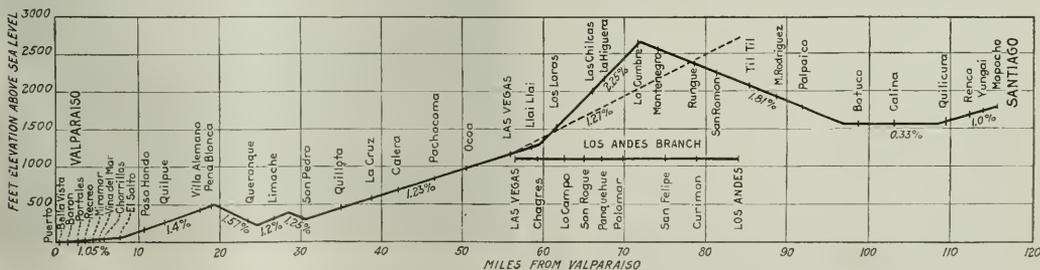


Map of Zone Being Electrified

conditions by electric operation constitutes an important improvement in operation.

The grade conditions have always been an obstacle in the way of moving, advantageously, the traffic in the first zone. It has been necessary to maintain several helper sections to handle the freight traffic, while practically all passenger trains require helpers ascending the Tabon grade between Llai Llai and La Cumbre. With electric operation all helper service will be eliminated, except in connection with the freight trains ascending the Tabon grade.

The condensed profile gives a general idea of the grade



Condensed Profile of the First Zone of the Chilean State Railways to Be Electrified

that with most of the locomotives, though much more powerful than the steam locomotives being replaced, the duty on the track from static loading will be less than that with the steam locomotives.

The largest bridge is that over the Vina del Mar River near Valparaiso, known as the Las Cucharas Bridge. This is a steel structure of the cantilever type, 440 feet long and carries two tracks. There are a number of girder type bridges, the longest of which is 250 feet in length.

There are six tunnels on the main line, namely: Los Maquis, Los Loros, Centinela, San Pedro and the two Paso Hondo tunnels, the latter being located on the double track section. San Pedro is 1,600 feet in length; the longest of

conditions. The maximum grade, which is 2.25 per cent, is located on the Tabon between Llai Llai and La Cumbre, the summit. This is the most severe grade in the first zone and forms the major part of the twelve mile grade. The summit has an elevation of 2,600 feet above sea level. The maximum grade on the eastern slope is 1.81 per cent and is located near San Ramon. The elevation of Santiago is 1,800 feet, so that the most severe hauling conditions are south bound, or toward Santiago.

To provide for increased traffic under steam operation would require heavier locomotives than those in service at present which would probably necessitate the installation of heavier rails. This in turn would involve a relatively large

expense, and the maintenance expense would increase proportionately.

The change to electric operation permits of increasing the tonnage tremendously without the necessity of changing rails, by reason of lower track stresses, even with engines of greater power than those in service at the present time. The more efficient use of the trackage by electric operation due to being able to handle not only a greater number of trains, but a greater tonnage per train, is an extremely important con-



Puerto Station, Valparaiso. The Station Building Is on the Right

sideration. For equal tonnage the track maintenance will be less with electric operation than with steam.

The Fuel Situation

While it was realized that the problem of traffic congestion could perhaps be solved by the use of larger and more powerful steam locomotives, it was further recognized that steam operation would not solve the fuel problem. This problem has two serious phases; first, the cost of fuel; and second, the partial dependence upon imported coal.

The railroad fuel bill has in the past few years reached excessive figures due to the high price of coal. The price of coal in Chile is governed, not by the price of coal mined in Chile, but by the price of imported coal, much of which in the last few years has come from the United States. To the cost of the coal must be added ocean freight transportation, and lighterage charges, so that before the war the cost varied from \$7.00 to \$10.00 per ton for imported coal of good quality. During the war it is understood to have risen as high as \$25.00 to \$28.00 per ton, while more recently the price has ranged from \$15.00 to \$20.00 per ton.

The price of Chilean coal has been slightly less than these values, but it is readily seen that with the almost unlimited hydro-electric power available, sold at a reasonable rate, the electrification program is not only justified, but is the solution of the fuel problem from the cost standpoint. The further energy economies made possible with electric motive power by the reduction of standby losses in freight, passenger and switching service, and as a result of the energy returned to the line by regenerative electric braking, are not to be ignored.

The elimination of transportation of fuel for railroad use not only releases this car and locomotive equipment for hauling revenue freight, but will assist in supplying needed rolling stock for the transportation of products of the South. The railroads in the past have been embarrassed seriously at times due to inability to obtain sufficient coal for their operation at times of labor troubles in the Chilean mines, as well as from other causes. At these times it has been necessary to curtail the service with the consequent inconvenience to the traveling and shipping public. By the use of hydro-electric power for transportation, this situation will be entirely relieved and the nation will be wholly self dependent.

Present and Future Freight Service

The southbound tonnage consists largely of imports such as coal, merchandise, machinery, automobiles, food products, etc. Part of this tonnage results from the coastwise steamer traffic in handling the transfer of products of the nation from one point to another.

The northbound traffic is composed largely of agricultural products such as wheat, corn, rye, potatoes, alfalfa, tobacco, beans, fruits of all kinds, dairy products, wool, wine, live stock, coal, copper and lumber from the great forests of the South. Much of this tonnage is destined for the central and northern sections of Chile, while a considerable part of it is exported to other countries.

The principal exportation in the past has been nitrate of soda and copper. Large quantities of iodine, borax, sulphur, salt and iron ore are also exported.

Freight tonnage southbound from Valparaiso averages approximately 3,600 gross tons daily in normal times, while that passing Las Vegas in the same direction is 3,900 tons. The northbound traffic is only slightly less than that of the southbound.

At present, the freight trains going toward Santiago are made up of 20 to 30 cars each, or a trailing load of 550 tons. These trains are hauled by Mikado type steam locomotives assisted by a Borsig Consolidation between El Salto and Pena Blanca and on the Tabon grade. In the opposite direction a helper locomotive is used between Til Til and Rungue.

With electric motive power 770 ton trailing loads will be hauled by one locomotive in either direction, except in ascending the Tabon grade a helper will be used. The trailing weights will be increased 40 per cent and the number of trains reduced approximately 28 per cent.

The locomotives employed for this service will weigh 113 tons and have a nominal rating of 1,680 hp. At this rating the speed will be 22.6 miles an hour, with a tractive effort



Las Cuchuras Bridge Spanning the Vina del Mar River near El Salto

of 27,950 pounds. These engines will be of the Baldwin-Westinghouse design with 0-6-0 + 0-6-0 wheel arrangement. The two three-axle trucks will be connected by a Mallet hinge and all the buffing strains will be transmitted through the underframing. The maximum speed of these engines will be 40 miles an hour.

Electro-pneumatic control will be used for the control equipment, so arranged as to provide for regenerative braking. A motor generator set will supply current for separately exciting the motor fields in regeneration.

Westinghouse EL air brake equipment will be used. It has the straight air feature for control of the engine and automatic air for control of both the locomotive and train.

The Westinghouse air brake has been the standard air brake equipment of Chilean railroads for many years.

A considerable reduction in running time will be made by the freight trains. Through freight trains that now make the one-way trip in 10 to 12 hours will be capable of going through in six to seven hours. With the faster schedules the crew expense will not only be less, due to the reduction of time on the road, but fewer locomotives will be required to handle the service, on account of the shorter running time. The increasing of the freight train trailing loads alone will result in reducing the number of trains and the crew expense by approximately 28 per cent on the basis of present traffic.

Helpers Will Be Eliminated in Passenger Service

Under normal conditions the express passenger trains carry six to ten cars, or a trailing load of 200 to 300 gross tons in either direction between Valparaiso and Santiago. Occasionally these trains are composed of as many as 16 cars, and helpers are used on the Tabon grade. The express passenger trains are for the accommodation of first and second class passenger traffic and are the fastest trains in the service, making only a few stops in the 116 mile run. The omnibus trains which make all stops between Valparaiso and



East Portals of the Paso Hondo Tunnel

Santiago are always the most heavily loaded passenger trains in the service and carry cars for the accommodation of first, second and third class passengers.

The electric locomotives will be capable of hauling the 300 ton trains in either direction without the aid of helpers on any section of the line. These locomotives will have a nominal rating of 2,250 hp. corresponding to a speed of 37 miles per hour at a tractive effort of 23,400 pounds. They will weigh 127 tons and will have 105 tons on the drivers. The wheel arrangement will be 2-6-0 + 0-6-2, a two-wheeled guiding truck being used at each end of the locomotive.

The two three-axle trucks will be connected at the inner end by a drawbar held in tension spring buffers. These locomotives will be capable of making a maximum speed of 62½ miles per hour. The cabs will be very similar to the freight engine cabs and will carry virtually duplicate control equipment.

Local passenger trains are operated between Valparaiso and Llai Llai and intermediate points. At present many of these trains carry ten cars between Valparaiso and Vina del Mar, while the locomotive ratings provide for a maximum of 12 cars per train. These trains are composed of first, second and third class cars, usually hauled by one locomotive as this section of the line does not have the most severe grade conditions.

The new motive power for this service will consist of 80-ton double truck locomotives having the inner ends of the trucks connected by a Mallet hinge. The wheel arrangement will be 0-4-0 + 0-4-0. Each of the four axles will be equipped with a direct geared motor the same as the express passenger locomotives. The engine rating will be 1,500 hp. corresponding to a tractive effort of 15,600 pounds at a speed of 37 miles per hour. The maximum speed of these locomotives will be 56 m.p.h. The profile over which these locomotives will operate does not justify the use of regenerative electric braking so that this feature will not be included in the design. These engines will be required to haul trains of 260 to 350 tons on the local runs, including the 300 ton trains of the Los Andes branch.

In the interest of improving the service, faster schedules are desirable. These cannot be obtained with the present steam equipment and in fact with heavy traffic the present time tables are maintained by double-heading on the grades. With electric operation it is proposed to reduce the running time of the fastest passenger trains between Valparaiso and Santiago from three hours and forty minutes to three hours and fifteen minutes, or a twenty-five minute reduction in running time. The way passenger, as well as the local trains will also operate at higher speeds, with a consequent reduction in running time.

The switching will be performed by 65-ton double truck locomotives. These locomotives will have a rating of 480 hp. or a tractive effort of 15,600 pounds, at a speed of 11.6 m.p.h.

Locomotive Maintenance and Renewals

The maintenance of the steam locomotive equipment is of a high order on the State Railways. Many of the executives of the State Railways have had foreign experience in railroad shops of the largest systems in the United States and England—a number at the Altoona shops of the Pennsylvania.

Repairing of electric locomotives does not present a difficult problem to the railroad as the present shop equipment is, with the exception of a few items, adequate to handle this work. High grade skilled labor is available so that with a certain amount of training, covering the care and maintenance of electrical equipment, this work can be handled readily.

Chile has purchased most of her modern locomotives in the United States. However, a number have been and are now being reconditioned in her shops, while in the past some have been designed and built there entirely. It is apparent that the wisest course is that of investing in locomotives which will give the longest life in order to avoid frequent foreign purchases. The electric locomotive fills this requirement and has the added advantage of being ready for service a greater percentage of the time than the steam engine.

In some respects the purchase of electric motive power can be regarded as being part of a program of normal renewal of motive power equipment in view of the necessity of purchasing more steam locomotives to replace obsolete types and provide for increasing traffic.

The maintenance and operation of water stations involves a considerable expense. Furthermore, the loss of time at these stations by the trains represents an additional loss with steam operation that will be eliminated by the new system of operation. Many of these water stations require the maintenance of pumping stations, which represents an added expense.

All steam locomotives are coaled by hand rather than by automatic coaling stations, so that this expense is considerable. The elimination of these stations will make available additional yard trackage.

With continued steam operation it would have been necessary to have invested in a number of new enginehouses.

This expense is now eliminated, due to the fact that much less space is required by the use of a fewer number of locomotives to handle the service.

Energy generated by hydro-electric plants will be purchased by the railroad for the operation of its trains. One of these generating stations is now in course of construction by the Chilean Electric Tramway and Light Company, Ltd., and known as the Maitines station. From this station, the power will be carried to the receiving station at Santiago and on through to Valparaiso by 110,000 volt transmission lines. The end substations will be served by 1,200 volt transmission lines, while the three intermediate stations will receive their power from 44,000 volt transmission lines fed through step-down stations from the 110,000-volt lines.

Each of the five railway substations will contain two 2,000 kw. motor generator sets. The sets will supply the overhead lines with direct current at 3,000 volts.

The climatic conditions are remarkably favorable to the successful operation of electrical equipment with the possible exception of that part of the line located along the seashore which requires consideration on account of the salt air from the ocean. The rainfall is limited in this district and snow is unusual. In the summer season the air temperature is high in the daytime, due to intense sun, while the nights are always cool due to the cool air from the Andes Mountains.

Storms are almost unknown except by the seashore. The wind velocity is very low, especially in the Los Andes branch district. Even lightning is infrequent, and is not severe in the district of the first zone.

It may be said that the electrification of the first zone of the Chilean State Railways solves most, if not all, of the serious operating problems of this section of the system. The advantages to be gained by electric operation are:

- (1) An increase in the capacity of the present trackage to provide for future increase in traffic:
 - a. Faster schedules.
 - b. Heavier trains.
- (2) A reduction in operating expenses by reducing:
 - a. Fuel costs.
 - b. Locomotive maintenance costs.
 - c. Crew costs.
 - d. Elimination of coaling and watering stations.
 - e. Reducing track maintenance costs.
- (3) Provision for motive power and rolling stock additions and renewals.
- (4) Better traveling conditions.

The full realization of all the operating economies will be attained when the entire system is electrified so that all advantages can be taken of the characteristics of electric motive power.

W. G. Bierd Opposes Regional Board of Adjustment

IN A LETTER setting forth the reasons why the Chicago & Alton is not willing to join in the support of the Train Service Board of Adjustment for the western territory, W. G. Bierd, president of the road, has presented forcibly the position of railways that are opposed to such boards. He proposes that, if the present committee system of the road is not satisfactory to the employees, all committeemen of the railway itself be called in and a board for the road itself be organized to which disputes shall be referred regarding which the local and general committees and the management cannot agree.

The principal reasons why the management of the road is not willing to become a member of the regional board of adjustment are stated to be that, first, it is impossible for any board whose members are not employees of the company to dispose of disputes in as equitable a manner as can a committee composed of employees of the railroad, and second, "these boards of adjustment, labor boards, commissions and committees, other than our own employees and officers serve only to further separate the management and the employees

and bring about misunderstandings instead of perfecting understanding."

Mr. Bierd's letter reads in part as follows:

"We believe it impossible for any board whose members are not employees of the company to be as familiar with the conditions surrounding disputes that may arise between the officers of the company and your organizations as would a committee composed of employees of the Alton railroad, or be as able to dispose of such disputes in as equitable a manner. I fully agree with you that such minor disputes as do arise should be referred to the United States Railroad Labor Board for decision only as a last resort, and as you are well aware, it has been our policy, both through the Railroad Administration period and at the present time, to settle these matters ourselves and not refer them to any board. In fact, only three or four submissions have been made since the beginning of government control.

"However, the principal objection of the officers of this company is that these boards of adjustment, labor boards, commissions and committees, other than our own employees and officers, serve only to further separate the management and the employees and bring about misunderstandings, instead of perfecting understandings. Therefore, the officers of this company are opposed to every form of board of adjustment that lodges our own misunderstandings with any body of men other than Alton officers and Alton employees, for no set of men, no matter who they may be, can deal with these subjects as fairly, intelligently and honestly as the employees and officers themselves.

"We are equally opposed to the principle of the Labor Board because that board has also helped to pull apart the officers and employees of the railroad, and it will always be so as long as there are such boards foreign entirely to the railroad company itself. No matter what board may pass upon these matters it cannot be properly informed and cannot pass upon them as intelligently, as fairly and as honestly as the management and the employees can through the regular channels that have been built up during the past 25 or 30 years, namely, the proper practical operating officers and the proper practical men who form your committees. If we cannot agree fairly and justly, then an entire stranger, foreign to our interests, cannot decide such questions intelligently.

"However, we have the Labor Board. It was created by law and we cannot control that situation. Therefore, we must accept it, and in doing so we accept every ruling of the Labor Board cheerfully and fairly and try to carry them out honestly and intelligently. We are trying to give the Labor Board just as much assistance as we can in order that it may be just as successful as possible. Therefore, since we must have the Labor Board and pay the cost of handling these matters before it, we should confine ourselves strictly to it. Surely the employees have paid a very severe tax for these large meetings, committees and conferences that have involved hundreds of men during the past four years and still are continuing, but we should take absolutely no cases to the Labor Board or any other board that we can work out ourselves and we should not create another board of adjustment to still further confuse the situation and make matters worse.

"In our opinion these boards have been the most harmful influence for the railroads and their employees that has developed during the past four years, for they have only helped to pull the management and the employees apart and to create bad feeling between the two classes of men who must work and should work closely together, and as a result have destroyed the good service built up in years past.

"We understand clearly that there must be some proper means of adjusting these disputed questions and we believe that on a road of our size where the general officers can be in constant touch with the employees and where the employees have an open door to come to the general officers at any time

and in any way, the employees and the management will be best served and best satisfied to handle these subjects with our own committees constituted as they are. We can know and understand the rules better than any board of adjustment and can settle such disputed questions more fairly and more honestly to all concerned than a body of strangers who have no particular interest in the Alton railroad or its employees.

"It is the belief of the officers of this company that nothing will help the present disturbed condition more than to get back to the point where the management and employees will deal with each other face to face across their own table. Therefore, we believe that the recently created board to which you refer is unnecessary and is not good for the employees or the management of the Alton railroad.

"The officers of this company believe we will best prosper by handling these matters as we now handle them. However, as above stated, we also recognize that it has become a belief that there must be a practical board to hear such disputes where the committee and management cannot agree. While this is not our view, if you and the employees you represent believe there should be such a board, then we want to join you, with all other committees and employees of the Alton railroad and create a board of our own—of Alton men and for Alton interests—which will be far better than a board of strangers or people far removed from our interests. If such a board should fail, as I think it would seldom do, the case could be submitted to the Labor Board as the law makes it possible for either side to do."

Commissioner Potter Expresses Views on Rates and Wages

THAT FREIGHT RATES are too high and ought to be reduced immediately but that there does not appear to be any possibility of a proper reduction in the near future or until railroad operating costs are reduced, is the opinion expressed by Mark W. Potter, of the Interstate Commerce Commission, in a letter dated December 22 to Philip S. Tuley, president of the Kentucky Manufacturers' Association, who has made it public in a bulletin.

Mr. Tuley had asked Mr. Potter to comment upon a resolution on the subject of transportation adopted by the association. The commissioner's letter was in part as follows:

Excepting only that part of the resolution which favors abolishing the Railroad Labor Board and delegating to the Interstate Commerce Commission jurisdiction over wage rates, I am in entire accord with the sentiment of the resolution. I have not permitted myself to arrive at final opinions as to whether the Railroad Labor Board should be abolished, or as to what, if any, jurisdiction should be given to this commission over wages. Aside from the fact that I have not permitted myself to become committed in my own mind on these questions, it is obvious that propriety should impel me to withhold an expression of my views regarding them.

There is no question in my mind but that freight rates are too high. The welfare of the country demands that they be reduced promptly. There should obtain in this country a constant tendency of freight rates to reduce. This should be the natural result of increasing efficiency, increase of business, expansion of industrial development of the country and the promotion of a proper relation between railroads. The increases in recent years are fundamentally abnormal and unsound as permanent adjustments. They must be eliminated before the country can go back to normal and continue its onward movement. There will not be a sound and permanent resumption of prosperity and healthy industrial and commercial activity under the present scheme of freight rates. They ought to be reduced and be reduced immediately. Unfortunately there does not appear to be any possibility of a proper reduction in the near future. I do not see how the reduction which the welfare of the country so urgently demands can be accomplished until operating costs are reduced. To a considerable extent the railroads are in no position to control their costs. The right and power to deal with labor which is the most important element of operating costs has been taken away from the

carriers. The Congress has determined that wage questions shall not be handled in the manner that they are handled in ordinary industrial enterprises. The hands of the carriers have been tied by the law which prescribes the manner in which railway wage adjustments and determinations shall be brought about. The jurisdiction has been taken over by the Railroad Labor Board, a governmental agency. Unless and until that Board acts, the carriers are going to be helpless and can not be blamed for not making those rate reductions which a wage reduction would permit. With a scale of wages paid to railway employees universally known and recognized to be higher than the scale which obtains in other industries, with costs of living substantially reduced, there seems to be no prospect of getting the problem of wage adjustment before the Labor Board for determination for several months to come. If the carriers are not to be allowed to handle their own labor problems—if the law of supply and demand is not to apply to railroads as it applies to other industries—the shipping public, it seems to me, must pay the price for the system which their representatives have established by the controlling law, and be patient until the government agency which has the power sees fit to exercise it.

Railroads Should Be Run for People as a Whole

I am perfectly clear on one question and that is that the railroads of the country exist and should be run for the people as a whole and not for the employees. The people as a whole have the right to have the railroads run on a scale of wages which will permit a scale of rates which industry can afford to pay provided men can be found to run the roads upon that basis. Rates which the shipping public can afford to pay should be made the basis of determination of wage scales and preferential wage determination should not determine rates. The interests of the 100,000,000 people are supreme and should not give way to the demands of the 2,000,000 merely because those demands are backed by threats of distress to the nation if they are not acceded to. Just now the thought in some high places seems to be that what is a proper wage is the first question to consider and that rates are a secondary consideration. The first thing to do is to bring about a sound fundamental basis on which to consider these questions. In my judgment, it is the province of the Interstate Commerce Commission to determine what rates industry can stand and that determination should be accepted as a basic factor in determining what wages the railroads can afford to pay. The thought of the Railroad Labor Board apparently is that the basic question is as to what wages should be paid and that this commission must accept that determination as a basis for fixing rates. I do not venture an opinion as to whether the Labor Board should be abolished and I am sure this commission does not want any more burdens thrown on it, because it now has more than it can do. I do so, however, that the present system by which the labor board and our commission operate independently upon the same subject matter has caused and is sustaining a hybrid system of regulations barren of satisfactory results.

The Justification for Unions

What I have said above is said by one who is friendly to labor and a believer in the principles of labor organization. I would be the last to contend that in the past labor has had its fair share of what the public pays for the products of the joint activities of capital and labor. I want to see a gradual improvement of the status and conditions of employees in all industries.

It should be borne in mind too that the principles of labor organizations are justified in so far as they advance and protect the interests of labor generally, and deal fairly with all classes of labor. No particular class of employees has the right in the name of labor to use labor organizations for the benefit of the few, and against labor generally, by demanding high wages for the few, which repress industry generally and throw many more millions of laborers out of employment. The position recently taken by certain classes of employees has injured employees generally more than anything else. A few are insisting upon profiting at the expense of the many. This, it seems to me, is a prostitution and a misapplication of the principles of labor organization. Just how long labor generally and the public are going to stand for this is an interesting question. One of the troubles that I see is due to the fact that labor has been led or misled into taking arbitrary positions without consideration or regard for the interests of others who are involved. Neither owners nor employees have the right to be arbitrary. The Railroad Labor Board was created as a protection to employees, employers and the public. It is the tribunal which the law has created to guard them all. When labor leaders refuse to utilize that tribunal and threaten nation-wide strikes and national distress, if they are required to follow the procedure which the law provides, I am suspicious of their confidence in the merit of their claim.

Results of the National Perfect Package Campaign

THE AMERICAN RAILWAY ASSOCIATION and the American Railway Express Company, which jointly conducted the national perfect package campaign during the month of November, 1921, have prepared a 16-page pamphlet telling of the results of that campaign as compiled from the reports of 1,294 participating cities and towns. It is generally believed that the good effects emanating from this effort to improve the packing and handling of packages cannot be measured in dollars and cents, nor entirely by the large number of irregularities which were corrected at the

month 92,165 packages were refused acceptance by the Bureau's inspectors and returned to the shippers to be re-coopered and repaired. This totaled 150 per cent more package refusals than recorded by that bureau during the previous month, and, according to freight claim representatives, it is a fair indication that closer supervision of this sort had been long needed. In addition, shipping and receiving clerks, as well as the shipping public, obtained an intensified education in the requirements of the freight classification. Propaganda, in the form of circulars and pamphlets, articles in the newspapers and trade journals, as well as numerous lectures, have all helped to provide for the establishing of an efficient freight and package handling system which had been greatly deficient before. It is felt that

TABLE 1—TABULATION OF IRREGULARITIES

	Freight	Per cent	Express	Per cent	Total	Per cent
Number of errors discovered in bills of lading or express receipts.....	25,965	28.0	45,406	56.7	71,371	41.0
Number of errors discovered in marking shipments.....	46,590	50.2	22,395	27.9	68,985	40.0
Number of other defects discovered in packing or packages.....	20,168	21.8	12,320	15.4	32,487	19.0
Total.....	92,723	100.0	80,130	100.0	173,853	100.0
Percentage of shipments received without exception.....	98.91%		99.26%		99.10%	

point of shipment. However, the country-wide interest attracted to the importance and necessity of starting shipments right—well packed, in adequate containers, and correctly marked—has amply repaid those who have helped to make the work a success.

The campaign is considered to have developed broader and more cordial relations between shippers and carriers. This is evidenced by the permanent joint committees which have been established at many shipping points. Furthermore, work of this kind enabled the railroads to determine, at practically every receiving station, which of the shippers were at fault in their method of packing. It also definitely established the extent of the imperfection of the packages being delivered to the carriers by the shipping public. The Western Weighing & Inspection Bureau reported that during the perfect package

the accomplishment of this work will be of particular value to the claim agents in their efforts to make favorable claim settlements.

Table No. 1 shows that the greatest number of errors reported during the perfect package campaign were the result of inaccuracy in the marking of shipments.

Table No. 2 gives the recapitulation of the detailed reports contained within the pamphlet. The reports of the 1,294 cities and towns are grouped with respect to their size and are summarized accordingly.

The above tables are considered more of an "indication" than a fact. The wide range of differences in the figures indicate inaccuracy which is due to the variability in the efficiency of the freight inspection service throughout the country.

TABLE 2—RECAPITULATION OF DETAILED REPORTS HEREWITH

Group	Population	Freight		Express		Freight and express		Combined per cent perfect
		Number shipments	Number exceptions	Number shipments	Number exceptions	Number shipments	Number exceptions	
A (56 cities).....	Over 100,000	5,724,764	50,357	7,871,455	64,697	13,596,219	115,054	99.15
B (156 cities).....	25,000 to 100,000	1,946,605	30,726	1,508,649	6,931	3,455,254	37,657	98.91
C (254 cities).....	10,000 to 25,000	1,098,041	16,324	808,641	5,559	1,946,683	21,883	98.88
D (27 cities).....	5,000 to 10,000	338,155	2,761	350,523	2,137	688,678	4,898	99.99
E (601 cities and towns).....	Under 5,000	332,180	1,592	320,083	1,746	552,263	3,338	99.40
Total (1,294 cities and towns).....		9,339,745	101,760	10,897,352	81,070	20,299,009	187,810	99.10

*Totals of freight and express exceptions in tables 1 and 2 do not agree because 145 cities totaled but failed to itemize all exceptions.

RECORDS OF LARGER CITIES

City	Freight		Express		Freight and express combined		Per cent
	No. of shipments	No. of exceptions	No. of shipments	No. of exceptions	No. of shipments	No. of exceptions	
New York	689,097	1,230	2,412,787	50,492	3,101,884	51,712	98.33
Chicago	973,902	9,506	1,156,859	2,380	2,130,761	11,895	99.44
Philadelphia	333,187	1,967	41,006	1,037	745,253	3,054	99.59
Detroit	92,525	236	117,098	151	209,623	377	99.82
St. Louis	415,327	2,718	434,910	138	759,437	2,326	99.69

AN APPEAL TO AUTOISTS—The New Year will see a thousand or so new graves and the hospitals will care for thousands more who will be seriously injured, all due to careless autoists at railroad crossings. Are you, Mr. Autoist, going to fill a grave in 1922? Are you going to supply patients for the hospitals? Or are you going to drive with care and stop and look and listen at the railroad crossings?—*R. P. & P. Circular*

F. A. SANDLIN, agent of the Southern Railway at Old Fort, N. C., is complimented by the auditing department for reporting for the month of November, when his business amounted to 21,677, uncollected bills of only \$552; and the auditor says, in his letter, that this is not materially different from the reports of the preceding ten months. Mr Sandlin has been in the service 34 years, a part of the time as train dispatcher

Practical Education in the Car Department*

Systematic Instruction and Examination of Inspectors and Foremen and Annual Staff Conventions

By C. G. Juneau

Master Car Builder, Chicago, Milwaukee & St. Paul

THE EXPERIENCE of ages has been used to build up and advance most of our methods of transportation, but in railroading we have only the wisdom of a hundred years to help solve our problems. And as the United States contains some 60 per cent of the railroad mileage of the world and the remaining 40 per cent is scattered over the face of the earth, we cannot even turn for help to others but must confine our studies to an analysis of our own experiences in the endeavor to solve our difficulties.

Examination of the industry of railroading reveals, first, that it is immense. Excluding agriculture, it is the largest single industry in the country, and it approaches in size a majority of the other industries combined. Its very immensity means to it many problems. Second, it is very complex in its make-up, including, as it does, large and varied forms of activities. Wide experience is a first necessity to a successful railroad man. Third, it is variable, ever fluctuating in quantity and changing in character. The problem of how to handle a certain quantity of coal today will be replaced tomorrow by a deeper problem, because of the changing of the chief commodity to be moved to wheat, lumber, or oil. There is nothing tangible to guide railroads; and as business conditions change much more rapidly than it is possible to alter existing equipment or provide new equipment, only by careful study of all forms of industrial and agricultural conditions, politics, money markets, and general world conditions, can an intelligent forecast of demands upon the railroads be arrived at.

The fact that the undertaking is so immense at once suggests that railroad employees should be drawn from particular schools or universities wherein they would be specially trained for one or another of the phases of railroad work. No educational institution can produce a railroad man for the reason that railroading is complex and fluctuating. His education must accompany his experience, and must change to conform to fluctuations in railroad conditions.

Lacking centuries of experience on which to base their judgment, unable to use the experience, of other countries, and unable to turn to educational institutions to provide a trained personnel, the railroads' one chance of resurrection seems to lie in the education of their own employees along the lines of their employment.

Railroad education might be divided into three phases, viz., (1) education of the men; (2) education of their officials, and (3) education of the public. I am going to deal mainly with the first subject and confine my remarks to our own experiences in the mechanical department of the railroad I serve.

Systematic Education of Foremen and Inspectors

As a prelude to our educational campaign, it was laid down that all officers in the mechanical department should endeavor to educate those responsible to them to help in making railroad service a vital response of human effort and energy. It was realized that the first milestone could not be successfully and safely approached unless those interested undertook their work seriously, and this could not be brought about until those in charge had created an atmosphere of

respect and established the fact that there was need for each employee's best effort.

The multiplicity of instructions and the rapidity with which they were issued during government control made compliance with them almost a human impossibility. Conflict, doubt and confusion existed. Our then master car builder drew up and issued a booklet laying down guiding rules for every phase of work in the car department. This was issued to all supervisory forces, and its effect was electrical. Summed up in the terms of the carman, "it put the car department on the map." The principal parts of this booklet were published in the *Railway Mechanical Engineer*, commencing in January, 1920. This move may be termed the real beginning of our educational system in the mechanical department. At the present time, a book covering the maintenance of and repairs to locomotives, and instituting standard practices even to the finest detail, is in process of completion. In the meantime the information is utilized by being issued piece by piece in the form of circular letters.

Following the issuance of the first booklet, a concerted move was made to have every foreman or group of foremen provided with a *Car Builders' Dictionary* and to supplement this later with other books. Those engaged in special undertakings were induced to obtain the most authoritative publications dealing with their particular work, and many of our car department supervisors became connected with institutions and organizations which conducted discussions and issued current literature on terse subjects.

Monthly educational bulletins have been issued which deal systematically with the various phases of the car department work. One series of articles covers air brake work, another safety appliances, etc. The bulletins are furnished in sufficient quantities to make the information available to every employee in the department, no matter where located. Questions arising in connection with the articles are taken up by the men direct with whoever is conducting the publication, without passing through any official channels, and the questions and the answers both appear in the next issue of the bulletin. When necessary, the bulletins are supplemented with blueprints or sketches.

It was realized, however, that results would be derived more from successful application than from any particular virtue of the scheme itself. We therefore arranged for every inspector—freight and passenger—to be examined by our general safety appliance inspector, and later all foremen were similarly questioned. When this questioning was completed, a regular monthly examination system was inaugurated. This is conducted by sending to the district general car foremen 20 questions, based on information previously published in the educational bulletins, which on a given day are distributed to inspectors and foremen. Below each question, space is provided for the answer. When filled in the papers are returned and marked; five marks per question are allowed. The results are systematically recorded in my office and bulletined locally.

As a result of this system we have effected an improvement beyond our most sanguine expectations. The first report on our educational campaign stated that the then existing opinion that bad safety appliance conditions on our cars and locomotives was due to negligence was not correct; it was

* Abstract of a paper read before the Western Railway Club, Chicago, on January 16, 1922.

due to ignorance. It went on to say that not more than ten per cent of the inspectors on the system could pass an 85 per cent examination, and not 25 per cent could pass a 50 per cent test. That report was made less than two years ago, but today the number not regularly obtaining 90 per cent is negligible. Of course there has been quite a little transferring of men to other work, and in some instances inspectors have had to be taken out of service. But our inspectors today—the men we regard as of primary importance to the movement of our equipment—wear an air of confidence born of knowledge. Our derailments and accidents have decreased, and our percentage of on-time trains has risen to a very pleasing degree.

The examinations so far have been confined to safety appliances and matters connected directly and indirectly therewith. Extension to air brakes is being made, and we propose gradually to include questions concerning wheels, axles, general repairs, etc. Now no carman is appointed an inspector unless he can pass the necessary practical examination. Men desirous of promotion are voluntarily taking the monthly examinations, and we have at present a considerable number of men fast qualifying for positions of responsibility. The enthusiasm alone displayed by the men has been full reward for the effort necessary to inaugurate and sustain the campaign, but I feel that the big harvest is yet to be reaped.

Annual Department Staff Meetings

It was realized that as a group railroad employees attained a tremendous measure of experience, due to the large scope of the work, but that failure resulted from lack of opportunity for exchanging ideas. Accordingly, it was arranged to hold annual staff meetings of the car department and the locomotive department at Milwaukee. Later we inaugurated conventions of the blacksmiths, traveling engineers, and others interested in a particular phase of railroad work. At these staff meetings and conventions, prepared papers are read and discussed. The keen interest of the management in the meetings has been evidenced by the attendance of the president, vice-president, general manager, general superintendent of motive power and other officers. Such meetings as these wherein matters are discussed without restraint are most valuable educational schools. Foremen or master mechanics opposed to a scheme proposed by the management will leave such meetings enthusiasts for the scheme by virtue of knowledge of the other man's viewpoint; or, on the other hand, modification and even withdrawal of schemes may result from cold facts produced by unrestrained discussion.

At these staff meetings supervisors are educated as to how to deal with their men, to lay out their work, to handle their material. The papers and the discussions are printed and circulated, so that every foreman on the system may obtain the fullest possible benefit from the meetings. The papers are not contributed wholly by men within the mechanical department, but also by those in other departments, and even by persons entirely outside of the railroad field. Our aim is to secure as authentic articles as possible, to spread their contents by means of discussion, and then to make them available as guides for the following year's work.

Special instructions prepared and issued for various classes of service include, in addition to safety appliances and air brake, already mentioned, valve motion for locomotives, electricity, and the federal locomotive inspection law. Monthly reports covering all phases of the department's operations are issued to principal supervisors and, in condensed form to every foreman on the system.

Education of Operating Officers

Because the mechanical side of railroading has never ceased to advance, there arises the necessity of educating those we serve in the operating department to the viewpoint

resulting from our experience and experiments. This task is simplified somewhat where officials have served in the ranks, or made more difficult where they have not. It is not an easy matter to impart one's knowledge to another, and the added handicap of lack of time and opportunity often makes it a difficult problem. The need of having those administering a department made aware of all that is involved, however, stands out very clearly in my mind. The means we endeavor to employ to attain the desired result is discussion of each problem by the men on the spot. This admittedly does not entirely serve the purpose, and greater education in this direction is much to be desired.

Education of the Public

Although the railroads are servants of the public, it is astonishing what colossal ignorance exists in regard to even the simplest phases of their operation. This alone is a severe handicap to railroads in their present dilemma; but when public opinion is fed by contributions to a vicious press by authors often ignorant of anything beyond the most elementary railroad matters, they are even further harassed. I do not refer to the press as a whole, but to a certain section of it which allows its remarks on railroad problems to take the form of destructive criticism. Such articles are not productive of any good, but do the railroads much damage. If the section of the press referred to is attempting to harm the railroads, its attitude is a great success. If it is trying to better conditions for the public, it is a drastic failure.

Partially as a result of the attitude referred to, we occupy the very unpleasant position of having a portion of the public believe that the railroads are nothing but a network of intrigue—rotten in morals and with only sordid aims in view. To those who have devoted the best part of their lives to the work, not because they received adequate monetary or other reward, but because the word "service" meant to them what the colors mean to a regiment in battle, this is indeed their cup of bitterness. It is time for action. Let us concert our efforts to have the public know that the railroad man is not a rotter, not an ignoramus, but their efficient most loyal servant, and a worthy citizen of this great republic.

EXPORTS OF APPLES from Halifax, N. S., this season have amounted to 613,886 barrels, 5,635 boxes and 3,739 half barrels. These apples have gone to Liverpool, London, Manchester, Glasgow, Hull, Avonmouth, Cardiff, Newfoundland, West Indies, New York and Boston.



Photo by Kadel & Herbst

Fighting the Snow in Norway

Handling Freight in the Country's Largest Terminal

Marked Reductions in Costs Obtained by Operating Electric Tractors and Trailer Trucks

THE PENNSYLVANIA has recently revised its method of handling less-than-carload freight at its new terminal at Polk street, Chicago, with excellent results. Hauling by trailer trucks and electric tractors is the outstanding feature of the new system. Introduced in July, 1920, and enlarged upon in the following year, the equipment and the system built around it has operated to accomplish marked economies. The amount of labor required for the handling of the freight has been reduced more than half and the tonnage handled per man has more than doubled. Greater elasticity in performance has obtained, while business is

months of tractor operation the equipment was enlarged by the addition of two tractors and a sufficient number of trailer trucks to bring the total up to 725.

The System of Handling the Freight

The system under which the haulage operations are performed with this equipment is as follows: The building being divided into outbound and inbound sections; outbound freight delivered to the house by street vehicles is received at any one of 33 doors, unless it is a load of seven packages or less in which case it is received only at a package door, or unless it is a load of perishable freight when it is received only at a perishable freight door. At these doors the vehicle is met by a gang of three men consisting of a receiving clerk, truckman and loader, who with the exception of the gangs at the package and perishable freight doors, are assigned to two doors.

These men proceed to load the goods received from the vehicles upon the empty trailer trucks which are distributed by tractor under orders from a supervisor. Only that freight may be placed on any one truck which is to go into one car even though it amounts to no more than a single package. As soon as this freight is loaded on the trailer trucks, they are pushed to the nearest elevators, the average



A Typical Tractor Train on the Freight House Floor

handled with greater dispatch and less demand on floor space.

As described in the *Railway Age* of August 2, 1918, shortly before the opening of this large freight house, the Polk street terminal is a four-story structure, 450 ft. wide and 745 ft. long, which is built over 19 tracks with a standing capacity of 375 cars; the first or street level floor constituting the freight house proper and the upper three floors being utilized for storage by a warehousing concern. All merchandise is handled between the several floors and the track level platforms by 32 elevators, 8 of which are three-ton, 21 five-ton and 2 10-ton.

From the opening of the building in 1918 to July, 1920, the hauling was accomplished by hand-trucking. The equipment consisted of the ordinary two-wheel trucks and 25 trucks of the four-wheel type, and the system required each trucker to push his load from the point of loading to its destination. Meanwhile the Western Warehousing Company, a subsidiary of the Pennsylvania, which occupies the 600,000 sq. ft. of storage room on the upper three floors, had adopted and was operating to advantage a system of tractor haulage, the warehousing equipment consisting of three tractors and 200 trailer trucks.

Hand trucking in the freight house never having been very satisfactory and having afforded little opportunity to reduce a considerable expense and annoyance of handling freight by this means in so large a building, observations were made of the warehousing company's system, and some experimenting was done on the freight house floor itself. As a result of these observations it was finally decided to inaugurate tractor haulage and pursuant to the decision four Mercury tractors and an equipment of trailer trucks were installed in July, 1920. In November, 1921, after 15



Tractor Trains Operating on the Track Platforms

distance to which is 40 ft., where they are surrendered to an elevator man who lowers them to the track level and pushes them out upon the platforms. Here they are arranged into trains by a "floating stevedore" under a plan whereby all of the trucks for each track are assembled together. They are then picked up by a tractor and hauled to their destinations, the tractor in every case picking up the trucks as it proceeds from the outer end of the platform toward that end which permits it to pass around the end of the tracks.

The plan also provides that on any one trip only those trailer trucks are picked up for transit which are to be delivered to the platform for which the tractor train is enroute. Having reached the platform in question, each truck is then set out at a point adjacent to the car in which the contents are to be loaded, this operation being performed by

the one man, aside from the motorman, who accompanies the tractor train. When the freight is received by rail in trap or transfer cars the system differs only in the fact of its operations being carried on entirely at track level without the intervening steps introduced by elevator operation.

The Inbound Operations Are Just the Reverse

In handling inbound freight the packages are loaded upon the trailer trucks under a tallyman's direction and according to a plan whereby each truck is loaded only with that freight marked for the same destination in the house. After

in use at the Polk street terminal is that the benefits which are now accruing from it are the results of considerable development and have increased steadily as the men have become more accustomed with the system and as the amount of equipment has been enlarged. A good indication of this is furnished by the fact that while the average tons handled per man per hour was 1.20 for the first six months of 1921, it has increased to an average of 1.76 for the last six months and for the last three months the figure has averaged above 1.80.

We are indebted for the above information to E. H. Kirk-

TRUCKING OPERATIONS AT THE PENNSYLVANIA'S POLK STREET TERMINAL BEFORE AND AFTER TRACTOR INSTALLATIONS

The six months period prior to tractor haulage					The last six months of 1921 under tractor haulage								
Month	Number of trucks employed	Trucker hours	Tons handled	Tons per man hour	Month	Trucking force			Trucking hours			Tons handled	Tons per man hour
						Tractor operators and helpers	Total	Truckers	Tractor operators and helpers	Total	Truckers		
January	195	43,651	37,038	.85	June	90	8	98	18,922	1,740	20,662	33,712	1.63
February	183	48,763	45,940	.94	July	80	8	88	16,275	1,454	17,729	29,773	1.68
March	328	85,023	56,611	.66	August	82	8	90	19,444	1,902	21,346	35,710	1.67
April	155	37,339	22,926	.61	September	84	8	92	17,815	1,782	19,597	35,256	1.80
May	199	49,785	38,104	.77	October	93	8	101	19,734	1,862	21,596	39,921	1.85
June	256	69,674	55,107	.79	November	86	12	98	17,964	2,346	20,310	37,356	1.84
Average men per month	219.3	334,635	255,726	.764	Avr'ge. men per month	85.8	8.7	94.5	110,154	11,086	121,240	211,728	1.746

the trucks are loaded each truck is pushed to the nearest elevator where an elevator man raises it to the first floor, the operation thereafter consisting of its haulage by tractor to the proper destination which may be in the alphabetical section of the house, such as Section D for Duncan Brothers, a section specially restricted for a particular shipper; the cold storage room, or a point where cars are loaded for the underground tunnel system. Arriving at these points, the trucks are uncoupled from the train and the freight is either unloaded or left on the trucks, depending upon the demand for trucks at the time and the likelihood of their being released within a period not to exceed 48 hours.

The trains ordinarily consist of seven or eight trucks but often carry as many as 14 or 15 loads, this loading being governed almost entirely by the bulkiness of the packages and operating convenience rather than by consideration of tractive power. As has been stated above, the tractor crew consists only of a motorman and an attendant although some conditions arise where it is found advisable to engage the assistance of additional attendants temporarily as where a long train of bulky material must be assisted around sharp corners or along narrow platforms of which there are several in the house.

Marked Results Have Been Obtained

The benefits which have arisen from the tractor operation are several. A comparison of the records for the last six months of this year with those for the six months immediately preceding the inauguration of the present system bring this out. As the accompanying table shows, between these periods the average number of tons handled per trucker has been increased from 1167 to 2228, or 90 per cent, while the number of tons handled per man per hour has been increased from an average of 0.764 to 1.746 or 128 per cent, or if compared with the records of the last three months of the year from an average of 0.764 to above 1.80. This reduction in the forces actually handling the freight has also permitted some reductions to be made in clerical forces. The average size of the gangs receiving the freight from vehicles and of those loading or unloading the cars has been reduced from 6 or 7 men to 2 and 3. It has also been possible to cut down the distance through which the truckmen are required to operate from an average of 1,000 ft. or more to less than 50.

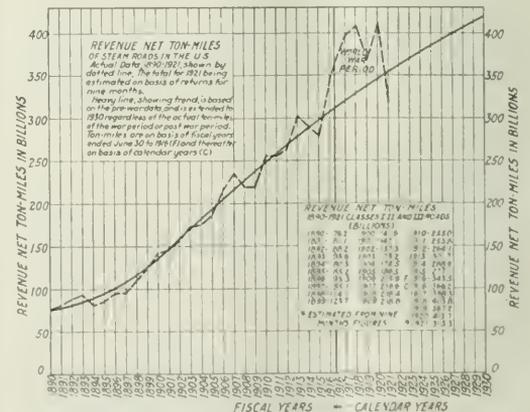
One interesting point which arises in studying the system

land, freight agent and Oscar Hess, general freight foreman, of the Pennsylvania Terminal, under whose direction these trucks have been installed.

Trend of Freight Traffic

WASHINGTON, D. C.

THE Interstate Commerce Commission has given to the press the accompanying chart prepared by its Bureau of Statistics, showing the trend of railway freight traffic since 1890, which indicates that, based on the rate of growth prior to the war period, and disregarding the great increase during the war period, which was lost in 1921, it would take until 1929 to reach the high level that was reached in



A Trend Curve of Revenue Ton Miles

1920. The dotted line of the chart shows the revenue net ton-miles, 1921 being estimated on the basis of the actual figures for nine months, while the heavy line shows the trend extended on the basis of the pre-war data. The 1921 ton mileage is estimated at 313,300,000,000, which is less than for any year since 1915.

Railroads Conclude Rate Testimony Before I. C. C.

Testimony and Cross-Examination of Executives to Be Followed
by Testimony of Shippers on Particular Commodities

WASHINGTON, D. C.

S. M. FELTON, president of the Chicago Great Western; H. E. Byram, president of the Chicago, Milwaukee & St. Paul; W. L. Apolther, president of the Louisville & Nashville, and Samuel O. Dunn, editor of the *Railway Age*, testified before the Interstate Commerce Commission in its general rate inquiry on January 12, 13 and 14, after which three days, January 16, 17 and 18, were devoted to cross-examination of the railroad witnesses. Daniel Willard, president of the Baltimore & Ohio, was also questioned by the commissioners at some length following the reading of his prepared statement on January 11.

Commissioners Aitchison and Hall resumed their attendance at the hearing on January 17, joining Commissioners Esch and Lewis after their appointments had been confirmed by the Senate the day before.

The commissioners asked numerous questions as to the possibility of increased efficiency and economy from various methods which have been very generally suggested, such as joint use of terminals, pooling of equipment, electrification, abolition of passes and "private" cars, etc. At one point Commissioner Lewis said, however, that the fact that questions were asked which had been suggested did not necessarily mean that the commission was impressed with the suggestion. All of the railroad witnesses agreed that there are many opportunities for greater economies but that the important ones usually require the investment of considerable amounts of capital for better or more facilities. While they also agreed on the importance of small economies, and Mr. Byram particularly described many ways in which economy or increased efficiency had been brought about by plans for enlisting the co-operation of the employees, Mr. Willard said the railroad problem is not to be solved by saving on lead pencils or abolishing private cars or passes. All of the executives said that the percentage to be prescribed by the commission as constituting a fair return after March 1 should be not less than six per cent.

Felton Says Rates Cannot Now Be Reduced

There can be no hope in the railroad situation if freight rates are to be reduced at the first sign of improvement, Mr. Felton said.

"The position of the railways," said Mr. Felton, "is that no further reductions of rates can be borne by them until labor costs and other expenses are reduced. The western lines in company with the other railways of the country are just beginning to struggle to their feet financially. The increases in their net operating income, which have been secured within recent months, have been partly due to reductions of wages and other costs but even more to extremely drastic retrenchments. The facts show that no reduction of rates sufficient to have any considerable tendency to increase the traffic moving could be made, unaccompanied by corresponding reductions of labor costs, without throwing the western railways back financially in as unpromising a situation as they were in a year ago.

"There is still room for effecting large economies in operating expenses, but this can only be accomplished by very heavy capital expenditures. Much has been done along this line in the past, and much more can be done. The capital required, however, can only be obtained on fair terms, if the credit of the roads is good, and that must depend to a large part on the operating results which may be secured.

"If rates are placed on such a level that the return is reduced to the minimum, the prospect of obtaining the vast

amount of additional capital is far from promising. On the other hand, if the railroads' credit is such that they can raise the necessary capital and thus be enabled to embark on a program of wise improvement in and additions to their properties, with all that means in the matter of making a market for the materials that go into the work and the employment it will give to thousands who are now out of work. I know of no other single factor which will go farther towards reviving industry.

"It is impossible to estimate prospectively the effect upon net income of economies which may be made through increased efficiency and the use of more economical methods in any given period of time. Efficiency of management must be tested by results and railroad executives have a right to demand that they be so tested. The record of the American railroads for the past 30 years is a record of progressive efficiency through which billions of dollars have been saved to the public in the lessened expenses of operation and but for which the transportation bill of the country would be greatly in excess of what it is."

To Fix Rate Below 6 Per Cent a Blow to Credit

Mr. Felton said it would be entirely wrong to predicate any action on the somewhat improved situation during the four months ending October 31. In making the recent reductions on agricultural products the carriers have gone the limit as to rate reductions until they reach a stabilized basis either by reduced costs or increased traffic. In speaking of the need for heavy capital expenditures he recalled the fact that in his testimony in Ex Parte 74 he had referred to the need of more facilities but, he said, periods of depression must be disregarded in planning for the future. It is the judgment of the railway executives, he said, that there has been no change in conditions to warrant the commission in prescribing a less percentage of return than that provided in the transportation act for the period ending March 1, and there could be no greater blow to the credit of the railroads than an act of the commission fixing a rate lower than six per cent. This, he said, should also be regarded as an average so as to make up in prosperous times for periods of depression. If it is to be regarded as the limit in good times and the roads cannot attain it in dull times there is no hope for the roads.

Replying to inquiries by Commissioner Lewis, both Mr. Willard and Mr. Felton expressed the opinion that a reduction in the passenger rates from 3.6 cents to 3 cents per mile would not stimulate traffic sufficiently to offset the decrease of \$280,000,000 in the carriers' revenues which such a reduction would mean.

Mr. Willard Questioned

Commissioner Esch inquired of Mr. Willard as to the losses that come from the issuance of passes and the use of private cars. Mr. Willard said that while he did not think it could be said that there was no loss from the use of passes, the complete abolition of passes "would not have a controlling influence over the present situation."

Mr. Willard told of economy measures that have been taken by the Baltimore & Ohio, particularly in relation to the saving of fuel. He said even to teach firemen to save one scoop of coal a mile would mean a saving to that road annually of 500,000 tons which Commissioner Lewis pointed out would mean an annual saving of \$1,500,000.

Questioned regarding the use of private cars, Mr. Willard

said: "That is another thing which has been very much misunderstood. Of course the private car is just as much of a working institution of the railroad as the office."

Mr. Willard said that while there may have been some abuses of the private car in the past, in his belief there is no ground for complaint on this score at the present time.

"Take my own case," he continued. "When I am on the road it is the same as when I am in my office. My secretary is with me. My files are with me. I get my messages and carry on my business the same as I would if I were at home. A car is of very great assistance and what is true in my own case is true of all other officers who are provided with cars."

"Is it true that New York bankers have passes over practically all roads?" asked Commissioner Lewis.

"It is not true of the Baltimore & Ohio," replied Mr. Willard with emphasis.

Pointing out that coal shipments constitute approximately 48 per cent of the traffic over the Baltimore & Ohio, Mr. Willard said that should a ten per cent reduction in coal freight rates be made, his road would be required to handle 20 per cent more coal or 60 million tons additional in order to make up for the loss in such revenues. Such a thing, he said, would be impossible because the Baltimore & Ohio has not got the facilities to handle such an increase.

View Rate Reduction With Apprehension, Says Byram

Mr. Byram and Mr. Mapother both asserted that while some relief has already been provided the carriers through the action of the Railroad Labor Board in reducing wages, it is inadequate to enable any further reduction in rates at this time.

Mr. Byram told the commission that despite the fact that his road had taken advantage of every available resource to promote efficient and economical operation it has been unable to produce net returns for its stockholders "and during several months in the last year has failed to earn its fixed charges."

"The universal demand for further reduction in freight rates presents a situation, therefore, which we must view with apprehension," he said.

Mr. Byram added that while immense opportunities are available for further increasing economy of operation by large investments in reducing grades, double track, improving and increasing terminal facilities, etc., these improvements cannot be made because they would "require the investment of immense sums of new capital which cannot be obtained unless the earnings of the railroads are such as to satisfy investors that such investments in railroad securities would be safe and productive."

"At the present time," he continued, "because of the impaired credit of the railroads generally, money for improvements cannot be borrowed in the usual way except at rates considerably above the rates permitted by the Transportation Act to be earned on the value of the improvement."

"Therefore, it would seem that the need of the immediate situation requires a reduction in operating costs and fuel and labor, which absorb 80 per cent of the total operating cost, must bear the larger portion of the reduction. Fuel and other supplies already are coming down and the United States Railroad Labor Board decision 147 decreased our payroll almost 11 per cent or about \$770,000 per month effective last July. These changes have been helpful but it is evident from figures already submitted that greater relief is needed to keep the transportation system intact."

W. L. Mapother for Southern Roads

After reviewing the financial condition of the southern railroads which for the year which ended on October 1, 1921, earned only 1 1/4 per cent on their investment, Mr. Mapother said:

"Rates cannot be reduced without a very material reduc-

tion in operating costs, which latter cannot be produced without the modification of rates of pay and working conditions along the lines suggested. Any arbitrary or premature reduction of the revenues of the carriers would certainly prove ruinous to the general business interests."

Mr. Mapother said "present conditions of business do not justify an optimistic expectation for an early commercial revival."

"Judged even by the net railway operating revenue of the southern carriers for the four months' period since the wage reduction, from July 1, 1921, to October 31, 1921, the yield on the investment falls about 33 1/3 per cent short of that contemplated by law," he continued. "Had not the traffic movement in October been influenced by abnormal conditions the deficiency in the return on the investment for the four months' period since July 1, 1921, would have been even greater. The management of almost every road in the southern region has given expression to a deferred maintenance in 1921, particularly in equipment. Had the full complement of maintenance been effected, the yield on the investment would have been still further reduced."

"I believe that thrifty and careful administration has been practiced to the maximum extent and it is quite evident that the exigencies of the transportation situation during the past year have forced the application of economy upon a scale which, if continued for any great length of time, must ultimately rebound to the detriment of the public interest."

Mr. Mapother said "wages of railroad employees should be more flexible and in a larger degree determined by the management."

"In this way," he said, "railroad operations will more quickly adjust themselves to economic conditions and the ability of the railroads to pay a given wage under certain conditions will be given consideration in fixing wages. The standardization of railroad wages is wrong in principle. There is no logical reason why railroad labor should not be amenable to the law of supply and demand to the same extent as labor engaged in other lines of industrial endeavor. Aside from this discussion, however, the first essential to increasing the net income of carriers in the southern region is a reduction in wages."

"While the greatly increased cost of fuel in recent years has been a substantial factor, the excessively high expenditures for labor have presented by far the most formidable barrier in the way of smaller costs of operation and incidentally the greatest obstacle against the realization of a satisfactory income under the Transportation Act. Labor costs, although measurably modified by recent revisions in wage schedules and agreements, are still overstepping all bounds of proportion in comparison with other charges and their absorption of gross earnings is yet substantially greater than was ever recorded under normal or pre-war conditions."

Joint Facility Savings Much Exaggerated

Mr. Mapother said that in his opinion the saving which it is claimed would result from greater use of joint facilities is very much overestimated.

"It is not believed," Mr. Mapother said, "that any enhanced economy can be produced in this direction without incurring an enormous expenditure for rearranging and expanding the existing terminal facilities. Personally, I believe that the somewhat popular idea that great economy and improved efficiency can be brought about through a more intensive joint use of the existing terminal facilities has been very much exaggerated or is, in fact, a fallacy."

"Joint facilities are now being made use of in most instances wherein the handling of traffic can be expedited and economies effected. During federal control much effort was made to extend the joint use of facilities, but the results were according to my observation, very far from satisfactory. In many instances, it was not only clearly demonstrated that no

economy resulted, but the expedition of traffic was impaired; shippers were subjected to great inconvenience and much dissatisfaction resulted.

"The joint facility accounts of the Southern lines for the year which ended on September 30, 1921—showing a debit of \$1,550,273—indicate that the exchange of facilities is being practiced on a very considerable scale. Additional arrangements of this character are being and will be effected whenever the possibility of more economical operation may present itself, but nothing short of complete reconstruction and enlargement of the existing facilities would render it possible to uniformly establish joint operations at all important terminals."

Decline in Railway Development

Pointed Out by S. O. Dunn

The progressive decline in railway development in the United States as measured by miles of line and cars and locomotives ordered and built in recent years was shown by Mr. Dunn in tabulations of statistics compiled by the *Railway Age* and confirmed by official reports of the Interstate Commerce Commission. This decline, Mr. Dunn showed, has been accentuated since the war and by 1920 there was an actual reduction in the mileage of line and in the number of locomotives and freight and passenger cars in service, but the decline in the annual rate of increase had begun long before the war.

In each of the last five years the mileage of railroad line abandoned in the United States has exceeded the mileage of new line built, Mr. Dunn said, and in 1921 the mileage of new line and the cars and locomotives ordered were less than in almost any previous year in railway history. The new railroad mileage built in 1921 was 475 miles, or less than has been reported in any previous year except 1920, when only 314 miles were built. In the four years ending with 1901 the new mileage averaged 4,524 miles a year; in the four years ending with 1905 the average was 4,974 miles; in the four years ending with 1909 it was 4,449 miles; in the four years ending with 1913, 3,314 miles; in the four years ending with 1917, 1,135 miles, and in the four years ending with 1921, 549 miles.

For the five years 1917 to 1921 inclusive, the mileage of railroad abandoned in the United States has totalled 4,939 miles, of which 1,714 miles represents track actually torn up and the balance represents mileage on which operation was suspended. In 1921 operation was suspended on 1,409 miles, 217 miles of line were actually torn up and authority was asked of regulating authorities to abandon 575 miles.

The Interstate Commerce Commission during the year ending October 31 issued certificates authorizing the construction of 405 miles of new line and the abandonment of 702 miles. Mr. Dunn also quoted from Interstate Commerce Commission records which show a decrease in the total mileage of railroad owned in the United States from 254,251 in 1916 to 253,708 in 1920.

Few New Cars and Locomotives Acquired

The number of locomotives in service on the railways of the United States increased 7,378 in the four years ended with 1913, Mr. Dunn said, but only 473 in the four years ended with 1917 and 617 in the four years ended with 1920. The number built for service in the United States and Canada in 1921 was 1,185, or less than the number built for the United States alone in any year since 1897.

The average number of locomotives built annually in the United States and Canada in the four years ending with 1909 was 4,319; in the four years ending with 1913 it was 4,137; in the four years ending with 1917 it was 2,126 and in the four years ending with 1921 it was 2,259. The number of locomotives ordered in 1921 for service in the United States was 239, which is the smallest number ever reported except in 1919, when it was 214. The average number of

locomotives ordered annually for 21 years has been 3,225, while the average number ordered annually during the last four years was only 1,384.

As to freight cars, Mr. Dunn showed that the average number built for the United States for the six years ending with 1904 was 123,256. In the five years ending with 1904 it was 111,824, and in the four years ending with 1921 it was only 65,823. The number built in 1921 was only 40,292, which is the smallest number ever reported since the *Railway Age* began to compile the statistics in 1899. In 1906 and 1907 alone the number built was 516,667.

The number of passenger cars built in 1921 for use in the United States was 1,275, the smallest number ever reported except in 1920 and 1919 and the number of new passenger cars ordered during the year was only 246.

Mr. Dunn Questioned

Commissioner Lewis asked if these statistics were presented to show that the railroad plant is not being kept up properly. Mr. Dunn replied that he had been asked to present the statistics, but he had no doubt that if compared with those of other industries they will show that the railroad plant has not kept pace with the development of other industries. Asked whether the railroads would be able to meet a normal demand for transportation, Mr. Dunn said he did not think they would. He recalled some of the experiences of the years 1917, 1918 and 1920 when the shippers of many kinds of commodities were unable to get cars.

Commissioner Lewis suggested that some people say there is less need for new cars than for better handling of cars. Mr. Dunn replied that that is undoubtedly true to some extent and in many cases it is not so much a question of cars as of having enough locomotives and other facilities to handle them promptly. But, he said, the figures show the same reduction in orders for new locomotives and new track facilities as in cars.

"Why haven't the railroads provided the facilities?" asked Mr. Lewis.

"Because they haven't had the money," Mr. Dunn replied.

"These figures on their face indicate a very unsatisfactory situation," said Mr. Lewis. "If that condition continues, what will be the effect?"

"The most important result will be the effect on the public," said Mr. Dunn. "If the development of the railways fails to keep pace with other business we are going to come to a condition where the railways will be wholly unable to handle the business. Many industries have undergone a great increase in capacity in recent years."

Questions regarding the reasons for the decline in railway development led to a discussion of the rate of return earned by the railways. Clifford Thorne asked if it was not a fact that in the three years prior to federal control the railways had earned a greater return than in any previous three-year period. Mr. Dunn said he had made a very careful check of that and had ascertained that it is not a fact.

Cross-Examination

Resuming the stand for the purpose of cross-examination, Mr. Felton said that his road had saved a considerable amount of money owing to the difference in labor costs through the repair of cars in outside shops.

Work which the Chicago Great Western estimated would cost \$1,100 per car, Mr. Felton said, cost only \$800 under contract while the cost of repairing five locomotives which that company has sent to outside shops was about 30 per cent less than what the same work would have cost in the company shops.

He told of having steel freight cars repaired in this manner and said the work was done for about one third less than it would have cost had his road had the facilities to perform the work. A large part of the equipment which that road had

repaired outside, Mr. Felton said, was equipment which had been roaming around the country during the period of federal control under the general plan of pooling equipment.

Representatives of shippers questioned Mr. Felton regarding coal prices now being paid. The witness said that many of the western roads are now storing coal in anticipation of a possible coal strike on April 1 next, but that this coal can be bought from \$2.10 to \$2.20 a ton at the mines compared with \$4 and \$5 a ton in the fall of 1920, and \$2.75 to \$3.75 on present contracts. Mr. Felton denied in reply to a question by Glenn E. Plumb, that this reduction in price was being granted by the coal operators contingent on an alleged agreement by the carriers to aid them in reducing wages.

At Mr. Fulbright's request, the carriers agreed to furnish the commission with comparisons of wages being paid railroad employees in the various districts with the "going rate" for other labor in the same territory.

Mr. Shriver, Mr. Aishton and Mr. Wettling were recalled for cross-examination on Monday. Most of the time was taken up by questions by Clifford Thorne, on behalf of the shippers' committee, regarding the statistical testimony, which seldom elicited an affirmative answer from the witnesses. Mr. Thorne tried several times to get Mr. Shriver to admit that the railroads had charged \$200,000,000 to operating expenses in 1920 or 1921, representing the increase in the inventory value of materials and supplies turned back by the Railroad Administration as compared with the value at the beginning of federal control without any increase in out of pocket cost. Mr. Shriver declined to agree to the statement, saying that new material that cost even more was also used and that it was charged out on the basis of the average stock price. Mr. Thorne said he was trying to make the point that this situation invalidated the comparison of maintenance expenditures. He also tried unsuccessfully to get Mr. Shriver to admit that the difference of some \$4,000,000,000 between the net capitalization and the property investment accounts of the railways must represent what has been acquired through the use of surplus earnings or charged to expenses, or gifts. Mr. Shriver said that if the balance sheets are properly related it would be impossible to arrive at any such conclusion.

Referring to the chart published in the *Railway Age* comparing the increases in prices and rates since 1890, which Mr. Shriver had used in an exhibit, Mr. Thorne asked if he had made any comparisons based on the period immediately preceding the war. Mr. Shriver said such a comparison would be absolutely erroneous because during that period the railroads had been forced to sell their product at a rate far below the prevailing level of prices. They had only been able to do this, he said, by the expenditure of large sums of new capital on which no return was earned.

Mr. Shriver Questioned by Clifford Thorne

In reply to questions by Mr. Thorne regarding the sums paid to the roads or due them from the government as rental or guaranty, Mr. Shriver said the roads in 1916 had earned a net operating income of \$1,055,000,000 or 5.92 per cent on the property investment, and in 1917, \$986,000,000, or 5.8 per cent. For 1918 and 1919 the roads taken over by the government were guaranteed a rental of \$897,000,000, which was equal to 4.83 per cent on the property taken over. For 1920, if the roads finally get half a year's rental for the six months' guaranty, without deduction on account of maintenance, they should receive \$848,000,000, or 4.28 per cent. If they do not receive the full amount of their expenditures during the six months period this amount would be reduced. For two months of 1920 the roads received \$151,000,000 as rental, their guaranty for six months was \$484,000,000, and there was a deficit for that period to be made up of \$216,000,000. Mr. Thorne asked if it is not fair to say that the railroads have received in addition to the rates paid by the public, a billion and a half dollars since 1917. Mr. Shriver pointed

out that the companies had not received the revenues, nor the amounts necessary to meet deficits, but in reply to the question he made up a statement showing that in 1918 the Railroad Administration had earned \$255,000,000 less than the rental, in 1919 \$448,000,000 less and in the first two months of 1920, \$99,000,000 less than the rental, making a total of \$802,000,000 paid from taxation rather than from rates. The six months guaranty added \$484,000,000, making a total of \$1,286,000,000 and in addition there was a deficit of \$216,000,000. Mr. Shriver said the average net operating income of the test period was 5¼ per cent but when applied to the property actually taken over it produced only 4.83 per cent.

In questioning Mr. Wettling, Mr. Thorne referred to the railroad claims against the Railroad Administration for undermaintenance and asked if the expense of making up deferred maintenance in 1920 should properly be charged to current expenses. Mr. Wettling said they should not if they are reimbursed by the government but Mr. Thorne apparently wanted to consider the claims as a real account to which they could be charged.

Mr. Willard, Benjamin Campbell, vice-president of the New York, New Haven & Hartford, Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, C. R. Capps, vice-president of the Seaboard Air Line, and W. C. Maxwell, vice-president of the Wabash, were cross-examined on Tuesday.

Mr. Thorne questioned Mr. Willard closely regarding the basis for his statement that the rate of return should not be less than 6 per cent. Mr. Willard declined to be drawn into a discussion of intricate financial questions. He said that during the last 10 years the percentage of return had only exceeded 6 twice and with the experience of the past in mind he was convinced that nothing less than 6 per cent would meet the situation. As long as the United States government will not lend to the roads for less than 6 per cent on first class collateral, he said, it is difficult to see how stock can be sold on a lower basis. He said, of course, the percentage now to be fixed is not necessarily to be permanent. Under other conditions it might later be reduced. Railroads must be in a position eventually to sell stock at par and in his opinion the Baltimore & Ohio couldn't sell stock at par unless it paid 8 or 9 per cent.

After Mr. Thorne had referred to various statements made by Mr. Willard in the past the witness turned the tables by reading from a statement recently made by Mr. Thorne before the Senate committee, saying he did not wish to leave the impression that he thought it wise to starve the railroads or to have them undermaintained or have poor credit. On that statement Mr. Willard said he was in accord with Mr. Thorne.

In speaking of measures of economy and efficiency, Mr. Willard described a plan which the Baltimore & Ohio has recently developed carefully of holding cars of through traffic for certain principal destinations until there are enough cars to make up a 50-car train, which is then run through without intermediate switching, saving more than enough time to make up for the initial delay. He said other roads had done the same thing but he thought his road had given it more attention than some others and had found it necessary to work out a complete book of instructions to show all employees concerned just what to do.

When Mr. Dunn was recalled for cross-examination Mr. Thorne again brought up the discussion in connection with his assertion that the percentage earned by the railways in the three years ending June 30, 1917, was larger than that for any preceding three-year period. Mr. Dunn said he had received a statement on that point from the statistical bureau of the commission which showed an average return during the three years ending with 1907 of 5.62 per cent; during the three years ending with 1911 of 5.32 per cent, and during the three years ending with 1917 of 5.36 per cent. Mr.

Thorne took the position that accrued depreciation should be deducted from the property investment in the latter period before computing the percentage, saying that the commission did not require the roads to report the depreciation in the former period and that if the figures were placed on a comparable basis the result would be different from that shown by the statement.

Banker Discusses Rate of Return

Jerome J. Hanauer, of Kuhn, Loeb & Co., New York, testified on January 18, regarding the rate of return. He said in part:

The particular problem which is the occasion of this hearing is not only difficult, it is insoluble. The transportation act has made it mandatory upon this commission to initiate, modify, establish or adjust rates so that carriers, in groups which you have designated, will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn, as nearly as may be, a fair return upon their aggregate value. The commission is now required by law to determine the fair rate of return after March 1, 1922 and until again changed by it. In enacting this law, Congress omitted to provide that the shippers of the country should furnish the traffic necessary to make the law effective. The mandatory provisions of the act violate economic laws in so far as they require rates to be increased in times of depression when there is a minimum demand for transportation and to decrease the same in times of great prosperity, when the demand is at its maximum. At no time since the passage of the act have the carriers earned the permissive return, and, contrary to the belief held by many, there is no guarantee whatsoever. The companies are to earn the return if they can, but if they do not, they are not even permitted, except to a limited extent and for special purposes, to recoup themselves, out of earnings in excess of the permissive rate, earned in more prosperous times. Transportation companies are subject to the same economic forces as any other business endeavor; they will have good years and bad years and, unless they have a guarantee (which I do not favor), they must be permitted to build up a substantial surplus in the good years, to enable them to survive in times of depression. Only thus can their credit be stabilized, so that they will be able to give to the country that efficient service, without which its industrial life will be stifled.

Because the railroads perform a great public service, investment in their securities should be encouraged by a return at least as large and if possible more stable than that which can be obtained from any form of private investment having similar risks and similar opportunities.

In considering the rate of return necessary to attract investment funds into railroads, it does not avail to be guided by the rate at which old outstanding issues of underlying mortgage bonds are selling or that at which a very limited number of new issues of some of the few still prosperous companies have recently been sold. To all intents and purposes, first mortgage bonds are a thing of the past. The large additional amounts required hereafter must be raised by junior securities, for which the obligation itself of the particular company will be the main reliance, and by the sale of additional preferred or common shares. It is many years since any new issues of shares have been sold. Few companies could today sell any large amount of common stock and not many more could sell preferred stock and, of course, these are those companies that have the least need of new capital. And yet if our transportation system is to be enlarged and improved, if outlying sections of the country are to have railroads, if branch lines are to be built to the farming districts, to factories and to mines, much of the needed capital should be, probably will have to be, found by the issuance of new shares. In some quarters it seems to be expected that railroad companies can go on increasing their debt forever without increasing the equity behind it, yet how generally it is understood that little encouragement would be given to the owner of a house or a factory by the holder of his mortgage if he suggested that the mortgagee should increase his loan for the purpose of making additions and improvements, without the owner establishing an additional equity by providing, say one-third of the new money required.

Investors in railroad securities, as in fact in any securities, do not consider them as a class; they study the situation of the particular security in which they are asked to invest. Unless the margin of earnings is sufficiently ample to safeguard that security during lean periods, the security is discriminated against. Some railroad common shares yield, at current prices and with current dividends, about 6 per cent

and others as high as 9½ per cent per annum, all, however, with limited markets.

In determining the just rate of return upon the value of railroads, as established by this commission, much consideration must be given to the present physical condition of the companies' roads and equipment, and the conditions affecting the companies during and since government operation.

During the war the government recognized the necessity of being very liberal with manufacturers and others engaged in providing necessary war supplies. All such were permitted to earn large profits, the government relying upon the income and excess profits taxes to cover part of these profits into the Treasury. But all those engaged in these occupations were quite properly permitted, and did charge off out of profits before such taxes were figured, large amounts for the depreciation of their facilities due to the excess war costs, in addition to the customary charges for depreciation and depletion. These industrial concerns were thus enabled to set aside large reserves to tide over the difficult times which have come to them in the last year. Not so, unfortunately, with the railroads.

While the government spent great sums to provide other war facilities, all capital expenditures on the railroads were charged to the companies. In particular, there were purchased at inflated war prices, locomotives and cars costing almost \$400,000,000, which could today be produced for a much lesser amount, and from which the railroads could obtain no financial benefit until after the close of the guaranty period soon after which the business depression set in. No part of this cost was assumed by the government as a war cost and, therefore, the same must be borne by the roads and passed on eventually to the public.

These conditions have resulted in the railroads being in a poor situation to meet the depression which ensued after the boom period following the armistice. In order to maintain their solvency, they were compelled to reduce maintenance to a minimum, a policy which would, if persisted in for a longer period, place the properties in such a position as to be unable to meet the requirements of commerce when normal conditions return. Not alone this, but the absence from the market of large purchases by railroads, the discharge of labor employed in railroad maintenance, and in the production of railway supplies further greatly depresses business, causes much unemployment in other lines, and results in an endless chain of stagnation.

Liberal Rate of Return Necessary

Full consideration of the conditions affecting railroads and the relations of investors thereto, some of which I have endeavored to outline, lead conclusively to the decision that a liberal return on the value of the railroads is essential, not only to their prosperity, but to the prosperity of the entire country.

No figures of the exact division of railroad securities between bonds and shares is available to me. The percentage of shares is increased by the fact that a considerable part has been issued in reorganizations in which bondholders were compelled to exchange bonds for shares. In order, however, to be ultra-conservative with our figures, let us assume that two-thirds of the value of the properties is represented by bonds and only one-third by shares. The average net cost of the part represented by bonds is surely 5 per cent, probably more. The part represented by stock should, in view of no profit being figured in this calculation on the part represented by bonds, earn a profit of not less than 10 per cent to allow for a fair dividend, certain capital expenditures and a margin of safety for lean years. This would make a fair return on the entire capital value (not, of course, capital securities outstanding) 6½ per cent per annum. It is quite impossible to fix rates which would bring this return under anything like present conditions. No good purpose would be served by attempting to do so. The purpose now provided by the transportation act is not being reached even with present reduced expenditures for maintenance. An increase of the permissive return can, therefore, be left to future consideration, but on the other hand, any indication of reducing the rate of return now permitted, in the face of the fact that this rate is far below that required to induce investment in junior securities and shares of railroads, and far below the return obtainable from other forms of investment, would alienate whatever confidence remains in the future of our railroads and their securities.

Mr. Hanauer Cross-Examined

Mr. Hanauer was cross-examined by Mr. Thorne and other representatives of the shippers in an effort to show that the condition of railroad credit is no worse than that of other industries or public utilities. He said he was not trying to

make any such comparison but to show that the prospect of a return in the case of railroads is not sufficient to induce the investment of new capital. When Mr. Thorne asked him if he would agree that section 15-a ought to be repealed, he said he would if it were made entirely clear to the public that it was repealed because it is not wise to limit railroad return in good times without any guarantee for bad times, rather than allow the public to believe it was repealed because 6 per cent is too much.

On January 19 testimony in behalf of the shippers was begun, two days being allowed on coal and coke.

Freight Car Loading

WASHINGTON, D. C.

LOADING of revenue freight totaled 605,992 cars during the week ended on January 7, compared with 531,034 during the previous week or an increase of 74,958, according to reports compiled by the Car Service Division of the American Railway Association. In both instances the comparisons were between five-day weeks owing to the observance of a holiday in each. Compared with the corresponding week of 1921 the total for the week of January 7 was a decrease of 91,649 while it was a reduction of 224,681 compared with the corresponding week in 1920.

With the exception of ore, which showed a loss of 562 cars compared with the week before, increases were reported in the loading of all commodities.

The greatest increase over the previous week was in coal, the total being 136,982 or 31,320 cars more than were loaded during the week which ended on December 31, but this was 54,251 less than during the corresponding week last year and 72,356 less than the corresponding week in 1920. Loading of merchandise and miscellaneous freight amounted to 350,279 cars, a gain of 22,262 over the week before but 24,185 less than the total for the same week last year.

Grain and grain products totaled 40,673 cars, 10,598 more than the preceding week and 1,585 more than during the same week one year ago. It was, however, 182 under the total for the same week in 1920.

Livestock, with a gain of 1,091 cars over the week before, totaled 25,658 cars, which was 5,469 under the corresponding week in 1921, while coke showed a gain over the week before of 584 cars, which brought the total to 7,008.

Compared by districts, increases were reported in the loading of all commodities over the preceding week.

The freight car surplus for the period ending January 8 showed a further increase to 496,357 cars, of which 208,929 were box cars and 219,444 were coal cars.

Regional Conferences Proposed to Adjust Disputes with Brotherhoods

WASHINGTON, D. C.

DEFINITE PROGRESS toward an amicable adjustment of the differences between the railroads and the train service brotherhoods regarding wages and rules governing working conditions was reached at a conference of railway executives and the heads of the "big four" brotherhoods on Monday with Secretary Hoover of the Department of Commerce. It was decided, according to an announcement issued after the meeting by Secretary Hoover, to submit to the railway companies and to the train and engine service organizations the proposal that the pre-war regional conferences should be convened to consider the endeavor to adjust all questions between the railways and the brotherhoods, the conferences to be held as near to February 10 as practicable.

This was the second of the conferences called by Mr. Hoover, at the suggestion of the President, to try to bring about an adjustment between the roads and the brotherhoods that would eliminate the danger of an interruption of transportation this spring as the result of a conflict that would be coincident with the wage dispute arising from the expiration of the mine wage contracts on March 31. The first conference, attended by the brotherhood leaders and half a dozen railway executives, was held at a dinner at Mr. Hoover's residence on January 7.

The Secretary of Commerce tried to get the railroad and labor leaders onto common ground which would result, if possible in a settlement without the delay incident to a proceeding before the Railroad Labor Board. He has also been trying to bring about an adjustment of the mine wage controversy.

The conference on Monday was attended by the same men who were at the dinner and by a number of other executives. It was held in the offices of the American Railway Association.

In announcing the result, Mr. Hoover said the conference was entirely informal and in full accord with Section 301 of the Transportation Act which makes it the duty of the railroads and their employees to try to reach an agreement before referring a dispute to the Labor Board.

"Neither wages nor rules were discussed," he said. "The sole question was on the practicability of re-establishing the conferences, thereby to facilitate the work of the Railroad Labor Board and above all to create a spirit of working good will by adjustment instead of litigation."

The railway executives were to meet in Chicago on Saturday.

REVENUE FREIGHT LOADED—WEEK ENDED SATURDAY, DECEMBER 31, 1921

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise, l. c. l.	Miscellaneous	Total revenue freight loaded		
										This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,842	2,545	24,631	1,459	3,881	970	47,804	42,804	129,936	143,030	148,511
	1920	4,050	2,293	46,710	1,640	5,167	984	36,924	44,771	110,390	110,390	110,390
Allegheny	1921	3,112	2,379	29,874	3,080	2,015	1,896	35,223	33,811	78,195	78,195	78,195
	1920	1,614	3,07	59,931	5,753	2,460	2,217	30,655	39,671	78,195	78,195	78,195
Pennsylvania	1921	18	69	9,056	125	74	23	3,843	1,895	15,884	15,884	15,884
	1920	78	87	7,574	395	1,313	30	3,761	1,570	15,884	15,884	15,884
Southern	1921	5,611	1,85	15,403	323	9,587	383	27,321	20,745	78,195	78,195	78,195
	1920	3,365	1,77	4,737	729	9,26	1,76	15,914	23,484	78,195	78,195	78,195
Northeastern	1921	7,291	5,73	6,847	1,036	7,187	71	18,666	18,936	68,187	68,187	68,187
	1920	8,169	6,23	1,277	1,277	6,169	871	18,359	18,673	68,187	68,187	68,187
Central Western	1921	8,630	8,52	16,771	234	3,338	611	4,616	21,677	84,368	66,531	84,368
	1920	9,488	7,88	1,370	247	417	1,653	2,414	27,663	84,368	84,368	84,368
Southwestern	1921	3,775	1,678	1,081	167	4,818	29	12,588	18,088	44,154	44,154	44,154
	1920	3,366	1,367	4,815	50	4,536	464	13,553	21,186	44,154	44,154	44,154
Total all roads	1921	30,075	14,567	165,662	6,124	41,406	4,883	170,461	157,956	531,034	482,103	509,362
	1920	28,773	13,875	172,467	10,386	31,180	8,780	150,480	177,018	602,368	602,368	602,368
	1919	2,396	11,715	158,068	35,734	13,832	...	339,396	...	612,741	612,741	612,741
1919 figures for week ended January 1 no separation of Coke and l. c. l.												
Week ended												
December 31	1921	10,075	4,567	105,662	6,242	31,400	4,843	170,061	157,956	531,334	602,368	612,741
December 24	1921	16,793	1,958	135,852	7,140	45,518	5,249	191,029	201,248	665,927	648,406	684,784
December 11	1921	37,393	1,367	134,841	7,148	48,690	5,335	191,163	228,384	725,003	802,271	806,734
December 10	1921	18,656	1,159	137,847	6,638	49,744	6,128	215,718	236,021	742,976	832,953	763,940
December 3	1921	47,227	11,953	137,393	6,345	18,403	5,317	227,906	243,008	747,454	882,664	789,296



A Tractor and Trailer in the Erie Freight Service

Erie Adopts Direct Freight Delivery at New York

Plan Involves Breaking Bulk at Jersey City, N. J., and Use of Auto Trucks, Tractors and Trailers and Ferries

THE ERIE RAILROAD has recently inaugurated a new method of handling freight at the Port of New York which combines the features of the store door delivery and the container car ideas for the moving of freight. Under the immediate direction of J. J. Mantell, regional manager, the plan has been developed to the point where the road now has in actual operation two inland freight forwarding and receiving stations with arrangements for the proper complement of trucks and trailers. Two additional stations are to be opened shortly, while a plan is under advisement for the extension of the present newly installed method by the utilization of breaking bulk at a transfer, transferring the freight to containers which will be moved by special container floats to a centrally located pier and then by trucks to destination or to inland stations.

Port Congestion Is Cause of Change

The method installed by the Erie is a distinct departure from that which has been in vogue in the past at New York City. Under the plan now common to the railroads entering the port, the cars of freight received at the break-up yard and destined for New York City are placed on car floats. These car floats are then taken, either by tugs or under their own power, to different freight piers on the New York shore, where the freight is unloaded and trucked in or otherwise moved onto the floor of the pier proper. Final delivery to the consignee is made by or through the consignee, who sends his trucks to the pier, where they are loaded at his expense. This has resulted in considerable congestion, due to the fact that it is not always possible to secure immediate loading of the truck, not to speak of the delays caused by the numerous rehandlings of the freight.

The plan which the Erie has now put into operation involves the breaking of bulk of all domestic freight except a few products, such as perishables and dairy products, at

Jersey City. To date this covers only freight destined for points south of 14th street in Manhattan. Instead of moving the cars across the river on car floats, the freight is transferred to automobile trucks or to tractors or trailers, which are then transported to the city by the ferries, after which the trucks or trailers travel direct to destination. At present where tractors are used, three trailers have been provided in order to keep the tractors constantly at work, thus reducing to a minimum any possible wastes due to waiting time. In this manner carload freight, which ordinarily forms about 60 per cent of the tonnage handled is delivered directly to the consignee or to an inland station, if so desired. Outbound freight is handled in a similar manner at the option of the consignee.

The outbound freight, whether collected direct from the consignee or indirectly through the inland stations, is moved by truck and ferry to Jersey City, where it is loaded into cars designated for through movement to points on the Erie or to connections with that road. In this way, only one handling by freight is necessary between the time that it is loaded upon the trucks or trailers and the time that it reaches its destination.

Proposed Extension of Plan

Although the present plan is intended to cover only the area south of 14th street, New York, it is hoped to extend it shortly so as to cover all of Greater New York and vicinity. This will be done through a utilization of the container plan of freight handling, and, in a way, will be carried forward in two steps. At first, it is planned to break bulk at the transfer, loading the freight into containers of all-steel or steel-frame construction, so built as to be handled quickly and economically by cranes. These containers will measure approximately 17 ft. 5 in. by 8 ft. by 8 ft. 5 in. They will be loaded at the transfer point on flat cars, which

will be moved to Pier H at the Weehakwen, N. J., waterfront. This pier is equipped with four electric cranes of 20-ton capacity, and is also capable of handling 125 cars at a time. On a basis of two containers to a car, this pier will have a capacity of approximately 250 containers at a setting.

After the cars are spotted on the pier, the containers will be lifted by cranes, and placed on the deck of a car float. Each car float will have sufficient room on its deck for 60 containers if placed in a single tier, and double that when two tiers are used. These car floats will then be towed to a centrally located pier on the Manhattan side, also equipped with cranes, which will remove the containers and load them up on motor trucks. The trucks will then make delivery direct to the consignee, or to inland stations where immediate delivery is not desirable or necessary. The inland stations will be equipped likewise with crane facilities so that the containers can be removed promptly and the trucks released, the containers being unloaded at the inland stations, and the freight handled as desired. In instances where the consignee is receiving or dispatching large tonnages of freight, it is expected that crane facilities will be installed at the consignee's place of business so that the containers can be handled in a manner comparable to that for the inland stations. Where this is not the case, the freight will be unloaded direct from the container onto the truck in much the same manner as it is now being done. The outbound freight under this plan will be handled in a similar manner.

Second Step Contemplates Use of Container Cars

The development of what might be called the second step of this extended plan contemplates the utilization of the

container system in connection with container cars to serve the New Jersey territory. This business is more or less short-haul business, and originates in the various industrial centers of New Jersey, such as, for instance, Newark, Passaic, Middletown, and Port Jervis. Through the use of the container-car system, it is expected to move carload and less-than-carload from these points, and other similar ones, to New York, and the reverse without rehandling. This will eliminate the breaking of bulk at any point, and will eliminate one of the heaviest expenses connected with short-haul traffic. Thus, for instance, freight destined to some particular consignee in New York City may be loaded into a container, after which the container will be moved direct to the consignee without any handling further than that performed by the cranes in making the transfer of the containers from the car to the float, and from the float to the truck. The delivery of containers will not be limited to Manhattan alone since the plan is sufficiently flexible to permit the moving of container car floats to either the Bronx, Brooklyn, or Staten Island.

The Erie's plan for the handling of freight at the port of New York has been developed by J. J. Mantell, manager of the New York region, under the general direction of F. D. Underwood, president. It has been based upon studies made of terminal operations and costs, including all details such as switching, yard work, pier handling and lighterage.

In conjunction with the United States Trucking Corporation, New York, studies were made by the road on costs of handling freight by this method, as well as possible routes to secure the most economical and satisfactory deliveries by trucks or tractors and trailers.

Further Reports of I. C. C. Work for 1921

Complaints, Formal and Informal; 444 Suspensions Asked for; Obstacles to Uniform Classification

Supplementing previous articles on the annual report of the Interstate Commerce Commission, submitted to Congress on December 7, we give herewith abstracts of those portions

referring to the Formal Docket; the Bureau of Informal Cases, the Bureau of Traffic and the chapter on Divisions of Joint Rates.

Formal Docket

Since our last report, the forms relating to the monthly operating statistics have been revised after a conference with a committee representing the American Railway Association.

The wage statistics section has been recently organized to examine and compile the monthly reports of the service and compensation of railroad employees required by our order of April 18, 1921, effective July 1, 1921. These reports are designed to meet both our needs and those of the Railroad Labor Board.

The accident statistics section prepares quarterly and annual bulletins of railroad accident statistics. The analysis of causes of accidents has been elaborated to meet the needs of those engaged in accident prevention.

To effect the more expeditious issue of our monthly and quarterly statements the use of card-punching and tabulating machines has been extended and centered in a mechanical tabulation section. A reference room is maintained for the use of the public in consulting the files of annual, quarterly, and monthly reports of carriers.

The increased duties imposed upon us by the transportation act, 1920, have necessarily increased the amount of statistical work to be done. The marked growth in the number of clerks employed by railroads frequently gives rise to the suggestion that perhaps much unnecessary information is being collected by the government. Careful consideration is given to all such comments and from time to time requirements are eliminated where the data are no longer needed. The annual report form for 1917 was thoroughly

revised from this standpoint. In 1920 the distribution of locomotive-hours was eliminated. Proposals for important additions to statistical requirements are discussed before adoption with representatives of railroads to ascertain the cost of compiling them. The importance of supplying adequate information regarding wages and hours of service as having a bearing on our analysis of railroad costs, being necessary in the work of the labor board, and assisting in the formation of an enlightened public opinion on this subject, justified the expansion of the wage statistics above referred to. Much of the accounting and statistical burden felt in recent years

ing March 1, 1921. More than 900 such complaints were filed during February, 1921.

The formal complaints filed numbered 1,487, of which 1,307 were original complaints and 180 subnumers, an increase of 447 as compared with the previous year. We decided 840 and 841 have been dismissed by stipulation, or on complainants' request, making a total of 1,021 disposed of, as compared with 620 during the previous period. We conducted 1,616 hearings and took approximately 185,111 pages of testimony, as compared with 1,303 hearings and 150,986 pages of testimony during the preceding period. The following statement shows certain facts with respect to the condition of our docket as of October 31 of the years indicated:

	1918	1919	1920	1921
Formal complaints filed.....	456	838	1,040	1,487
Cases at issue but not set for hearing.....	21	54	146	201
Cases set for hearing but not heard.....	142	192	92	205
Cases heard but not fully submitted.....	87	234	505	714
Cases submitted.....	386	274	385	445
Cases disposed of.....	653	598	620	1,021

by railroads is due to the passage of the properties from private to public control and back again to private control.

The transportation act provides that complaints praying for reparation on account of damage caused by rates collected through the President during the period of federal control may be filed with us within one year after the termination of federal control. By reason of this provision an unusually large number of complaints was filed during the months immediately preced-

Bureau of Informal Cases

The number of informal complaints received was 7,811, an increase of 3,603. The director general of railroads and carriers filed 2,350 special docket applications for authority to refund amounts collected under the published rates, admitted by them to have been unreasonable, an increase of 552. Orders authorizing refund were entered in 1,289 cases, a decrease of 564, and reparation thereon was awarded in amounts aggreg-

gating \$798,278.23. In addition, 211 cases were dismissed or otherwise disposed of without orders. The bureau also handled approximately 91,500 letters, an increase of 52,500. Many of these had the characteristics of complaints, although not so classified. Others sought general information and informal rulings upon the respective rights and obligations of the public and common carriers under existing statutes.

The provisions of section 206 (c) of the transportation act, 1920, and the ruling of the director general of railroads that so-called straight overcharge claims were included therein, largely accounts for the increase in the number of informal complaints filed and letters received.

Bureau of Traffic

This bureau has jurisdiction over all matters dealing directly with the charges for transportation and transmission, by freight, passenger, express, pipe line, and telegraph service, other than proceedings on the formal docket and complaints handled by the bureau of informal cases.

In addition to the special work of the various units of the bureau, its activities are directed toward the adjustment of controversies with respect to the legal charges under the tariffs on such items as duplicate rate situations involving readjustments of kinds, classifications and charges of all kinds. These adjustments are accomplished by correspondence and by informal conferences with shippers and carriers.

The work of the bureau has been especially heavy and important during the past year. The increases authorized in *Increased Rates, 1920, supra*, were allowed to become effective by the publication of supplements to all existing tariffs, the supplements containing percentage tables under which the increased rates are computed.

As anticipated, these general increases not only have called for many important readjustments of the rates themselves, but, because of the impossibility of publishing the increased rates specifically and the necessity of using percentage tables, have added greatly to the difficulty of ascertaining the legal rates and charges, thereby materially increasing the number of controversies between shippers and carriers. In the endeavor to settle as many of these controversies as possible without the delay and expense incident to formal proceedings, numerous conferences have been held, both in Washington and at other points accessible to the interested parties.

To remove the difficulties caused by use of percentage tables in increasing the rates we have required carriers to reissue their tariffs as promptly as possible and therein to state the rates specifically. Tariffs containing 432,429 pages of rates, rules, and regulations were so supplemented following *Increased Rates, 1920, supra*, and of these tariffs 360,220 pages have been reissued to bring them into conformity with our tariff rules up to and including September 1, 1921, the latest period available, leaving 132,209 pages yet to be reissued. This work under our instructions should be completed by March 1, 1922.

It has been our policy, in dealing with rate readjustments, to encourage such changes as would tend promptly to relieve the existing depression of business in so far as changes in transportation charges may effect this result. Pursuant to this policy we have allowed changes in rates to be published upon less than the statutory 30 days' notice in a greater number of cases under more liberal rules than heretofore.

Tariffs

There were filed 103,748 tariff publications containing changes in freight, express, and pipeline rates, passenger fares, and classification ratings; and 201,656 certificates of concurrence and powers of attorney. A large majority of these changes have resulted in reductions of charges, many of the changes being due to readjustment of rate inequalities and relationships which had been disturbed by the percentage increases.

Rate memoranda have been supplied in 6,574 cases for our use and for shippers, carriers and other branches of the government. In addition to these memoranda many informal rate quotations and verifications are made daily.

CLASSIFICATION OF FREIGHT

In our last annual report we described the consolidation of official, southern, and western classifications, effective December 30, 1919.

Many of the ratings were thereby made uniform. Another issue of the consolidated classification was filed with us during the year. The following analysis thereof indicates the degree of uniformity reached:

Less-than-carload ratings.....	10,790				
Carload ratings.....	4,940				
Total number of ratings.....	15,730				
		Less than carload	Per cent	Carload	Per cent
Ratings not uniform					
Alike in official and southern.....	1,369	12.69	671	13.58	
Alike in official and western.....	2,012	18.65	1,435	29.05	
Alike in southern and western.....	906	8.49	1,449	29.57	
All different.....	1,303	12.08	1,531	30.99	
Total.....	6,590	61.08	3,986	80.69	
Uniform					
Total.....	4,200	38.92	954	19.31	
Total ratings.....	10,790	100.00	4,940	100.00	

Representatives of the shipping public appearing at public hearings conducted by the classification committees during the period covered by this report generally have protested against any changes in classification resulting in increases, whether made to cure some patent inconsistency in the classification or for the sake of uniformity. They have particularly opposed the latter. Owing to the general increases in rates resulting from our report in *Increased Rates, 1920, supra*, the carriers concluded to defer special efforts towards uniformity along lines suggested in *Consolidated Classification, 1921, I. C. C.*

There has been no material change in the situation relative to state classifications. Negotiations are in progress looking to the adoption of the consolidated classification rules and items with western classification ratings and southern classification ratings for application within the states of Iowa and Georgia, respectively. The Illinois classification has been revised along the lines of the consolidated classification as to rules and items. Generally the same ratings as in official or western classification have been established therein, depending upon competition which Illinois shippers have to meet. Some delay has been, and is being, experienced in unifying the ratings between the official and western classifications. Consequently some delay has resulted in adjusting ratings in Illinois on certain commodities, notably food products and paints.

SUSPENSIONS

Upon the investigation and suspension docket, 207 proceedings were received as an increase of 141 as compared with the preceding year. Of these, 157 were disposed of, an increase of 124. Rate readjustments were protested and suspension asked in 444 instances, an increase of 304 over the previous year. These protested adjustments often represent not only a number of rate schedules, but many rates and many points of origin and destination. One of them involved more than 1,000 tariffs and more than 100,000 rates covering traffic between a considerable portion of southeastern and Mississippi Valley territory, on the one hand, and a large part of the United States, on the other. Of these protested rate readjustments 43 represented reductions and 401 increases.

In 168 cases we refused to suspend, in 27 the protests were received too late for action, in 14 the protests were withdrawn by the protesters, and in 28 carriers withdrew the protested schedules prior to their effective dates. Of the rate adjustments representing reductions which were protested, 11 were suspended, 31 not suspended, and 1 is still pending.

THE FOURTH SECTION

In our last annual report we stated that since the return on March 1, 1920, of the transportation systems to corporate control and the removal of more active competition between individual carriers there has been a growing increase in the number of applications for relief from the provisions of the fourth section. That this condition still continues is evidenced by the fact that more than twice as many applications have been filed than during the preceding year.

The number of applications for relief received was 408, an increase of 208 over the preceding year. The number of orders entered was 426, of which 218 were for permanent and 208 for temporary relief. Orders granting relief in whole or in part totaled 278. Orders denying relief in whole or in part numbered 148. In 9

instances applications were assigned in whole or in part for bearing in connection with other proceedings.

Pursuant to *Memphis-Southwestern Investiga-*

tion, 55 I. C. C., 515, referred to in our last annual report, the class rates between the Ohio and Mississippi river crossings and the Gulf ports generally have been revised in accordance with the provisions of the fourth section. On commodities between the same points rates have been filed which would correct the fourth section departures existing in these rates. The commodity rates proposed for this purpose are not yet effective, pending determination of the proceeding instituted by us to determine their reasonableness. Whatever the decision may be, it will result in the establishment of rates between all Ohio river and Mississippi river crossings and Gulf ports, by the principal direct lines between these points, which will conform to the provisions of the fourth section.

There is also in progress as a result of our decision in the *Memphis-Southwestern Investigation, supra*, and in other cases involving the rates in southwestern Missouri and Arkansas and Louisiana, the effect of which will be to remove entirely fourth section departures on the direct routes to and from points in this section. The rates which have been proposed by the carriers for this purpose are now under consideration.

The transcontinental carriers have brought to our attention great increases since the close of the war in the movement of traffic by water between the Atlantic and Pacific seabards via the Panama Canal. A considerable portion of this traffic, it is claimed, is being diverted from the rail line, because of the lower rates accorded by the water carriers.

The rail lines are expressing concern over the situation and, for the purpose of meeting water competition, have filed applications for fourth section relief to establish rates from the Atlantic seaboard and Gulf ports to Pacific Coast terminals, also from Pacific coast terminals to certain Atlantic ports, which shall be lower than rates from and to intermediate points.

Divisions of Joint Rates

Paragraph 4 of section 1 of the interstate commerce act makes it the duty of carriers to establish reasonable joint rates and equitable divisions thereof.

In *New England Divisions, 62 I. C. C.*, 513, the carriers operating most of the mileage in New England sought blanket increases in their divisions of the joint rates with connecting lines. That is to say, they urged that the divisions be treated "as a whole," without regard to the specific divisions of individual joint rates, contending that under the law "mileage is no longer the yard-stick by which divisions are to be measured," and that the disproportionate increases in the expenses of the New England roads and their financial condition, with other circumstances, justified the relief sought. We declined to grant blanket increases and found that the record afforded no basis upon which might rest a valid prescription of specific divisions. The existing divisional arrangements, however, were found to be incongruous and chaotic, and the parties to the case were advised to designate appropriate committees, so that they might "promptly submit to us proposed readjustments that will remove the inconsistencies portrayed of record and bring into conformity with the provisions of law and equity expressed in the act the divisional arrangements, individually and as a whole."

The Interest of the Employees in Railroad Earning Power*

By Robert S. Binkerd

Assistant to the Chairman, Association of Railway Executives

THE RAILROADS of the United States cannot give to the public the good service which they want to give without the whole-hearted co-operation of the railroad employees. Management and employees are genuine partners in a great co-operative enterprise. Work must be performed efficiently and in good spirit, and the employees themselves must be treated and must be convinced that they are treated reasonably, justly and humanly by the railroad companies. Despite all the controversies railway executives are looking forward again to the day when the loyalty and devotion of their employees to their company and their work will be the outstanding characteristic of the American railroad man.

Nevertheless, assuming that management makes every effort in its power, this day will not arrive until the great majority of railway employees are themselves convinced of the futility and impropriety of some of the important policies to which labor at the moment seems to be committed.

We are now suffering hard times, for which there is no quick relief in sight. These hard times spring from various causes, some of which are international in character and beyond our control. But there is a principal factor in the present depression which is within the control of the American people. That factor is found in the unbalanced relationship between the prices of farm products and most other basic commodities, on the one hand, and the prices of manufactured goods, transportation service and various other services and products on the other hand.

If the price of manufactured goods and of railroad transportation had declined as much as the prices of farm products have now declined, the farmers' purchasing power would be unimpaired. There would be substantially the same volume of domestic business and substantial normal employment in domestic manufacturing. But, by reason of the fact that manufactured goods and transportation have not declined upon an equal basis, the farmers' purchasing power is greatly decreased and an effective blockade is created against the resumption of normal business.

The attempt of organized labor to maintain wartime wage rates and working conditions which make against high output is, therefore, fundamentally unsound.

Back of this policy there is the thoroughly unsound assumption that capital pays wages. The truth is that wages are paid out of production. That production must leave, in addition to wages, a surplus for the compensation of capital and for the marketing and sale of the product. The price of the product is ultimately fixed by the consuming public itself, and sooner or later any product or service which cannot be produced or given profitably at a price which the public is willing to pay must go out of existence.

Now, it is true that the railroad service cannot go out of existence. But it is equally true that what may be charged for that service must, in the long run, be determined by the value of the commodities to be moved. The charges collected by the railroads must not be higher than will permit the fullest economical distribution of those commodities, and, therefore, for transportation, as for everything else, there is an economic limit to what can be charged. Inside of that limit must be found the wages of labor and the compensation of management and capital.

Fundamental Economic Law

Management is just as powerless as labor to avoid the compulsion of fundamental economic law. The annual trans-

portation bill of the American people is, with declining commodity values, now tending to get outside the economic limit above referred to. The cost of transportation must be reduced. This involves, among other things, the necessity of reduction in basic wages. This need not necessarily mean any decline in real wages, because, paralleled by decreases in wages in other industries, it should result in a living wage for themselves and the possibility of renewed employment for hundreds of thousands of their fellow workers.

It would be a sad mistake for the employees to believe that there is any insuperable conflict between an adequate compensation for railroad capital and a decent standard of living for railroad labor.

Disregarding the whole period of federal control, on account of its necessarily abnormal aspects, it is a fact susceptible to the easiest demonstration that the standard of living of the American railroad employee is primarily the result of the effort of capital and management. If you will look at the 20 years before the European war you will see:

That passenger traffic increased 162 per cent;

That the cost of carrying a passenger one mile decreased one per cent;

That the number of tons of freight carried one mile increased 259 per cent;

That the average receipts per ton-mile decreased over 11 per cent;

And that the compensation of the employees increased approximately 200 per cent.

Improvements in Operation

This increase in the compensation of employees was made possible because of the increase in the production power of each employee, brought about by improvements made in the operation of the railroads. Had there been no such improvements, it would have taken approximately three times as many employees, and three times as many cars and locomotives to haul a traffic which had tripled. There could, therefore, have been neither any decrease in the cost of transportation to the public, nor any increase in the wages paid to labor.

The increase which was paid to labor was the outcome of investments made by railroad management, whereby it hauled a tripled traffic with only a 75 per cent increase in locomotives; only a 61 per cent increase in passenger cars; only an 87 per cent increase in freight cars; and less than a 100 per cent increase in employees. Hence, there was created a surplus, and out of this surplus came the increase in wages and the increase in the standard of living of the railway employees.

Nothing now is more important for the interest and welfare of the employees than that the earning power of the railroads should be restored at the earliest possible date. For it must be plain to all that some of the processes by which the railroads achieved their extraordinary improvement, in the face of declining rates and advancing costs, prior to the war, are tending to become exhausted. New methods will have to be found to increase the mileage of freight cars, to decrease the expense of handling passenger traffic, and to intensify the use of the enormous and costly terminal facilities in our cities. Whatever these new methods may turn out to be, one thing is sure, and that is that they will call for the investment of enormous sums of new capital. The possibility of increasing the production power of the railroad employees and of further advancing their standard of living will, therefore, be entirely dependent upon the ability of the railroads to raise upon their credit enormous sums of money. This money cannot be raised except upon the basis of the surety of past investments and the attractiveness of the investments still to be made. An adequate earning power in the railroads of the United States is the best friend that the railroad employee can ever have.

*From an address before the Chamber of Commerce, Altoona, Pa., on January 5, 1922.

Conditions Affecting the Head of a Rail*

Modern Track Conditions and Wheel Loads Produce Overstrained Steel—A Serious Problem

UNDER CERTAIN CONDITIONS of loading every steel structure will ultimately fail. Steel rails are subject to such loads in kind and often in degree. Interest does not attach alone to conditions which affect the head of the rail, but the head is the most critical part. The rail problem is an open one and will so remain, at least, until there is a general understanding of the destructive influences which prevail and the necessary modifications made to ameliorate them.

It is not the gross load which rails carry, as such, which makes the problem a difficult one, but the manner in which the load is applied. The prime and practically the only irremediable cause of rail failures, in the final analysis of the case, is the excessive impinging pressure between the head of the rail and the tread of the wheel.

Attention Concentrated Upon Head of Rail

These remarks refer specifically to the head of the rail. It is an elementary principle in engineering practice to maintain a certain relation between the gross load and the number of square inches of metal provided to sustain it. No application of such a rule is witnessed in respect to the heads of rails. The impinging pressures, in all cases, exceed many times the permissible loads per square inch allowed in other engineering examples. While this disparity goes on increasing, no permanent relief is in sight.

In regard to the choice of steel for rails, the opportunity is open to make any desired choice, within limits. Track conditions, however, restrict the choice to hard steel—a steel which in earlier days would have been considered very hard. The softer grades will not sustain present wheel loads without objectionable deformation.

Steel structurally sound, free from interior seams and streaks, is best adapted to meet the general conditions of rail service. It is the task of the steel maker to keep inferior seaminess at a minimum, and when this is accomplished the head of the rail will be in a condition to endure wheel pressures, as favorable as falls within the ability of the steel maker to control. External seaminess of the rail may be regarded as a negligible factor since failures from such a cause have not been witnessed.

First Strains Introduced at Time of Fabrication

The first straining of the metal of a rail takes place during cooling, at the time of fabrication. Internal strains of compression are acquired by the metal adjacent to the top and sides of the head. In order to balance these compressive strains at the periphery, the metal at the interior of the head is put into a state of tension. The stresses equivalent to these strains amount to thousands of pounds per square inch. They have been measured many times in longitudinal direction. There is no reason for supposing that cooling strains of corresponding degree do not exist in lateral directions, thus subjecting the interior of the head to cubic extension.

At times these cooling strains have caused the formation of internal cracks at the center of the head and at the junction of the web and the base. Waring and Hofmann at the Altoona Laboratory of the Pennsylvania Railroad, first called attention to a shattered zone which they found along the center of the head in a new rail. Subsequent investiga-

tion showed that a similar zone existed at the junction of the web and the base in certain rails. It was further noted that these shattered zones did not extend to the hot sawed ends of the rails. The last circumstance fixed the time of their development at the cooling stage, following the last pass of the rail mill. A careful search was instituted for shattered metal in rails taken from the track which resulted in their discovery in quite a number of cases. The rails in which they were found were of high carbon steel. Shattered metal was not found in rails of medium carbon content. The widths of these cracks were infinitesimal, with no foreign substance enclosed.

Forming Internal Cracks Experimentally

Internal cracks have been experimentally formed in rails, resembling those in tires more closely than the shattering cracks which have presented themselves in rails. Steel is known to be more sensitive to thermal treatment when first cooled from the ingot than upon subsequent reheating and cooling, a circumstance which may assist in explaining the difficulty in producing at will shattered zones in rails.

After the cooling strains of fabrication are acquired, the next thing that may happen to the head of the rail is straightening at the gagging press. No instance has come to notice in which the fracture of a rail in the track could be attributed to the immediate influence of the gag. Gagging, however, profoundly affects existing cooling strains, causing their rearrangement and even reversing their values. Cooling strains of compression may be changed to strains of tension. Internal strains do not admit of being eliminated by cold bending loads. There will be zones in a neutral state, and those zones may be shifted in position by gagging. The effacement of internal strains, complete or partial, is accomplished only by annealing the steel.

Elongation in Drop Test Specifications

Rails may be tested with the head down, and the elongation measured on the running surface. Those of the heavier sections tested in this manner not infrequently rupture without developing their normal extensions. The abrupt change in cross section dimensions at the fillets under the head causes rupture to have its origin at that place, thence extending to the top of the head. In such a fracture the metal does not display normal elongation. It is possible that a heat may be rejected, not through any fault of the steel, but on account of the design of the rail.

Notwithstanding the disparity in size, comparing a rail with the locomotive which it supports, the bending stresses involved, taken by themselves alone, are not disquieting. Track tests made by the speaker in the past and recent tests by others, with different classes of engines, on rails of different weights, and on different kinds of ballast, show a range in fibre stresses which would not be considered sufficient to cause rupture. Under vertical loads rail failures may be traced to definite causes of which bending stresses are components but not the principal ones.

A particular condition which leads to large numbers of rail failures is the cold rolling of the head by the wheels. Rails reach the track in a certain primitive state of internal strain. Additional strains are at once introduced by the impinging pressures of the wheels, which go on increasing until, perchance, rupture ensues. This destructive influence

*Paper read before the New York Railroad Club January 20, 1922 by James E. Howard, engineer physicist, Interstate Commerce Commission.

is accountable for many rail failures, for which little consideration has been given.

Exterior strains of compression are necessarily opposed by interior strains of tension. The problem is how to preserve the integrity of the metal in the interior of the head, against strains of tension both lengthwise and crosswise. Failures from longitudinal strains of tension in the interior of the head result in the display of transverse fissures; those from crosswise strains of tension become split heads. No mystery attaches to the formation of either a transverse fissure or a split head; a common cause exists for each. They are the direct consequences of high wheel pressures. Together they constitute practically all the head failures of rails.

Split head fractures occur when lateral flow, penetrating the head sufficiently, encounters an interior seam or streak of structurally weak metal. A minute separation of the metal occurs—the incipient point of a split head fracture. The formation of this incipient crack gives some relief to the internal strains. Wheel pressures restore the state of strain, however, and the incipient crack is increased in size. The process is repeated and a split head fracture is thus progressively formed. Under ordinary track conditions considerable time should elapse before the accumulated internal strains become adequate to start an incipient crack. Once started the rate of development should be an accelerating one. A split head fracture may eventually extend many feet in length, possibly originating at more than one place along the length of the rail.

Data of Proper Sort Is Lacking

Evidence which would lead to the identification of an internal strain which is on the verge of causing rupture seems lacking. There is a flattening of the grain of the steel adjacent to the running surface. In cross section, a central zone shows flattening without drift. On each side of this central zone flattening of the grain occurs with lateral flow or drift toward the nearest side of the head. The split head fracture does not have its origin in this upper zone of the head, but within its influence and below where, microscopically, the grains are distorted in shape. Internal strains of thousands of pounds per square inch exist without microscopic evidence of their presence. Divested of the phenomenon of permanent set or general elongation the actual separation of adjacent particles when ruptured by shear or by tension does not reach a measurable quantity. These characteristic features which lead to rupture demand consideration. The display of inherent primitive properties occurs as a rule only in tests for acceptance of the steel.

A split head fracture is regarded as the failure of structurally unsound steel. It is believed that rails of perfectly sound steel would not display this type of fracture. If the grade of steel was too soft to sustain the wheel loads a mashed head would result, not a split head.

The dimensions of the head, even in the widest rails, admit of lateral distortion, a condition not experienced in lengthwise direction of the rail. No relief is afforded the lengthwise strains except such lateral increase in width as expressed by Poisson's ratio, that is, the lateral expansion will be from one-quarter to one-third of the direct compression.

Longitudinal strains due to normal cooling at fabrication acquire moderate values in the head; higher in other parts of the cross section. The peripheral metal of the head for the most part is left after cooling in a state of compression, the interior acquiring a state of tension.

The Question of Transverse Fissures

Stresses exceeding 20,000 lb. per sq. in. compression have been found in the upper part of the head, in rails taken from the track. The interior of the head was in a state of tension. Here are the conditions which account for the development of transverse fissures. This explanation of their occurrence

was given in the first report of the Interstate Commerce Commission upon this type of fracture, in connection with the Manchester accident of August, 1911.

Following the discovery of a shattered zone in the head of a rail, it was asserted that the proximate cause of transverse fissured rails had been found in this development. Investigation did not confirm this assertion. Transverse fissures were found in rails with shattered zones and in rails without shattered zones, also shattered zones were present in rails without transverse fissures. The results of investigation raised the doubt whether the shattered zone even shortened the life of the rail; whether diffusion of the strains from the wheel loads did not occur and thus an influence was presented which tended to prolong its life.

Possible for Railroads to Acquire

More Definite Information

The railroads are not without opportunity to acquire extended information in respect to the physical condition of the rails since the number of transverse fissures amount to some three thousand reported in one state alone, representing over 1,200 different heats. The practice in vogue of removing from the track all rails of a given heat, when a certain number have displayed transverse fissures does not constitute a corrective measure, nor does it increase the common stock of information when no examination is made of the rails removed.

There is similarity between the development of transverse fissures and split head fractures. Each is progressive in its development, each starts from a definite nucleus, and each usually requires a term of years of service before it makes its appearance as a fractured rail. Transverse fissures usually require for their display a term of four to ten years in the track, but there is no definite period within which they occur. It is a matter of track conditions, not one of time which governs the development of these fractures.

Little Known Regarding Internal

Strains in Manganese Steel Rail

Manganese steel rails display transverse *fractures* but not of the type called transverse *fissures*. Transverse fractures in these rails have their origins at the running surface and do not start at the interior of the head; in this respect they are distinguished from transverse fissured rails. The phenomenal toughness of this steel is completely destroyed by the cold rolling action of the wheels. A surface film, a few hundredths of an inch in depth, is affected. Incipient cracks are formed in this shallow film, some of which may extend downward separating the head and possibly a portion of the web, if not earlier removed from the track. A fine hair line marks the presence of such a fracture. Nothing is known concerning internal strains in manganese steel. The difficulty of machining the steel presents an insuperable obstacle.

Notwithstanding the complete loss of toughness at the running surface leading to the fracture of the entire head and half of the web, the rail will still retain toughness in the remaining part of its cross-section. In such a condition the strength of a carbon steel rail would be a negligible quantity. Absolute brittleness in the balance of its section would prevail. No lurking danger has been detected in a manganese steel rail, and from this standpoint it is a safe rail. Its ability to retain toughness under such adverse conditions makes it not only a safe rail, but the only safe rail under parallel conditions. Its superior resistance against abrasion has long been known.

Wheel Burning a Contributing Factor

A source of injury to the heads of rails, of common occurrence, is wheel burning. They constitute the most numerous group of injuries which are apparent to the eye. Fortunately they are not always as bad as they seem. At times the

hardened layers caused by wheel burning flake off. Again cracks in the steel are not arrested at the junction of the hard and soft metal but extend into the normal metal below. This extension of the cracks is a dangerous development. Rails in this condition are among those which are seemingly least affected by wheel burning. Such rails have been found on curves; cracks being formed at close and regular intervals and present on both the high and the low rails.

Wheel burning may occur in which so much heat is generated—heating such a large part of the rail—that hardening by conductivity will not take place. The term “snow burning” is used in some parts of the country having the same meaning as wheel burning, but applying specifically to the stalling of an engine in a snow drift. Under such a condition the head is so generally heated that hardening does not always take place. The severe abrasion and roughening of the surface which results on such occasions weakens the rail and leads to early failure.

Prolonging the Life of Rail

It will be realized from this review of the conditions which affect the head of a rail how serious are the influences which

are encountered when the rail reaches the track. The destructive tendencies are clearly in evidence from which no rail escapes. Rails are overstrained members. Increase the overstraining forces and rupture will inevitably follow. Decrease the overstraining forces and the lives of rails will be increased.

At best, the problem is how to prolong the lives of rails. They reach the track with a certain margin in strength and therefore of safety. This margin is weakened in all rails and in some destroyed, and all steel is breakable. There are inexorable exigencies of service, as some would have it believed, that impose excessive demands upon steel, of such a nature that no relief is possible. The oft-repeated remark is heard that steel makers know the conditions of service and must make rails to meet them, without considering whether these demands transgress natural laws governing the strength of steel. A corresponding remark might with propriety be addressed the designers of motive power and equipment where wheel loads are established. The exhibit presented in the annual report of rail failures, of which there is no parallel in engineering literature, gives emphasis to the subject.

A Plea for Recognition of the Traveling Auditor

Writer Adds This Office to List of “Railroad Goats”
Now Including Secretaries and Chief Clerks

By A Traveling Auditor

THE communications that have recently appeared in the columns of the *Railway Age* relative to the lack of recognition given the chief clerk and particularly the letter to the editor in the issue of September 24 written by a secretary and entitled, “The Official Goats,” induce me to write a few words on another Railroad Goat—the traveling auditor.

Higher-up officers have always drawn larger salaries and continued demands by trainmen and other union members have put them in the prosperous class, but the traveling auditor is still hardworked and ill-paid. He is another example of the skilled brain worker whose services are necessary to a great business but who is treated much less liberally than the man who works with his hands.

Traveling auditors are usually appointed from clerks who have served eight or ten years in the various departments of accounting. They are then given a certain territory or number of station accounts to supervise and audit twice yearly and as many more times as the occasion demands.

A traveling auditor's duties are numerous. He must be a gentleman and at all times be dignified and courteous in his treatment of those, whose duties are under his supervision. Undue familiarity with an agent or any of his office force is frowned upon by the general auditor, as it is an unwritten law that a traveling auditor is not to accept the hospitality of an agent. When an auditor strikes a station in a town that does not boast of a hotel, he enacts the role of the Lord Mayor of Cork and fasts. He is even supposed to smoke his own cigars and not depend upon the agent's bulky and gorgeously banded, two-for-a-nickel brand.

The Work Performed by the Traveling Auditor

The audit of the account is naturally the first requirement.

The auditor sees that the agent is neither over nor short in the cash transactions, that all reports are neatly and ac-

curately rendered, records properly filed and company property safeguarded. If the cash drawer should be 17 cents short, whether through error in making change, an accounting error, or the agent's fondness for the delicacies of the season, the auditor looks very serious, impresses the culprit with his grave danger and paints a mental picture of the yawning doors of the penitentiary. If several dollars have been mysteriously mislaid, it is called a shortage and so reported to the general auditor, with a letter explaining the circumstances in detail, giving suggestions as to criminal intent involved and recommending leniency or dismissal.

A waybill is really an invoice of a shipment made out at the station from which the shipment originates and shows destination, shipper, to whom consigned, commodity, weight, rate, and the amount of charges prepaid or to be collected upon delivery of freight. These waybills have to be reported in the receiving agent's ledger, the amount of collect charges thereon showing as a debit to the account. When charges are collected, they are posted on the credit side of the ledger and must agree with the amount shown in the cash book, which in turn is supposed to balance with the amount remitted to the bank. This reporting and posting has to be checked over by the auditor and the amounts deposited verified. The agent has to show the freight itself, the cash, showing delivery has been accomplished, or some evidence that a box, crate or keg, did actually contain certain commodities.

For instance, if a shipment consisted of a box of limburger cheese, a crate of garlic or a keg of whiskey, and was received with containers empty, through theft, leakage or evaporation, (as is often the case with the last mentioned), the auditor can, by exercising his trained sense of smell, determine just what the contents have been. If, after repeated sniffs of the keg, and a once-over of the box and crate, he is satisfied that pilfering has been done, the agent is relieved of the charges shown on the waybill by a special credit

and an investigation is indulged in to find out what gentleman with an Italian appetite, or with an uncurbed fondness for liquid refreshments, is on the pay-roll.

An inexperienced agent, if dishonestly inclined, often makes the mistake of thinking he can collect charges on a waybill, pocket them and by destroying the waybill get rich quick. This is an error of judgment that agents soon find is disastrous to them, as they fail to take into consideration that all waybills are checked from the forwarding station, and if not shown on station reports to which destined, an immediate investigation is made.

After the freight accounts come the tickets. An agent is charged with a certain number which he has to have on hand or be able to show have been sold and proper fare collected and remitted. Irregularities in these accounts are easily detected, as all tickets are numbered consecutively and each number must be accounted for.

A final balance of all ledgers and a grand summary of all business done, showing to a conclusion that all waybills, adjustments, tickets and cash, has been accounted for, completes the financial part of the audit.

Between Three Not Two Fires

The traveling auditor then answers about 75 questions on a personal report, covering general conditions, the efficiency of the agent and office force, together with observations as to the cause of irregularities, if any. The agent's neatness, cleanliness and morality are noted. If the report is favorable, the general auditor calls the T. A. down for not discovering a shortage or other irregularity. If unfavorable, the superintendent jumps on him for picking on the men on his division and if it is just between the two, the agent greets him on his next visit with an injured air and the question, "Why didn't I receive a letter of commendation, as a result of your last audit?"

There you are, the harassed T. A. is up against it whichever way he turns.

As an Instructor, Commences with Multiplication

As an instructor, this traveling phenomenon is supposed to know everything about the railroad business. He must be able to take charge of a station efficiently in an emergency and answer the calls and needs of other departments besides the accounting. He instructs raw material in the first step to a railroad presidency. He scolds, coaxes and pleads with the boy from the farm, whom the superintendent picks up, gives a uniform of brass buttons, a cap with "Agent" in near-gold letters on the front and tells, "If there is anything you don't know, and want to know about, send an S. O. S. for the traveling auditor."

In many cases, the auditor has to commence with the multiplication table (most of the embryo agents know their A. B. C.'s) and step by step under the watchful and guiding eye of their teacher, the subjects rise to positions of great responsibility with salaries many times greater than that of the poor, patient, plodding representative of the accounting department.

The ability to administer proper encouragement and to give sound advice is, besides a portfolio of blanks, pencils and a ham sandwich, part of the traveling auditor's equipment. He buoys up the agent with praises as to his unusual aptness, whether deserved or not. He shows him how to prepare his reports and how not to prepare them, encourages him to keep all records up-to-date and helps him do it. He shows him also how to facilitate the preparation and rendering of reports from the accounting department to the president each month. He enthusiastically pictures success and promotion, which strict attention to minor details of the work, as well as the general duties, will warrant. He even listens sympathetically to the domestic troubles of the agent, such as his wife's fondness for the movies to the neglect of the tooth-

cutting embryo agent and her hardworking husband. He not only listens but suggests remedies.

The traveling auditor is being continually called upon by the general auditor to criticize prevailing methods of accounting with a view to improving and devising efficient short-cuts, and securing the maximum result with minimum labor and time. It is necessary for him to keep in touch with the agent's method of living, his associates and to be quick in investigating the source of an unusual display of wealth on the part of an agent whose salary will not warrant it. He is not only an auditor but he is an instructor, a Sherlock Holmes, a sympathizing parent and an ever-present help in time of trouble.

No Eight-Hour Day

No eight-hour day with pay for overtime is allowed. The T. A. has a certain number of offices to audit twice yearly, besides taking care of transfers of agents, in which latter cases a thorough audit is made to allow the incoming agent to start with an absolutely clean slate. This means hard work, early and late, and the T. A.'s work is far from completed when he reaches his headquarters at night, as he then has to make out his daily report of activity, schedule for the next day, answer correspondence and maybe take an unofficial trip out on the division to help some poor agent make out a balance sheet, or locate a difference.

The attitude of an agent, cashier or accountant, especially at the smaller agencies, to a traveling auditor, is usually antagonistic. This is a great handicap, as the agent can, when so minded, help along considerably by volunteering information, as to the why and wherefore of different adjustments and entries. This reticence to meet the auditor halfway and expedite the work of the auditor, usually makes it less pleasant for the agent, as the longer an auditor pokes around through the account, the more little irregularities he finds, while if the agent is helpful, the cash balances and reports are neatly and accurately rendered and all questions answered cheerfully and promptly, the auditor is more than likely to assume responsibility for the correct performance of minor duties without an investigation. Of course, the figures are there and all transactions must be verified, but it takes less time to verify a condition than to develop and then verify it.

Does Not Pay to Regard Agents With Suspicion

In my earlier experience, I was taught to consider all agents and cashiers as second-story men, but I soon found that method unjust, as well as a handicap to my work. If an agent sees he is regarded with suspicion, he naturally resents it and puts all kinds of obstacles in the way of a speedy audit. If he is kept in good humor and treated as a respectable business associate, and if possessing any intelligence at all, he is only too glad to do all he can to shorten the auditor's visit. When a shortage or any serious irregularity, which has taken some time to develop, is found, there is a bare possibility that the auditor will receive a letter from the general auditor commending him on his work, but the chances are in favor of a curt note, requesting advice as to why it was necessary to spend so much time at a station that usually requires but a short time to audit. They work on schedule in the general office, 9 a. m. to 5 p. m., with half holiday Saturday, and any deviation caused by exceptional conditions on the road, cannot be understood. It is thought that if some previous audit was made in a day, all subsequent audits should be made as speedily, there apparently being little conception of the diabolical mess an untutored agent can get an account into.

A small account is not necessarily the easiest to balance. In fact, I have had more headaches over accounts kept at a one-man station than over those at larger stations, where it took a month to strike a balance.

The Comforts of Travel

The operating department, from the general manager down, thinks a traveling auditor has a wonderfully good time, traveling around seeing the country, but they do not take into consideration the hardships with which he has to contend. The traveling auditor has no private car but is dependent on regular passenger trains, the schedules of which are unfortunately arranged for the convenience of the traveling public. It means no regular hours, meals at random and hotel beds, where the springs have escaped their mooring and bulge up here and there, making it necessary to practice the convolutions of a snake to enable one to lie in them and sleep the troubled sleep of the just. Then in the small town, there are the hotel rooms with the musty neglected odor, that probably have not been occupied for months, except by tiny unwelcome visitors whose company would sooner be foregone.

There is not much time for recreation, as an auditor is subject to call, Sundays and holidays, and he must at any hour be ready to pack his grip and sally forth.

An auditor doing the same class of work in other lines and under similar conditions, could demand \$10,000 a year and get it. Railroad accounting is more complicated and has more detail work than any other. You ask, why then doesn't he go to work for some commercial concern? Simply because his entire training has been in the railroad business, probably ten years in a clerical capacity, before he is eligible for the intricate duties of an auditor. He gets in a rut, subdued by his lack of adequate compensation and consideration and he feels that he cannot do commercial auditing. He could, however, and it would be easy after his railroad training. In justice to the man of the road, the minimum salary should be \$6,000 a year, ranging from that to \$10,000, according to experience and length of service.

A Comparison with Accounting Office Chief Clerks

Chief clerks in the accounting department receive better salaries than do the traveling auditors and their duties cover supervision of but one class of the accounting work. They are not supposed to be conversant with the workings of another department; for instance, the chief clerk of the freight accounts has nothing to do with the ticket accounts, and vice versa. The chief clerk in charge of claims and adjustments would not necessarily have to know what a freight or ticket

balance sheet looked like, while a traveling auditor has to have an intimate and working knowledge of all this, besides numerous other details at the stations with which chief clerks never have to worry.

I do not wish to deprecate the value of chief clerks as they have great responsibilities and are well worth all they receive, but is it not reasonable to assume that the traveling auditor, whose knowledge embraces all departments of accounting, should at least have a salary equal to that of those whose duties end in one department?

I personally know one chief clerk, who asked one of his assistants what an advance charge on a waybill meant. Another chief clerk of tickets, upon seeing some Pere Marquette abstracts headed, "P. M.," wondered why it was all those reports were prepared in the afternoon, thinking that was what "P. M." stood for. These men were both efficient and knew the workings of their department from A to Z, but there it ended.

Suggests a Voice as to Appointment

and Promotion of Agents

A traveling auditor should be recognized by the various departments as something more than a necessary evil. A most excellent move would be to give him a say as to the promotion and appointment of agents. Having authority in this respect would insure a better feeling between agent and auditor and the agents would then work with the auditor, instead of against him. Certainly the latter has a better idea of men with whom he comes in direct contact.

There has recently been organized a traveling auditors' union. It is thought by some that it is non-ethical for a supervising official to belong to a union but from results already obtained in the way of increased compensation, it is a question whether upholding ethics is paramount to the embarrassment of an unpaid grocery bill.

Due to the fact that all of my energy is needed in an attempt to check the progress of a few million tubercular germs, I am probably out of the game for good, and will check no more railroad accounts but I feel, from my experience as a traveling auditor for 12 years, that too little is actually known by higher officials of the man who does so much toward making efficient agents, insuring correct accounting and safeguarding railroad revenue.

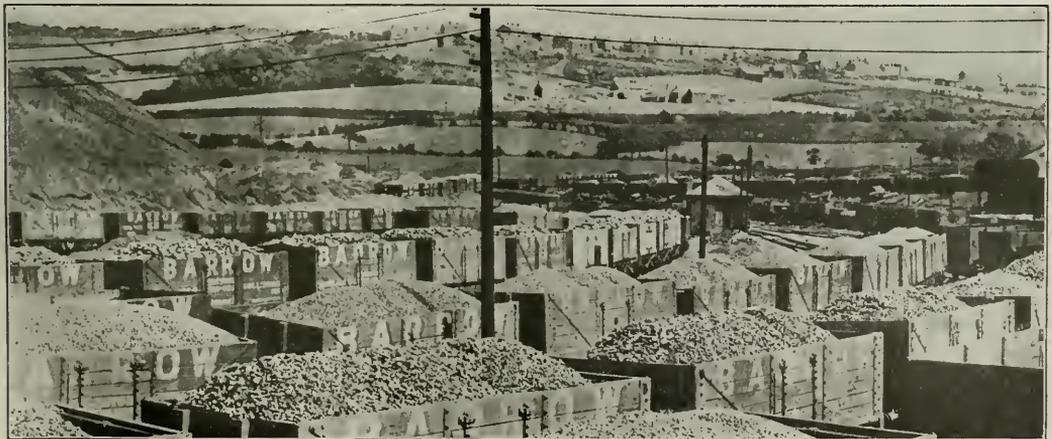


Photo by Kadel & Herbert

Yard at an English Colliery

General News Department

A Freight House of the Chesapeake & Ohio at Norfolk, Va., was damaged by fire on January 13; estimated loss \$75,000.

The American Society for Testing Materials announces that its twenty-fifth annual meeting will be held at the Chantelle Hotel, Atlantic City, N. J., beginning on June 26 next.

Professor William Z. Ripley, of Harvard University, is to lecture at the Polytechnic Institute of Brooklyn, New York, on Tuesday evening, January 24, on "The National Railroad Situation." The auditorium of the Polytechnic Institute is at 99 Livingston street, near the Borough Hall. This lecture is one of a course given at the Institute on National problems in their relation to the industries of greater New York.

The Summary of Wage Statistics, issued by the Interstate Commerce Commission for the month of September, 1921, compared with August, shows an increase of 38,403 in the number of employees of the railroads of the country as of the middle of the month, while their total earnings decreased \$3,773,073. The number of employees was 1,718,330, and their total compensation was \$223,972,822. The decrease in earnings is said to be due to the fact that there were 27 working days in August, while there were only 25 in September. The statistics do not include the Detroit, Toledo & Ironton, which had not yet filed its report.

A Census of Safety Workers

The National Safety Council, Chicago, is now taking a census of those who are directly charged with the duty of promoting safety through inspection, safety investigations, safety education, control of health hazards, or similar work in industries and on the railroads. This is the first time any attempt has been made to obtain a census of the persons engaged professionally in the safety movement.

C. E. Denny Predicts Revival of Railroad Construction

C. E. Denny, vice-president and general manager of the New York, Chicago & St. Louis, in an address before the annual convention of the Associated General Contractors at Cleveland was reported in the daily press as predicting that the railways of the country will do more construction during the first six months of the current year than in any similar period since the beginning of federal control. Furthermore, the press reports said, he stated that there would be greater activity during the last six months than during the first.

Baltimore & Ohio Consolidates Divisions

Effective Jan. 1, the Indiana and Illinois divisions of the Baltimore & Ohio were consolidated into the St. Louis division, with headquarters at Washington, Ind. The mileage of the new division will be approximately 640, and it will be composed of the main line and the branches between Cincinnati, Ohio, St. Louis, Mo. This will include 400 miles of the original Illinois division with the branches to Springfield, Ill., and Shawneetown, and 240 miles of the Indiana division including the line to Louisville, Ky.

New Postal Buildings at New York City

The Postmaster General has been authorized, following extended preliminary negotiations, to contract with the Pennsylvania and the New York Central for the use of large new buildings, to be put up by these railroad companies, on the west side of New York City, for the accommodation of the postal service. The New York Central plans to put up a building at Tenth avenue and Thirtieth street, providing 356,400 sq. ft. of space, the rental to be \$145 a sq. ft. The Pennsylvania is to put up a

building above its tracks in the rear of the present general post office, Thirty-second street and Eighth avenue, to provide 592,000 sq. ft. The rental is to be \$170 a sq. ft., the estimated cost of the building being \$10,000,000.

Accident Bulletin No. 80

The Interstate Commerce Commission has issued its eightieth bulletin of statistics of railroad accidents; it is for the three months ending with June, 1921. In that quarter the number of persons killed in train accidents was 88 and of injured 942, as compared with 128 killed and 1,984 injured in the same quarter of 1920. Adding the casualties in train service accidents the totals for this quarter are 1,268 persons killed and 9,511 injured, as compared with totals in the same quarter of the former year of 1,451 killed and 14,367 injured.

Of passengers killed in train accidents, the total in the quarter now reported is 24, as compared with 29 a year ago; passengers injured, 603 this year, 1271 last year.

Nominations for Labor Board Soon

As the time approaches for the expiration of the terms of three members of the Railroad Labor Board, A. O. Wharton, representing the employees; J. H. Elliott, representing the railroads, and G. W. W. Hangar, representing the public, the candidacy of several prominent labor leaders have been announced. B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, will be the Federation's candidate to succeed Mr. Wharton, according to reports circulated on January 16. At the Labor Board it was stated that Mr. Wharton will also be a candidate for renomination. All of the nominations to fill vacancies on the Board are to be presented to President Harding on March 1.

Celebrating Franklin's Anniversary

The month of January has been designated as "Thrift Month" by the Chicago, Rock Island & Pacific. Special posters have been put up in all the shops, roundhouses, and offices of the system, urging employees to "Save Today and You Will Have Something Tomorrow." The January issue of the Rock Island magazine is called the "Thrift" Number. It contains articles by prominent bankers, United States Treasury officials, officers and employees of the road. "Thrift and Savings" were made a feature of a special meeting held on January 11 at Chicago, attended by both officers and employees of the company, when George S. Hovey, president of the Interstate National Bank, Kansas City, Mo., delivered the main address.

Mr. Hoover on Electrification

Herbert Hoover, Secretary of Commerce, made special reference to the subject of electrification at the annual meeting of the American Engineering Council of the Federated American Engineering Societies, held at Washington, D. C., on January 5 and 6. Mr. Hoover stated that he thought of electrification as one of the biggest problems confronting the country, and suggested that the engineers tackle this problem in the form of a waste survey. Such a survey, he said, afforded at this time great possibilities in the direction of effective leadership in the elimination of waste. The proposed superpower area along the Atlantic seaboard in the region between Boston and Washington was the starting point, he said, for prodigious development in consolidating the electrical powers of the country along national lines which would affect every village and hamlet, combine into super-power stations thousands of minor electrical plants with millions of horsepower and result in tremendous savings to industry.

Dispatchers' Chief Scores Hoover Conferences

The Hoover conferences in Washington between labor leaders and members of the Association of Railway Executives constitute an "attempt to establish a super Railroad Labor Board," and will impair the prestige of the Board functioning under the Transportation Act, according to J. G. Luhrsens, president of the American Train Dispatchers' Association.

"At a time when the Labor Board must fight to have its powers determined in the federal courts (referring to the injunction suit brought by the Pennsylvania), we have a cabinet officer setting himself up as an intermediary between litigants, past, present and prospective, before the Labor Board," said Mr. Luhrsens in a statement issued on January 16. The statement contends the outcome of the Pennsylvania suit should be awaited and that railway employees should meanwhile keep their faith in the United States Railroad Labor Board.

Common Officers for Various

Pennsylvania Companies Allowed

The Interstate Commerce Commission has issued an order comprising 50 typewritten pages authorizing common officers and directors among the various companies affiliated with the Pennsylvania System. In the original order Charles E. Ingersoll was authorized to hold until further order the positions of director of the Pennsylvania Railroad, the Pennsylvania Company, the Philadelphia, Baltimore & Washington, and president of the North Pennsylvania, and either the position of director of the Missouri Pacific or president of the Midland Valley. He was given 30 days to make his election which position he will hold. Later the commission issued a supplemental order authorizing Mr. Ingersoll to hold until further notice all of these positions.

Shop Employes Decide Not to Take Strike Vote

No strike vote will be taken by shop employes as the result of the Labor Board's recent rulings on the working conditions of these employes, according to an announcement made on January 15, by B. M. Jewell, president of the Railway Employes Department of the American Federation of Labor. A committee of shop men has been considering the new shop craft rules and it was decided to ask the Railroad Labor Board for a rehearing on some of the new provisions. Particular objection was raised to the rule eliminating punitive overtime for Sunday and holiday work for those employes necessary for continuous operation.

"As the rules now stand, they may mean anything," Mr. Jewell said. "We want the board to interpret them so we can tell just what they mean. Therefore, we are going to reopen the case and find out just where we stand before we act."

Burlington Establishes Pension System

The Chicago, Burlington & Quincy has followed up its announcement of December 1, indicating that the road was about to inaugurate a pension system, with a circular to the employes of the road, dated January 1, giving the plan and the conditions under which it is to be operated. The plan provides that, after a continuous service of at least 20 years, pensions may be granted to trainmen, enginemen, yardmen, and foremen in track and bridge service, who have reached the age of 65 years, after an examination by the Pension Board, and to all employes after the age of 70 years is attained, except when upon application of such employes and in the judgment of the Board their service does not demand retirement. In the event of physical disability before the age limit has been reached, pensions may be awarded after a continuous service of 25 years. The pension allowance per month is based upon the average of the monthly wages received for the ten years preceding retirement and is set at one per cent of that amount for each year of continuous service, but in no case is the allowance to be less than \$1 for each year of continuous active service nor less than \$25 per month, and in no case greater than \$150 per month. The entire cost is to be paid by the company without contribution by the employes. The Board of Pensions as appointed for the first year is as follows: Chairman H. R. Safford, vice-president; E. P. Bracken, vice-president; W. F. Thiehoff, general manager; F. A. Torrey,

general superintendent of motive power; H. W. Johnson, controller; and secretary, J. N. Redfern, superintendent, relations and employment department.

Mr. Schwab Pleads for the Railroads

Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation, speaking before the Ohio Society of New York at its annual meeting on January 14, told his hearers some incisive truths about the railroad situation. He said, in part:

"The greatest of American interests next to agriculture is that of transportation. I have been told that it would take five billion dollars to put our transportation companies abreast of the commercial requirements of the nation and to make up for their inability to expand and progress during the last few years. Our railroads for the last two years have abandoned more miles of track than they have built, and have probably retired from service more freight and passenger cars than they have installed. In a country like ours, with its great future still ahead of it, that is an impossible situation.

"We have imposed upon our railroads a network of laws and restrictions which has made their rates no longer responsive to the changing commercial needs of the country. The way to get results in life and in industry is to put your faith in men. We should stop knocking our railroad presidents. The railroads have had an awful drubbing such as no other industry has ever gone through. There have been evils in the past, but the damage done through the laws which have been passed has been infinitely greater than all the material harm due to the financial scandals. We should of course prevent evil and scandal, but we must also be careful not to stifle progress.

"But no matter what has taken place in the past, I am firmly of opinion that no finer and more conscientious lot of men was ever attempting to discharge their duties to the public under difficult conditions than the men who are today running the railroads of the United States. Do you know a single one who does not deserve your implicit confidence? They are not speculators; they are not grafters; they are high minded public servants deserving of public trust and of public enthusiasm. There isn't a man today at the head of an American railroad who is not a credit to the industry and an asset to his country. . . . Let us back our railroad officers as the manager of a great industry would get behind his department heads. At every turn they are hemmed in by restrictions which prevent the exercise of the sound business judgment which has grown out of their long experience. You never make progress by ham-stringing ability and initiative, and no industry ever gave good service long if it wasn't prosperous itself. . . . Maintain such regulations of railroads as actual experience shows to be justified, but abandon all the regulation which is based merely upon political motive and popular prejudice."

New A.S.C.E. Constitution to Be Given a Chance

The sentiment as expressed by those attending the annual meeting of the American Society of Civil Engineers held on Wednesday, January 18, through the medium of their votes, indicated a desire on the part of the members to give the newly adopted constitution of the society a chance to show what results it can produce. Two groups of amendments came before the annual meeting, the first group being introduced with the approval of the societies' counsel for the purpose of clarifying some inconsistencies in the constitution. This group was approved by the meeting and will be sent out for letter ballot with that approval. The second group dealt with numerous changes which it was hoped would tend to further and advance the local activities of the society. In the discussion regarding the second group of amendments it was brought out that the board of direction had been and was still continuing to give the subject of local activities serious consideration; that the revised constitution had been revised at a considerable cost, and much effort and study had been expended upon it to improve it and in particular those sections which dealt with local activities. It was urged that since this constitution had only been in effect since November 5, 1921, the time elapsed had not been sufficient to judge accurately just how well it was going to come up to expectations and that therefore at least a year should be allowed to pass before any amendments, such as in the second group, were considered. It was voted to send out the amendments for letter ballot with an adverse recom-

mendation. A call for a division of the meeting into members from District 1 and from all other districts showed that there were 223 members present from District 1 and 150 from the others. Honorary memberships were presented to Samuel Rea, president, Pennsylvania Railroad; Charles Prosper Eugene Schneider, Paris, France; Luigi Luiggi, Rome, Italy; Ambrose Swasey and Howard A. Carson.

Supply Men's Association Announces

June Convention Details

J. D. Conway, secretary of the Railway Supply Manufacturers' Association, has sent out invitations and exhibit blanks for the convention of the Railway Supply Manufacturers' Association to be held June 14 to 21 on Young's Million Dollar Pier, Atlantic City, N. J., in conjunction with the meeting of the American Railway Association, Division V. The communication which is designated "Official Circular No. 1" says that it is anticipated that "we will also have Division VI, Purchases and Stores, join with us." The circular says that though it was considered advisable to cancel the convention scheduled to be held in June, 1922. A general canvass of the manufacturers shows that they very largely favor an exhibit, and "the many inquiries we are receiving evidences a greater interest than in any previous year."

The circular gives complete details concerning the exhibit. The track exhibits will be arranged for as usual and a number of changes have been made on the pier which it is believed will improve its exhibit conditions.

New York Central Veterans

The Metropolitan Chapter of the New York Central Veterans' Association is the name of the old-timers' organization recently established by New York Central officers and employees in New York City. It is open to all who have been with the company fifteen years or more, and was launched with more than 500 charter members. A. S. Lyman, General Attorney, was temporary chairman of the organization meeting. Lieutenant Colonel William L. Burnett, assistant conductor on the Electric division, was elected president; William O. Wichman, engine man on the Electric division, vice-president; J. M. Woodridge, chief clerk to the General Attorney, secretary-treasurer, and Fred T. Slack, inspector of passenger service, historian. It is expected that veterans at Albany, Buffalo and other centers also will form chapters.

Chauncey M. Depew, chairman of the Board of Directors and one of the charter members of the new association, in a letter to his fellow veterans said in part:

"On the first day of January, 1922, I completed 50 years of service in the company. That I am in about as good shape in this January, 1922, as I was in January, 1866, is a tribute to the health and happiness and longevity which comes from service in the New York Central. . . . Every organization is divided into boosters and knockers. A knocker is one who is dissatisfied with everybody above him, everybody around him, and especially, with the organization with which he is working. A railroad man should leave criticism and complaints against his job to the commuter, the shipper, the politician and the fellow who cannot get on the payroll.

"The booster is always healthy, always happy, and always cheerful. He helps others and in that way helps himself. He has pride in his organization, pride in his train, pride in his locomotive, pride in what he believes can be done by his company better than by any other in the world. A knocker is a poor citizen, a booster is a good one."

President A. H. Smith addressing the meeting, said that the difference between officers and me is an invisible line; the officers are of not much consequence without the men behind them, and to have the men behind them, if they are willing and earnest is what gets the answer. Mr. Smith praised warmly the spirit of patriotism and loyalty that enabled the railroad workers to accomplish seeming miracles during the terribly cold winter of 1918, when the country was at war and the Allies calling for munitions. "You will never get the credit, because credit does not come after those troubles are over, but I know it and you know it, and it is perhaps sufficient that we do know it. As long as I live, I never can find words to express to you and the others my appreciation of the efforts then put forth."

Traffic News

The Transportation Club of Flint, Mich., at its annual meeting on January 12, elected the following officers: President, F. A. McHale; vice-president, L. F. Burckart; secretary, Paul Heyer; treasurer, J. E. Clark; board of directors, E. F. Bilo, John S. Gibson, F. J. Shepner and V. A. Rogers.

The Industrial Traffic Club of Portland, Ore., at its annual meeting on January 4, elected the following officers: President, W. H. Sainsbury; vice-president, F. G. Donaldson; secretary, F. P. Kensingler; treasurer, F. A. Baker; directors, J. L. McConnell, W. O. Rogers, R. C. Long, F. L. Miller and T. H. Spencer.

The Federal Trade Commission will open a hearing on January 30 at Milwaukee, Wis., on the "Pittsburgh plus" case. This case was initiated in 1919 by the Western Association of Rolled Steel Consumers, and since that time the American Farm Bureau Federation, the National Association of Purchasing Agents, the Southern Association of Rolled Steel Consumers, and the legislatures of Illinois, Wisconsin, Minnesota, Iowa and Missouri and the state senate of Georgia, have joined with this company to fight the case.

The differential system of making passenger fares between New York and Chicago which prevailed prior to federal control was re-established on January 1 by the lines other than the New York Central and the Pennsylvania, when the Interstate Commerce Commission failed to suspend the tariffs filed by the former "differential" lines, although urged to do so by the two "standard" lines. In filing the tariffs providing for the reduced rates the roads said they had lost a large share of their through passenger business after their fares had been put on the same basis as those of the New York Central and the Pennsylvania.

The American Short Line Railroad Association, through its Bureau of Tariffs and Printing, announces that in order to give prompt service to its patrons in the Western territory, the National Reproduction Company of Chicago, has been engaged to print 1,200 pages of planograph matter daily as required. Western Trunk Line Territorial Directory No. 1-A of 350 pages was recently reproduced in four days, and in emergency this time can be reduced. Experienced tariff men are now on duty in the Chicago office, and the time required for the communication and handling of Western orders will be reduced. The Chicago office is at 5 North Wabash avenue, and the manager is I. T. Hanson.

The ninth annual meeting of the Southern Hardwood Traffic Association was held at Memphis, Tenn., January 6. J. H. Townshend, secretary-manager of the association, was delegated to "obtain rates, route all freight traffic from and to all points and handle traffic matters generally" for nearly 100 different companies and it is expected that he will receive authority from 225 additional firms within a few days. S. M. Nickey, president of the Green River Lumber Company, Memphis, was re-elected president of the association; vice-presidents for the district offices were elected as follows: J. F. McSwain, Memphis; S. W. Richey, Cincinnati, Ohio; F. A. Norman, Jr., Louisville, Ky.; L. E. Moore, New Orleans, La.; A. C. Thompson, Helena, Ark. Elliott Lane was re-elected treasurer. The directors re-elected Mr. Townshend, secretary-manager and J. V. Norman of Louisville, Ky., as general counsel.

The American Farm Bureau Federation has announced a program which it proposes to submit to the national agricultural conference to be convened at Washington on January 3. This will suggest immediate reductions in freight rates, all savings in operating costs to be further reflected in further rate reductions until the entire increase of August 26, 1920, is wiped out, and repeal or amendment of the Adamson law. The conference will also be asked to declare for the repeal or amendment of the Esch-Cummins law so as to abrogate what is called the "guaranty" clause, and to "revitalize the

Railroad Labor Board and co-ordinate wage-making powers with the rate-making power of the Interstate Commerce Commission." J. E. Gorman, president of the Chicago, Rock Island & Pacific, has been invited to attend the conference as a representative of transportation.

Shippers in New York and Boston, and other Atlantic seaboard territory, following a recent meeting in New York City, have organized a committee to protest, at Washington, against any increase in freight rates which shall put eastern territory at a disadvantage compared with Chicago; the argument being that the Interstate Commerce Commission, unless restrained, may authorize important reductions from Chicago while not allowing similar changes from eastern cities. W. H. Chandler, of Boston, manager of the Transportation Bureau of the Boston Chamber of Commerce, was appointed chairman of a committee to follow the hearings which are to be given by the Interstate Commerce Commission. P. W. Moore, secretary of the shippers' conference committee and manager of the Traffic Bureau of the Queensborough Chamber of Commerce; E. Grace, of the Brooklyn Chamber of Commerce, and W. J. Banham, traffic manager of the Otis Elevator Company, are to be other members. Mr. Banham will serve as New York chairman.

The National Industrial Traffic League will hold a special meeting at Washington, D. C., on January 27, to consider the report of the legislative committee, suggesting certain desired changes in the Transportation Act. At the same meeting the general rate inquiry of the Interstate Commerce Commission which will be resumed on January 11, will be discussed and the attitude of the league's witnesses before the commission will be decided. J. H. Beek, secretary of the league, at Chicago on January 5, said: "The rate reductions which have been made voluntarily by the carriers or ordered by the commissions since April 26, 1920, have been largely for the benefit of specific commodities. The National Industrial Traffic League favors reductions in all rates, both class and commodity, made upon a percentage basis if the commission finds that a reduction is warranted. When the rates were advanced they were advanced on a percentage or horizontal basis and if rates are to be reduced we believe they should be reduced in a similar manner."

The Pennsylvania Railroad announces new arrangements concerning the stop-over privilege. The passenger must apply to the conductor of the train entering the place where the stop-over is to be made, and ordinarily the ticket must be deposited by the passenger with the station ticket agent immediately on arrival, but all-year tourist, summer tourist and winter tourist tickets will permit stop-over at any point without deposit. On one way and 30-day round trip tickets a stop-over, not to exceed ten days, will generally be allowed. The passenger may enjoy the stop-over privilege at as many authorized stop-over points as he may desire. In general the cities authorized as stop-over points are as follows: Akron, O.; Baltimore, Md.; Buffalo, N. Y.; Canton, O.; Chicago, Ill.; Cincinnati, O.; Cleveland, O.; Columbus, O.; Cumberland, Md.; Dayton, O.; Detroit, Mich.; Elmira, N. Y.; Ft. Wayne, Ind.; Hagerstown, Md.; Harrisburg, Pa.; Hibbard, Ind.; Indianapolis, Ind.; Lima, O.; Louisville, Ky.; Mansfield, O.; Marion, O.; Mayville, N. Y.; New York, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; Rochester, N. Y.; St. Louis, Mo.; Salamanca, N. Y.; Sandusky, O.; Springfield, O.; Toledo, O.; Valparaiso, Ind.; Warren, O.; Washington, D. C.; Watkins N. Y.; Wheeling, W. Va.; Wilkes-Barre, Pa.; Wilmington Del., and Youngstown, O.

The Long Island Railroad, in presenting its argument for enough income to enable it to properly expand its facilities so as adequately to deal with an increasing volume of freight traffic is able to use a striking and concrete example, namely, the great activity in construction of new buildings throughout the territory served by the railroad—which territory has no other railroad. In 1921 these buildings have numbered 11,000, a total much larger than in any previous year. The railroad delivered 111,868 tons of brick, or more than twice the quantity recorded in 1920, and very large increases are recorded in cement, lumber and other articles. Speaking to the "Knot Handlers," a club of lumber dealers, and alluding to other figures, Donald Wilson, general freight agent of the road, emphasized that the railroads are generally sick abed, and need the sympathy and co-operation of

the public, who pays the bills. The governmental bodies which regulate both wages and rates, do not always assume responsibility as to the successful operation of the roads. There is an idea in the minds of many people that the freight rates on building materials are so burdensome that building construction has consequently been limited; but a well-known architectural engineer has recently analyzed the owner's direct building costs, and finds that only 8.3 cents of each dollar spent in the construction of a typical industrial building goes toward paying the freight charges on building materials.

Coal Production

Production of soft coal recovered appreciably during the first week of 1922, according to the weekly bulletin of the Geological Survey. The output is estimated at \$7,460,000 tons. The New Year holiday was observed in some districts but not in all.

The joint international commission of the governments of the United States and Canada has submitted to President Harding a report which he has in turn transmitted to Congress, containing a comprehensive proposition for the improvement of the St. Lawrence River between Montreal and Lake Ontario, as well as the completion of the new Welland ship canal, the connecting link between Lakes Ontario and Erie. The cost is estimated at over \$250,000,000 for the work on the St. Lawrence and \$60,000,000 for the Welland improvement. The purpose is to open up a waterway which will enable ocean vessels to pass into the Great Lakes, and the commission recommends a draft of 25 feet in the canals and 30 feet in the sills of the locks.

Anthracite Shipments for December

The effect of the abnormally mild temperatures that existed during December, and the general industrial depression are reflected in a decrease of approximately 1,800,000 tons in the shipments of anthracite as compared with the corresponding month of 1920, and of nearly 680,000 tons as compared with November. Shipments last month (4,635,922 gross tons) were the smallest since September, 1920, when the "vacation" strike of the mine workers reduced the shipments to 3,592,954 tons.

The total shipments for the year 1921 amounted to 67,617,713 tons against 68,627,125 tons in 1920.

Shipments by initiating carriers were as follows:

	December 1921	December 1920	November 1921
P. & R.	985,262	1,324,004	1,017,409
L. V.	801,796	1,161,305	913,737
C. of N. J.	532,597	497,735	512,613
D. L. & W.	626,377	840,515	814,131
D. & H.	654,987	806,475	736,593
Penna.	307,520	457,242	429,638
Erie	450,465	675,979	503,488
N. Y. O. & W.	107,107	164,557	136,945
L. & N. E.	169,811	318,508	229,455
	4,635,922	6,436,320	5,314,014

Light Hay Movement Due to Other

Factors Than Freight Rates

A general review of the hay market situation just completed by the Department of Agriculture shows, according to its publication "Weather, Crops and Markets," that while the movement of the marketable surplus of hay to December 15, 1921, was considerably less than normal, the cause is not entirely attributable to freight rates, as has frequently been asserted. This publication says:

"There are several other important factors, such as high marketing costs, mild weather in several important consuming sections, local forage, and general business depression. Marketing costs including the freight, total more in many instances than the amount received for the hay. Baling charges have been reduced about \$1 to \$1.50 per ton, baling wire is less expensive, and hauling charges are less than they were one year ago, but with the exception of one or two markets no reduction has been made in the terminal market charges.

The large amount of local forage available in sections which are usually heavy buyers of hay from other sections is

probably an important factor and is one which is being made of great importance by the financial condition of the consumers who are using all substitutes available. Consumption, where it depends upon the activity of commercial enterprises, such as sawmills, lumber camps, coal and other mines, or construction camps, is very light. . . . There are numerous territories in which only a general return to normal conditions will bring the demand for hay back to normal."

A Plea for the Truck Horse

The suggestion of Major Church, transportation engineer of the Port of New York Authority, in favor of the creation of special motor truck highways to be equipped with stations and with the same regulations respecting traffic schedules as railways is very interesting.

His article would have been more interesting had he mentioned that it was his purpose to have these highways built by taxation. He proposes to create competition for the railways at the expense of the taxpayers; and the railways are among the heaviest taxpayers.

The more logical course would be to build a complete system of railways under the Port of New York Authority at the expense of the taxpayers; such railways will cost less than the very expensive type of motor roads which the Major proposes will last five times as long, and the engines, rolling stock, etc., required will cost much less because of their longer life and much slower depreciation; while the expense of transporting goods will be definitely less on account of the much larger loads which can be hauled.

If we must develop added transportation facilities for freight at public expense, by all means go the whole distance and build state-owned railways to reach every part of the city. . . . No city can give adequate service to its merchants and factories unless adequate freight and express terminals are provided. Short cartage hauls favor business by reducing delivery costs. Cities which provide numerous team tracks give their merchants and manufacturers a substantial advantage over cities not so well planned.

Boston with many wharves and team tracks has very few hauls that are not under two miles for the round trip, and Boston moves her enormous shipments of wool, leather, fish, vegetables, fruits, etc., at a very low cost. Seventy-five per cent of her merchandise is horse-drawn, and she enjoys the distinction of having the best lot of horses on the average of any city in America.

Philadelphia, with numerous wharves along the river and frequent team tracks, is also a city where merchants and manufacturers enjoy the advantage of short hauls, and here again we find keen appreciation of the economy of horses in such work.

Investigations covering six months—January 1 to July 1 this year—were made in New York, Philadelphia, Baltimore, Washington, Boston, Springfield, Hartford, New Haven, Lowell, Providence and other Eastern cities, and from studies, other surveys and figures furnished by firms who own and use 51,927 head of horses, we can say positively that on hauls within a horse's working radius, i. e., the distance a team can travel in a day, horses furnish more economical service than motorized equipment. This holds good on both straightaway, heavy duty hauls and on house-to-house delivery.

On local delivery work from store to store, or house to house, the evidence is overwhelmingly for horse-drawn equipment. Ice companies, coal companies, groceries, bakeries and milk companies agree emphatically with the great packing companies whose verdict is that on all hauls under twenty miles a day the horse is most economical.

The packers emphasize four fundamental features of horse use in their report—low initial investment, long life, low repair cost and moderate maintenance.—*Wayne Dinsmore in the New York Times.*

SAFETY FIRST AND EARLY—As our most lasting impressions and characteristics are formed in childhood, it is the duty of every parent and teacher to indelibly impress on the mind of the child never to walk along the tracks, and at railroad crossings to stop and look carefully in each direction before crossing. In all sincerity we ask every parent and every teacher to teach this lesson fervently and frequently.—*B. F. & P. Circular.*

Commission and Court News

Interstate Commerce Commission

The commission has suspended from January 24 until May 24, the operation of schedules which propose to increase the rates on common window glass, carloads, from Oklahoma and Arkansas producing points to Sioux Falls, S. Dak., from 46 to 49½ cents per 100 pounds.

In response to a resolution passed by the Senate at the instance of Senator Pittman of Nevada, the Interstate Commerce Commission has ordered a proceeding of inquiry and investigation regarding the organization, management and control of the Transcontinental Freight Bureau.

The commission has suspended until May 15 the operation of schedules which propose the establishment of increased and reduced rates on asphalt, road oil, etc., from points in Missouri, Kansas, Oklahoma and Arkansas to points in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North and South Dakota and Wisconsin.

The commission has suspended until May 15 the operation of schedules published by the Duluth, Winnipeg & Pacific which propose increase and reductions in rates on prepared roofing, etc., between Chicago, Peoria, Ill.; St. Louis, Mo., and other points, and Mankato, Minn., and Hawarden, Ia., and points taking same rates, and from Duluth to Virginia, Minn.

The commission has suspended until May 11 the operation of certain schedules which propose to reduce to 14 cents per 100 pounds the present proportional carload rates of 19 cents per 100 pounds on petroleum and its products from Shreveport, La., and group points to Natchez, Miss., via the Louisiana & Arkansas, to Vicksburg, Miss., via the Vicksburg, Shreveport & Pacific, and to Baton Rouge, La., via the Louisiana Railway & Navigation Company.

The commission has suspended from February 15, until June 15, the operation of schedules which propose to establish reduced proportional class and commodity rates from Chicago, Ill., Ohio and Mississippi river points, and points taking same rates, to Gulf ports, New Orleans, La., to Pensacola, Fla., inclusive, and to South Atlantic ports, Jacksonville, Fla., to Wilmington, N. C., inclusive, applicable to shipside for transshipment via the Panama Canal to Pacific Coast points in the United States and British Columbia.

The commission has suspended from January 2, until May 2, 1922, the operation of schedules published by the American Railway Express Company, which propose the establishment of a rule in connection with its mileage scale of rates applicable on milk, cream, buttermilk and condensed milk between points west of the Mississippi river, except the Pacific Coast states, providing that where there are two or more routes between points of origin and destination the distance via the route actually used will determine the rate.

The commission has suspended from January 2, until May 3, 1922, the operation of schedules published by the New York, New Haven & Hartford, which provide that shippers are required to ice less than carload shipments of less than 5,100 quarts of buttermilk, condensed milk, cream, evaporated milk, milk, potcheese and skim milk moving between points on the New York, New Haven & Hartford and Central New England and from points on these lines to New York and vicinity in connection with the Erie, New York Central, and New York, Ontario & Western.

State Commissions

The Board of Railway Commissioners for Canada announces the appointment of R. Richardson as assistant secretary and registrar, and George A. Brown as assistant chief traffic officer; headquarters, Ottawa.

The Railroad Commission of California, on December 21, denied the application of the railroads of that state to increase freight rates on petroleum road oil.

The Public Utilities Commission of Michigan on December 28, assumed authority to fix the annual rentals that railroad companies charge for portions of their right-of-way, used by coal dealers, grain elevators, etc. Chairman Sherman T. Handy filed an order in the case of E. B. Muller & Company, of Port Huron, against the Pere Marquette, in which the commission refused to consider the contention of the railroad company that the act under which the state assumed to fix rates is unconstitutional. The order reduces the rentals on the Muller Company's stations at Elkton, Sandusky, McGregor and Deckerville.

Personnel of Commissions

The appointments of Henry C. Hall and Clyde B. Aitchison as members of the Interstate Commerce Commission were confirmed by the Senate on January 16, after a delay of over two weeks. Their terms expired on December 31 and pending confirmation they were retained by the commission as special examiners.

Court News

Automatic Bell Ringer Within the Inspection Act

The Circuit Court of Appeals, Seventh Circuit, holds that a bell ringer is a part or an appurtenance of a locomotive and tender within the Boiler Inspection Act, and that if an engine is equipped with an automatic ringer which is out of repair, a hand operated bell cord cannot be accepted as a substitute, especially where the hand operated bell is utterly insufficient.—Hines v. Smith, 275 Fed. 766.

Disregard of Signals by Taxicab Driver

The Wisconsin Supreme Court holds that a taxi-cab driver killed at a crossing in a city was guilty of contributory negligence, barring recovery for his death, where the signalman signaled him to stop about 80 ft. from the crossing and continued to signal him until he was forced to step aside to avoid being run over by the taxi.—Rowatt v. Kewaunee, Green Bay & Western (Wis.), 185 N. W. 189.

No Lookout Duty Owing to Employee Off Duty

The Kentucky Court of Appeals holds that a railroad company owed no lookout duty to a member of a fencing crew housed in a bunk car on a side track, who was struck by a train as he was entering the car at night while off duty. To impose such a duty on the company would require it to maintain a lookout for its employees both day and night over practically all of its tracks.—C. N. O. & T. P. v. Brown (Ky.), 234 S. W. 455.

Automobile Drivers in New Mexico

The New Mexico Supreme Court holds that where one approaching a crossing in an automobile, according to his own testimony stopped, looked and listened at a distance of 57 ft. from the track, and did not thereafter again stop, look and listen, but drove upon the track, he is guilty of contributory negligence, and cannot recover for injury to himself or his car by collision with a train.—Morehead v. Atchison, T. & S. F. (N. Mex.), 201 Pac. 1048

Employers' Liability—Federal Rule

of Damages Controlling

In actions brought in state courts under the federal Employers' Liability Act, the proper measure of damages to be awarded for ascertained future earnings must be settled according to general principles of law administered by the federal courts. The Supreme Court of the United States seems to have definitely decided that in such cases the sum to be awarded for the anticipated earnings of a decedent must be the present worth only of such earnings; that it is the duty of state courts to so direct the jury; and it has reversed the Kentucky Court of Appeals, for no other reason than that the state court failed to comply with the rule

of the federal courts in that respect. See *Chesapeake & O. v. Kelly*, 241 U. S. 485, 36 Sup. Ct. 630; *C. & O. v. Gadney*, 241 U. S. 494, 36 Sup. Ct. 633. For the same reason the Nebraska Supreme Court in two recent cases reversed judgments for the plaintiffs—*Sweat v. Hines (Neb.)* 184 N. W. 927. *Sheehan v. Hines (Neb.)*, 184 N. W. 934.

Fences Not Required at Station Grounds

The Montana Supreme Court holds that Rev. Codes, § 4308, requiring fences and cattle guards, is not applicable to tracks at station grounds. Liability for injury to animals straying on the grounds depends on negligence in managing the trains. If the company does fence at places not required by the statute, there is no presumption that the fences constitute a trap for animals killed straying into the grounds, so as to make the company liable in the absence of negligence in moving the train.—*Bowers v. Chicago, M. & St. P. (Mont.)*, 201 Pac. 825.

Safety Appliance Act—Car in Steel Company's Yard

A steel company's brakeman was injured attempting, under the orders of his yardmaster, to uncouple cars, one of which belonging to a railroad company, had no uncoupling lever. The brakeman, however, would not have been injured but for the steel company's engine being moved the wrong way by its employees' erroneous signal or failure to observe a signal. The Ohio Supreme Court holds that the railroad was not liable under either the federal or state Safety Appliance act.—*Loucks v. New York, Chicago & St. Louis (Ohio)*, 132 N. E. 849.

Carrier Not Liable for Injury to Goods

Improperly Loaded by Shipper

In an action for damage to furniture alleged to be due to negligence in transportation, the Virginia Supreme Court of Appeals holds, citing the authorities, that where a shipper for purposes of his own convenience undertakes to load and unload the goods, the carrier is not responsible for injuries received in transportation traceable solely to improper loading and packing. In this case it was not the practice of the railroad to make inspection of carloads loaded by shippers. The court said that a different question would be raised if the improper loading were manifest to ordinary observation when the car was received. There was evidence proving that the furniture was not properly loaded and packed in the car by third parties employed by the shipper. There was ample evidence of the railroad's employees to overcome the presumption of negligent transportation arising from the arrival of the goods in a damaged condition, and to prove that damage would not have occurred if the car had been properly loaded and the goods properly packed. Judgment for the plaintiff was therefore reversed.—*Hives v. Buchanan (Va.)*, 109 S. E. 219.

Service of Summons on Soliciting Agent Invalid

In a personal action in a federal court of Minnesota against the Union Pacific, a foreign railroad corporation operating no lines within the state, on a cause of action arising in another state, service was attempted to be made by delivering a copy of the summons to the company's soliciting freight and passenger agent at Minneapolis. The district court holds that the fact that the company maintains an office in the state with such an agent, who has, however, no authority to make contracts, issue bills of lading or passenger tickets, or to collect freight charges, does not constitute doing business in the state such as would validate the service.—*Stephan v. Union Pacific*, 275 Fed. 709.

Liability for Injuries Resulting From Quarrel

Two employees of a railroad, both engaged in shoveling coal, quarreled as one was quitting and the other starting for the day as to the amount of work done by each. In the course of the quarrel one, while leaving the premises, was struck by a lump of coal thrown by the other. In a proceeding under the Workmen's Compensation Act, the Indiana Appellate Court holds that the Industrial Board was warranted in finding that the applicant received his injury by an accident arising out of his employment;

this on the theory that the disagreement arose out of the employer's work in which both men were engaged.—Payne v. Wall (Ind. App.), 132 N. E. 707.

United States Supreme Court

Regulation as to Manner of Tendering Base for Lien Lands Within Power of Secretary of Interior

The Supreme Court of the United States has affirmed the judgment of the Court of Appeals of District of Columbia (263 Fed. 637), holding that under a railroad land grant (of the Southern Pacific), providing that when land is lost to the company for any of the reasons mentioned in the grant, other lands may be selected by the railroad in lieu thereof, "under the direction of the Secretary of the Interior," a ruling of the Secretary that land tendered as a base for lien lands must not be tendered in fractions of 40 acres, is a matter of administration, committed by Congress to the sound discretion of the Secretary, and as such not subject to the control of the courts. Mr. Justice Van Devanter said in part that "the regulation is merely an administrative measure designed to facilitate the examination and disposal of the selection lists and to be fair alike to the claimant and the government. It neither abridges the right of selection nor unreasonably obstructs its exercise, but on the contrary leaves the claimant free to select and obtain indemnity for all losses if only the lands available in the indemnity limits are sufficient for the purpose."—Southern Pacific v. Fall. Decided January 3, 1922.

North Dakota Excise Tax Held

Invalid as to Interstate Railroads

The Director General of Railroads and five railroad companies sued to enjoin the collection of a special excise tax assessed against each of the companies for 1918 and 1919 under the North Dakota tax law of 1919, c. 222. The companies were all organized under the laws of other states, and all own lines running into or through North Dakota. The lines during those years were all under federal control.

The taxing officers at first assessed the tax for 1918 against the companies by taking the value of their property within the state at that proportion of the total value of their stocks and bonds that the main track mileage within the state bears to the main track mileage of the entire line of each company, as prescribed in the second proviso of the statute. The United States Supreme Court held, however, that the tax so assessed was an unwarranted interference with interstate commerce and a taking of property without due process of law. Wallace v. Hines (1920) 253 U. S. 66. Thereupon the taxing officers assessed the tax for that year, and also for 1919, by using the ratio specified in the last preceding clause of the statute applicable to corporations in general—that is, a ratio fixed by contrasting the value of each company's railroad within the state with the value of its entire railroad within and without the state.

The validity of the tax on this new basis was challenged on the ground, among others, that as to railroad companies whose lines lie partly within and partly without the state the statute does not authorize or sanction a tax assessed on that basis. This contention is sustained by the Supreme Court, because of the above-mentioned proviso or excepting clause in the statute coming immediately after the clause relating to other corporations, providing that in the case of a railroad with lines running into or across the state, "property within the state shall be held to mean that proportion of the entire property of such corporation engaged in such business which its mileage within the state bears to its entire mileage within and without the state." Although this provision was held in Wallace v. Hines to be in conflict with constitutional limitations and indefensible as respects these railroad companies, it must still be regarded as part of the act for all the purposes of construing the remainder of the act. Therefore the taxing officers, on finding that the tax could not constitutionally be assessed on the basis specially prescribed in the statute, were not at liberty to assess it on another basis which the statute shows was not to be applied to railroads such as these. The tax was accordingly held invalid and its collection enjoined. Davis v. Wallace. Decided January 9, 1922. Opinion by Mr. Justice Van Devanter.

Labor Board Decisions

Right to Dismiss Section Foreman for

Inefficiency Sustained

In a case against the Texas & Pacific, the Labor Board sustained the action of the railroad in dismissing R. Phillip, section foreman, because he had not maintained his section properly.—Decision No. 551.

Carpenters Refuse to Aid in Strike Duty

Three carpenters on the Pennsylvania Railroad refused to work on bunk cars required by railroad police during the outlaw switchmen's strike in April, 1920. In a case involving the pay of these carpenters for the time not employed during the strike, the Labor Board held that the men were not entitled to it.—Decision No. 517.

Wage Increase to Painters

In a complaint by the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers against the Delaware, Lackawanna & Western, the Board held that painters were entitled to an increase of 15 cents an hour as specified in decision No. 2 and as covered in paragraph B of decision No. 92, effective March 1, 1920.—Decision No. 518.

Terminal Mileage Denied Enginemen

Operating Milk Trains

In a controversy between the New York, Ontario & Western and the men in engine service on milk trains the Labor Board decided that the article of the schedule on which the employees based their claim for terminal mileage, refers to passenger service only. Under the provisions of the schedule the engineers and firemen employed on milk trains receive freight service rates.—Decision No. 482.

Employees Discharged for Furnishing Information for Railroad Labor Board Are Reinstated

Switchman and a fireman submitted information to their respective brotherhood executives that had been requested of the brotherhoods by the Labor Board. The Interstate Railroad requested these men to promise not to take up such questions with their brotherhoods in the future and on refusal the men were discharged. The Labor Board decided that the employees should be reinstated and paid for time lost.—Decision No. 528.

No Additional Compensation for

Clerical Employees for Saturday Afternoon

Twenty-nine employees of the Chicago, Milwaukee & St. Paul requested overtime for three hours' extra work on September 10, 1920, quoting Rule 57 of the agreements to substantiate their claim. The Board, in its decision, held that the last paragraph of Rule 57, upon which the claim was based, did not contemplate that clerical employees should be paid overtime for Saturday afternoons, but provided for a continuation of allowing employees to be off part of a day on certain days.—Decision No. 468.

Conductor Dismissed for Disobedience

of Operating Rule Denied Reinstatement

A train on the Bangor & Aroostook had passed a station without sufficient time to make the next station for a first-class train. The conductor discovered the error and stopped the train by applying the air from the rear. After the train was stopped a back-up signal was given to the engineer, and the train backed up to the south end of the passing track against traffic and without flag protection. The railroad discharged the

conductor for this infraction of the rules. The Labor Board ruled that while the permanent dismissal of the conductor was a severe penalty, the Board could not condone the violation of important operating rules or interfere with the management in the application thereof. The request for reinstatement was, therefore, denied by the Board.—*Decision No. 498.*

Seniority Rights for Less Than Six Months' Service

Three Italian track laborers on the Buffalo, Rochester & Pittsburgh were laid off in January, 1921, on account of reduction in force, and entered a complaint before the Labor Board because they were not allowed to displace other laborers junior to them in the service. They had been in the employ of the road less than six months. The Board decided that while it favors close observance of the seniority rule, it does not construe the provision of this agreement as making it compulsory for the carrier to regard seniority of employees until they have been in service six months. The complaint was, therefore, denied.—*Decision No. 523.*

Leaving Duty Without Permission

A. L. Callahan, yard foreman on the International & Great Northern at Fort Worth, Tex., was discharged for leaving his work and going to town at 3 p. m. on September 16, 1920, after having obtained permission from Roadmaster Grizzle for whom he was handling some work train service. The railroad contended that Callahan should have known that the permission of the roadmaster applied only so far as he was concerned personally and that Callahan had no right to leave without permission from the general yardmaster. The Labor Board refused to reinstate Yard Foreman Callahan or pay him for lost time.—*Decision No. 496.*

Enginemen's Request for Change

in Flaggin' Rules Denied

In a complaint against the Virginian Railway by the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen the employees requested that a special rule of that road to the effect that the enginemen of a following or incoming train is responsible for a collision at a station, coaling plant or water tank be rescinded. In its place the enginemen requested that the standing train be required to be protected by flagmen in accordance with standard rule 99. The carrier's contention that the promulgation of operating rules is solely a managerial question and that there is no reason for a change was sustained by the Board.—*Decision No. 488.*

Conductors' Claim for Switching Run Rate Sustained

For many years turn-around service has been operated between Elizabeth, Ga., and Tate (a distance 40 miles each way), and the mine- or switching-run rate of pay was applied thereto; but, effective May 30, 1920, this turn around service was discontinued and runs 17 and 18 were put on to operate in through-freight service between Elizabeth and Copperhill (95 miles). On June 27, 1920, they were made to run between Elizabeth and Blue Ridge (81 miles), and have been paid through-freight rates. It is the conductors' contention that these changed runs should still be paid the mine- or switching-run rates because of doing station switching.

It is the position of the carrier that switching of the kind cited should not be classified as mine- or switching-run work as covered by section d, Article IV of the existing agreement; that station switching by through-freight trains between terminals does not operate to change the classification of the service nor the rate applicable to through-freight service, as clearly indicated in the Director General's ruling cited above, and fully confirmed by subsequent decisions of the Railway Board of Adjustment No. 1.

The Labor Board decided that under the provisions of the schedule and the instructions issued when the straight-away runs were inaugurated, supplemented by the actual switching done at stations, the position of the employees is sustained.—*Decision No. 481.*

Foreign Railway News

Wage Reductions in Britain

Under the sliding scale of wages in Great Britain, whereby railway wages are increased or decreased in accordance with the cost of living index number, wage rates suffered a further decrease of from 2 to 6 shillings (\$1.50 to \$1.50) per week, effective January 1, according to the Railway Gazette (London).

Private Companies May Operate French Railways

LONDON.

The French parliamentary committee appointed to inquire into the condition of the government railway services in France have recommended by a majority that these lines be handed over to a private company to be worked. The state will still remain the owner.

British Company to Build Locomotives in Austria

According to an Associated Press dispatch appearing in the New York Times, the Vickers-Armstrong Company, a British concern, has made an offer to the Austrian government for the Woellersdorf Arsenal. The British company, it appears, wishes to turn the arsenal into a plant for the manufacture of locomotives.

Rates Increased in Argentina

LONDON.

It is reported that the outcome of a meeting between the Minister of Public Works, of Argentina, representatives of commerce and industry in the regions affected and directors of the Entre Rios and the Argentine North Eastern railways, the former railway is to be allowed to increase its rates by 17 to 23 per cent and the latter company by 25 per cent. Passengers, livestock and oranges are exempted from the higher tariffs.

Russians Seek to Hold Chinese Eastern

John J. Oblomievsky, a Russian railway engineer, arrived in Washington recently to work for the preservation of Russian control over the Chinese Eastern. Mr. Oblomievsky, as reported in the daily press, said in part:

We hope that the Washington conference will remember that the Chinese Eastern Railway was built with money taken from the Russian people and that the loss of this railway to Russia would mean the cutting off of Siberia from the Pacific. We hope the conference will act as moral trustees of Russia at this time of her temporary disability. We trust that the conference will confirm the Russian-Chinese Treaty of 1896, and will call upon the Chinese Government to revise the private agreement of the Russian management of the railway with the Chinese Government, concluded on October 12, 1920, inasmuch as in some parts this agreement contradicts the fundamental treaty of 1896.

The recognition of the Russian legitimate rights in accordance with the treaty of 1896 would make it possible to establish the Council of Consuls in Harbin as a body that would supervise the execution of the treaty by both contracting parties. In this capacity the Council of Consuls would succeed the Interallied Technical Board, now in Harbin, which was organized only as a temporary body for the purpose of supervising various technical matters connected with the presence of the allied troops in Siberia. In order that the Chinese Eastern Railway could continue to function normally, it is necessary that an authoritative body be established able to regulate questions of general policy connected with the railway, and to supervise the execution of the Russian-Chinese Treaty.

The Chinese Eastern Railway is a part of the Transsiberian. For twenty years it operated with great yearly deficits, bringing the total Russian expense to about 500,000,000 gold rubles. Russia met the expense, looking upon the Transsiberian Railway as a means of bringing life, culture and prosperity to the vast spaces of Siberia.

During the 25 years of its existence millions of Chinese have settled in the railway zone and where there was at one time a vast wilderness. The treaty of 1896 gives China the right to

redeem the road after 36 years of operation, on repayment to Russia of all that the railroad cost her. According to another provision, the railway will pass into China's possession after 80 years of operation without any compensation on China's part.

Reduction in English Freight Rates

LONDON.

The decision of the English and Welsh railway companies in regard to the lowering of railway rates has proved very disappointing to business interests. The decision to limit the reduction of rates to coal, coke, patent fuel, iron and steel, limestone for chemical works and limestone used for iron and steel making has caused numerous comments from the British industries.

The reduction will operate from January 1, 1922, and will amount to 25 per cent of the present increase of 100 per cent. It is agreed among all the large associations of shippers that this limited concession can have little, if any, effect on a general trade revival. They are not in a position, however, to question the railway companies' statement that even this small concession will mean a reduction in railway revenue of £10,000,000 (\$48,600,000 at normal rate of exchange) a year, but they do state that this figure may easily be reduced by increase of traffic.

The railway companies in putting forward this reduction state that they would have been unable to face this reduction were it not that they look for relief at an early date from a further fall in the prices of materials and the automatic reduction of wages arising from the fall in the cost of living bonus.

Reorganization of the L. & N. W. and the L. & Y.

The London & North Western and the Lancashire & Yorkshire, as was briefly noted in these columns last week, will be consolidated on the first day of next year under a new scheme of organization. The new organization, which has been announced, embodies some novel features.

In accordance with customary English practice, the head of the system will be the general manager, Arthur Watson. Mr. Watson is at the present time the general manager of both companies, so that feature of the plan calls for no changes.

In general, the most distinctive feature of the new arrangement is the divisional organization. For operating and traffic purposes the combined railways are divided into two divisions, the Northern and the Southern. The former is made up of the entire Lancashire & Yorkshire and that part of the London & North Western lying to the north of Crewe. The Southern division is that portion of the London & North Western lying south of Crewe.

On the other hand, for engineering, mechanical and stores department services the combined carriers are divided into divisions A and B. Division A is the London & North Western as it now stands and division B is the Lancashire & Yorkshire as it now stands. Thus, while many changes are necessary in the operating and traffic departments, the present organizations of the engineering and mechanical departments of both roads are maintained in large part with, of course, a new authority placed above both of them.

Furthermore, the chief goods manager will cease to be an operating officer and will devote his attention entirely to duties similar to those of the freight traffic manager of an American railway. Details concerning the passenger traffic will apparently, however, continue to be handled by the operating department.

At the head of the Northern and Southern divisions are divisional general superintendents. Reporting to them will be, as suggested by the Railway Gazette (London), those officers responsible for passenger traffic work, the operation of trains and yards, the collection and delivery of freight, the operation of freight and passenger stations and the marine department.

The electrical department is combined with the mechanical and the head of the department will be known as the chief mechanical and electrical engineer.

Other changes are less striking.

Arthur Watson, the general manager, will have seven assistants. H. G. Burgess will be principal assistant and H. Marriott will be assistant to the general manager, parliamentary. Other assistants to the general manager will have charge respectively of rates and fares, general matters, staff, "indoor" and statistical.

The divisional general superintendents will be Ashton Davies for the Southern division and L. W. Horne for the Northern. The chief goods manager will be S. H. Hunt. Under him will be divisional goods managers on the Northern and Southern divisions.

The chief engineer, E. F. C. Trench, will have under him divisional engineers of divisions A and B, who will oversee all engineering and signal work.

The chief mechanical engineer, G. Hughes, will have under him two divisional mechanical engineers, H. P. M. Beames and G. N. Shawcross. Directly under him also will be divisional electrical engineers and the divisional carriage and wagon superintendents.

Poland to Permit Railway Construction

by Private Concerns

The Polish government will permit the construction and operation of railway lines by private concerns, but under such unfavorable terms that it may be of interest to follow the situation to see to what extent the opportunity will be taken advantage of. Some of these provisions are:

The company must secure the permission of the government before it can make preliminary surveys and studies.

The Minister of Railways decides upon the granting of the concession, depending upon his opinion regarding the desirability of the proposed railway and the financial and other arrangements advanced by the company. The company must assure the Minister of its ability to finance the project.

At the end of 99 years the railway so constructed, with all its buildings, real properties, rolling stock, etc., automatically become the property of the government—without compensation to the company.

The government may buy the railway at any time before the concession expires by the payment of a sum arrived at as follows: Average annual net income for the best 6 of the preceding 8 years (but not less than 4 per cent on the outstanding stock) capitalized at 5 per cent (if the concession has 20 years or more to run—otherwise the average annual net income multiplied by the years the concession has to run).

The government is not limited in granting concessions to other companies for lines connecting with the one to be built.

The Minister of Railways must approve the detailed construction plans. He will supervise the work of construction. He may order the construction of new buildings.

The company, upon the demand of competent authority, must rebuild any bridges or highways affected by its activities and, apparently, must provide overhead or subway structures for all highways.

The Minister may lower rates as he sees fit or allow the government to participate in profits over a certain amount.

The government has the right-of-way for telegraph and telephone lines along the railway.

The company will be required to transport postal parcels and employees free of charge and, when cars are provided by the postal authorities, handle and repair these cars at the company's expense.

The company must enter into such relations as to joint use of facilities or equipment as the Minister may require.

THE NATIONAL SAFETY COUNCIL, 168 North Michigan avenue, Chicago, is to compile a census of safety managers, superintendents, and all safety workers, and requests everyone who ought to be included in that census to send in the necessary data. Each individual should say how long he has been in his present position and what technical or special training he has had for it.

The principal points asked for are: Name; Company; City; State; Nature of company's business; Is safety your principal work? Whether or not engaged in other activities: fire protection, health and sanitation, workmen's compensation and claims, manager or superintendent, engineering (other than safety), legal, insurance, welfare, educational.

Equipment and Supplies

Freight Cars

THE UNION PACIFIC is inquiring for 70 double truck caboose cars.

THE FRUIT GROWERS' EXPRESS, Washington, D. C., will be in the market soon for 100 refrigerator cars.

THE NORFOLK & WESTERN contemplates carrying out an extensive program for the repair of coal cars.

THE ELYRIA ENAMELED PRODUCTS COMPANY, 101 Park avenue, New York City, is inquiring for 10 milk cars.

THE NORTHERN REFRIGERATOR CAR COMPANY, Milwaukee, Wis., has ordered 500 refrigerator cars from the Haskell & Barker Car Company.

THE CENTRAL OF GEORGIA, reported in the *Railway Age* of December 17, as inquiring for 500 box cars, has ordered this equipment from the Mt. Vernon Car Manufacturing Company.

THE LONG ISLAND, reported in the *Railway Age* of November 12, 1921, as inquiring for 10 caboose cars, has ordered 10 steel underframe caboose cars from the American Car & Foundry Company.

THE PACIFIC FRUIT EXPRESS, reported in the *Railway Age* of January 7, as about to ask for prices on refrigerator cars, is inquiring, through the Southern Pacific, for 3,000 refrigerator cars, also for 300 additional for replacement purposes.

Passenger Cars

THE LONG ISLAND, reported in the *Railway Age* of December 17 as inquiring for 40 motor cars for electric service and 10 steel coaches for steam service, has ordered this equipment from the American Car & Foundry Company.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of November 26, as inquiring for 9 baggage cars, 5 combination baggage and mail, 20 coach and 10 smoking cars has given an order for 45 steel cars for passenger train service, to the American Car & Foundry Company.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of November 26, as inquiring for 124 cars for passenger train service, has placed orders for 62 passenger cars and 12 dining cars with the Pullman Company and for 53 baggage and mail cars, with the Standard Steel Car Company.

Iron and Steel

THE GRAND TRUNK, Western Lines, has ordered from the Illinois Steel Company 9,500 tons of 100 lb. rail.

THE CHICAGO UNION STATION COMPANY, through Graham Anderson Probst & White, architects, are inquiring for approximately 15,000 tons of structural steel.

THE NEW YORK, NEW HAVEN & HARTFORD will receive bids until 12 o'clock, noon, January 31, 1922, at New Haven, Conn., for its requirements of steel castings, to be ordered as required during the year ending December 31, 1922.

THE "CONSCIENCE FUND" of the Southern Pacific has received since 1907, contributions ranging in amount from 3 cents to \$75, and aggregating altogether \$1,164. A resident of Bakersfield, Cal., sent \$1.53 to cover an additional amount due to the railroad, as the result of a 13-year-old boy riding from Fresno to Bakersfield on a half fare ticket. An employee in Los Angeles refunded \$5.13, which was a result of overcharges in his expense account. From Portland, Ore., a man sent 80 cents to defray the loss of two barrel covers owned by the company which he had thrown into the Marys river.

Supply Trade News

The Bird-Archer Company has moved its offices from 90 West street to 33 Rector street, New York City.

J. C. Donaldson has been appointed sales engineer of the Hall Switch & Signal Company, Garwood, N. J.

Fairbanks Morse & Co., Chicago, are transferring the marine engine department of the company from Three Rivers, Mich., to Beloit, Wis.

The Railways Ice Company, Chicago, will erect a two-story ice manufacturing plant at Clearing, Ill., 150 ft. by 300 ft., at an estimated cost of \$200,000, including machinery.

The Interstate Car Company, Indianapolis, Ind., is planning the erection of a one-story foundry for the production of iron castings, estimated to cost approximately \$25,000.

E. O. Schneider has been appointed representative in eastern Pennsylvania of the McDougall-Butler Company, Inc., Buffalo, N. Y. Mr. Schneider will have his headquarters at Philadelphia, Pa.

The Streets Company, Chicago, which has heretofore confined itself largely to the construction and repair of wooden freight cars, has issued an inquiry for certain equipment for the manufacture and repair of steel cars.

W. F. Cremean, representative at New York, of the Wine Railway Appliance Company, Toledo, Ohio, has been appointed sales engineer, with headquarters at Toledo, and Peter P. Beck succeeds Mr. Cremean as eastern representative, with office in the Grand Central Terminal, New York City.

Atlee B. Saurman, has been appointed general sales manager of the Standard Underground Cable Company with headquarters at Pittsburgh, Pa. Mr. Saurman has been connected for over 20 years with the company's New York, Boston, San Francisco and Philadelphia sales offices, having served successively as manager of the last three offices.

B. B. Milner, formerly engineer motive power and rolling stock of the New York Central, who for the past year has been with the Frazar importing-exporting interests, is returning to the Orient where he will establish his own practice as consulting sales engineer. A photograph of Mr. Milner and a biographical sketch appeared in the *Railway Age* of September 17, 1920, page 504.

The personnel of the executive staff of the Bridgeport Brass Company, Bridgeport, Connecticut, is now as follows: F. J. Kingsbury, chairman of the board; Carl F. Dietz, president and general manager; W. R. Webster, vice-president; F. J. Kingsbury, treasurer; R. I. Neithercut, secretary; W. D. Blatz, general sales manager; W. R. Clark, general works manager; E. G. Oakley, works manager fabricating division, and Arthur Brewer, works manager mill products division.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announces a number of changes and transfers in personnel in its railway sales department, the organization of which is now as follows: F. H. Shepard, director of heavy traction; M. B. Lambert, manager; E. D. Lynch, office manager; F. F. Rohrer, assistant to manager in charge of contracts; C. H. Long, section manager railway equipment contracts and orders; R. Seybold, manager price section; T. H. Stoffel, electric railway freight haulage export; W. R. Stinemetz, manager, and R. W. Carter, assistant manager of the heavy traction division; K. A. Simmon, manager, light traction division; J. L. Crouse, manager and J. W. Lewis, assistant manager, railway development and supply division; H. A. Campe has been appointed manager of the small motor appliance section of the industrial department, succeeding

V. M. Beeler, who has been transferred to the Springfield office. H. B. Smith has been appointed manager of the domestic service section of the department, succeeding Mr. Lampe and G. L. Washington has been appointed to manager of the Havana, Cuba, office of the Westinghouse Electric International Company.

Pullman Company Reorganization

At a special meeting of the stockholders of the Pullman Company at Chicago, on January 14, the company was reorganized, following its absorption of the Haskell & Barker Car Company. John S. Runnells retired as president of the company and was elected chairman of the board of directors succeeding Robert T. Lincoln, and Edward F. Carry, president of the Haskell & Barker Car Company was elected president to succeed Mr. Runnells. Charles A. Liddle, vice-president of the Haskell & Barker Car Company and David A. Crawford, treasurer, were elected vice-presidents of the Pullman Company.

John Sumner Runnells was born at Effingham, N. H., on July 30, 1844, and was educated at Amherst College, graduating with the degree of A.B. in the class of 1865. During 1868, he served as private secretary to Governor Merrill of Iowa. From 1869 to 1871, he was consul at Tunstall, Eng., returning to this country during the latter year and being

to the vice-president and then to general manager, which position he resigned on January 1, 1916, to become vice-president of the Haskell & Barker Car Company, the position he occupied at the time of his recent appointment.

The Warren Tool & Forge Company, Warren, Ohio, has purchased the American Block & Manufacturing Company and the General Malleable Company, both of the same city. The American company manufactures malleable unions with bronze inserted seats, for the production of which the plant has a capacity of about 250,000 per month. The General Malleable Company manufactures malleable castings, a large proportion of which are used by the railroads and the total capacity for the production of which is about 600 tons per month. These companies will henceforth be operated as a part of the Warren Company, the capitalization of which under the merger is \$1,800,000. The company will continue to operate under the present management.

The Portland Cement Association, Chicago, has organized a railway bureau to compile and present authoritative data on railway uses of concrete. D. A. Tomlinson, who has been appointed manager of this bureau, was graduated from the Massachusetts Institute of Technology in 1912, following which he entered the engineering department of the Chicago



C. A. Liddle



E. F. Carry



J. S. Runnells

admitted to the bar. He practiced law at Des Moines, Iowa, from 1871 to 1887, during which time he was a reporter for the Supreme Court of Iowa, and later United States district attorney. In 1887, Mr. Runnells was appointed counsel for the Pullman Company, and, in 1905, was promoted to vice-president retaining his duties as general counsel. He was elected president in 1911.

Edward F. Carry was born at Fort Wayne, Ind., on May 16, 1867, and was educated in the public schools of that city. He began his business career with the Wells & French Car Company at Chicago, and at the time of the consolidation of this company with the American Car & Foundry Company, was serving as secretary. He served the last named company successively a district manager, first vice-president, second vice-president, and first vice-president and general manager, a service extending over a period of 28 years. On January 1, 1916, Mr. Carry was elected president of the Haskell & Barker Car Company, which position he occupied at the time of his recent appointment.

Charles A. Liddle, who has been elected vice president of the Pullman Company, was educated in the public schools at Philadelphia, Pa., and entered business as an employee of the Allison Manufacturing Company at Philadelphia. Mr. Liddle later served the Jackson & Sharpe Company and the Harlan & Hoopingsworth Company at Wilmington, Del., and the Pressed Steel Car Company at Allegheny, Pa. In 1901, he entered the service of the American Car & Foundry Company as an engineer. Later he was promoted to assistant

& Western Indiana. Five years later, while occupying the position of assistant engineer of that road, with headquarters at Chicago, Mr. Tomlinson enlisted in the army, serving as a captain in the coast artillery and instructor in railway artillery and orientation at the heavy artillery camp at Fort Monroe, Va. For the past two years he has been connected with the structural bureau of the Portland Cement Association, with headquarters at Chicago.

John M. Weir, whose resignation as chief engineer of the Kansas City Southern, to become general superintendent of construction of the National Boiler Washing Company, Chicago, was noted in the *Railway Age* of January 14 (page 210), was born in Ireland on July 31, 1879. He entered railway service with the Illinois Central in June, 1899, as a track apprentice and after occupying various positions, was promoted to resident engineer in charge of construction in March, 1907. Later he was concerned for a time with the construction of a small railway in Canada. After completing this work he returned to this country and entered the service of the St. Louis-San Francisco as assistant engineer at Springfield, Mo. Subsequent to 1908, he was made assistant engineer in the chief engineer's office in charge of construction of the Gainesville & Northwestern in Georgia and not long thereafter he entered the valuation department of the Chicago, Rock Island & Pacific. He served this company as assistant engineer of track of the Chicago terminal and as assistant engineer in charge of terminal valuation. In June,

1916, he was appointed division engineer of the Kansas City Southern, with headquarters at Pittsburg, Kan., and was promoted to chief engineer in March, 1917.

Harry Barrett Marshall, who for 13 years served as manager of the St. Louis branch of The Electric Storage Battery Company, Philadelphia, Pa., has been placed in charge of

all railway sales work of the company. Mr. Marshall, who will be located at Philadelphia, has been associated with the company for the past 16 years. He graduated from the Armour School of Technology in 1905, and a few months afterwards, joined The Electric Storage Battery Company, serving in a clerical position at the Chicago branch. In 1909, he was appointed manager of the St. Louis branch, which position he held until his recent appointment in charge of all railway sales work. From the company, Mr. Marshall has devoted considerable time to the question of railway sales.



H. B. Marshall

the beginning of his association with shall has devoted considerable time to the question of railway sales.

Alfred E. Pratt, sales engineer of the National Carbon Company, Inc., Cleveland, Ohio, has been appointed assistant manager of the railroad department with headquarters at Cleveland. Mr. Pratt

was born at West Scarborough, Maine, December 11, 1887, and was educated at Mount Union College and Western Reserve University. After leaving college he spent two years in the maintenance of way department and signal construction on the western lines of the Erie Railroad. In October, 1909, he was appointed supervisor of signals of the Buffalo Creek Railroad at Buffalo, N. Y. In January, 1913, he became general signal foreman of construction with the

Erie Railroad while automatic signals were being installed on four divisions. In November, 1916, he was appointed signal supervisor of the Buffalo division of the Erie Railroad and in April, 1917, was transferred to the Kent division with headquarters at Marion, Ohio. On March 1, 1918, he resigned to accept the position as sales engineer in the railroad department of the National Carbon Company.



A. E. Pratt

THE NEW YORK CENTRAL VETERANS' ASSOCIATION was formally launched at meetings held in New York City on Sunday, January 8, (about 2,000 persons being present), and on Wednesday, January 11. This local organization, as before announced, is intended to promote a better acquaintance between all classes of persons employed by this road in New York City and vicinity and northward as far as Albany; and is open to officers and employees of all ranks who have been in the service 15 years.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will make repairs and alterations to its grain elevators at Argentine, Kan., at an estimated cost of approximately \$15,000.

CANADIAN PACIFIC.—This company, in conjunction with the Canadian National, is contemplating the construction of a union station at Peterborough, Ont.

CENTRAL OF GEORGIA.—This company which was noted in the *Railway Age* of December 3, page 1121, as receiving bids for the construction of a 500-ton concrete coaling station at Columbus, Ga., has awarded a contract for the work to the Ogle Construction Company, Chicago.

CHICAGO, BURLINGTON & QUINCY.—This company will receive bids until January 27 for the construction of an addition and alterations to its hotel and eating house at Cody, Wyo. The structure is to be two stories and of bishopric board construction.

CHICAGO UNION STATION.—This company plans to complete its passenger terminal at Chicago within two years.

FORT WORTH & DENVER CITY.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a two-story brick hotel at Texline, Tex., estimated to cost \$75,000.

ILLINOIS TERMINAL.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Le Clair to O'Fallon, Ill., 14 miles.

MISSOURI PACIFIC.—This company will construct a new passenger station, 24 ft. by 115 ft. of fireproof hollow tile and stucco construction with a slate roof, and reinforced concrete and hardwood floors, at Earle, Ark. A concrete foundation for this building has recently been completed by company forces, and it is expected that bids for the construction of the superstructure will be requested at an early date. The work is estimated to cost \$23,000.

NEW YORK CENTRAL.—This company has awarded a contract to the Walsh Construction Company, Syracuse, N. Y., for grade elimination at North Tonawanda, N. Y., to cost in the neighborhood of \$500,000. The work, which will eliminate two grade crossings involves a change of line and the contract includes track work, bridge work and grading.

NORFOLK & WESTERN.—This company has awarded a contract for a reinforced concrete coaling station, including mechanical equipment, to be constructed at Williamson, West Virginia, estimated to cost \$75,000, to the Roberts & Schaefer Company, Chicago.

NORTHERN PACIFIC.—This company, in conjunction with the Great Northern, is planning for extensive grade crossing elimination work in northeast Minneapolis, Minn. The preliminary plan which was prepared by the city and accepted by the companies provides for track elevation, including twelve bridges, which will accommodate from two to six tracks. The work is estimated to cost \$5,000,000 and, according to an ordinance recently passed by the city council, must be completed within five years.

WENATCHEE SOUTHERN.—This company which was noted in the *Railway Age* of December 24 (page 1286), as having been organized to construct a railroad from Wenatchee, Wash., to Kennewick, a distance of approximately 132 miles, has applied to the Interstate Commerce Commission for authority to construct this line.

WESTERN PACIFIC.—This company has been authorized by the State Railroad Commission of California to extend its San Jose branch across the Santa Cruz line of the Southern Pacific at College Park, Cal. This permission was granted after the above lines agreed to install an interlocking plant at that point which will be in operation on or about March 15.

Railway Financial News

BOSTON & MAINE.—*Modification of Decree Opposed.*—A resolution has been filed with the Massachusetts legislature upon petition of Edmund D. Codman, former president of the Fitchburg Railroad, in opposition to any modification of the decree relative to the Boston & Maine by the New York, New Haven & Hartford.

The attorney general now has under consideration a proposal to modify the dissolution decree of 1914 under which the New Haven was ordered to divest itself of Boston & Maine control by sale of all Boston & Maine stock directly or indirectly owned by it. Pending such sale the stock was placed in the hands of federal trustees.

The Codman interests assert that the proposed modification would be prejudicial to the public interest and a grave menace to the interests of all individual shareholders of the Boston & Maine "by reason of the fact that the possibility of independent operation of the Boston & Maine would be eliminated and its financial restoration would become subordinated to the interests of the New Haven railroad whose solvency is far from certain."

CHICAGO & WESTERN INDIANA.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$223,000 of consolidated mortgage 4 per cent bonds to be disposed of at par to lessee companies to retire and replace general mortgage bonds.

CHICAGO, BURLINGTON & QUINCY.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$30,000,000 of first and refunding mortgage bonds under a proposed mortgage, to be sold at not less than 89½ per cent, for the purpose of reimbursing the treasury for expenditures for additions and betterments during the period from February 1, 1916, and January 31, 1921.

CHICAGO, MILWAUKEE & ST. PAUL.—*Loan Approved.*—The Interstate Commerce Commission on January 18 announced its approval of a loan to this company of \$25,000,000 for five years.

DAYTON, TOLEDO & CHICAGO.—*Claim for Guaranty Period Denied.*—The Interstate Commerce Commission has denied the claim of this company for a guaranty for the six-months guaranty period of 1920 on the ground that it is not subject to the guaranty provision provided in Section 209 of the Interstate Commerce Act.

DENVER & RIO GRANDE.—*Protective Committee.*—A protective committee has been formed for the 7 per cent cumulative adjustment mortgage bonds, due April 1, 1932, and for the holders of certificates of deposit of the New York Trust Company with respect to this issue. The committee consists of Richard Sutro, chairman of Sutro Bros. & Co., of New York; Thomas L. Robinson, vice-president of the American Exchange National Bank, and William Loeb, Jr., vice-president of the American Smelting and Refining Company. Samuel Untermyer is counsel and Harry Hoffman, of 120 Broadway, is secretary.

There are \$10,000,000 of the bonds outstanding, all of which are secured by a mortgage to the New York Trust Company as trustee. The company defaulted interest on the issue on October 1, 1921. The bondholders are asked by the committee to deposit their holdings not later than February 28.

GREAT NORTHERN.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a branch line from Northport to Rossland, Wash., 16.96 miles.

LEHIGH VALLEY.—*New Directors.*—Charles D. Norton and Edward S. Moore, both of New York, have been elected directors to succeed George F. Baker and William H. Moore. Mr. Baker, complying with a recent ruling of the Interstate Commerce Commission, chose to remain on the New York Central Board rather than that of the Lehigh Valley. William H. Moore resigned.

MIDLAND VALLEY.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$363,000

of first mortgage 5 per cent gold bonds to be sold at not less than 75 or to be pledged as collateral security for short term notes.

MISSOURI PACIFIC.—*Director Resigns.*—Cornelius Vanderbilt has resigned as a director in compliance with the order of the Interstate Commerce Commission, noted in last week's issue of the *Railway Age*, page 196, which stated that Mr. Vanderbilt might remain on the Board of either the Missouri Pacific or the Illinois Central, but not on both.

NEW YORK, CHICAGO & ST. LOUIS.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$1,008,000 series A and \$3,027,000 series B second and improvement mortgage 6 per cent gold bonds to be pledged as collateral security for a note to the director general of railroads and for short term notes.

NEW YORK, NEW HAVEN & HARTFORD.—*Proposed Modification of Dissolution Decree.*—See Boston & Maine.

SAN DIEGO & ARIZONA.—*Authorized to Assume Obligation.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$600,000 of equipment trust certificates guaranteed by the Southern Pacific.

SOUTHERN RAILWAY.—*Bond Offering.*—A syndicate headed by J. P. Morgan & Co., and including the First National Bank, the National City Company, Harris, Forbes & Co., the Guaranty Company and the Bankers Trust Company, is offering \$30,000,000 6½ per cent development and general mortgage bonds maturing April 1, 1936 at 94½ and interest, to yield over 6.90 per cent. The development and general mortgage dated April 18, 1906, provides for a rate of 4 per cent. It is proposed to enter into a supplemental indenture providing for the obligation to pay the additional interest to increase the rate to 6½ per cent. The proceeds are to be used in liquidation of existing obligations and in reimbursement of capital expenditures. This issue was authorized by the Interstate Commerce Commission on January 14.

TERMINAL RAILROAD OF ST. LOUIS.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$65,000 of general mortgage 4 per cent bonds in payment for certain real estate.

Additional Sales of Equipment Trust Certificates

The director general of railroads announced on January 12 that he had, with the consent of the President, confirmed additional sales, at par plus accrued interest, of railroad equipment trust certificates now held by the government, as follows:

To Salomon Brothers & Hutzler and Kidder Peabody & Co., of New York:	
Atlantic Coast Line, 1925-1928, inclusive.....	\$1,701,200
To Cassatt & Co., of Philadelphia:	
Monongahela Railway Company, 1928-1935, inclusive.....	263,200
To Kuhn, Loeb & Co., of New York:	
Pennsylvania Railroad Company, 1923.....	3,894,000
To Freeman & Co., of New York:	
Colorado & Southern Railway Company, 1923-1935, inclusive..	910,000
Total amount of these sales is.....	\$6,768,400

The sales were arranged by Eugene Meyer, Jr., managing director of the War Finance Corporation. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$147,391,400. The figures given in the last announcement, plus the sales given above, aggregate \$142,401,100, the difference being due to the advance payment of January 15, 1922, maturities by certain roads since the date of the last announcement.

Additional sales were announced on January 17 as follows:

To Poe & Davies, Baltimore, Indiana Harbor Belt, 1928 to 1935, inclusive.....	\$314,400
To Continental & Commercial Trust and Savings Bank, Chicago, Pennsylvania, 1927.....	3,894,000

This increases the total amount of equipment trust certificates sold to \$164,226,100.

Dividends Declared

Central of New Jersey—\$2, quarterly, payable February 1 to holders of record January 27.
 Huntington & Broad Top Mountain R. R. & Coal Co.—Preferred, \$0.50, payable February 15 to holders of record February 1.
 Mine Hill & Schuylkill Haven—\$1.25 payable February 1 to holders of record January 14.

Railway Officers

Executive

Will Hartwell Lyford, whose election as vice-president and general counsel of the Chicago & Eastern Illinois, with headquarters at Chicago, was announced in the *Railway Age* of



W. H. Lyford

January 7 (page 162), was born at Waterville, Me., on September 15, 1858. After being graduated from Colby College in 1879, he entered railroad service on July 15 of that year as an assistant engineer on the Chicago & Eastern Illinois. He worked in this capacity until 1881, at which time he was made stenographer to the general superintendent, holding that position until 1882, when he was promoted to chief clerk to the general manager at Chicago. From 1883 to 1884 he was claim agent with the same head-

quarters. After being admitted to the bar in 1884, he was promoted to assistant general solicitor, which position he held until 1888, when he was appointed attorney in charge of the law department. He was promoted to general counsel on March 15, 1892, and to vice-president and general counsel for the receivers in December, 1920, which position he was holding at the time of his recent election.

John W. Platten, whose election as chairman of the board of directors of the Chicago & Eastern Illinois, was announced in the *Railway Age* of January 7 (page 162), was born at



J. W. Platten

Port Perry, Ontario, and was educated in the public and high schools of that city. He began his business career in a bank at Toronto and came to the United States in 1888 to a position in the office of the assistant general passenger agent of the New York, Pennsylvania & Ohio (the Erie) at Cleveland, O. In 1889, he went to New York and entered the office of the second vice-president and general manager of the Erie. During the period of fifteen years which Mr. Platten served with the

Erie in New York, he was successively chief clerk in the insurance department, chief clerk in the operating department, assistant purchasing agent and, finally, treasurer. In 1903, he left the Erie to become assistant to the president of the Lehigh Valley, having charge of the financial, accounting and purchasing departments. In 1904, he was promoted to second vice-president of that company but left that position in 1905 to become vice-president of the United States Mortgage & Trust Company. In 1910 he succeeded to the presidency of this company which position he still holds. Mr.

Platten is also the chairman of the board of directors of the Gulf, Mobile & Northern and the Meridian & Memphis and is an officer and director of a number of companies. He has acted as chairman of various reorganization committees of several transportation companies.

Financial, Legal and Accounting

Robert S. Henry, whose appointment as associate counsel and director of public relations of the Nashville, Chattanooga & St. Louis, with head-



R. S. Henry

quarters at Nashville, Tenn., was announced in the *Railway Age* of December 10 (page 1178), was born at Clifton, Tenn., on October 20, 1889. He was graduated from the law school of Vanderbilt University in 1911. Mr. Henry entered railroad service on December 1, 1921, when his recent appointment became effective.

J. E. Taylor has been appointed general attorney of the Kansas, Oklahoma & Gulf, with headquarters at Muskogee, Okla. He will

have supervision over the legal and claim departments.

William King has been appointed freight claim agent of the New York, New Haven & Hartford with headquarters at Boston, Mass., succeeding **J. A. Beahan** who has been promoted to assistant general freight agent.

Operating

Henry Flanagan has been appointed trainmaster of the St. Paul division of the Northern Pacific, with headquarters at Minneapolis, Minn., succeeding **F. L. Birdsall**, transferred.

G. E. Dornblaser, assistant division superintendent of the St. Louis-San Francisco with headquarters at Sapulpa, Oklahoma, has been promoted to superintendent of terminals with headquarters at West Tulsa, Okla.

Traffic

R. P. DeCamp has been appointed assistant coal traffic manager of the Illinois Central, with headquarters at Chicago.

Alan McMichael has been appointed coal freight agent of the New York Central, Lines East, with headquarters at New York.

H. L. Carey has been appointed general freight agent and auditor of the Sabine & Neches Valley, with headquarters at Deweyville, Tex.

J. Noble Snider has been appointed coal traffic manager of the New York Central Lines East, with headquarters at New York, succeeding **G. N. Snider**, resigned.

R. C. Hicks has been appointed traffic manager of the Georgia & Florida with headquarters at Augusta, Ga., succeeding **J. A. Streyer**, resigned to engage in other business.

R. E. Buchanan, division freight agent of the St. Louis-San Francisco, with headquarters at Memphis, Tennessee, has been promoted to general agent, with the same headquarters as heretofore.

Arthur J. Chouinard, traffic manager of the Wabash, Ches-ter & Western, has resigned from the service of that company effective January 15, to take charge of the sales

organization work at Rockford, Illinois, for the Petroleum Motors Corporation.

Arthur B. Smith, general passenger agent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been appointed passenger traffic manager of the Northern Pacific, with headquarters at St. Paul, Minn., succeeding **A. M. Cleland**, who has retired after 31 years of service with that road.

C. W. Andrews, traveling freight agent of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to general agent, with headquarters at Indianapolis, Ind. **E. E. Morris**, chief rate clerk in the freight traffic department at Chicago, has been promoted to commercial agent, with headquarters at Paducah, Ky.

W. F. Knobloch, whose appointment as assistant general freight agent of the St. Louis Southwestern, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of December 10 (page 1178), was born at St. Louis, Mo., on March 31, 1888. He entered railroad service on May 15, 1905, as an office boy in the freight traffic department of the St. Louis Southwestern, since which time he has progressed through various promotions in that department to his present position.

C. J. Nelson, commercial agent of the Chicago, Burlington & Quincy, with headquarters at Paducah, Ky., has been promoted to general agent, with headquarters at Herrin, Ill. Mr. Nelson was born on a farm in Madison County, Iowa, on September 1, 1887. He entered railroad service in May, 1905, as a telegraph operator on the Chicago Great Western, which position he held until the following year when he left to become manager for the Western Union Telegraph Company at Fairfield, Iowa. He had worked at this position but a short time when he entered the service of the Chicago, Burlington & Quincy, as an operator, later becoming both operator and station agent at various points on the main line in Iowa, in which capacity he worked until May, 1912, when he was promoted to traveling freight agent, Iowa lines, with headquarters at Burlington, Iowa. During the war he was granted a leave of absence in order that he might serve with the Inland Traffic Service Bureau of the War Department. After having been two years engaged in this work he returned to the Burlington as commercial agent, with headquarters at Paducah, Ky., which position he was holding at the time of his recent promotion. His new duties give him jurisdiction over all matters pertaining to traffic in his territory with particular reference to coal traffic.

Mechanical

C. H. Norton has been appointed master mechanic of the Susquehanna and Tioga divisions of the Erie.

Wm. N. Nelson, mechanical engineer of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has been appointed mechanical engineer of the Kansas City Southern, with headquarters at Pittsburg, Kan., succeeding **E. P. O'Connor**, assigned to other duties.

C. T. Ripley, general mechanical inspector of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been promoted to the newly created office of chief mechanical engi-

neer, with the same headquarters. **H. H. Lanning**, assistant mechanical engineer, with headquarters at Topeka, Kan., has been promoted to mechanical engineer with the same headquarters.

Engineering, Maintenance of Way and Signaling

N. F. Brown, assistant to the chief engineer of the Pennsylvania, has resigned to become vice-president of the Dravo Contracting Company, Pittsburg, Pa.

George T. Anderson, roadmaster of the Kansas City Southern, with headquarters at Spiro, Okla., has been promoted to the newly created position of general roadmaster, with headquarters at Texarkana, Tex., his jurisdiction extending over the engineering and roadway departments. The position of division engineer at Texarkana, Tex., has been abolished. Mr. Anderson has also been appointed general roadmaster of the Texarkana & Fort Smith, a subsidiary line, and the position of chief engineer of that road has been abolished.

Arthur Nelson Reece, whose appointment as chief engineer of the Kansas City Southern, the Poteau Valley and the Arkansas Western, and consulting engineer of the Texarkana & Fort Smith, with headquarters at Kansas City, Mo., was announced in the *Railway Age* of January 14 (page 210), entered railroad service in June, 1903, after having studied civil engineering at the University of Kansas for three years. He was successively chairman, rodman, draftsman and instrumentman on the Atchison, Topeka & Santa Fe from June, 1903, to April, 1905. From the latter date until March, 1911, he was instrumentman, inspector on building construction, assistant engineer and chief clerk to the general superintendent of the St. Louis-San Francisco. He entered the service of the Kansas City Southern in March, 1911, as assistant engineer. He left in November, 1912, to become chief engineer of the Hanna & Hickey Construction Co., Fort Worth, Tex., re-entering the service of the Kansas City Southern in November, 1913, as office engineer, with headquarters at Kansas City. He was later promoted to division engineer with headquarters at Texarkana, Tex., which position he was holding at the time of his recent promotion.

C. B. Brown, Jr., who has been appointed engineering assistant to the vice-president of the Canadian National, was born on August 27, 1879, at Ithaca, N. Y. He was educated at Cornell University, from which institution he was graduated in 1901 with a degree in civil engineering. He began his railroad career at once as a draughtsman and rodman for the Canadian Pacific at Trail, B. C. The following year he became assistant engineer in the bridge department. He was next, until 1904, resident engineer on the Ontario division. In 1906 he was promoted to division engineer at St. John, N. B. In 1908 he was transferred in a similar capacity to Montreal. Four years later he became principal assistant engineer, Eastern lines, with headquarters at Montreal and the following year was appointed chief engineer of the Canadian Government Railways with headquarters at Moncton, N. B. In 1917 he was appointed assistant general manager, Eastern lines, in addition to his duties as chief engineer, relinquishing the latter title in 1918. The Canadian Government Railways had now become the Eastern lines of the larger Canadian National system and Mr. Brown remained as chief engineer of these Eastern lines until his appointment as engineering assistant to the vice-president of the entire Canadian National system.

Obituary

James H. Glynn, general agent of the Southern Pacific, with headquarters at Boston, Mass., died at his home in Dorchester, Mass., on December 31.

George T. Boggs, who was vice-president, assistant secretary and assistant treasurer of the Chicago, Rock Island & Pacific in 1911, when he retired, died in New York on January 16 as the result of an operation.



C. J. Nelson

EDITORIAL

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At a recent meeting of the Institution of Locomotive Engineers (England), H. N. Gresley of the Great Northern

Alloy Steels for Locomotives

Railway of England, pointed out the advantages of the chrome nickel steel used for the side rods and valve gear parts of locomotives which he recently designed. The advantages of this material apply particularly to locomotive main rods. These rods are subject to buckling either in a vertical or lateral direction, but by using the alloy steel the weight of the rod can be reduced without impairing its strength. The rod is also subjected to stress due to its own inertia when the engine is running at high speed. The inertia sets up alternately reversed stresses in the top and bottom flanges of the rod and if the steel can be made stronger it has a further advantage, as the lightening of the rod reduces these stresses. The use of alloy steel is advantageous under conditions existing in Great Britain. It is almost compulsory on American locomotives if satisfactory results as regards counterbalancing and track stresses are to be secured. Railroads that want to get the best in modern motive power should not fail to consider alloy steels when preparing locomotive specifications.

Glenn E. Plumb, in a recent open letter to President Markham of the Illinois Central, has afforded another fine example of the misrepresentation of the railways which prevails in the labor union propaganda against private management. He charges that the railways are violating the law by giving rebates to favored shippers. He alleges as evidence in support of his charge that payments for loss and damage of freight increased from \$22,000,000 in 1910 to \$122,000,000 in 1920. No more preposterous misrepresentation or one worse adapted to serve as evidence in support of his charge could have been made. In 1913 the loss and damage claims paid amounted to \$22,738,893. In 1917, the last year before the government operation, they had increased to \$34,079,757. In 1919, the second year of government operation, they were \$104,507,174. Plumb frankly says that his entire attack is upon private ownership and management, but these figures show an increase of over 200 per cent in two years in loss and damage claims paid under government management. Of course, he ignores this increase under government management entirely. He has only interpretation of the facts which would show that more than three times as much rebates were paid in the form of loss and damage claims under government operation than two years before under private operation. Instead, therefore, of citing the figures for 1919 he cites those of 1920, and exaggerates them. The total freight loss and damage payments in 1920 were \$120,939,903. But these figures do not indicate an increase of rebating under either government or private operation. There was during these years an increase in the total freight handled. There was a very large increase in the prices of commodities. If there had been no increase whatever in the amount of freight lost and damaged there would necessarily have been an increase in payments for loss and damage due merely to

the increase in the value of the freight lost and damaged. Plumb's efforts to prove an increase in rebating by the increase in payments for loss and damage of freight helps to show what the *Railway Age* repeatedly has charged, namely, that there is almost no form of misrepresentation or falsification to which the advocates of the Plumb plan will not resort in their efforts to discredit private management of railways.

As a result of the conferences between officers of the four train service brotherhoods and railway executives in Washington, held under the sponsorship of Secretary Hoover, the Association of Railway Executives has announced that conference committees will be formed in the Eastern, Southern and Western territories to meet with representatives of the brotherhoods "in a fair effort to compose and adjust all points at issue." These conferences which the Association of Railway Executives has gone on record as favoring should not be confused with the regional boards of adjustment, upon which the association took no action as a whole. These regional boards were set up by only those carriers which approved of them. The regional boards are restricted to the consideration of individual grievances. The territorial conferences will not take up such matters, but will deal with general disputes such as wages and working conditions. In the case of the conferences, however, as with the regional boards, no road need become a party unless it so desires. Both of these movements, that for the regional boards and that for the territorial conferences, are in the nature of experiments, but both have the laudable purpose of settling points of difference without taking them before the Labor Board. There is a distinction between the nature and purposes of the two, however, which should not be overlooked.

During the past few years many important developments and practical applications have been made in the field of wireless telegraphy and telephony. Therefore, it is of interest to note that the Nashville, Chattanooga & St. Louis has recently installed wireless stations at Tullahoma, Tenn., and Guntersville, Ala., and is now awaiting a government license before inaugurating regular day and night message service. These two stations were selected for the first installation on the N. C. & St. L. on account of the difficulty of building land line communications because of the waterways, it being estimated that a pole line between the two points would cost \$25,000 as compared with \$2,000 for radio equipment. It is now proposed to follow this installation by others between the general office in Nashville, Tenn., and the various division headquarters. Almost all railroads have been inconvenienced because of important inter-office circuits being out of service when pole lines were torn down by wind, sleet or floods. The increased mileage of a circuit adds to the chances for trouble, whereas the limits of wireless apparatus depend primarily on the power of the sending equipment.

Territorial Conference Committees

Wireless Railroad Communication

There are, therefore, numerous conditions on the railroads under which wireless communication might well produce economies and supply more reliable service. For this reason it would seem advisable that the railroads should keep informed as to the progress in wireless communication on the N. C. & S. L.

With its eighteenth annual meeting completed, as recorded elsewhere in this issue, the American Wood-Preservers' Association is well along in the second decade of its career. The paper by A. F. Robinson recording the results secured by the Atchison, Topeka & Santa Fe System, after more than 20 years' experience in the construction of creosoted trestles with ballasted decks, also serves to show how well established is the treatment of timber. There is ample evidence that money thus expended has paid satisfactory returns in decreased annual cost of the structures protected. However, as in the case of cross ties, there is an utter lack of uniformity in the application of these methods by the railroads throughout the country. Preservative processes as applied particularly to bridges, have had their greatest application in the south where climatic conditions are unusually favorable for decay and where timber may begin to rot before it can be hauled out of the woods. In such an environment the introduction of timber treatment is particularly favorable—the beneficial results are especially tangible. The fact that conditions in the northern states are not so conducive to decay serves to explain, but does not necessarily justify, the failure of many of the northern roads to avail themselves of the advantages that would accrue from applying creosote or other preservative processes to their wooden structures. Yet, it is a fact that a great many of the roads have made little or no use of these treatments. On some roads a consistent policy toward progressive elimination of all timber bridges makes the subject of less importance. On others, an extreme restriction of funds precludes the use of anything but the very cheapest of structures. But in spite of the variation in conditions, there would appear to be an unwarranted disparity of practice and until this has been overcome the railroads cannot be said to have derived the full benefit to be gained from the work of such technical organizations as the American Wood-Preservers' Association.

Progress in Timber Treatment

experience in the construction of creosoted trestles with ballasted decks, also serves to show how well established is the treatment of timber. There is ample evidence that money thus expended has paid satisfactory returns in decreased annual cost of the structures protected. However, as in the case of cross ties, there is an utter lack of uniformity in the application of these methods by the railroads throughout the country. Preservative processes as applied particularly to bridges, have had their greatest application in the south where climatic conditions are unusually favorable for decay and where timber may begin to rot before it can be hauled out of the woods. In such an environment the introduction of timber treatment is particularly favorable—the beneficial results are especially tangible. The fact that conditions in the northern states are not so conducive to decay serves to explain, but does not necessarily justify, the failure of many of the northern roads to avail themselves of the advantages that would accrue from applying creosote or other preservative processes to their wooden structures. Yet, it is a fact that a great many of the roads have made little or no use of these treatments. On some roads a consistent policy toward progressive elimination of all timber bridges makes the subject of less importance. On others, an extreme restriction of funds precludes the use of anything but the very cheapest of structures. But in spite of the variation in conditions, there would appear to be an unwarranted disparity of practice and until this has been overcome the railroads cannot be said to have derived the full benefit to be gained from the work of such technical organizations as the American Wood-Preservers' Association.

Railways and Train Service Employees

IN ACCORDANCE with a resolution adopted by the Association of Railway Executives on October 14 the various railroads have been holding conferences with all their employees preliminary to hearings before the Railroad Labor Board on the question of a further general reduction of wages. Secretary Hoover has started a movement which makes it possible that the question of reduction of the wages of employees engaged in the operation of trains will be settled without hearings by the Labor Board.

Secretary Hoover, acting evidently with the backing of the Harding administration, brought about informal conferences between the heads of the four principal train service brotherhoods and a number of railway executives. The result on the railways' side was a meeting of the Association of Railway Executives in Chicago on January 21 at which an important resolution was adopted. This provides that conference committees representing the railways in the eastern, southeastern and western territories, respectively, shall be constituted and authorized to meet with the four train and engine service brotherhoods "in a fair effort to compose and adjust all points now at issue, no restrictions to be imposed upon the

consideration of any and all questions of wages and rules governing working conditions." The resolution expressly states that any individual railroads that prefer to do so shall carry on negotiations with their own employees rather than participate in the territorial negotiations. If agreements are not reached the differences left unsettled must, of course, be brought before the Labor Board.

One may or may not believe that these direct negotiations between groups of railroads in the various territories and the train service brotherhoods are likely to result in satisfactory settlements. It is merely summarizing recent history to say it has been a very long time since direct negotiations between the train service brotherhoods and the railways resulted in anything except disagreements which were followed by threats of strikes and finally by arbitration of one kind or another, or by legislation such as the Adamson Act. On the other hand, it is clearly desirable that amicable settlements of questions affecting wages and working conditions shall be attained by direct negotiations if possible. Furthermore, their attainment in this way, if possible, is in strict accordance with the spirit and the specific provisions of the Transportation Act. No proceeding involving wages or working conditions can legally be brought before the Labor Board until the matters in controversy have been made the subject of direct negotiations and have resulted in a disagreement.

From the standpoint of both the railways and the train service employees an amicable settlement of all their differences regarding wages and working conditions would be most desirable. The train service employees, as the *Railway Age* repeatedly has pointed out, are almost the only employees who are peculiarly railroad men, and the only ones a strike by whom would immediately result in an interruption of transportation. Therefore, these employees are peculiarly charged with a duty to the public, and at the same time it is of peculiar importance to the public to prevent strikes by them. It should be easier at present for the railways to effect an amicable settlement with them than with almost any other class of employee. As the *Railway Age* said in an editorial in its issue of October 29, 1921, in discussing how railway wages should be readjusted, "full consideration should be given to the fact that the advances in wages which have been received by the employees in train service have been relatively less than the advances which have been given to many other classes of employees." The very fact that this has been true necessarily dictates that the railways should ask relatively smaller reductions in the wages of these employees than in those of most other classes. Since the railways are bound to ask them to give up relatively less than other employees it should be easier to get the train service employees voluntarily to give up whatever they reasonably should.

There is an almost universal demand for reductions of freight rates. The railways have promised to try to secure further reductions of wages and to give the public the full benefit of them in reductions of rates. The railways and the leaders of the train service brotherhoods, in entering the negotiations, must both of them recognize this public sentiment regarding rates and bear in mind the promise the railways have made to the public relative to reductions of wages and reductions of rates. While the train service employees cannot reasonably be asked to accept as large reductions of their compensation as most other classes of employees, the negotiations would be rendered futile, if the labor leaders should enter them with a determination to make no concessions which would cost the employees anything, or effect any real reduction in railway expenses. There are involved not only the questions of wages but those of punitive rules and of time and one-half for overtime in freight service. The present wages of at least two classes of train service employees, firemen and brakemen, are too high compared with those of engineers and conductors and compared with

the present cost of living. Time and one-half for overtime in freight service is economically unsound. No settlement which the railways themselves can defend before the bar of public opinion can be reached unless both sides enter the negotiations with a disposition to be fair and to consider the public interest as well as their own.

Can Railways Earn a Fair Return?

WE PUBLISH elsewhere in this issue an article by the distinguished railway economist, Sir William Acworth, discussing the question "Can the Railways Earn a Fair Return"? The conclusion he apparently reaches is somewhat startling. Surveying conditions throughout the world, he seemingly decides that under these conditions railways cannot in most countries charge, or will not be permitted by the public to charge, rates sufficient to make them self-sustaining. Whether under government or private operation, they are in practically all countries failing to earn a net return sufficient to pay interest on the investment in them. He seemingly believes this will continue to be the case and that the deficits, if paid at all, must be paid from public taxation.

Everybody who is informed regarding world railway conditions knows that, as stated by Sir William Acworth, almost without exception railways owned and operated by governments are incurring huge deficits. These deficits are, and of course must be, paid from taxes. Most privately owned and operated railways also have been incurring recently the equivalent of deficits, since they have been failing to earn sufficient net returns to pay even the interest rates that prevailed before the war upon their total investment. The total fixed charges of the Class I railways of the United States, including interest and rentals of leased property, are now about \$640,000,000 a year. Their net dividends in 1920 were \$271,500,000. This added to the fixed charges makes a total of \$911,500,000. Their net operating income in 1921 is estimated at \$616,000,000, or almost \$300,000,000 less than their present fixed charges and their dividends of last year. The loss incurred under private ownership and operation falls, where there are no government guarantees, as is now the case in the United States, upon private investors.

The important question is whether the losses from railway operation being incurred under both government and private management are to be perpetuated or are temporary; and if they are to be perpetuated whether they are unavoidable or due to governmental policy. Sir William Acworth makes some statements from which the conclusion might be drawn that he thinks they are unavoidable in many countries, and will continue to be incurred because traffic cannot bear rates high enough to pay all railway expenses and an adequate return upon railway investment. He clearly recognizes the fact, however, that in the long run if railway service is to be continued, whether under government or private ownership, all the expenses and an adequate return upon the investment must be paid. Hence his apparent conclusion that in future in most or all countries the cost of railway service must be partly paid from taxes.

The growth of railways throughout the world during the last century has been due to the fact that they have been able to carry goods and passengers by land cheaper in proportion to the quality of the service rendered than any other agency. Has this ceased to be true? There is no evidence to support the view that it has. Motor vehicles operating over highways provided by public taxation recently have become active competitors of the railways for longer and longer hauls. If, however, the total cost of motor transportation, including interest on the investment in and the expense of

maintaining the highways, were made the basis for the rates charged for motor transportation it never could compete with railway transportation except for very short distances. Insofar as motor transportation has succeeded in competing with railway transportation in this country for considerable distances, it has been due to the policy of the governments of virtually subsidizing it by allowing commercial vehicles to use highways built by the public without making any adequate charge for their use of the highways.

Whatever may be true in England where the railways have to meet water as well as motor competition on almost every hand, it is demonstrable that, in the United States, it is wholly unnecessary, except temporarily, to operate the railways at a loss and then pay the deficit in taxes. The traffic handled by our Class I railways in the year ended September 30, 1921, was almost the same as in the year ended June 30, 1916. In these five years the total earnings increased about 75 per cent. This indicates how large were the total advances in rates meantime. The much lower rates charged in 1916 yielded the railway companies a net return of \$985,000,000, or 5.9 per cent. The traffic had no difficulty whatever in standing rates at that time which yielded that much net return. The increase in traffic that year was the largest ever known. In the year ended September 30, 1921, the net return earned was only \$542,400,000, or 2.75 per cent on the property investment, and yet in that year there was an enormous decline of traffic and loud outcries that the rates were higher than the traffic could bear. The net return in 1916 was one-third of the total earnings. If it had been as large in 1921 as it was in 1916 it would have been only one-sixth of the total earnings, and being what it actually was it was only one-tenth of them.

It is clearly evident that if in 1921 the rates had been as much higher than they were, as would have been necessary to have given the companies a net return twice as large as they received the difference in the rates would have had practically no effect upon the amount of traffic moved. The main things that made necessary the advances in rates were an increase between 1916 and 1921 of \$2,200,000,000, or 127 per cent, in operating expenses, and an increase from \$146,000,000 to \$286,000,000, or 94 per cent, in railway taxes. The real question seems to be not whether the traffic can stand rates that will yield a fair return, but whether it can stand rates high enough to pay such enormous increases in expenses and taxes. In this connection, it will be noted that the taxes paid by the railways of the United States from their earnings in 1921 were almost exactly equal to the amount by which they failed to earn their fixed charges and dividends equal to those of 1920. If they must be subsidized, why not do it by the simple process of exempting them from taxation instead of first collecting taxes from them, and then paying part or all of their deficits from the taxes collected?

There is no serious difficulty in the United States in the way of fixing railway rates which the traffic can easily bear and which at the same time will yield an adequate net return to the companies, except a system of government regulation which is predicated mainly upon an entirely false economic principle. As a result of enormous exaggeration of the extent to which the amount of the rates charged is determined by the efforts of the companies to make profits our whole system of regulation is predicated mainly upon the principle that the way to secure reasonable rates is narrowly to limit the net returns earned. The inevitable tendency of the extreme application of this theory is to increase rather than to reduce the rates the railways must be allowed to charge. All the large economies in operation have been obtained through investments of capital in improvements of plant having the sole and specific purpose of reducing expenses. The policy of regulation followed for fifteen years has steadily reduced the amount of new capital invested in

economy-producing improvements and has therefore directly tended to maintain and increase operating expenses, thus putting upon those who pay transportation rates a much heavier burden that would have been put upon them if reasonable net returns had been allowed to be earned.

Perhaps Sir William Acworth, for whose opinions we have great respect, would answer that it makes no real difference, if the net return is adequate, whether it is derived from freight rates or taxes. But no responsible American railroad management would ever, so long as the railways are privately owned and operated, rely upon government appropriations to make up railway deficits. Very recent experience with government guarantees is all the experience of that kind that the railways of this country ever want. Government ownership and operation would be far preferable in this country to a policy of regulation and management under which the rates were deliberately and for a long period so fixed that they would not yield the companies a reasonable net return. Under the former policy the government would have to pay the deficits and there might be adequate development of railways. Under private management nothing could be surer than that unless the companies are allowed to get adequate net returns out of their rates and earnings they will never get them at all, and that there will not be adequate development of the railways.

How Freight Shipments Increased and Decreased

COMPLETE STATISTICS regarding freight car loadings in 1921 are very interesting because they show just what increases and decreases occurred in the shipments of the various classes of commodities during the year. Many people will be surprised by a reference to "increases" in shipments. Most people think that shipments of all kinds declined. This, however, is not true. The total freight business of the railways declined more than in any other year in history, but this decline in total business was accompanied by some remarkable increases in the movement of certain classes of commodities.

Relatively the greatest decline of shipments was in ore shipments, which decreased from 2,413,893 carloads in 1920 to 904,513 in 1921, or 63 per cent. This largely accounts for the extent to which the earnings of some roads handling a large amount of this business, such as the Great Northern and the Chicago & North Western, have suffered.

The decline of coal business had the greatest absolute effect upon the total traffic moved. The coal business fell from 10,082,450 carloads in 1920 to 7,934,048 carloads in 1921, or over 21 per cent. The decline in the coal business accounts for more than one-third of the total reduction in carloadings.

The number of carloads of forest products shipped declined from 3,056,923 in 1920 to 2,483,079 in 1921, or 18.7 per cent. Shipments of miscellaneous commodities declined from 16,503,179 carloads to 12,957,857, or 21½ per cent. The decline in shipments of livestock was small—¾ per cent.

There were two remarkable increases in shipments. The first was in grain and grain products, the shipments of which in 1921 amounted to 2,281,852 carloads as compared with 1,843,018 in 1920, an increase of 24 per cent. In absolute amount the increase in less than carload merchandise shipments was the largest. In 1920 they amounted to 9,017,074 carloads, while in 1921 they amounted to 10,677,226, an increase of 18.4 per cent. This very large increase in less than carload shipments unquestionably was due to the fact that many concerns which in 1920, when business was good, shipped in carload quantities, found it convenient in 1921, when business was poor, to ship in less than carload lots.

The foregoing statistics not only show clearly the classes of commodities in which the largest decreases of shipments took place, but also plainly suggest a conclusion as to why they took place. The increases occurred in the shipments of grain and grain products, all of which are food-stuffs, and in merchandise, which consists very largely of commodities daily used and consumed in ordinary living. On the other hand, the greatest declines in shipments which occurred were in the cases of basic commodities—coal, lumber, ore, etc.—and undoubtedly were due to the general stoppage of the enlargement of the physical plant of industry and the general depression in the manufacture of things largely used in the development of this physical plant. There are persons who attribute the decline in freight movement largely to the advances in rates. They will find it difficult to get any support for this view in the figures showing the actual increases and decreases in the amount of the various commodities shipped.

New Books

Railway Signaling. By E. E. King, professor of railway civil engineering, University of Illinois, Urbana, Ill. 371 pages. 349 illustrations and 13 plates. 6 in. by 9 in. Bound in cloth. Published by the McGraw-Hill Book Co., New York.

This is a work which will be widely welcomed. It gathers into one book a great variety of facts concerning signaling, and especially signal apparatus, which hitherto have been accessible only in scattered places—the Signal Dictionary, the files of the *Railway Signal Engineer* and the catalogs of the signal manufacturers. The author has done his work with careful fidelity. It is a systematic treatise; but to many readers a large part of the material will be rather unattractive because it is too much like a text-book—facts packed together in such solid fashion that considerable study or reflection will be required to get at the whole meaning. A comprehensive book on signaling has been waited for by many persons—railroad men and others—who have not the time or ambition to do much studying.

This book is, frankly, made up largely from material supplied by the signal manufacturers; and the records of the Signal Section of the American Railway Association have also been drawn upon. Some of this material is quoted without any clear explanation of whether the Association is responsible, or it is only an expression of a committee.

The book consists of 16 chapters and three appendices. It opens with a brief outline of the development of signaling. It is primarily devoted to the description and uses of the different classes of apparatus employed in block and interlocking signaling, but does not enter into engineering features to any extent. For example, under the head of track circuit, no mention is made of the effect of rail and ballast resistance on efficient track operation. No mention is made of the development of the welded rail bond in steam railroad practice. In some cases too much space has been devoted to apparatus which, while still in use, is fast becoming obsolete.

A chapter might well have been devoted to later developments, such as remote control of outlying switches. Automatic train control receives only a single paragraph.

As already intimated, this book "fills a long felt want"; but this want is felt largely by a class of readers who, when they get hold of the book, will swallow it whole. This is the reason for mentioning these criticisms. To the practical signal man, these and other faults will not appear very large. He will in most cases note them and soon lose sight of them, because of their relative unimportance as compared with the great mass of useful information to be found in the book.

The language is simple and non-technical and the hundreds of illustrations appear to have been selected, from the thousands available, with excellent judgment.

Can the Railroads Earn a Fair Return?

If Rates Will Not Yield a Reasonable Revenue, the Balance
Should Be Made Up by Taxation

By Sir William M. Acworth

LONDON, England.

THE GREAT WAR has changed everything, not only objective conditions but mental attitudes. For one thing, it has brought into prominence a fundamental difference, which even students of transport questions have not hitherto appreciated, between ordinary commercial undertakings and public utility companies. There can be few trading or manufacturing companies which have not at some period, either during or since the war, made exceptionally large profits. Even the shipping trades, which from many points of view are analogous to railroads, had several years of unprecedented prosperity.

On the other hand, railroads and street railways, and—in England at least, for I cannot speak from personal knowledge of other countries—gas and electric supply companies have a record of continuous adversity. The bulk of the railroads on the Continent of Europe are at the present moment not earning their operating charges. Even in England and in the United States, where things are somewhat better, their condition is precarious. Experience has shown that public utilities cannot adjust their charges to their expenses in times of emergency. Further, it has become not unreasonable to question whether the pre-war situation, when it was taken for granted that railroad corporations as a whole could and would earn at least a living wage, has not passed away forever.

Present Scale of Rates Excessive

Your Congress at Washington and our Parliament at Westminster have passed laws very much to the same effect. Congress has enacted that the Interstate Commerce Commission shall fix such rates as will with efficient and economical management produce a net return of $5\frac{1}{2}$ per cent or 6 per cent on the value of railroad property devoted to public service. Here in England, where there has never been any question of "water," and where before the war gross and net revenues hardly varied from year to year, the law says that railway rates shall be so fixed as to produce the pre-war net income, which is to be regarded as the new standard net revenue. But the rates that have been fixed so far have completely failed in both countries to provide the required result; and it is already evident that, if the existing rates have failed to produce it, it will not be produced by raising these rates still higher. And this for two reasons. Not only will public pressure prevent rates being still further raised, but railway men themselves in both countries admit that the present scale is excessive, that it is in some cases at least throttling trade; and that increased net revenue is more likely to be obtained by judicious reductions than by further increases.

At this point the difference between the situation in the two countries should be noted. Speaking broadly, our railway system is complete. With the exception of urban and suburban passenger lines, of which there will be more to say presently, we are not likely to build new railways, nor to need to purchase additional equipment. The result of the great amalgamations now to take place is indeed likely to be that we shall find too many miles of track and too many locomotives and cars, rather than too few. Electrification is the only direction in which, with us, much capital expenditure seems likely to be required. Such comparatively small sums as may be needed can in case of necessity be found by issuing

prior charge stocks; for with us the debenture debt is at present less than 30 per cent of the total capital.

The United States is in a very different position. Much new capital expenditure is imperative at this moment, and will be required annually for many years to come. It is obvious that from their own resources the railroads cannot raise it, unless they have a prospect of a reasonable commercial return, which no one is likely to put at a lower figure than $5\frac{1}{2}$ per cent.

But apart from this difference, which is not fundamental, the situation in the two countries is substantially the same. The public have at least learned one lesson from the war, that railroads are essential, that they must be adequate for the service that they are called on to render, and that, if they are inadequate, the public suffers. We seem then to have reached this conclusion, that railway revenues are inadequate; that somehow they must be made adequate; but that this cannot be done by further increasing railway charges. And this brings us up against a reconsideration of first principles.

Should Railways Pay Their Own Way?

In England and in America we have hitherto taken it for granted that railroad corporations, like any other enterprise, must pay their own way; and very broadly, taking the rough with the smooth, they have done so, for there have been no subsidies to railway enterprise in Great Britain, and your land grants and state and municipal subscriptions to bonds are a flea-bite to the mass of private money invested in the United States railways. In the nature of things there was no reason why this should be so. Taking the world over, railways have not been expected to be self-supporting, at least in their development period. In almost every country in the world—Canada is a sufficiently conspicuous instance—public money has been spent to provide railroads, or public guarantees have been given on capital privately provided. And why not?

The provision of roads is universally accepted as a natural function of government. Normally the road, built wholly at public expense, is thrown open to free use by the community at large. For the use of particular roads tolls are sometimes charged, while in other cases license duties are levied on vehicles which use the road. But in no case do tolls and license duties cover anything like the total cost. Here in England, for instance, we have new and greatly increased taxation of motor vehicles. The taxes bring in £10,000,000 per annum. The cost of road maintenance is over £50,000,000. Does a road cease to be a road when it becomes a railroad; when its capacity for public service is increased ten-fold by laying steel rails on the top of it? And if not, why should the universal principle that the roads are provided for public use at public cost fail to apply?

I have been discussing the matter so far as one of principle. The working out of the principle in practice is another matter. For my own part, I see no great difficulty. We start from the point that Congress and Parliament have fixed the return which it is reasonable that the private investor should receive in both countries. There are expert tribunals whose business it is to fix such scales of rates as it is reasonable that the customer should pay. And no better definition of reasonableness can be found than the much-

abused phrase, "what the traffic can bear," remembering that this means, not the last ounce which can be squeezed out of the customer, but such a rate as will not check the growth of trade, the development of new industries, and the opening up of new districts. If rates and fares, reasonable when tried by this standard, will not yield such a revenue as will provide a reasonable return, not only on existing capital but new capital as it requires to be employed, then the balance, whatever it is, falls to be made up from general taxation.

Suggests a Subsidy

I fully expect that a suggestion of this kind will meet with serious opposition from railway men themselves. They will argue that, if public subsidy is given, greater public control will be enforced in return. I do not think the argument is sound. The theory both of the English and the American legislation is that the rate-fixing tribunal shall be satisfied that, as a condition of being permitted to earn the standard net revenue, the railway management shall be efficient and economical. And the inspection necessary to satisfy the tribunal that the management is in fact efficient and economical is precisely the same whether the desired revenue is postulated to be 5½ per cent, or 4 per cent, or 3 per cent, or any other figure.

Before passing from this point, however, a query may perhaps be interposed as to how the criterion of efficiency and economy is to be applied in practice. The standard revenue is in the United States to be fixed either for the whole country or for a great territorial group as the commission may decide. So far they have decided to fix it by groups. What is to happen, if in any given group the commission is satisfied that the management of ten companies is efficient and economical, while the eleventh falls short? Is there to be a *pro rata* reduction of the permitted revenue of the whole group? This would seem a hardship upon the ten just managements which need no repentance.

The alternative, to forbid the ill-managed company to charge the same rates as its neighbor, is clearly impossible. For the limitation of the charges of the ill-managed company is in effect the limitation of the practical maxima of the well-managed ones so far as they are in competition. Even at points where they are not in competition, it seems to be impossible for any company to have different scales and rates in different parts of its territory, for this would be to penalize that portion where the ill-managed company does not compete.

In Great Britain, where the railways are to be grouped in four districts, mainly non-competitive, the theoretical difficulty is not so great. It will be possible in theory to have a higher scale of rates, at least for local and retail traffic, in one district of the country than in another. But in the long run this will be impossible for bulk traffic, for which railway rates are a serious item in production cost. Serious difficulties in pressure of railway rates must tell on the competitive industrial strength of the various districts, and may even in certain cases enforce the transference of great industries from one district to another, and so defeat the very object sought to be attained by the imposition of higher rates.

Metropolitan Rapid Transit

I have spoken hitherto of railways as a whole and have suggested what seems to me to be a tendency of the future, rather than proposed a measure which can be considered to be within the range of practical politics at the present moment. But when we consider, not main line railways, but the rapid transit undertakings of the great cities, the question is one of practical urgency. The population of Greater London and Greater New York continues to increase. Not only is it necessary to provide new accommodation for the increasing population, but it is an accepted rule that the greater the population the greater number of rides per head. Now it is

clear that on the present scale of fares no one can afford to build a new rapid transit line as a commercial proposition. It is equally clear, at least in London, that existing fares cannot be raised further: passengers disappear and the expected increase of revenue does not materialize.

On the other hand, it is essential in the interest of public health that the population shall be dispersed and the crowding at the centre lessened. And this can only be effected by rapid transit railways. If then rapid transit lines must be built, that portion of the cost which is not met by the fares paid will have to be provided from public taxation.

There is another point which perhaps applies more to London than to New York. Underground or overhead railways undoubtedly relieve street congestion. If the underground or overhead railways are not made, or if, owing to prohibitive rates they are not fully used, street congestion increases till street widenings become imperative. And these are most required precisely where land is most valuable, and therefore the cost highest. Now the entire cost of street widening is borne as a matter of course by local taxation. A given sum spent on a new railway, which can move many hundreds of passengers at a time, in trains succeeding each other at 90 seconds' interval, will do far more to relieve congested traffic than any conceivable street widening. In other words, a new underground street is not only more efficient, but more economical than a surface street; and further, whereas the community bears the entire cost of the provision of the surface street, to the cost of the sub-street it is only asked to contribute.

From every point of view, then, it seems reasonable to accept the general principle that urban rapid transit must be provided at the joint cost of the community and the actual users and for their joint benefit. And further, it would seem that, under the new conditions that have arisen, the old idea must be abandoned, according to which not only in New York but also in Paris the municipality has sought to obtain from the passenger fares—sometimes successfully, sometimes not—the full interest on the bonds which it has issued to meet construction cost.

Assuming the acceptance of the theory that it is right that new railroads should be provided in part out of the proceeds of taxation, there is clearly a distinction to be drawn between main lines and urban railroads. Main line subsidies must apparently be made out of national taxation. Not so in the case of cities. A city has a distinct common life and fixed boundaries, and the land within these boundaries is a definite area. Assuming that the urban railways are fairly distributed over the area, the whole of the land within the area is enhanced in value: Wall Street, because a larger population is brought to it from the outskirts, just as much as the Bronx, because the land there is made accessible for the residence of those who have business in Wall Street. It would seem to be not only equitable but reasonably practicable to impose a special land tax to meet some portion at least of the cost of construction of new urban railways.

A BILL TO COMPEL railroads to use steel passenger cars under certain conditions was introduced in the Senate on January 18 by Senator Harris of Georgia.

TRADES UNIONISM and the refusal of employees to do an honest day's work for an honest day's pay, constitute the most perplexing problem before the managers of the railways of Canada, according to Hon. F. B. Carvell, chairman of the Canadian Railway Commission, as recently quoted in the *Quebec Chronicle*. Examining the records of the inspection of an electric warning at a crossing of the Grand Trunk at Lachine he found that as high as 25 hours a month was spent in the inspection of this bell and its wiring. "The railways are in the hands of these labor unions," said Mr. Carvell. The railway, he thought, was spending more for the operation of the bell than it was worth.

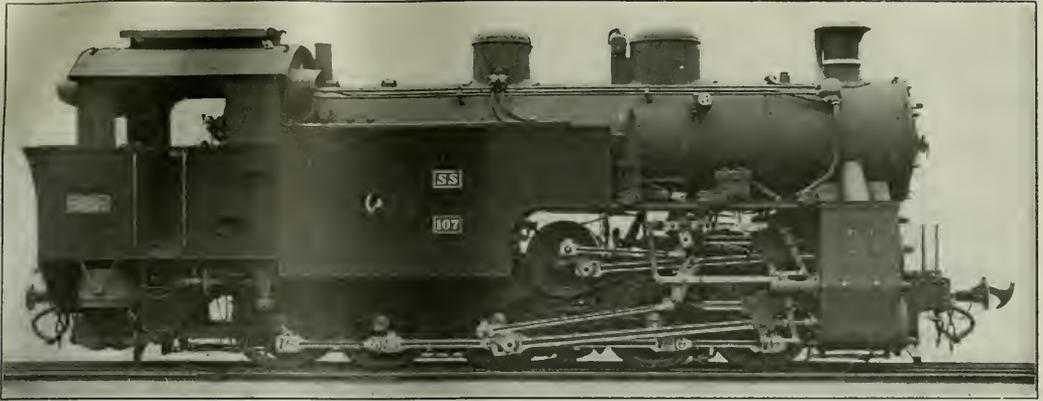


Fig. 1.—Adhesion and Rack Locomotive of 0-10-2 Type

Adhesion and Rack Locomotive for Sumatra

Interesting Design of 0-10-0 Type Superheater Four-Cylinder Compound Locomotive for Dutch State Railways

By S. Abt

THE DUTCH STATE Railways on the west coast of Sumatra operate about 152 miles of line of 3 ft. 6 in. gage with about 70 locomotives. From Padang, the terminal of this line, to Fort de Kock and to the coal fields of Ombilia there are some very heavy grades. Portions of this line are provided with a rack bar of the Rigenbach type. The



Fig. 2.—Train of 360 Tons on a Heavy Grade with Two 0-8-2 Type Locomotives

grades on the adhesion track vary from 0.6 per cent to a maximum of 2.3 per cent, and on the rack portion of the line from 5.1 per cent to 6.8 per cent, the total length of the rack line being 22.5 miles. The radius of the sharpest curves on this part of the line is about 500 ft.

Six types of locomotives have been built up to the present time for service on the mixed track. The first four designs were of the four-wheel coupled type and had simple cylinders. The sizes of these locomotives and the year in which they were delivered are shown in table No. 1:

TABLE NO. 1

Year received	1889	1892	1893	1894
Type	0-4-2	0-4-0	0-4-0	2-4-0
Cylinder diameter, in.	13½	17	17	17
Cylinder stroke, in.	19½	19½	19½	19½
Weight in working order, lb.	57,900	46,200	47,650	64,500
Heating surfaces, sq. ft.	777	350	650	817
Grate area, sq. ft.	15.2	9.6	14.3	13.8
Boiler pressure, lb.	162	162	176	176

The bulk of these locomotives were constructed by the Esslingen Machine Works.

The new design of locomotive shown in Fig. 1, is of the 0-10-0 type and was built by the Swiss Locomotive and Machine Works, Winterthur. This type of locomotive was proposed as far back as 1906, when it was found that the four-wheel coupled locomotives were too small, but the first locomotives of a larger type were only built in 1912, when three 0-8-2 type locomotives were constructed. This design is similar to that built for the Brunig Railway by the same company. Fig. 2 illustrates the manner in which the trains are operated on this line. It shows a train of 360 tons handled by two locomotives of the 0-8-2 type, one in the middle of the train and the second at the rear.

The latest engines which are described herewith were pro-

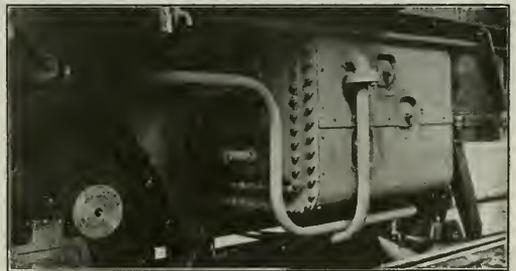
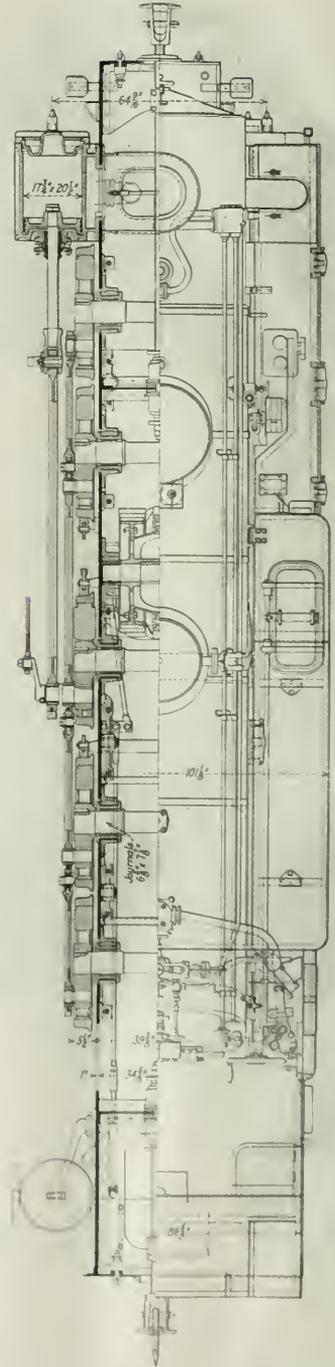
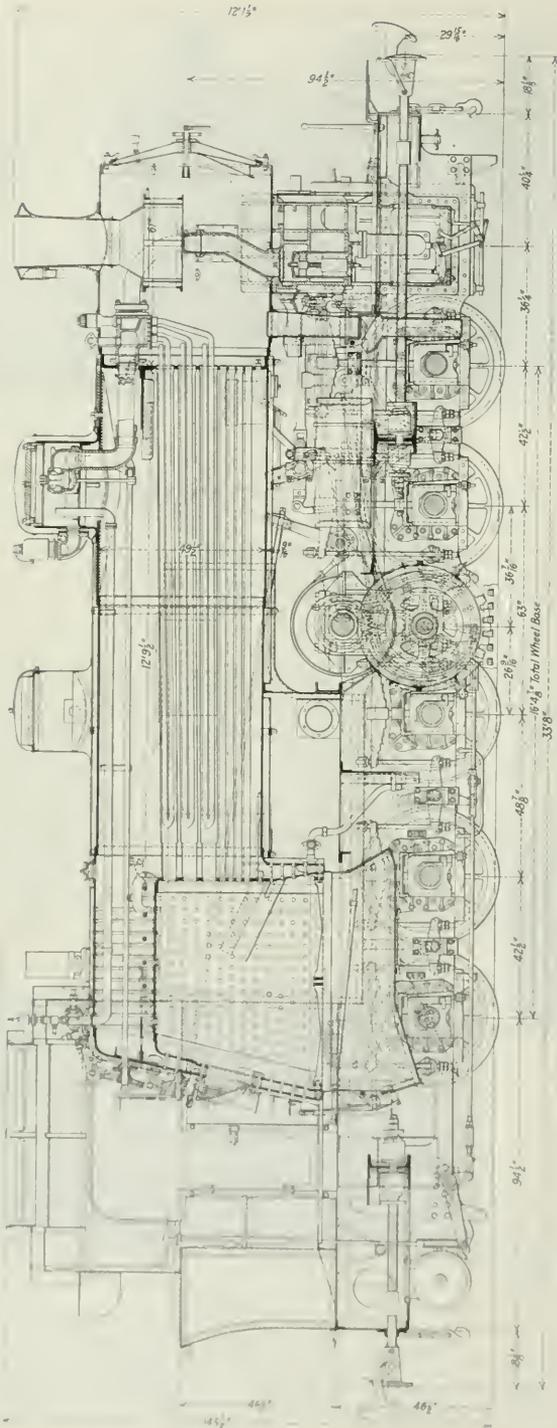


Fig. 3.—The Feedwater Heater Is Located Under the Cab

posed in 1916 and have but recently been completed. Nine of them were built by the Swiss Locomotive and Machine Works, Winterthur, and six by the Esslingen Works, the latter working to the plans furnished by the Winterthur company. Three of these locomotives are equipped with the Caille-Potonic system of feedwater heating and two are



Elevation and Plan of Adhesion and Rack Locomotive for Sumatra

equipped with the Titan dumping grate as used on the Hungarian State Railways. These engines will exert a maximum tractive effort of 14,000 kilograms (30,865 lb.); that is, they will handle a train of 200 metric tons on a 5.8 per cent grade.

The principal features of the new 0-10-0 type locomotive are shown in the drawings. The boiler is the same as that used on the 0-8-2 locomotive with the exception that it is provided with a Schmidt superheater. The barrel of the boiler consists of two courses, has an inside diameter of 1,230 mm. (48.5 in.) and contains 64 tubes, 3,900 mm. (12 ft. 9½ in.) long and 18 flues of the same length for the superheater elements. The tube and flue evaporating surface is 64.5 sq. m. (694 sq. ft.) and the superheater elements have

tions. When it is desired to place the low-pressure cylinders, which operate the rack-wheel, into operation the engineer, by means of a steam operated valve, changes the flow of the exhaust steam from the high-pressure cylinders into the steam chest of the rack or low-pressure cylinders. From these cylinders it passes to the exhaust. In this way the

TABLE No. 2

Gage	3 ft. 6 in.
Tractive effort.....	30,865 lb.
Weight in working order.....	114,600 lb.
Weight on driving wheels.....	114,600 lb.
Wheel base, driving.....	16 ft. 4¾ in.
Driving wheels, diameter.....	39¾ in.
Cylinders, diameter and stroke.....	17¾ in. by 20½ in.
Valves	Piston
Boiler	Straight
Steam pressure.....	205 lb. per sq. in.
Outside diameter of first ring.....	50¾ in.
Tubes, number.....	64
Flues, number.....	18
Tubes and flues, length.....	12 ft. 9½ in.
Heating surface, tubes and flues.....	694 sq. ft.
Heating surface, firebox.....	76 sq. ft.
Evaporated heating surface.....	770 sq. ft.
Superheating surface.....	331 sq. ft.
Grate area.....	19.9 sq. ft.

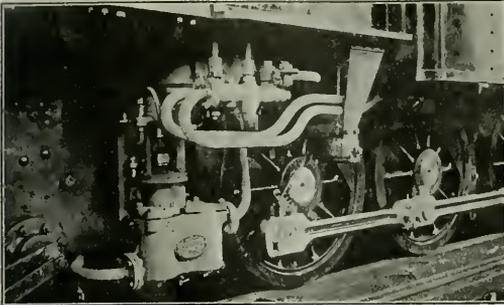


Fig. 4—Double-Acting Caille-Potonie Feedwater Pump

a heating surface of 30.8 sq. m (331 sq. ft.). The firebox, which is made of copper, has a heating surface of 7.06 sq. m. (76 sq. ft.). The working pressure of the boiler is 14 atmospheres (205 lb. per sq. in.). The firebox has a grate area of 1.85 sq. m. (19.9 sq. ft.). The smoke box is provided with a hopper, operated by a lever on the right hand side of the engine, and is cleaned by a jet of hot water, as is also the ash pan. The two 3-in. safety valves, located on the back of the dome are of the Coale type. The boiler is insulated by white asbestos mattresses and sheet lagging.

The driving wheels are 1,000 mm. (39¾ in.) in diameter. The leading and trailing drivers have a side play of 22 mm. (about 7⁄8 in.). The locomotive frame is suspended by laminated springs with equalizers between the fourth and fifth pair of drivers. The total wheel base is 5,000 mm. (16 ft. 4¾ in.).

The rack-wheel is driven from a separate set of cylinders, located above the main cylinders, through a jack-shaft located across the top of the locomotive frame. On this jack-shaft is mounted a spur gear which meshes with a gear on the cog-wheel axle. The pitch diameter of the driving rack-wheel is 975 mm. (38¾ in.). The gearing between the crank axle and the main cog-wheel axle has a ratio of 1 to 2.033. The gear teeth are of the helical type with a pitch angle of 23 deg.

As will be seen from the illustration, the locomotive is of the four cylinder compound Winterturth type with all four cylinders located outside the frames, two on each side. They are provided with piston valves operated by Walschaert valve gear and controlled by one screw reversing gear. The lower cylinders are the high-pressure cylinders and drive the five coupled adhesion axles. They are cast separately in order to facilitate removal and repairs. The upper or low-pressure cylinders drive the main cog-wheel as mentioned above. These are not placed in operation while the locomotive is running on the adhesion track.

The exhaust steam after leaving the high pressure cylinders passes direct to the exhaust pipe under ordinary condi-

tions. When it is desired to place the low-pressure cylinders, which operate the rack-wheel, into operation the engineer, by means of a steam operated valve, changes the flow of the exhaust steam from the high-pressure cylinders into the steam chest of the rack or low-pressure cylinders. From these cylinders it passes to the exhaust. In this way the

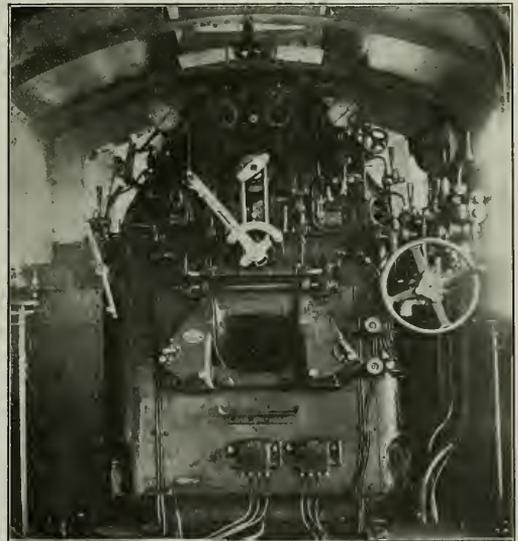


Fig. 5—Cab Arrangement of the Sumatra Adhesion-Rack Locomotive

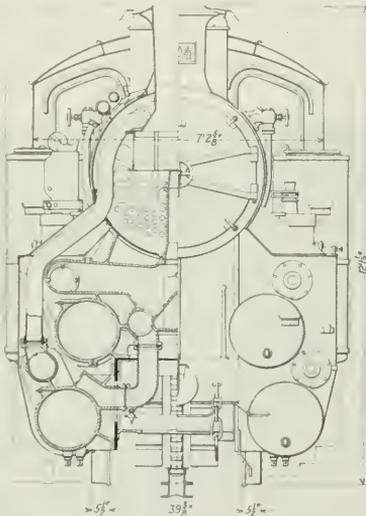
locomotive works as a twin engine. The four cylinders are of the same diameter and have the same stroke.

The locomotive is equipped with three kinds of brakes; an air counterpressure or repression brake is used in going down hill and acts on all four cylinders, or independently on either pair of them. For working this brake a valve is fitted under the smoke box which closes the passage from the cylinders to the exhaust and opens a passage to the atmosphere. By reversing the valve gear the cylinders draw in the air which is compressed, the discharge being made through a small pipe leading to a small perforated chamber at the top of the stack. In order to counteract the heat produced by compression, water is sprayed in the exhaust

passages of the cylinders, the resulting mixture being driven through the superheater into the header passing out through the discharge pipe mentioned above. By regulating the valve which controls the discharge of the compressed air the locomotive engineer is able to regulate the speed of the train. This is the ordinary way of braking a descending train under normal conditions.

Brake shoes are provided on the second, third and fourth pairs of driving wheels and are operated either by two vacuum cylinders or by hand from the fireman's side of the cab. In addition to this there is a powerful band brake acting on the crank pin disc of the rack engine. This consists of steel bands lined with brass blocks that fit into a series of grooves cut into the circumference of the discs and are worked by a screw.

The Caille-Potonie feedwater heater and feedwater pump form an important addition to three of these engines as already mentioned. The feedwater heater is shown in Fig. 3, and the double acting feedwater pump shown in Fig. 4. The heater consists of 264 tubes of between $\frac{5}{8}$ in. and $\frac{3}{4}$ in.



Front Elevation and Cross Section

in diameter. These tubes pass through the water chamber and have a heating surface of 10.8 sq. m. (116 sq. ft.). The steam required for this heater is taken from the exhaust of the cylinders and admitted to the heater through a regulating valve.

Fig. 5 shows the cab arrangement of the 0-10-0 locomotive. The firebox is fitted with the F. Marcotty smoke consuming device. There are two water gage glasses of the Klinger type, two injectors of the Friedmann pattern No. 7 and an Hausshalter speed recorder. The cab is well arranged and has a ventilated double roof.

Two Bosch mechanical feed lubricators, having six feeds form part of the equipment. Gresham and Craven's steam sanding devices are applied to the leading and main driving wheels, sand being delivered from a sand box on top of the boiler.

The coal bunker in the rear of the cab has a capacity of 1,200 kg. (2,425 lb.) and the combined capacity of the water tank is 5,000 litres (1,320 gal.). Tool boxes are provided in the two corners in front of the coal bunkers and their covers serve as seats.

The total weight of the locomotive in working order is 51.98 metric tons (114,600 lb.) distributed approximately as follows: Leading axle, 10.96 tons (24,200 lb.); second axle, 11 tons (24,250 lb.); main axle, 9.98 tons (22,000 lb.); fourth axle, 10.11 tons (22,300 lb.), and the rear axle, 9.93 tons (21,900 lb.).

The principal dimensions of these locomotives are given in Table No. 2. A comparison between Table No. 2 and Table No. 1 indicates the change which has taken place in operating conditions.

Railway Session of the A. S. C. E.

THE ANNUAL MEETING of the American Society of Civil Engineers, held in New York on January 18-20, devoted one afternoon to a discussion of railway transportation matters. The speakers at this session were Howard Elliot, chairman of the Northern Pacific; William N. Doak, vice-president of the Brotherhood of Railroad Trainmen, and Col. F. A. Mollitor, chairman of the Board of Economics and Engineering, National Association of Owners of Railroad Securities, New York.

Mr. Elliot presented an extensive paper which, while covering some of the important engineering developments of the Northern Pacific, dealt chiefly with the situation of the railroads at the present time in contrast with the situation and development of the country over a long period of years. In regard to the present situation, he stated that there is too great a tendency on the part of the public and the law-makers to see only minor mistakes and that, in other words, they "hold the penny of failure so close to their eyes that they cannot always see the 20-dollar gold piece of accomplishment." He laid particular stress upon the question of an adequate return upon the investment in the railroads and added that although the railroads are in distress, agriculture in trouble, and industry slack and business poor, that those who are now advocating that one way to bring about a resumption of business activity is to further reduce railway income should handle the subject with care. He pointed out that private industries were afforded an opportunity to build up and make vital improvements to their plants during the war period. The railroads were not—in fact the opposite conditions prevailed—and thus it is only the more imperative that they be given a chance to build up their systems to a more normal basis.

He also spoke on numerous other problems concerned with railway transportation, concluding his talk with the following pertinent statement: "Railroads are common carriers of people and property; they are not common carriers of all the economic troubles of the country. These cannot be cured by reducing rates, by tuning the railroads and perhaps forcing government ownership, to which this country is opposed. Give brains, courage and management a chance once more. Declare a 10-year holiday in the ceaseless investigation of the transportation question and let the undivided attention and energy of owners, managers and employees be devoted to maintaining, operating and perfecting this engine of civilization—the wonderful railroad system of the United States."

Mr. Doak's remarks were concerned with the relation of employees and employers and expressed a belief on his part that the best results in the solution of the problems between the two would come through direct conferences and meetings. He condemned the large amount of ill-advised propaganda and half truths which had been and were still being disseminated, since it was undermining the faith of the public in the railroads and creating a spirit of bitter bi-partisanship. He stated that the managements and the employees should conduct a campaign of education based on a fair investiga-

tion and presentation of the facts to restore public confidence.

In regard to labor disputes, Mr. Doak brought out that compulsory arbitration had been tried in other countries and here and that it had generally failed as a means of satisfactory labor adjustment. He strongly favored mediation and conciliation, and bi-partisan regional boards of adjustment, with the selection of high-class men to act as mediators. The Labor Board should be given a fair trial to show what it can do; so far it has been in existence too short a period to judge fairly as to its merits, though he did not believe that tripartite boards would be ultimately successful because of the inexperience and lack of knowledge of one-third of the membership. There was always the possibility, he thought, of the presence of partisanship, because of the opportunity of being able, in a way, to pass the responsibility to a third party. Management, labor and industry, he said, were all right if permitted to follow a normal and proper course. The problem of today should be judged from a practical business standpoint and the theories, speculations and cries of the reformers should be disregarded.

Colonel Molitor discussed the situation of railway securities, bringing out the decline in the volume of sales as well as the decrease in their prices, as an indication of the decrease

in interest in them on the part of the investor and thus a weakening of the credit position of the roads. One of the chief factors which helped to bring about this state of affairs was the operation of the roads by the government. The continuation of the meagre return to the investors will keep railway credit at a low ebb, he stated, and unless the railway problem is removed from politics and an economic and liberal policy pursued instead, the result can only be financial disaster and early government ownership. In regard to the latter, he added that while the general public had been lulled into security since the passage of the Transportation Act, the undercurrent of political affairs was such, at present, to cause the belief that public ownership of railroads was closer today than three years ago.

Colonel Molitor offered as suggested remedies: That any further general reductions in freight rates should be discontinued; labor wages should be adjusted to the cost of living; the Labor Board should be transferred to the Interstate Commerce Commission; and the six per cent return should be continued as a measure of rate making. He also added that railway employees should be prohibited by statute from striking and that labor unions should be required to incorporate and to file financial reports to the Secretary of Labor.

Interchangeable Mileage Bill Passed by Senate

Strong Objections Offered Because It Favors a Class That Can Best Afford to Pay Full Rates

WASHINGTON, D. C.

A BILL directing the Interstate Commerce Commission to require the railroads to issue interchangeable mileage tickets for not less than 1,000 nor more than 5,000 miles and to prescribe the rate therefor was passed by the Senate on January 21, after three days of debate, in the form of a substitute offered by Senator Cummins for S. 848, which would have directly required the railroads to issue 5,000-mile tickets at a rate of $2\frac{1}{2}$ cents a mile. There was no record vote. The substitute as originally offered by Senator Cummins would have "empowered" the commission to require the mileage ticket. Before passage this was amended to "direct" the commission, and the bill as passed is as follows:

Be it enacted, etc., That section 22 of the act entitled "An act to regulate commerce," approved February 4, 1887, as amended, is hereby amended by inserting "(1)" after the section number at the beginning of such section and by adding to the section two new paragraphs, as follows, to wit:

(2) The commission is directed to require, after notice and hearing, each carrier by rail, subject to this act, to issue at such offices as may be prescribed by the commission joint interchangeable mileage tickets at a just and reasonable rate per mile, good for interstate passenger carriage upon the passenger trains of any and all other carriers by rail subject to this act. Such tickets may be required to be issued for any distance not exceeding 5,000 miles nor less than 1,000 miles. Before making any order requiring the issuance of any such tickets the commission shall make and publish such reasonable rules and regulations for their issuance and use as in its judgment the public interest demands; and especially it shall prescribe whether such tickets are transferable or non-transferable, and if the latter, what identification may be required; and especially, also to what baggage privileges the lawful holders of such tickets are entitled.

(3) Any carrier which, through the act of any agent or employee, willfully refuses to issue or accept any such ticket demanded or presented under the lawful requirements of this act, or willfully refuses to conform to the rules and regulations lawfully made and published by the commission hereunder, or any person who shall willfully offer for carriage any such ticket contrary to the said rules and regulations shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not to exceed \$1,000.

The title was amended so as to read: "A bill to amend section 22 of the act entitled 'An act to regulate commerce,' approved February 4, 1887, as amended."

The bill, S. 848, introduced by Senator Watson of Indiana at the instance of the commercial travellers' organizations, was but one of several which have been introduced in Congress. Hearings had been held by a subcommittee of the

Senate committee on interstate commerce, but no action had been taken by the committee when Senator Robinson of Arkansas obtained the unanimous consent of the Senate to discharge the committee from consideration of the bill and to take it up in the Senate.

Attempt Made to Fix Rate Per Mile

It was apparent at once that there was a strong sentiment in the Senate for a mileage book at a reduced rate but after Senator Cummins had proposed his substitute there was a vigorous debate between those who, under Senator Robinson's leadership, desired to fix the rate per mile in the bill, and those who strongly insisted that the rate and the terms should be left to the commission. While the bill was proposed and discussed largely from the standpoint of the commercial traveller, many senators dealt with it mainly as a means for reducing passenger fares, and the debate was made the occasion for a wide range of discussion of the railroad rate situation, both freight and passenger, in which the present level of rates was charged by many with a large share of the responsibility for the depressed condition of business. A number of the advocates of the bill desired to reduce the mileage to 2,000 or even 1,000 miles in order to make the mileage books more generally available.

Senator Cummins read a letter from Commissioner Esch, on behalf of the legislative committee of the Interstate Commerce Commission, pointing out many defects in the bill as it stood and the inadvisability of fixing rates or fares by statute.

Senator Robinson and other advocates of the bill fixing the rate insisted that the railroad revenues would be increased rather than diminished by the reduction, and in answer to the contention that the rate should be left to the commission, said that the membership of the commission is divided in opinion both as to their power, without additional legislation, to require interchangeable mileage tickets and as to the policy of doing so. Senator Robinson said that while W. G. McAdoo was in charge of the railroads he had issued an

order abolishing reduced mileage book rates for the purpose of reducing travel rather than for the purpose of increasing revenues. Senator Cummins retorted that if it was McAdoo's purpose to reduce travel he failed signally, because until 1921 the passenger travel upon the railroads increased by leaps and bounds under the increased rates.

May Prevent Reduction of Freight Rates

Senator Cummins made a long speech in which he said he believed in the system of mileage book tickets and that he had no doubt that the commission when vested with power will speedily make the necessary order. He did not, however, feel like reviewing the action of the Interstate Commerce Commission and insisting that it is less qualified to enter a judgment upon this question than the Congress, which must necessarily act with very inadequate and imperfect information. First, Senator Cummins said, the bill as proposed would be obviously unconstitutional, as fixing an arbitrary rate without proper investigation as to the difference warranted between the mileage rate and the regular rate and, second, if it were constitutional it is manifestly unwise for Congress to attempt to fix either freight rates or passenger rates. His third objection was that at this time no obstacle should be put in the way of the efforts of the commission or of the carriers to reduce freight rates. "The passage of this bill," he said, "will just as surely arrest the progress of that movement as that time is to go on."

His fourth objection was that the difference of over 1 cent a mile would be the grossest sort of discrimination in favor of corporations and individuals who can afford to buy \$125 worth of transportation at one time. The fifth point was that the bill would take direct possession of the authority which, in his judgment, is vested in the several states, because it attempted to fix passenger rates within the states.

In reply to Senator Robinson's assertion that reduced rates will produce greater revenues, Senator Cummins said the commission is now investigating that question, but, he said, "there is not a man of intelligence within the borders of the United States who will assert that the revenues of the railroad companies are now more than they ought to be," and "there is not a lawyer in the United States who will assert that if the Interstate Commerce Commission did anything that reduced their revenues below the point at which they now stand the order of the commission would be sustained in any court."

Senator Cummins said that the Senator from Arkansas and Senator Smith of South Carolina, who had also criticized the present rates, assume that "all that is the trouble with the world is either a high passenger rate or a high freight rate." "The world is sick," he said, "with a great variety of diseases, and high rates may be one of these diseases."

When Senator Robinson asked whether Senator Cummins thought it is possible to restore vitality and prosperity to American business without a reduction of rates, he replied in the affirmative.

"Suppose the price of corn were \$1 a bushel, or \$1.50 a bushel," he said, "our farmers would not lack prosperity on account of the high freight rates. Freight rates have nothing to do with making the corn worth \$1.50 a bushel. Freight rates have a good deal to do with the amount which the farmer receives from the price paid for his corn. If the farmer could sell his product at \$1.50 a bushel in my state, he would be prosperous even though he paid the present high rates."

Prices and Freight Rates

This led to an interesting discussion of prices and freight rates, in which Senator Cummins said the low price of corn is brought about because there are a great many people who do not want to buy corn. Senator Robinson insisted that there are millions of people who are anxious to buy corn at a reasonable price if it can be transported to them at a

reasonable price. Senator Cummins pointed out that the freight rates are borne by the farmer and that high rates in the United States do not produce the trouble in Europe or the reasons why Europe does not buy more of our corn.

"To suggest that the high freight rates and the high passenger rates are the cause of all the evils with which we are now afflicted," he said, "is to close our eyes to countless evidences of misadjustment and maladjustment not only throughout our own country, but throughout the world. I want to see freight rates come down, but I want the system of transportation which we have built up maintained at the same time."

When the time came for a vote on the bill, Senator Robinson proposed the amendment "directing" the commission instead of merely "empowering" it, and said with that modification he would somewhat reluctantly accept the Cummins amendment. Senator Harris of Georgia attempted to add an amendment requiring railroads to use steel cars for passenger service, but it was ruled out on a point of order. Senator Trammell, before Senator Cummins' substitute had been voted on, secured the adoption of an amendment to the original bill, to provide for 1,000-mile books instead of 5,000-mile books, but after the adoption of Senator Robinson's amendment, the Cummins substitute was adopted. Among those who supported Senator Cummins in opposing the fixing of rates by statute were Senators Pomerene, Kellogg and Capper, while Senators Poindexter and Smith were the principal speakers with Senator Robinson in favor of fixing the rate by statute. Senator Smith said that Congress should direct the Interstate Commerce Commission to lower freight rates a certain percentage, the percentage to be governed very largely by the current average cost of material now used as compared with the cost at the time when the rates were advanced.

The letter from Commissioner Esch in commenting on S. 848, said in part:

"It may be proper to remark that in the past bills somewhat similar to this one have been referred to us for our views, and we have expressed our disapproval of them, not only on the grounds indicated but on account of the inadvisability, as it seems to us, of fixing rates or fares by statute.

"It has seemed to us that when reductions in fares were warranted they should be made in such a way that all travelers could benefit by them.

"The bill, in effect, creates a privileged or favored class into which no one may enter who has not \$125 available for the purpose. Whatever reduction in cost of travel is thus effected would inure, not to those of small means, who need it most, but to those with abundant moneys in hand, who need it least. The mileage ticket sought at a rate of 2.5 cents per mile would enable the holder to travel over the Southern Pacific line in Arizona or Nevada, where the base rate is 4.8 cents per mile, or over other lines in the state where the base rate is still higher, and in doing so to ride in Pullman cars without paying the so-called Pullman surcharge, which accrues to the rail carrier. His fellow passengers, sharing the same accommodations, would pay twice as much.

"The bill does not declare the existing base fares to be unreasonable. It amends an act under which we have found them reasonable. But, without any finding of the reasonableness which the act enjoins upon all rail carriers, it proposes to require them all to establish and maintain a much lower rate per mile for those who can afford to lay out \$125 in order to secure it. It also provides that as the general rate of fare for the rest of the public is reduced from its present exceptionally high level this special base shall be reduced in proportion, so that, whatever happens, the holders of these tickets shall always travel for less than anyone else.

"The bill disregards the fact that the President, through the director general, determined that a base rate lower than 3 cents per mile was too low and that the commission has since authorized 20 per cent increase in that base rate.

"It further raises the question whether any rail carrier subject to the act could justly any base higher than 2.5 cents per mile for any passenger after this bill should become law.

"The bill repeals portions of section 2 of the interstate commerce act, which provide for compliance with section 6 of that act in respect of the filing and publication of joint tariffs and which make applicable the penalties provided under section 10 of that act.

"The bill lays its obligation to sell and honor these interchangeable mileage tickets upon 'each common carrier by railroad, or partly by railroad and partly by water, within the continental United States, subject to this act,' and thus upon common carriers which now publish no passenger tariffs and carry no passenger traffic.

"The ticket may be issued and all the money collected by a carrier which does not participate in the transportation and is financially irresponsible.

"These are some of the obvious defects of the bill."

Wood Preservers Discuss Economics of Ties

Proceedings at Annual Convention
Demonstrate Advance in the
Use of Treated Timber

THE American Wood-Preservers' Association held its eighteenth annual convention at the Hotel Sherman, Chicago, on January 24-26, inclusive. This organization of men interested in the preparation and use of treated timber includes a large proportion of railway officers and is by far the largest single factor in promoting the use of treated cross ties in this country. For the railroad man particular interest is attached to the papers relating to the economics of tie utilization and tie production.

Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio, presented a paper in answer to the question "Should Cost of Treating Ties Be Charged to Maintenance or Capital Account"? Mr. Stimson stated that the position of the railroad with respect to this depends upon the degree of prosperity or state of business credit. He himself favors the present practice of charging the cost of treating ties to maintenance.

Advance in the application of treated timber to car construction was reported by a committee on car lumber and a paper by Forrest S. Shinn on the Treatment of Car Sills and Decking. These papers and others of perhaps less specific application to the railroads are presented in abstract below.

The officers of the American Wood-Preservers' Association during the past year were: President, C. M. Taylor, superintendent, Port Reading Creosoting Plant (C. R. R. of N. J.-P. & R.), Port Reading, N. J.; first vice-president, F. J. Angier, superintendent timber preservation, Baltimore & Ohio, Baltimore, Md.; second vice-president, H. S. Valentine, assistant general manager, Eppinger & Russell Company, New York City; secretary-treasurer, G. M. Hunt, engineer, Forest Products Laboratory, Madison, Wis.

In the election of officers held on Thursday the following were elected: President, F. J. Angier; first vice-president, W. H. Grady, vice-president, American Creosoting Company, Louisville, Ky.; second vice-president, H. S. Sackett, assisting purchasing agent, Chicago, Milwaukee & St. Paul, Chicago; secretary-treasurer, George Hunt.

Factors Affecting the Cost of Treated Cross Ties

By E. E. Pershall

Vice-President, T. J. Moss Tie Company, St. Louis, Mo.

The purchase of timber for conversion into cross ties is largely made in two general ways, i. e.:

1. The purchase of land and timber in fee.
2. The purchase of timber only on certain described lands.

The land values on which the timber may be standing has a very direct bearing on the cost of stumpage, as timber land having a relatively high potential value for farms or ranges, in most cases carries with it taxes that are very closely related to its future use. For example, there are certain swamp timbered areas, particularly where cypress, oak, and gum comprises the major portion of the stands, that make



Loblolly Pine Trees Treated with Zinc Chloride—Condition After 16 Years of Service in Oklahoma.

The convention was opened by an address by R. H. Aishton, president of the American Railway Association, who commented on the insistent demand for efficiency in all phases of railway operation. He paid a tribute to the wood preserving industry for the constructive work which it is doing in stimulating the treatment of timber and thereby extending its life. He pointed out the close relationship of this industry to the railways as is evidenced by the fact that over 90 per cent of all of the timber treated is used by the railways and that their use of this material is increasing more rapidly today than ever before. He emphasized the importance of the Wood Preservers' Association giving more publicity to the constructive work which it is doing in order that the public at large may know what it and the railways are doing to promote economy and efficiency.

Following Mr. Aishton's address C. M. Taylor, president, reviewed the work of the association during the past year. Mr. Taylor placed particular emphasis upon the suggestion made by Mr. Aishton regarding the importance of disseminating information concerning the possibilities of timber preservation and the results which have already been accomplished. Mr. Taylor also pointed out that the association should keep constantly in mind that it is not sufficient for an industry to depend upon its past performances but that the success of the association, aside from its ability to make known what it is accomplishing, depends upon the industry and co-operation of all members to study along new lines and to develop the work of wood preservation in its diversified branches. He called particular attention to the necessity of studying the properties of the creosote oils as prepared at the present time and concluded his address by urging the members to keep constantly in mind the importance of the problem of wood preservation both to the railways and to the public at large.

exceedingly rich farm lands after the timber is removed and drainage ditches constructed.

Estimating the Value of Timber

Values of timber and timber lands, as may be used for the manufacture of cross ties, are in most cases determined by experienced timbermen, who are not only expert at estimating the amounts of the various kinds of timber standing, but much more importantly the numerous considerations involved in the profitable removal of the timber from stump to river bank or railroad. The amount of labor in the imme-

diate territory available for carrying on the making and hauling of ties, the character and topography of the timberlands, which always affects most directly the amount of the standing timber that will be actually removed at a reasonable cost, the length and character of the haul to the railroad or river bank; the cost of driving, rafting, or barging from river bank to railroad, where necessary; and the freight rates from prospective shipping points to certain large rate basing points, such as Cairo, Thebes, St. Louis, Kansas City, Chicago, Louisville, Cincinnati, etc.; all enter very pertinently into the proper valuation of a profitable timber investment.

Various Species of Timber and

U. S. R. R. A. Specifications

Prior to the existence and general acceptance of the cross tie specifications of the United States Railroad Administration, a very substantial amount of standing timber of such species as hickory, ash, elm, maple, gum, and pine, that always grew on timber lands together with white and red oak, were left standing, in many cases, to the ravages of decay, fires, winds or the girdling of the future farmer. The general sale and purchase of cross ties on the basis of fair values for the various species enumerated, or better still, classified under the U. S. R. R. A. specifications, has done much good toward the conservation of timber through prompting the timely conversion of species other than oak into cross ties rather than allowing a very substantial percentage of good sound trees of these species to lapse into the category of cutover lands and thereafter to eventual waste.

Manufacture of Cross Ties

The manufacture of cross ties, after felling the tree and cutting the hole into eight foot or multiple logs, is accomplished by hewing and sawing. The hewing of cross ties is at best but a rough wood-working operation that cannot, in the majority of instances, be carried on within a restricted tolerance of dimensions, and a broadaxe in the hands of a steady and skilled tie maker must some times deviate from straight lines and parallel faces. An attitude of appreciation of these unintentional slips of the tie maker's broadaxe on the part of the railroad inspector who ultimately grades the cross ties for the basis of invoice is called "the exercising of some judgment" by the majority of our best tie men, but the justification therefor does not by any means meet with universal approval.

The manufacture of cross ties by saw mills is generally done in the Mississippi Valley territory by the use of so called "portable tie mills." After the tree is felled and bucked into logs, teams and log wagons haul 3 to 5 logs per load to the mill set, where they are sawed later into cross ties and lum-

ber one inch thick, commonly called "tie siding." The price obtainable for this tie siding is a very important factor affecting the cost of the cross tie, but fortunately or unfortunately as the case may be viewed, the prices for tie siding are always highest when cross ties are finding a ready market, and the siding can hardly be sold at all when cross tie prices are depressed.

Freight

One of the largest factors entering into the cost of the treated cross ties is freight. These transportation charges, as at present in effect, are quite double the legal tariffs in effect for identical services in 1913. Cross ties are a relatively low priced commodity when figured on the basis of weight and values at point of shipment, so that the rate of freight to point of use often amounts to more than the first cost of the cross tie at point of production.

The character of the freight rates used is of course the result of years of evolution in the matter of freight rate structures, but they are generally based upon a per cwt. or a per tie basis. In the absence of specific rates on cross ties, the rate of freight applicable on rough lumber of the same species is generally effective.

The use of local rates from point of origin to treating plants, and local rates out of treating plant to destination are not generally used, except at rate breaking points, such as river crossings, where, for certain reasons, the combination of local together with particular conditions defining the movement from point of origin to treating plant, and treating plant to destination, give a more advantageous arrangement than treating in transit on the basis of through rates from original point of origin to destination.

It is further obvious that as cross ties are purchased in the largest extent by common carriers, the question of routing and billing is a very important factor entering into the cost of the treated cross tie, particularly where there are usually four or five junction points available.

Selling Arrangements

The sale of cross ties, either untreated or treated, as the buyer may elect to purchase, is generally done by negotiation, and contracts are usually based upon: (A) Flat price for a specific number of ties; (B) cost-plus arrangements, and (C) price adjustments in line with market conditions.

Method C is but a continuation by mutual agreement of method A. Method B is self-explanatory as to principle. Cost-plus arrangements have several advantages in avoiding any substantial losses to the manufacturer due to rigid inspection or adverse market fluctuations, but usually requires a system of strictest accounting, which, under certain conditions, may be quite unwieldy.

The Economics of Tie Renewals

In a paper on the Economics of Cross Tie Renewals, V. K. Hendricks made a comparison of three formulas advocated for calculating the annual cost of cross ties. These methods are as follows:

- a Without consideration of interest
- b By the use of simple interest.
- c By the use of compound interest.

In order to adopt the simplest method consistent with reasonably accurate results, we should determine the difference in results by these three methods, which methods are represented respectively by the following formulas:

$$a \quad A = \frac{C}{n} \quad V = C \frac{(1+R)^n R}{(1+R)^n - 1}$$

$$b \quad A = \frac{C}{n} \quad C \quad P$$

- A Annual cost per tie.
- C First cost of tie in place.
- R Interest rate
- n Life of tie in years

Mr. Hendricks showed that these methods gave decidedly varied results. For instance, based on the three methods given above, the following tabulation shows results for certain ties having a life of 6, 12, and 18 years, and at certain assumed total costs in track:

Case No.	Total cost in track	Average life of ties in years	Annual Cost per Tie		
			No interest a cents	Simple interest b 6% cents	Compound interest c 6% cents
1	\$1.20	6	20.0	27.2	24.404
2	2.40	12	20.0	34.4	28.7
3	3.60	18	20.0	41.6	33.3
4	1.90	12	15.8	27.2	22.7
5	2.36	18	13.1	27.2	21.8
6	2.046	12	17.05	29.34	24.404
7	2.64	18	14.67	30.52	24.404

This demonstration was carried further by taking a particular case involving a road requiring a total of 1,800,000

ties from which, by carrying out the various methods, the inconsistency of methods *a* and *b* was clearly shown, leaving only method *c* as a logical solution. Mr. Hendricks also offered the following as the factors which must be taken into consideration in determining the first cost of a tie in place.

1. Purchase price of ties, f. o. b. cars.
2. Inspection (of ties and treatment) and handling charges, including distribution of ties.
3. Work train charges or estimated cost of transporting over company lines (both to and from the treating plant in the case of treated ties).
4. Freight charges over foreign lines, and switching charges.
5. Interest on the cost of ties during the period they are held for seasoning, provided this is not included in the purchase price.

6. Interest on investment in any real estate, plant, tracks, or other facilities required for procuring, seasoning, or treating the ties, when not included in the purchase price, and also maintenance of such property.
7. Cost of adzing and boring before treatment, and any similar expenses not included in the cost of treatment.
8. Cost of treatment.
9. Cost of the plates. We have no authentic information as to the life of tie plates, but if we assume the life the same as the life of a treated tie, then for a tie having only half that life we should include only half the cost of tie plates, and for other lives in proportion.
10. Cost of spikes. In comparing wooden ties with wooden ties, however, the cost of spikes will be the same and that cost could be omitted without material error; in comparing wooden with metal ties, the spikes must be included to correspond with the metal tie fastenings.
11. Cost of placing ties in track.

The Use of Treated Timber in Cars

The Committee on Car Lumber presented a report on the treatment of timbers used in cars and submitted recommendations on practice applicable to this particular field for the treatment of timber. An abstract of the report follows:

Since decay is responsible for more repairs to wooden cars than any other single factor it follows that a way must be found to prevent decay without retarding the work of shop forces engaged in repairing the cars. The pressure treatment is superior to other known methods of preserving wood and creosote is the best agency by which its physical life may be extended. Zinc chloride and sodium fluoride are also proven wood preservatives of high rank, but to be of any material value they must be applied under pressure, while the application of creosote by means other than pressure, such as non-pressure treatments, will unquestionably add to the life of the timber so treated.

The committee has studied every conceivable method of treating car timbers by the pressure process after they have been framed, and has found them impracticable. In most cases treating plants are located many miles from the car shops, meaning that after the timbers have been framed they must be loaded on cars and sent to the plant for treatment.

There is also the usual objection to the use of creosoted timbers that is always met with on account of refusal of

labor, especially the semi-skilled labor, usually employed around car shops, to handle these timbers after they have been treated. However, this feature could be overcome by the use of zinc chloride or sodium fluoride, which are not offensive to handle, and if it were practical to apply either preservative without pressure our problems would be nearer solution.

This committee earnestly desires to see some definite step taken toward preserving car lumber and recommends the very simple method of giving all points of contact a brush treatment, using two brush coats of hot creosote. This should also apply to roofing and in the case of open and stock cars to the decking, posts and entire interior of the car.

This treatment should be applied to all points of contact regardless of whether the timber is green or dry, or whether it is white oak, red oak, pine, fir, or any other species. The best results will be obtained if the timber is dry, but it is not always dry when put in a car and we must face the conditions as they actually exist. It is certainly better to paint creosote on a green piece of timber than to put none on it at all, and this principle if accepted, must be general and cover all lumber used in freight car construction and maintenance.

It has been suggested that the actual application of the creosote be supervised by the department of timber preservation of the railroad.

Burlington Treats Car Lumber

Supplemental to the above report, Forrest S. Shinn, supervisor of plant, Chicago, Burlington & Quincy at Galesburg, Ill., presented a statement of the progress in preserving car timbers on that railroad. An abstract of Mr. Shinn's statement follows:

The Burlington has treated 1,297,188 ft. b. m. of car sills and 1,815,804 ft. b. m. of car decking. These were treated with the straight creosote process in the following years:

Year	Sills, Board feet	Decking, Board feet
1911.....	104,700	115,728
1912.....	409,764	1,087,116
1913.....	339,720	153,012
1914.....	223,500	89,892
1915.....	53,736	56,688
1916.....	166,068	176,796
1917.....	.....	79,888
1918.....	.....	56,688
Total.....	1,297,188	1,815,804

We are not in a position as yet to know just what results will be obtained from this treatment, as none of the lumber has been taken out for any cause except on account of being broken; however, in view of the fact that we are taking out yearly a large amount of untreated flooring on account of rot we feel that the money spent for treatment has brought good returns. We have not made any tests on this material,

comparing the strength of the treated lumber with the untreated, but from close observation have come to the conclusion that treatment very materially increases the hardness and makes it much more resistant to wear. We find that many untreated planks in cars built in 1911 and 1912 have been worn so thin that they had to be replaced.

In November, 1921, two treated planks were removed for inspection from the end of C. B. & Q. car 67391, built in May, 1912, with treated sills and flooring; two treated gangway planks from C. B. & Q. car 67190, built in February, 1912, with treated sills and flooring; and two treated gangway planks from C. B. & Q. car 68729, built in September, 1915, with treated sills and flooring. There was no sign of decay on either the sills or flooring. The planks were slightly worn but were perfectly sound and, from all appearances, were good for as many years more life as they had already given. On the same day two untreated gangway planks were also removed from C. B. & Q. car 67261. This car was built in March, 1912, with treated sills and flooring, with the exception of the gangway plank which was not treated. These two untreated planks were warped, shattered on the ends, and worn down to less than half the original thickness.

In the last month I have inspected 200 stock cars built in

1914 or earlier, 100 of which were built with treated sills and decking and 100 built with untreated sills and decking. The treated decking is in as good condition as when first laid down, showing no signs of decay, warp, or check, while the untreated decking is badly warped or buckled and all of it is more or less checked, and in a large percentage the ends are badly shattered.

We feel that some time in the future we are going to be able to prove conclusively that the treatment of sills is justifiable. I have seen many decayed sills in cars built 1900 to 1906 and I am sure that everyone will agree with me that a

well treated car sill will never show any signs of decay unless it was decayed before being treated.

In addition to the treatment of sills and decking for stock cars we treated, with the Burnettizing process, sub-flooring for one dining car that was placed in service May, 1921, and one that was placed in service June, 1921. We also treated sub-flooring with the Card process (zinc chloride and coal tar creosote) for two dining cars that will be placed in service soon. We have found that sub-flooring in the kitchens of these cars rots quickly and are sure that we can overcome this by preservative treatment.

Report on San Francisco Bay Marine Piling

The conditions in San Francisco Bay and the study of constructions that will resist the inroads of marine borers was the subject of another extended report presented by a special committee organized for this purpose. This same subject was treated in a previous report which was abstracted in the RAILWAY AGE of February 18, 1921, page 420, and the present report covers much of the same ground but in greater detail and in the light of more complete information. The conclusions of the committee which are given below are presented in the same form as in the report abstracted in the RAILWAY AGE of February 18, 1921, the changes from the previous report being shown in italics. These conclusions are as follows:

(1) Marine borers are very active in San Francisco Bay and connected waters, and in places where their attack is severe will destroy untreated piling in as short a time as six to eight months. In other places the untreated piling may last from two to four years.

(2) The information secured indicates that it is reasonable to expect a life of five to eight years from paint and batten protections in *sheltered waters*, if the work is well done. If it is not well done, or if the covering is damaged by careless handling or if *unprotected wood is exposed by mud scour*, this range of life cannot be expected.

(3) *The data so far in hand indicates that it is fair to expect creosoted Douglas fir piling in San Francisco Bay to give a life of 15 to 20 years under present conditions. Certain piles are of authentic record from the Oakland Long Wharf which were sound when removed after a service of 29 years. Poor treatment, or damage to creosoted piling by careless handling, rafting, storage or construction, will materially reduce the life which might otherwise be rendered by such piling.*

(4) Most of the attack on creosoted piling by marine borers, which the committee has observed throughout this survey, appears to have begun in spots where untreated wood has been exposed by damage in handling the piles or placing the superstructure. It is urgently recommended that improvements be made in the methods of handling creosoted piles and building structures upon them, so that damage to the surface of the piles may be reduced to a minimum.

(5) Precast reinforced concrete piles and pile casings have not been in use in San Francisco Bay a sufficient length of time to determine their ultimate life. A detailed examination of those structures which have been in service for 10 years shows no evidence of deterioration *below high water line*, and they seem capable of a long further life. The length of life to be expected from this type of construction is largely dependent upon the quality of materials and workmanship and the skill and care with which they are employed; and any laxity in these particulars will materially shorten the length of service which may be secured.

(6) *Reinforced concrete cylinders cast in open caissons have been in use for 12 years. Although the average life of many earlier cylinders has been considerably shortened by construction defect, these cylinders with minor repairs still give promise of a long period of service. Similar cylinders designed and constructed in accordance with best modern concrete practice should constitute a type of construction only excelled for longevity by solid fill or mass concrete.*

(7) Cast in place concrete pile jackets may be expected to give satisfactory results if properly constructed of suitable materials and proper regard is given toward exclusion of sea water from forms. The difficulties of this type of construction, however, are of such a nature that the probability of securing a maximum length of life is less than in the case of precast concrete piles or pile casings.

(8) *Copper sheathed piles have given very satisfactory service*

in locations where damage from abrasion and theft can be minimized. Such piles carefully prepared and handled fall into the class of best surface protections, when used under the conditions indicated.

(9) The selection of a type of piling or pile protection for a given structure must be made upon the basis of cost and permanence of the materials under consideration, the character of the structure and the probable need for future alterations to meet the changing requirements of commerce. When a comparatively short increase over the life of *untreated* wooden piling is sufficient, the surface protections will often be found economical in waters not exposed to severe storm action; if a moderately long physical life approximating the average economic life of marine structures in this harbor is desired, a good creosote treatment will provide it at the lowest annual cost so far as present knowledge goes; if conditions warrant building for the greatest permanence, with less regard for first cost, concrete construction *has shown a high value in this harbor*. For the protection from further damage of wooden piles already in place and showing attack by borers, not yet severe enough to require condemnation, the concrete casting, precast or poured in place, is the only means of salvage so far found by the committee.

The subject of plant operation treated by sub-committees covered six phases of this work. Papers presented include one on the Requirements for Pressure Machinery Utilized in Preserving Plants and one on Material Handling, which was devoted primarily to the equipment required in large lumber yards.

The Committee on Preservatives presented a report on the properties and supply of certain special oils including vertical retort tar oils, low temperature coal tar oil, blast furnace oil and high temperature petroleum gas tar oil. Tentative specifications were also submitted for creosote oil to be used for non-pressure treatment and for creosote oil to be used for marine piling treatment. C. Henri Strawn, official photographer of the Atchison, Topeka & Santa Fe, Topeka, Kan., presented a paper on Photography in Wood Preservation.

The Committee on Utilization and Service prepared reports by sub-committees on Economics, Track, and Flooring and Paving.

The sub-committee on tie service test records presented the usual tabular statement of the service records prepared by the Forest Products Laboratory at Madison. No detailed report was presented on the results obtained on an individual railroad.

At THE OPENING SESSION on January 30 of the annual meeting of the National Civic Federation at the Hotel Astor, New York, the question of industrial mediation and conciliation will be discussed. The proposals to make the decisions of the Railroad Labor Board mandatory, to combine the Board with the Interstate Commerce Commission or to abolish it entirely will be taken up. The principles involved in a court of industrial relations such as that in Kansas will be discussed. Among the speakers will be Ben W. Hooper, of the Labor Board, B. M. Jewell, of the Railway Employees' Department of the American Federation of Labor, and Charles P. Neill, umpire in disputes arising between coal operators and the anthracite miners.

Proposal for a Commissioner General of Transportation

WASHINGTON, D. C.

THE COMMITTEE on Railroads of the Chamber of Commerce of the United States has prepared a summary of the recommendations to be made in its report to the board of directors, which is to be considered at the meeting of the National Council of the chamber to be held on February 8 and 9, at which time that body will be asked to advise the board of directors on the questions involved.

It is the sense of the committee that there should be some governmental agency adequately equipped, having appropriate jurisdiction, and the duty to promote, sustain and develop the transportation facilities of the country in the light of the public interest, before committees of Congress and before the various governmental agencies now in existence or hereafter created that have power of action or decision in respect to any matters affecting transportation.

Pursuant to this principle the committee presents the following recommendations:

1. That the Chamber of Commerce urge Congress to enact appropriate legislation authorizing the President to appoint and prescribe the compensation of a special administrative officer with the title of commissioner general of transportation.

2. The commissioner should hold office subject to the will of the President, and upon the occurrence of a vacancy in the office the President should appoint and prescribe the compensation of a successor.

3. The commissioner should be selected because of his familiarity and experience with transportation conditions, problems and necessities, and should keep himself informed of the transportation needs of the country and make such recommendations to all governmental agencies charged with the regulation of interstate transportation as he may find will be for the public interest and will tend to coordinate the administration of the laws respecting interstate transportation by land, water and air for the promotion and development of a national system of rail, water, highway and aerial transportation, and will make possible the articulation and economical use of all transportation facilities including tracks, highways, terminals, transfer facilities, docks and landing places. The commissioner should make an annual report of these matters to the President for transmission to Congress.

4. The commissioner should not be permitted to engage in any other business, vocation or employment during his term of office, nor to be eligible for any elective office within two (2) years after he ceases to be commissioner.

5. The commissioner should ascertain and report to the President from time to time for transmission to Congress each and all conflicting or inharmonious functions and rulings of any one or more boards, commissions, bureaus or other governmental agencies with respect to interstate transportation as related to the functions and rulings of any or all other such agencies that cannot be so reconciled by administrative practices as to promote the general development of a coordinated system of interstate transportation; such report to be accompanied by recommendations of the commissioner designed to correct and remove such inharmonious provisions and practices.

6. The commissioner should render all possible assistance to the Interstate Commerce Commission in facilitating and advancing the consolidation of railroads into a limited number of competing systems as authorized in the Transportation Act, 1920.

7. The commissioner should be notified of all hearings before any board, commission, bureau or other governmental agency now existing or hereafter created with respect to trans-

portation, rates, fares, regulations, terminal charges, wages, working conditions or other subject matter affecting interstate transportation; and should be entitled to be heard in person or by representative at all such hearings and to produce evidence that will tend towards a result that will promote and facilitate the continuous development of an interstate transportation system that will be adequate and efficient to meet the transportation needs of the country.

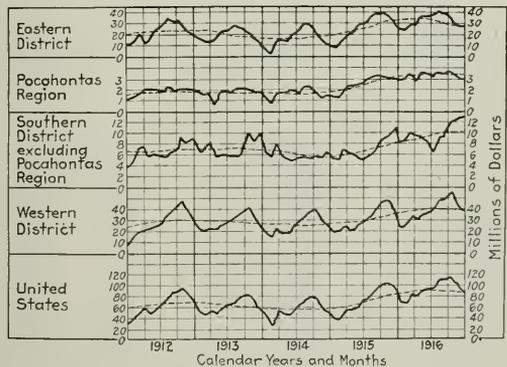
8. The commissioner should be authorized to call upon any department or bureau of the government for any information as to interstate transportation matters that may be needed by him in the performance of his duties; and such departments and bureaus should be required to furnish such information on his request.

9. The commissioner should be authorized to grant federal charters to corporations proposing to engage in interstate transportation by land, water or air, and upon application therefor, to convert state corporations so engaged into federal corporations so that by such conversion the existing corporation shall not close or interrupt its business as a common carrier, nor shall any of its existing obligations to others nor any existing obligations of others to it be in any manner prejudiced or impaired, but it shall continue as a corporation with the same officers and directors until other directors shall have been chosen under the federal charter and the same property assets and business as before its conversion, save only that jurisdiction over it as a corporation shall be vested in the government of the United States.

10. The Congress should make adequate appropriations for carrying out the foregoing provisions until such time as receipts from charter license fees to be authorized by Congress are sufficient for this purpose.

The Seasonal Variation of Operating Income*

THE TRANSPORTATION ACT, 1920, has made it necessary to know what rate of return upon investment is earned each year by steam roads. Before the actual earnings for an entire year are available, it is desirable to know how nearly the 5½ or 6 per cent standard is being reached. In



The Seasonal Variation of Operating Income

order to utilize the monthly reports of revenues and expenses for this purpose, it is necessary to know what fraction of the year's income ought normally to be expected each month. One-twelfth of the annual amount is not an accurate standard

*A statement issued by the Bureau of Statistics of the Interstate Commerce Commission.

for what each month ought to contribute. As Congress made the three years ended June 30, 1917, the test of the rental to be paid for the use of the railroad properties, it may seem that this so-called "test period" should be taken as a basis for a statement of monthly variations in earnings. It happens, however, that this period is one in which there was a rapid growth of traffic so that the earnings of various months in each year were affected by the general annual trend upward, and by the abnormalities incidental to the war, as well as by seasonal changes.

Where the fiscal year ending June 30 is taken as the base, it may be noted that the result is to understate the relative importance of the months from July to December. For ex-

distorted by extraordinary fluctuations in revenues and expenses.

The plan of procedure was to compute a moving monthly average of twelve months, month by month for the five-year period. The deviation each month from this average was considered as the seasonal influence for that month. The following chart shows by districts the actual variation in railway operating income for each month of the five-year period and also the moving average representing the other than seasonal influences. It will be observed that in the Eastern district the peak usually appears in August; in the Southern district, in December; and in the Western district and the United States as a whole in October. The Pocahontas region

TABLE I—NET RAILWAY OPERATING INCOME WHICH CLASS I STEAM ROADS SHOULD EARN EACH MONTH IN EACH GEOGRAPHICAL DISTRICT TO PRODUCE AN ANNUAL RETURN OF 6 PER CENT ON AN INVESTMENT OF \$18,599,000,000, AS OF DECEMBER 31, 1920

Month	Eastern district		Pocahontas region		Southern district (excl. Pocahontas)		Western district		United States	
	Amount (thousands) (a)	Per cent (b)	Amount (thousands) (c)	Per cent (d)	Amount (thousands) (e)	Per cent (f)	Amount (thousands) (g)	Per cent (h)	Amount (thousands) (i)	Per cent (j)
January	\$23,926	5.3	\$3,046	7.5	\$9,732	7.4	\$27,080	5.5	\$63,784	5.7
February	20,766	4.6	2,681	6.6	10,390	7.9	27,080	5.5	60,917	5.5
March	31,601	7.0	3,331	8.2	13,020	9.9	35,450	7.2	83,402	7.5
April	31,149	6.9	3,087	7.6	10,127	7.7	33,034	6.1	74,397	6.7
May	36,115	8.0	3,453	8.5	9,996	7.6	32,988	6.7	82,552	7.4
June	42,435	9.4	3,575	8.8	9,075	6.9	37,912	7.7	92,997	8.3
July	44,693	9.9	3,453	8.5	8,680	6.6	42,835	8.7	99,661	8.9
August	51,916	11.5	4,021	9.9	9,864	7.5	49,728	10.1	115,529	10.4
September	49,659	11.0	3,818	9.4	10,785	8.2	56,129	11.4	120,391	10.8
October	47,853	10.6	3,696	9.1	13,284	10.1	60,560	12.3	125,393	11.2
November	38,372	8.5	3,250	8.0	12,494	9.5	51,206	10.4	105,322	9.4
December	32,955	7.3	3,209	7.9	14,073	10.7	41,358	8.4	91,595	8.2
Total	\$451,440	100.0	\$40,620	100.00	\$131,520	100.0	\$492,360	100.0	\$1,115,940	100.0

ample, in the test period, the three months of July are July, 1914, 1915 and 1916, while the three months of June are June, 1915, 1916, and 1917. The June average thus represents conditions nearly one year later than the July average. The distorting effect of the growth in traffic in over-emphasizing the earnings of the month of June, compared with July, is readily seen from the following:

	Class I roads Railway operating revenues	
	June	July
1914	.....	\$255,958,639
1915	\$249,495,045	.....
1916	\$300,019,380	303,232,007
1917	349,669,869	.....
Average	\$299,728,098	\$272,802,601

When the calendar year is used, the same distortion occurs, December being overemphasized as compared with January.

shows the least monthly variation, but August, on an average, is somewhat better than any other month.

It should be emphasized that we are here dealing with operating income, and not revenues or expenses. Expenses are spread more evenly throughout the year than are revenues, and hence the resultant income varies more widely from month to month than do the revenues. The percentage hereinafter given for monthly income variations should not be taken as the seasonal variation in the amount of business.

The results reached by the method above described have been modified slightly in preparing Table I in order to make the totals in both directions exactly consistent. The table shows the distribution of 6 per cent return on the investment of Class I steam roads by districts and by months. The investment is based on the tentative valuation as of December 31, 1919, used by the Interstate Commerce Commission for

TABLE II—CUMULATIVE TOTALS FROM JANUARY 1, FOR DATA SHOWN IN TABLE I

Months ending with—	Eastern district		Pocahontas region		Southern district (excl. Pocahontas)		Western district		United States	
	Amount (thousands) (a)	Per cent (b)	Amount (thousands) (c)	Per cent (d)	Amount (thousands) (e)	Per cent (f)	Amount (thousands) (g)	Per cent (h)	Amount (thousands) (i)	Per cent (j)
Jan ary	\$23,926	5.3	\$3,046	7.5	\$9,732	7.4	\$27,080	5.5	\$63,784	5.7
February	44,692	9.9	5,727	14.1	20,122	15.3	54,160	11.0	124,701	11.2
March	76,393	16.9	9,058	22.3	33,142	25.2	80,610	18.2	208,103	13.7
April	107,442	23.8	12,145	29.9	43,269	32.9	119,644	24.3	282,500	25.4
May	143,557	31.8	15,598	38.4	53,265	40.5	152,632	31.0	365,052	32.8
June	185,970	41.2	19,173	47.2	62,349	47.4	190,544	38.7	458,040	41.1
July	206,663	45.8	22,626	55.7	71,020	54.0	233,379	47.4	557,210	50.0
August	226,601	49.6	26,647	65.6	80,884	61.5	283,107	57.5	673,239	60.4
September	246,616	54.2	30,465	75.0	91,669	69.7	339,236	68.0	793,630	71.2
October	266,669	58.9	34,161	84.1	104,953	79.8	399,796	81.2	919,023	82.4
November	286,685	63.1	37,411	92.1	117,447	89.3	451,002	91.6	1,024,345	91.8
December	306,640	67.5	40,620	100.0	131,520	100.0	492,360	100.0	1,115,940	100.0

It becomes necessary, therefore, to segregate the seasonal variation from the general annual trend.

For the purpose of this study, the five-year period ending December 31, 1916, has been chosen. The reason for not going back of 1912 is that it is desirable to have the results by geographical districts, and the monthly returns were not so divided for a full year prior to 1912. The reason for stopping with 1916 is that the returns for the later years are

the purposes of Ex Parte 74, Increased Rates, 1920, 58 I. C. C. 229, with suitable modification for the classes of roads covered and for the increased investment of 1920. In Table II the same results appear cumulatively for successive periods from January. In getting the rate of return for any month or period, the process is to take such a proportion of six as the net railway operating income of the month is of the sums shown for the month or period in the tables.

Reclaiming Sheets of Outside Metal Car Roofs

Important Savings in Car Repair Costs Result from
Moderate Expenditures for Facilities

AS ONE of the results of pooling equipment and deferring maintenance during the period of federal control, owner lines are now having returned to them a great number of box cars requiring extensive repairs to roofs. At the present time one large eastern line has from 10,000



Car with Roof of Reclaimed Sheets

to 15,000 box cars equipped with various makes of metal roofs which are in need of roof repairs. Making new metal for the roofs of these 10,000 to 15,000 cars would entail an expenditure of from \$500,000 to \$750,000. To avoid this heavy expense, the road has established plants for reclaiming used roof sheets at 31 points on its system where cars are repaired.

In the great majority of instances, the wear in the original metal sheets was due to poor material supplied during the war period, resulting in leaks occurring at the lower edge of the sheets at the eaves of the car where the sheets overlap the flashing. The plan for reclaiming the sheets involves their removal from the car, cutting off the worn end, reforming and painting.

The roofing sheets, now being reclaimed, originally were



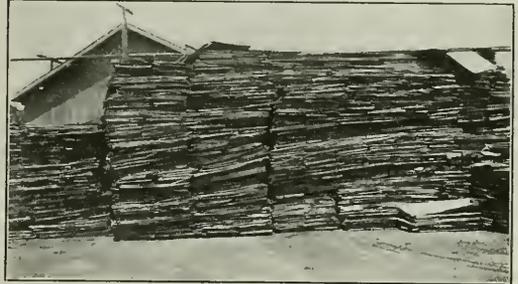
Sheets Before and After Reclaiming

of two lengths, 4 ft. 6 $\frac{5}{8}$ in. and 4 ft. 8 $\frac{7}{8}$ in. Both length sheets were used with 4 $\frac{1}{4}$ in. flashing. As reclaimed the 4 ft. 6 $\frac{5}{8}$ in. sheets are cut back to a length of 4 ft. 3 in. and used with 7 in. flashing if the wear in the original permits. Where the wear is greater the sheets are cut back to a length of 4 ft. 0 in. and used with 10 in. flashing. Sheets originally 4 ft. 8 $\frac{7}{8}$ in. long when reclaimed are cut back

to 4 ft. 5 $\frac{1}{2}$ in. for use with 7 in. flashing and to 4 ft. 2 $\frac{1}{2}$ in. when 10 in. flashing is used.

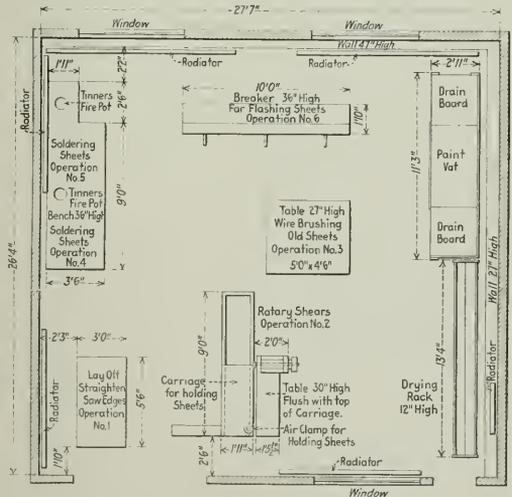
Roof sheets which are not suitable for use with either the 7 in. flashing or 10 in. flashing are squared and split in the center of the width after all defective metal has been cut off the ends, and are then formed into 7 in. flashing. The 10 in. wide flashing is made from new galvanized iron.

The drawing showing the arrangement of the facilities in



Defective Roof Sheets Formerly Used for Building Purposes or Sold for Scrap

the car roof reclaiming shop illustrates the simple and inexpensive layout and equipment required. The building is of frame construction, 26 ft. 4 in. wide and 27 ft. 7 in. long. The equipment is standard and includes facilities for straightening the sheets, rotary shears for cutting the sheets



Layout of Shop

and the flashing, a table used in connection with the shears for holding the sheets while being cut, a break machine for reforming the ends of the roof sheets and the flashing, a

table and wire brushes for cleaning old sheets, tinning and soldering outfits and painting vats and drying racks.

The reclaiming involves six operations; straightening, clipping, cleaning, soldering, reforming and painting. The painting is done by the bath method, and a second coat of paint is applied to the top of the sheets and the flashing after the roof has been rebuilt and applied.

In applying the reclaimed material to the car roofs standard practice, as it obtains with new material, is followed closely. The flashing is nailed to the side fascia and a hold-on-clip or cleat is used to hold the flashing. This is nailed to the roof carlines or to the sheathing. Where there is no carline for the nails they are driven through the sheathing and clinched. The flashing has an interlocking seam at each end to prevent leaks.

One of the photographs shows a pile of defective roof sheets. Before the plan for reclamation was perfected these sheets were used for building purposes, covering bridge ties and so on. Many of them were sold as scrap or disposed of in fills along the right-of-way. Another photograph shows piles of roof sheets before and after reclaiming, while a third photograph shows a car roofed with the reclaimed material.

With the facilities described a daily output of sheets and flashing sufficient to provide roofing for five cars is secured at each of the plants. This is done with an expenditure totaling less than \$28 per day per plant or, in other words, at a cost slightly in excess of \$5 per roof.

President Discusses Transportation

GREATER ATTENTION to the development of inland waterways and to plans for the electrification of railroads was urged by President Harding in his address at the agricultural conference at Washington on January 23. In discussing transportation the President said:

"No country is so dependent upon railroad transportation as is the United States. The irregular coast lines of Europe, its numerous indenting arms of the sea, as well as its great river system, afford that Continent exceptional water transportation. The vast continental area of the United States is quite differently situated, its greater dependence upon railroad transportation being attested by its possession of nearly one-half the railroad mileage of the world, and even this is not adequate. The inevitable expansion of population will enormously increase the burden upon our transportation facilities, and proper forethought must dictate the present adoption of wise and far-seeing policies in dealing with transportation.

"If broad-visioned statesmanship shall establish fundamentally sound policies toward transportation, the present crisis will one day be regarded as a piece of good fortune to the nation. To this time railroad construction, financing and operation have been unscientific and devoid of proper consideration for the wider concerns of the community. To say this is simply to admit a fact which applies to practically every railroad system in the world. It is as true regarding the railroads of Canada and Great Britain as it is in reference to those of the United States. It is equally applicable to the railways of Continental Europe, in whose development considerations of political and military availability have too far overweighed economic usefulness. In America we have too long neglected our waterways. We need a practical development of water resources for both transportation and power. A large share of railway tonnage is coal for railroad fuel. The experience of railway electrification demonstrates the possibility of reducing this waste and increasing efficiency.

"We may well begin very soon to consider plans to electrify

our railroads. If such a suggestion seems to involve inordinate demands upon our financial and industrial power, it may be replied that three generations ago the suggestion of building 260,000 miles of railways in this country would have been scouted as a financial and industrial impossibility.

"The waterway improvement represents not only the possibility of expanding our transportation system, but also of producing hydro-electric power for its operation and for the activities of widely diffused industry.

"I have spoken of the advantage which Europe enjoys because of its easy access to the sea, the cheapest and surest transportation facilities. In our own country is presented one of the world's most attractive opportunities for extension of the seaways many hundred miles inland. The heart of the continent with its vast resources in both agriculture and industry would be brought in communication with all the ocean routes by the execution of the St. Lawrence waterway project. To enable ocean-going vessels to have access to all the ports of the Great Lakes would have a most stimulating effect upon the industrial life of the Continent's interior. The feasibility of the project is unquestioned and its cost, compared with some other great engineering works, would be small.

"Disorganized and prostrate, the nations of Central Europe are even now setting their hands to the development of a great Continental waterway, which, connecting the Rhine and Danube, will bring water transportation from the Black to the North Sea, from Mediterranean to Baltic. If nationalist prejudices and economic difficulties can be overcome by Europe, they certainly should not be formidable obstacles to an achievement, less expensive, and giving promise of yet greater advantages to the peoples of North America. Not only would the cost of transportation be greatly reduced, but a vast population would be brought in immediate touch with the markets of the entire world."

Many of the speakers at the conference urged a reduction in freight rates as one of the most important means of improving the condition of the farmers.

The conference appointed a general committee on transportation, with H. J. Waters of Missouri as chairman, and also committees on railway, waterway and highway transportation. Among the members of the committee on railway transportation are E. E. Clark, former chairman of the Interstate Commerce Commission; T. C. Powell, vice-president of the Erie; M. J. Gormley, chairman of the Car Service Division, American Railway Association; Clifford Thorne, of Chicago, and S. H. Cowan, of Texas. Julius H. Parmelee, director of the Bureau of Railway Economics, is secretary of the committee. B. M. Robinson, president of the American Short Line Railroad Association, was appointed a member of the waterway transportation committee, and J. E. Forman, president of the Chicago, Rock Island & Pacific, a member of the committee on highway transportation.

JOHN G. WAIBER, speaking for the Eastern railways, calls attention to the extravagance of the statements in the newspapers, to the effect that the revision in the rules for clerks announced last week by the United States Railroad Labor Board would result in a saving for the carriers of \$50,000,000 a year. The same figure was named, not long ago, in connection with the revision of the shipmen's rules. Neither of these estimates was authorized by the Labor Board or by any member of it. When employees, of the classes referred to, had their pay advanced in December, 1919, it was estimated that the total increased cost of labor would be \$25,000,000. It is obvious that a revision of only a portion of the rules, applying to less than 38 per cent of the employees covered by the \$25,000,000 estimate would not result in a saving of twice twenty-five millions.

Labor Board Announces New Rules for Clerks

Punitive Overtime After Ninth Hour and Employment of Men on "Split Tricks" Authorized

A NEW SET of 51 rules to govern the working conditions of railroad clerical employees was announced by the Railroad Labor Board on January 23. The most important departures from the provisions of the clerks' national agreement, which will be superseded by the new code, are contained in new rules relative to the payment of overtime, the so-called arbitraries or punitive payments and the employment of men on "split tricks." Under the new rules regarding overtime for clerical workers time and one-half is paid after the ninth hour instead of after the eighth hour as was the case under the overtime rule of the national agreement.

The principle of the eight-hour day, however, is specifically retained in the rules as it was in the recently announced codes to govern the working conditions of shop and maintenance of way employees. Where clerical work is intermittent, the new provisions permit the employment of men on "split tricks"—prohibited by certain provisions of the national agreement.

A dissenting opinion directed at the new overtime rules was made by the three railroad members on the Board, Samuel Higgins, J. H. Elliott and Horace Baker. This opinion termed the payment of punitive overtime for any service rendered by the clerical employees within the ten hour period as "unjust, unfair and unreasonable." This dissenting opinion was answered at length by W. L. McMenimen of the labor group on the Board and B. W. Hooper and G. W. W. Hanger, members of the public group. A. O. Wharton also appended a dissenting opinion, concurring in the statement signed by Messrs. McMenimen, Hooper and Hanger but expressing opposition to the provisions of the new overtime rule on the grounds that punitive overtime should begin after the eighth hour instead of the ninth.

The new provisions are effective February 1, and apply to each of the carriers parties to the dispute covered by the decision, except in such instances as any particular carrier may have agreed with its employees upon any one or more of such rules, in which case the rule or rules agreed upon by the carrier and its employees shall apply on said road."

Board Approves 27 Rules of the Clerks' National Agreement

The clerks' national agreement contained 87 rules. The new code announced by the Board contains 51 rules, of which 27 are reproductions of rules of the national agreement. Six rules of the national agreement are automatically eliminated by new conditions and 15 rules have been changed—but 11 materially. Thirty-nine of the rules of the national agreement have not been mentioned in the new code, the points involved being left for negotiation between the individual carriers and their own clerical forces. Three rules covering new points of controversy have been added by the Board.

The 15 rules which have been changed in this order are in some cases more elastic and in others more specific. The principal change, as stated above, has been made in the provision pertaining to overtime. Under the clerks' national agreement hourly rated employees received time and one-half for overtime after the eighth hour and daily rated employees received time and one-half for overtime for work in excess of the full number of hours per week (produced by multiplying by eight the days of the weekly assignment). Under the new rule no such distinction is made

and all employees are paid pro-rata rates for the ninth hour and time and one-half thereafter for overtime.

Rules Requiring Punitive Payments Altered

The group of rules relating to payments for intermittent service, for reporting, for work during meal periods, when notified or called, when Sunday or holiday work takes less than a full day period, and for travel time in camp cars, have been revised in general to cut down partly payments to employees for which no service is received. The changes which have been made in these rules are summarized as follows:

Rule 58 of the national agreements provided in part that employees should be paid time and one-half on the minute basis for service performed continuous with and in advance of the regular work period.

The new rule eliminates this provision but continues the remaining part of the rule which provides for the payment of a minimum of three hours for two hours work or less when called to perform work not continuous with the regular work period.

Board Authorizes "Split Tricks"

Rule 49 of the national agreement relating to intermittent service prohibited the working of "split tricks," by providing for the payment of a flat monthly rate and setting a minimum of 48 hours per week for workers so employed. The new rule covering this point states:

Where service is intermittent 8 hours actual time on duty within a spread of 12 hours shall constitute a day's work. Employees filling such positions shall be paid overtime for all time actually on duty or held for duty in excess of 8 hours from the time required to report for duty to the time of release within 12 consecutive hours, and also for all time in excess of 12 consecutive hours computed continuously from the time first required to report until final release. Time shall be counted as continuous service in all cases where the interval of release from duty does not exceed one hour.

Under the old rule an employee reporting for duty at eight a. m. received time and one-half overtime after four p. m., although during that period he might have had several hours of idleness. The decision of the Board on this point was influenced by the charges which have been made that employees actually performed other work in such intervals. For instance at a station under the present rule where all the work, due to the arrival and departure of trains only in the morning and evening, comes within a spread of 12 hours, an employee covered by this provision would report for work in the morning, be released in the middle of the day without pay and report in the evening for the remainder of the day's work of 8 hours. Under the old rule he would have been paid punitive overtime for the work performed in the evening, or it would have been necessary to employ two shifts.

In commenting on this rule at the Labor Board it was said, "Employment conditions of this sort at the smaller stations caused criticism by the farmers who contended that the employment of unnecessary men and the payment of punitive overtime, because of periods of enforced but compensated idleness, exerted a demoralizing influence on labor conditions in the country. The new rule will not only allow the railroads to open many small stations with one shift of employees, but at the larger terminals, where the arrival and departure of trains is bunched, to employ baggagemen, train announcers, gatemen, train and engine crew callers,

and employees in similar positions on 'split tricks' instead of having to maintain two shifts."

Other Changes in Punitive Payment Provisions

Rule 50 of the national agreement, providing for the payment of a minimum of three hours' pay for employees called and not used, and for the payment of eight hours' pay if an employee so called is released before the end of a full day's work, has been changed to provide for the payment, under such conditions, of a minimum of but two hours instead of three, and for the payment of a minimum of four hours if worked any portion of the day, or the payment of eight hours where the employee is worked in excess of four hours. A provision has also been added to this rule stating that it does not apply "to regular employees who lay off of their own accord before completion of the day's work."

Rule 54 of the national agreement, providing for the payment of time and one-half to employees who work through their regular meal period, has been changed to provide for the payment of but pro-rata rates under these conditions.

Rule 65 of the national agreement, providing for the payment of a minimum of two hours at overtime rates for two hours' work or less, and pro-rata rates after the second hour of each tour of duty, to employees who are called to work on Sundays and holidays for a less number of hours than constitutes a day's work, has been changed to provide for the payment of employees under these conditions at the pro-rata rates for actual time worked with a minimum of three hours, and for the payment of time worked before or after the limits of the regular week day assignment in accordance with Rule 57, which has already been described.

Rule 66 of the national agreement, containing a method for determining the daily rate of employees who have heretofore been paid on a monthly or weekly basis, has been re-written to eliminate the specific method of computation. The remainder of the rule remains unchanged.

Rule 69 of the national agreement, providing for the payment of straight time to employees traveling in boarding cars during regular working hours, for traveling on Sundays and holidays during the hours established for work periods on other days, and for the payment of half time for time spent in traveling in boarding cars after 10 p. m. and before 6 a. m., has been changed to eliminate the necessity for paying for any time so spent after the regular work period hours.

In addition to these changes, the scope of the rules has been changed so that the clerks which this agreement covers have been divided into two classes, *i. e.*, clerical workers and machine operators. The exceptions to this rule have been changed so that "laborers" instead of "employees" on coal and ore docks, elevators, piers, wharves, etc., are exempted from its provision. The paragraphs of this rule, providing for the exception of personal office forces, chief clerks, supervisory agents at larger stations, foremen who supervise sub-foremen, etc., have been eliminated.

The rule of the national agreement, relating to the qualifications and definition of clerical workers, has been re-written to conform to the classification mentioned in the preceding paragraph and is less specific in excepting certain classes of employees from the provisions of the rule. In this connection a new class of clerical workers, "student and apprentice qualifying for specific clerical work or as machine operators," are excepted.

Rule 76 of the national agreement defining "daily assigned representative," has been re-written to include not only "the regularly constituted committee representing the class of employees on the railroad where the controversy arises, but to include any representative or representatives employees directly interested may select or designate."

A new rule adopted by the Board requires the carriers to

give employees who are leaving the service a letter showing the length of their service, the capacity in which they were employed and their cause for leaving, if the employee requests it.

The other changes made in the rules are of a minor nature and will not bring about any decided changes in the working conditions of clerical employees.

The rules of the national agreement which have been continued in the new code are those headed or pertaining to promotion, the eight-hour day, length of meal periods, continuous work without meal period, time of the meal period, changing starting time, starting time of shifts, employees recalled after completing their regular tour of duty, absorbing overtime, authorizing overtime, notification when time claims are disallowed, day of rest, temporary assignment, witnesses when attending court, rating positions, preservation of rates, pay of women employees, pay in new positions, posting notices, transfer by management and by seniority, transportation, incapacitated employees, furnishing of machines, bond premiums, free transportation and rates.

The rules of the national agreement which are remanded to negotiation between the individual carriers and their clerical forces include those headed or pertaining to vacancies and new positions, declining promotions, failure to qualify, declaring former position vacant, bulletins, temporary appointments, short vacancies, indefinite vacancies, long vacancies, change in rates, bidding for positions after absence, more than one vacancy, changing starting time, reducing forces, rosters, scope of roster, filing applications, transferring, consolidations, positions abolished, re-entering service, excepted positions, validating records, exercising seniority, hearings, appeals, further appeal, grievances, representation, right of appeal, advice of cause, exoneration, date of suspension, transportation, organization membership, pending decision, time limit, leave of absence and extension of seniority. These rules in general compromise Articles III, IV and V of the clerks' national agreement covering broadly the regulation of seniority, discipline and grievances and leaves of absence.

Regarding rules on vacations and sick leave with pay, the Board's decision says: In the opinion of the Labor Board the question of vacations and sick leave with pay is one which should be left at this time to the carriers and their respective employees for the adoption of such rules as may be severally and mutually agreed upon.

Those rules in the new code which are similar to rules of the national agreement do not carry with them the interpretations of the Railroad Administration, adjustment boards or similar agencies, according to the closing terms of this decision.

Railroad Members of Board File Dissenting Opinion

The dissenting opinion of Messrs. Higgins, Elliott and Baker, the railroad representatives on the Board, gave as reasons for their objection to the provision of the new rule which provides for punitive payment for service rendered beyond the ninth hour, the following:

Prior to Federal control of railroads, clerical forces generally were paid a monthly rate basis which covered all service rendered.

Other classes of employees covered by the clerks' agreement, including freight house laborers and other station employees, generally worked 10 hours per day and were paid at pro-rata rates for all time worked, or, during the same hours of service per day are now required to meet business needs throughout the country along the lines of the carriers.

The clerks' rules govern a large class who are not clerks either by training or special skill required, such as yard clerks, messenger boys, chore boys, laborers, students, apprentices, et cetera.

The work of all classes covered by this agreement is to an extent intermittent and does not require constant application. With a ten or day more than 10 hours the carriers cannot, with economy and efficiency, meet the demands of the public.

Punitive payment has but one justification, namely, preventing the working of unreasonable hours; therefore, it is our judgment

that the imposing of rules requiring punitive payment for any service rendered by employees covered by this decision within the 10-hour period is unjust, unfair, unreasonable, and burdens the carrier with an uneconomical condition.

Labor and Public Members Join

in Answering Dissenting Opinion

The answer to this opinion by Messrs. McMenimen, Hooper and Hanger takes up the dissenting opinion of the railroad representatives in detail. The following is an abstract of this answer:

The first paragraph of the dissenting opinion stating that "prior to federal control of railroads clerical forces generally were paid on a monthly rate basis which covered all service rendered" is termed "erroneous to the extent that a number of carriers were paying overtime to clerical and station employees prior to federal control."

The second paragraph of the dissenting opinion stating that employees covered by the clerks' agreement generally worked ten hours per day and were paid pro rata rates for all time worked is characterized as "erroneous to a very large degree" and "rather indefinite." In support of this opinion Messrs. McMenimen, Hooper and Hanger cite a large number of responses by individual railroads to a questionnaire sent out during federal control to ascertain certain facts with respect to the conditions of employment governing employees covered by Supplement 7 to General Order 27 which, it is claimed, covers the employees in question. Most of the answers quoted indicate that clerical employees did not work ten hours a day as a rule, the answers varying on different carriers. To further sustain their position, Messrs. McMenimen, Hooper and Hanger quote from the monthly report on employees' service and compensation of the Interstate Commerce Commission for the month of July, 1921, which shows that the various classes of employees covered by the clerks' national agreement during that month worked from 169 to 222 hours per employee on straight time, and from 1 to 17 hours overtime.

The statement in the dissenting opinion to the effect that "the Clerks' rules govern a large class who are not clerks, either by training or skill required, such as yard clerks, messenger boys, chore boys, laborers, students, apprentices, etc." is refuted by the statement that the inexperienced clerical workers "comprise a very small percentage of the total." It is said, for instance, that the "yard clerks are among the most important clerks on the railroad and their work not only requires training and special skill but considerable responsibility."

Referring to the paragraph in the dissenting opinion which states that "the work of all classes covered by this agreement is to an extent intermittent and does not require constant application," Messrs. McMenimen, Hooper and Hanger again cite figures from the report of employees and compensation for July showing that the number of employees in that month, subject to the provisions of the clerks' rule, was 309,793. They add "it will be noted that approximately 205,000 of these employees are clerical workers. It has been conservatively estimated by certain railroad managers that about 50 percent of clerical workers in railroad service are employed in the general offices and a large percentage of the balance are in the larger freight stations, division offices and store departments where the work performed requires continuous application throughout the entire tour of duties. In any event Rule 49 of this decision provides that the eight hours work may be distributed within a spread of 12 hours without payment of any overtime."

A. O. Wharton Files Separate Opinion

Mr. Wharton's statement accompanying the Board's decision says:

"I concur in the statement made by the majority, although opposed to the provisions of Rule 57 for reasons set out in

the majority statement and because the principle of punitive payment for overtime after eight hours, for service of this character, is so well established and so generally recognized, and for the further reason that it is not my conception of the purposes of the Transportation Act wherein the Labor Board is charged with the duty of establishing 'just and reasonable' working conditions."

Interstate Cited

The Labor Board has cited the Interstate Railroad to appear before it on February 6 to determine whether or not that road has violated a decision of the Board in a controversy between this carrier and the Brotherhood of Railroad Trainmen and the Brotherhood of Locomotive Firemen and Enginemen. On December 31, 1921, the Labor Board ordered the Interstate Railroad to reinstate a switchman and fireman who claimed to have been discharged because they had responded to requests from union officers for information as to the status of wages being paid on the carrier. The carrier, according to the Labor Board, did not combat these charges but replied to the effect that it did not care to present any evidence in the case because it did not deal with its employees through the representatives of labor organizations.

The Board then sustained the position of the labor organizations and ordered the reinstatement of these men with pay for time lost. It is now charged that the carrier has refused to allow them to re-enter the service.

Automatic Train Stops in Use on American Railroads

THE notice of the Interstate Commerce Commission, calling upon prominent railroads to install automatic train stops, which was published in the *Railway Age* of January 14, page 189, has revived interest in the general subject of automatic stops, and many inquirers are calling for information concerning it. Apparatus of this character is already in use on 11 railroads in this country, of which four run both passenger and freight trains, and it will be of interest at this time to note briefly the situation on these railroads. The list below, "List A," gives the names of these roads, with some data concerning the kinds of apparatus and the extent of the installations.

This list begins with elevated and subway intramural railroads, the situations of which are so different from those of ordinary railroads that most students of the problem have paid little heed to the question of adapting the simple mechanical trips of these city railroads to the needs of heavy and mixed trunk-line service; but it is proper to include the city lines in this list, for two reasons: First, the main reason for classing the simple trip as available only on these city roads is that it is particularly susceptible to being interfered with by snow and frost; but the government now calls for installations where snow and frost do not make much trouble; and the adaptation of the principles of these trips to apparatus usable in cold climates has not as yet been thoroughly studied.

Second, the experience of the subways and the elevated lines should be availed of by all railroads in the matter of discipline of runners. One of the persistent arguments against the use of automatic train stops is that they will make, or tend to make, all enginemen careless. But officers of roads using the stops give strong testimony that the actual effect is exactly the other way; the stops make the men more careful. Testimony on this point on the Boston Elevated covers a period of over 20 years. The Chicago & Eastern Illinois, with its more varied traffic and different conditions, confirms the story of the Boston Elevated. An

important element in the successful operation of automatic stops on a busy line is the success or (un)success) with which the enginemen maintain smooth and regular operation; and no road can afford to ignore the records of the years of successful operation on these city railroads, with their many hundreds of motormen.

In a second list, "List B," there are shown the names of roads on which experimental installations have been made. Of the 16 items in this list, five—Nos. 1, 6, 7, 13 and 15—have been the subject of recent published descriptions or news notes, as shown in the list. Item 12 refers to a recently reported contract, concerning which we have no detailed information. The other 10 refer to experiments which have been closed, or which have lain dormant for a considerable length of time.

"List C" is a rearrangement of the items given in "List B."

The most recent comprehensive publication relating to automatic train stops is the report of the Automatic Train Control Committee (A. M. Burt, chairman), of the United States Railroad Administration, which report was transmitted to the director-general of railroads on December 31, 1919, and abstracted in the *Railway Age* of January 16 and 30, 1920, pages 227 and 382. This report, hereinafter referred to as the Burt Report, gave the results of a thorough and intimate study made by a committee of seven, including six railroad officers and engineers, and W. P. Borland, chief of the Bureau of Safety of the Interstate Commerce Commission.

Besides analyzing and describing the different types of apparatus and giving brief descriptions of devices examined, the report, following its general conclusions, gives a comprehensive bibliography of the subject; and a list of 17 devices, more or less fully developed, which were deemed worthy of further tests. Eleven of these devices are noted in the tables which are printed herewith.

The report of this committee was extremely cautious, the most progressive paragraph being that to the effect that, on lines of heavy traffic, fully equipped with automatic block signals, the use of train control devices "is desirable." The committee recommended that after the termination of federal control of the railroads, its work should be continued by a committee of the American Railway Association; and such a committee was established. Of this committee, C. E. Denney, vice-president of the New York, Chicago & St. Louis, is chairman, and G. E. Ellis, Chicago, is secretary.

This last named committee, in conjunction with the Bureau of Safety of the Interstate Commerce Commission, issued a list of requisites for automatic train control which was noticed in the *Railway Age* of March 4, 1921.

LIST A—AUTOMATIC STOPS IN USE

- a Boston Elevated—Stops in use over 20 years. Simple mechanical trip. Described in Signal Dictionary, pages 122-124.
- b Interborough Rapid Transit Co., New York—Subway and elevated lines. Simple mechanical trip. Described in Signal Dictionary, page 117.
- c Hudson & Manhattan (Subway).—New York and Jersey City. Same general type as above. Signal Dictionary, page 108.
- d Pennsylvania, New York City Terminal. Tunnels; also in unprotected stations. The Hill mechanical trip. Described in Bulletin No. 63 of the Union Switch & Signal Co. and in the *Signal Engineer* of January, 1912.
- e Brooklyn Rapid Transit Co. (N. Y.) Subway and elevated lines.
- f Chicago & Eastern Illinois—Used on both passenger and freight trains over about 100 miles of line. Miller Train Control Corporation, apparatus described in the *Railway Age*, November 27, 1914.
- g Chesapeake & Ohio Single Track Train Control Company, in use on about 50 miles, single track. Apparatus described in *Railway Age*, March 24, 1919. Rump type.
- h Chicago, Rock Island & Pacific. Regan Safety Device Co. Described in *Railway Age*, April 9, 1919, page 1243. Rump type, with speed control.

NOTE:—The three last preceding installations have been under inspection during the past year by the Bureau of Safety of the Interstate Commerce Commission and the Train Stop Committee of the American Railway Association.

- i Cincinnati, Indianapolis & Western. The Shadle automatic train control, intermittent electric contact type. *Railway Age*, October 1, 1919.

- j Washington Water Power Company. This is a trolley road; overhead automatic stops in use on 22 miles. Described in Signal Dictionary, page 112.
- k San Francisco-Oakland. Double track line, overhead trip, Signal Dictionary, page 113.

LIST B—AUTOMATIC TRAIN-STOP EXPERIMENTS

- 1 Buffalo, Rochester & Pittsburgh—General Railway Signal Co., induction apparatus; *Railway Age*, October 29, 1921, page 817.
- 2 Canadian Pacific.—Prentice "wireless" apparatus. *Railway Age*, June 23, 1911.
- 3 Chicago, Burlington & Quincy.—Gollos automatic stop. *Railway Age*, March 21, 1916.
- 4 Delaware, Lackawanna & Western.—Wooding's train control. *Railway Age*, September 14, 1917, and November 9, 1917.
- 5 Interborough Rapid Transit Co.—G. P. Finnigan's induction apparatus. Described by J. M. Waldron in the *Railway Age*, June 16, 1911.
- 6 Erie.—International Signal Company's apparatus; Webb system. *Railway Age*, January 14, 1922, page 175.
- 7 New York Central.—Sprague induction system. *Railway Age*, November 26, 1921, page 1051.
- 8 New York Municipal Railways (Brooklyn Rapid Transit Co.) Elaborate speed control system, made by the General Railway Signal Co.; subjected to elaborate tests in 1916. Description in the *Signal Engineer*, August, 1915.
- 9 New York, New Haven & Hartford.—The Webb apparatus, noticed above, was subjected to extensive tests in 1917.
- 10 Pennsylvania (Western Lines).—Gray-Thurber system; tested by the Division of Safety, Interstate Commerce Commission, in 1914. Report submitted to Congress on January 9, 1915.
- 11 Philadelphia & Reading.—Schweyer's induction system. *Railway Age*, June 21 and July 5, 1918.
- 12 Pittsburgh & Lake Erie.—Union Switch & Signal Co.
- 13 Raritan River.—M-V All-weather train control. *Railway Age*, January 14, 1922, page 185.
- 14 Southern (C. N. O. & T. P.)—Julian-Beggs automatic speed control. *Railway Age*, March 21, 1916.
- 15 Southern Pacific.—National Safety Appliance Co. Experimental plant is now being installed between Hayward, Calif., and Halverton.
- 16 Western Pacific.—National Safety Appliance Company's induction apparatus subjected to extensive tests near Oroville, Cal. *Railway Age*, October 8, 1915.

LIST C—INDEX TO NAMES OF PROPRIETORS IN LISTS A AND B

NOTE:—The numbers at the left refer to the position of the items in Table B, and the letters to Table A.

.. Bostwick—See National Safety Appliance Company.

5 Finnigan—Interborough Rapid Transit Co.

1 General Railway Signal Co.—B. R. & P. Ry.

3 General Railway Signal Co.—B. R. T. Co. (N. Y. Municipal Railways)

3 Gollos—C. E. & Q. R. R.

10 Gray-Thurber—Pennsylvania

6 International Signal Co.—Erie and N. Y., N. H. & H.

14 Julian-Beggs—Southern.

13 M-V All-weather train control—Raritan River.

f Miller—Chicago & Eastern Illinois.

16 National Safety Appliance Co.—Western Pacific.

15 National Safety Appliance Co.—Southern Pacific.

2 Prentice—Canadian Pacific.

Regan—Chicago, Rock Island & Pacific.

h Schweyer—Philadelphia & Reading.

i Shadle—Cincinnati, Indianapolis & Western.

7 Sprague—New York Central.

12 Union Switch & Signal Co.—Pittsburgh & Lake Erie.

6 Webb (See International Signal Co.)

4 Wooding—Delaware, Lackawanna & Western.

The devices named by the Burt Committee, December, 1919, as available for test, were as follows: In Table A, items f, g, h, i; in Table B, items 1, 4, 6, 7, 11, 12, 15.

The following references to the *Railway Age* will be of interest to those who may wish to examine the subject of cab signals, some of the details of which are of value in connection with the automatic stop problem:

- 1 May 7, 1920. Description of Augereau's wireless cab signal, as installed on France.
- 2 July 2, 1920. Page 29. Historical review of cab signal experiences in Europe, by Louis Weissenbruch, secretary of the International Railway Association.
- 3 March 4 and 18, 1921. Report of New York State Public Service Commission on automatic stops.
- 4 April 22, 1921. J. B. Latimer on automatic stops and audible signals.
- 5 December 3, 1921; page 1119. Recent improvements in cab signals in France.

Matter supplementary to the above mentioned article by Mr Weissenbruch may be found in a paper by F. Maison, in the Bulletin of the International Railway Association for November, 1921. Mr Maison's paper has been prepared for the International Railway Congress which is to be held in Rome next April. It fills about ninety pages of the Bulletin. Like Mr Weissenbruch's paper, it covers experiences terminating about 1914; and the author promises a second paper dealing with developments in this field since 1914.

Shippers Urge Reductions in Freight Rates

Program Provides for Testimony as to Various Groups of Commodities and on Behalf of Public and Labor

WASHINGTON, D. C.

THE RATE HEARING before the Interstate Commerce Commission since January 19 has been devoted to testimony of shippers as to particular commodities, beginning with coal and coke on January 19 and 20, and ore, furnace materials and iron and steel articles on January 21 and 23, and sand and gravel, brick, lime, cement, gypsum and asphalt on January 24 and 25. A revised schedule of dates for the hearing as to various commodities has been published, which devotes four days, January 30 to February 4, to testimony of the public and shippers as to general aspects of the case. It is understood that during this period Secretary of Commerce Hoover and Walker D. Hines, former director general of railroads, will appear. February 10-11 has been set aside for the railway labor organizations.

The other dates for commodities are as follows: January 26-27, lumber and forest products; January 28, fertilizers and materials, sulphuric acid, phosphate rock; February 8, vegetable oil and soap; February 9, grain, flour and agricultural products; February 15, canned goods and wholesale groceries; February 16, fruits and vegetables; February 18, milk, cream and dairy products; February 20, beverages and beverage containers; waste material; February 21-22, livestock and packing house products; February 23-24, petroleum and petroleum products; February 25, other commodities. Announcement will be made later of dates for carriers' rebuttal evidence and for oral argument. In beginning the commodity testimony Commissioner Hall asked the witnesses to bear in mind that the investigation is not being held for the purpose of going into questions of relationships, differentials, etc.

Coal

J. D. Morrow, vice-president of the National Coal Association, the first witness on behalf of shippers, urged a heavy nation-wide cut in freight rates on coal as a means of lowering the cost to the ultimate consumer and improving the economic position of the nation as the first to be made if the commission finds that any rate reductions are warranted. He said, however, that the association does not have a sufficient knowledge of the details of the carriers' finances to attempt to say whether rates generally can be reduced or to what extent, and it is entirely satisfied to leave the determination of that question to the commission.

"We feel," he said, "that the position of bituminous coal in the economic life of the nation is such that under present circumstances the rates on this commodity deserve special consideration. Our position is that material reductions in these rates should reduce the unit operating expenses of the carriers and tend to increase their traffic. Moreover, we are convinced that such rate reductions are necessary to the revival of business and industry, upon which the carriers must depend primarily for increased revenue. Although not an issue here, the inflated wage scales in the mines and upon the railroads are an important part of these economic conditions and I would not feel that I had stated clearly the position of the bituminous coal producers as I understand it, did I not recognize that fact and state it as the conviction of these men that such inflated wage scales on the roads and in the mines must be readjusted. I wish it clearly understood at the outset that the National Coal Association wants the carriers to receive a fair and adequate return, not only because such return is just to them, but because it is even more essential to the prosperity of the United States

and the welfare of its citizens. We approach this inquiry with every desire to give full weight to the requirements of the carriers' financial position."

Although not definitely suggesting what particular cut in rates the railroads ought to make, Mr. Morrow said that through the savings to the carriers in fuel coal alone, and making allowance for the saving in freight rates on their own fuel coal, the railroads undoubtedly would be justified in making a reduction of 75 cents a ton, although, he said, it might be only 50 cents. Mr. Morrow also referred to the reductions in prices of some of the other materials used by the railroads, but said he did not wish to over-estimate the extent of such reductions, because he was not familiar with the financial position of the producers and manufacturers of railway supplies nor with their ability to pass on the full measure of any reduction in their production costs.

When Mr. Morrow had urged a reduction in export coal rates, Commissioner Hall remarked that it seems to be "a little strong" to say that the rail rate is the main cause of the loss of export business. It remains to be demonstrated, he said, whether a reduction of the rail rate to nothing at all would be sufficient to enable the American producers to compete with foreign coal.

Mr. Morrow cited figures showing that the railroads are paying considerably less for bituminous coal than for months past and quoted witnesses for the carriers as admitting that their fuel costs for the coming year, particularly for the coal year beginning April 1 next, after wage readjustments are made in the unionized coal mines, will be considerably lower than for the past year.

As indicating the excessive freight charge on haulage of coal today, Mr. Morrow pointed out that the average rate per ton is \$2.27, as against an average sales price at the bituminous mines of \$2.13 a ton, or 14 cents higher than the cost of the coal.

"The freight charge of \$150 or \$200 on a car of coal which can be bought at the mines for from \$50 to \$100," said Mr. Morrow, "shows on its face the disproportion between the transportation cost and the market value of the commodity."

"Doubling the freight rate on a carload of motor cars, for example, from Detroit to Washington between 1914 and 1922, added only \$15 or \$20 to the price of a car selling at approximately \$1,000 to \$1,500. Such a condition makes no material difference to the customer who is ready to pay \$1,000 for a motor car, but an increase of \$50 or \$100 a car on coal which is being sold at the mines for less than the transportation charge on that coal to destination, will quite obviously have a deterrent effect upon the consumer of that coal who expects to use it in industrial establishments."

To make plain the relation of the transportation charges to the present high price of delivered coal, Mr. Morrow stated that 48½ per cent of each dollar paid for coal ordered by the manufacturer goes to the operator, out of which all his costs must come, while 51½ per cent goes to pay the freight on the coal.

Mr. Morrow quoted from reports just obtained by the National Coal Association from operators with 55,460,000 tons of bituminous tonnage during the 7 months from April 1 to October 31, 1921, showing that during those months there was an average loss of 2 cents a ton, while the reports for November and December showed even further losses.

Mr. Morrow pointed out that, while wage cuts in the union mines "would result in some lowering" of the mine price of coal, still the effect of such reductions already has

been discounted in several fields through reductions in the mine price to meet lower wage and mine prices in competing non-union fields.

George H. Cushing, managing director of the American Wholesale Coal Association, said the present rates on coal are not necessary to allow the railroads to collect the needed revenues and he produced voluminous statistics to show that with a normal tonnage the railroads could stand a reduction of 13.87 per cent of their revenues and still earn 6 per cent on their value. Rates that will do this, he said, are unreasonably high, and he did not understand that the carriers contend for a schedule of rates so high that they can earn 6 per cent in years of depression. The rates, Mr. Cushing contended, should be no higher than 50 per cent above the rates of April, 1917.

Mr. Cushing attempted to predict the future traffic of the carriers by estimating a continued increase in coal production based on an analysis of the recovery after periods of depression in the past and then declared that the statistics indicate that the growth of coal production measures precisely the expansion of all business. The figures of the American Coal Association show, he said, that for each car of coal loaded, the railways load a fraction more than three cars of all freight other than coal. In addition to a general reduction of coal rates, he said, the rates now applying on export coal are unreasonable to the extent of \$1 a ton, that in any readjustment of rates the differentials as between producing districts which obtained on April 6, 1917, should be preserved and that reassignment and demurrage charges should be reduced.

Mr. Cushing said the railways have a reasonable expectancy of business arising from the fact that the business of the country is likely to continue to grow, that the railways are by law guaranteed against those fluctuations of earnings which formerly arose from competitive rates and that this expectancy of steadily increasing business at stable rates is a sufficient guarantee for any business concern.

Mr. Morrow and Mr. Cushing were recalled by the commission to discuss the question of seasonal coal rates or any other method of equalizing the production of coal throughout the year. Both expressed the opinion that it would take more than a difference in the freight rate to overcome the conditions which lead consumers to buy coal in general only as they need it and that the only solution of the problem of seasonal fluctuations is to find a way to equalize the need for coal. Mr. Cushing said the coal industry had always made seasonal coal prices but they had had little effect in encouraging people to buy coal when they didn't want it. Mr. Cushing said that the need of industry for coal is largely controlled by the seasonal buying power of the farmer. Both expressed the opinion that they would prefer to have the present freight rates and good railroad service than lower rates and an inferior service.

H. W. Prickett of Salt Lake City, on behalf of Utah and Wyoming coal producers, said that water-borne coal from Australia and from Cardiff is being sold at San Francisco and other coast cities at \$7.50 to \$8.00 a ton, whereas the rail rate alone from Utah to San Francisco is \$7.25. When A. P. Hamburg, commerce attorney of the Illinois Central, said the rate had been reduced to \$6, Mr. Prickett said the reduction was still under discussion.

A. H. Campbell, traffic manager of the International Paper Company, urged a reduction in the rates on coal, which he said had become so burdensome that his company had converted two of its mills in Maine to oil-burning. His company pays over a million dollars a year in freight and coal alone, he said, and the rates are now close to 250 per cent of the mine price of coal.

E. E. Kelley, representing the state of North Dakota, said the present rates on coal are excessive and unreasonable.

W. J. Thompson, secretary of the Anthracite Producers'

Association, said that present prices of anthracite are too high for the average consumer to pay. The anthracite producers, he said, "gravely doubt" that general rate reductions would restore general prosperity, but consider that freight rates on their product should be lowered to nearer the rates on bituminous.

Iron, Steel and Ore

Shippers of iron and steel articles in general asked for an elimination of the increases made by the commission in Ex Parte 74, although most of them disclaimed any intention to deprive the carriers of adequate revenues. M. D. Langhorne, speaking for the Virgiuia Pig Iron Association, declared that every blast furnace and ore mine in his state is closed down because they cannot operate without losing from \$4 to \$5 on each ton of pig iron produced. He said that if rates on basic commodities should be reduced, the movement will be so stimulated that the carriers will receive a larger net revenue than they are receiving at present. A. G. MacKenzie, testifying on behalf of the Utah chapter of the American Mining Congress, said that freight rates constitute 22 per cent of the cost of producing the metals that come from the mines in Utah, which are now operating at about 28 per cent of capacity. Every item of cost of production had been reduced, he said, except freight rates.

J. A. Topping, chairman of the Republic Iron & Steel Company, appeared as spokesman for 40 independent iron and steel manufacturers. He said that excessive freight rates, like excessive prices for iron and steel, were both the outgrowth of war conditions. The manufacturers have taken steps to bring about liquidation and deflation and they believe that freight reductions are essential to a normal consumption of iron and steel. He recognized that the problem is whether the cost of conducting transportation can be reduced sufficiently and that this is largely a labor question. Yet, he said, this item has hardly been touched. The reduction in railroad wages has amounted to only about 12 per cent while the wages of most other labor have been reduced from 30 to 50 per cent. He said that if the Adamson law stands in the way, its repeal should be urged in the public interest and he advocated making the Railroad Labor Board subject to the orders of the Interstate Commerce Commission on the principle that two boards dealing with the same subject or parts of the same subject cause only confusion. Specifically, Mr. Topping advocated the cancellation of the increases made in Ex Parte 74, and such other adjustments as might appear equitable upon the completion of the commission's investigation. He thought that with special readjustments the volume of tonnage would be increased to such an extent that there would be no material shortage in the net revenue of the carriers below a fair return.

Cancellation of the increases made in Ex Parte 74 was also advocated by F. A. Ogden, general freight agent of the Jones & Laughlin Steel Company; Robert Hula for the independent plants in the Chicago district, and L. C. Bihler, traffic manager of the Carnegie Steel Company, who appeared also for the American Steel & Wire Company, American Sheet & Tin Plate Company, American Bridge Company and the Lorain Steel Company.

"We feel," said Mr. Bihler, "that the iron and steel industry has long borne and is still bearing more than its proper share of transportation charges and, therefore, in connection with any reductions in rates, special consideration should be given to specific reductions on all the inbound raw materials and the outbound products, pig iron and furnace products, semi-finished and finished products of the mills." He said that the iron and steel industry has done its full share in bringing about liquidation and that a restoration of normal conditions in this industry will almost double the number of people employed directly, in addition to the increased employment in related industries.

I. C. C. Finds Hardwood Lumber Rates Unreasonable

Six Commissioners Favor Slight Reduction, Two for Larger Reductions and Three Disapprove of Any

WASHINGTON, D. C.

THE WIDE DIFFERENCES of opinion which exist among the members of the Interstate Commerce Commission as to how rates ought to be reduced are strikingly illustrated in the report made public on January 20 in the Southern hardwood lumber case, the third important case in which the commission has prescribed rate reductions since its order in Ex Parte 74. The majority report, which represents the views of 6 of the 11 commissioners, finds that the rates on hardwood lumber and forest products from points in Missouri, Arkansas, Texas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, West Virginia, Tennessee and Kentucky to central territory and other defined territories north of the Ohio river are and will be for the future unreasonable to the extent that they exceed the rates in effect August 25, 1920, by more than the amounts shown in a table in the report, which range from 6 to 11 cents per 100 pounds.

As in the reports in the western livestock and hay and grain cases, no order was issued, but the report says the carriers will be expected to file and make effective rates in accordance with the findings made not later than March 6, by publication upon not less than 10 days' notice.

In the hay and grain case, after the railroads had failed to file the tariffs by the date named, a formal order was issued for a later date.

Two Dissenting Opinions

There were two concurring and two dissenting opinions. Chairman McChord said he concurred in the conclusions reached by the majority as far as they go, but thought they fell short of substantial justice to the shippers, and to his mind the commission should issue an order prescribing more substantial reductions. Commissioner Campbell subscribed to Mr. McChord's views.

Commissioner Potter concurred in the report with respect only to reductions of rates to points where such reductions make for a restoration of relationships as they existed prior to August 26, 1920, while Commissioner Daniels filed a dissenting opinion, objecting that the finding was based on "inadequate and tenuous grounds" and is "particularly unfortunate because it comes at a time when we are conducting a general investigation to determine whether we may lawfully require further rate reductions than those already made, not including this, and without awaiting the outcome of that inquiry."

Commissioner Eastman also dissented, saying that while the reductions are not large in amount and while he agreed that the restoration of rate differences as they existed prior to August 26, 1920, is desirable, it does not seem to him that this proves that the rates assailed are unreasonable.

Those who presumably favored the majority report, therefore, were Commissioners Cox (who is named as the author of the report), Aitchison, Esch, Hall, Lewis and Meyer. Commissioner Aitchison was recently attacked in a speech in the Senate by Senator Trammell of Florida who said that Mr. Aitchison had tried to bring the case to a vote at a time when two commissioners were absent and it appeared that a majority of those present would oppose a reduction in the rates. This speech was also made the occasion of a protest by a number of Southern senators because the President had not given the South additional representation upon the commission, although Chairman McChord is from Kentucky, and Senator Trammell introduced a bill to provide

for a geographical distribution of commissioners in future appointments.

Pending Since October 10

The case has been pending before the commission since October 10 and the report is dated January 16. The complaint was initiated by the Southern Hardwood Traffic Association and other hardwood interests intervened in support of the complaint, which attacked as unreasonable the rates on hardwood logs, bolts, billets and other rough material between points in the South, and as unreasonable, unjustly discriminatory and unduly prejudicial, the rates on hardwood lumber and other hardwood forest products taking lumber rates or arbitrary higher from points in the states named to the Ohio river crossings and to destinations beyond. The general rate level was assailed rather than individual rates, it being alleged that the increases since June 24, 1918, have resulted in transportation charges greater than the traffic can bear and in undue prejudice to complainants and undue preference of competing shippers in Wisconsin, Michigan and other northern states because of the widening of the spread in favor of such competing points, resulting from percentage increases in rates. Later that part of the complaint dealing with logs was withdrawn.

The report says the hardwood industry of the South is in a state of prostration. While there was a considerable falling off during 1921 in the hardwood lumber movement, it was represented that loss of traffic in the near future may be still greater because the logging operations have been greatly curtailed. Complainants did not seriously contend that the increases in freight rates alone are the cause of the business depression as it affects them, but admitted the fact of lessened demand and rapidly falling prices. To meet the changed market conditions, they had made substantial reductions in their operating costs. The commission says that the admission that transportation charges cannot be said to have caused the present condition of the industry is confirmed by the fact that prices of hardwood lumber at such a destination point as Cincinnati were, generally speaking, materially lower after the freight rate increases of August 26, 1920, than immediately prior thereto. The plea for the removal of the 1920 increases was based primarily on the effect of percentage increases on long haul traffic. The report continues in part:

"Defendants oppose the reductions sought primarily because of their own unfavorable financial condition and secondarily because, in their judgment, the rates assailed are not unreasonable and are not responsible for the present plight of complainants. The testimony shows that more hardwood moved from certain points in the south during selected periods of 1921 than moved during corresponding periods in 1920. As previously indicated, however, the increased movement during 1921 may be attributed, at least in part, to the fact that large stocks of lumber were on hand at the beginning of the year and also to unexpired contracts previously entered into. . . .

Conditions in Hardwood Industry Not Encouraging

"While the figures reflect a rather unfavorable financial condition of the defendants, this fact does not preclude us from finding particular rates or rates on particular commodities to be unreasonable when the facts are sufficient to justify such a finding.

"The present financial condition and business outlook of

the southern hardwood industry are far from encouraging. Defendants insist that this condition has resulted largely from stagnation in building and general business depression as well as from the increased use in recent years of cement and other lumber substitutes and is not the result of increased freight rates. On the other hand, as already pointed out, there is considerable testimony to the effect that if the reductions sought are established many of the lumber mills would resume operations. Complainants urge that the situation here is similar to that in *Rates on Grain, Grain Products, and Hay*, 64 I. C. C., 85, but the fact must not be overlooked that the carriers in the western district, which was principally affected by our decision in the *Grain Case*, were earning a return somewhat in excess of the return to which they were entitled under the transportation act, 1920, whereas the carriers principally affected in the present case are and have been earning as a whole substantially less than the return to which they are entitled under the law. Nevertheless it does not necessarily follow that the present earnings on hardwood lumber are properly adjusted to the aggregate earnings of the region, or that some readjustment may not be reasonable.

"The percentage increases, as applied to rates on hardwood lumber from points on defendants' lines to points in western trunk line, central freight, and eastern trunk line territories have to a considerable extent disturbed the relationship of rates between the more distant hardwood-producing points of the South and the comparatively near-by producing points of Michigan, Wisconsin, and other northern states. Manifestly this disturbance has been greater at some points than at others and the present record is inadequate for determination of the precise extent to which this disturbance has resulted at all destination points involved. In the basis which we prescribe herein, consideration has been given to the measure of the rates and also to a contraction of the spread between the rates from northern and southern producing points to common markets, with a view to making the spread for the future bear a closer relationship to that which existed prior to August 26, 1920. A revision of rates on hardwood lumber from southern points may stimulate the movement from those points to the destination territory described, and thereby increase rather than diminish the net revenue of the southern carriers."

Concurring and Dissenting Opinions

Commissioner McChord, in stating that he would approve more substantial reductions, said that conceding that there may still be some play of other economic factors in the situation, it is manifestly antagonistic to the interests of both carriers and producers to maintain rates at levels that tend to curb rather than to stimulate a flow of traffic. Commissioner Potter expressed the opinion that the complainants are entitled to reductions necessary to restore relationships and without regard to the other circumstances mentioned in the report, his thought being that the disproportionate increases by percentages of the long haul rates have, under existing conditions, become unjust and unreasonable and, therefore, the resulting rates are not just and reasonable.

Commissioner Daniels said that the sweeping finding of unreasonableness is not supported in the report by any citation of ton-mile earnings. If the rates prescribed were to be applied universally on lumber and forest products, the effect on carrier revenue might well prove revolutionary. No evidence of record is cited in the report, he says, that shows or tends to show that the rates reduced are unreasonable from the standpoint of earnings and on the showing made, the commission must be confronted with complaints from hardwood producers in the Northwest and Central Freight Association territory for corresponding reductions in their rates. The indeterminate standards of reasonableness on rates from the South, set up by this report, necessarily extend in their influence to all forest products from the South and this in

turn affects all from the Pacific Coast and Inland Empire which will bring into direct issue the rates from Wisconsin and Michigan and reduction there will start the wheel revolving again. Continuing, he says:

"The commission thus in effect sets up a criterion of reasonableness which is impossible of application unless it be assumed that all rates in this country were reasonable on some past date. August 25, 1920, is the date taken here, although on that date all the general percentage increases had been made except that under *Ex Parte* 74. Logically we should go back to the fore part of 1914, and starting from that must find that every percentage increase was unlawful to the extent that it changed the difference in amounts per unit between rates for longer and shorter hauls. It is of the essence of percentage increase that it should do that very thing. I am unable to accept the doctrine that every carrier which has made percentage increases under our express authorization will violate the law in maintaining the rates so established, and this report is bedded on that doctrine, whether consciously or not.

"The findings in the report are really less serious in their immediate effect on carrier revenue than in their prospective effect on future rate adjustments generally. There seems not unlikely an eventual equilibrium of general prices perhaps 50 per cent over the prewar level. To the new level, whatever it be, an adjustment must eventually be made. But until carriers' costs have been adjusted thereto, the reduction in rates, if it outruns the contemporaneous reduction in expenses, means progressive inability to meet the needs of traffic, indefinite postponement of securing additions and betterments which the normal growth of traffic renders indispensable, and will only intensify the distress that is certain to come, if and when industry again resumes its normal stride. For this reason it is imperative that reductions which we require should be made upon a carefully reasoned program, and not upon such inadequate and tenuous grounds as we here cite for our action."

Freight Car Loading in 1921

WASHINGTON, D. C.

THE NUMBER of freight cars loaded with revenue freight during the year 1921 was 39,037,817 as compared with 45,118,863 in 1920, 42,180,328 in 1919 and 44,755,041 in 1918, according to a compilation just made by the Car Service Division of the American Railway Association of the weekly reports made to it by the railroads. The 1921 figures represent a decrease of 13.7 per cent as compared with 1920, of 7.4 per cent as compared with 1919 and of 12.8 per cent as compared with 1918.

The average loading of freight per car in 1921 was slightly less than in 1920, due to the fact that since there were plenty of cars available throughout the year the shippers were less inclined to load cars heavily. Therefore, the actual reduction in the volume of freight handled was somewhat less than is indicated by the car loading figures. The statistics of ton miles of freight handled are available only for the first 10 months of 1921. For that period the reduction as compared with 1920 was 23 per cent.

The loading of grain and grain products in 1921 was greater than that for previous years, 2,281,852 cars as compared with 1,843,018 in 1920 and 2,048,968 in 1919.

The loading of less than carload merchandise was also much greater than for the preceding years, 10,677,226 cars as compared with 9,017,074 in 1920 and 8,165,619 in 1919.

The loading of other classes of freight, however, showed decreases as compared with 1920 and in most cases as compared with 1919 also. Live-stock loading was less than for the two previous years, 1,495,344 cars as compared with 1,553,424 in 1920 and 1,732,852 in 1919. Coal loading was

also much less than in the two preceding years, 7,934,048 cars as compared with 10,082,450 in 1920 and 8,829,883 in 1919.

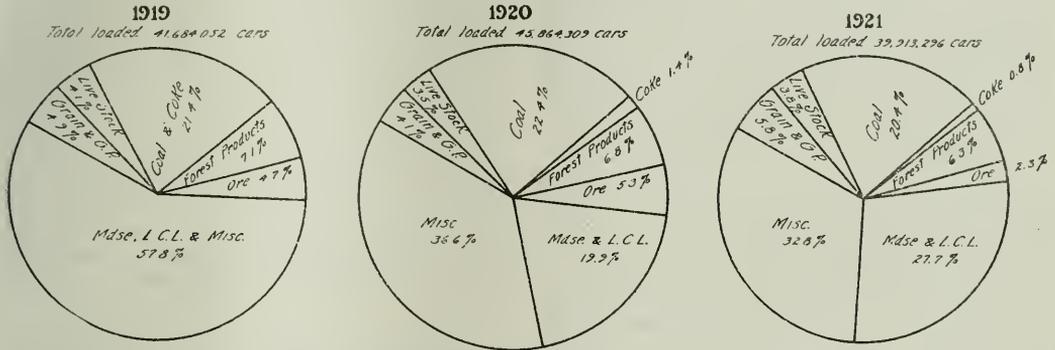
The number of cars of coke loaded was 303,898 as compared with 648,902 in 1920 and 225,517 in 1919; of forest products, 2,483,079 as compared with 3,056,923 in 1920 and 2,988,807 in 1919; of ore, 904,513 as compared with 2,413,893 in 1920 and 1,949,909 in 1919, and of miscellaneous freight, 12,957,857 as compared with 16,503,179 in 1920 and 21,201,811 in 1919.

Reports received by the Car Service Division of the American Railway Association show that 720,877 cars were

Coal also showed an increase of 22,263 cars over the previous week, the total being 159,245, but this was 23,551 cars less than during the same week last year. Reports showed 36,165 cars loaded with livestock, an increase within a week of 10,507 and 1,000 more than during the corresponding week of 1921. Loadings of grain and grain products amounted to 50,187 cars, an increase of 9,514 cars over the previous week and 4,702 more than the same week last year. It also was an increase of 9,367 over the corresponding week in 1920.

Forest products with a total of 48,490 cars showed an increase of 7,419 over the previous week and 3,876 more

REVENUE FREIGHT LOADED



EXPLANATION. Complete circle represents total loaded. Sectors of circle represent proportion of commodity indicated to total.

loaded with revenue freight during the week ending January 14. This was an increase of 114,885 cars over the week before, which was, however, a holiday week owing to the observance of New Year's day.

The total was an increase of 5,022 cars over the corresponding week in 1921, but 119,647 cars less than for the corresponding week in 1920.

Loading of merchandise and miscellaneous freight amounted to 415,081 cars, an increase over the week before of 64,802 cars and 27,328 cars more than were loaded during the corresponding week in 1921. It was, however, 57,660 less than were loaded during the corresponding week in 1920.

than during the same week in 1921. It was, however, less than in 1920. Ore loading increased 130 cars within a week to a total of 4,451 cars while coke totaled 7,258 cars or an increase of 250 cars over the week before.

Compared by districts, increases over the corresponding week in 1921 in the loading of all commodities were reported in all except the Allegheny, Central and Southwestern districts which showed decreases.

The freight car surplus for the period ending January 15 showed a considerable decrease over the previous week, amounting to 439,982, of which 190,180 were box cars, and 195,284 were coal cars.

REVENUE FREIGHT LOADED FOR WEEK ENDED SATURDAY, JANUARY 7, 1922

District	Year	Grain and grain products	Live	Total revenue freight loaded							This year, 1922	Corresponding year, 1921	Corresponding year, 1920
				Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous				
Eastern	1921	6,644	2,662	32,999	1,675	4,316	792	48,022	49,286	146,396	158,365	204,756	
Allegheny	1922	2,845	3,021	38,079	3,410	2,389	1,164	33,765	37,965	122,638	149,908	169,779	
Pocahontas	1921	1,760	3,786	55,814	6,174	2,940	2,122	32,942	44,370	25,347	33,025	35,934	
	1922	304	69	17,200	197	869	26	4,341	2,341	2,444	2,444	2,444	
Southern	1921	156	142	24,545	610	1,091	63	4,174	2,444	95,541	101,932	120,372	
	1922	3,666	2,048	19,751	423	13,117	508	29,549	26,419	78,020	87,498	116,729	
Northwestern	1921	3,018	2,032	26,794	807	11,486	2,652	28,564	26,779	78,020	109,717	121,984	
	1922	12,321	7,473	8,103	974	10,713	369	19,138	18,995	78,020	97,498	116,729	
Central Western	1921	11,304	9,162	6,205	1,237	10,185	925	21,652	26,828	109,717	109,717	121,984	
	1922	10,840	8,446	17,645	212	3,825	772	23,969	24,660	90,369	69,641	830,673	
Southwestern	1921	12,839	10,479	22,936	297	2,991	2,105	26,213	31,857	109,717	109,717	121,984	
	1922	4,053	1,939	3,205	117	5,842	690	13,002	18,827	47,675	57,196	60,919	
Total all roads	1921	4,829	1,844	5,648	89	5,943	464	14,778	23,601	605,992	697,641	830,673	
	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,493	605,992	697,641	830,673	
Increase compared	1921	39,088	31,127	191,233	10,871	41,402	9,456	168,249	206,215	3,537	91,649	100,000	
Decrease compared	1921	40,855	37,386	209,338	10,399	58,565	10,252	142,006	321,872	3,537	91,649	100,000	
Increase compared	1920	1,585	5,469	54,251	3,863	331	5,135	27,722	27,722	27,722	27,722	27,722	
Decrease compared	1920	182	11,728	72,356	3,391	17,494	5,931	29,780	143,379	224,681	697,641	830,673	
January 7	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,493	605,992	697,641	830,673	
December 31	1921	30,793	24,867	105,662	6,424	31,406	4,883	170,061	157,956	531,034	602,368	612,741	
December 24	1921	36,275	22,958	135,852	7,140	45,518	5,489	210,929	201,248	665,927	648,406	684,784	
December 17	1921	47,383	33,861	134,842	7,145	48,690	5,335	221,163	228,384	727,005	802,271	806,734	
December 10	1921	48,630	32,159	137,836	6,638	49,744	6,128	225,718	236,033	742,926	837,953	761,940	

Toronto Electrification Disapproved by Canadian Commission

A PLAN for establishing a system of radial electric lines extending in several directions from Toronto has been investigated and disapproved by the commission appointed to inquire into hydro-electric railways. The majority report opposing the plan as presented is signed by four commissioners while the minority report approving it is signed by one.

The railroads included in the proposal are spoken of as the hydro-radials and include a total of 325 miles of line. This total is divided among five radial lines varying in length from 44 to 83 miles, including one line which runs from Toronto to Niagara Falls. A part of these lines are to be built, while some are already in existence, owned by private corporations or by the Dominion government, and operated by the Canadian National Railways. Agreements are proposed for the interchange of freight and for operating over the tracks of other railroads at certain points. The project involves an expenditure of about \$45,000,000.

Outstanding Features of the Proposed Project

The hydro-radials, as proposed in the plan, are to be constructed and operated under co-operative public ownership. Power is to be obtained from Niagara Falls and from other hydro-electric plants in the vicinity.

The type of electric railway proposed is a counterpart of a high class steam road operating between large cities. It is proposed to combine the interurban passenger business with the shorter suburban and in some instances local city services, all for passenger transportation, with freight business, doing heavy carload service along with the lighter l. c. l. business; and express service. These additional classes are proposed to be superimposed upon an interurban railway, thus loading it to a capacity limited only by the practical operating conditions of its various lines.

The area proposed to be served by the projected system is not only the most populous in Ontario, but to some extent surrounds and is tributary to the capital city, with its population of over half a million. There have been no recent developments of suburban service by the steam roads in Toronto, and this has doubtless had a strong influence towards encouraging the project of hydro-radials.

Findings of the Commission

The commission was appointed under Order-in-Council and was directed to inquire into and report on the whole question of hydro electric railways and all matters which in the opinion of the commissioners were relevant thereto. It was also directed to make such suggestions and recommendations as might be deemed desirable.

Various matters having a bearing on the subject were raised and discussed and the findings of the commission, as published in the majority report, are as follows:

(1) "The financial condition of electric railways in Ontario and the United States in and prior to 1920 has been so precarious and unsatisfactory, and the outlook for improvement so dubious and discouraging, that the construction of the proposed system of electric railways should not, in our judgment, be entered upon unless the evidence of competent operating experts fully justified the conclusion that they will be self-supporting.

(2) "Upon full consideration of the evidence, and the greater weight to be given to the witness, we are of opinion that the proposed electric railways would not be self-supporting.

(3) "We are further of opinion that the construction of the proposed electric railways, paralleling and competing as they would with the Canadian National Railway System, would be unwise and financially insound and would strike

a serious blow at the success of government ownership.

(4) "We are further of opinion that until the Chippawa power scheme, now estimated to cost \$60,000,000 or upwards, is completed and has been in operation for sufficient length of time to be self-supporting, the Province would not be justified in endorsing the construction of an electric railway system at an initial estimated cost of \$45,000,000.

(5) "We are further of opinion that the endorsement by the Province of bonds of the Hydro Electric Power Commission for systems of electric railways in various parts of the Province, at the instance of the municipalities concerned, is highly dangerous and may lead the Province into great financial difficulties. The endorsement for one locality would give rise to demands for the like accommodation for other localities, which it will be hard for any government to refuse, and might result in the Province being drawn into serious financial liabilities, and we would therefore suggest that government endorsement of such bonds should be discontinued. To the risk involved in accommodation endorsements, it is no answer to say that they are mere matters of form involving no real liability. Individual and corporate experience is to the contrary.

(6) "Further, we are of opinion that the expenditure of \$25,000,000 on improvement of public highways in the Province having been begun, it would be unwise to commence the construction of the electric railways in question until the effect in the improvement of these highways has been ascertained, and the use of them by motor cars and motor trucks (whose competition with electric railways has been found so keen and difficult to meet elsewhere) made clearly apparent.

(7) "We are further of opinion that the rapidly increasing debts and financial commitments of the Dominion, Province and municipalities have aroused well-founded apprehension in the minds of thoughtful citizens, and are a cogent reason against the embarkation at this time in the construction of the contemplated electric railways."

The opinion is also expressed by the railway commission that the Hydro Electric Power Commission of Ontario made a fundamental error when preparing the original estimates, which was repeated when the supplementary estimates were prepared, in not seeking and securing the assistance of experienced operating men, particularly insofar as operating costs and possible revenues were concerned.

Alternative Suggestions

As the situation in the city of Toronto naturally separated itself from the rest of the project in the province, the commission deemed that it should be treated as a purely local problem and worked out with the view that the city of Toronto should undertake the construction and operation as a municipal enterprise co-ordinated with other undertakings of a similar nature now in hand. This alternative suggestion crystallizes into a purely radial scheme based on Toronto.

The term "radial" which was applied to the hydro-radial railway project had its inception in Toronto, where it is particularly applicable, and appears to have grown outward from its center.

The commission states that in general such a Toronto radial scheme, as it might be worked out, appears to offer various advantages. It would, states the report, supply an opportunity for a truly "radial" system of railways operating into the city from a suburban belt up to say 10 or 15 miles radius.

Such a unified transportation system, according to the report would enable the Civic Commission to work out its own plans in conjunction with the problem of the street railway proper when taken over, and would not put it in the position of being a competitor with another transportation system operating within its area, such as the hydro-radials might be.

Walker D. Hines Reviews Federal Control Period

Before Senate Committee Former Director General Replies to Criticisms of Railroad Administration Policies

WASHINGTON, D. C.

WALKER D. HINES, formerly director general of railroads, testified before the Senate Committee on Interstate Commerce on January 24 at the request of the committee, in connection with its general investigation of the railroad situation, presenting an extended statement reviewing some of the principal developments of the federal control period. Mr. Hines devoted particular attention to answering criticisms of the government's administration of the railways, and statements made by railroad officers attributing increases in operating expenses in 1920 to the results of the practices or policies of the Railroad Administration during 1919 or 1918. He was to be followed by W. G. McAdoo, who was director general in 1918.

Mr. Hines said he felt great pride in what was accomplished, particularly in view of the exceptional difficulties after the armistice, such as the diminution in morale; the loss of many of the most experienced railroad men in the Railroad Administration, such as Carl Gray, R. S. Lovett, A. H. Smith and C. H. Markham, and the impossibility at that late date to obtain other men of equal experience; the violent fluctuations in business on account of the slump in the first six months of 1919 and the nation-wide coal strike in the last two months, and the tendency to let down in morale as the change of control approached.

Operating Statistics Compared With 1920

He showed that compared with 1916 and 1917 the year 1919 made a far more favorable showing as to car shortages, notwithstanding that in September and October, 1919, the business had been exceedingly heavy, and was also more favorable as to the number of passenger train car miles and freight train car miles per locomotive mile, also as to passenger miles per passenger train mile, and also as to revenue ton miles per locomotive mile or per freight train mile. He said 1919 was also more favorable than 1920 in all these respects except revenue ton miles per freight train mile, and that in this respect also 1919 was more favorable than 1920 in what he termed the only two fairly comparable months—September and October.

Mr. Hines also asserted that, contrary to many representations, the car miles per day in 1919 had made an exceedingly favorable showing for the only months where comparison was fair, and that for practically all the months of 1919 the showing was better than in 1921.

He said that the year 1919 made a better showing than any of the preceding three years in the consumption of fuel, and also compared most favorably with 1920.

He called attention to the fact that in 1920 the transportation results obtained had been greatly applauded and also mentioned that they had not been exclusively through the action of the railroad companies but that the railroad executives had had to appeal to the Interstate Commerce Commission for its aid through unifying anew certain phases of transportation.

Mr. Hines claimed that the quotations he made from the reports of the regional directors for 1918 and 1919 show a vigilant and efficient performance of the public service and a satisfactory handling of the business under peculiarly difficult conditions. He mentioned specially the attention to insuring the scheduled performance of passenger trains, the handling of live stock, oil, and packing house products, etc., improvement in the freight claim situation, in fuel economies and in the methods of the stores' departments in handling

materials and supplies. These reports, he said, suggested the exceptional degree of initiative and energy displayed by the able railroad men who were charged with seeing to the adequate performance of the public service. He emphasized that such evidence had the advantage of viewing the whole situation and that no adequate idea could be obtained of the results by paying attention simply to extreme cases which could not reflect the general average of results achieved.

He stated that the federal managers were expected to operate according to established practices subject to the direction of regional directors, and subject to the policies of the central administration. He pointed out that these federal managers were absolutely free to select and change their subordinate officers just as under private control.

Mr. Hines then took up the question of efficiency of railroad labor. He said the true basis of comparison was the number of man hours paid for, since the change to the eight-hour day made comparison of the number of employees misleading and that the traffic units of service per man hour had increased from 82 in 1915 to 96 in 1917 and 1918 and to 100 in 1919, thus showing more traffic units per man hour than ever before. He stated that "with this start" the result had been even better in 1920 when 101 traffic units were realized for each man hour paid for. He suggested that 1921 ought to show even better results, especially since increased efficiency was to be expected as unemployment increased.

Maintenance

The allegations that the railroads were turned back in an under-maintained and broken-down condition were next discussed. Mr. Hines said this was a "fiction representing extraordinary distortion of the facts" and that if such conditions had existed, the regional directors would have been the first to know it and to comment upon it. He said their reports could be searched in vain for anything indicating a broken-down condition of the properties, but on the contrary, they showed the properties had been substantially maintained, except for some shortage of rails, ties and ballast upon some of the railroads. He elaborated upon this by quoting from reports of the various regional directors.

The critics of the Railroad Administration's maintenance policy, Mr. Hines said, seem to take the remarkable position that the Railroad Administration ought not to place any limitations upon the amount of maintenance, although every railroad company makes it the policy to limit its officers strictly in the amount of maintenance. Mr. Hines said it was indispensable to have a limitation to protect the government and that the Railroad Administration had adopted the perfectly proper limitation that the amount of maintenance should correspond reasonably with the government's contract obligations, except in circumstances where still more maintenance was necessary for safety, or in order to do the business satisfactorily.

Taking up equipment specifically, Mr. Hines said that the railroad executives seemed to take as a starting point the idea that their equipment was in an ideal condition at the beginning of federal control, but that this was wholly wrong. He quoted from testimony of President Rea of the Pennsylvania Railroad Company before the Interstate Commerce Commission in the Rate Advance Case in 1917, in which Mr. Rea said that it had been impossible to maintain passenger car equipment, that freight cars had been in service so continu-

ously that comparatively little general repair work had been done and a great many cars were in need of general repairs but had been kept in service by patching and that on account of insufficient and inefficient labor the locomotives were improperly prepared for road service and would break down en route, and that the Pennsylvania Railroad System, like the Eastern carriers as a whole, was in a situation where it had had to curtail maintenance expenses.

Mr. Hines also stated that Carl R. Gray, now president of the Union Pacific, transmitted with his report for 1918 as director of the Division of Operation in the Railroad Administration, a report from his mechanical department, which stated that one of the prime reasons why the government had to take possession of the railroads was the generally bad condition of locomotives and cars.

Because of the bad condition of equipment at the beginning of federal control and of the heavy use to which it had to be subjected during the war the shops had been worked from 60 to 70 hours per week until after the armistice, but were then reduced to eight hours per day. In the spring of 1919 the federal managers on account of the slump in business had reduced the shop hours and forces to some extent and the number of bad order cars considerably increased.

On this account in June instructions were issued to all the regional directors to restore all car repair forces to eight hours, in August instructions were issued to increase the car repair forces to nine hours, and in September these instructions were reiterated together with the direction that even if car repairs were low on a particular road it should work on repairs to cars from other railroads when feasible.

Mr. Hines explained that although it was believed that in view of the bad condition of equipment at the beginning of federal control and the heavy expenditures upon it, the government had substantially over-maintained the equipment, yet in order to handle the business an extensive maintenance program was carried on; but that naturally under such circumstances the government wished the maintenance put on equipment which it could use, and hence various instructions were issued to give the preference to repairs which could be made promptly so that the equipment could be speedily put in service in order to meet the heavy business that developed in mid-summer and the fall.

Mr. Hines contradicted a statement by Daniel Willard to the effect that the Railroad Administration had ordered a change in the standard of what made a bad order car. Mr. Hines said that, on the contrary, the tests of inspection were probably more strict during federal control than prior thereto, and in substantiation of this position he quoted from a memorandum prepared in November, 1919, by J. J. Tatum of the Baltimore & Ohio, who during the war was in the mechanical department of the Railroad Administration, to the effect that standards of inspection were higher during federal control than prior thereto. Mr. Hines also said that in the rate investigation before the Interstate Commerce Commission in 1917 Mr. Willard had shown that under private management the railroad companies were giving preference to repairs which could speedily be made, in order to get cars quickly back into service, rather than to make heavy repairs, and said this was precisely what Mr. Willard was attempting to condemn the Railroad Administration for doing.

The effect of his advice at the end of federal control, Mr. Hines said was that at that time locomotives were in distinctly better condition than at the beginning and that the condition of freight cars would compare favorably with the condition at the beginning. He emphasized that it must be remembered that both locomotives and freight cars were, generally speaking, in an exceedingly poor condition at the beginning of federal control and in a poorer condition in fact than was indicated by statistics, since the congestion and exceedingly abnormal conditions kept both locomotives and

cars from being classed as needing repairs when they really ought to have been so classed.

As to maintenance of way and structures, Mr. Hines explained that careful studies were made so as to enable the government to control the maintenance according to its contract obligation. He pointed out that the complaints offered to the limitations placed on maintenance rested necessarily on the untenable position that the government should have left the maintenance at the unlimited discretion of the regional directors and federal managers. He showed that aside from a temporary limitation for the month of June, which was "designed to get control of the situation," the limitation was simply to conform to the contract obligation. He maintained, however, that in doubtful cases it was better to fall somewhat short of the contract obligation rather than to exceed it, because the contract expressly gave the corporation a claim for the shortage and did not expressly give the government a correspondingly clear claim for the excess.

Labor Policies of the Railroad Administration

Turning to the labor policies of the Railroad Administration Mr. Hines said critics of these policies necessarily imply that they should have been left as they were before the war, but this was impossible because wages were known to be low and relations between managements and employees were decidedly strained and getting more so. The Railroad Administration was called upon to assume responsibility and to unify control and it had to adopt a policy. The critics offered no policy except the impossible one of leaving things as they were.

Mr. Hines characterized as extraordinary the apparent position of various critics that the railroad managers should have continued to have the final say as to all questions of discipline. He said the government could not tell the employees they must not strike because conditions had changed and they were working for the government and at the same time leave them subject to the same railroad managers without any supervision whatever by the government.

The necessity for government supervision was so obvious, Mr. Hines said, that the practical railroad men in the Railroad Administration promptly sanctioned the creation of the boards of adjustment and these were created by agreements between the regional directors and the representatives of organized labor. Mr. Hines said he understood all these agreements had the approval of Mr. Gray, director of the Division of Operation, and now president of the Union Pacific.

He had never heard any suggestion that any better method could have been selected for the discharge by the government of its responsibility in this matter than the method provided by these agreements entered into by the regional directors. He also said he believed these agreements constituted an important and beneficial precedent in dealing with the railroad labor problems of the country and that this was true whether such boards of adjustment in the future were local or national.

There had been much criticism of the excessive general level of railroad wages and of the excessive number of railroad employees, but after the return to private control, the Labor Board had shown that the general level of wages during federal control was not excessive by approving a further increase of over \$600,000,000 per year and the railroad executives had shown that the number of employees was not due to political considerations, because in 1920 they increased the number of employees by 118,000, and it then came to be more clearly realized that the director general was right in explaining that the increase in the number of employees was due to the eight-hour day and did not mean that the railroads had to pay for an increased number of hours.

Mr. Hines said that numerous comments had been made upon specific instances of excessive pay and no doubt among

nearly two million employees there would be a considerable number of cases of this sort, but that these cases were not typical, and it was precisely their extreme character which had caused them to be so widely discussed.

National Agreements

Taking up the national agreement with the shopcrafts, which was signed September 20, 1919, and made effective October 20, Mr. Hines said there were numerous important misconceptions tending to confuse the committee, particularly the notion that this national agreement accounted for a very large part of the heavy increase of \$345,000,000 in the cost of maintenance of equipment in 1920 as compared with 1919. He said that, contrary to the implications on the part of many of the critics of this agreement, the rules involving possibility of relatively great increases in cost had not been put into effect by the agreement but had been in effect throughout the year 1919. He pointed out that the recognition of the shopcrafts organizations and the handling of grievances by Board of Adjustment No. 2 were already in effect in 1918.

The points most discussed by critics before the committee and in the press, Mr. Hines said, were the standardization of pay and classification of work, resulting in making rates of pay uniform throughout the country and defining work so that it might be necessary for employees of several classes to work on the same job though a small one. He said these provisions of the national agreement were almost identical in language with the general order issued July 25, 1918, and hence they were in effect throughout 1919 and could not account for the increased expense in 1920, and the same was true as to time and a half for overtime over eight hours and for all time on Sundays and holidays. He said that there had also been much comment on the elimination of piecework but that this did not originate with the national agreement but resulted from instructions in December, 1918.

He also pointed out that numerous railroad companies had agreements similar to the national agreement prior to federal control, this being particularly true of the railroads in the Southwest, including Atlantic Coast Line, Norfolk & Western and Southern Railway and numerous others, and that agreements containing numerous similar provisions were in effect on many Southwestern and Northwestern railroads, and also that rules on many other railroads established many of the principles contained in the national agreement.

In order to show the bearing of this national agreement upon the increase of costs in 1920 over 1919, Mr. Hines said, it would have been necessary to eliminate the questions of standardization, classification, time and a half and piecework on all railroads and also to eliminate operations on a great many railroads to the extent that they had similar provisions before federal control, and that the result would have been so to narrow the effect of the national agreement as to force the railroad executives to omit the national agreement as a leading explanation for the increase of 1920 over 1919.

Mr. Hines claimed that, as a matter of principle, it was right and proper to establish by agreement a code of rules to protect the employees; that the railroad companies themselves had done this long before as to train and engine men and many of them had done so as to the shopcrafts. He explained that as to procedure the provisions of great relative importance, from a pecuniary standpoint, were already in effect and that all the provisions were considered and heartily recommended by W. T. Tyler, director of the Division of Operation, who had supervision of the negotiation and was in daily contact with it and who had the benefit of the advice of both the management and labor members of the Railroad Administration's Board of Wages. Mr. Hines claimed that these facts substantially contradicted the misleading statements by representatives of the organization of railway executives to the effect that he had signed an agreement gotten up solely by representatives of organized labor.

Why Rates Were Not Advanced in 1919

It seemed desirable, Mr. Hines said, to state the facts bearing upon the question of making an increase in rates in 1919, since most of the comment on that subject appeared to be made without knowledge of the facts. He explained that the entire deficit of Class I railroads in federal control up to October 1, 1919, was \$480,000,000 and would have been eliminated if the rate increases which took effect in June, 1918, could have taken effect January 1, 1918. This constituted a striking parallel to the condition in 1920, when practically the entire deficit for the 12 months could have been avoided if the rate increase had taken effect at the beginning of the year, instead of in September. But the necessary delay in the effective date of the increase in 1920 was not regarded as a reason for an additional increase. Another striking parallel existed between the first six months of 1919 and the twelve months of 1921, he said, in that in both these periods the failure to pay in full the contract rental or the statutory return was largely due to a slump in business, but no one claimed that there should be a further increase in rates on account of the slump in business.

By reason of these conditions, so similar to subsequent happenings, and because of the impracticability of an accurate estimate of operating cost on the basis of normal traffic, there was no plausible basis for an additional rate increase in the early part of 1919, Mr. Hines contended. Congress certainly manifested entire lack of sympathy with a further rate increase because it repealed the director general's right to put rates into effect without suspension by the Interstate Commerce Commission, removed any presumption of reasonableness attached to rate increases made by him, and also prohibited any increase in intrastate rates without consent of state commissions. While this bill was vetoed by the President on the ground that it subjected the federal power to the power of the states, it was clearly understood that the other features of the legislation would be adopted if rate increases were attempted.

As a result any rate increase in 1919 would have consumed several months because the commission naturally would not have assumed the greater responsibility which the proposed legislation would have imposed upon it except after thorough investigation.

When suggestions for a rate increase became insistent in the summer of 1919, it was evident they could not be made effective much, if any, before the return of the railroads to private control, which the President had announced would be on December 31.

The director general was unwilling in such conditions to attempt to make a rate increase which would be practically entirely for the benefit of private management, especially since the statutory power to make an increase seemed to contemplate that it would be for the purpose of paying operating costs and rental during the period of operation by the government as a unified system. In any event, such an increase would not have met conditions after the return to private control because the return contemplated by the statute was \$200,000,000 more than the rental payable by the government. In addition the increase in traffic made such a favorable showing in July, August and September, 1919, that only five per cent, or at most ten per cent, increase in freight rates appeared necessary to meet all conditions other than those of further wage increases and yet after the return to private control the railroads estimated they needed about \$900,000,000 increase, aside from wage increases. Hence in any event a second increase would be necessary after the return to private control, Mr. Hines said, and it was clear that two different increases would be so disturbing as to be seriously contrary to the public interest. Indeed, if a rate increase had been made effective, say in December, 1919, it is probable that public antagonism would have been so aroused as to make

the further increase necessary on the return to private control impracticable.

Mr. Hines said that he was thoroughly convinced that a rate increase under such conditions would be contrary to the public interest, would be detrimental rather than helpful to the railroad companies themselves and instead of promoting railroad credit would have been injurious to it.

In discussing the general financial results of federal control, Mr. Hines said two separate purposes must be clearly distinguished. One purpose was to ascertain the total appropriations which Congress had made and would have to make and that this purpose called for consideration of every character of expense connected with federal control. But, he said, the purpose primarily related to the Senate inquiry was entirely distinct, and was the purpose of comparing the federal operation of the Class I railroads with the private operation of those same railroads. For this purpose there were numerous expenses incurred by the government which had no bearing whatever and only those expenses should be considered which were embraced in the operating costs as defined by the commission's accounting rules. He pointed out that operating statistics of Class I railroads under private operation were not charged with differences between quantities of materials on the first and last of the year, not for loss on additions and betterments made for special purposes or for other items outside of regular operating costs.

None of these matters, Mr. Hines said, had any proper relation to a comparison of operating results of Class I railroads under private control and federal control. For the purpose of a fair comparison the entire deficit for the 26 months of federal control for the Class I railroads was the excess of the rental over the net railway operating income, or about \$714,000,000 for the 26 months, as compared with about one million dollars on the same basis for the first 12 months of private operation. But he said that was not a satisfactory basis for comparison because it depended so largely upon the level of rates and the dates when rate increases became effective. The true basis of comparison should be the total cost, which consists of total operating expenses, tax accruals, etc. On this basis the total cost of operating Class I railroads was:

In 1917	\$3,080,000,000
In 1918	4,240,000,000
In 1919	4,690,000,000
In 1920	6,109,000,000

Testimony of Labor Representatives

Mr. Hines was followed by J. E. Anderson, vice-president of the International Association of Machinists, representing the Railway Employees' Department of the American Federation of Labor, who made a general statement denying that the national agreements had caused unnecessary expense or had hampered the operations of the railways, saying that the cases cited by railroad officers to discredit the national agreements were extreme cases. Some of the cases, he said, did occur and some were only partly true, while others were wholly fictitious and in some cases the effects cited were due to the inefficiency of the management in administering the rules. He asserted that many of the rules had been in effect on hundreds of railroad before the national agreements, and he filed with the committee a statement which he said contained detailed answers to every example of the effect of the national agreements which had been cited by representatives of the railroads. He said there had never been an opportunity to present these in full either to the committee or to the Railroad Labor Board and that the labor board had recently issued a decision as to the rules which he considered most unjust and to his mind indicated that the board had been influenced by the railroad propaganda. In reply to a question by Senator Cummins, Mr. Anderson said that there

is no authority that can figure out the exact cost of the national agreements as they have been applied under abnormal conditions.

J. J. Dermody, vice-president of the Order of Railroad Telegraphers, presented a statement prepared by E. J. Manion, president of that organization. Mr. Manion said that the railroads in their testimony had apparently desired to leave the impression that if they had not been taken over by the government wages would not have been substantially increased and that the increases made were excessive and left as a heritage to the private managements on the return of the railroads. He said that when the government took over the railroads there were pending demands for wage increases from practically all classes of employees and that the first increases made during federal control in 1918 were, therefore, in the nature of a heritage from private control. He declared that railroad employees had been so underpaid before that time that the percentages of increase seemed high. He went into detailed analysis of the wage schedules from the standpoint of the telegraphers.

H. T. Hunt Testifies

Henry T. Hunt, formerly a member of the labor board, gave a general discussion of the railroad situation, taking as a text a statement made in testimony by A. H. Smith, president of the New York Central, that "95 per cent of this railroading is human." Mr. Hunt took the position that the railroad problem is rather of men than money and that one of the most important essentials to an improvement of the railroad situation is a greater degree of co-operation between the managements and the employees. He said two things are necessary, a better morale among the personnel of the railroads and better credit for the railroads. He declared that railroad employees never have been and are not overpaid, but that the difficulties of the railroads do not arise so much from their wage costs as from the methods of the railroad managements in handling their labor and capital. He recognized that many economies in railroad operation could be brought about by greater capital expenditures but he said the railroads are not now using the money that is available in the ways that will tend toward the greatest of economies. The railroad executives say that they are doing all they can do to bring about greater co-operation with their employees, but they are not acting in such a way as to convince the employees of their sincerity and the employees do not think the managements have done all they can to bring about good will.

For example, he said, frequently thousands of railroad employees are laid off without warning because all the available income is required to meet interest payments, yet at the same time the employees see the railroads spending money for competitive purchases, such as the proposed purchase of the Chicago Junction by the New York Central. In other words, he said, the managements do not give labor sufficient consideration in planning their outlays. If certain capital expenditures resulted in labor saving to such an extent as to require less men, the men could adjust themselves to that condition, but the ways in which the railroads now economize frequently result in large lay-offs without warning.

Good management, he said, could stabilize the number of employees and thus improve the quality of labor. He also pointed out that the fixing of just and reasonable wage rates by some authority does not insure an adequate compensation to the men, because the board in fixing the wage rates assumes continuous employment and when the men are laid off the effect is destroyed. As one remedy he suggested that the employees ought to have a greater degree of participation in the management, including representation on the boards of directors, and he suggested that banking interests should nominate representatives of labor for membership on the boards.

General News Department

The Interstate Commerce Commission has issued orders authorizing common directors among the companies comprising the systems of the Philadelphia & Reading and the Boston & Maine.

The Nashville, Chattanooga & St. Louis, on January 9, changed its engine terminals from Lexington, Tenn., to Hollow Rock Junction where new repair shops and other buildings will be provided.

Senator La Follette has published in the Congressional Record of January 23 a memorandum report of the alleged "secret" conference held at Washington on December 9, attended by representatives of the railroads and shippers, including several farm organizations.

The Youngstown Equipment Company has taken a contract to operate the Kent (Ohio), shops of the Erie Railroad. Webster W. Warner, superintendent of shops has resigned his position with the railroad to become manager for the equipment company.

The United States Supreme Court on January 23 denied the petition of the state of North Dakota for permission to file an original bill against the order of the Interstate Commerce Commission increasing intrastate rates in North Dakota. The court held that the case must be first taken up in the district court.

The engineman and fireman of the Southern Pacific operating their locomotives with the greatest efficiency in the use of fuel oil, are to be awarded gold badges. The name of the winner with the date of the award is to be inscribed on the back of the medal. If a man wins an award a second time, a red enameled star will be inserted in the badge. The award is to be made on a three months' performance basis.

Passenger train punctuality on the Pennsylvania railroad during the year recently ended is reported as 11 per cent better than the previous year. For the period from March to December, inclusive, for the two years, 93.9 per cent of the passenger trains operated were on time in 1921, as against 82.5 per cent on time during the same period in 1920. In 1921 the percentage of trains making schedule time was 96.8, an improvement over 1920 of 4.8 per cent.

Theft of a locomotive and a carload, of cheese from the Chicago & North Western yards in Milwaukee, Wis., is the charge against two men now under arrest in that city. The men obtained the locomotive by posing as railroad employees. They ran engine and car 18 miles, but were halted at a crossing by another train and were forced to make a get-away. It was the plan of the thieves to unload the cheese into a truck and then dispose of the loot through the establishment of one of the men, who had a commission business.

Meals at a fixed sum of one dollar are now furnished at mid-day and evening on the dining cars of the Sunset Limited express trains of the Southern Pacific, the diner having a choice of meat or fish, two vegetables, bread and butter and coffee, tea or milk. The commissary department of the Southern Pacific now furnishes from its headquarters at West Oakland, Cal., the material for 250,000 meals monthly. The West Oakland plant is now being enlarged and will soon be the largest and most complete establishment of its kind in the world, so far as is known.

The New York Farm Bureau Federation announces that efforts are to be made at once to secure the repeal of the New York State full-crew law. S. L. Strivings, president of the Federation, in a statement issued at Syracuse, says

that advices received from the railroads show that the unnecessary expenses incident to this law in New York State amount to \$2,000,000 yearly—or to \$3,000,000 when freight traffic is heavy. During the seven years and five months that this law has been in effect, the railroads have been put by it to an unnecessary expense of about \$16,000,000.

Engineers of seven different classes are now wanted by the Interstate Commerce Commission, for duty in connection with the valuation of railroads and telegraph lines; and the Civil Service Commission, Washington, announces that applications will be received until further notice. Salaries range from \$1,320 for junior engineers to \$2,700 for senior engineers, grade 2. Appointees whose salary is \$2,500, or less, and whose services are satisfactory, may be allowed the regular bonus of \$20 a month. Engineers of the several grades are wanted in the fields of civil, electrical, mechanical, signaling, architectural and telegraph engineering.

Edward H. Shaughnessy, second assistant postmaster general, speaking at a hearing before the post office committee of the House at Washington has set forth the reasons which make desirable a general and extensive enlargement of the air mail service. He says that business interests, particularly bankers, are calling for additional air mail service, especially night flying, by which they would save large sums of interest by exchanging their clearings from city to city in less time. Representative Steenerson, chairman of the committee, has prepared a bill under which the postmaster general would contract for the establishment of routes and would prescribe, for transportation of first class mail by airplane, rates three times the regular postage rates.

Tentative Valuations

The Interstate Commerce Commission has issued tentative valuations in which it finds the final value of the property of the Durham & South Carolina as of June 30, 1917, to be \$460,796 and of the Ulster & Delaware for 1916 to be \$6,472,889 for the property used and \$6,468,019 for the property owned.

Sleeping Cars for the Canadian Pacific

In the description of the new sleeping cars for the Canadian Pacific published on page 1301 in the issue of December 31, 1921, it was stated that the frames and trucks were built by the Canadian Car & Foundry Company. We are now informed that the frames and trucks of 18 of the 12-section sleeping cars were built by the National Steel Car Corporation, Ltd., Hamilton, Ont.

I. C. C. Appropriation

The independent offices appropriation bill reported by the House appropriation's committee on January 18 provides for an appropriation of \$4,859,500 for the Interstate Commerce Commission for the fiscal year 1923, of which \$1,300,000 is for the valuation work. The valuation appropriation is \$450,000 less than the appropriation for 1922 and \$200,000 less than was recommended by the Budget Bureau.

Examination for Locomotive Inspectors

The United States Civil Service Commission announces an open competitive examination for inspectors of locomotives on March 8 and 9, 1922. Vacancies in the Bureau of Locomotive Inspection of the Interstate Commerce Commission at salaries of \$3,000 a year and in positions requiring similar qualifications will be filled from this examination. Applica-

tions for the examination should be made on Form 1892 which can be obtained from the Civil Service Commission, Washington, D. C.

The June Conventions

In the *Railway Age* of January 21, in a news item announcing the arrangements of the Railway Supply Manufacturers' Association for exhibits at the annual convention of the American Railway Association, Division V, appeared a statement to the effect that, although it was considered advisable to cancel the convention in 1922, manufacturers were showing great interest in the plans for this year's convention. This statement is plainly a typographical error. The sentence referred to the convention which was cancelled in 1921 and not to this year's convention. Otherwise the item is correct. Plans are being made to hold the convention this year with exhibits, on June 14-21, at Atlantic City.

Feiker to Continue With Department of Commerce in Advisory Capacity

F. M. Feiker, vice-president of the McGraw-Hill Publishing Company, who for the past eight months has been assisting Secretary of Commerce Herbert Hoover in the reorganization of the department has resigned. Mr. Feiker has not, however, completely severed his relations with the department. He has been appointed a special agent of the Bureau of Foreign and Domestic Commerce, to continue in a consulting capacity the work he has begun. Under the direction of Mr. Feiker and Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, the industrial and business contacts of that Bureau have been enlarged, business relations with trade association committees have been established and the so-called commodity division of the Bureau created.

Union Leaders Dissatisfied With Labor Board Decisions

E. H. Fitzgerald, president of the Clerks Organization, in commenting on the new rules (see page 277 of this issue) declared that the recent action of the Labor Board in abolishing time and one-half for the ninth hour "virtually had created a nine-hour day contrary to the intent of the Transportation Act and to common practice in all industries." Mr. Fitzgerald said he and the members of his organization were

greatly disappointed over the decision, terming it "a hard blow, especially in view of the proposed further wage reduction to be sought."

"We are also opposed to that part of the decision covering intermittent service because it provides split tricks, whereby employees are required to be available for duty 12 hours in order to gain pay for eight," he added.

Following conferences at Chicago extending for over two weeks, a committee of 100, representing the six federated shop crafts, decided on January 24, to open a fight on the overtime provisions of the new shop crafts working rules announced by the Labor Board recently. A circular will be issued ordering the system federations on the individual carriers to institute new disputes with the railway managements. If no agreement is reached the issue will be brought before the Labor Board again.

Resumption of Service on the Southern Pacific of Mexico

Service will be restored over the rehabilitated lines of the Southern Pacific of Mexico into Tepic and Nayarit, on February 2. Trains will be run from Nogales, twice weekly, on Thursdays and Sundays. In announcing this service, H. B. Titcomb, president of the Southern Pacific of Mexico, states that it is difficult to forecast the time when the complete reconstruction of the properties will be made, and also the time when reconstruction will be undertaken on the Tonichi and the Mamos branches. Mr. Titcomb said that the Mexican officials were in full accord with the reconstruction program and that they are now considering seriously the question of financing the amounts due to the Southern Pacific of Mexico.

Pressed Steel Mfg. Co. Wins Patent Suit in District Court

In the suit of the Pressed Steel Manufacturing Company, Chicago, and W. P. Murphy, against the Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., for patent infringement, a decision has been handed down by the United States judge for the Eastern District of Illinois, sustaining the validity of all of the claims of the plaintiff's patents at issue. The patents involved are known as the Murphy-Sisson patent No. 1,031,571, Sisson re-issued patent No. 14,434, Murphy patent No. 1,058,880, Sisson patent No. 1,271,234 and Sisson patent No. 1,254,860, and contain a large number of claims, only 13 of which are at issue. The claims

I. C. C. SUMMARY OF RAILWAY REVENUES AND EXPENSES FOR NOVEMBER (241 ROADS)

	November		11 months	
	1921	1920	1921	1920
1 Average number of miles operated	235,583.62	235,086.98	355,758.82	347,544.11
Revenues				
1 Freight	\$342,024,698	\$436,801,709	\$1,615,562,465	\$3,341,811,442
2 Passenger	182,653,536	210,665,315	1,065,431,278	4,135,626,356
3 Mail	7,241,535	8,341,313	85,806,900	143,176,199
4 All other transportation	9,783,344	10,880,577	9,483,655	134,369,434
5 Joint facilities	13,803,210	15,868,064	159,518,391	145,287,437
6 Joint facilities—Dr.	9,531,237	12,991,871	10,911,166	178,477,668
7 Joint facilities—Cr.	590,884	7,715,915	6,447,344	7,144,767
8 Joint facilities—Dr.	143,984	67,093	1,572,915	1,184,379
18 Railway operating revenues	465,497,432	592,954,192	5,144,112,400	5,771,114,796
Expenses				
11 Maintenance of way and structures	73,367,149	81,236,656	715,658,773	960,937,550
12 Maintenance of equipment	103,993,186	146,767,411	1,262,900,333	1,433,841,812
13 Traffic	6,606,903	6,785,261	77,445,773	66,295,537
14 Transportation	178,729,311	264,683,700	2,164,572,771	2,628,477,884
15 Maintenance operations	3,717,033	5,566,908	45,574,400	58,840,039
16 General	13,698,328	15,698,378	153,801,407	158,347,561
17 Transportation for investment	546,975	551,626	5,461,407	4,594,141
18 Railway operating expenses	360,301,350	513,614,308	4,253,664,741	5,373,932,815
19 Net revenue from railway operations	105,196,082	79,339,884	890,447,659	1,397,181,981
20 Revenue from other sources	55,361,637	62,847,716	366,841,666	451,761,641
21 Transportation—Dr.	112,842	78,469	1,446,000	921,604
22 Railway operating income	152,515,077	56,319,131	655,843,325	1,047,022,018
23 Transportation—Dr. balance	416,383	1,180,178	4,874,313	7,589,856
24 Joint facilities—Dr. balance	141,127	1,871,596	15,474,414	17,537,535
25 Net railway operating income	152,007,567	54,067,355	635,494,602	1,026,934,809
26 Ratio of expenses to revenues (per cent)	77.66	86.75	82.67	93.11

1 Includes sleeping and parlor car surcharge.
 2 Includes sleeping and parlor car surcharge.
 3 Includes sleeping and parlor car surcharge.
 4 Includes sleeping and parlor car surcharge.

involved are all basic, covering the corrugated steel plate end for freight cars; and the court has decided that they are valid and have been infringed by the defendant, the Mt. Vernon Car Manufacturing Company, in building 1,000 box cars for the Baltimore & Ohio, which were equipped with corrugated steel plate ends furnished by the Chicago-Cleveland Car Roofing Company. An injunction and order for accounting has been granted by the court.

Notice of appeal has been filed by the defendant.

University of Illinois—

Research Graduate Assistantships

The University of Illinois announces that there are ten vacancies for the position of Research Graduate Assistant in the Engineering Experimental Station and also one position for a man who wishes to specialize in gas engineering. These positions are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics and applied chemistry. Appointments are made for two consecutive years, at the expiration of which period, if requirements have been met, the degree of Master of Science will be conferred. Not more than half of the time of the assistant is required in connection with the work of the department, the remainder being available for graduate study. Research work and study may be undertaken in railway, mechanical, electrical or civil engineering and also in other branches.

Attached to the position is an annual stipend of \$600 and freedom from fees except these in connection with matriculation. Additional information and application blanks can be obtained from the Director, Engineering Experimental Station, Urbana, Illinois.

"Conditions Affecting the Head of a Rail"

The discussion of the paper presented by James E. Howard, engineer physicist, Interstate Commerce Commission, before the New York Railroad Club on January 20, while brief, brought out that there was a considerable variance of opinion regarding rail failures from that expressed in the paper. Robert Job, chemist, Montreal, Canada, stated that there were other factors to be considered aside from the question of wheel loads. The condition of the steel was highly important in this connection as, for instance, experience had shown that there was a tremendous decrease in fissures when brittleness was eliminated. He also took exception to the statement regarding impinging pressures since fissures do occur under light pressures. He cited in detail some of the results obtained in Austria where there are light wheel loads and where fissures have occurred in number but only where the steel was unsound.

C. B. Bronson, mechanical engineer, New York Central, stated the roads must secure rail to meet the conditions since they have heavy wheel loads and cannot escape from them. On the New York Central, he said, there had been an enormous increase in traffic during past years, with an increase in wheel loads but on the other hand the number of rail failures had decreased. He cited numerous examples of where heavy wheel loads were common yet the occurrences of fissures was comparatively rare. He said that the roads recognized the responsibility resting upon them in this respect but believed that it was a joint responsibility with the manufacturers. He emphasized this point by citing some stretches of line where fissures had been numerous with one make of rail but when a different make had been substituted, the trouble had stopped and no fissures had been recorded to date. Decreasing rail failures was a problem regarding which both the road and the steel companies must co-operate closely and where that was done, better results would be secured.

National Chamber of Commerce

To Consider Railroad Situation

The railroad situation and what should be done about it will be considered at a meeting of the National Council of the Chamber of Commerce of the United States to be held in Washington on Wednesday and Thursday, February 8 and 9. The council is made up of one representative each

from the 1,400 business organizations within the membership of the chamber.

Some business men see a drift towards government ownership and operation unless the roads can be put on a self-supporting basis. They feel that the transportation act should be given a longer trial and that attempts which are being made in Congress to amend the act, if successful, will precipitate a crisis which may make it impossible for the roads to continue under private management. The chamber's railroad committee is of the opinion that the transportation act can be left untouched and at the same time there can be worked out a constructive plan. It will suggest to the council meeting a program for dealing with the situation. This committee in the past has made suggestions which have been adopted by the chamber's membership and some of the corresponding principles subsequently have appeared in legislation. The transportation act itself contains many features which the committee strongly recommends as a result of the years of study which it has devoted to railroad transportation in the United States.

Negotiations Between Railways

and Train Service Brotherhoods

A meeting of the member roads of the Association of Railway Executives was held in Chicago on January 21 to consider whether negotiations between various groups of the railways and the train service brotherhoods should be reopened in an attempt to arrive at a settlement of existing differences by direct negotiations. The meeting grew out of informal conferences between several railway executives and the heads of the train service brotherhoods which were initiated by Secretary of Commerce Hoover.

Following the meeting in Chicago, Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, authorized the following statement, which shows the decision reached by the railways at their meeting:

"On Monday, January 16, Secretary Hoover issued a statement referring to an informal meeting held in Washington on that date between some of the railway executives and representatives of the train service organizations, and said in part:

"It was decided to submit to the railway companies and to the train and engine service organizations the proposal that the pre-war regional conferences should be convened to consider and endeavor to adjust all questions between the railways and the four brotherhoods."

"At a meeting of the member roads of the Association of Railway Executives, held in the Hotel Blackstone today, this suggestion was submitted, and the following resolution adopted:

"Resolved, That it is the sense of this association, as one of the methods provided by Section 301 of the Transportation Act, that conference committees, representing the railway managements in the Eastern, Southeastern and Western territories of this association, similar in nature to those which in some territories handled negotiations with the four brotherhoods prior to federal control, be constituted and be authorized to meet with the four train and engine service brotherhoods, in a fair effort to compose and adjust all points now at issue, no restrictions to be imposed upon the consideration of any and all questions of wages and rules governing working conditions.

"In default of an understanding mutually agreeable in any territory, recourse to be had to the Labor Board in the regular manner provided by the Transportation Act.

"This resolution shall not be construed so as to prevent separate negotiations in additional territories not mentioned above, if desired by the roads in such territory, nor shall it be construed as preventing railroads individually from exempting themselves from such general negotiations, substituting therefor individual negotiations with their own men."

"The four transportation brotherhoods above referred to are the Brotherhood of Locomotive Engineers, Brotherhood of Locomotive Firemen and Enginemen, Order of Railroad Conductors, and Brotherhood of Railroad Trammens, and constitute approximately one-quarter of the railway employees of the country.

"This action does not involve an abandonment by the railways of their previously pledged policy to seek a reduction in the labor cost of railway operation, the benefit of which

is to be turned over to the public in reduced rates. It simply represents an attempt, by direct negotiation and discussion with the leaders of these four organizations, to arrive at a fair and amicable settlement of the present questions affecting those employees."

National Railway Appliances Association Exhibitors

The following firms have taken space and are arranging to participate in the exhibit which the National Railway Appliances Association will present in the Coliseum, Chicago, on March 13-16, during the annual convention of the American Railway Engineering Association and the stated meeting of the Railway Signal Association. As noted, this list includes 161 firms which have taken place to date.

Adams & Westlake Company, Chicago.
Adams Motor & Manufacturing Company, Chicago.
Air Reduction Sales Company, New York.
American Abrasive Metals Company, Chicago.
American Car & Foundry Company, Chicago.
American Casting Company, Birmingham, Ala.
American Chain Company, Inc., Bridgeport, Conn.
American Hoist & Derrick Company, St. Paul, Minn.
American Kron Scale Company, New York, N. Y.
American Malleable Castings Association, Cleveland, Ohio.
American Radiator Company, Buffalo, N. Y.
American Steel & Wire Company, Chicago.
American Valve & Meter Company, Cincinnati, Ohio.
American Vulcanized Fibre Company, Pittsburgh, Pa.
Argyle Railway Supply Company, Chicago.
Armo Culvert & Flume Manufacturers' Association, Middletown, Ohio.

R. & L. Baker Company, Cleveland, Ohio.
Balkwill Manganese Crossing Company, Cleveland, Ohio.
Barrett Company, New York.
Barrett-Cravens Company, Chicago.
Bethlehem Steel Company, Bethlehem, Pa.
Boss Nut Company, Chicago.
Blaw-Knox Company, Pittsburgh, Pa.
L. S. Brach Manufacturing Company, Newark, N. J.
Brown Hoisting Machinery Company, Cleveland, Ohio.
Bucyrus Company, South Milwaukee, Wis.
Bryant Zinc Company, Chicago.
Buda Company, Chicago.

Carbie Manufacturing Company, Duluth, Minn.
Carter Bloxwood Flooring Company, Chicago.
Challenge Company, Batavia, Ill.
Chicago Bridge & Iron Works, Chicago.
Chicago Flag & Decorating Company, Chicago.
Chicago Malleable Castings Company, Chicago.
Chicago Pneumatic Tool Company, Chicago.
Chicago Railway Signal & Supply Company, Chicago.
Central Electric Company, Chicago.
Cleveland Railway Supply Company, Cleveland, Ohio.
Crerar, Adams & Company, Chicago.
Chipman Chemical Engineering Company, Inc., New York.
L. & R. Culvert Company, Chicago.

Delco-Light Company, Dayton, Ohio.
Detroit Graphite Company, Chicago.
Detroit Steel Products Company, Detroit, Mich.
Diamond State Fibre Company, Bridgeport, Pa.
Dickinson, Paul, Inc., Chicago.
Dilworth, Porter & Company, Inc., Pittsburgh, Pa.
Direct Sales Company, Chicago.
Doty Business Machines Company, Chicago.
Duff Manufacturing Company, Pittsburgh, Pa.
Edison Storage Battery Company, Orange, N. J.
Edison, Thos. A., Incorporated, Bloomfield, N. J.
Electric Storage Battery Company, Philadelphia, Pa.
Elwell-Parker Electric Company, Chicago.
Engineering & Contracting Publishing Company, Chicago.
Eymon Crossing Company, Marion, Ohio.
Fairbanks, Morse & Co., Chicago.
Fairmount Gas Engine & Railway Motor Car Company, Fairmount, Minn.
Federal Signal Company, Albany, N. Y.
Federal Electric Company, Chicago.

Flannery Bolt Company, Pittsburgh, Pa.
Fisg. Switch & Manufacturing Company, Carlisle, Pa.

General Automatic Scale Company, St. Louis, Mo.
General Electric Company, Schenectady, N. Y.
General Railway Signal Company, Rochester, N. Y.
Globe Company, Chicago.
Grave Construction Company, Chicago.
W & I E. Gates, Inc., N. Y.

Hall Signal & Signal Company, Garwood, N. J.
Hawley Rail Joint Company, Macon, Ga.
Hayes Tank Apparatus Company, Richmond, Ind.
Hazard Manufacturing Company, Chicago.
Headley Good Roads Company, Philadelphia, Pa.

Howlett Construction Company, Moline, Ill.
Hubbard & Company, Pittsburgh, Pa.
Illinois Steel Company, Chicago.
Ingersoll-Rand Company, New York.

Johns-Manville, Inc., New York.
O. F. Jordan Company, East Chicago, Ind.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.
Kaustine Company, Inc., Buffalo, N. Y.
Kelly-Derby Company, Inc., Chicago.
Kerite Insulated Wire & Cable Co., Inc., Chicago.
Keuffel & Esser Company, New York.
Keystone Tool Grinder & Manufacturing Company, Pittsburgh, Pa.
Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.
Kochring Company, Milwaukee, Wis.

Lehon Company, Chicago.
Lorain Steel Company, Lorain, Ohio.
Lufkin Rule Company, Saginaw, Mich.
Lundie Engineering Corporation, The, New York.

M. W. Supply Company, Philadelphia, Pa.
Mac Rae's Blue Book, Chicago.
Maintenance Equipment Company, Chicago.
Massey Concrete Products Corporation, Chicago.
McGraw-Hill Company, Inc., New York.
Mechanical Manufacturing Company, Chicago.
Midvale Steel & Ordnance Company, Philadelphia, Pa.
Miller Train Control Corporation, Danville, Ill.
Milwaukee Tank Works, Milwaukee, Wis.
Morden Frog & Crossing Works, Chicago.
Mudge & Company, Chicago.

National Boiler Washing Company of Illinois, Chicago.
National Carbon Company, Inc., Cleveland, Ohio.
National Lead Company, New York, N. Y.
National Lock Washer Company, Newark, N. J.
National Malleable Castings Company, Cleveland, Ohio.
Geo. P. Nichols & Bros., Chicago.
Northwestern Motor Company, Eau Claire, Wis.

Ogle Construction Company, Chicago.
Okonite Company, Passaic, N. J.
O'Malley Beare Valve Company, Chicago.
Oxweld Railroad Service Company, Chicago.

P. & M. Company, Chicago.
Page Steel & Wire Company, New York City.
Patterson Company, W. W., Pittsburgh, Pa.
Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
Pocket List of Railroad Officials, New York.
Positive Rail Anchor Company, Marion, Ind.
Pyrene Manufacturing Company, Chicago.

Q and C Company, New York.

Rail Joint Company, New York.
Railroad Accessories Corporation, New York.
Railroad Herald, Atlanta, Ga.
Railroad Supply Company, Chicago.
Railway Purchases & Stores, Chicago.
Railway Review, Chicago.
Railway Safety Tie Company, Milwaukee, Wis.
Ramapo Iron Works, Hillburn, N. Y.
Raymond Concrete Pipe Company, Kansas City, Mo.
Rawls Machine & Manufacturing Co., Chicago.
Reade Manufacturing Co., Jersey City, N. J.
Richards Manufacturing Company, Massillon, Ohio.
Richards-Wilcox Manufacturing Company, Aurora, Ill.
Geo. J. Roberts Company, Dayton, Ohio.

Sellers Manufacturing Company, Chicago.
Signal Accessories Corporation, Utica, N. Y.
Sherwin-Williams Company, Cleveland, Ohio.
Simmons-Boardman Publishing Company, New York.
T. W. Snow Construction Company, Chicago.

Templeton, Kenly & Company, Ltd., Chicago.
Toledo Pipe Threading Machine Company, Toledo, Ohio.
Track Specialties Company, New York City.
Train Control Appliance Company, El Paso, Texas.

Union Switch & Signal Company, Swetsville, Pa.
U. S. Wind Engine & Pump Company, Batavia, Ill.

Verona Tool Works, Pittsburgh, Pa.
Volkhardt Company, Inc., Stapleton, S. I., N. Y.

Wailes Dove-Hermiston Corporation, Cleveland, Ohio.
Warren Tool & Forge Company, Warren, Ohio.
Watersbury Battery Company, New York.
Wayne Oil Tank & Pump Company, Fort Wayne, Ind.
Werner Machine Company, West Mills, Wis.
West Disinfecting Company, New York.
Western Electric Company, Inc., New York.
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.
Wm. Wharton, Jr. & Co., Inc., Easton, Pa.
Wood Shovel & Tool Company, Piqua, Ohio.
Woods Bros. Construction Company, Lincoln, Neb.
Woolery Machine Company, Minneapolis, Minn.
Wyoming Shovel Works, Wyoming, Pa.

Traffic News

F. P. Dougherty has been appointed traffic manager of the Beaver Board Companies, with headquarters at Buffalo, N. Y., succeeding G. E. Griffith, who has resigned.

The Chesapeake & Ohio has reopened its office at Seattle, Wash., and it is in charge of I. W. Dudley, general agent, who was in charge at the time of closing the office when the government took over the railroads.

The Seattle Transportation Club elected the following officers on January 10: President, Alpheus Byers; vice-presidents, I. P. Iversen and W. S. Elliott; secretary-treasurer, R. A. Nichols; directors, W. J. Barr, R. E. Johnston and O. H. Wood.

The Traffic Club of Kalamazoo, Mich., has elected the following officers: President, J. F. Campbell, traffic manager, A. M. Todd Company; vice-president, C. E. Reed, agent, Grand Trunk; secretary, C. H. Winslow, assistant traffic manager, Kalamazoo Chamber of Commerce; treasurer, L. E. Weirs, agent, Chicago, Kalamazoo & Saginaw.

The re-establishment of week-end excursion fares, abolished in 1918, is indicated by an application of the Southern Pacific, approved by the railroad commission of the state of California, on January 13, introducing such fares from Oakland and San Francisco to points in northern California and to towns in Contra Costa county.

Traffic men of Texas will meet at Dallas, on February 8, to confer and decide upon a policy with which to go before an examiner of the Interstate Commerce Commission at St. Louis, Mo., on February 20, at a hearing to consider the establishment of a mileage scale of class rates from Mississippi river crossings to points in Texas.

Senator Trammell of Florida, submitted in the Senate on January 19, a resolution directing the committee on interstate commerce to investigate the present express rates on citrus fruits, vegetables and other perishable farm products with a view to bring about early legislation that will result in a reduction. The resolution was referred to the committee.

The Indianapolis Traffic Club has elected the following officers: president, F. A. Butler, secretary-treasurer, C. B. Cones & Son Manufacturing Company; vice-presidents, W. H. Coltharp, traffic manager, Midwest Engine Company; G. J. Jeffries, general superintendent, Terre Haute, Indianapolis & Eastern Traction Company and Herbert Clark, traffic manager, Ball Brothers, Muncie, Ind.; secretary-treasurer, George N. Baker, freight traffic agent, Monon.

Secretary Hoover, of the Department of Commerce, is warning the public and large consumers of coal that the stage is apparently set for a strike of coal miners on April 1 when the present wage contracts expire and that it would be well for coal consumers to stock up in advance. In this connection he has observed that there has been a general disposition to hold off orders in the hope of a reduction in the freight rates on coal, but has ascertained that there is practically no possibility that any such reduction could be made effective before April 1.

Maine Roads Not Included

in Agricultural Rate Reduction

In the issue of December 31 there was published a statement that the Interstate Commerce Commission on December 22 had granted permission to the New England railroads, at their request, to make the general 10 per cent reduction in rates on agricultural products. We have since been advised that this item was incorrect in giving the impression that all the New England lines were to reduce the rates. The Canadian Pacific lines in Maine, the Bangor & Aroostook, and the Maine Central refused to join in making the reduction. The potato, apple and hay crops were

very large in Maine last year and the three Maine roads felt that they should not be called upon to make the reduction, particularly as at least two of the roads were not in a financial position to reduce their revenues.

Coal Production

During the week ended January 14 bituminous coal production increased to 8,268,000 net tons, according to the weekly report of the Geological Survey. This is a larger production than has been reported since late in November.

Railroads Decline to Reduce Export Coal Rates

R. N. Collyer, on behalf of the tidewater coal carriers, has advised Chairman McChord, of the Interstate Commerce Commission and Secretary Hoover, of the Department of Commerce, that the railroads have given further consideration to the suggested reduction of one dollar a ton in the inland freight rate on coal for export by water and have come to the conclusion that they can find no justification for the reduction. The letter says the present export coal situation appears to be the result of an economic condition caused by unstable foreign credit and exchange, and industrial depression; and also by the comparatively high costs in this country. Also that it is clearly shown that the rate proposed would be ineffective in meeting foreign competition either in the Mediterranean or the West Indies and South America.

Perfect Package Month

The "perfect package campaign," carried out throughout the month of November by the American Railway Express Company and the American Railway Association, resulted in a mass of statistics, made up from data gathered in 1,294 cities, showing that 99.1 per cent of the shipments made during that month at the several express offices and freight stations in those cities were in satisfactory condition. The other nine-tenths of one per cent consisted of shipments in which the carriers made some exception, because of faulty packing, marking or billing. The total number of shipments recorded was 20,239,097, of which a little more than half were by express and a little less than half by freight. The report, issued by Lewis Pilcher, secretary, Chicago, on behalf of the American Railway Association, and by J. H. Butler, New York City, on behalf of the express company, says that some of the local committees which were formed to carry out this campaign, have been continued, for the purpose of providing facilities for the discussion, between shippers and carriers, of problems of mutual interest.

Dinner of Chicago Traffic Club

The fifteenth annual dinner of the Traffic Club of Chicago was held at Hotel La Salle on January 24, with an attendance of about 800 and President R. B. Robertson in the chair. The toastmaster was George A. Blair, general traffic manager of Wilson & Company. Governor Henry J. Allen of Kansas was the first speaker. He said, in part: Labor has killed the goose that laid the industrial egg. More than six million men are now idle because of unstable labor conditions. He dwelt largely upon the success of the Industrial Court of Kansas, where, out of 40 decisions affecting wages and working rules 37 have satisfied both sides. The weakness of the Railroad Labor Board results from the fact that its decisions need not be obeyed.

The next speaker was George M. Barnard, Public Service Commissioner of Indiana. He attacked the apathy of the American people in politics which has allowed our legislation to drift without national aim resulting in Congress being coerced into passing the Adamson Law, on what he called the blackest day in American history; four hundred thousand controlled destiny of over one hundred and ten million. He said that the railroads should be emancipated. The Railroad Labor Board should be abolished or else combined with the Interstate Commerce Commission.

Both speakers were agreed in the opinion that the railroad wage scales should be adjusted so as to permit freight rates to be lowered and thus pave the way for a return of normalcy.

Commission and Court News

Interstate Commerce Commission

The Commission has issued an order authorizing common officers and directors among companies subsidiary to or affiliated with the Chicago & North Western.

The commission has suspended from January 24 until May 24, the operation of certain schedules which provide for the non-application of rates on lumber and other forest products in connection with the Colorado & Southern Ry., when originating in California and Nevada and destined to points in Colorado, leaving combinations applicable.

The commission has suspended from January 26 until May 26, the operation of certain schedules published by the Chicago, Burlington & Quincy which propose the cancellation of transit privileges on grain or seeds at Schuyler, Neb., when originating on the Chicago, Burlington & Quincy in Kansas, Nebraska, Colorado, South Dakota, Montana and Wyoming and destined to Missouri River points, Chicago, St. Paul, Duluth, etc., and points taking same rates, routing via Columbus, Neb., and Union Pacific to Schuyler, Neb., and move out via the Union Pacific, Fremont, Neb., and Chicago, Burlington & Quincy, resulting in the application of combination rates in lieu of the present through rates plus transit charge of 5½ cents per 100 pounds.

State Commissions

The Public Utilities Commission of the state of Michigan, on January 18, opened an inquiry as to whether freight rates on farm products in the state are too high. All Michigan railroads have been ordered to appear on February 15 to show why these rates should not be reduced. The summons states that five different associations of shippers had appeared before the commission and obtained reduction in rates affecting their business but that the farmers, having no organization for gathering the necessary data, had not appeared.

Court News

Gates or Flagman Not Required

The Minnesota Supreme Court holds, in a crossing accident case, that, while the crossing was on a much traveled highway and within the corporate limits of a village, where there were no houses in its immediate vicinity and the view was not obstructed for travelers, and the line was a branch line over which a passenger and freight train passed each way daily, a finding of negligence in failing to maintain gates, a flagman or other warning device, in the absence of a statutory requirement, was not justified.—*Hollister v. Hines* (Minn.), 184 N. W. 857.

Freight Agent Cannot Agree

to Purchase Damaged Shipment

In an action by a consignee for damages to a shipment of canned tomatoes plaintiff relied upon a statement of the local freight agent as to the damaged cans, that "we will take care of them." The Maine Supreme Judicial Court holds this did not mean that the railroad would take the goods off the plaintiff's hands, but meant no more than that it would dispose of them as it could and account to the plaintiff for the proceeds. Moreover, the power to admit liability for negligence in transportation or to make contract in whatever amount to purchase at face value damaged goods in the hands of dissatisfied consignee is far outside the scope of the freight agent's employment. The company having disposed of the damaged goods and tendered the proceeds to the plaintiff, verdict for the plaintiff for that amount only was affirmed.—*A. Gauthier & Son v. Hines* (Me.), 115 Atl. 258.

Sunday Held a Holiday Within

48-Hour Limit of Liability

The New York Appellate Division holds that Sunday must be deemed a legal holiday within the provisions of the uniform bill of lading making a carrier liable as a warehouseman only for loss by fire occurring after 48 hours exclusive of legal holidays after notice of arrival. So far as the court found, the only reported decisions construing these provisions on this point are *Hussa Brewing Co. v. C. & N. W.*, 151 Wis. 666, 139 N. W. 415, and *St. Louis B. & M. v. Hicks* (Tex. Civ. App.) 158 S. W. 192, and in both of them it was held that Sunday was excluded.—*Cereal Products Co. v. D. L. & W.*, 190 N. Y. Supp. 698.

Necessity for Structure Along Line a Question

For the Executives, Not for a Jury

The New York Appellate Division holds that the necessity of building fences, water plugs, mail cranes, and other structures along the line of a railroad for the transaction of business, is a question of judgment, depending upon many facts not readily susceptible of proof, and is a question for the executives of the company, not for a jury to decide (*Southern Pacific v. Berkshire*, 254 U. S. 417). When the company has erected its structure, it then may become a question of fact as to whether the location was made and the construction done in a negligent manner.—*Long v. Payne*, 190 N. Y. Supp. 803.

Not Liable for Goods Stolen Before Received for

In an action for the value of a bale of cotton, it appeared that the plaintiff had bought the bale from a farmer, who delivered it on the platform and notified the plaintiff, but not the defendant. During the day plaintiff bought 15 other bales, which were similarly placed. At the end of the business day he applied for a bill of lading. The first bale placed on the platform had disappeared and the agent refused to receipt for it. The railroad had posted a notice that it would not be liable for goods left on the platform until issuance of bill of lading. The South Carolina Supreme Court holds the railroad was not liable, notwithstanding the shipper's custom of so leaving bales purchased by him.—*Behrmann v. Atlantic Coast Line* (S. Car.) 109 S. E. 397.

Cold Waiting Room—Damages Must Be Shown

The Mississippi Supreme Court holds that the mere violation of the statute requiring railroads to heat and light their passenger waiting rooms for 30 minutes after the arrival of trains for the use of disembarking passengers does not give a right to recover damages unless it is also shown that the violation resulted in injury to a passenger having the right to use the waiting room. This was regarded by the court as an unusual case, in that the plaintiff, with her husband and two children, was unable to get accommodation for the night at a hotel, and but for the friendly shelter of the waiting room, in which they might have built a fire, they would have had to stay out in the open all night in extremely cold weather.—*Davis v. Day* (Miss.) 89 So. 814.

Railroad Held to Have Acquired Title

by Adverse Possession for 70 Years

In an action in ejectment by the City of New York to recover possession of a strip of land 66 feet in width running from 72d street, New York, to Spuyten Duyvil creek, now used by the New York Central as a part of its system, the New York Appellate Division holds that, the railroad having constructed its tracks on land owned by the city under a claim that its franchise from the state entitled it to do so, and having used the land as a right of way for more than 70 years under this claim, and paid taxes thereon as its property, the railroad had acquired title to the land by adverse possession. Judgment of dismissal was therefore affirmed.—*City of New York v. New York Central*, 190 N. Y. Supp. 777.

Labor Board Decisions

Section Foreman Reinstated

A section foreman on the Central of New Jersey was dismissed on April 2, 1920, as a matter of discipline. The Labor Board decided that the discipline administered was too severe and that he should be reinstated to his former position with seniority rights unimpaired; but not paid for the time lost.—*Decision No. 579.*

Dismissal of Freight Brakeman

for Inefficiency Sustained

A brakeman riding three loaded oil cars that were "kicked" onto a side track failed to stop the cars in time to prevent the loaded cars from striking an empty flat car and breaking it in two. The carrier contended that the accident was the fault of the brakeman for not slackening the speed in time and that his former record was indicative of carelessness and indifference. The Labor Board decided that the claims of the employee for reinstatement could not be sustained.—*Decision No. 527.*

Five-Day Week Not Violation of Rules

On February 9, 1921, the Central of New Jersey found it necessary to make further reductions in expenses and to avoid further decreasing its forces it introduced the five-day week. Maintenance of way employees objected to this measure and quoted Section 1, Article V, of the agreement which reads: "Gangs will not be laid off for short periods when proper reductions of expenses can be accomplished by first laying off the junior men." The Labor Board decided that the railroad did not violate the meaning and intent of the section and that the employees were not entitled to claims for payment for the days lost.—*Decision No. 519.*

Runaround Claims Denied

At Duran, N. M., a terminal on the El Paso & Southwestern where no switch engine is employed, two extras east had been called. While they were coupled onto and making up their trains and drawing time under the schedule, an express train of cantaloupes arrived. Another engine and crew were called and got out ahead of both of the other extras. The carrier contended that the first-in-first-out rule did not apply where engine crews had been called to make up their own trains, which custom had been borne out by past practice. The claims of the enginemen of the first two extras for runaround pay was denied by the Board.—*Decision No. 486.*

Extra Men for Winter Work Not Section Laborers

During the winter of 1920-1921, extra gangs were employed by the Chicago & North Western for removing snow from the right-of-way, the men in some cases working with regular section men. These men were paid straight time for the ninth and tenth hours, but contended that because they were employed with section hands they were entitled to time and one-half after eight hours. The railroad contended that it was within its rights in organizing extra gangs for extra work at any time and the men must be paid in accordance with rules governing the payment of extra gangs. The decision of the Board sustained the contention of the railroad.—*Decision No. 522.*

Full Day for 6½ Hours and Pay for 3 Hours for Reporting When Not Notified Not to Report

Under Rule 50 of the national agreement, the employees contended that two clerks who had reported for work on the Pere Marquette at their regular starting time, having not been notified, and were then sent home without working,

were entitled to three hours' pay therefor; and that three men, who worked 6½ hours, were entitled to not less than 8 hours' pay. The carrier took the opposite view but the Board held that the men having been regularly employed, were entitled to compensation as contended by their representatives and the position of the employees was sustained.—*Decision No. 566.*

Daily Rated Clerical Employees

Allowed Pay for Armistice Day

The employees at a freight station of the Pere Marquette at Lansing, Mich., with daily rating on the payroll, were notified not to work on Armistice Day, November 11, 1920, this day being declared a legal holiday. The employees claimed one day's pay which had been deducted from their wages on the ground that Rule 66, as it referred to holidays designated in Rule 64, did not cover the case, as the railroad contended. The board upheld the contention of the employees, ruling that since other holidays had not been agreed upon in addition to those in Rule 64 the employees involved were entitled to receive pay for Armistice Day.—*Decision No. 574.*

Right of Clerical Employee to Seniority Right

The position of clerk in the enginehouse of the New York, New Haven & Hartford, at East Providence, R. I., was abolished and the road declined to allow the employee released to exercise his seniority in claiming a position in the enginehouse at Providence, R. I. The employee contended that in the absence of an agreement the seniority districts established by Supplement No. 7, to General Order No. 27, remained in effect, and therefore he had the right to exercise his seniority rights. The board upheld his contention and ruled that he should be permitted to exercise his seniority to any position within the scope of the national agreement and that he should also be reimbursed for the time lost on account of being refused the right to the transfer when his position was abolished.—*Decision No. 578.*

Extra Gang Men Refuse to Work Late

for Straight Time

On July 12, 1921, 23 extra gang laborers on the Delaware, Lackawanna & Western were engaged in unloading ballast under conditions that made it desirable to have them work overtime, the assistant foreman advising them that they were to be paid straight time for so doing. Previous to this they had been paid time and one-half for overtime, but in accordance with Addendum No. 2, to Decision No. 119, pro rata rates had been established, of which however, the men were not aware. Consequently they refused to work and were dismissed. The Labor Board sustained the action of the carrier but decided that the railroad must not discriminate against these men in case they apply for re-employment.—*Decision No. 588.*

Dismissal of Section Foreman Not Sustained

A section foreman on the San Antonio, Uvalde & Gulf at North Pleasanton, Tex., was dismissed on January 27, 1921, on the ground that he had not been sufficiently attentive in watching his mail box for instructions coming to him by mail or telegraph, as a consequence of which he failed to cover up some oil as instructed in a telegram. The carrier also contended that his failure to follow instructions in this case was a culmination of numerous failures to do so and that he also failed to detect broken angle bars about 2½ months earlier. Inquiry developed that the failure to find the telegram in his mail box was not considered adequate reason for discharging the foreman and that the matter of the angle bars had not been called to his attention at any previous time. The decision of the board was that the management of the railroad was not justified in relieving Mr. Davis and he was restored to his position with seniority rights and paid for time lost.—*Decision No. 552.*

Train Dispatcher Paid for Time Absent on Account of Sickness

In a case between the American Train Dispatchers' Association and the Denver & Rio Grande, it was contended that a dispatcher should be paid for time absent on account of sickness from May 14 to June 20, 1920, inclusive, in accordance with a rule of the road to the effect that dispatchers should be accorded the same treatment as the other division officers for loss of time on account of sickness. The carrier contended that it was not the practice to pay division officers for time lost on account of sickness when necessary to employ some one in their places, and also that the dispatchers are on an eight-day basis while the other division officers are on a monthly basis. The Labor Board sustained the position of the dispatcher.—*Decision No. 564.*

Reduction of Earnings of Clerical Employees to 4½ Days a Week Not Upheld

Five employees in the purchasing department of the Gulf & Ship Island at Gulfport, Miss., were required to work 4½ days a week or 20 days a month, on account of a decrease in business. These employees entered a complaint, contending that the action of the carrier was in conflict with Rule 66, while the carrier contended that the action was taken to avoid reducing the force, that all but one employee expressed willingness on circulation of a petition and that protest was not made until April, 1921, although the change was made in January. The board held that the reduction of the working days of the employees below six days a week was in violation of Rule 66 and that the employees should be compensated for the cut.—*Decision No. 572.*

Section Foremen Not Paid Extra for Work on Holidays

The United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers presented a claim for compensation for section foremen on the Southern Pacific for work performed on holidays. Prior to federal control section foremen were paid by the calendar month for service including Sundays and holidays. The increase under Supplement No. 8 to General Order No. 27 made no change in the number of days constituting a month's work. Under the National Agreement, effective December 16, 1919, the section foremen were placed on a 313-day basis, allowing extra compensation for Sunday work. The carrier continued this plan after March 1, 1920, but the Brotherhood contended for a 306-day basis to allow for seven regular holidays. The board sustained the action of the carrier.—*Decision No. 546.*

Track Watchmen Should Be Paid a Monthly Basis

On the Lehigh & Susquehanna division of the Central of New Jersey, 74 men are employed as track watchmen and 6 are classified as tunnel watchmen, assigned to eight-hour shifts, paid a monthly rate of \$114.67 and allowed overtime for any service outside of the eight-hour tour of duty. On another division of the railroad these men are paid by the hour, the same as track walkers. The contention of the men was that they should be paid on an hourly basis, the same as on other divisions of the railroad, but the railroad contended that this work was of a special nature requiring the men to spend practically all of their time on inspection work and that under the provision of Section 4-12, Article V of the agreement promulgated by the United States Railroad Administration, these men should be paid a monthly rate and that they are not track walkers in the ordinary sense of the term. The Labor Board sustained the railroad.—*Decision No. 583.*

THE CANADIAN PACIFIC, according to a statement attributed to an officer of the company, is going to establish through fortnightly passenger service between England and the Orient through Canada. The steamship agents report fairly heavy through bookings for this service already.

Foreign Railway News

Polish Railway Rates to Be Reduced

LONDON.

According to a Reuter dispatch, the Polish government has decided to reduce railway fares by 50 per cent.

Electrification of Greek Railways

LONDON.

Approximately 300 miles of line are to be electrified in Greece, in which is included the railways of New Greece. This electrification it is estimated will represent a saving of about 3,000 tons of coal in about 15 to 20 years.

Head of Swiss Federal Railways Resigns

Hans Dinkelmann, for many years president and director general of the Swiss Federal Railways, has been elected director of the International Bureau of Railroads at Berne, Switzerland, succeeding the late Mr. Forrer. Mr. Dinkelmann has resigned from the service of the Swiss Federal Railways.

Proposed Electrification in Serbia

LONDON.

The Yugoslav government has submitted to the Parliament a proposal for the electrification of the Serbian railways. The length of line proposed to be electrified is 530 miles and will involve the construction of a number of hydro-electric stations. The £4,000 (\$19,464 at normal rate of exchange) granted to Serbia by the British government is to be used in railway construction.

Oil Fuel for Russian Locomotives

LONDON.

Reports from Moscow state that the Soviet government intends to import a large amount of corn and meat from Siberia during January, and has given instructions for the locomotives of the Zlatomst railway to be adapted for the consumption of oil fuel. The railway employees are promised special bonuses payable in money and bread if the task is carried out successfully.

Passenger Tickets Include Hotel Accommodations

LONDON.

The London, Brighton & South Coast railway, have arranged in conjunction with Thos. Cook & Son, tourist agents, to issue combined railway and hotel weekend tickets from London to Brighton and Eastbourne, seaside holiday resorts close to London. The tickets will provide for hotel accommodation and will be available from Friday or Saturday to the following Monday.

Exports of Locomotives in November

Sixty-one steam locomotives, valued at \$2,558,771, were exported in November, as compared with 92, valued at \$3,509,440 during October. Mexico continued as the largest purchaser, receiving 40 of the month's total. Detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Number	Dollars
Mexico	40	1,756,270
Cuba	2	31,341
Dominican Republic	1	29,000
Brazil	1	23,500
Chile	10	360,000
China	3	300,000
Philippine Islands	4	58,660
Total	61	2,558,771

A Correction

In the item on the reorganization of the London & North Western and the Lancashire & Yorkshire, published in our last week's issue, it was incorrectly stated the reorganization was to take effect next year. Instead the changes have already been brought about. It should also be noted that

Ashton Davies is superintendent of the Northern division and L. W. Horne of the Southern, whereas the reverse was stated.

Exports of Car Wheels and Axles in November

Exports of car wheels and axles in November totaled \$60,625, as against \$142,895 during October. Detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Dollars
Canada	6,972
Honduras	192
Mexico	2,220
Jamaica	53
Cuba	1,987
Dominican Republic	246
Brazil	785
Colombia	291
Ecuador	460
Venezuela	160
China	37,200
British India	314
Hongkong	3,510
Japan	5,863
Australia	350
Total	60,625

New Line in Mexico

Construction of the Chihuahua & Orient Railroad will be started soon by William D. King, who recently obtained a concession from the Mexican Government for the project, according to reports from Candelaria, Mexico. It is explained that while the proposed railroad will be in the nature of a separate and private enterprise its primary object is to afford a transportation outlet for the ores of the mines of the Ericpion Mining Company and that this corporation will finance the construction of the line. The proposed railroad will run from a point on the Juarez-Chihuahua division of the National Railways of Mexico, near Candelaria, to the Los Lamentos Mountains and thence to the Chocolate Mountains. According to the terms of the concession plans and specifications must be submitted for approval to the secretary of Public Works within 80 days from the date of signing the contract and active construction work must be started within sixty days after the plans and specifications have been approved.

Waste on Russian Railways

LONDON

According to recent advices, the Russian Commissary for Communication, Djerdjinsky, has handed to the Petrograd Soviet a report complaining of waste on the railways which states that 80 per cent more fuel is consumed than formerly. He further states that for economical reasons and because of the difficulty in procuring the necessary food, fuel, and so forth, the railway system of Russia is to be worked in three sections. The first will be the only one of the three to receive all its requirements from the state, this being because of its necessity in the transport of food and fuel. The second section will receive half its requirements from the state and the third will receive only 30 per cent, the balance in both the second and third sections being provided by the local population. Owing to the difficulty of fixing railway rates in consequence of the fluctuations in the value of the ruble, a proposal has been made that freight for the transport of goods should be paid in natura, the railways taking a percentage of the goods transported.

Repair of Italian Rolling Stock

LONDON

The locomotives owned by the Italian State Railways at the present time number 6,150, and all of them are badly in need of repairs, nothing having been done to them since before the war. In order to improve the condition of the rolling stock, the Italian State Railways Administration, has decided to give repairs to national and foreign firms in addition to the government repair shops. It is estimated that the present need requires that 120 to 125 locomotives be repaired monthly, whereas the government works are only able to repair 60 locomotives monthly and private works 15 monthly. With the increase in the number of repair shops, namely 17 as against 6 in the year 1920, it is expected that the required number will soon be reached. German and Austrian firms have receive 450 locomotives for repairs. It is stated that

the cost of repairing locomotives in the government works is from 10 to 15 per cent lower than that of the private repair shops.

Italy has under construction three new types of locomotives, namely: (1) a four-axle, coupled locomotive for fast trains to be used on the lines of low gradients, (2) a five-axle, coupled locomotive for passenger trains, to be used on the mountain lines, and (3) a tank locomotive with four axles, coupled, for the lines of the Appennino.

Car Exports in November

In November, 11 passenger cars were exported from this country. None were exported in October. One hundred sixty-three freight cars were exported in November, valued at \$222,630, as against 83, valued at \$278,412 in October. Detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Passenger		Freight and other		Parts of cars
	Number		Number		
Belgium					\$15,153
Germany					1,920
Spain					10,305
England					1,939
Canada			1	\$220	163,105
Costa Rica					1,830
Guatemala					1,168
Honduras					5,571
Panama					26,043
Mexico	9	\$36,900	70	143,225	442
Newfoundland, etc.					1,502
Jamaica					2,652
Trinidad and Tobago					18,079
Cuba			50	80,000	1,877
Dominican Republic			30	14,050	10
Argentina					110
Bolivia					17,086
Chile			12	15,135	4,872
Colombia					5,143
Peru	2	28,105			4,052
China					160,998
Kwantung					1,170
Chosen					7,877
British India					33
Other British East Indies					45,071
Japan					13,175
Australia					8,669
Philippine Islands					330
British West Africa					37
British South Africa					
Total	11	\$64,105	163	\$222,630	\$520,219

British Owners of Interoceanic

(Mexico) Become Restive

The British owners of the Interoceanic Railway of Mexico are growing restive at the delay of the Mexican government in handing back their properties and in making compensation for using them. The properties have been operated by the National Railways of Mexico and during the past seven years the company has received no compensation.

The present administration in 1920 made the promise to meet its obligations. In the light of the promise the company is of the opinion that the government is unduly slow in making good. The chairman of the company likened President Obregon's plea that the properties should not be returned until they were restored physically to a tenant who wrote his landlord as follows:

"I am not sending you a check for the quarter's rent, as my children have done so much damage to the nursery that I am using the rent to carry out the necessary repairs."

At a meeting of the stockholders it was resolved:

"That the holders of debenture and capital stocks in the Interoceanic Railway of Mexico (Acapulco to Vera Cruz), Ltd., a British undertaking incorporated under the Companies Acts of Great Britain and the bulk of whose debenture and stocks and capital is held by British subjects, most indignantly and emphatically protest against the arbitrary action of the Mexican government in retaining the railways for upwards of seven years and in not returning them to the rightful owners, while neither paying over the compensation due to the company, as laid down by the Railway Law of Mexico, nor even remitting the net earnings of the company's lines."

A similar resolution was passed at a meeting of the stockholders of the Mexican Southern, a railway leased by the Interoceanic.

Track Material Exports in November

Track spikes, weighing 818,840 lb. and valued at \$23,385, were exported in November, as against 1,035,484, valued at \$41,780, in October. Exports of steel rails jumped from the October figure of 9,976 tons to 15,026 tons, valued at \$677,032, in November. Switches, frogs, splice bars, etc. exported were valued at \$333,495, as against \$194,855 in October. Detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Railroad spikes, pounds	Rails of steel, tons	Switches, frogs, splice bars, etc.
Canada	147,000	2,502	\$3,521
Costa Rica	7,000	.....	110,464
Honduras	86,900	1,144	2,044
Nicaragua	600	.....	5,253
Panama	.....	15	4,655
Salvador	7,700	224	1,407
Mexico	34,973	978	1,380
Cuba	90,400	552	23,196
Dutch West Indies	2,497	25	8,917
Dominican Republic	9,834	.....	2,896
Argentina	.....	1,546	3,990
Brazil	5,766	98	16,663
Chile	.....	164	74
Colombia	10,000	1	1,033
Ecuador	.....	98	.....
Peru	5,480	.....	1,257
Venezuela	15,200	8	150
China	2,600	745	2,751
Japan	146,384	4,777	41,648
Australia	.....	1,100	96,921
Philippine Islands	246,912	1,034	2,020
Other countries	.....	9	2,507
Total quantity	818,840	15,026	.....
Total value	\$23,385	\$677,032	\$333,495

Exposure of Graft on Mexico's Railways Reported

Since Ramon P. de Negri became a member of the administrative staff of the National Railways of Mexico as the personal representative of President Alvaro Obregon nearly eight months ago a number of changes and reforms have been accomplished in the management of the government controlled property, according to advices from Mexico City. According to Mr. Negri's own statement one of the most difficult problems and abuses he has had to meet was the widespread system of graft that was in operation in every department of railroad service when he entered upon his new duties. He asserted in a recent statement that during the last ten months of the year 1921 the National Railways lost approximately \$300,000,000 by graft. This is exclusive of an enormous sum of money which was taken out of the pockets of shippers by the same system of graft. Such a strong hold had the practice of taking tribute from the railroad and shippers become that Mr. Negri found his efforts to eliminate this enormous leakage opposed at every turn. The fact, however, that he has plenary powers granted him by President Obregon enabled him to go to the heart of the abuses in many instances and as a result of his efforts much of the graft has been abolished.

It is stated that formerly commanding officers of the army in a number of cases exercised absolute jurisdiction over the movement of trains in their respective military zones. No shipments could be made without money tribute being first paid to them. In other instances government officials apportioned to their personal use a certain percentage of the freight and passenger receipts of the stations in the territory over which they exercised jurisdiction. So extensive was this practice of graft that in order to get a car of freight moved the shipper had first to pay the yardmaster, switchmen and engine crew a bonus; then when the car was finally attached to the train, the entire crew from the conductor to the brakeman had to be "sugared" in order to insure the movement of the car to destination. If this was not done the car would be set out on some remote siding and perhaps not heard of again for weeks or months.

Another phase of the many peculiar arrangements which he found was that of farming out railroad cars and engines to private corporations, especially large manufacturing and mining concerns. There were even private transportation companies organized for this purpose. Although the freight rate charged by these private transportation companies was 50 per cent higher than the regular rates many shippers found it to their advantage to patronize them because better and prompter service was obtained by that method than by the railroad itself. This novel method of handling shipments has been done away with

Equipment and Supplies

Locomotives

The DONNER STEEL COMPANY, Buffalo, N. Y., is inquiring for 1, 0-6-0 type locomotive.

THE ERIE RAILROAD is having 5 Santa Fe type locomotives repaired at the shops of the Lima Locomotive Works.

THE DELAWARE, LACKAWANNA & WESTERN, reported in the *Railway Age* of December 10, as inquiring for 5 Pacific type locomotives has ordered this equipment from the American Locomotive Company.

THE CHICAGO, BURLINGTON & QUINCY, noted in the *Railway Age* of November 12 (page 959), as having authorized the purchase of 55 locomotives for heavy passenger and heavy and light freight service, is now inquiring for this equipment.

Freight Cars

THE NATIONAL RAILWAYS OF MEXICO have ordered 250 tank cars from the General American Tank Car Corporation.

THE UNITED FRUIT COMPANY, New York, is inquiring for 50 fruit cars of 30 tons capacity, for use on the Tela Railway.

THE CENTRAL OF GEORGIA is having a number of steel hopper cars repaired at the shops of the Chickasaw Shipbuilding Company.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 300 steel underframe stock cars from the Illinois Car & Manufacturing Company.

THE CHICAGO, BURLINGTON & QUINCY is expected to order the greater part of the freight cars which it has on inquiry about January 30.

THE ATLANTIC COAST LINE will build 50 box cars at its Waycross, Ga., shops and is inquiring for steel super structures and steel underframes for these cars.

THE GREAT NORTHERN, it is expected, will place contracts for refrigerator and passenger cars which it is inquiring for about February 15, while the date of ordering the other equipment on inquiry is indefinite.

Passenger Cars

THE BALTIMORE & OHIO is inquiring for 40 coaches, 2 dining cars, 3 combination baggage and mail and 5 mail cars.

THE ATCHISON, TOPEKA & SANTA FE reported in the *Railway Age* of August 6 as inquiring for 10 dining cars, has ordered 8 dining cars from the Pullman Company.

THE CHICAGO & NORTH WESTERN has ordered 3 combination baggage and smoker cars and 3 chair cars from the American Car & Foundry Company. This order is in addition to the order for 44 cars noted in the *Railway Age* of January 21 (page 251) and makes a total of 50 passenger cars ordered by this road.

Iron and Steel

THE SOUTHERN is inquiring for prices on 26,600 tons of 85-lb. rail and 8,500 tons of 100-lb. rail.

THE FLORIDA EAST COAST has ordered 2,500 tons of rail from the Tennessee Coal, Iron & Railroad Company.

THE CAROLINA, CLINCHFIELD & OHIO has ordered 5,000 tons of rail from the Tennessee, Coal, Iron & Railroad Company.

THE MINARETS & WESTERN has ordered 10,000 tons of 60 and 75 lb. rail from the American representative of the Forges de la

Providence Marchienne-Au-Pont, Belgium. This company has also purchased 300 tons of structural steel for bridge work from the American Bridge Company.

Miscellaneous

The NORFOLK & WESTERN will receive bids until 12 o'clock noon February 8, at Roanoke, Va., for 2,100 lbs. of tie dating nails and 1,726,459 tie plates.

TAKATA & Co., New York City, has ordered from the United States Steel Products Company, 2,000 axles to be used on freight cars in Japan.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for approximately 5,000 bbl. of cement for the period from February 1, 1922, to April 1, bids to be submitted to W. J. Hiner, Cincinnati, Ohio, before 12 o'clock noon on February 1.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon February 3, for its requirements of track bolts, splice bars, frogs, switch points, track switches complete, offset splice bars, iron pipe farm gates, fence wire, crossing frogs, double curved frogs and railroad crossings.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 15 openhearth, rigid frogs; 14 openhearth, spring frogs; 2 manganese frogs, insert type, and 66 switch points. Bids are to be submitted to W. J. Hiner, Cincinnati, Ohio, before 12 o'clock noon on February 1.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, February 8, for the requirements of the New York Central and subsidiary companies of track spikes and angle bars. Bids will also be received until 12 o'clock noon February 9, for the requirements of the same companies of steel wheels for locomotive, passenger car and tender repairs.

The NORFOLK & WESTERN will receive bids until 12 o'clock noon, February 1, at Roanoke, Va., for 1,100 bars of reinforcing steel, 120 billets of welding steel, 1,000 sheets of polished steel; requirements for one year of certain renewal parts for electrical equipment and certain electrical apparatus, and the like; repairs to electrical apparatus and repair parts for mechanical stoker; one 5,000 kva. transformer; 500 tons of steel rail and 150 steel tees.

Signaling

THE PHILADELPHIA & GARRETSFORD STREET RAILWAY, Philadelphia, Pa., has let a contract to the Union Switch & Signal Company, Swissvale, Pa., for an electro pneumatic interlocking at the 59th street terminal, Philadelphia. This plant will have 21 switches and 22 signals.



Fighting the Snows in Canada

Supply Trade News

W. Rutherford, formerly managing director of Dick Kerr & Co., Ltd., and subsequently of the English Electric Co., Ltd., has been elected a director of G. D. Peters & Co., Ltd., London, Eng.

E. H. Dewson has retired as district engineer of the Westinghouse Air Brake Company, Wilmerding, Pa., in the Eastern territory with headquarters



E. H. Dewson

at New York City and will henceforth serve the company in a consulting or advisory capacity. J. C. McCune, assistant district engineer at New York, has been appointed district engineer to succeed Mr. Dewson. E. H. Dewson has been with the Westinghouse interests since 1901, when the old Standard Brake Company was acquired by Mr. Westinghouse and moved to Wilmerding, Pa., to be known as the Standard Traction Brake Company. Mr. Dewson had been chief engineer of the Standard Brake Company, a position which

he retained under the new management. Several years later the engineering departments of the several Westinghouse companies at Wilmerding were consolidated, the Standard Traction Brake Company changing to the Westinghouse Traction Brake Company and Mr. Dewson became assistant chief engineer of the united organization. When the district organizations of the Westinghouse Air Brake Company were created, Mr. Dewson was named resident engineer for the



J. C. McCune

Eastern district, embracing New England, New York, New Jersey, Eastern Pennsylvania, Maryland and Delaware. He has since remained in this position with headquarters in New York City. He has been closely identified with many important improvements in the air brake field during the last quarter of a century and is especially well known for his intimate knowledge of operating problems and traffic conditions in the city of New York. Mr. Dewson now resides at Quincy, Mass., where he plans to spend

most of his time while enjoying the greater leisure which his new position will afford. Joseph C. McCune, who succeeds Mr. Dewson as district engineer of the Eastern territory, is his former assistant. Mr. McCune received his early training under the late W. V. Turner, and has held positions of importance in the Westinghouse organization for a number of years. He joined the Westinghouse Air Brake Company after graduation from Cornell University in 1911. He served through the war as an officer of engineers, acting as an instructor in the Third Officers Training Camp at Camp Lee,

Va., and later saw service in France as a member of the Expeditionary Forces. He will maintain his present headquarters in New York City.

William J. Cleary has been appointed assistant general sales manager of the Sharon Pressed Steel Company, Sharon, Pa., effective February 1. Mr. Cleary's headquarters will be in the Dime Bank building, Detroit, Mich.

The **Dayton-Dowd Company**, Quincy, Ill., has opened a district office at Pittsburgh, Pa., at 809 Keenan building, in charge of T. J. Barry, who has been in the engineering and sales departments in the Quincy office for several years.

David A. Crawford, treasurer of the Haskell & Barker Car Company, who has been elected a vice-president of the Pullman Company, as was announced in the *Railway Age* of January 21, was born at St. Louis, Mo., on April 1, 1880. He was graduated from the University of Wisconsin in 1905, and for the following two years served as an instructor at the university. In 1907 he was appointed secretary to E. F. Carry, vice-president of the American Car & Foundry Company, and five years later was elected assistant secretary of the company. He was elected treasurer of the Haskell & Barker Car Company on January 13, 1916, which position he occupied at the time of his recent election, as above noted.



D. A. Crawford

Leroy Holt, assistant purchasing agent of the Tennessee Coal, Iron & Railroad Company and the Chickasaw Shipbuilding Company, Birmingham, Ala., has been appointed purchasing agent, succeeding **George Gray**, who has resigned, effective January 1, to become associated with the Wofford Oil Company.

The **Pressed Steel Car Company** and **Western Steel Car & Foundry Company** have discontinued their Washington, D. C., office effective February 1. **L. O. Cameron**, who has been a representative of these companies in the Southern territory for many years, has severed his connections with these companies, but will continue his office in the Munsey building to handle other accounts.

C. W. Johnson, formerly of the Chas. W. Johnson Lumber Company, Seattle, Wash., has been elected vice-president of

the **Duncan Lumber Company**, Portland, Ore., and will be in charge of general operations, effective February 1. **C. D. McCoy**, formerly sales manager of the company, has been elected a vice-president and will be in charge of the eastern sales of the company, with headquarters in the McCormick building, Chicago.

The **Combustion Engineering Corporation**, New York, has opened its own office in the First National Bank building, Pittsburgh, Pa., and will soon open an office in Cleveland, Ohio, both of which will be in charge of **W. C. Stripe**, former manager of the Philadelphia office, arrangements having been made between this corporation and the **George J. Hagan Company** of Pittsburgh, whereby the Hagan Company discontinues representation of the Combustion Engineering Corporation. The Hagan Company will retain the exclusive agency for the type H stoker, formerly known as the American stoker, for use in Hagan industrial furnaces.

Edwin F. Wendt, consulting engineer, has opened an office at room 513, Union Trust Co. Building, Washington, D. C., for the general practice of engineering in connection with valuation, financing, consolidation and regulation of railroads, telegraphs, water lines and other common carrier properties. Mr. Wendt was a member of the Engineering Board, Bureau of Valuation, Interstate Commerce Commission, in charge of the Eastern District from May 1, 1913 to October 31, 1921. This district included the states in New England and in addition, New York, New Jersey, Pennsylvania, Delaware, Maryland, the District of Columbia, West Virginia, Virginia and North Carolina. Mr. Wendt was graduated from Geneva College in 1888. After graduation he entered the service of the Pittsburgh & Lake Erie at Pittsburgh, Pa., and was, until he entered government service, engineer in charge, in various capacities, of construction and maintenance work. He was a member of the New York Central Lines' Engineering Committee from 1907 to 1913; a member of the commission to inspect the Government Railroad in Alaska in 1917, and president of the American Railway Engineering Association in 1913. He is a member of the American Society of Civil Engineers.

Trade Publications

CENTRIFUGAL PUMPS.—Much valuable data regarding centrifugal pumps is contained in Bulletin W605 published by the Worthington Pump & Machinery Corporation, New York. The bulletin is, in reality, a handbook for operating engineers. It covers thoroughly the question of installation, operation and maintenance of centrifugal pumps. One of the features of the book is a curve showing the maximum water temperature allowable for varying suction lifts which, it is stated, has never been printed before. Curves are also included to show the head-capacity and efficiency-capacity characteristics of centrifugal pumps. The concluding pages contain a large amount of valuable tabular matter to facilitate the solution of pumping problems.



The New York Central's 60th Street Yard, New York City

Railway Construction

ARIZONA EASTERN.—This company, in conjunction with the Atchison, Topeka & Santa Fe, will construct a union station at Phoenix, Ariz. Plans have been prepared and it is expected that bids will be requested as soon as several agreements between the companies have been settled.

ATCHISON, TOPEKA & SANTA FE.—This company will accept bids until February 1, for the rebuilding of a bridge across the Des Moines river at Dumas, Mo. The work is estimated to cost about \$80,000.

ATCHISON, TOPEKA & SANTA FE.—This company has awarded a contract to the Federal Engineering Company, Chicago, for the installation of oil-handling facilities, including a steel trough 380 ft. in length, a pump, and numerous pipe lines, at Argentine, Kan., estimated to cost \$18,000.

ATCHISON, TOPEKA & SANTA FE.—This company which was noted in the *Railway Age* of October 22, page 804, as contemplating extensions and improvements to its machine shops at San Bernardino, California, estimated to cost \$224,000 closed bids for the same on January 25.

CHICAGO GREAT WESTERN.—This company will receive bids until February 1, for the construction of a steel coaling station at Chicago.

FORT WORTH & DENVER CITY.—This company has awarded a contract to the Federal Engineering Company, Chicago, for the installation of a heating and plumbing system in its new hotel building at Texline, Tex., to cost \$15,000.

LEHIGH VALLEY.—This company has submitted preliminary plans to the Board of Utility Commissioners and to the city authorities proposing the elimination of two grade crossings at Perth Amboy, N. J.

LOUISIANA RAILWAY & NAVIGATION.—This company is preparing plans for the construction of a new station at New Orleans, La. The same company is also planning to take bids for the construction of a gravel washing plant estimated to cost about \$50,000.

MISSOURI PACIFIC.—This company which was noted in the *Railway Age* of December 31 (page 1333), as accepting bids until January 9, for the construction of a frame freight and passenger station at Zeigler, Ill., and the remodeling of a brick roundhouse at Coffeyville, Kans., has awarded a contract for this work to J. D. Fitzgibbon, St. Louis, Mo. The same company noted in the *Railway Age* of January 14 (page 207), as receiving bids until January 16, for the construction of a station at Nashville, Ark., estimated to cost \$12,000, also awarded the contract for this work to J. D. Fitzgibbon.

NORTHERN PACIFIC.—This company contemplates the removal of its tracks from the University of Minnesota campus and the construction of a bridge, 1,200 ft. in length, over the Mississippi river at Minneapolis, which projects are estimated to cost \$2,000,000, of which the state will contribute \$750,000. This road also plans the construction of a 300-ft. tunnel at Plateau, Mont., estimated to cost \$107,000; and the construction of a 60 ft. concrete subway under six tracks at Livingston, Mont., estimated to cost approximately \$100,000.

PHILADELPHIA & READING.—This company has awarded a contract to A. L. Carhart, Philadelphia for the erection of a 60 ft. span concrete arch to carry a highway over its Frackville branch at Mill Creek Jct., near Port Carbon, Pa.

TENNESSEE CENTRAL.—This company contemplates extending its lines from Hopkinsville, Kentucky, to Paducah, a distance of about 70 miles.

VIRGINIAN.—This company has awarded a contract to the Federal Engineering Company, Chicago, for the installation of a heating plant in its new roundhouse at Elmore, W. Va., to cost \$15,000.

Railway Financial News

BALTIMORE & OHIO.—*Income Account for 1921.*—The income statement for the 12 months to December 31, 1921, partly estimated, shows:

Net railway operating income.....	\$22,440,294
which is after charging approximately \$3,400,000 on account of lap-overs from the "guaranty period" which is reflected in credit to other income of like amount, making—	
Total of non-operating income.....	9,136,221
And total income (December partly estimated)...	\$31,576,515
a decrease of \$257,639, compared with previous year.	
From which are deducted—interest, rents, taxes and miscellaneous charges, aggregating.....	25,546,971
an increase of \$958,297.	
Leaving net corporate income of.....	\$6,029,544
a decrease of \$1,215,936.	
Out of which have been declared semi-annual dividends at the rate of 2 per cent (4 per cent for the year) upon the preferred stock (paid September 1, 1921, and payable March 1, 1922).....	2,354,531
Leaving surplus of approximately.....	\$3,675,013

GRAND TRUNK.—*Asks Bond Listing.*—This company has applied to the New York Stock Exchange for permission to list \$25,000,000 15-year 6 per cent sinking fund debenture bonds due September 1, 1936.

ILLINOIS CENTRAL.—*Director Resigns.*—J. Ogden Armour has resigned as a director in accordance with the Interstate Commerce Commission's order on interlocking directorships. He will remain a director of the Chicago, Milwaukee & St. Paul.

MISSOURI, KANSAS & TEXAS.—*Suit.*—Judge Walter H. Sanborn of the United States Circuit Court of Appeals of St. Louis, has granted The Central Trust Company of New York leave to file suit for foreclosure of a mortgage of \$3,254,000. The suit is the first of several similar ones to be filed under the reorganization plan to clear up titles to property of company under various mortgages. The petition states that the mortgage was issued November 1, 1894, and would mature in 1944. The railroad has defaulted payment of all interest since November 1, 1915.

NEW YORK CENTRAL.—*New Director.*—Warren S. Hayden, of Cleveland, has been elected a director to succeed Samuel Mather. *Special Meeting Postponed.*—A special meeting of stockholders called for action on leasing the Toledo & Ohio Central has been adjourned to February 3.

PITTSBURGH & WEST VIRGINIA.—*Authorized to Acquire Control.*—The Interstate Commerce Commission has granted authority to this company to acquire control of the railroad of the West Side Belt through an agreement providing for the operation of the properties of both companies by the Pittsburgh & West Virginia. The Pittsburgh & West Virginia has also filed an application with the commission under Section 5 of the Interstate Commerce Law for authority to acquire control of the road by purchase of its corporate property, rights and credits, not including franchise. The application states that this does not involve a consolidation. The Interstate Commerce Commission recently denied a similar application on the ground that it had not been filed under Section 5.

RICHMOND TERMINAL.—*Asks Authority to Issue Bonds.*—This company and the Richmond, Fredericksburg & Potomac and Atlantic Coast Line have applied for authority for the issue by the Terminal Company of \$3,380,000 of first mortgage, 30-year 5 per cent gold bonds guaranteed by the Richmond, Fredericksburg & Potomac and the Atlantic Coast Line for funding the indebtedness incurred in connection with terminal facilities at Richmond. The bonds have been sold subject to the commission's approval to Kuhn, Loeb & Co., at 92.75.

TENNESSEE, ALABAMA & GEORGIA.—*Sale Postponed.*—The sale of this road has again been postponed until March 18. The original upset price of \$400,000 has been reduced by court order to \$200,000.

TENNESSEE CENTRAL—Sale.—This road was sold at auction on January 10 to C. M. Hovey, assistant general manager of the Nashville Industrial Corporation for \$1,500,000.

The Tennessee Central operates 293 miles, its main line extending between Harriman, Tenn., and Hopkinsville, Ky., 247 miles. The road has been in the hands of receivers since January 1, 1913.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—Six Months Guaranty Determined.—The Interstate Commerce Commission has issued a certificate stating the final amount of the guaranty to this company and its subsidiaries for the six months period of 1920, amounting to \$1,693,960, of which \$287,960 is now payable.

TOLEDO, ST. LOUIS & WESTERN.—Proceeds of Settlement.—Edwin G. Merrill, chairman for the 4 per cent collateral trust bonds of 1917, series "A" has sent a letter to holders of certificates of deposit and to non-depositing holders announcing that the settlement of the litigation concerning the "Clover Leaf" 4s of 1917 has been approved and confirmed by the United States District Court. The proceeds of the settlement became available for distribution beginning January 20, 1922.

The New York Life Insurance & Trust Company has been appointed by the court and by the bondholders' committee as agent to carry out the distribution. Holders of certificates of deposit representing the 4 per cent bonds on surrender of their holdings, indorsed in blank to the insurance and trust company, will receive the following distributive shares with respect to each \$1,000 face amount of the bonds represented by the certificates surrendered:

- (1) \$152 in cash.
- (2) Certificates of deposit representing 1.8 shares of common stock.
- (3) Certificates of deposit representing 1.8 shares of preferred stock of Toledo, St. Louis & Western.
- (4) Certificates representing 12.5 shares of common stock of the Chicago & Alton.
- (5) Certificates representing 5.6 shares of the preferred stock of the Chicago & Alton.

Certificates will not be issued for fractional shares. In all cases where the aggregate face amount of bonds represented by the certificates of deposit surrendered by any one depositor is such that distribution upon the set ratio would result in the delivery of fractional shares the trust company will adjust such fractions.

WEST SIDE BELT.—Acquisition.—See Pittsburgh & West Virginia.

Additional Sales of Equipment Trust Certificates

January 20, 1922.

The director general of railroads has confirmed additional sales, at par plus accrued interest, of railroad equipment trust certificates held by the government, as follows:

- To Robinson & Company, New York:
- Toleah & Ohio Central Railroad, 1923-1935, inclusive..... \$1,882,400
- To the Guaranty Trust Company of New York:
- Southern Railway Company, 1923-1935, inclusive..... \$5,946,000

This latter sale comprises two-thirds of all the maturities of this equipment trust issue. The government will hold the balance of one-third of all maturities stamped as subordinated, in accordance with the agreement as amended. Other sales are under negotiation.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Chattanooga, New Orleans & Texas Pacific Railway Co.....	\$525,000.00
Delta Southern Railway.....	60,000.00
Houston & Brazos Valley Railway Company.....	130,000.00
St. Joseph Terminal Railroad Co., paid Director General.....	3,000.00
Short Lines.....	
Missouri Railroad Company.....	800.00

Dividends Declared

- Chattanooga, New Orleans & Texas Pacific—Preferred, 4 1/2 per cent, payable March 1 to holders of record February 18.
- Railroad & Ohio—Preferred, 2 per cent, semi-annually, payable March 1 to holders of record February 28.
- Delaware & Hudson—1 1/2 per cent, quarterly, payable March 20 to holders of record February 28.
- Houston & Brazos Valley—1 1/2 per cent, quarterly, payable March 1 to holders of record February 1.
- Toledo & Western—Common, 1 1/2 per cent, payable March 18 to holders of record February 28.
- Missouri Railroad—Preferred, 4 per cent, quarterly, payable February 28 to holders of record February 1.
- Railroad & Ohio—Preferred, 1 per cent, quarterly, payable March 1 to holders of record February 17.

Railway Officers

Executive

G. B. Butts has been elected president of the Roby & Northern with headquarters at Roby, Texas.

H. W. Stanley, receiver of the Tennessee Central since 1917, with headquarters at Nashville, Tenn., has been elected president and **G. G. Morse** and **C. K. Boettcher** vice-presidents, with the same headquarters.

Financial, Legal and Accounting

Eugene Wright, general storekeeper of the Long Island, has been elected secretary, effective January 16, succeeding **Frank E. Haff**.

John E. Taylor, whose appointment as general attorney of the Kansas, Oklahoma & Gulf, with headquarters at Muskogee, Okla., was announced in the *Railway Age* of January 21 (page 255), was born at Foster, Ky., on February 21, 1879. He has been a practicing attorney in Missouri since May 7, 1900, and was associated with the law firm of Karnes, New & Krauthoff, and the successors to that firm, Miller, Comack, Winger & Reeder, with offices in Kansas City, Mo. Mr. Taylor has been connected with the legal affairs of the Kansas, Oklahoma & Gulf through association with Arthur Miller, member of the above mentioned firm and general counsel of that railroad. He was engaged in this work up to the time of his recent appointment.

Operating

James E. Bradford has been appointed assistant general manager of the Dansville & Mount Morris with headquarters at Dansville, N. Y.

J. C. McPherson, whose appointment as superintendent of the newly created East Bay Electric division of the Southern Pacific, with headquarters at Oakland, Cal., was announced in the *Railway Age* of January 14 (page 209), was born in Ireland.



J. C. McPherson

When 16 years old he came to America and shortly thereafter entered railroad service in a shop of the Atchison, Topeka & Santa Fe. Through various promotions he was successively advanced to the position of locomotive fireman, and later locomotive engineer. He came to California in 1895 to enter the service of the Los Angeles & Pasadena Interurban, the first unit of the present Pacific Electric system. He was successively

dispatcher, chief dispatcher, trainmaster and assistant superintendent. He left in 1907, to accept the position of superintendent of the Los Angeles Interurban railway. Later when this company was absorbed by the Pacific Electric, Mr. McPherson was appointed superintendent of its Northern division. In 1913, he was appointed superintendent of the Southern Pacific's electric lines in Oakland, Alameda and Berkeley, or what now comprises the East Bay Electric division. During the recent war he served as a captain in the 66th engineers, and for a brief period before the armistice he was superintendent of terminals at the Vincennes docks,

with headquarters at Bordeaux, France. At the conclusion of his military service he re-entered the employ of the Pacific Electric as assistant general superintendent, with headquarters at Los Angeles, Cal., which position he was holding at the time of his recent appointment.

W. C. Higginbottom has been appointed superintendent of the Richmond division of the Pennsylvania, succeeding A. C. Watson, transferred.

P. W. S. Joy, trainmaster of the Southern Pacific, with headquarters at Sparks, Nev., has been transferred to Tracy, Cal., succeeding W. T. Small, who has taken service with another company. Mr. Joy will be succeeded by **B. S. Richart**, trainmaster at Carlin, Nev.

Traffic

H. P. Smith has been appointed commercial agent of the Seaboard Air Line with headquarters at Denver, Colo., effective January 20.

W. R. Canova has been appointed general agent of the Seaboard Air Line with headquarters at Tallahassee, Fla., effective February 1.

C. J. O'Neill has been appointed assistant freight claim agent of the San Antonio, Uvalde & Gulf, with headquarters at San Antonio, Tex.

Alexander M. Cleland, whose retirement as passenger traffic manager of the Northern Pacific, was announced in the *Railway Age* of January 21 (page 256), was born at Alliance,

Ohio, on November 22, 1862. He entered railroad service in 1879 as a ticket seller on the Pennsylvania. From 1881 to August 1886, he was a ticket seller at the Union station, Chicago, and from that date to May, 1890, he was a ticket seller on the Chicago, Milwaukee & St. Paul, at Chicago. On the latter date he entered the service of the Northern Pacific as a ticket seller at St. Paul, Minn. On April 30, 1892, he was made a clerk in the passenger department at St. Paul, and in November, 1896,

he was promoted to chief clerk in that department. In February, 1901, he was made assistant general passenger agent, with headquarters at St. Paul, and on April 1, 1904, he was promoted to general passenger agent, with the same headquarters. He was promoted to passenger traffic manager, with the same headquarters, on May 1, 1919, which position he was holding at the time of his recent retirement.

Archibald Gray, whose appointment as assistant to the traffic manager of the Western Pacific, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of January 14 (page 210), was born at Strachur, Scotland, on August 12, 1863. He entered railroad service on August 1, 1887, as a clerk in the local freight office of the St. Paul, Minneapolis & Manitoba (Great Northern) at Minneapolis, Minn. He was later promoted to chief clerk in that office, and in 1893, he was made chief clerk to the general traffic manager at St. Paul, Minn. From 1894 to 1896 he was assistant general freight agent, with headquarters at St. Paul. He was transferred to Butte, Mont. in June, 1896, and was promoted to assistant general freight and passenger agent on June 1, 1905, which position he held until October 1 of that year, when he was transferred to Sioux City, Iowa. From January 1, 1907, until April 1, 1911, he was assistant

general freight agent at Seattle, Wash., and from the latter date until October 16 of that year, he was assistant general freight and passenger agent, with headquarters at Portland, Ore. He left the service in October, 1911, to become general freight agent of the Western Pacific, with headquarters at San Francisco, Cal. He was appointed traffic agent, with the same headquarters on April 16, 1919, and again general freight agent at San Francisco on March 1, 1920, which position he was holding at the time of his recent promotion.

A. B. Chown whose appointment as assistant general passenger agent of the Grand Trunk Railway in Chicago was announced in the *Railway Age* of December 10, page 1178,

was born in Belleville, Ontario, in 1887. He was graduated from the public and high schools and took a course at the Ontario Business College in Belleville. He entered the service of the Grand Trunk at Belleville as a ticket clerk in 1907, in which capacity he remained until 1911 when he was promoted to soliciting passenger agent at Toronto. He was appointed traveling passenger agent in 1913 with headquarters in Pittsburgh. In June, 1918, he was transferred to New York. In December, 1918, he

was appointed acting general agent, passenger department. He was appointed general agent, passenger department in March, 1919, and in July, 1920, was appointed general agent, passenger department, of the Canadian National-Grand Trunk system, in which capacity he was serving at the time of his recent promotion.

Wilbur E. Coman, whose appointment as western traffic manager of the Northern Pacific, with headquarters at Seattle, Wash., was announced in the *Railway Age* of December 3 (page 1123),

was born at Portage, Wis., on May 15, 1872. He began railroad work in 1888 in the service of the Chicago, Burlington & Quincy. Later in the same year he was employed by the Kansas City, Springfield & Memphis, at Kansas City, Mo. He entered the service of the Union Pacific at Portland, Ore., in 1890 and he was appointed general agent of the Oregon-Washington Railroad & Navigation, with headquarters at Butte, Mont., in 1897. Later in that year he was appointed general

agent of the Oregon Short Line, with headquarters at Portland, which position he held until 1901, when he was transferred to Salt Lake City, Utah. He was appointed assistant general freight agent of the Oregon-Washington Railroad & Navigation, with headquarters at Portland, in 1902. He later became general freight and passenger agent of the Southern Pacific, with the same headquarters, which position he held until 1910, when he was appointed general freight and passenger agent of the Spokane, Portland & Seattle, with head-



A. B. Chown



A. M. Cleland



W. E. Coman

quarters at Portland, soon after being promoted to traffic manager. From 1913 to 1919 he was vice-president and general manager of the Northwestern Electric, at Portland and from 1919 to the time of his recent appointment, he was connected with the Washington Water Power Company at Spokane, Wash.

James B. Duffy, assistant general passenger agent of the Atchison, Topeka & Santa Fe, Coast Lines, with headquarters at San Francisco, Cal., has been promoted to general passenger agent, with headquarters at Los Angeles, Cal., effective February 1, succeeding to the duties of J. J. Byrne, assistant passenger traffic manager, deceased. Mr. Duffy was born on January 3, 1875. He entered railroad service in 1890 as an assistant ticket agent on the Atchison, Topeka & Santa Fe at San Francisco. Two years later he was made a rate clerk, and in March, 1895, he was promoted to chief clerk in the general passenger traffic office at Prescott, Ariz. In January, 1896, he was



J. B. Duffy

transferred to Albuquerque, N. M., and was later made passenger agent at San Jose, Cal., which position he held until July, 1900. From that date until the present, he has been successively station ticket agent, city passenger agent, general agent, and assistant general passenger agent at San Francisco, Cal., except for a brief period during federal control, when he was manager of the consolidated ticket office in that city.

E. S. Leavitt has been appointed general agent of the Southern Pacific, with headquarters at Boston, Mass., succeeding **James H. Glynn**, lately deceased.

E. E. Carter, superintendent of terminals of the St. Louis-San Francisco, with headquarters at Tulsa, Okla., has been appointed general agent, with the same headquarters.

W. G. Powell has been appointed freight traffic manager of the Dansville & Mount Morris, with headquarters at Dansville, N. Y., which position he will occupy in addition to that of general manager.

Engineering, Maintenance of Way and Signaling

W. L. Dayton, supervisor of signals of the Detroit division of the Grand Trunk, with headquarters at Durand, Mich., has been transferred to the Chicago division, with headquarters at Battle Creek, Mich., succeeding **H. E. Burns**, transferred. He will be succeeded at Durand by **J. P. Coleman**, formerly assistant supervisor of signals of the Chicago division, with headquarters at Battle Creek.

Henry D. Jouett, terminal engineer, Grand Central Terminal improvements, of the New York Central with headquarters at New York City, has been promoted to chief engineer of the Cleveland Union Terminals with headquarters at Cleveland, Ohio. Mr. Jouett was born at Summerville, Mass., on March 30, 1878, receiving his technical training at the Massachusetts Institute of Technology from which he was graduated in 1900. He entered railway service in June of the same year as a rodman in the division engineer's office at Albany, N. Y. One month later he was promoted to an inspector of erection of bridges, holding this position until in April, 1901, when he was promoted to assistant supervisor of track. In April, 1902, he was promoted to assistant in the division engineer's office at Albany, where he remained until August

when he left the employ of the railroad to go with a building contractor. Mr. Jouett re-entered the employ of the New York Central in February, 1903, in connection with the electrification work in the New York district and since that time has successively served as transitman, assistant engineer on construction, resident engineer, designing engineer on the electric zone improvements and later on the west side improvements in New York City, and terminal engineer, the position which he held at the time of his latest promotion.

W. H. Coverdale, recently appointed consulting engineer of the reorganized Chicago & Eastern Illinois, was born at Kingston, Canada, in 1871. He was graduated from Geneva



W. H. Coverdale

College, Beaver Falls, Pa., in 1891 with the degree of bachelor of arts, and received the degree of doctor of science in 1914. From 1892 to 1900 he was in the service of the Pennsylvania, Lines West, as rodman, instrumentman and assistant engineer, and during the last three years of that period was track elevation engineer in charge of the Pittsburgh, Fort Wayne & Chicago track elevation from 47th street to Park Manor, Chicago. From 1901 to 1903 Mr. Coverdale was employed as civil engineer by a New York firm of engineers and contractors. Since 1904 he has practised as a consulting engineer, specializing in railroad and industrial management and financing. In addition to his recent election as director and appointment as consulting engineer of Chicago & Eastern Illinois, Mr. Coverdale is chairman of the board of directors of the Pittsburgh & West Virginia, and of the Pittsburgh Terminal Railroad & Coal Company; he is president and director of the West Side Belt, director and consulting engineer of Gulf States Steel Company, and of the Gulf, Mobile & Northern; a director of the Meridian & Memphis; and ancillary receiver of the Connecticut Brass & Manufacturing Corporation.

Purchasing and Stores

E. Gardner Thorpe has been appointed general storekeeper of the Long Island, succeeding **Eugene Wright**, promoted.

G. W. Bichlemer, purchasing agent of the Union Pacific with headquarters at Omaha, Nebr., has been promoted to general purchasing agent with the same headquarters.

Miscellaneous

J. P. Burns has been appointed assistant chief of the department of investigation of the Canadian Pacific with headquarters at Winnipeg, succeeding **Wm. McLeod**, deceased. **A. H. Cadieux** has been appointed assistant to the chief of the investigation department with headquarters at Montreal.

Obituary

T. J. Hudson, formerly general traffic manager of the Illinois Central, died on January 21, at St. Petersburg, Fla. Mr. Hudson retired from active railroad service in 1907.

THE INTERSTATE COMMERCE COMMISSION has issued orders authorizing common directors among the companies comprising the systems of the Philadelphia & Reading and the Boston & Maine

EDITORIAL

Railway Age

EDITORIAL

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One measure fostered by union labor under the sponsorship of the United States Railroad Administration was the standardization of wages, that is, the same wage for the good, the bad and the indifferent, under all conditions. Under this plan every possible effort was made to decrease the differential

A Much Needed Adjustment

between the wages paid to the inexperienced beginner and that received by the efficient veteran. Considerable progress was made to this end in the clerical organizations; minimum rates of pay were greatly increased and only moderate increments were made in the established rates for the more experienced employees. The plan under which wages were reduced by the Labor Board in Decision 147 has not corrected this condition. As a result, the railroads are now compelled to pay wages to boys and girls with no experience which are greatly out of line with those paid more experienced clerks. So small has been this differential between positions of different grades that it has been difficult in some cases to get clerks to take the more responsible positions. At least one railroad recently has found it possible to overcome this difficulty by arriving at an agreement for a reduction in wages with representatives of its clerical employees. This reduction has been worked out on a sliding scale whereby practically no decrease has been made for the positions requiring the greatest degree of responsibility and experience but with a maximum reduction for the beginners. It is to be hoped that other roads will be successful in the prosecution of similar negotiations with their employees.

The Southern Pacific has announced a plan, effective February 1, whereby employees of the system will be assisted in the

Helping Employees Buy Stock

purchase of Southern Pacific Company stock. This means the addition of another important railway system to the list of roads which have now adopted such plans. This list includes the Lehigh Valley, the New York Central, the Union Pacific and now the Southern Pacific—rather imposing advocates, we should say, for a plan of any kind. The Southern Pacific plan, in its essentials, is the same as those of the other roads. The company proposes to assist its employees by securing the stock for them and having them pay for it by the deduction of monthly installments from the employee's pay. The stock is not treasury stock but is secured in the open market. There is lacking, therefore, any of that feature of paternalism which might otherwise spoil a plan of this kind. In the Southern Pacific plan, as in the plans adopted by the other railway companies and by certain industrial companies, the employee, when he has completed the payments on his stock, is as much a bona fide stockholder as any other stockholder. The *Railway Age*, on a number of occasions has stated its belief that railway employees should be encouraged to secure stock of the company by which they are employed. The railway that numbers many of its employees as stockholders will agree that our opinion is correct. The Lehigh Valley established some time ago a plan such as the Southern Pacific is now adopting and has had marked success with it. It may be cause or effect, but it is a fact that the officers of the Lehigh Valley are most enthusiastic concerning the spirit of loyalty which exists on the Lehigh Valley system. The Pennsylv-

ania numbers a proportion of its employees also as stockholders, although it has not had a plan for assisting its employees to buy stock. Presumably this ownership of stock by employees is only one factor among several, but it is nevertheless true that the morale of the Pennsylvania rank and file is one of the most valuable assets the Pennsylvania System has.

Control of the Shantung Railway is a point on which hinges the settlement of a number of perplexing problems in the Far East. According to the New York Times, Japan has agreed to accept China's offer of 53,000,000 marks for the property, with the stipulation that the traffic manager is to be a Japanese. At this point China balks. There is much to be said for the Chinese stand in this controversy. If China can control her railways, then all nations will have equal opportunities in China. Heretofore the foreign-owned railways have been used entirely too frequently as political instruments of the country of ownership. China needs the help of foreign capital and foreign skill in solving her railroad problem, but the solution of that problem will be indefinitely postponed as long as railways are seen primarily as instruments of economic domination rather than as means of increasing the national wealth. It seems that China is likely to have little confidence in railways operated by foreigners and, that being the case, the taking over of such railways by the government is the only course to follow.

The Shantung Railway

The extent to which obsolete, worn-out machinery limits railroad shop output and increases costs is generally recognized. Additional evidence of this unfortunate condition, however, continually crops out, as indicated in the

Old Shop Machinery Limits Output

discussion of a paper on the correct machining of wheels and axles, read before a recent meeting of the Car Foremen's Association of Chicago. When questioned as to how many rolled steel wheels can be turned on a modern wheel lathe in an eight-hour day, one of the members said, "With our machinery, which is not modern, we can turn out about five pairs in eight hours. At C— (mentioning another point on the system), where the machinery is not quite so old, they can turn eight pairs in eight hours." The fact of the matter is that had a modern, high-power wheel lathe been installed at either of the points mentioned, rolled steel car wheels could have been turned in an average of 30 minutes a pair from floor to floor, making a total of 16 pairs in eight hours. No reflection is intended on the car shop foreman at the point where only five pairs of wheels are being turned in eight hours. He has probably found by sad experience that any attempt to secure more than that production will result in a broken lathe and consequent delay and tie-up of the work while the lathe is being repaired. Neither is there reflection on the railroad management, which probably has many such old machines and would be only too glad to replace them all could the necessary funds be obtained. Whatever may be the reason, the fact remains that car wheel lathes with only

33 to 50 per cent of the efficiency of modern machines are being used by that railroad with the unavoidable conclusion that every pair of car wheels turned is costing almost that proportion more for the operation than should be necessary.

The Automatic Train Control Order

WHILE the order which the Interstate Commerce Commission served on 49 carriers to show cause on or before March 15, 1922, why they should not be required to make installations of automatic train control, was unexpected, it has served to clarify the atmosphere with reference to this important development in train operation. As was to be expected, the order has produced widely differing reactions. Some railway men feel that the art has not yet been developed sufficiently to warrant installations on such an extensive scale. Others seem to think that too much time already has been spent on investigation and discussion. Still others regret because the order was issued before installations which they were planning had been started.

While the order shows evidence of haste in preparation, and the specifications are very general in character the action taken by the commission may well be considered as a start toward determining, under actual service conditions, the value of a number of devices which show evidences of merit, but which have not as yet been tested outside the laboratory, as well as toward further testing of the value of devices which already have shown what they can do under actual service conditions.

Some confusion exists as to the provisions of this order. In brief, it requires that the railroads mentioned shall each make an installation of an automatic train stop or train control device over a full passenger locomotive division which may be selected by the railroad itself with the approval of the commission, between those points on the carrier's main line designated in the order. The device selected must be applied to or operated in connection with all road engines operating on or over the district chosen.

It is to be expected that the order will be modified after the hearings before the commission. It is possible that all of the roads cited in the order may not be required to make installations. It further appears that the roads were selected on the basis of gross earnings, and the list includes a number which have little or no signaling, which fact will undoubtedly be taken into account before any final order is issued. It is also reasonable to expect that the commission will allow the carriers to select other passenger engine divisions than between the points specified.

Another question of paramount interest is the cost of installation. With such data as are at hand, and on the basis of an average passenger engine division of 125 miles with approximately 65 locomotives operating over it, it is estimated that the cost of installation will range between \$100,000 and \$600,000, depending on the device selected.

It is to be hoped that the railroads will not endeavor to contest this order, provided it is modified in such a manner and to such an extent that the installations may be made without undue hardship to any road concerned. The installations should be located in different sections of the country in order that the effects of widely differing climatic and operating conditions may be studied carefully. The kind of device to be installed should be left to the carrier to determine in the light of what it thinks will best meet its needs. In order that no undue hardship shall be placed on any carrier, or carriers, it has been suggested that the expense of the installation and maintenance of the device should be prorated among the members of the American Railway Association.

The air brake, the automatic coupler, and the automatic block signal system have effected savings in addition to providing greater safety in operation. The average operat-

ing officer may well ask wherein automatic train control will aid operation. It is interesting to note in this connection, that the movement of trains by signal indication with the elimination of the written train order and the derail are receiving serious consideration at the present time. No doubt the shortcomings of the train order system and the fact that a derail, when effective, may wreck a train are largely responsible for this. In train operation by signal indication the defects of the train order system are corrected but the fallibility of the human element still remains. It is this that it is hoped automatic train control will practically eliminate without decreasing the employees' sense of responsibility. While many have feared that the installation of additional mechanical safety facilities will tend to make men careless, train movement with train control has been in operation sufficiently to largely remove this fear.

Through the use of automatic train control and the automatic block system, with take-siding signals and the remote control of passing siding, junction, or other switches, derails can be eliminated and trains can be operated much closer to schedule through fogs and storms safely without train orders, and a maximum use of the tracks will result. Also, it should be remembered that the expenditures for certain classes of collisions and derailments will be materially decreased, as well as overtime, while there will be less wear and tear to equipment because of the elimination of unnecessary stops.

Labor Board Should Stick to Facts

IT HARDLY NEEDS to be said that opinions rendered, awards made and statements issued by, or on behalf, of the Railroad Labor Board should be based upon a knowledge of facts and that the facts should be correctly stated. The award made, the opinions rendered and statements issued on behalf of the majority of the board in the case involving the rules and working conditions of clerks, freight handlers, express and station employees do not measure up to these requirements. The award made by the majority of the board, which became effective on February 1, gave all these employees an eight-hour day except where service is intermittent, with pro-rata overtime for the ninth hour, and time and one-half thereafter. Where service is intermittent eight hours actual time on duty within a spread of twelve hours is made to constitute a day's work.

The three railroad members of the board filed an opinion dissenting from the part of the decision of the majority providing for punitive payment for service rendered beyond the ninth hour. In their dissenting opinion the railroad members made certain statements of fact regarding the hours of work of these classes of employees prior to federal control. Three of the members who joined in the majority opinion, Messrs. McMenimen, Hooper and Hanger, then filed an answer to the dissenting opinion, in which they attempted to show that the statements made by the railroad members regarding working hours prior to federal control were incorrect. The result of the publication of this answer to the dissenting opinion was to disclose that a majority of the members of the board who had signed the majority opinion did not themselves state correctly the facts as to the working hours of these classes of employees prior to government control or on what basis they were paid.

The railroad members, in their dissenting opinion, said that prior to federal control clerical forces generally were paid on a monthly rate basis, which covered all service rendered. Messrs. McMenimen, Hooper and Hanger, in their answer, said: "This statement is in error to the extent that a number of carriers were paying overtime to clerical and station employees prior to federal control." It develops, however, that a tabulation made by the Railroad Wage Commission, based upon a study of representative railroads

for the month of December, 1917, showed that on these railroads more than 99 per cent of all clerks were paid a monthly rate which did cover all service rendered by them.

Another statement made by the railroad members in their dissenting opinion was that prior to federal control other classes of employees covered by the clerks' agreement, including freight house laborers and other station employees, generally worked ten hours per day and were paid at pro-rata rates for overtime work. It was added that ordinarily the same hours of service per day are now required to meet business needs throughout the country along the lines of the carriers. This statement also was challenged in the answer to the dissenting opinion as "erroneous to a very large degree." It now develops that the study by the Railroad Wage Commission of the hours and working conditions of these classes of employees mentioned above showed that 89 per cent of them worked ten hours or more. It also showed that 92 per cent of the "freight house laborers and other station employees" mentioned in the dissenting opinion worked ten or more hours in December, 1917.

In support of their contention that the statements made by the railroad members regarding working hours under private operation were erroneous, Messrs. McMenimen, Hooper and Hanger quoted extensive extracts from answers made by the regional directors and individual railroads to a questionnaire sent out by the Railroad Administration in August, 1919. It develops, however, that the answer to the dissenting opinion did not include all the replies received by the Railroad Administration to these questions, although the language in it plainly implied that it did, and in consequence a misleading impression was given regarding the facts shown by the replies to the questionnaire.

For example, one question asked in the questionnaire, was: "Would it be possible to work the employees coming under the provisions of supplement No. 7 on a 44-hour week without punitive overtime in (a) general offices, (b) division offices, (c) warehouses, (d) station ticket offices and other (e) miscellaneous points." With reference to the reply received from the Pocahontas region it was stated: "Reply indicates that all but 5 per cent of the employees in the general offices and warehouses could be given a 44-hour week without the payment of punitive overtime." The reply actually received by the Railroad Administration from the Pocahontas region was quite different, being as follows: "It would not be possible to work employees coming under the provisions of supplement No. 7 on a 44-hour week without punitive overtime, for the reason that numerous such employees now work Saturday afternoons and certain hours on Sundays. The percentage would possibly be (a) general office, 5 per cent; (b) division office, 20 per cent; (c) warehouse office, 5 per cent; (d) station ticket office, 100 per cent; (e) miscellaneous office, 5 per cent." The answers made by some important railroads, including, for example, the Pennsylvania and the Chicago, Milwaukee & St. Paul, were not quoted at all. The records of the Railroad Administration show that these railroads answered that employees of none of the classes mentioned could be given a 44-hour week without the payment of punitive overtime. It is as pernicious and indefensible to misrepresent by refraining from telling all the facts, when all are presumed to be given, as it is to misstate them.

The railroad members, in their dissenting opinion, said: "The work of all classes covered by this agreement is to an extent intermittent and does not require constant application. With a lesser day than ten hours the carrier cannot, with economy and efficiency, meet the demands of the public." Those signing the answer to the dissenting opinion undertook to show that practically all these employees worked continuous time. The report of the Interstate Commerce Commission regarding the time worked and the compensation of the 310,000 employees included in these classes in July, 1921, shows that in that month they received \$2,181,-

404 for time paid for but not worked, and that every single class of them received some of this money.

The misrepresentations of facts contained in the answer made to the dissenting opinion were sufficiently indefensible. But this was not the worst of the matter. A statement headed "From the Railroad Labor Board," regarding the new rules established was given to the press, which said: "These two changes in the rules are expected to save the railroads many millions of dollars, any exact estimate being impossible owing to fluctuations in business and traffic conditions. Railroad critics of the national agreements, in past hearings before the Railroad Labor Board, contended that these two rules cost the roads great sums, even hitting at amounts in excess of \$50,000,000, but experts attached to the board say that \$15,000,000 is a conservative estimate." As a result of this statement being given to the press it was heralded all over the country that the board had made changes in the rules which would save the railroads from \$15,000,000 to \$50,000,000.

Soon afterward Samuel M. Felton issued a statement showing that the board's own statistical department had estimated the savings that would be made at only \$4,823,524.84. Only a short time ago a statement was issued by an employee of the board estimating that changes made in the rules in the shop crafts agreement with the employees would save the railways \$50,000,000 a year and this was also widely published. Subsequently, R. M. Barton, chairman of the board, said: "The statement referred to was not made by nor authorized by the board. We have no means of knowing with accuracy what the saving will amount to."

The Railroad Labor Board is a government body whose members represent railway employees, the railroads and the public. Its usefulness will be determined, in the long run, by the extent to which it deserves the confidence of all these parties. It cannot gain or hold, much less deserve, such confidence unless its members make much greater efforts to learn the facts bearing on the questions they are dealing with, or to stick to the facts after they have learned them, than they did in the instances mentioned.

Why Two Specifications for Steel Railway Bridges?

DURING THE LAST 20 years the specifications for steel railway bridges adopted by the American Railway Engineering Association have come to be accepted as the standard guide for the design and construction of steel bridges on American railways. For this reason, railway engineers concerned with bridge design now find themselves in a rather confused state of mind when they receive copies of a specification prepared by the Special Committee on Specifications for Bridge Design and Construction of the American Society of Civil Engineers. Except for major changes in three or four paragraphs, the new specifications for design are almost identical with the latest draft of the A. R. E. A. specifications adopted in March, 1920. The two specifications are so nearly alike in form and substance that it is exceedingly difficult to understand why it was necessary to issue the later instrument under the sponsorship of another society.

With a record of 20 years of useful work the Committee on Iron and Steel Structures of the American Railway Engineering Association has come to be recognized the world over as the leading authority on steel railway bridges. Not only are its specifications in general use here but even in countries as remote as India its work is given a great deal of consideration in the development of similar rules. Because of this, the similarity in the specifications of the two societies, together with a duplication of words in the names of the two organizations, can but result in an unfortunate confusion.

It is conceded that the A. R. E. A. specifications are not

perfect. Some engineers are far from satisfied with certain features of the rules of design in their present form, chief among which is the column formula. The method of determining the required section of the compression flange of plate girders has also been criticized, and a few bridge engineers have been disappointed because the specifications in their present form do not provide for the proportioning of bridge members for maximum loadings and maximum stresses. It is in reference to these specific features that the American Society's specification differs in substance from the A. R. E. A. instrument. One of these, the column formula, the new specification offers three alternative methods because members of the A. S. C. E. committee could not agree on any one of them. The modifications proposed by the A. S. C. E. specifications with respect to disputed points may comprise distinct improvements over the corresponding requirements in the A. R. E. A. specifications. Nevertheless, we believe that such improvement may be accomplished far better through action by the committee responsible for the original specifications than through the agency of some other organization. That such changes or improvements may be forthcoming is evidenced by the fact that the report of the Committee on Iron and Steel Structures for consideration at the next convention of the American Railway Engineering Association offers a new formula for the design of compression flanges of plate girders which is identical with the one embodied in the new A. S. C. E. specifications.

The present rules for the design of steel railway bridges as drawn up by the Iron and Steel Committee of the A. R. E. A. are the result of a process of evolution. They represent years of work by the committee and many hours of discussion at the annual conventions. Through this process, they have undergone a gradual improvement and will continue to do so through the combined efforts of bridge engineers representing the railroads and other interests vitally concerned in this work. Any benefits to accrue from independent efforts on the part of others will be largely neutralized by unnecessary and confusing duplication.

Face the Problem Squarely

THE TRANSPORTATION ACT requires the Interstate Commerce Commission to determine from time to time what net return the railways as a whole should be allowed to earn. It is required in doing this to consider the country's need for adequate means of transportation. The law makes 5½ to 6 per cent the measure of a reasonable net return only until March 1, 1922. Therefore, the commission must again soon say, if the law is not changed, what return it believes it is reasonable and in the public interest to let the railways have.

It is to be hoped that in passing upon this question, the commission will squarely face the railroad problem as it actually is. Although that problem is being discussed by many persons and dealt with by many government bodies, almost nobody is facing it squarely and discussing or dealing with it on its merits. Continued paltering with it will cause disaster, not only to the railways but to every class of business interests and every class of people in the country. The *Railway Age* can see as clearly and has recognized as frankly as anybody the improvements in the railroad situation which have occurred within recent months. The efficiency of labor has improved, operating costs have been reduced, net return has increased and expenditures for equipment and improvements have been partially renewed.

But these things do not solve the railroad problem, or necessarily bring a real solution of it nearer. The railroad problem will be solved only when the public and the government decide finally to do one of two things and then act accordingly. One solution of it would be the adoption

of government ownership. It would be a bad solution, but it would be a solution. The only other solution possible is the definite and final adoption of a policy of allowing the railways under private ownership to earn an average net return, in good years and in bad, sufficient to enable them to improve and expand their properties so that they can handle all the traffic offered to them with economy.

Whatever might be true under government ownership, it is plain that under private ownership and management there never can be any solution of the railroad problem consistent with the public welfare unless the railways are allowed on the average, year by year, to earn relatively as large net returns as are earned in other businesses. Government regulation may decide that the railways, like other industries, may earn large profits in good years and small profits or none in bad years. It may decide that in good years the railways must be content with smaller profits than those earned in other businesses and in bad years will be allowed to earn larger profits than are earned in other businesses. One or the other of these policies it must adopt, however, if the railroad problem is to be solved under private ownership.

Upon the net return the railways are allowed to earn always must depend the amount of new investment they can make in their properties. Upon the new investment they can make must always depend, in turn, both the economy and adequacy of the service they can render. They cannot in the future effect economies in operation and make reductions of rates as in the past, unless they can make large capital expenditures as in the past. They cannot increase the amount of service rendered by them in the future as in the past, unless they can make large capital expenditures as in the past.

Facts such as these have been theoretically recognized but actually ignored in all past regulation of the railways. They have been regulated as if it was to the public interest to reduce and limit their net returns as much as the courts would not hold confiscatory. The facts regarding railroad development under this policy of regulation are indisputable. The development of the railways has steadily declined. This decline did not begin within recent years. It began more than ten years ago and has continued at an accelerating rate ever since.

Both the fact, and the main cause, of this rapid decline of railroad development were recognized by the public and Congress when the Transportation Act was passed. It was owing to this that the rate-making provisions of the Transportation Act were adopted and that a large advance in rates in 1920 was willingly conceded.

Now, however, a great part of the public and of public men are advocating not merely a return to the policy of regulation which formerly prevailed, but the adoption of a more unfair and dangerous policy. They are insisting upon reductions in rates in entire disregard of the fact that in the past the railways did not earn as large profits as were made in other industries, that the net return they have earned under the Transportation Act has been only one-half as large as that act virtually promised them, and that to make immediate large reductions of rates would completely wipe out the present net returns. They are advocating repeal of all those provisions of the Transportation Act which were intended to assure to the railways a better opportunity to earn reasonable net returns and at the same time favoring the retention of all the provisions of that act which impose upon the railways increased restrictions and burdens. They would repeal the rate-making provisions but leave the railways burdened with the present system of regulation of the wages and working conditions of their employees which, at a time when they are earning an inadequate net return, is forcing them to pay higher wages than are being paid to similar labor in any other industry. Even the Interstate Commerce Commission is yielding to this pressure for unfair

and destructive regulation. It is ordering large reductions of rates in spite of the fact that the railways never have earned and are not earning now the net return that the Transportation Act requires the commission to let them earn.

The demands being made for reductions of rates and for changes in the Transportation Act express a mania regarding the railroad question comparable to past manias in this country regarding fiat paper money or free silver. Formerly, millions of our people, including many regarded as intelligent and wise, advocated legislation to depreciate the country's currency as a sovereign means of alleviating the effects of panics and industrial depression. Now, literally millions, including many regarded as intelligent and wise, advocate wholesale reductions of railway rates and the adoption of unfair railway legislation as the main remedy for present business conditions. They proceed on the remarkable theory that the way to improve business is financially to ruin and prevent revival of the development of the railroad industry. The present prices of most kinds of commodities are relatively higher than the railway rates on them, and yet the very producing and distributing concerns that are charging these prices, and which have made much larger profits than the railways for years, are contending that the restoration of normal business conditions demands, first of all, immediate reductions of railway rates.

Perhaps the Interstate Commerce Commission, in determining what return the railways shall be allowed to earn in the future, will be controlled by the present railway mania. Perhaps, if it is not, Congress will deprive it of the power to determine the net return that they may earn. We hope neither of these things will occur, although history shows that such things are quite possible. The railroads could then appeal to the federal courts and get some protection there, but in the long run appeals to the courts, however successful, will not solve the railroad problem. It will never be solved under private ownership, unless Congress and the Interstate Commerce Commission, as a deliberate public policy, decide that the railways must be allowed to earn adequate net returns and shall then consistently act in accordance with this decision. Government regulation of the railways in the past has been a failure and worse than a failure because it has been consistently predicated upon the false economic theory that the railroads should be restricted to the smallest net return that the courts will not hold confiscatory. The application of this theory has slowed down and finally stopped railroad development. Its continued application will forever prevent an adequate revival of railroad development, and that would be worse than government ownership itself.

New Books

Life of George Westinghouse. By Henry G. Prout, C. E., A. M., LL. D., 375 pages. Portrait frontispiece and eight other illustrations. Size 6 in. x 9 in. Bound in cloth. Charles Scribner's Sons, New York. Price \$2.50.

George Westinghouse was a great man. He was a genius, but a good deal more than that. He developed his own and others' inventions and was a business executive as well as an engineer. Above all this he was a gentleman, associating always with worth-while people, and benevolent to his employees because that was his nature, not merely because it was "good business" to take an interest in their welfare. His pre-eminence as a noble citizen is indicated by the very lines of his portrait, and readers of this book who are unacquainted with his career will be charmed to see how the varied acts of his life, as here narrated, confirm the impressions which they will gain from this picture.

And Colonel Prout has made a great book. Chronological treatment of the subject, as a whole, was out of the question, for Westinghouse left no systematic memoranda and but

few letters; and so the author, in a dozen chapters, has given, separately, a condensed history of each of a dozen careers, almost any one of which would be enough to make a man distinguished. The chapter introducing these, with two other chapters at the close, contain the distinctively "human interest" part of the story, though there is human interest everywhere.

Colonel Prout is not only a scholar, he is one of the most accomplished writers in the field of engineering, and a discriminating observer. Adding to this his own acquaintance with many of the topics dealt with, and his years of association with Westinghouse himself, one may reasonably expect a thoroughly illuminating narrative. This expectation is not disappointed. The reading public is fortunate in having the benefit of such an unusual combination.

Railroad men who shortsightedly have thought that the fame of Westinghouse rested on the air brake alone will find this book an eye-opener. The air brake was, indeed, the great outstanding mechanical feature in the railroad world from 1869 to 1889, and that alone served to put Westinghouse's name alongside of Stephenson's; but Westinghouse had a great career after that. The biographer classes his work in developing alternating electric current for the manufacture of power as at least of equal importance. In three other fields—natural gas, the turbo-generator and electro pneumatic apparatus for signaling—Westinghouse did a prodigious amount of pioneer work.

The candor of the author is always in evidence, and the great things which glorified the name of Westinghouse from a hundred different angles are not allowed to obscure the truth necessary to make an honest narrative. Mistakes and reverses are recognized with almost Scriptural fidelity. Another point calling for frank treatment was the question of recognizing the work of the "large group of able, loyal and devoted assistants which Westinghouse attached to himself," these including brilliant and constructive organizers, administrators, executives and engineers. Of these a few exceptional names are mentioned, but as regards the list as a whole "the committee (mentioned below) and the editor regret that it is not practicable to enter upon the delicate task of telling what these men did."

The American Society of Mechanical Engineers is primarily responsible for this book, Messrs. Scribner working in co-operation with a committee of the society, of which Charles A. Terry was chairman. The author also gives, in the preface, the names of 18 other men who contributed material and advice; in short he has employed all the resources of the experienced editor, with a purpose of making a book of which every paragraph should be faultless.

The main chapters, as above noted, are the first, 17th and 18th. The titles of the others are: the air brake; friction draft gear; a general sketch of electric activities; the induction motor and meter; rotary converter; the Chicago World's Fair; Niagara Falls; electric traction; steam and gas engines; the turbo-generator; signaling and interlocking; natural gas; various interests and activities; European enterprises; financial methods, etc. The lighting of the World's Fair at Chicago, in 1893 and the epoch-making work at Niagara Falls in 1889, and the following years—where now there are hydro-electric plants with an aggregate capacity of 500,000 h.p.—are among the most absorbing stories in the book.

In an appendix devoted to some description of the numerous patents taken out by Westinghouse, eight pages are required for a simple index, one line to each patent. In 11 years, from his 34th year to the end of his 44th, Westinghouse took out 134 patents, an average of more than one each month; and at the same time he was stimulating and directing the work of many other inventors. Another list, filling two pages—a single line to each item—gives the names of the Westinghouse associated companies, chronologically arranged.

Letters to the Editor

The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.

The Automatic Train Stop Problem

NEW YORK

TO THE EDITOR:

What are the railroads to do? The Interstate Commerce Commission tells them that certain sections of their roads must be equipped with automatic train stops; leaves the roads to select apparatus without any practical advice from any government source as to type or kind, and then gives warning that every last detail will be subject to approval by the Bureau of Safety. Isn't that a pretty crude and hasty command? One would think that after reflecting on Section 26 for 21 months, those eleven commissioners could evolve something more sane than this half-baked proposal.

And the public is very lenient in calling for an accounting to cover only 21 months; for this problem has been before the Washington authorities ever since President Roosevelt set the ball rolling in 1906. However, if the infliction of a slight bodily injury on a popular member of the President's cabinet in a rear collision of passenger trains can arouse the commissioners, it behooves us to ask no questions; it will not be the first time that a long period of more or less futile discussion has been ended by a trifling accident.

Perhaps you may think I am only a fault-finder; that, like some railroad presidents, I only wish to throw the whole responsibility on the commission while, I myself, seek to do everything possible to block the wheels of progress. That is not the case. I simply wish to ask the question with which I started; I am disappointed that you, in your editorial of January 21, merely push the whole perplexing mess farther into the future. The commissioners evidently know that this is a troublesome question and they mean, no doubt, to avoid burning their own fingers; and so the question remains, What are the railroads going to do? WALL STREET.

[Holding no brief for the railroads we cannot tell what they will do. They themselves will tell, at Washington, no doubt, within a few weeks. Railroad managers, however, are much like the courts, in having great regard for precedent, and it may be expected that their first move, in seeking to find an automatic train stop which will satisfy the Interstate Commerce Commission, will be to review what has been done already in that line. Our correspondent may be interested in the list, printed last week, of train stops which are already in use, or which have been tried with more or less success.—EDITOR.]

The Most Economical Freight Train Speed

ST. LOUIS, MO.

TO THE EDITOR:

The article on page 1273 of the issue of December 24, 1921, entitled "Economic Speeds of Freight Operation," is very interesting in so far as the data contained therein apply to the various speeds, train loads and production in gross ton miles per train hour; however, the same thorough study that was given the foregoing factors appears to be lacking in that portion dealing with "Costs." The "Average Cost per Gross Ton-Mile" in the table on page 1274, was

computed on the basis of an assumed average cost (\$14.50) per train hour, this same average being used for each speed whether it be 5 or 29 miles per hour. It is inferred that this average cost embraces wages, fuel, train supplies and expenses, locomotive supplies and expenses and probably engine-house expenses. If such is the case, exception is taken with respect to the cost data contained in the article for the following reasons:

The average cost per train hour of a single freight train varies with the speed of the train. As an example, a freight train moving continuously between two terminals 100 miles apart, at an average speed of 12½ miles per hour, will cover the distance in 8 hours. The same train moving continuously at a speed of 25 miles per hour will cover the distance in 4 hours. The wages of the train and engine crew would be exactly the same at each speed. The cost of train supplies and expenses, as well as locomotive supplies and expenses, would also be approximately the same at both speeds. There would be no variation in engine-house expenses. There would be some variation in the cost of fuel, but the amount would probably be slight. Therefore, the average cost per hour of the train moving 25 miles per hour, would be approximately double the average cost per hour of the train moving at the slower speed.

Assuming that it was practically possible to move freight trains continuously at stated speeds and using the Gross Ton-Miles per Train Hour at various speeds, as shown in the table on page 1274, it will be found that greater economy will be obtained at a speed of 12½ miles per hour than at a speed of between 17 and 18 miles, as stated in the article.

As proof of this, it is safe to state that the total cost of a 100-mile run would be almost the same at 12½ miles per hour as at 17 or 18 miles per hour. At the speed of 12½ miles per hour about 95,004 gross ton-miles (see table on page 1274) would be produced per hour for a period of 8 hours, or a total of 760,032 gross ton-miles; at the 17-mile per hour speed about 110,551 gross ton-miles (see table on page 1274) would be produced per hour for a period of 5.9 hours, or a total of 652,251 gross ton-miles. From this it is readily apparent that the slower speed would be the more economical for the reason that 107,781 more gross ton-miles would be produced thereby and at approximately the same cost.

A. E. LONG,

Statistician for Chief Operating Officer, M. K. & T. Lines

American Railway Men in Asia

CHICAGO

TO THE EDITOR:

When Charles R. Crane passed through Chicago recently on his return from China by way of Siberia and Russia he said of the American railway men in Asia: "My journey was facilitated by the kindly offices of the American engineers under John F. Stevens and Col. B. O. Johnson, the railway experts, who still maintain their headquarters in Harbin. Their influence is to be felt the whole length of the Trans-Siberian Railway, where the Russians have the best of feelings toward America because of the conscientious care that has been exercised by these forgotten Americans in desolate Manchuria. The tradition of the good work that the Red Cross and other organizations did there still exists. But these patient railway men have done most of all to keep up the good name of America in Siberia and Russia. They have been most sympathetic towards the Russians, both workers and bosses, and have made themselves most favorably known all the way to Moscow. They helped to make my journey secure and comfortable. Their contribution to the history of the times has been most dramatic and most valuable."

The Russian Railway Service Corps, as the American en-

gineers were officially known, numbered 216 men when it reached Asia in December, 1917. The old corps was sent home in May, 1920, after the triumph of the Bolsheviks. Col. B. O. Johnson, formerly of the Northern Pacific, was instructed to retain a small staff and remain in Harbin with Mr. Stevens. They then continued to function under the terms of the inter-allied agreement, which is expected to retain its life until the last allied (Japanese) soldier leaves Siberia. Col. Johnson retained only three men out of the original engineers, but he then proceeded to organize some American-trained Chinese engineers and presently railway affairs in Manchuria and eastern Siberia were moving along very well.

Then began the most interesting developments of all. The absolute breakdown of Russian authority in the Far East forced the Russians into a relationship with the Americans which has become closer in the last 18 months. The Russians learned to trust the Americans. The Americans pay no attention to Russian politics, knowing all reds and reactionaries alike, only as Russians. The Russians no longer even talk their politics to the Americans, as the latter have insisted that they are not interested.

"I have grown very fond of the poor old Russian," writes one of these Americans now in Harbin. "He has had one — of a time. He is peculiar, and all that sort of thing, but since I have been able to talk to him in his own language and have got under his hide I sure like him. And things are looking up with him. This is Russia's hard winter. You are going to note a very rapid evolution of Bolshevism towards a practical working democracy in the next 12 months. Russia's recovery will be very rapid. Russia's wealth is in her soil. She had only about 45,000 miles of railway and little manufacturing. A few thousand tons of well selected repair parts would make a wonderful change in her transport. Her track is better than that in America, despite her troubles."

The improvement in the Chinese Eastern has been enormous. For the benefit of the foreign colony in north Manchuria a time table in English has been prepared showing arrivals and departures between Vladivostok and Manchuria station, 1,608 versts away. Dining cars and first, second and third-class sleeping cars are now run regularly. Trains are electrically lighted throughout. It is hoped soon to have a regular service between Vladivostok and Irkutsk.

PAUL WRIGHT.

A Difference of Opinion on Water Treatment

CHICAGO

TO THE EDITOR:

I have read with interest the article by C. R. Knowles in the issue of November 12 and the subsequent communications on the subject of "The Interior Treatment of Boiler Waters." As I am an "exterior treatment man" I would not have felt competent to enter into the subject if it had not been for the letter by C. H. Koyl, which appeared in the issue of December 24.

For about 20 years I have been actively engaged in the design, construction and operation of water treating plants. My experience covers more than a thousand plants treating more than half as many waters and ranging in capacity from several hundred gallons to several million gallons per day. As a result of this experience I am firmly convinced that exterior treatment is the best method we have and that unless something as yet unknown is found, much more than the 50 per cent of the boiler waters referred to by Mr. Knowles will ultimately be taken care of that way.

If we take the figure of 6 per cent as being approximately correct for the proportion of water needing treatment that

is now receiving it, or if the proportion is twice as great, it will take many years to install plants to take care of the balance, even if the money were immediately available—which it is not. This being the case, it seems to me not only proper but very desirable that there should be a discussion of other means that can be used under present conditions. From the article published and from other sources I gather that with reasonably proper use, compounds—both anti-scale and anti-foaming—do decrease certain expenses, avoid or reduce certain troubles and in other ways produce results of which the benefit exceeds the cost. The cost per pound or per other unit may be, and I understand is, greater than for exterior treatment, but if they pay their way and leave a balance, what valid argument is there against using them until something better can be done?

So far as they relate to this aspect of the situation, I cannot take at all seriously the committee pronouncements made 50 years ago, and quoted in the article printed in your issue of December 24. There is a proverb that "the good is the enemy of the best," meaning that we are pretty apt to take things somewhat easily as long as we get along pretty well; but it seems to me that to turn this around and make the best the enemy of the good, to argue that we should do nothing at all until we can do the best is rather stretching things. I suspect that if those committees could be re-assembled they would be found to be made up of rather practical fellows who would gladly use any means available and that they would be somewhat surprised at the rigid construction put on their words.

If compounds may be used, and Mr. Koyl himself approves of them to an extent, it is impossible to have too much information about them and a series of articles or a to-the-point discussion in which results and methods of use are brought out is apparently needed, and I hope it will be continued. If he had said that to install adequate treating plants is a step forward, I would have agreed, but certainly to try to do more intelligently something that is useful and that we are already doing is not "a step backward."

Another statement in Mr. Koyl's article that I cannot agree with is that "20 years ago it used to be said that 'an increased tendency to foam is characteristic of all water treated with soda ash.'" This was true 20 years ago and is now so far as relates to using a water treated with soda ash without separation of the precipitate, but apparently the reference is to the use of soda ash in a water softening plant. With possibly an occasional exception so rare as not now to be remembered and very likely due to some other and unusual condition, my experience has been that water after softening is less apt to foam than before, whether soda ash is used in the treatment or not. Likewise this has been the experience of all others so far as I ever heard. It is a common experience for boilers to show an increased tendency to foam for a time after the use of softened water is begun. This, however, is laid to the increased amount of mud present from the softening and disintegration of the old scale and it stops when the boilers are clean.

What is meant by the reference to the sludge being left, not by soda ash but by lime treatment, is not clear since the addition of soda ash in amount equivalent to the permanent hardness will commonly cause no precipitation in water without heating or the addition of lime also, whereas lime without soda ash will quickly cause precipitation. When both are used and the reaction of each one produces calcium carbonate, how can it be told which portion of calcium carbonate is left?

Mr. Koyl has, however, done a real service in directing attention to the part played by suspended matter in causing foaming as against that of dissolved solids. While this has been known for a long time it is frequently overlooked or not given the attention it deserves. We have all seen a boiler that had been steaming quietly, suddenly start to foam vig-

ously on the addition of turbid water. Of course, every boiler in service contains solids both in suspension and in solution and both play some part in every case of foaming, but as Mr. Koyl points out, the amount of dissolved solids may be very greatly increased if the amount of suspended matter is kept down.

It should be noted also that while the effect of dissolved solids in causing foaming is roughly in proportion to the amount present, regardless of what the soluble salts are, this is not the case with suspended matter. With the latter the effect is more nearly proportional to the number of particles present than to the weight; in fact after particles reach a certain maximum size they may have very little effect at all. This is the reason why substances like magnesia and silica which precipitate in very fine form, have an effect all out of proportion to the amount present as compared with the effect of some other substances.

It is a realization of this desirability of eliminating suspended matter as far as possible that has led to the use of sand filters in much present day water softening work. Not only is clear water obtained in this way but an additional grain or so of half-suspended or colloidal matter that will not settle out may also be removed. Something of the same result may be secured by the use of coagulant such as sulphate of alumina or sulphate of iron in connection with the treatment, but it is necessary to use more than with filters which means increased expense and increased solids in the water. There is no essential difference between clarifying a water naturally turbid and one that has been made turbid by treatment; very much the same kind of materials and very much the same conditions of suspension are present in both cases. It would seem advisable therefore to take advantage of the experience in clarification gained in such fields, for instance, as municipal supplies, rather than to go through again the experiments and arguments long passed by. All experienced water works engineers use sand filtration as the most dependable and most economical means of getting a satisfactory supply, sedimentation basins being used to first get rid of the heavier suspended matter. This is exactly what is now being done by most of those manufacturing water softening equipment and since history tends to repeat itself it may be expected to become standard practice.

In one place Mr. Koyl makes the statement that "all experienced men say 'water softening consists of adding lime and soda ash to the water which is then stirred until chemical reaction has taken place.'" This is contrasted with a statement quoted from Mr. Knowles that "water softening consists of adding lime and soda ash to the water which is then allowed to stand until chemical action has taken place." I might stop with the suggestion that water softening does not "consist of" either one or the other but that both refer to methods or steps that are used in one or another water softening plant. Every or nearly every concern making water softeners has made experiments, both laboratory and field, to ascertain what could be expected from agitation for different periods and the results are no secret to those in the business. Perhaps the outcome of these experiments is best shown by the fact that not a single concern manufacturing such apparatus now uses prolonged agitating, nor does any one advocate it so far as I know except Mr. Koyl and those who have been subjected to his influence.

Under some conditions or with some waters the effect of excessive agitation is harmful in that the precipitate formed will be broken up to such an extent that it will scarcely settle at all, so that the hardness of the water increases. Perhaps there is not actual resuspension but the establishment of some of the precipitate in a colloidal form so that it acts as though in solution. This harmful effect of prolonged agitation can be entirely overcome by the use of a coagulant such as sulphate of aluminum or sulphate of iron and this is what Mr. Koyl does. Except for the cost of the larger

amount of coagulant used and the increase in dissolved solids, there is no objection to the process but within my knowledge every result claimed for it has been produced, and I think even better results obtained, without any agitation at all except for perhaps a few minutes to secure mixing.

W. H. GREEN,
Vice-President, International Filter Co.

The Motor Truck and the Railroad

CHATHAM, N. J.

TO THE EDITOR:

The editorial entitled "Unfair Motor Vehicle Competition" which appeared in your issue of December 10 has a double interest for me as I am both a railroad employee and a resident along one of the motor highways now in process of reconstruction in New Jersey. The position of the carrier of heavy freight motor traffic on our highways is indeed enviable when it may charge what rates and pay what wages it chooses, unhampered by Interstate Commerce Commission or Labor Board and under no expense of construction or upkeep of its roadbed or right-of-way.

Recently the foundation of our house became so weakened by the constant jarring of the heavy trucks which speed past our door that we were obliged to have it reconstructed to preserve a structure which has stood since before the Revolution. Unless we attempt to hold up some of these trucks there is small chance of our collecting for the damage they have caused, but our taxes will undoubtedly be higher next year to pay for the new pavement now being put in. When the machine which was engaged in ripping up the old pavement nipped off the branches of some of our shade trees and damaged the remaining foliage by misdirected steam, we registered our annoyance and were comforted with the information that such slight inconvenience should be borne cheerfully, considering the great public improvement under way. In contrast, a few years ago the Lackawanna railroad, which serves this part of New Jersey, embarked upon a program of eliminating its grade crossings through this section. In making the embankments the railroad was obliged to take small portions of the adjoining property which had previously been devoted to the cultivation of burdock weeds, ashes and tin cans. It was remarkable how prosperous the people soon became who had been deprived of their property for the public benefit in this case.

So much for my private grievance as one taxed for the support of a species of transportation in competition with the one which pays my salary. Of course there is no use in setting one's self in the way of progress to be run over by it. It cannot be denied that motor trucks can do things which a railroad train cannot do as effectively. Strikes and the war have opened our eyes to new uses for motor vehicles as well as for aeroplanes. Whether further development of the aeroplane and motor transportation, aided by the Lincoln highway idea, will relegate our much harried and regulated railway transportation to the level of our present canal transportation is a question for those who control the purse strings of the railroads, notably the Interstate Commerce Commission and the investing public. Already railroads are reducing their mileage wherever possible.

I cannot help wondering why transportation is not more often considered broadly as transportation, the means of getting from one place to another by whatever method employed, whether railroad, truck, aeroplane or trolley car. Instead of railroad companies, why should we not have great transportation companies, unrestricted as to method of locomotion, which might convey the public and its freight from Waterford, Maine, to Hoquiam, Wash., by any combination of types of transportation which would do it most expeditiously and economically. Does not the way out for the railroads as well as the public lie in that direction?

G. H.

New Haven Using Motor Cars on Branch Lines

Important Advantages of New Passenger Equipment Are
Flexibility and Low Operating Cost

ANYONE who examines the map of the New York, New Haven & Hartford is at once impressed by the numerous short lines and the many junctions. The lines of this company form a network over southern New England, traversing both highly developed industrial sections and rural districts. The area covered by the road is small and therefore outside of the main passenger lines there are few through passenger routes. Most of the territory through which the New Haven runs is rather densely populated so there is considerable passenger traffic available, but the short lines make a satisfactory arrangement of passenger train

have now been received. Two are in service between New Haven, Conn., and Derby, and Tremont, Mass., and Fairhaven. The third will soon be assigned.

The cars combine many of the characteristics of automotive and railroad equipment as will be noted by reference to the illustrations. The motive power is furnished by the Mack truck engine, made by the International Motor Company, New York. This motor has four cylinders, each of 5 in. diameter and 6 in. stroke. The power rating according to N. A. C. rules is 40 hp., but the motor actually develops a maximum of about 60 hp. The motor is located under a



Mack Rail Car, Used in Local Passenger Service on the New Haven

service and locomotive runs almost impossible. To make conditions still more difficult private automobiles and motor buses maintain keen competition for the business and therefore the branch line passenger traffic is often a source of expense instead of a revenue earner. Under these circumstances the railroad has found it advisable to restrict passenger train service on many lines to two trains a day.

The officers of the New Haven made a careful analysis of this situation to determine the most economical method of handling branch line passenger service with the primary object of reducing the cost of operation. It was felt that it might be possible to reduce operating costs on some of the lines where there is only light traffic by running small unit cars. The study of the problem led to the conclusion that the usual three-car train was unsuited for the existing conditions and that the service demanded equipment which was more economical and also more flexible. This decision led to the design of gasoline-driven passenger cars of which three

hood placed ahead of the car body and power is transmitted by a gear drive to the rear axle which is of the bevel gear type, the gear ratio being 4.29 to 1. The axle has no differential, and drives two 40 in. wheels with cast steel centers and rolled steel tires. The transmission, of the selective type, gives four speeds forward and four in reverse with direct drive in high speed.

The leading truck is of the four-wheel type with 20 in. diameter wheels. The axles, like those of the driving wheels, run in Timken roller bearings. The truck has a swing bolster supporting leaf springs which in turn carry the underframe. At the rear the frame is also supported on leaf springs which are slung under the rear axle. In order to reduce vibration and deaden sound, rubber blocks are interposed between the ends of the springs and the car underframe.

The cars are braked by the Westinghouse Air Brake Company's motor vehicle brake. The pressure for this device

does not fall below 20 miles an hour on $\frac{3}{4}$ mile grades of 2 per cent.

One of the items of greatest interest in connection with the gasoline rail car is the cost of operation, but the limited experience with these cars does not make it possible to give a close estimate of costs. However, it seems certain that this type of vehicle will effect remarkable economies in wages, fuel, maintenance and fixed charges. The crew required to operate the New Haven car consists of two men, an engineer and a conductor. The gasoline consumption averages about $\frac{1}{2}$ gal. per mile. The cost of maintenance is yet to be determined. Similar engines in motor truck service show very low repair costs and equally good results are anticipated in rail service.

The conditions on rail cars should be less severe than on



Front End of Body, Showing Driver's Seat and Controls

heavy trucks. While the weight of the car is greater the grades are not as steep and the shocks due to uneven road surfaces are minimized. For these reasons it is anticipated that maintenance charges will be less than for trucks with the same motor. It is of interest to note that the railroad will not carry repair parts in its storehouse as the International Motor Company has a branch at New Haven.

The popularity of road motor buses augurs well for the success of the rail motor car, which operates far more smoothly and can safely maintain higher speeds. There is every indication that the service will be popular with passengers. From the railroad standpoint the advantages are many. Operating costs are reduced; the necessity for extensive terminal facilities are eliminated; in short, the car provides a flexible, economical unit that is just what the railroads need for handling branch line traffic.

WHY OLD RAILROAD TIES ARE BURNED.—Samuel Porcher, general purchasing agent of the Pennsylvania, answering critics who think that railroad companies should allow people to take old ties for fuel, says that not all of those taken out are burned. A considerable number are sold to persons living on or near the right of way, who buy them at ten or fifteen cents apiece; but this is practicable only where the ties can be delivered at a public crossing, or other point where they can be obtained safely by the users. The company cannot sanction the public going promiscuously over tracks and through yards to gather up old ties. Dealers in fire-wood do not want old ties. The ties are often dirty; or contain grit which might injure the saws used in cutting them. Their fibre is more or less crushed, so that they burn out too quickly. Efforts have been made to sell ties for wood pulp, for burning and sale of the ashes for fertilizer, and for manufacture into charcoal, but without success.

Correction

IN THE REPORT of the decision of the Interstate Commerce Commission in the hardwood lumber case, published in last week's issue, page 283, it was stated that the commissioners who presumably favored the majority report were Commissioner Aitchison, Cox, Esch, Hall, Lewis and Meyer, because the others signed minority reports. Our attention has been called, however, to the fact that on the date of the decision in that case, January 16, Mr. Aitchison and Mr. Hall were not members of the commission and not eligible to vote in the decision, as their appointments were confirmed by the Senate late in the afternoon and they were not sworn in until the following day. The report was made public on January 20.

Agricultural Conference Asks Rate Reduction

WASHINGTON, D. C.

IN ADDITION to a heterogeneous assortment of other measures designed to relieve the condition imposed upon the agricultural industry by a more rapid decline in the prices of farm products than in the prices of many commodities which the farmer buys, the agricultural conference held at Washington last week adopted recommendations for immediate reductions in freight rates, a repeal of the so-called "guaranty" clause of the transportation act and a restoration of the powers of the state railroad commissions to reduce rates without too much interference from a federal commission in case their orders happen to cause discrimination against interstate commerce.

These recommendations of the sub-committee on railroad transportation were adopted without much argument but suggestions that reduced freight rates might be made more possible of attainment by a reduction in the wages of railroad employees and coal miners and a repeal of the Adamson law encountered the denunciation of Samuel Gompers, who was a delegate to the conference and he succeeded in defeating those proposals in connection with a report of the committee on marketing. The fight was renewed, however, in connection with the report of the railroad committee and the report was adopted by the conference containing a recommendation insisting that "railroad corporations and railroad labor should share in the deflation in charges now affecting all industries," as "essential to the restoration of normal conditions in agriculture" and "to the welfare of the entire community," and appealing "to those in authority to take such action as may be necessary in order to accomplish that result." This was adopted over Mr. Gompers' vigorous protest and his motion to strike it from the report, after one of the farmer delegates had raised the question whether this was a conference of farmers or of the American Federation of Labor. Mr. Gompers insisted that labor had already been "deflated" as indicated by the large number of unemployed, but some of the farmer delegates made some pointed contrasts between the wages of railroad employees and the earnings of the farmer. The report as adopted is as follows:

"On the basis of present agricultural prices existing levels of freight rates on basic agricultural commodities constitute an excessive burden upon the agriculture of the country, and if long continued will result in re-locating much of our agricultural production with consequent modification of railroad revenues and revenue-producing centers.

"Wherefore it is recommended as follows:

"I. That the freight rates on farm products, live stock and the products of allied industries be reduced to the rates in effect August 25, 1920, and that the Interstate Commerce Commission put the above reductions into effect at once, and

further reductions as rapidly as reductions in operating expenses will justify.

"That the carriers be directed to readjust freight rates on other commodities as quickly as possible upon the basis of what the various classes of traffic will reasonably bear. That those rate relationships between producing districts and markets which existed prior to the application of general percentage or horizontal rate increases, which destroyed said relationships, unfairly increasing the advantages held by certain sections over others should be corrected, and the relationships should be restored as they existed prior to the war so far as conditions will permit.

"II. We believe that Section 15-a of the Interstate Commerce Act, containing the provisions as to the fixed amount of return that must be provided for if possible on the aggregate value of railroad properties, regardless of the economic conditions, is fundamentally unsound, and we recommend its immediate repeal in its entirety.

"III. The full powers of the state railroad commissions as they existed immediately prior to the federal control of railroads (except as to control and distribution of cars in interstate commerce) should be restored by act of Congress at the earliest possible date.

"IV. The railroads are seeking to fix a valuation upon their properties which will include the so-called land multiple, on the theory that if they had to re-purchase such lands today the cost of condemnation proceedings and damage to adjoining property would compel the payment of more than twice the present value of their lands. This theoretical basis would increase the present transportation burden of a return upon several hundreds of millions of dollars. We urge upon Congress the prompt passage of a law which will effectually prevent such a method of valuation.

"V. We are opposed to the many abuses that have grown up through violations of the principle of the long and short haul clause which requires that rates to intermediate points shall not exceed the rates between the most distant points. For many years the intermountain states were discriminated against by the charging of more for the short hauls than for the long hauls. This situation has been corrected, but today there is an effort to change this, and we earnestly recommend to the Interstate Commerce Commission that no change shall be made in the present adjustment.

"VI. This committee recognizes the urgent need of extensive and prompt additions to the refrigerator car equipment of the carriers, and the repairing or rebuilding of much of the present equipment to adequately and safely handle the perishable crops of the country. The committee, therefore, strongly recommends that the carriers give this question prompt attention; that as rapidly as conditions permit a sufficient number of new refrigerator cars be built and such part of the present equipment as is inefficient be brought to a state of efficiency by repair or rebuilding; that in determining the type of car to build, cars of less efficiency than the standard refrigerator cars as adopted by the United States Department of Agriculture and the United States Railroad Administration should not be built. That the same principle govern so far as possible in rebuilding.

That the refrigerator cars be standardized as to essential construction to permit prompt and economical repairs and replacement of parts.

"VII. That we commend the Interstate Commerce Commission and the railway companies for their recognition of agriculture as the basic industry of the country and for their action in effecting certain general reductions in the freight rates on agricultural products.

In conclusion we insist that the railroad corporations and railroad labor should share in the deflation in charges now afflicting all industries. This is essential to the restoration of normal conditions in agriculture and it is essential to the well-being of the entire community. We earnestly appeal to

those in authority to take such action as may be necessary in order to accomplish that result."

The conference also adopted a committee report recommending an investigation by the Interstate Commerce Commission to determine the advisability of extending preferential export freight rates to agricultural commodities not now affected.

Hooper and Plumb Discuss Settlement of Labor Problems

BEN W. HOOPER, of the Labor Board, and Glenn E. Plumb addressed the opening session of the annual meeting of the National Civic Federation at New York on January 30. Mr. Plumb appeared only as the representative of B. M. Jewell, president of the Railway Employees' department of the American Federation of Labor, and not to express his personal views.

The subject assigned to both speakers was the discussion of the Railroad Labor Board, whether it should be abolished, combined with the Interstate Commerce Commission, replaced by a general industrial court like that in Kansas or given power to enforce its decisions.

Mr. Hooper's opinions on this subject are rather generally known and were outlined in detail in his address before the New York Railroad Club on December 15, which was published in part in the *Railway Age* of December 17, page 1197. In brief, his contention was for making the decisions of the board mandatory by fixing penalties for violation of its decrees. This would make strikes illegal. Mr. Hooper contended, however, that such a provision would not penalize the unions unduly since with one exception they have obeyed all the board's decisions anyway, whereas the violations by the carriers have been, according to Mr. Hooper, "too numerous to mention." In his opinion the board has already justified its existence by the work it has accomplished. Furthermore, he objected to the proposal that wages and rates should be fixed by the same body on the ground that ability to pay cannot be treated as a primary consideration in fixing wages.

Mr. Jewell's paper, read by Glenn E. Plumb, outlined his objections to any form of compulsion in the settlement of disputes arising between labor and management. His belief was that the board is "unscientific in principle, uneconomic in theory and impracticable in operation." He said in part:

Those who have acquired skill and knowledge in the industry fully realize that labor costs are not determined alone by the hourly or daily wage but are actually determined by the wage rate divided by the volume of output, so that it is quite possible to have a decreasing scale of cost accompanied by an increasing scale of wages. On the other hand, it is also quite possible to have an increasing scale of costs accompanied by a decreasing scale of wages. At some point, to be determined only by those who have the required intimate knowledge of the industry, is found a rate of pay which induces the highest degree of efficiency. Beyond this rate of pay, wages ordinarily should not rise unless accompanied by a corresponding increase in efficiency. Below this point, wages should not fall. The exact point on the scale can be determined only by the judgment of those most experienced and most skilled in the supervision of labor and the performance by labor of the duties which this service requires. Considering this to be the ideal to be attained, see how impossible it becomes to accomplish this ideal through a body organized after the manner of the Railroad Labor Board.

The underlying idea of the paper was apparently that the only solution for the labor problem was the admission of labor into the management of the carriers.

Mr. Hooper addressed the Boston Chamber of Commerce on January 27. His theme was the function of governmental supervision of the railways, particularly insofar as the Labor Board is concerned, and the success of such activity. He expressed himself as viewing with optimism the business outlook and predicted a reduction in rates.

General Testimony Before I. C. C. in Rate Case

Shippers Express Conflicting Opinions as to How Reductions, if Any, Should Be Made

WASHINGTON.

AFTER HEARING since January 19 the testimony of shippers of specific so-called basic commodities, most of whom urged reductions in freight rates approximating the amount of the increases made by the commission in 1920 in Ex Parte 74, the Interstate Commerce Commission on January 30 began hearing testimony on behalf of the public and shippers as to the general aspects of the case. Following the testimony reported in last week's issue, statements were made by witnesses on sand and gravel, brick, lime, cement, gypsum and asphalt, lumber and forest products and fertilizer and materials. While most of these asked for reductions in their rates, some of them only went so far as to say that if the commission determined that any reductions are warranted, their commodities should be given consideration and many said they were as much if not more interested in reductions in rates on coal and other raw materials as in the rates on their own products. The public or general testimony was to continue until February 4, after which there will be other commodity testimony and two days have been scheduled for railroad labor organizations.

N. I. T. League Favors Horizontal Decrease, if Any

The first general witness on January 30 was W. H. Chandler, president of the National Industrial Traffic League, representing also the Boston Chamber of Commerce and the New England Traffic League. The position of the league had been determined at the annual meeting in November, which Mr. Chandler said had a larger attendance than any previous league meeting, and at a special meeting in Washington on January 27, attended by some 200 of the 1,000 members of the league, at which resolutions were adopted "that if and when, in the opinion of the commission, freight rates and charges may properly be reduced, the reduction should be made in the same manner in which the advances were made in Ex Parte 74." The resolutions also expressed the opinion of the league that "the findings of the commission should be definite with respect to the question of general reductions so that all uncertainty with respect to this question be removed and that business men may make their commitments with some degree of certainty and stability." It was further declared that "the league is fully cognizant of the necessity for the carriers' revenues being adequate in every respect to insure proper transportation facilities and service in times of business prosperity and to support their credit; and also recognizes the imperative necessity as an aid to the restoration of normal business conditions, that the present high level of rates be reduced as soon as possible."

The league does not say, Mr. Chandler said, that there shall be reductions, but that if there are to be reductions, they should be general rather than placed on a few specific commodities, and in order to make rate reductions possible, he said, the commission should give the carriers moral support in their efforts to reduce wages. Mr. Chandler said he did not assume that the resolutions adopted represented the position of every individual member of the league. Many of the members had expressed their opinion in the testimony as to specific commodities, but there is a very heavy tonnage of commodities not represented by those who have spoken and a heavy tonnage moving on class rates. The position of the league had been expressed at the annual meeting and in addition a circular had been sent to the members asking which shippers wanted the league to represent them at the

hearings and whether they shared in the views of the league. He presented some 200 letters which had been received, all except eight or ten of which endorsed the position taken in the resolutions and represented mainly the views of members who were not present at the meeting.

Mr. Chandler said he had frequently heard it stated that it would be most unfair if the commission should show preferential treatment to any class of business, that when the emergency in 1920 necessitated a radical increase in railroad revenues all shippers were required to bear their equal share of the burden and just as soon as it is possible to relieve the country of that burden in whole or in part, all classes of shippers should get equal relief. He had heard railroad officials say that the class rate structure should remain where it is because class rates have not borne their proper relation to commodity schedules. If this be true, he said, it is a sad commentary on the railroad experts who for many years have been building up the rate structure. If the relation is wrong, it should be handled before the commission in an entirely separate proceeding.

Reduction in Passenger Fares Not Asked

Commissioner Hall asked if the equality of treatment proposed should be extended to passenger fares. Mr. Chandler said that the league had voted only to ask the commission to adjust freight rates. Commissioner Hall remarked that if the position is sound that rates should be reduced by a reversal of the order in which they were increased, the passenger fares might be entitled to consideration because they were advanced in order to provide an additional increase in revenues after the wage order had been issued. Mr. Chandler replied that the general position seems to be that freight rates have more to do with business than passenger fares and many of his people, he said, are not dissatisfied with the passenger fares. Commissioner Aitchison asked if the witness was not asking preferential treatment for his people over others who may not ship freight but have to travel, to which Mr. Chandler replied that the league had not made any objection to any reduction in passenger fares. Commissioner Lewis raised the question of mileage books. Mr. Chandler said he had not heard of any chamber of commerce asking for mileage books. Certain organizations of commercial travelers, he said, have been very active in this demand, but he had heard of no other commercial organization that had expressed any interest in mileage books.

The Matter of Adequate Service

Asked as to how the reduction should be made so as to restore the relationship of rates, Mr. Chandler said he would instruct the carriers to go back to the base rates in effect at the time the 1920 advances were made and apply to those base rates a percentage increase which was less than the increase authorized at the time the emergency existed. Very material reductions, he said, have taken place in the price of many commodities which the carriers use, but cost of labor, one of the largest items, has not been adequately deflated. It is apparent that the carriers generally are paying more than is being paid for similar work in other lines of industry and it is obvious that the carriers are not being operated economically because they are paying more than the market price for labor. There is a general impression, Mr. Chandler said, that high rates are causing buyers'

strikes and that business would be very greatly improved if freight rates were reduced. Whether or not this be true, it is the very general impression that the uncertainty in the rate situation is a permanent factor in the present business situation. Mr. Chandler said that the statement made by railroad executives that the measure of the rate is of less importance than the character of the service, is far from accurate. Very frequently it is the freight rate that determines whether goods will be bought in one market or another and the executives apparently do not distinguish between conditions which existed during the war and those that prevailed before. While shippers are vitally interested in having adequate service, it is not correct to say they are more interested in freight service than in the general level of rates. He said he knew that the railroads are losing revenue because of their present high level of rates and that they do not appreciate it. He had been told by shippers that they were moving even low class freight by motor truck at a considerable saving and one big manufacturer, a member of his transportation committee, said he had not used the railroad on which he is located for a year.

Commissioner Aitchison asked the witness if there are any complaints now of railroad service. Mr. Chandler said: "They are not complaining; they are not shipping because the service is not good and the rates are high." He said that motor truck transportation has its disadvantages and if the railroads would give good service at reasonable rates the shippers would be glad to go back to the railroads. In reply to questions, however, he said that the criticisms of the service apply more particularly to short distance service under 50 miles. It seems to be a general theory on the part of railroad operating officers, he said, that l.c.l. freight cannot be handled at a profit. It was his belief that they formed this opinion during the war when they did not want to be bothered with it, but he pointed out that they must maintain an organization for handling long distance l.c.l. traffic and he thought it should be possible to handle additional units at reasonable rates.

Railroad Labor a Preferred Class

Returning to the subject of high wages, Mr. Chandler said that in his opinion one of the most beneficial things the commission could do, if it finds from the testimony that railroad labor has been made a preferred class, would be to come out flatfootedly and tell the people of the United States that from the evidence which has been submitted railroad workers are paid more than the prevailing rate of wages in the open market and that in its opinion the carriers should make further effort to reduce these labor costs. "I think it would be entirely proper," he said, "for this commission to say to the public that by reason of the failure of the Labor Board to deflate wages, the cost of conducting transportation is many million dollars more than it should be and that the railroads are not being operated economically so long as this situation exists."

Commissioner Esch asked if that would not be asking the commission to give advice to another body of equal dignity and authority within its own sphere as to what its position should be. He asked whether the league intends to file another petition with the Labor Board for a hearing on behalf of the shippers. Mr. Chandler replied that so far as he knew it does not intend to do so, but he declined to agree with the statement that the other board is of equal dignity and authority with the commission.

"I do not think any one thinks this," he said. "Something has got to be done. We have got to get wages down or the railroads have got to keep rates up. No one seems to have the moral courage to do it. The Labor Board has got to have a jolt. We thought it had one at the time that the strike was threatened, but one of its members began to organize and pulled things up."

No Progress in Twenty Years

As to other economies which the railroads might effect, Mr. Chandler said there is room for much greater supervision to prevent loss and damage claims and that the railroads are selling freight which has gone astray for almost nothing. He said the carriers have made no progress in 20 years in that direction and as to the simplification of tariffs, if they have advanced at all they have advanced backward. Commissioner Aitchison apparently took this as a criticism of the commission and asked whether he desired to propose amendments to its tariff circular. Mr. Chandler said it could not be done by amendments of the circular, but the basis of stating rates should be changed.

Mr. Chandler said that if the commission should show a receptive attitude he thought something could be done, but he thought the railroads or perhaps the commission rather than the league should take the initiative. Mr. Chandler also criticized the propaganda of the railroads for the purpose of trying to bring about heavier carloading, saying that the establishment of excessive carload minima has the effect of putting the small merchant out of business and he also said the carriers are not getting sufficient revenue under their contract with the express companies. Regarding statements by railroad officers as to the need for more equipment, Mr. Chandler said that the terminal and intermediate yards are congested "because cars are permitted to loaf" and that the available car supply would be materially increased if cars were kept moving steadily, not necessarily fast. In conclusion, Mr. Chandler said:

"We, therefore, respectfully urge upon the commission the vital importance of an early and authoritative announcement concerning the railroad situation. The public wants to be informed of the standing of the carriers and of their ability to bear substantial reductions and whether the commission will order reductions; in other words, what it can expect, so that business can be resumed. How much of a reduction, if any, shall be made is for the commission to determine. We do desire, however, to emphasize our belief that transportation costs must be reduced. We do not believe that the public will be content to continue to pay exorbitant freight rates in order that railroad labor shall be treated as a preferred class. In reply to a question as to what would happen if the commission should decide there should be no reduction, Mr. Chandler said: "Well, I guess we'd all go home and go to work."

F. H. Wood, of the Southern Pacific, asked Mr. Chandler if it was wrong for the railroads to make reductions during the last year on particular commodities to meet the economic conditions without at the same time reducing all rates. Mr. Chandler said he would not oppose any particular reductions which seemed necessary in the judgment of the traffic officials and if the carriers found any rates out of line, they should reduce them, but if the commission finds that reductions are warranted they should be general rather than confined to specific commodities. Asked whether he would rather have a horizontal reduction of one per cent than a substantial reduction on some commodity, Mr. Chandler said he did not think the commission would order any such reduction. Commissioner Esch referred to a statement by Mr. Willard that a reduction of less than 10 per cent would have little effect and asked the witness whether if a 10 per cent reduction were to be made, amounting to approximately \$450,000,000, it should be distributed among all commodities and diluted or whether it should be concentrated on six, eight or ten basic commodities.

"I do not see how the Interstate Commerce Commission could play favorites," Mr. Chandler replied. "I do not see how any one can say that any reduction from the peak would not help. The big shippers who are interested in particular commodities can usually take care of themselves."

Representatives of Commercial Organizations Favor General Reduction

A number of representatives of commercial associations followed Mr. Chandler, most of whom specifically endorsed the position taken by the National Industrial Traffic League, or at least expressed the general opinion that any reduction in the rates should be a horizontal percentage reduction. These included H. Mueller, of the St. Paul Association of Public and Business Affairs; Frank H. Baer, Cleveland Chamber of Commerce; J. H. Tedrow, Chamber of Commerce of Kansas City; C. E. Childe, Omaha Chamber of Commerce; R. M. Field, Illinois District Traffic League; P. W. Hanson, East Side Manufacturers' Association; P. W. Coyle, St. Louis Chamber of Commerce; George P. Wilson, Philadelphia Chamber of Commerce; C. S. Bather, Rockford Manufacturers and Shippers' Association; W. C. Lindsay, National Confectioners' Association, and C. G. Hylander, National Association of Chewing Gum Manufacturers. Many of these witnesses laid emphasis on the importance of some definite statement by the commission at an early date to relieve the uncertainty as to whether rates are to be reduced. Some of them were questioned by members of the commission as to the importance of passenger fares. Mr. Childe said there is an economic demand for reduced passenger fares. Mr. Field said that his association had taken no position on passenger fares because of the opinion that freight rate reductions are of greater importance. A number of the witnesses said that the present level of rates is restricting the markets of manufacturers by tending to reduce long haul shipments. When Mr. Lindsay said that candy manufacturers now can only reach the nearby territory, Commissioner Hall asked if there is any special reason why candy should move for long distances and whether it is not an advantage to the manufacturer to have other competition kept out of his territory. Mr. Lindsay said that it works both ways, but that a reduction in rates would be a great help to the industry. Commissioner Lewis asked whether 10 or 15 per cent reduction in freight rates would increase the sale of candy. The witness said he thought it would. Every little item helps in this industry, he said, and reduction ought to help the consumer. Mr. Hylander said that the production of chewing gum in this country was last year approximately 100,000,000 pounds. During 1919 it was 110,000,000 pounds. The price has not been advanced and he did not attempt to say that a reduction in freight rates would increase the sale, but urged the importance of a reduction of the cost of transportation as one of the costs of doing business in order to restore business to normal conditions.

Construction Industries Want Reduction in Building Materials

William B. King, representing the National Federation of Construction Industries and the National Association of Builders Exchanges, opposed a horizontal or general reduction in rates as unscientific and said that reductions should first be made on the heavier and more basic commodities. He urged a rate reduction on the ground that it would tend to promote construction and relief of the housing shortage but admitted that the freight rate is only one of many elements which enter into the situation. If he had to choose, he said, he would probably prefer to have a larger reduction in wages than has been made.

Mr. Hines Advises Against General Rate Reduction at This Time

Walker D. Hines, former director general of railroads, testified on January 31 at the request of the commission and expressed the opinion that there ought not to be a general reduction in rates at this time and that great caution should

be exercised in making any specific reductions, for the reason that reductions which would reduce the income of the carriers would be detrimental to the public service and that it is wholly problematical whether reductions would have a sufficient effect in stimulating traffic to increase net earnings. He said he thought the commission would be justified in taking as starting points for its consideration the fact that the railroads are not now earning more than a fair return and that no reduction in rates could be called for on the ground that the earnings are too high (although, he said, we must all admit that the rates are high), and that the slump in business is due to fundamental conditions of worldwide character and not to the rates in this country. The depression, he said, is due to the inability of the entire world to readjust itself after the war. Mr. Hines said that the commission has the authority and duty to consider the reasonableness of rates on specific classes of traffic, but he was not in a position to offer observations as to the reasonableness of specific rates. However, from the standpoint of the public interest in adequate transportation, the attitude which should probably be adopted toward specific complaints is that the entire condition at present is essentially abnormal and temporary.

He also pointed out that any revenue which the railways may be able to save would go to build up a reserve which he thought of the largest public interest. They have not been in a position to build up a satisfactory reserve and their surplus has in recent years been depleted. When Commissioner Campbell asked whether Mr. Hines thought the roads should start to build up a reserve in abnormal times, Mr. Hines said he had not meant that, but that in a doubtful case the need of the railroads for a reserve is a factor to be borne in mind. It is to be expected, he said, that the railroads will not earn a fair return in times of depression. The only thing to hope for is a surplus in good years. A reduction in rates now, Mr. Hines said, would deplete the revenues of the railways unless it should result in a considerable stimulation of traffic and to reduce the revenue would reduce the purchasing power of the railways. There would also be a serious doubt in many cases as to whether a reduction in rates would go to the benefit of that part of the community that ought to have it. The benefit is often appropriated by some class of society that is highly organized.

In reply to a question by Commissioner Lewis as to what would be the effect on the business of the country of a general 10 per cent reduction in rates, Mr. Hines said his impression is that a reduction of that sort would translate itself into such an exceedingly small change in prices that it would not have an important effect. It would probably be absorbed by the highly organized class of society and not get very far. An increase in demand is required to bring about an increase in business and he did not think a reduction of that amount would be sufficient to increase the demand in general. It is well to recall, Mr. Hines said, that the railroad enterprise is so big and so obvious that it is likely to be a target toward which every one directs his shafts when there is discontent, although the transportation service is not the real cause of the trouble. In his opinion, one of the greatest burdens on production in this country is the system of distribution, but it is much easier to direct an attack against the transportation than it is against the system of distribution in general. Therefore, we have a situation where the complaints of the public take the direction of the demand for action whose certain effect would be the hampering of the public service.

Mr. Hines said he had no other idea than that there will be a continued expectation of rate reductions and the commission should supervise the situation so that reductions may be made from time to time in such a way as not to be hurtful to the public interest. He believed the most useful

method of getting a satisfactory idea of the situation would be to take all the information available and create a statement of railroad operations for a constructive year, assuming a normal traffic and a normal level of expenses. Much confusion is caused by stressing matters out of proportion to their effect on costs as a whole. For example, he said, the discussion of the national agreements has created an impression that they cost hundreds of millions of dollars, but he had seen no estimate on the part of the executives of great savings to be effected by the modifications made in them by the Labor Board.

Mr. Hines also expressed the opinion that the railroads have not devoted as much attention to terminal and maintenance expenses as they have to road haul expenses. One of the difficulties is that we have not developed satisfactory measures of results in those fields.

Reduction in Rate of Return Not Advisable

In reply to a question by Commissioner Esch as to what should be a fair rate of return after March 1, Mr. Hines said that under present conditions a reduction in the rate of return would not be advisable, but he questioned whether the commission is under duty to fix a rate on or before March 1. He thought it would be entirely proper for the commission to hold that matter under consideration as long as there is no hope of the railways earning an excessive return and fix the percentage when the time comes to make use of it. At any rate, it would not be expedient to reduce it below the present rate. Commissioner Esch pointed out that the law merely states that the percentage shall be determined from time to time as often as may be necessary. Commissioner Esch referred to the criticism of the valuation tentatively fixed by the commission for the purpose of the rate case, on the ground that it included property paid for out of surplus earnings and asked if that sort of property should be legitimately included. Mr. Hines replied that the property as it stands belongs to the railroad companies and its value is the value as it stands. The fact that it was created in part out of surplus earnings does not impair the ownership. Mr. Hines said that he did not believe that the reasonableness of rates at the present time should be decided by any assumption of what business will be for the future, but that there should be a continuing study of the situation.

"We know," he said, "that the returns in the immediate past have been decidedly low, and it is reasonable to believe that any substantial reduction in revenues would be injurious to the public interest. Extreme caution should be used in reaching a decision that any rate is too high."

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A Polish Container Car for Coal Service; One Section of Body Removed to Show Construction of Underframe

Tie Production Greatly Curtailed

THE PRESENT limited demand for cross ties on the part of the railways is naturally leading to a marked curtailment in production in practically all parts of the country. Indicative as this is of the retrenchment in expenditures which the roads have been forced to effect, it is also a result of an extensive over-production in 1920. However, this situation forecasts a shortage when the roads begin to buy, for a considerable interval necessarily elapses between the beginning of tie making operations and the delivery of ties to the roads. The present lack of activity in the principal tie producing areas of the United States was outlined in reports prepared by operators in those regions and presented at the fourth annual meeting of the National Association of Railroad Tie Producers, which was held at the Hotel Sherman, Chicago, on January 26 and 27.

In Virginia, West Virginia and Ohio a number of roads withdrew from the market late in 1921, while others curtailed their purchases. This has led to a decline in production until the output is only 20 to 25 per cent of normal in Virginia and 35 to 40 per cent in West Virginia.

In the southeastern states including Kentucky, Tennessee, northern Alabama and Mississippi, a few scattering lots of ties of 1920 manufacture remain. Relatively few ties have been produced in 1921. Recently some of the roads have bought ties under contract or have started buying along their right-of-ways, but the demand is still so limited that the tie contractors and buyers are only going after those ties which can be obtained most cheaply and with the least effort practically stopping production in the more inaccessible areas.

In the South Central states, including the Ozark region, production is now somewhat below normal, but in the cotton producing sections where the crop is almost a failure it could easily be stimulated to double what it is now. The prices now being paid are approximately 50 per cent of those of a year ago. The demand from the railroads has been below normal until recently, but the indications are now that it will increase to practically normal during the spring and summer.

Operations in the northern woods are now smaller than at any time in the last 20 years. In this territory the ties are produced during the winter on contracts let in the fall. Last fall the roads did not enter the market to any extent and those ties purchased were at prices about half of those of a year ago. Under these conditions the only ties which are now coming out are those produced by farmers who are compelled to cut some timber in order to eke out a living.

In the Rocky Mountain territory most of the ties are hewn far back in the woods and are transported to market by driving in spring flood waters, also necessitating fall contracts. The railways have secured marked concessions in prices and have put into effect more drastic specifications. Aided by an ample supply of labor at reduced wages some of the operators are going ahead. The production as a whole, however, has been curtailed greatly in this area.

In the Pacific Northwest the production is now limited principally to the immediate local requirements of the roads. A considerable portion of this demand is being supplied by the small producer, principally the ranchers who have small tracts of suitable timber which they can convert into ties. The percentage of hewn ties in this area is now much greater than for many years.

A BILL HAS BEEN introduced in the State Senate of Kentucky, to give to the Board of Public Works the power to order and to contract for the elimination of grade crossings, charging the railroad companies with 65 per cent of the cost and the city or town with 35 per cent.

Revised Station Plans Embody New Features

The Chicago Project Embraces Headhouse of Office Building Type
and a Large Railway Mail Terminal

DEVELOPMENT OF PLANS for the Chicago Union Station during the progress of construction has led to some interesting modifications of the original layout, chief among which is a decision to adopt an office building type of structure for the headhouse instead of one providing only for the waiting room and auxiliary facilities. Another departure from the original plan is provision for an enormous railway mail terminal now in process of construction. A further innovation embraces separate baggage platforms with ramps connecting to the basement baggage room so that eleva-

sequent resumption of the construction the desirability of certain departures from the original plans have presented themselves from time to time and these changes have been incorporated in the final plans.

One of the important changes agreed upon provides for the necessary changes in the headhouse to permit of an office building in place of the monumental type of construction originally contemplated for exclusive use as a station structure. This modification was undertaken as a means of securing more efficient utilization of the full block of valuable



Architect's Drawing of the Completed Station, with a Suggested Plan for a New Post Office at the Right

tors and trucking tunnels below the level of the tracks have been largely eliminated.

The general conception of the station as described in the *Railway Age Gazette* for November 3, 1916, page 803, remains unchanged. As there described, the project provides for a headhouse occupying the entire block bounded by Canal, Adams and Clinton streets and Jackson boulevard, with a passenger concourse under and east of Canal street and two separate grids of station tracks to the north of Adams street and to the south of Jackson boulevard respectively. The station proper and tracks will be on a level below the city streets with a baggage room occupying a sub-basement, having communication with the street by means of two long inclined driveways that open onto the street at the northwest and southwest corners of the headhouse.

Work on this project was curtailed with the advent of the war and the period of government control, but upon the sub-

stantial treatment of the great waiting room which will be 250 ft. long by over 100 ft. wide. Access to the offices will be afforded by entrances on the Adams street and Jackson boulevard sides of the building, which will have no connection with the waiting room floor except minor stairways for the accommodation of persons employed in the offices in going to and from trains. The large waiting room will have entrances from the centers of the Canal street and Clinton street sides with stairways leading to the waiting room level which is 16½ ft. below Canal street and 10 ft. below Clinton street. The main entrance on Canal street will be in duplicate, the two doorways and stairways being separated a distance of 112 ft. This space between the two stairways will be utilized to provide a single broad corridor leading from the waiting room to the passenger concourse, and with one passageway instead

of two, as originally planned, it will be possible to place the ticket offices on one side and the baggage counter on the other side. The result will be a most logical separation of the functions of the passenger concourse and the waiting room. Thus, the concourse will provide, in close proximity, all of the facilities needed by the passenger for the business of taking or leaving a train, namely, the ticket office, baggage counter, parcel check, cab stand and convenient access to the street by means of ramps from entrances on Jackson boulevard and Adams street close to the two river bridges. These will be of special convenience to the suburban passengers since they afford entrance to the station at those points on the station property nearest to the business center of the city. The waiting room is designed to provide for those passengers who are compelled to spend some time in the station. Along the west wall of this great room will be found a lunch room and restaurant, while at the northwest and southwest corners will be the women's waiting room and smoking room, respectively, together with toilets, rest rooms, etc.

Unique Baggage Platform Arrangement

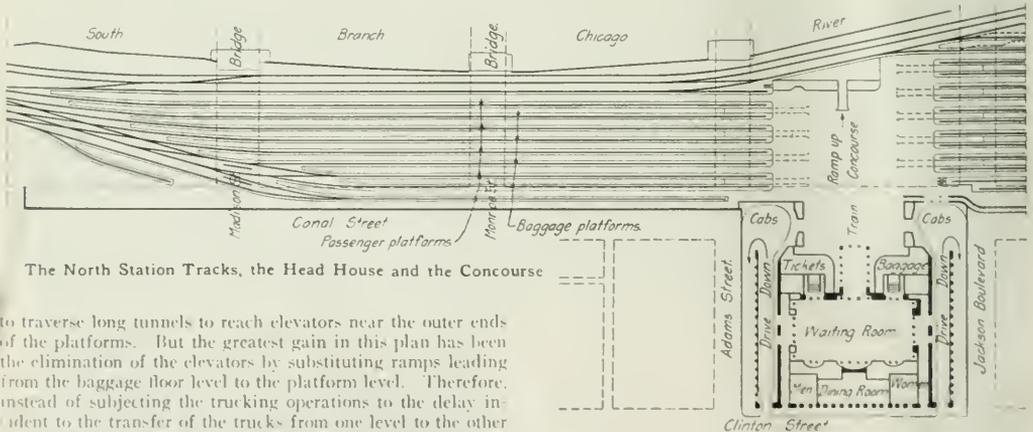
By far the most interesting feature of the new plan is the arrangement of the baggage platform which was brought about as a means of obviating the costly construction of trucking tunnels and elevator pits below the water level of the nearby Chicago river, but aside from considerations of economy, a number of operating advantages will accrue from the arrangements agreed upon. The primary result will be the segregation of passengers and trucks on independent platforms. This in turn obviates the objection to the movement of trucks on the platforms to and from the baggage and express cars at the outer ends of the platform, thereby permitting all trucks to pass from the baggage room direct to the platform instead of requiring all trucks for outbound trains

the use of high station platforms, but owing to the through car traffic movement involving the use of cars from various connecting roads in the west, it was found that the high platforms would entail extended changes in equipment by roads that do not enter the station. Consequently, it has been decided to adopt the low passenger platform but with a type of construction that will readily permit of a change to high platforms whenever this is found desirable. The construction of low passenger platforms will require a slight incline downward from the concourse floor level to the platform level. In event of subsequent construction of high passenger platforms, a slight ramp upward from the concourse to the platforms will be required.

Large Structure for Railway Mail Service

Another important change in the station plans has been brought about through an arrangement with the United States Postoffice Department whereby the City of Chicago will secure the advantage of a considerable increase in its postoffice facilities without the need of obtaining an appropriation from Congress. Under a contract consummated between the station company and the Postoffice Department, the former is now erecting a seven story building, 796 ft. long by 75 ft. 6 in. wide, extending along the east side of the station property for the full distance between Van Buren street and Harrison street. This feature of the project alone will entail an expenditure of approximately \$4,000,000. The Postoffice Department has agreed to lease this building for a period of 20 years, and the building will be adequate to take care of the railway mail service of the railroads entering the Union station and will also afford a large measure of relief to the greatly overcrowded general postoffice of the city.

The building is an enormous structure providing over 11 acres of floor area and 8 1/2 million cu. ft. of cubical contents.



The North Station Tracks, the Head House and the Concourse

to traverse long tunnels to reach elevators near the outer ends of the platforms. But the greatest gain in this plan has been the elimination of the elevators by substituting ramps leading from the baggage floor level to the platform level. Therefore, instead of subjecting the trucking operations to the delay incident to the transfer of the trucks from one level to the other by means of elevators, the operation can go continuously as the ramps will be wide enough to permit the passage of two trucks abreast. The plan will be better understood by reference to the drawing. The design provides for placing the head of the ramps at about the normal position for the end of the tender of an incoming locomotive so that the baggage platform will be at the normal level opposite the nearest door of the leading baggage car.

The baggage platforms will be 10 ft. 9 in. and the passenger platforms 13 ft. 1 in. in width and by a rearrangement of the tracks it has been possible to provide approximately the same amount of track space in the station as was originally planned with the tracks spaced 27 ft. center to center across the platforms. The original plan was committed to

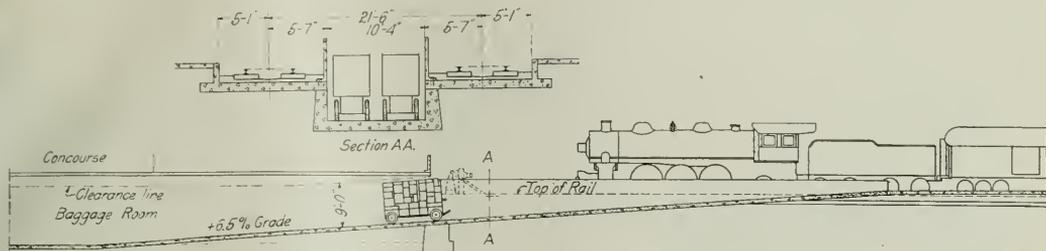
The use of this building for the handling of mail to and from trains will be limited to the basement, the track level floor and a portion of the street level floor, the remaining portion of that floor and all those above being reserved by the postal department for the sorting and distribution of papers, parcel post and similar mail matter. Mail is delivered and received on both the track and the basement level. On the track level, platforms are provided adjacent to two longitudinal tracks and four stub tracks with adequate space for 61 cars. In the basement communication is provided by means of two tunnels for the handling of mail on platform trucks to and from mail cars standing on tracks elsewhere in the sta-

tion. One of these tunnels passes transversely under the south end of the south station tracks and gives access to these tracks by means of elevators. The other tunnel connects the mail building with the station baggage room where the ramps, previously referred to in this article, afford direct access to the baggage platforms adjacent to any of the tracks.

The building is to be equipped with the most modern appliances for the mechanical handling of the mail. Fifteen

end of the building, or to upper floors of the building for reclassification.

The building is also of considerable interest from the standpoint of design and construction. It has a structural steel frame containing 7,000 tons of structural steel and is supported on concrete caissons extending about 50 ft. below the city datum. The most notable feature is a steel truss in the west wall 149 ft. 4½ in. long, center to center of sup-



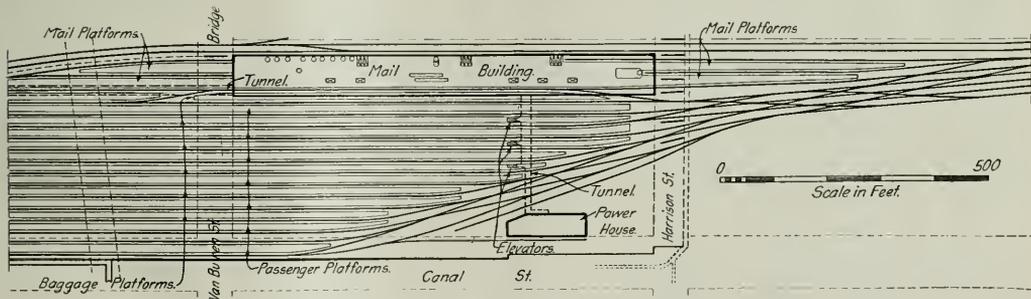
Two Sectional Views, Illustrating the Arrangement of Ramps from Baggage Platforms Into the Baggage Room

elevators will be provided for the handling of the mail trucks. Nine of these elevators will extend from the basement to the sixth floor.

Five of them will operate between the driveway level and the basement and one will serve between the basement and the track level. In addition to the elevators provision has been made for the transportation of mail from place to place in the building and also for classification

porting columns, which carries a load of 4,050 tons and is the heaviest truss which has ever been used in building construction.

The building of this truss is occasioned by the requirements of the trackage serving the mail terminal. One of the railway tracks for the building is located inside the columns supporting the west wall of the building and to connect this track with an outer track parallel to it, it was necessary to



The South Station Tracks, Showing Also the Mail Terminal

through the agency of belt conveyors. Spiral chutes will also form an important feature of the layout.

Building of Unusual Character

The street level floor of the building will be devoted to the handling of mail to and from street vehicles. The building has but a very limited frontage on the two streets, but ample truck space will be provided by a driveway which is being constructed along the east side of the building for the entire distance between Van Buren street and Harrison street. Outgoing railway mail will be received at the north end of the building and passed into 18 chutes by which the mail will descend either to the track level or the basement. The arrangement of elevators is such that ample facilities are provided for the delivery to the lower floors of any mail that is unsuited to handling in the chutes. Inbound railway mail will be received directly from cars and spotted at the house platforms or on platform trucks coming in through the trucking tunnels. This mail will be elevated to the street floor for delivery to street trucks in the driveway at the south

provide a crossover with No. 7 frogs requiring a length of 220 ft. between switch points. As a consequence of this it was necessary to omit four of the wall columns in the track level story of the building and support these columns in the floors above by a truss in the street level story or at a sufficient elevation so that the bottom chord would give a clearance of 17 ft. above top of rail. The weight of this truss is 365 tons and it contains 11 tons of field rivets, largely of 1 1/16 in. diameter.

The building is not enclosed with walls on the track level, but will have brick curtain walls for all stories above the street grade.

The delivery platforms on the street level are provided with steel rolling doors. The floors are of reinforced concrete construction, covered with crosoted blocks for all areas used for trucking or handling mail.

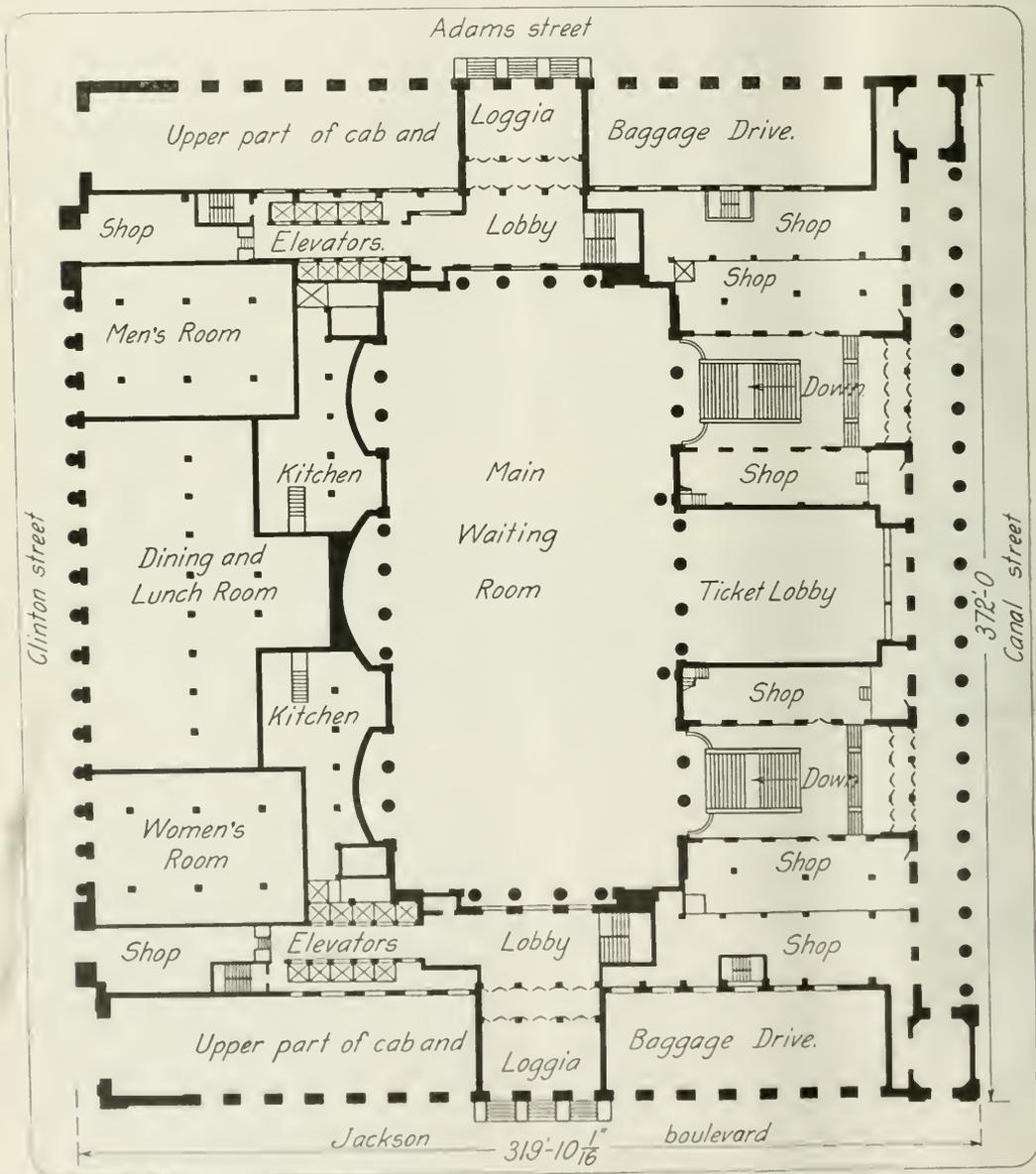
A street entrance and public lobby are provided at the Van Buren street end of the building with access to three passenger elevators communicating with the various floors. A portion of the sixth floor is arranged to provide space for

postal offices, stock room, repair shops, cafeteria, study room and incinerator, a room for charging batteries for electric tractor trucks and auxiliary uses.

Work on the station project is progressing under the direction of J. D'Esposito, chief engineer, and A. J. Hammond, assistant chief engineer, Chicago Union Station Company. Graham, Anderson, Probst & White, Chicago, are the architects. Arrangement for the use of the railway mail terminal by the United States Railway Mail Service is under the direc-

tion of Colonel E. H. Shaughnessy, second assistant postmaster general, Washington, D. C.

PASSENGERS CHECKING BAGGAGE on the Chicago, Burlington & Quincy, commencing March 1, will be allowed to declare the actual value of their property. The new rule will replace that limiting the value to \$100 for each adult ticket. Receipts for the excess valuation, are to be indicated by stamps affixed to the baggage.



The Head House—a Section at the Street Level

W. G. McAdoo Defends His Administration

Former Director General Replies to Criticisms with Charges Against Railway Executives

WASHINGTON, D. C.

A DETAILED REPLY to numerous criticisms of the federal administration of the railroads during 1918 and 1919 was made by W. G. McAdoo, director general of railroads during 1918, in a prepared statement presented before the Senate committee on interstate commerce on February 1 and 2. The statement comprised 140 typewritten pages, a large part of which was made up of quotations from statements made by railroad executives in testimony before the Interstate Commerce Commission and Congressional committees, and by the commission in reports and in testimony before the committees regarding the condition of the railroads prior to federal control, from various reports and memoranda contrasting operations during federal control and those under private management and from correspondence of the Railroad Administration, which Mr. McAdoo uses to support his contentions. Much of the material used has previously been published in reports of the Railroad Administration. A condensed abstract of the prepared statement, omitting most of the quotations, is as follows:

McAdoo's Testimony

Charges of inefficiency in the management of the railroads during federal control have, from time to time, been made and published with a recklessness for which ignorance, design or selfish purpose alone can account. So far as 1918 is concerned, the unpublished testimony of seven of the ablest railroad men in the United States, given in a report to my successor as director general of railroads, Walker D. Hines, January 17, 1919, is conclusive answer:

"The measures taken during the year 1918 called for no apologies. They were caused by war conditions and the efficient operation of the railroads in support of the government during the war justifies every act of the administration during that period. It was impossible to avoid the increases in wages which were granted, and those which are pending are inherently a result of the same causes. War industries surrounding the railroads on all sides were paying war prices for labor and depleting the railroad supply of labor, particularly the supply of skilled labor. These conditions necessarily forced increases in wages of railroad labor and will persist not only during the present year (1919) as a necessary part of the war experience of the country, but for sometime in the future."

This report was signed by: A. H. Smith, C. H. Markham, R. H. Aishton, Hale Holden, B. F. Bush, N. D. Maher and B. L. Winchell.

There has been a general disposition to compare railroad operations in 1918 when, out of imperious necessity, they had to be devoted, first, to war purposes; and, second, to the general needs of the country, with the operation of the railroads under peace conditions and in normal times. A moment's reflection will convince any unbiased mind that such a comparison is wholly unfair and prejudiced. Even on this basis it is clear that railroad operations in the year 1918 were conducted with great efficiency, skill and ability.

In 1918, after paying a rental of \$906,000,000 there was a deficit in railroad operations of \$216,000,000. Unthinking people urge this as conclusive evidence of the failure of the Railroad Administration. It is, of course, a superficial and unfair judgment, because it is a part of the war cost and, like all war cost, it is an expenditure for which there is no compensation but victory. When we consider the imminent peril which faced the country because of the breakdown of the railroads under private control, in 1916 as well as in 1917, and reflect that the assertion of federal control alone overcame that peril and transformed the railroad systems of the country into a tremendous and effective war machine, and that the total cost of transportation for the war purpose in the year 1918 was only \$216,000,000, and for the entire 26 months of federal control only \$714,000,000 on Class I roads, it is infinitesimal as compared with the total expenditures made by the American people to win the war.

When the government took over the railroads there was, of course, no opportunity to make an inspection of tracks and structures and to determine with certainty their condition; nor to make similar investigations of the condition of motive power and equipment; nor to check inventories. The government had

to rely upon railroad officials and railroad men, all of whom were retained in the service of the government and upon whose loyalty and integrity the government had a right to depend, at a time when our sons were shedding their blood and giving their lives upon the fields of battle. Railroad men ran the railroads of the United States while I was director general, and if they were inefficient or disloyal to their government in that time, they must answer to their own consciences. But I have said before that I believed them to be both loyal and efficient, and that the remarkable results achieved in 1918 conclusively prove that they were.

Pre-War Condition of Railroads Called a Menace

In the fall of 1917 the inefficiency of the American railroads made them unintentionally but nevertheless actually the strongest ally of the German Kaiser. The collapse under the burden of war traffic had almost cut the line of communication between the American army at the front and its base of supplies. The condition of traffic, particularly in the east, and the embargoes on freight in all important centers, had reached such an acute state of almost complete congestion that the Interstate Commerce Commission December 1, 1917, felt impelled to submit to Congress a special report sharply calling attention to the critical situation which faced the country.

Upon our declaration of war the railroads in response to the resolution of the Council of National Defense, organized on April 11, 1917, a special Committee on National Defense, usually called the Railroad War Board, to secure co-operation between the various railroad systems. Despite the activities of this committee and its various efforts at co-operation, the condition of the railroads grew steadily worse until there had become an almost complete paralysis of transportation. This Railroad War Board, on December 22, 1917, only five days prior to the President's proclamation to take over the roads and in response to a questionnaire by the chairman of the committee on interstate commerce of the Senate, submitted replies outlining what it had accomplished during the more than eight months of its existence, emphasizing the things deemed necessary for successful operation of the railroads and the difficulties with which they were faced.

[Then follows a series of quotations from the report of the Railroad War Board and other expressions as to the condition at that time.]

This breakdown of the American railroads did not occur overnight. It resulted not alone from lack of unification, but from the impaired physical condition of the roads extending over a period of years, and from long-deferred maintenance and improvements.

It is now asserted by railroad representatives or executives that when the roads were taken over by the government January 1, 1918, they were a well-equipped machine and in splendid physical and operating condition. The falsity of this assertion is shown by the report made by the Railroad War Board in which it is recited that the railroads needed "approximately 2,000 locomotives and 150,000 cars in addition to those now on order to meet the requirements" of the year 1918 and that "the cost of this equipment is approximately \$500,000,000 and that "the railroads generally cannot * * * (in the year 1918) provide through their usual channels for the capital requirements for the acquisition of equipment and other possible additions to plant." They invoked, therefore, the co-operation and aid of the government to secure for them on their own individual credit the new capital found by the government to be necessary not only for enlarging plant but for renewing maturing obligations.

At the time this statement was made the railroads had on order 1,902 locomotives and 42,857 freight cars.

By their own confession the railroads needed 3,902 locomotives and 192,857 freight cars. During federal control 4,226 locomotives and 159,056 freight cars were supplied to the railroads. Notwithstanding this great addition to the equipment of the companies the railroad executives are now claiming that the railroads were returned to them a less well-equipped machine than at the time the government took control of them, January 1, 1918.

If the railroads had been a "well-equipped machine" and in splendid physical and operating condition January 1, 1918, why was it that, in the fall of 1916, there was a congestion and breakdown of railroad transportation in the United States of a similar character and with like hurtful consequences, to the breakdown and congestion which occurred in the fall of 1917 just prior to federal control?

Further startling differences between the present attempt to

show that the railroads were in splendid condition and the effort of the railroad executives to obtain various increases in rates are disclosed by the records of the Interstate Commerce Commission. In view of the pathetic picture of the condition of the roads as drawn by these executives before the Interstate Commerce Commission from 1910 to 1917, the least cynical might be justified in questioning the good faith of these who in order to bolster up a "reticent case against the operation of these roads under federal control, now assert that they were maintained under private control "to the highest point of efficiency."

As long ago as 1910, in testimony given before the Interstate Commerce Commission, the railway officials acknowledged that their roads were not being maintained and improved in accordance with public expectation and the traffic needs of the country.

If evidence, other than the statement of the Railroad War Board and the testimony of the railroad executives is needed to demonstrate that lack of sufficient motive power continued to the beginning of federal control, it will be found in the letters to me (quoted) in January, 1918, from various executives of the Eastern lines answering my complaint of their inefficient operation of the roads. For instance, Samuel Rea confessed that the Pennsylvania Railroad had "practically the same plant as in 1915"; President Dice of the Philadelphia & Reading itemized his difficulties of operation as—1st, shortage of locomotives, and 2nd, shortage of men; Mr. Besler, president and general manager of the Central Railroad of New Jersey said, "We lack sufficient locomotives, of which we have been in urgent need for months past." Mr. Besler also requested that 1 "immediately direct 25 freight locomotives *** be transferred to the Central Railroad of New Jersey."

It is a significant commentary upon the pre-war efficiency of railroad equipment that from 1914 to 1916 the number of locomotives in the service decreased from 67,012 to 65,595; and on December 31, 1917, there were only 66,070 locomotives in service. In other words, when the railroads were taken over there were 942 less locomotives in the service than in June 30, 1914, three and a half years previous, while the average tractive power of locomotives had increased only from 31,006 to 33,932 pounds.

Similarly the number of freight cars increased from 2,349,734 on June 30, 1914, to 2,329,475 on December 31, 1916, but increased December 31, 1917, to 2,379,472, or practically 50,000 cars increase in three and a half years, while their average tonnage capacity increased from 39.1 to 40.9 tons per car, or only 1.8 tons per car.

Bad Order Cars

The following tables, compiled from the records of the Railroad Administration on the basis of the number of locomotives and revenue cars on line, and not on the basis of units of equipment owned, show the condition of locomotives and freight cars at the beginning and end of federal control, and utterly refute the present extravagant claims of the railroads.

	Beginning of Federal Control*	End of Federal Control
Number of locomotives on line	58,319	65,100
Number of locomotives out of service for repairs requiring over 24 hours	9,105	11,587
Percentage of locomotives out of service for repairs requiring over 24 hours	15.6	17.8

* Figures include only roads owning 100 or more locomotives.

BAD ORDER CARS AS OF JANUARY 4, 1918, AND FEBRUARY 28, 1920

	Bad order cars	Revenue cars on line	Per cent of bad order cars to revenue cars
January 4, 1918	126,650	2,374,566	5.3
February 28, 1920	141,906	2,486,507	5.7

There were a total 1,475 cars held under Circular No. 20 awaiting disposition or authority to retire.

* These figures are based upon reports of the railroads made upon order of the Director General of Railroads.

The tables show that there was little difference in the reported number of bad order cars and locomotives at the beginning and the end of federal control. The percentage of bad order locomotives presented a more unfavorable showing to the railroad Administration than actually existed, for the reason that prior to federal control locomotives were only reported as out of service for repairs when they were in need of class repairs, while the Bad Order Administration required such a report for all locomotives held for repair which would require more than 24 hours to retrim. On this basis the number shown out of service (in repairs at the beginning of federal control) would be increased to about 20 per cent.

The fact that the bad order equipment at the beginning of federal control was holding the terminals and shops and roundhouse out of order during federal control a higher standard of maintenance and repair was maintained, so that at the end of federal control the railroads were in condition to meet the heaviest traffic demands of their list.

Remedies Applied

The Railroad Administration adopted the only two possible methods for improving the general condition of equipment; namely, first, immediately using more efficiently the available facilities and forces, and later increasing the shop facilities and forces, since immediate increase of these facilities and forces under war conditions was impossible. The Railroad Administration called on the representatives of the organized railroad employees to agree to certain modifications in their contracts with the railroad companies relative to hours of labor and to agree also to modifications of the rules governing the promotion to mechanics of apprentices and helpers.

Under these modifications the railroad employees patriotically gave up privileges and concessions which their organizations had obtained through many years of negotiations and controversy, in which they agreed to an extension of the hours of service to 70 per week and to the promotion of all competent helpers and apprentices to mechanics wherever a shortage of mechanics existed. The concessions granted to the government by the labor organizations at this time could not have been obtained by the railroad managements under any conditions. The employees had previously refused to make similar concessions to the railroad corporations because of their belief that once they gave up these privileges, they would never be restored under private control. The average increase in locomotive-shop hours for the entire country amounted to about 16 per cent, and the effect became immediately apparent by the increased number of locomotives repaired per week.

There were 1930 locomotives of various types built by locomotive works on administration orders during the full period of federal control and 100,000 freight cars were, on like order, built by car manufacturers. This equipment was standardized. As a matter of fact the Railroad Administration purchased 4226 new locomotives and 159,076 freight cars. Counting the equipment built in railroad shops we turned back to the carriers 2006 more locomotives, 26,815 more freight cars and 1051 more passenger cars than we received.

Standard practices were also established for mechanical work and many other economies effected. From the beginning, the mechanical department of the Division of Operation endeavored diligently to maintain the equipment, without any idea that economies should or could be realized by reducing maintenance which the equipment ought to receive, but with the thought that the fullest possible measure of maintenance should be given, trying through greater vigilance to get more maintenance per dollar of money expended than would be expected if such vigilance were lacking. With this thought in mind, immediately after the roads were placed under federal control, we began to check locomotive shop output and roundhouse shop costs, so that all unnecessary expenditures might be eliminated and greater efficiency in shop and roundhouse operation obtained. Where improper practices were found to exist, action was taken through the regional directors to secure more efficient and economical methods.

Federal managers were required to prepare and submit information regarding maintenance of equipment during the test period, during the seven years prior to the test period, as well as during the calendar year 1918.

Deficit of 1918 Charged to Railway Executives

The railway net operating income for the year 1918 as defined by the federal control act was \$690,418,778. The rental charge was \$906,524,492, leaving an operating deficit for 1918 of \$216,105,714.

A striking illustration of the result of the running of the railroads of the country by the corporations for the account of the government may be obtained by comparing the results of the first five months of 1918 with the first five months of 1917.

As shown by the Interstate Commerce Commission, the net operating income for the first five months of 1917 was \$346,439,522. The net operating income for the first five months of 1918 was \$215,278,841. This means that the corporations when running the railroads for the account of their government, with all the aid and assistance the government could give, earned \$131,160,681 less operating income than in the same period of 1917. This decrease occurred in spite of the advantage of a 15 per cent increase in official classification territory in class rates, directed by the Interstate Commerce Commission in June, 1917, and a general advance of 15 per cent in commodity rates in the same territory March 12, 1918, and without taking into account the retroactive wage increase (made upon the recommendation of the Railroad Wage Commission), properly chargeable against the first five months of 1918. The entire wage increase was charged to operating expenses for the last seven months of 1918, thus mak-

ing the showing for the first five months of 1918 more favorable to the corporations than the facts justify.

The rental charge for the first five months (5/12 of \$906,524,-492) was \$377,718,535, while the operating income was \$215,-278,841. The result is that the corporations, without charging them up with retroactive wage increase, did not earn the rental for the roads for the first five months of 1918 by \$162,439,694. If we charge to the first five months of 1918 their proportion of wage increases made subsequent to May, 1918, but retroactive to the first of January, 1918, it would add to the operating expenses \$198,780,724. This would reduce the net operating income of \$215,278,841, reported for the period, to \$16,498,117, a decrease of \$329,941,405 as compared with the net income for the first five months of 1917.

The proportionate amount of rental due the carriers for these five months was \$377,718,538. Deducting the net income of \$16,498,117, we have a loss for the five months of \$361,220,421, or more than the total deficit for the year 1918, viz.: \$216,105,714. On this basis there was a surplus for the last seven months of 1918 of \$145,114,707 as compared with a loss of \$361,220,421 for the first five months of 1918.

If, to offset the above charge due to wage increases against the operations of the carriers by corporations for the first five months of 1918, they should be credited with five-sixths of the \$494,-000,000 which Director General Hines says would have been received if the rate increase put in effect in June, 1918, had been in effect from January 1, 1918, the result would be to add \$412,000,000 to the net operating income for the first five months and convert the loss of \$361,000,000 to a surplus of \$51,000,000. On the other hand, allocating one-sixth of the \$494,000,000 to the last seven months of the year would increase the surplus of \$145,000,000 shown above to a surplus of \$227,000,000 or five times the surplus of the first five months of the year.

If, in these circumstances, there had been no deficit, what becomes of the charge of extravagance and wasteful inefficiency now preferred against federal control? Do not these figures show that the waste, inefficiency and incompetence, if any, was shown by the railroad executives when they were operating the railroad for account of the government during the first five months of 1918?

Private Control Declared a Failure During the War

The issue is inescapable that if there was in 1918 extravagance and inefficiency, these railroad executives were guilty of it, and if they were not guilty then, they are now, for their own purposes, guilty of an attempt to besmirch the record. I have defended their loyalty to the government, and have believed that they were honestly attempting to co-operate with the government in the efficient operation of the roads, but what excuse can they offer for their reckless and indiscriminate criticism of the operation of the railroads under federal control when figured on any basis, by far the greater part of the deficit for the year 1918 occurred when they were operating the carriers for the account of their government? What pretense can they make that they could have produced better results than the government when they signally failed to function efficiently not only during the first five months of 1918 but also in 1916 and 1917 as shown by the scathing criticism of the railroad corporations by the Interstate Commerce Commission in its decision of January 18, 1917, to which I have already referred?

Having failed so signally to raise capital to provide the necessary capital expenditures and the wage increase necessary to retain sufficient skilled labor to efficiently operate the roads, by what right do they now criticize the Railroad Administration which established a credit of a billion of dollars and more for capital expenditures, brought order out of chaos, not the transportation system of the country functioning, opened up the line of communication between the soldiers at the front and their base of supplies, and made possible the early ending of the gruesome and awful war?

Could private control have bettered the weather conditions of which the railroad executives complain, or overcome the ravages of influenza, or more capably cope with the competition for skilled labor which the high wages of the shipyards, munitions plants, and the cost-plus contracts generally, had abnormally excited? The inescapable truth is that private control was powerless to meet the demands upon the railroads.

It is unfair and stupid if not worse, to challenge the efficient operation of the railroads during 1918 under the stress of war conditions, because after paying more than \$900,000,000 to the owners in rentals there was a deficit of about \$216,000,000, all of which, on a fair comparison and adjustment was incurred by the railroad executives in the first five months of 1918 as I have already shown.

Corporations Relieved of Operating Carriers

On March 21, 1918, Congress passed the federal control act which created practically the relation of lessor and lessee between

the railroad corporations and the government, and by the first of May, I had become convinced that the management of the railroads by the railroad corporations under the direction of the director general could no longer be continued. Not only was I dissatisfied with the results of the corporate operation of the roads, but I realized that under the federal control act there would inevitably be conflicts between the duty of the railroad executives to their corporations and their duty to the government. Moreover, I became convinced that much economy could not be effected without rerouting of traffic by the shortest and most efficient lines which meant the elimination of competition, the abandonment of unnecessary passenger and freight mileage, the elimination of many employees who were required under competitive control and were not needed under unified operation of the railroads.

Experience of almost five months with corporate managements convinced me that their officers were so habituated to competitive practices that it was impossible even under government control to prevent them from competing with each other for business. Tradition and habit were too strong. Thorough co-ordination and the most efficient use of the properties for the war purposes required the abandonment of competition.

The unanswerable fact is that the performance of the railroads in 1920 would not have been possible if the railroad properties had not been returned to them by the government in exceptionally good condition. The railroads could not have performed "the greatest transportation task in their history" if they had been broken down or injured by the government. On the contrary, this "greatest task in their history" was performed because, during the period of federal control, \$1,219,840,291 was expended in improvements, additions, betterments and equipment which made of the railroad properties an infinitely better transportation machine than it was on January 1, 1918, when the government took possession. This is shown in part by the condition of locomotive tractive power and freight car tonnage capacity.

Complaint of Poor Distribution of Cars

One of the frequent complaints by the railway executives has been that when the carriers were returned to private control, the freight cars of the individual carriers were poorly distributed among them all, and due to the unification methods of federal control, this resulted in each railroad having only a small percentage of its own cars at home. And yet the Interstate Commerce Commission points out in its 1920 report, after the return to private control, "cars have been distributed primarily without regard to ownership" because "the movement of traffic was the first consideration." And within two and a half months, upon the petition of the railroads, the commission ordered the relocation of thousands of cars without regard to ownership. More than this, this report shows that the same Car Service Commission of the American Railroad Association, existing before federal control and which was used as the agency of the director general in distributing cars during federal control, was continued by the railroads after federal control and distributed hundreds of thousands of cars without regard to ownership. This complaint therefore, is baseless.

Bad Order Condition of Equipment

It is interesting to compare the bad-order condition of freight cars and locomotives at the end of federal control with such condition on July 1, 1921, with such a let up in traffic movement in the past year as to afford private management a splendid opportunity to bring the condition of the equipment up to that high standard of maintenance which they would have us now believe was usual in the "outstanding success" of the management.

It will be recalled that the bad order freight cars on February 20, 1920, numbered 141,906, or a percentage of 5.7; locomotives out of service for repairs over 24 hours were 11,587, or 17.8 per cent. On October 1, 1921, there were 364,372 bad order freight train cars, which is an increase since the close of federal control of 222,466. This, however, bad as it may seem, does not tell the story with respect to the alarming condition of freight train cars. Of the 141,906 bad order freight cars at the close of federal control, 62,936 required light repairs, and 78,970 required heavy repairs. Of the 364,372 bad order cars as of October 1, 1921, 78,040 required light repairs, while 286,332 required heavy repairs. It will thus be seen that while the number of bad order cars requiring light repairs has increased, 15,104, the number requiring heavy repairs has increased 207,362.

Using an estimated cost of repairs based on studies of the results during federal control, it would have cost at the end of federal control but \$9,508,865 to repair all bad order cars. It would have cost on October 1, 1921, \$33,365,204 to repair all of the bad order cars, but owing to the fact that many of these cars are of all steel construction and have been standing exposed to the weather for from one to two years, the cost to repair them at present would, without doubt, greatly exceed the above estimate. [Mr. McAdoo here included a detailed analysis of the Railroad

Administration labor policy—This portion of his testimony will be given in next week's issue of the *Railway Age*.]

Comparative Cost of Public and Private Operation

There are so many different factors to be taken into account, that no completely satisfactory comparison can be made of the operating and financial performance of the transportation system under the war administration as against the period since the termination of federal control. Moreover, as I have stated, the period covered by the Railroad Administration was unique and unprecedented. The railroads were managed with but one primary object in view—to assist in the winning of the war. When it became necessary, costs were disregarded. Even under these conditions, however, a very favorable comparison can be drawn with the results of private operation.

The railroads as public utilities cost the people of the country whatever amounts are paid for the transportation of freight and passengers plus whatever direct appropriations or grants are made from the public funds by the Congress after deducting assets remaining in the hands of the government. During the 26 months of federal control, the gross revenues paid to the railroads directly by the public amounted to \$11,036,572,509. Director-General Davis recently estimated that the ultimate cost arising from appropriations by Congress would be \$1,496,281,961. Adding this to the direct cost in revenues, we have a total cost to the public amounting to \$12,532,854,470, covering the entire 26 months of federal control.

Since the termination of federal control, statistics are available for 20 months of private control or until November 1, 1921. These show a total operating revenue paid by the public to the railroads of \$9,972,305,818. To this must be added the amounts which must be paid by the public under the 6 months guarantee period. The Interstate Commerce Commission estimates this will be \$525,412,135. This sum added to operating revenues makes a total cost to the public of 20 months of private control amounting to \$10,508,242,716. Reducing the cost of each period to a comparable monthly basis, gives the following result:

Cost to the Public Per Month

Railroad Administration	\$470,637,404
Private Control	525,412,135

Expressed in terms of dollars and cents, therefore, the cost of operating the railroads under private management has been \$54,774,731 per month more than it was during federal control or \$657,296,772 per annum. If the costs of operation are considered on the basis of units of transportation actually handled, or equated ton-miles, it is even more favorable to the Railroad Administration. It is as follows:

Cost to the Public Per 1,000 Equated Ton Miles

Under Railroad Administration	\$10.94
Under Private Control	12.81

Every advantage is given to this comparison to the period of private operation. The annual guaranteed rental of \$906,000,000 is fully included in the period of federal control while in the period of private control the return or net profit, contemplated under the transportation act, is practically omitted. If the expectations of the transportation act had been completely realized as the returns provided for the railroads (6 per cent on \$18,900,000,000) the cost to the public of private operation would have been greatly increased. The return provided for in the transportation act, if realized, would amount to \$1,134,000,000 annually. In 1920, however, the net income of the railroads was only \$62,264,000 and in 1921, according to estimates, the net income will not exceed \$600,000,000. Conservatively stated, therefore, the amount which it would have cost the public if the guarantee provision of the transportation act had been realized during the period of private management would have been at least one billion dollars more than the amount already stated. This is equivalent to \$50,000,000 for each month of the period. If added to the surplus of cost to the public per month, as before stated, of a private over governmental control, it would amount to \$93,379,275 a month or in other words, would show that private operation had cost the people \$1,120,551,300 more per annum than the Railroad Administration.

Annual Costs of Operation

As to actual operating costs and efficiency, a comparison may be made by eliminating all elements of profit and reducing the items to direct operating expense. This is done in the following table:

	Jan. 1, 1919, to February 29, 1921	March 1, 1920, to October 31, 1921
Total operating expense	\$9,966,900,273	\$8,876,733,707
Profit on sales	451,193,914	481,501,012
Income from other sources	1,717,574	2,008,975
Expenses not in revenue	2,900,771	24,552,116
Net facility cost	1,697,661	10,258,968
Total	\$9,735,176	\$10,143,778

By reference to this table it will be seen that the actual operating monthly costs under governmental control were only \$375,988,813 as against \$473,257,239 under private management; or in other words, private control cost \$97,268,386 more per month or \$1,167,220,632 per annum.

Expressed in terms of work done or units of traffic handled the cost per 1,000 equated ton miles under government control was only \$8.74 as compared with \$11.54 under private management. In other words the cost of private operation since federal control has been 32 per cent higher than under the Railroad Administration.

Clerks' Brotherhood Officials Protest Discharge of Freight Inspectors

H. J. Chapman, general chairman of the Brotherhood of Railway Clerks for Trunk Line territory, and J. J. Forrester, national legislative representative of the brotherhoods, testified before the Senate committee on January 27. Mr. Chapman said that last March the railroads abolished the Trunk Line Freight Inspection Bureau after the freight inspectors had refused a proposition to work six days a week for five days' pay and had thereby thrown out of employment 900 freight inspectors, who, he said, had saved the eastern railroads \$12,000,000 a year in revenue by detecting cases of freight which had been improperly classified by the shippers.

He said that at one point alone three inspectors who had received during the year \$3,900 in wages had saved the railroads \$100,000 in revenue. Mr. Chapman said that the railroads had taken this step on the ground of economy and had suggested that the work could be handled by the regular station forces, but, he said, that it was his personal opinion that the bureau was abolished because the employees had organized and that as a matter of fact the work had not been done by the other employees. In November the bureau was re-established with about 75 inspectors, most of whom were new men. A proposal that the inspectors work without salary but on a percentage basis was not accepted by the roads. Mr. Chapman said.

Senator La Follette, who took a great interest in this testimony, asked whether the railroads had abolished the freight inspectors so as to make it easy to extend favors to shippers. Mr. Forrester said he would not charge that that was the purpose, but that this would be the result. Senator Cummins remarked that the suspension of the inspection service would leave it just as open to the shippers the railroads did not want to favor, but Mr. Forrester said that it would be easier for a railroad to instruct one of its own employees to allow a mis-billed shipment to go through than it would be if the inspectors were employees of a bureau. He preferred to criticize the action of the railroads as mismanagement, but said that if it were not mismanagement there is some other motive on the part of the railroads. Senator Fernald who has himself had a great deal of experience as a shipper, said that in Maine he knew that every car of freight is inspected by the local agents. Mr. Forrester said this is not true in the larger terminals. Mr. Forrester said that the records of the bureau will show that even with the inspection there is a large amount of mis-billing and mis-classification of freight on the part of the shippers and that the abolishment of the inspection simply increased the waste of railroad revenues.

Mr. Chapman said that only five days before he was dismissed he had been approached by a shipper who proposed to put through 1,000 cases of whiskey billed as medicine and had offered him \$1 a case to let it go through. He had reported this to his superior who had notified the internal revenue officers, but he said apparently the railroads did not appreciate his action. Senator Cummins said that the charge appeared to be that the eastern railroads have thrown away \$12,000,000 a year without apparent reason and that he would take the liberty of calling the matter may have the attention of the railroads to see what explanation they may have.

Report of the Bureau of Locomotive Inspection

Smaller Percentage of Defects—Fewer Accidents—Welding Firebox Crown Sheets Dangerous

THE REPORT of the chief inspector of locomotive boilers to the Interstate Commerce Commission for the fiscal year ending June 30, 1921, shows a decrease in the percentage of locomotive defects and a falling off in the number of accidents. The number of locomotives inspected, moreover, was larger than in any previous year since the bureau has been in operation. A summary of the report is given below.

Statistics of Defects and Accidents

The tabulations have been arranged so as to permit comparison with previous years, and show the number of locomotives inspected; the number and percentage of those inspected



Low Water Caused Crown Sheet Failure and Boiler Explosion

found defective; and the number for which special notice for repairs was issued, withholding the locomotive from service because of having defects constituting violations of the law; together with the number of defects found; also the number of accidents caused by failure from any cause of the locomotive or tender and all parts and appurtenances thereof, together with the number of persons killed and injured as a result of such failure.

NUMBER OF LOCOMOTIVES INSPECTED, NUMBER FOUND DEFECTIVE, PERCENTAGE INSPECTED FOUND DEFECTIVE, NUMBER ORDERED OUT OF SERVICE, AND TOTAL DEFECTS FOUND BY YEARS

	1921	1920	1919	1918	1917
Number of locomotives inspected..	60,812	49,471	59,772	41,611	47,542
Number found defective.....	30,207	25,529	34,557	22,196	25,909
Percentage found defective.....	50	52	58	53	54.5
Number ordered out of service....	3,914	3,774	4,433	2,125	3,294
Total defects found.....	104,848	95,066	135,300	78,277	84,883

NUMBER OF ACCIDENTS, NUMBER KILLED AND NUMBER INJURED AS A RESULT OF FAILURE OF PARTS AND APPURTENANCES OF THE ENTIRE LOCOMOTIVE AND TENDER, BY YEARS

	1921	1920	1919	1918	1917
Number of accidents.....	735	843	565	641	616
Decrease from previous year (per cent)...	12.8	*49.2	11.8	4.1	...
Number killed.....	64	66	57	46	62
Decrease from previous year (per cent)...	3	*15.8	*23.9	25.8	...
Number injured.....	800	916	647	756	721
Decrease from previous year (per cent)...	12.6	*41.6	14.4	4.8	...

*Increase.

NUMBER OF ACCIDENTS, NUMBER KILLED AND NUMBER INJURED AS A RESULT OF THE FAILURE OF SOME PART OR APPURTENANCE OF THE BOILER ONLY, FOR THE FISCAL YEAR ENDED JUNE 30, 1912, 1915, 1920 AND 1921

	1921	1920	1915	1912
Number of accidents.....	342	439	424	856
Number killed.....	51	48	13	91
Number injured.....	379	503	467	1,005

DERAILMENTS DUE TO DEFECTS IN OR FAILURE OF SOME PART OF THE LOCOMOTIVE OR TENDER, AND THE NUMBER OF PERSONS KILLED AND INJURED AS A RESULT OF SUCH DERAILMENTS FOR THE FISCAL YEARS ENDED JUNE 30, 1917-1921, INCLUSIVE.

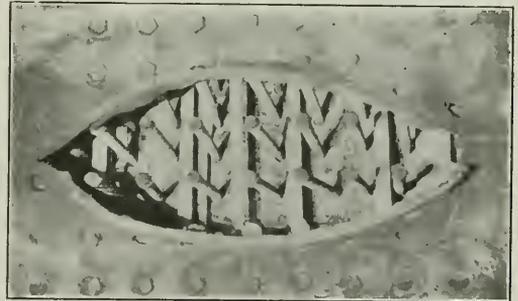
	1921	1920	1919	1918	1917
Number of derailments*	8	7	7	2	4
Number killed.....	7	6	6	1	1
Number injured.....	30	12	7	2	21

*Only derailments reported by carriers as being caused by defect in or failure of parts of the locomotive or tender were investigated or counted in this tabulation.

A summary of accidents and casualties occurring during the fiscal year ended June 30, 1921, as compared with the year ended June 30, 1920, covering the entire locomotive and tender and their appurtenances, shows a reduction of 12.8 per cent in the number of accidents, 3 per cent in the number killed, and 12.6 per cent in the number injured.

During the first six months of the fiscal year 1921 accidents and casualties occurred at an alarming rate and exceeded those of any like period during the five preceding years. However, during the last six months a marked reduction is recorded. The number of accidents and casualties during the year was considerably in excess of those occurring during the year 1919, a large number of accidents resulting in serious injury being caused by the failure of what are frequently termed unimportant parts. For instance, during the year 85 accidents were caused by the failure of some part of the grate-shaking apparatus, 82 by squirt hose, and 65 by some part of the reversing gear, all of which could have been avoided by reasonable care.

There were no authentic records from which comparisons



Crown Sheet Failure Caused by Low Water; Seam Had Been Autogenously Welded

could be made of accidents prior to the enactment of the boiler inspection law. A comparison, however, of the fiscal year ended June 30, 1912, the first year of the law, with the fiscal year 1915, the year in which the law was amended, and 1921, the present year, is of importance, and shows the far-reaching effect of proper inspection and repair, as required by the law and the rules and regulations established thereunder.

Comparing 1912, covering parts and appurtenances of the boiler only, with the year 1915, the fourth year of the law, there is shown to be a reduction of 50 per cent in the number of accidents, 85.7 per cent in the number killed, and 53.5 per cent in the number injured.

Comparing 1912 with the year 1921 covering parts and appurtenances of the boiler only, there is shown to be a reduction of 60 per cent in the number of accidents, 44 per cent in

the number killed and 62 per cent in the number injured.

Comparing 1915, the fourth year of the existence of the law, with the year 1921, there is shown a decrease of 19 per cent in the number of accidents, an increase of 292 per cent in the number killed, and a decrease of 17 per cent in the number injured, due to the failure of some part or appurtenance of the boiler only. Barrel explosions have been entirely eliminated, and while the so-called crown-sheet failures have materially decreased, the great increase in fatalities indicates that the severity of these failures has increased tremendously.

Welded Firebox Sheets

During the year there were a number of accidents investigated in which firebox seams formed by the autogenous welding process were involved, where, through the failure of these seams, it is believed the result of the accident was much more serious than would otherwise have been. Autogenous welding can be used on many parts of the locomotive and tender and on parts of the stayed surfaces of the boiler with safety and economy, but inasmuch as the bureau's accident investigations show that approximately 80 per cent of the autogenously welded seams fail, where they are involved in the accidents, it is believed that such methods should be avoided in firebox crown-sheet seams where overheating and failure are liable to occur, or on any part of the boiler where the strain to which the structure is subjected is not carried by other construction which fully meets with the requirements of the rules, at least until some means has been developed through which the quality and tenacity of the weld may be established in advance of its failure. This should apply on all parts of the locomotive and tender where, through failure, an accident and an injury might result.

Boiler Explosions

The next portion of the report is devoted to a discussion of the theory of boiler explosions and to what takes place in such occurrences.

The force of a boiler explosion is in proportion to the size and suddenness of the initial rupture and the temperature and volume of the water in the boiler at the time of the rupture. The average modern boiler has a capacity of approximately 500 cu. ft. of water below the crown-sheet and has a steam space of about 150 cu. ft. If such a boiler with 200 lb. pressure ruptures from any cause, so as to suddenly reduce the pressure to that of the atmosphere, the released energy will amount to approximately 700,000,000 ft.-lb. and if the explosion took place in two seconds approximately 690,000 h.p. would be developed.

This gives some idea of the force which accompanies many boiler failures, with their serious and fatal results, and supplies the reason for the violence which in many cases is sufficient to hurl the entire boiler several hundred feet or tear it into fragments, scattering them in every direction.

Explosions result because some part of the vessel is too weak to withstand the pressure to which it is subjected. This weakness may be caused by: 1. Abnormal steam pressure. 2. Weakness in design or construction. 3. Improper workmanship. 4. Corrosion or wasting away of material. 5. Broken or defective stays. 6. Overheated crown or firebox sheets.

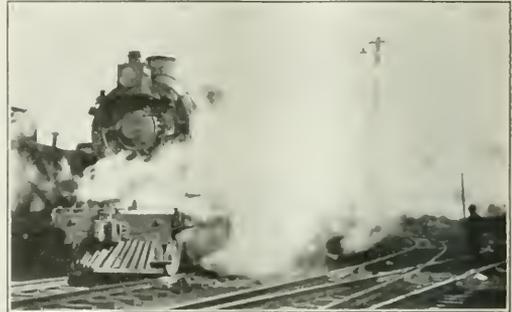
A remedy for the first three causes is provided for in the law and rules by requiring that the working pressure be fixed, after consideration of each individual boiler by competent authorities, and by fixing a substantial factor of safety to provide against any hidden defects of material and construction.

To protect against failure due to corrosion or other defects caused by wear and usage, the law requires that regular inspections, both interior and exterior, be made and that all boilers be subjected to a hydrostatic test at regular intervals

and a sworn report filed showing the conditions found and repairs made.

Failure of crown or firebox sheets, due to overheating, may be the result of scale or grease on the firebox sheets or from low water. The firebox sheets and tubes are in contact with the fire, and would become heated to that temperature if it were not for the presence of water in the boiler. As previously explained, the temperature of the water depends on the boiler pressure, but rarely reaches more than 400 deg. F.; therefore while the plates are in contact with the water on one side they cannot greatly exceed this temperature, although the temperature in the firebox may exceed 2,500 deg., which is about the fusing point of firebox steel.

The heat in the firebox is conducted through the plate to the water in the boiler, where it is absorbed, the sheet thus



Leaking Badly But Reported Ready for Service: Cylinder Cocks Closed

being prevented from heating to the temperature of the fire and burning gases. If, however, the transmission of the heat to the water is obstructed by scale or grease, or if the water fails to absorb the heat, due to being foamy, the plates will retain the heat, and may become red hot; or if the sheets are unprotected by water from any cause they become overheated. Metal loses strength when heated, and if heated to a high temperature has comparatively little strength to resist the pressure within the boiler, when as a result the sheets are forced off the stays and failure occurs. It is a well recognized fact that scale or grease may be the direct cause of an explosion. Scale may indirectly cause an explosion by restricting or closing the openings in the water-indicating appliances, thereby causing a false level of water to be registered, deceiving the enginemen.

Water Gages and Glasses

One of the most perplexing problems which has presented itself while operating the modern locomotive is that of securing a correct indication of the height of water over the crown-sheet under all conditions of service.

In the last annual report was included the results of tests made to determine the action of water in the boiler on the water-indicating appliances with respect to their correct registration. These tests established that gage cocks screwed directly in the boiler do not correctly indicate the general water level while steam is rapidly escaping from the boiler, and in order to secure a proper appliance it was recommended that a water column to which three gage cocks and one water glass were attached be applied.

As far as the bureau has been able to determine, practically all new locomotives constructed since that report was rendered have had water columns applied. On old locomotives the application has not progressed rapidly, probably due to the difficulty in obtaining necessary appropriations. The

necessity for such appliances, however, is practically unquestioned, and some roads are proceeding with the application in a very satisfactory way. It is hoped that in the near future this important appliance will be applied on all locomotives, so that enginemen may have accurate knowledge of the general water level in the boiler under all conditions of service.

Flue Removals

During the year 209 applications were filed for extension of time for the removal of flues, as provided in rule 10. Investigation showed that in 25 of these cases the condition of the locomotives was such that no extension could properly be granted; 22 were in such condition that the full extension requested could not be granted, but an extension for a shorter period within the limits of safety was allowed; 25 extensions were granted after defects disclosed by investigation had been repaired; 38 applications were withdrawn for various reasons; and the remaining 99 were granted for the full period requested.

Headlights

On July 1, 1920, the rules became effective requiring each locomotive used in road service between sunset and sunrise to be equipped with a headlight which will enable the enginemen to see in a clear atmosphere a dark object as large as a man 800 ft. ahead of the locomotive and that yard locomotives have one light on the front and one on the rear that will enable the enginemen to see 300 ft. ahead of the locomotive. These requirements have been given close attention and have been fully complied with. The lighting equipment with which locomotives are now equipped seems to be meeting with the universal approval of officers and employees required to operate and maintain them.

The fact that not a single formal appeal has been taken from the decision of any inspector during the fiscal year demonstrates that wisdom and good judgment have been exercised by the inspectors in the performance of their duties.

Recommendations

On closing the report the following recommendations are made:

That the act of February 17, 1911, be amended so as to provide for additional inspectors to be appointed by the commission as the needs of the service develop, and that adequate salaries may be paid that will obtain and retain in the service a full corps of well-trained, efficient inspectors, and that the amounts directly appropriated be increased to meet the requirements.

That all locomotives not using oil for fuel have a mechanically operated fire door so constructed that it may be operated by pressure of the foot on a pedal or other suitable device located on the floor of the cab or tender at a proper distance from the fire door, so that it may be conveniently operated by the person firing the locomotive.

The old swing-type door, which is largely used at present, is almost invariably blown open in case of firebox accidents and permits the discharging steam and boiling water, with the contents of the firebox, to be blown into the cab of the locomotive, seriously and most frequently scalding and burning the persons therein. Such accidents frequently occur while coal is being put into the firebox, and with the fire door necessarily open, under such circumstances it is impossible for it to be closed. The automatic fire door would remain closed if closed when the accidents occur. If open, it would automatically close the moment the operator's foot was removed from the operating device, thus preventing the direct discharge of the scalding water and fire into the cab of the locomotive with such serious results.

The automatic fire door is not a new and untried device, as there are thousands of them in service, and they are required by law in some states. The automatic fire door is

also of great value in prevention of serious cracks and leaks in firebox sheets by limiting the time the fire doors are open when placing coal on the fire, thus reducing the amount of cold air admitted, which causes loss of temperature and consequent expansion and contraction and the setting up of great strains.

That all locomotives be provided with a bell so arranged and maintained that it may be operated from the engineer's cab by hand and by power.

That cabs of all locomotives not equipped with front door or windows of such size as to permit of easy exit have a suitable stirrup or other step and a horizontal handhold on each side approximately the full length of the cab, which will enable the enginemen to go from the cab to the running board in front of it; handholds and steps or stirrups to be securely fastened with bolts or rivets; the distance between the step and handhold to be not less than 60 in. nor more than 72 in.

That all locomotives where there is a difference between the readings of the gage cocks and water glass of two or more inches under any condition of service be equipped with a suitable water column, to which shall be attached three gage cocks and one water glass, with not less than 6 in., preferably 8 in., clear reading, and one water glass with not less than 6 in., preferably 8 in., clear reading on the left side or back head of the boiler. Investigations have clearly established that gage cocks when screwed directly into the boiler do not correctly register the proper water level over the crown sheet. It is very important that at least two appliances attached separately be employed for this purpose so as to form a double check and so as to have one appliance in case of failure of the other while on the road and away from points where repairs can be made.

Felton Attacks Estimate of "Savings" Under New Working Rules

A PUBLICITY statement emanating from the Railroad Labor Board and containing an estimate of the enormous "savings" which are to ensue from the application of the new working rules for clerks, freight handlers and station employees, was impeached by Samuel M. Felton, president of the Chicago Great Western and chairman of the Western Committee on Public Relations of the Association of Railway Executives, in a statement issued on January 30.

"The press and public recently have been misled by misinformation emanating from the office of the Railroad Labor Board in a matter of such importance that the incident should not be allowed to pass unnoticed," Mr. Felton said.

"On January 28 a statement headed 'From United States Railroad Labor Board' was given to the press regarding an order the Labor Board had issued changing certain rules in the national agreements made by the Railroad Administration under federal control with the Brotherhood of Railroad and Steamship Clerks, Freight Handlers, Express and Station Employees. Referring to the changes in two rules which were made, the statement emanating from the Railroad Labor Board said, 'These two changes in the rules are expected to save the railroads many millions of dollars—any exact estimate being impossible owing to fluctuating business and traffic conditions. Railroad critics of the national agreements in past hearings before the Railroad Labor Board contended that these two rules cost the roads great sums, even hinting at amounts in excess of \$50,000,000, but experts attached to the board say that \$15,000,000 is a conservative estimate.'

"This whole statement regarding estimated savings, although emanating from the Labor Board, was a fabrication.

"First, no witness for the railways in hearings before the Railroad Labor Board ever estimated that the two rules in

question cost the railways \$50,000,000 a year, and therefore no witness for the railways ever intimated that by changing these two rules this amount could be saved.

"Second, the statistical department of the Labor Board itself estimated—not at \$15,000,000—but at \$4,823,524.84 the total saving that could be made by changes in these rules.

"The result was to give a large part of the public the impression that the saving made by these changes in rules was ten times as great as was estimated by the board's own statistical department. Furthermore, some railways which have carefully checked their figures are unable to find that the changes in rules in question will enable them to make any savings that are more than negligible.

"The press and the public are entitled to know the facts about this matter, because it is wholly unjust to give the public a grossly exaggerated idea of the reductions in railway labor costs which the Labor Board is making by its revision of the working rules."

No comment has been made at the Labor Board. Several members are not in Chicago and it is understood that no further action will be taken until the full board can assemble.

Rules for Recovery of Excess Income

THE INTERSTATE COMMERCE COMMISSION on January 28 made public an order dated January 16 prescribing regulations for the ascertainment and collection of the amounts due the government under the so-called "recapture" provisions of the Transportation Act in the case of roads earning a net railway operating income in excess of 6 per cent. The commission has decided that the first computation to be made of the excess earnings shall be made for that part of the year 1920 during which the roads were operated without guaranty from the government and that thereafter the computation shall be made on the basis of calendar years. For that part of 1920 the roads are required to report by February 1. There had been some speculation as to whether the commission would use for this purpose the first twelve months after the expiration of the guaranty, which would be the year beginning September 30, 1920, for most of the roads. The selection of the period makes some difference because during the last four months of 1920 the increased rates were in effect and the volume of traffic was heavy until December. For September the Class I roads earned at the annual rate of 4.52 per cent, for October 4.84 per cent, for November 3.39 per cent, and for December 0.29 per cent, whereas for the year ending August 30, 1921, the net operating income represented a return of only about 2.9 per cent. The difference, however, is comparatively slight for the roads as a whole, although wide variations may exist as to different roads, but by segregating the odd months of 1920 it is made possible to proceed hereafter on the basis of the calendar year, which is also the railroad fiscal year.

The order provides in part as follows:

It is ordered:

1. That the years or parts of years for which net railway operating income and the return represented by such income upon the aggregate value of railway property held for and used in the service of transportation are to be computed shall be the years or parts of years ending on December 31, respectively. In the case of any carrier which accepted the provisions of section 209 of the Transportation Act, 1920, the first period for which such computations are to be made shall be September 1, 1920, to December 31, 1920, both inclusive. In the case of carriers which did not accept the provisions of said section 209 of the Transportation Act, 1920, the first period for which such computations are to be made shall be March 1, 1920, to December 31, 1920, both inclusive.

2. That the excess income for the portions of a year ended December 31, 1920, shall be preliminarily fixed as the income in excess of such proportions of 6 per cent on the value of the railway property held for and used in the service of transportation as the net railway operating income for the months of September to

December, both inclusive, or for the months of March to December, both inclusive, as the case may be, in the three years ended June 30, 1917, bears to the total net railway operating income for the same three years.

3. The aggregate value of the railway property of the reporting carrier or carriers shall be based preliminarily, in the case of carriers which made such returns directly or indirectly, upon the amount reported or used by such carrier or carriers as the aggregate value of railway property held for and used by them in the service of transportation in the proceeding entitled "in the matter of the applications of carriers in official, southern, and western classification territories for authority to increase rates," Docket No. Ex Parte 74, with adjustments for—

- (a) New lines, extensions and additions, and betterments;
- (b) Retirements;

(c) Amounts of property for which permission to retain earnings under paragraph (18) of section 15a of the Interstate Commerce Act has been granted; and

- (d) Other increases or decreases,

properly affecting the aggregate value of the railway property of such carriers held for and used in the service of transportation, claimed or reported by the carrier and supported by detailed explanations. The value of such railway property, as reported, will be corrected and the actual value will be determined in the manner provided in paragraph (4) of section 15a of the Interstate Commerce Act, and corresponding adjustments in amounts recoverable by and payable to the commission will be effected. In the case of those carriers which did not directly or indirectly make returns in connection with Ex Parte 74, the investment in road and equipment as of December 31, 1919, with proper adjustments as hereinabove indicated will be used for preliminary computations, and these preliminary computations will be similarly corrected after the determination of actual values in accordance with paragraph (4) of section 15a of the Interstate Commerce Act.

4. The establishment of preliminary bases for prorating the return of 6 per cent, or ascertaining property values to which the rate is applicable, does not preclude any carrier from using such other bases as it considers more equitable and in accord with the facts; such other bases, however, must be fully and properly supported.

It is further ordered, That pursuant to the foregoing rules and regulations for the determination and recovery of the excess income payable under section 15a of the Interstate Commerce Act each and every carrier by railroad, or partly by railroad and partly by water, within the continental United States, subject to the provisions of the Interstate Commerce Act, excluding—

- (a) Sleeping-car companies and express companies;

(b) Street or suburban electric railways unless operated as a part of a general steam railroad system of transportation;

(c) Interurban electric railways unless operated as a part of a general steam railroad system of transportation or engaged in the general transportation of freight; and

(d) Any belt-line railroad, terminal switching railroad, or other terminal facility, owned exclusively and maintained, operated, and controlled by any state or political subdivision thereof, shall on or before February 1, 1922, report to the secretary of the Interstate Commerce Commission, Washington, D. C., the following matters:

1. The amount by which its net railway operating income for the period ended December 31, 1920, was in excess of that percentage of the value of railway property held for and used by it in the service of transportation, established by the foregoing rules, with explanation and details of the manner in which such excess income was computed, or, in the event there was no such excess railway operating income, that fact, with corresponding calculations and details in support of the return.

2. In cases where excess net railway operating income is reported, a statement of the title of the fund account in which one-half of such excess was placed, when such reserve fund was established, the amount placed in that fund, and how the assets in that fund are represented or held.

3. The amount of the remaining one-half of the excess income as preliminarily computed paid to the Interstate Commerce Commission and when and how such amount was paid. If unpaid the amount should be paid by remittance to or draft in favor of the Interstate Commerce Commission, transmitted to George B. McGinty, secretary of the Interstate Commerce Commission, Washington, D. C.

4. The value of the railway property of the reporting carrier or carriers with a statement in detail of the manner in which such value is arrived at and a full explanation as to the method in which the values of properties of a group of carriers have been aggregated in cases where property values and income are computed for a system pursuant to the provisions of paragraph (6) of section 15a of the Interstate Commerce Act. In such cases a full explanation should be given of the reasons why the group of carriers used are treated as under common control, management and operation.

Electric Traction for Steam Railroads

Tendencies of Practice in the United States—Limitations and Advantages of Equipment Used

A REPORT on heavy electric traction, which deals particularly with results obtained in the United States and Canada, has been prepared for the ninth International Congress of the International Railway Association by George Gibbs, chief engineer of traction, Long Island. The report deals with the subject from the standpoint of a railway man who has been in contact with the technical details, but who is writing for those not specially versed in them. Mr. Gibbs has dealt with the subject in an unusually thorough fashion and has made a number of pertinent statements well worth the attention of anyone interested in heavy electric traction. The outstanding parts of the report follow:

In 1910 electric traction was in service in the United States and Canada on 11 different railroads, including a total of 873 miles of track. At the end of the year 1920 the number of roads had increased to 19 and the miles of track to 3370.

This indicates considerable growth in the use of electric traction during a ten-year period, but the greater part is due to projects determined upon prior to the war. It may be said that for the past six years electric traction has been in the condition of arrested development—a situation which unfortunately, applies in some measure to its technical as well as to its physical aspect.

Advantages Secured

The reasons for which electric operation has been adopted have been so often stated that it is unnecessary to enlarge upon them at length, but it will be useful to note that the trend of development of electric traction in America has primarily been to secure better operating conditions, thus:

(1) For terminals, in large cities where tunnel approaches are generally involved (or in long tunnels elsewhere) and usually where steam locomotives are objectionable. Also, because switching and idle power movements can be reduced by using motor-car trains instead of locomotives for haulage. These advantages may greatly increase the capacity of a terminal or a tunnel.

(2) On heavy gradients (sometimes in connection with hazardous steam operated tunnels) where the running speeds with steam traction are low; to increase the capacity of the line and effect substantial operating savings.

(3) For short-haul (suburban) passenger services, to increase track capacity because of quicker schedules in services having many stops, and incidentally, to foster business, due to the attractiveness of electric operation from the standpoint of the traveller.

(4) In certain cases for long-haul services; for the main purpose of securing operating economy in districts where coal is expensive and where cheap hydro-electric power can be obtained.

In other words, the great majority of the installations have been undertaken to facilitate operation over some particularly difficult or congested portion of a railway. In all cases the direct operating savings plus the indirect advantages are sufficient to justify the adoption of electric haulage.

Locomotives

No approximation, even, to a standard electric locomotive design has been arrived at. The problems still ahead for solution are both electrical and mechanical; the former await the selection of a system and the development and perfection of apparatus, the latter relate to the working out of methods

of transmitting power from the motors to the driving wheels and securing the best type of locomotive structure for perfect tracking properties. It may be said, however, that the serious problems awaiting solution at present are mechanical, rather than electrical; motors and control of both the D. C. and the A. C. types work well; of the mechanical features we know little of a conclusive nature—experience has been too limited with electric locomotives.

Motors direct-g geared to axles are suitable only for slow-speed locomotives, such as those for switching or freight services. For the heaviest requirements of freight haulage, however, it is doubtful if this type is the best, because it is difficult to apply the drive to produce a stable wheel-grouping; also, because the heavy motor masses have a very low center of gravity and the un-spring-borne weights are very considerable. Large motors, furthermore, produce severe side shocks in curving and with track in poor surface, and hub-liner wear is apt to be great.

Locomotives equipped with quill driven geared motors, should produce better results in the above respects, but only in degree. A quill drive has not been entirely satisfactory for very heavy service, because mechanically it is difficult to find space for conservatively designed springs, and if the quill is not maintained normally concentric with the axle severe bending stresses are set up in the springs at each revolution of the wheels, whereas a helical spring should be subjected to torsional stresses only. Therefore, quill drive appears to have a distinct limitation in successful application to electric locomotives.

The type of locomotive which has the motor armature mounted rigidly on the axle, requires many axles for heavy traction, and a locomotive wheel arrangement which is somewhat complicated and unfavorable for tracking. It has been used for high speed work, however, in cases where track construction is of the heaviest character and its maintenance is of the highest order; its field is limited to high speed service because of low output of the motors at low speeds.

Gearless motors flexibly suspended around the axles, may be used for high speed passenger locomotives with either D. C. or A. C. traction, but it is not an economical type as regards first cost of motors and it has a low center of gravity of the running gear. It is furthermore subject to the difficulty mentioned above in securing durable spring-driving mechanism.

Locomotives having gearless motors and rod drive are suitable for high-speed passenger work with both D. C. and A. C. motors, and this type of drive allows the most desirable wheel arrangement and weight distribution for perfect tracking qualities of the locomotive. The motors, however, are very large and costly because of their low speed and their limited capacity; the type is not suitable for low-speed service.

The type of locomotive having geared motors and a rod drive, offers the most flexible and promising solution for passenger and freight locomotive construction, because of the allowable variation in wheel arrangement and in motor mounting and capacity; it permits most perfect tracking qualities for a great variety of designs and running speeds. It is suitable both for D. C. and A. C. traction systems.

Side rods connecting the various driving wheels are desirable in all types to prevent slipping of independent axles and to thus obtain maximum traction, especially with D. C. motors having series-multiple control.

A combination of driving and carrying axles is desirable, also an unsymmetrical wheel distribution, to assist in proper tracking. This point was clearly brought out by the experiments made by the Pennsylvania Railroad in 1909 when it took up the design of its electric locomotives for use in the New York Terminal (*Railway Age*, November 19 and November 26, 1921).

Motor Cars

American practice tends to a motor car which will have the largest passenger capacity consistent with the economical limits to the application of sufficient motive power to the car. Best economy in equipment and maintenance cost is obtained by using two motors only and mounting them on one truck. A modern car of steel construction and of about 70 feet length over-all will satisfy these conditions. It will weigh, without electric equipment, but including full seated passenger load, about 50 tons (100,000 lb.). Two motors will give a capacity of about 500 hp. total for the car, and with this capacity the most exacting local service schedules can be performed, if all cars in the train are equipped with motors.

Existing electrifications for such service are now conducted by the 650-volt D. C. system, by the high tension single-phase A. C. system, and by the 1,500-volt D. C. system with two motors per car; the high tension (3,000 volts) direct current system, requires four motors per car, because of the necessity of limiting the voltage in each motor to 1,500, and to obtain series-parallel control of the motors. Motor-car equipments for the 3,000-volt system have not yet been under practical trial on any electrified steam railway in America.

Current Collection

Third rail conductors have sufficient current-carrying capacity for all traction conditions even with low voltages, but it is believed that the third rail working conductor systems have become obsolete for general railway electrification in America.

The overhead working conductor systems will become standard in the future for general electrification, and the two important electric systems, namely, the alternating current and the high tension direct current must be adapted for all requirements with this form of conductor.

At the present state of the art, the 11,000-volt alternating current system has been demonstrated to be well adapted for current collection from an overhead conductor under all conditions met with on American railways; it is reliable and economical in upkeep.

The success of the 3,000-volt direct-current system, as regards current collection, seems less certain and remains to be demonstrated for some of the difficult conditions that must be met; difficult current collection is undeniably a handicap to the success of this particular electric system and will weigh heavily against its adoption as a standard unless some overwhelming advantages of another nature are possible in the way of future perfection of direct current apparatus which will outweigh the present and probable future advantages of the alternating current system.

Substations

The alternating current system substations contain transformers which alter the voltage of the current only, and the switching and safety apparatus to control it. Substations of this kind are relatively simple, as they contain no moving apparatus and require only occasional inspection and attention. Direct current systems require transformers, switching apparatus for the high tension current and rotary converting apparatus to change it into direct current, also, low-tension switching and safety appliances. This combination of apparatus is relatively costly and complicated and requires attendants at all times. It has been proposed to do away

with constant attendance by installing automatic means, controlled by the load conditions, to cut the apparatus in and out of circuit. A description is entirely too technical for insertion in a report of this kind but it may be said that automatic substations have been employed for interurban traction work and are in process of development. It is too early yet to pass upon the results obtained or to assign a definite field for their use. The control mechanism is necessarily complicated, delicate and expensive and probably has serious limitations as regards its use for important traction installations on steam railways. It is possible they may be used in these cases, but as an adjunct only, to assist and simplify the work of the regular attendants in emergencies.

Standardization and Power Supply

Until recently, in America, there has been no concerted action looking to the standardization of the important features of any system, much less fixing upon any one system as a standard for all work. But at the present time this question has been brought very much to the fore.

There exists no sufficient and comparable operating data covering all kinds of traffic from which to conclude as to the relative advantages and disadvantages of the two systems most generally advocated today, i. e., the "alternating" and the "direct" current.

It is too early in the state of the art to determine and fix the features of any one system to the extent required for purpose of useful standardization without restricting the future and desirable development of the system selected. For instance, if the high-tension direct current system should be decided upon as standard, no practical advantage would result unless the voltage should be fixed; no one knows however at present, what voltage should be adopted as a finality for this system and a change in a voltage once established is a serious matter in a direct current system, as it would make obsolete practically all features of an installation in use.

Neither system, as now developed and applied to a typical general case, differs greatly in first and operating costs.

There is danger in endeavoring now to arrive at one standard system of being unduly influenced in favor of one which is at the time enjoying the greatest use, and which may have been the only one available at the time of installation. An example of a system which operates well, but which is conceded to be already out of date for certain kinds of railway usage in America, is the 600-volt direct current third rail system. Main line railroads here are no longer seriously considering the third rail in any form for important main line electrification work. This system is, however, the one most perfectly developed as all features and details have been thoroughly tried out and weak points eliminated. But it is the realization of its limitations which has caused inventors to work to higher voltages and by so doing to get away from the third rail and back to an overhead working conductor system. Assuming that the above statements are well founded, and the writer believes from his experience that they are true, it would appear that the development of electric systems is proceeding along normal and logical lines at present and that there is no reason to force a conclusion at this time by hasty action in any direction. However, there is some reason to feel that this orderly consideration of the subject will not continue because of the views which are being generally expressed by those who are not engaged in operating the railways but are connected with other industries. To be explicit, because this is necessary clearly to explain the situation of the two great electrical manufacturing companies in America, one is committed at present to the advocacy of the direct current system, and does not offer train equipment for the alternating current system; the other company has been responsible for the development of the alternating current system and advocates its use, but will furnish direct current apparatus if the customer prefers.

The telegraph and the telephone companies are unfriendly to alternating current traction because they believe this system may cause them expense or difficulty to prevent inductive effects from the traction current. The commercial central power companies appear to consider it to their interest to advocate the use of direct current traction as the easiest system for them to supply power to, and they are now beginning to plan for the future railway power business. In explanation of this attitude these power companies find it advantageous for their commercial lighting and power loads to use 60-cycle current; this frequency is suitable for direct current traction, but cannot be used for alternating current traction in the present state of the art, without changing the frequency locally, which means added expense, hence they are opposed to the latter system.

While the above interests have decided views and are expressing them, the railways who must use the apparatus have not considered it necessary actively to advocate any particular electric system; they are trying out what they have got and are awaiting further information. Electrical engi-

neers, competent to pass upon the operating as well as the technical aspects of the question, are not very numerous nor very influential, as compared with the powerful interests which are taking a decided stand upon the subject, and engineers are, furthermore, divided in their views upon the question.

The writer wishes it to be understood that he does not wish to advocate any one system to the exclusion of another, and favors a further trial of both the alternating and the high tension direct current systems. However, it will be apparent from what he has said in this report that he considers high tension alternating current to have at present the greater number of demonstrated advantages for general railway use and to hold out the most promise for the future. Therefore, if it is thought necessary to standardize now, it would seem to him illogical to select the high voltage direct current system which has not yet been applied to all railway operating conditions, and which appears difficult of application to some, and to discard a system which has been so applied and is operating economically and well in all cases.

How Federal Valuation of the Roads May be Used*

A Résumé of the Applications Suggested by the Transportation Act and Other Regulatory Activities

By T. P. Artaud

Executive Assistant, Bureau of Valuation, Interstate Commerce Commission

THE USES of railway valuation and the purpose to which it may be put may be treated largely under the heads of:

(1) Those uses which are written into the Transportation act of 1920, and (2) general purposes for which valuation is available but which have not been made obligatory under the law.

Under section 15-A of the *Transportation act of 1920*, the Interstate Commerce Commission is required to prescribe just and reasonable rates under which the carriers as a whole, or as a whole in each rate group or territory, as the commission may designate, may earn an aggregate net railway operating income equal to a fair return upon the aggregate value of the railway property used within that rate group in the service of transportation. It is not to be argued that the valuation work now being conducted and approaching completion under the Interstate Commerce Commission should be the sole and only measure of value as the term is used in the preceding paragraph. But it is not to be disputed that this valuation is one of the most important, if not the most important single factor in determining that value. It is perhaps the only tangible, definite, and unmistakable fact which is available to anybody who is charged with determining the "fair value" of railway properties, but, as has been repeatedly pointed out by the courts, the physical value of the properties must be modified by other factors and considered in connection with them in fixing the sum of "fair value."

(a) Under the transportation act, the Interstate Commerce Commission is required to designate the limits of rate groups and to determine the aggregate value of railway properties within such groups. Having determined that value as a whole, it shall prescribe rates which will yield as nearly as may be a reasonable return on the value of the properties. If the rate structure is too low, there will immediately arise the question of the confiscation of the property devoted to public service. Therefore, it follows that the value must be established definitely and on legal grounds. The value of each rate group having been determined, it becomes possible to test the rate level as between the different groups and to modify or adjust such rate levels in accordance with the needs of the country as a whole. The val-

uation work shows the property devoted to common carrier service separately for each state and for the railroad system as a whole, so that it becomes possible to apportion the properties used in interstate, as distinguished from intrastate service, and to fix rates for these two different classes of traffic.

(b) Under the same section (15-A) the commission is required to determine the value of each individual railroad property and to ascertain the net railway operating income under the rates prescribed in the preceding paragraph. If this return is in excess of the figure set by the commission as reasonable, one-half of such excess is impounded by the carrier in a reserve fund, the uses of which are described in the act; the remaining one-half is to be recaptured by the commission and added to the contingent fund, from which loans shall be made to railroads in accordance with the provisions of this act. It is therefore evident that the valuation work conducted under section 19-A of the act is essential to the fulfillment of this provision.

(c) Under section 5, paragraph 4, the commission is required to prepare and adopt a plan for the consolidation of the railway properties in the United States into a limited number of systems, the par value of the bonds, together with the capital stock outstanding, of which is not to exceed the value of the consolidated properties as determined by the commission under section 19-A, the so-called valuation act. In this paragraph it is expressly provided that the commission shall proceed immediately to the ascertainment of such value of the properties involved in any proposed consolidation. The valuation so fixed shall also form the basis for the rental of property by one carrier to another and the basis of payment for joint use of facilities.

(d) Exclusive of the consolidation just referred to, the total value of securities issued by a corporation shall not exceed the value of the properties as determined by the commission, and no carrier may put out a security issue without the approval of the commission having been first obtained; thus security issues, both existing and proposed, rest directly upon the value as determined under section 19-A of the act.

(e) Carriers are authorized to set up, with the approval of the commission, reserve and depreciation funds, and the additions which may be made in any year are based upon percentages of the value as found by the Interstate Commerce Commission in accordance with section 19-A, the valuation act. Both the

*From a statement presented to the House Committee on Appropriations on December 21, 1921.

amount and the uses to which such reserve and depreciation funds may be devoted are expressly set forth in the transportation act.

(f) The commission is empowered under the act to make loans to carriers out of the revolving or contingent fund set up as heretofore mentioned and to lease to carriers equipment purchased out of that fund. It is implied in the act that the adequacy of the security for such loans shall be tested by the value of the properties together with other considerations relating to the carrier applying for the loan.

Other Uses

The foregoing are some of the essential uses in the transportation act to which the valuation authorized in section 19-A is required to be put. In addition to these, there are certain uses to which it may be put, not at present written into law.

(a) For 25 years or more prior to the passage of the valuation act, the Interstate Commerce Commission consistently called to the attention of Congress the necessity for a valuation of railroad properties in order that a check of the balance sheets of carriers might be made and the system of accounting for all roads might be standardized.

(b) Scarcely less important than the regulatory power of the commission itself is the effect on the investing public of comprehensive knowledge of the financial condition of the railroads. Railroad credit for many years has been impaired to such an extent that it is impossible for carriers to finance their operations on an adequate scale or at reasonable interest charges. Everything which will tend to restore confidence is essential, and a complete inventory and exposition of the assets, financial condition, and operating revenues and expenses is best calculated to produce this result. The impression is broadcast that many railroad security issues are to a greater or less extent "watered," and whether or not this impression be well founded, it is necessary to determine the fact.

(c) Under the Clayton Act, the commission is required to approve in advance of the letting of the contract expenditures amounting to over \$50,000 per annum. There has been gathered by the Bureau of Valuation information relating to every conceivable form of construction or purchase, and this should be of incalculable benefit in checking the reasonableness of prices and the character of work to be done under such contracts which the commission is required to approve or deny. It should form the basis for estimates or at least a criterion for checking every new contract or proposed extension.

(d) Any discussion of the possibilities of Government acquisition, either outright or in any modified form, can not be intelligently carried forward, nor can any proposed plan be considered, without knowledge of the value of the properties.

(e) The valuation work now being performed by the commission should, and doubtless will, when completed, be largely used in connection with the taxation of railroad properties. Closely connected with the question of reasonable railway rates

stands the question of reasonable railway taxation. Some few states tax railways on the basis of earnings, but there is no tendency for this practice to become general. The result is that railway taxation fails to show that degree of uniformity which one might reasonably expect in view of the general uniformity of method. Since railway taxes amount to between 4 and 5 per cent of the aggregate of the operating expenses, and since on this account a reasonable charge on interstate traffic may be affected by the manner in which the states administer their taxing laws, it may well be claimed that the valuation of railway properties becomes a matter of Federal concern. As the valuation of each carrier is determined by the commission this figure is served upon the states in which the carrier is located, together with the underlying data showing the apportionment of the property between the several states. There thus becomes available to each state not only the appraisal of the properties within its limits, but also the figures of value for the property as a whole. Each state therefore has at its hand full information upon which it may proceed to fix the taxes of such of the property as lies within its borders. Whether it makes use of this information or not, it is a matter of the highest concern to the Nation as a whole that the methods adopted within the several states be uniform.

(f) One of the major features in the accounting report underlying the valuation published by the commission is a financial and corporate history of the carrier. This consists of a full and accurate statement of facts and without any inference being drawn therefrom. Its utility is at once apparent. If much or any of the unsound financing, against which so much popular criticism has been directed, has been practiced, that fact will appear; if not, the record will show for itself. If the former, an exposition of the pertinent facts will do much toward correcting the situation, both by throwing the light of publicity on the subject and by pointing the way toward corrective and preventive legislation. If the latter, a clearing away of suspicion will greatly benefit the railroads themselves, the investing public, and the credit structure of the entire country.

There is just one thing further I should like to say. There are a great many extravagant statements made about over-capitalization and other irregularities. I am firmly convinced that this valuation will throw more true light upon and do more to restore the financial stability of the railroads than anything I know, and I think that the public will have a much clearer conception of the railroad problem, and expenditures will be more clearly explained and scrutinized than has heretofore been possible. Congress will have available all necessary facts on which to base further legislation. I know from long experience that if this valuation had been started years ago, it would have prevented such disastrous events as those on the New Haven and Frisco.



Two Types of Container Cars On the Left the New York Central Car; on the Right, Design Developed by the River and Rail Transportation Company

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended January 21 was 738,275, according to the weekly report of the Car Service Division of the American Railway Association. This not only represents an increase over the week before but an increase of nearly 30,000

Freight Transportation de Luxe

THE DURANT Motors Corporation, New York city, replying to our inquiry concerning recent large shipments of automobiles, and correcting an error in a news item printed in the *Railway Age* of January 14, gives the following notes of three train-loads sent in December to California. Availing themselves of the advertising value of these

REVENUE FREIGHT LOADED—WEEK ENDED SATURDAY, JANUARY 14, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded			
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920	
Eastern	1922	8,350	3,534	39,774	1,808	4,987	817	56,694	57,941	173,905	.....	.....
	1921	6,314	4,396	47,650	1,643	7,597	1,347	42,972	51,880	.....	163,799	201,979
	1920	2,514	3,618	42,864	3,428	2,624	1,248	40,634	42,444	139,374	.....	.....
Allegheny	1922	1,964	4,239	53,555	5,805	2,945	2,998	34,546	43,955	.....	150,007	170,583
	1921	244	75	20,863	1,197	1,124	23	5,168	2,060	30,353	.....	.....
	1920	135	113	20,957	515	1,039	69	3,910	2,407	.....	29,145	34,263
Peachontas	1922	4,268	2,598	21,959	500	14,905	474	35,148	29,820	109,672	.....	.....
	1921	3,900	2,094	26,554	650	12,260	1,866	31,204	30,272	.....	108,800	131,219
	1920	15,743	11,162	9,664	986	14,201	353	23,539	26,182	101,830	.....	.....
Northwestern	1922	13,617	10,157	6,897	1,360	12,291	991	22,885	28,063	.....	56,261	118,745
	1921	13,891	12,707	20,073	229	4,415	851	28,858	29,622	110,646	.....	.....
	1920	14,223	12,176	21,705	300	3,249	1,892	27,617	30,178	.....	111,340	124,975
Southern	1922	5,177	2,471	4,048	110	6,234	686	15,504	20,867	55,097	.....	.....
	1921	5,332	1,990	5,478	90	5,316	516	14,897	22,967	.....	56,503	60,760
	1920	50,187	36,165	159,245	7,258	48,490	4,451	205,545	209,536	720,877	.....	.....
Southwestern	1922	5,485	35,165	182,796	10,363	44,614	9,679	178,031	209,722	.....	715,855	.....
	1920	40,820	38,698	207,861	10,645	59,014	10,745	145,494	327,247	.....	.....	840,524
Week ended:													
January 14	1922	50,187	36,165	159,245	7,258	48,490	4,451	205,545	209,536	720,877	715,855	840,524	
January 7	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,493	605,992	697,641	830,673	
December 31	1921	30,075	24,567	105,662	6,424	31,406	4,883	170,061	157,956	531,034	602,368	612,741	
December 24	1921	36,793	22,958	135,852	7,140	45,518	5,489	210,929	201,248	665,927	648,406	684,784	
December 17	1921	47,383	33,861	134,842	7,145	48,690	5,535	221,163	228,384	727,003	803,271	806,734	

over the corresponding week of 1921, when the total was 708,658. For 1920 the total was 804,866. Increases as compared with the corresponding week of last year were shown in the loading of grain and grain products, forest

full train loads the shippers arranged to have the movements of the trains so timed as to bring them to certain cities at the most suitable hours for an effective display to the public while the train was being held for inspection or for change

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY JANUARY 21, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920	This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	10,035	3,011	37,337	1,707	5,542	687	58,969	61,486	179,074	.....	.....	196,914	.....	.....
	1921	6,579	3,961	45,223	1,443	3,778	890	43,230	51,506	160,210	190,375	.....	186,917	205,158	.....
	1920	2,374	4,184	46,823	3,613	2,763	916	43,610	43,796	147,273	.....	97,859	103,229	116,082	.....
Allegheny	1922	2,574	4,184	47,354	5,680	3,198	2,473	35,266	43,710	.....	144,237	162,168	.....	.....	.....
	1921	250	60	21,383	185	1,082	71	5,230	2,222	30,983	.....	11,575	.....	.....	.....
	1920	181	118	19,130	440	1,097	100	4,624	1,731	.....	27,421	31,046	.....	12,854	17,821
Peachontas	1922	4,546	2,187	23,061	488	15,734	588	36,338	30,539	113,981	.....	60,666	.....	.....	.....
	1921	3,960	2,551	23,933	541	13,207	1,453	33,017	32,878	.....	111,010	128,514	.....	60,204	78,249
	1920	14,823	9,792	8,440	900	13,941	477	24,175	26,428	99,976	.....	41,645	.....	.....	.....
Northwestern	1922	13,925	10,217	6,587	1,488	13,506	950	22,741	26,406	.....	95,820	108,257	.....	44,314	52,973
	1921	14,536	12,512	21,321	226	4,788	767	30,123	29,461	112,734	.....	43,065	.....	.....	.....
	1920	14,879	12,736	20,942	282	3,639	1,896	27,609	29,618	.....	111,601	123,848	.....	43,403	67,117
Central Western	1922	5,168	2,470	4,426	148	6,478	763	15,197	20,104	54,754	.....	41,727	.....	.....	.....
	1921	5,209	2,151	5,010	110	6,108	433	13,082	24,256	.....	58,359	60,658	.....	44,096	51,600
	1920	52,181	31,926	164,091	7,267	50,328	4,269	213,642	214,536	738,275	708,658	804,866	493,451	495,017	589,000
Southwestern	1922	5,177	35,165	186,179	9,984	48,131	7,905	181,569	210,065	.....	708,658	.....	.....	495,017	.....
	1921	3,207	35,118	168,179	10,367	58,720	10,795	148,466	313,844	.....	804,866	.....	.....	589,000	.....
	1920	4,111	36,397	189,066	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	5,074	.....	.....	.....	2,197	.....	32,073	4,471	29,617	.....	.....	.....	.....	.....
Decrease compared	1920	.....	3,757	4,088	2,717	.....	3,636	.....	.....	.....	.....	.....	1,566	.....	.....
Increase compared	1920	14,970	.....	.....	.....	.....	.....	65,176	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	4,436	24,975	3,100	8,392	6,526	.....	99,308	66,591	.....	.....	95,549	.....	.....
January 21	1922	52,181	31,961	164,091	7,267	50,328	4,269	213,642	214,536	738,275	708,658	804,866	493,451	495,017	589,000
January 14	1922	50,187	36,165	159,245	7,258	48,490	4,451	205,545	209,536	720,877	715,855	840,524	458,674	493,696	627,293
January 7	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,493	605,992	697,641	830,673	393,300	498,921	596,885
December 31	1921	30,075	24,567	105,662	6,424	31,406	4,883	170,061	157,956	531,034	602,368	745,446	380,858	457,732	591,437
December 24	1921	36,793	22,958	135,852	7,140	45,518	5,489	210,929	201,248	665,927	648,406	684,784	455,526	522,421	588,644

products, merchandise, and miscellaneous freight, the largest increase being shown by the l.c.l. merchandise, while there were decreases in livestock, coal, coke and ore.

Summaries for the weeks of January 14 and 21 are given in accompanying tables. The freight car surplus for the period January 15 to 22 was 396,192, a reduction of 43,000 as compared with the week before. Of the total, 159,109 were box cars, and 183,999 were coal cars.

of locomotives. This, in part, explains the varied character of the itineraries. The shippers' letter says:

"We have thus far made no shipments to the Pacific Coast through Canada except one trainload of 30 freight cars (150 Durant touring cars) which went over the Grand Trunk from Buffalo through Toronto, Ont., and thence to Sarnia, Ont. This was the shipment of December 14. The three shipments were routed as outlined on following page.

"December 5, solid trainload of 150 Durant touring cars in 30 freight cars, for Oakland, California; sent via Pennsylvania to Toledo; Michigan Central to Chicago; Chicago & Northwestern to Council Bluffs; Union Pacific to Ogden, and Southern Pacific to Oakland.

"December 14, second shipment, 160 Durant cars in 32 freight cars, via Pennsylvania to Buffalo; Grand Trunk to Chicago by way of Toronto, Port Huron and Lansing; Chicago, Milwaukee & St. Paul to Kansas City and thence over

along with the train to the Coast, the transfer from the Pennsylvania Lines to the St. Paul road was made at the Union Passenger station. Here the seals of the cars were broken and the shipment inspected.

"These trains were made up at the Greenville yards, south of Jersey City, and this last one was entered in the train



Photo by Underwood & Underwood

One Hundred Cars of Automobiles Starting a Transcontinental Trip on the Pennsylvania

the Chicago, Rock Island & Pacific, the El Paso & Southwestern, and the Southern Pacific to Oakland.

"December 30, the largest single shipment of any one commodity ever carried across the continent; 500 Durant touring cars carried in 100 uniform steel freight cars of the Pennsylvania. It was routed via Pennsylvania to Chicago and thence over the Chicago, Milwaukee & St. Paul, Union Pacific and Southern Pacific to San Francisco. This train was hauled by two large locomotives. To make the grades through Pennsylvania additional engines were used and the train was divided. At Chicago where officers' cars were attached to carry representatives of the three western railroads



On the Union Pacific

orders entirely across the continent as 'The Durant Prosperity Special.' W. J. Bailey, traffic manager for Durant Motor Company of New York, accompanied the train from New York to Omaha."

At Omaha it was decided to placard the train more effectively and a marker was displayed on the front of the locomotive, as shown in the illustration. It is assumed that after seeing the 100 cars behind the engine no one was left in doubt as to the appropriateness of the name.



On the Canadian Pacific

Division Accounting—An Operating Viewpoint

The Centralized and Decentralized Plans Contrasted—Methods Worked Out on the New Haven

By J. E. Slater

Special Assistant to General Manager, N. Y., N. H. & H.

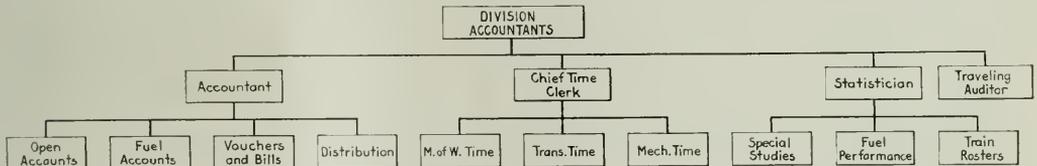
PART I

THE ACCOUNTING of expenses by operating divisions was instituted on the New Haven about five years ago, several years after it had been developed successfully on a number of other railroads. Since that time the original plan has been dropped and another installed. The experiences with the two plans and the reasons for the failure of one and the success of the other, may throw some light on this problem as it exists today.

In the first place it should be stated that this article is written *entirely from the viewpoint of the operating department*. It does not take into consideration the value of division accounting to the accounting department or the merits of any plan of division accounting as seen through the eyes

necessary for the compilation of the various reports are in the one office, and all of the work, with a possible exception of making out the payrolls, is done in this central accounting bureau.

The second plan may be called the decentralized plan. Under this organization, all of the work of compiling the expenses for a designated division is done by a bureau stationed at division headquarters. Any charges properly made against that division must pass through the division accountant's office and no charges from any other source are permitted in the account for that division. The organization is sometimes under the jurisdiction of the local operating officers and sometimes under the accounting department,



Accountant, Chief Time Clerk and Statistician represent actual positions in each office. The chart also indicates the division of the work in the three bureaus.

Organization of Local Division Accounting Office

of accounting officers. The operating officer is interested in accounts as indices of operating efficiency. He demands a scheme of accounting which provides currently accurate statistics of performance and cost, subdivided in such a manner that individual subordinates can be judged on their individual performances. To the extent that division accounting meets these requirements better than other plans, it is of value.

In 1916, the New Haven had relatively few divisional statistics of performance and cost. The cost data available related solely to payrolls. To obtain a complete statement of the expenditures made on any one division it was necessary to obtain information from five or six sources, some of these being on the divisions, others at the general accounting offices. In order to correct this situation and provide detailed indices of divisional performance and cost, divisional accounting was established.

Before deciding upon the plan and method, a study was made of the various systems already in effect. This study developed that there were two general plans radically different with respect to organization.

The Centralized Plan and Decentralized Plans

The first of these may be designated as the centralized plan. Under this plan, the entire division accounting organization is concentrated in one office, usually at headquarters in the office of the auditor of disbursements. The allocations to divisions are made by analysis of payrolls, open accounts, vouchers, bills, etc., and such other supplementary data as may be requested from time clerks, material clerks and others located at division headquarters. All of the data

but in either case the essential element of the scheme, namely, a local organization on each division, is retained.

The centralized plan was adopted by the New Haven in 1916. The reasons at that time were:

- (1) The complicated structure of divisional lines which rendered extremely difficult allocation of expenses to the actual operation on each division.
- (2) The greater facility of supervising compilation of the large amount of necessary data.
- (3) The greater ease of standardizing methods.
- (4) The fact that fewer changes in accounting methods would be necessary at the source.
- (5) The lower cost.

New Haven Divisions Not Well

Defined Operating Units

It will be noted that only the first of these reasons directly concerns the operating department. The others have to do solely with accounting department organization and administration. The first reason is, however, a very important one. The New Haven differs from most lines on which division accounting has been established in that its divisions are not well defined operating units. Each division is of necessity made up of a network of main line and branches. The result is a short mileage along any one route. Engines and crews are not confined to the division to which assigned. For example, passenger train crew runs from New York to Boston cover portions of five divisions and engine crew runs from New Haven to Boston cover portions of four divisions. The train service payrolls of one division, therefore, cover service on several others and fuel loaded on tenders at one division enginehouse is consumed on parts

of other divisions. The allocation of these expenses, therefore, to the division on which the expense is actually incurred is obviously more easy in a central bureau where all the data covering the runs are available.

Division accounting under the centralized plan was continued until the early part of 1918 when it was discontinued as a war economy. The experience of these eighteen months, however, demonstrated that, from the operating viewpoint, this method was not satisfactory. The reasons were:

- (1) The figures failed to reflect accurately the operating results on each division.
- (2) The plan did not provide figures promptly after the close of the period.
- (3) No supplementary data were given to the division forces in addition to regular statements.

Limitations of Centralized Plan

The failure of the statistics to reflect actual operating conditions was due to the attempt to allocate all expense to particular divisions. This resulted in superintendents being charged with items over which they had no control. Moreover, other factors were included, such as journal entries carrying adjustments, which often changed radically the results shown. When these facts became apparent to the division officers, their confidence in the statement was naturally lessened. This lack of confidence was accentuated by the fact that they possessed no detail of the items which brought forth criticism.

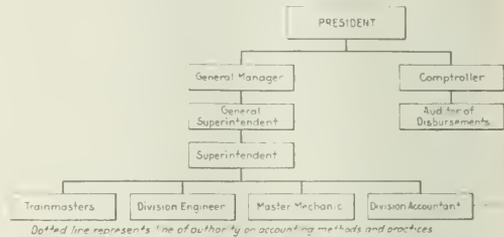
The failure of this system to produce the statistics promptly was also a serious hindrance to the satisfactory results under the centralized plan. It is axiomatic that statistics must be up-to-date to be of value. Under the centralized plan, the allocation of expense followed the closing of the books in the general offices. The statements containing the divisional information were issued about three weeks later, or six weeks following the period covered. Statistics issued so long after the close of period cannot be of material assistance to operating officers.

The failure of the centralized plan to provide supplementary data in addition to regular statements was due to the

In 1920, as a part of the general plan to standardize and improve accounts and statistics, consideration was given to the re-establishment of division accounting. For the reasons already enumerated, the centralized plan was discarded and a detailed study made of the problems to be met under the decentralized plan.

Reasons for Adopting New Methods

Chief of these questions was the line of authority and responsibility. On most railroads where the decentralized plan is in effect, the division accountant reports to the superintendent, receiving instructions as to accounting methods and practices from the accounting department. Under the alternative plan, the division accountant reports to the accounting



Line of Responsibility of Division Accounting Organization Under the Operating Department Plan

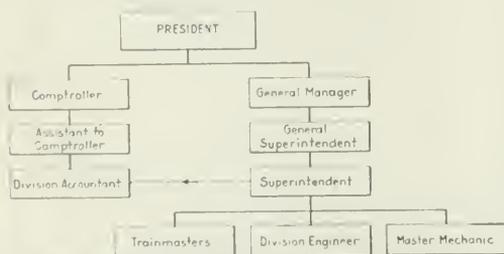
department, but co-operates with the operating organization and gives division officers the information which they require. After a careful study of the advantages of the two plans, the latter was adopted.

The reasons governing the New Haven officers in making this choice were:

- (1) The policy in recent years of concentrating all accounting and compilation of statistics in the accounting department.
- (2) The difficulty in former years in obtaining accurate and uniform statistics from operating offices.
- (3) The necessity under the operating department plan of utilizing a considerable force of traveling accountants, to check the work on the divisions and to maintain standardized methods and practices.

The first of these reasons being a matter of policy requires no comment. The second reason is based on a practical situation of great importance. Superintendents, for the most part, are not interested in the methods by which certain statistical results are obtained. If these results accurately reflect operating performance, the statistics themselves are of interest. The methods are likely to be waved aside as mere book-keeping. It is admitted that any superintendent is materially assisted by accounting knowledge. This fact is undoubtedly the controlling element in the admirable practice on the Great Northern of requiring certain accounting training of its superintendents. Nevertheless, on most railroads the majority of the superintendents do not have this knowledge, and view accounting problems as of relative insignificance.

With this practical situation as an initial problem, one must realize the great importance of proper supervision of methods employed. It is admitted that the results are more important, but to produce the results, the methods must be adequately supervised. If the superintendent is not interested or has not the necessary knowledge to provide this supervision, a corps of traveling accountants must be maintained. This method, however, cannot produce as favorable results as when the division accountants report to the accounting department and are held strictly responsible for the use of proper methods.



Line of Responsibility of Division Accounting Organization Under the Accounting Department Plan

fact that the figures were not compiled locally. In the central bureau, certain information was collected, separated and allocated to divisions, but the peculiar and differing requirements of individual officers could not be met. The net result of the system from the view point of the division officer was a large and complicated statement which reached him about six weeks after the close of the month, and which contained no detailed and specific data compiled in accordance with his views and requirements.

It will be noted that the net result of the centralized plan, from the operating view point, was three fundamental disadvantages, largely inherent in the plan itself, as opposed to one advantage

Division Accountant as a Member of the Superintendent's Staff

Nevertheless, it must be admitted that there are important advantages in making the division accountant a member of the superintendent's staff. Just as in the alternative plan, the division accountant is in closer touch with the accounting practices and problems, so, if in the operating department, he is in closer touch with operating problems. The operating officer is interested in results, both as a measure of his own performance and as a guide to check the performance of his subordinates. If the division accountant is in the operating department, he, too, is interested in the results and consequently is more likely to check and analyze them and to furnish the answer to his superintendent. In other words, the point of view of the division accountant is largely influenced by that of his superior, and it is as important that he be interested in results as in the technique which determines how these results should be compiled.

A second important advantage of the plan making the division accountant an operating representative, is the view point of the superintendent himself. It is human nature that a man has more confidence in results he has himself obtained than in those worked out by others. Likewise, a superintendent is likely to be more interested and to have more confidence in results obtained by his own subordinates than in those presented to him by an officer in another department.

Co-operation Between Departments Necessary

Regardless of the relative merits of either plan of organization, both require complete co-operation between accounting and operating departments. Both groups of officers are vitally interested in the questions of the accounting organiza-

tion and personnel. Both are especially interested in the selection of the proper men for division accountants. The ideal man should have a thorough knowledge of accounts, and equally important, an understanding of operating conditions, problems and requirements. He should be as watchful for weaknesses in operating performance as for accounting errors. He should keep the division staff posted on the many details of performance and cost which the latter cannot follow personally from day to day. His aim should be to furnish not only all data which may be called for, but to furnish information which is not requested. In the latter rests the greatest possibilities for division accountants.

The efforts made by the New Haven to insure the proper amount of co-operation is reflected in the organization and personnel in the division accounting offices. Of nine division accountants, five had their principal experience in the operating department, and some of these had previously had no accounting department training. Moreover, the division accountant has three principal assistants, an accountant, a chief time clerk and a statistician. Of these, the first is naturally an accounting man with all or most of his experience in the local or general accounting offices. The second must, of necessity, have had long training in time keeping, and most of the chief time clerks formerly held that position under the superintendent. The third bureau head in almost every case was taken from the operating department, and is expected to know the operating details and problems of the division to which he is assigned. From this it will be readily seen that from an organization point of view every attempt has been made to reach the proper balance between the two departments and to establish that close co-operation which is so essential.

Interesting Suggestions at R. B. A. Dinner

Included in Addresses by Eugene Meyer, Jr., and Frederick P.

Fish—Annual Meeting Takes Important Action

ABOUT 1,600 railway executives and railway supply men were in attendance at the thirteenth annual dinner of the Railway Business Association held at the Waldorf-Astoria Hotel, New York, on February 1. Addresses were delivered by Eugene Meyer, Jr., managing director of the War Finance Corporation, and Frederick P. Fish, chairman of the National Industrial Conference Board. President Alba B. Johnson gave an analysis of the present situation, made especially interesting by the inclusion of a number of humorous definitions of an optimist. Charles M. Schwab, who was present, was also called up to make some remarks.

Eugene Meyer's Address

Mr. Meyer spoke of the work which has been done by the War Finance Corporation with reference to the sale of the equipment trust certificates and with reference also to the assistance given to assist in stabilizing conditions in industry.

"The program for marketing railroad equipment trust certificates from the Government is substantially completed," he said, "and the needs of the administration are amply supplied out of the funds already raised. It is merely a question now if anybody wants some more."

Continuing he said in part:

"If anyone thing has made difficulty for the railroad industry and for the industries that depend upon the railroads more than any other, it has been the decline in the gross volume of business. With large fixed charges, inelastic

charges that cannot be controlled for the most part, your industries must run at or near the capacity of the transportation plant to be prosperous. You cannot control your fixed charges, your taxes or a large part of your overhead; and more perhaps than any manufacturing industry you must have a volume of business approaching the capacity of your plant in order to be even fairly prosperous.

"It was an unfortunate fact that when the railroads were returned from the Government to private control there existed a freight blockade and a congestion in traffic without precedent, I think, in the history of this country in time of peace. The financial credit strain existing at that time and subsequently was accompanied by collapsing markets and collapsing prices, and when the raise in the freight rate schedules was made effective in the fall, that collapse in prices and markets was well under way. It was unfortunate, perhaps, that when the freight rates were raised the collapse in the markets and prices was becoming acute, because it led to an altogether false and exaggerated idea of the relationship of the freight rate increases and the diminished volume of business and diminished volume of tonnage for the railroads. It is always difficult to trace cause and effect in such complex situations as we have been living through in the past year and a half, but with the strain and worry in every department of our economic activity it was not unnatural that every department of industry sought to find in some other activity the cause of its troubles.

"The railroads today find themselves between the pro-

ducers and the consumers of the country; the producers who do not get an adequate return for their labor, their risk and their capital involved; I mean the agricultural producers; and the consumers that pay, they think, too much for their necessities. This position between these two elements is one that you have to face in this industry. There is in every drama a villain, and you are in danger of being cast for the role unless you can analyze the facts, present them, and make clear to the country the causes and proper remedies for the difficulties.

"The problem of the adjustments of the railroads and allied industries to the new conditions that confront you, have to be met. These adjustments have to be made, I feel, with somewhat of a radical turning of the railroad minds from old conditions. I do not see an immediate prospect of the wholesale repeal of legislation as an immediate relief in the near future. Others have pointed out that the difficulties of the railroads are enchaned by the Panama Canal, good roads built at public expense and financed by tax-free securities, and the gasoline engine without a franchise and without great taxation competing with railroads in parts of this country. But these things have come to stay. We must face the future and try to deal with the problem in the light of the facts as they are.

Seasonal Fluctuations

"One important and revolutionary factor in the last generation which seems to me perhaps to be very much neglected in the consideration of the railroad situation, is the development of a system of national marketing. Coming as I do in contact with the various activities in various parts of the country, this fact has struck home as one of the important fundamental features to which perhaps too little importance is paid.

"You know that in the past hundreds of thousands of freight cars have been fully employed in October and unemployed in March. But as the wheat from the northwest and the cotton from the south and all the commodities were rushed to market in the fall months freight congestion, car shortage, developed and interfered with economic operation, and then in the spring, when it was all rushed to market by methods confused and disorderly and undeveloped, and unworthy, I think, of a civilized nation, we sat down in the spring with no business for the railroads and lots of idle cars.

Your membership has been co-operating, railroad men and men of the railroad industries in every way that I have ever been able to think of asking them to co-operate. During the war, and when the appropriation failed in March, 1919, and again during the past few months, the railroad industry have accorded the War Finance Corporation every possible help. It has been our good fortune in recent months to have the power and ample resources to go into this western country where the great bulk of our producers live who are suffering and have been, and do something to help them. Corn today in Iowa is selling for 35 cents on the farm, without any particularly important increase in the contract market, as against 15 to 18 cents when I was there in September.

Sheep are selling at a fair price. Cattle have ceased to be sacrificed to breeding herds in immature stock. The feeding operations in the Corn Belt have been restored to a great extent and in all of this work we have had your co-operation, and I hope we will continue to have it. We have had to ask in the Western country that the bankers and business men and the stock growers, the cattle men, who have been in great distress, by creating banking institutions to help us make our land effective, I mean companies known as cattle loan companies. And your railroads and business men in these communities have come forward and lacked these enterprises, these companies, with new capital in those

distressed states, so that today we have more capital invested, I mean private capital, in the live stock financing companies, in the new companies, than existed on October 1st in all the companies that had grown up previously to that time, and these new companies are enabling us to lend on a safe basis by millions in the great states where the cattle industry is so fundamentally a part of all of our industry, and the railroad men who are interested in that territory and who have followed our work with close interest, have been most helpful in stimulating the public sentiment to form these new companies that mean salvation to those people.

F. P. Fish's Address

Mr. Fish, in his address, discussed principally railroad labor matters. He began his address with an analysis of the present labor situation. He then suggested that one of the difficulties at present was the fact that matters of rates are handled by one body and matters of wages by another, and he proposed also that a study of the entire railway situation should be made by an impartial public board composed of such men as Elihu Root, Charles Evan Hughes, etc. He also made a plea for the incorporation of labor unions and showed wherein that would help the situation measurably.

With reference to the Interstate Commerce Commission and the Railroad Labor Board, he said: "It is not enough that these two Boards will act in the utmost good faith, but they will co-operate, they will consult together; it is logically and from a business point of view utterly absurd that the two functions should be separated. I am not going to make any suggestions as to how it should be done. There are many ways that obviously occur to any of you. It may well be that the whole thing should be put in the power of one board or one commission, and whatever is done that commission should be large enough and should be so well organized that it could not only deal with all these questions and take the whole responsibility of correlating the expenses which they control with the rates which they control so as to get the results that the Esch-Cummins Act was intended to make, but it should be so organized that that thing and all other questions coming before that board should be decided promptly. As I look back over what I have seen of the action of the Interstate Commerce Commission during all these years, the one great criticism that I make upon it is that their action has never been prompt. There have been delays after delays in the settlement of questions that should be settled immediately one way or the other, and I firmly believe that one of the great things that must be produced and developed in the near future is such an organization as will act comprehensively and will act promptly.

Mr. Fish's most interesting proposal was that of an intensive study with a view primarily to formulating principles by a body of impartial leaders of public thought. On this subject he said:

"It is one of the difficulties which we find with reference to all these innumerable boards that have been established during the last thirty or forty years, national and state, that they are turned loose and without any established principles to guide them, thereby being utterly different in character from the courts, which have developed logically from the earliest traditions of mankind. They have principles, and it is the function of the courts to develop and apply those principles as new cases arise. But these commissions have had largely to make their own principles, and they have drifted along from day to day, building up certain traditions. Sometimes they have recognized that they have made mistakes, and have corrected them, but generally it has been a growth without any solid fundamental principles which are to be developed and applied.

"One thing that I would most respectfully and humbly suggest is that today there is nothing that could be done that would be more important among those things that can be

done under the present legal situation than all these boards, particularly the Interstate Commerce Commission and the Labor Board, which has had but a short experience and has acted with the utmost good faith apparently, in the face of tremendous difficulties, should sit down today recognizing that the conditions of today are utterly unlike those not merely of thirty years ago but of five years ago or six years ago, and see if they cannot work out for themselves a more definite and settled series of principles than any that they have, and principles that are not based merely upon tradition or upon the situation as it existed five or thirty years ago, but that are brought up to date, that fit the conditions of this time, so that in their rules, in their regulations, in their laws which they establish and in their methods, they shall deal not with an academic problem, which may be dealt with in any old way—for an academic problem has little relation to realities—but with the exigencies of today, which is the period and the time with which we are tremendously interested.

"I go even farther with a suggestion that very likely will not receive approval from any source, and that is this: The changes in the situation from thirty years and seven years and six years to the present time, when you stop to consider them, are enormous. There is hardly any relation between the two, and yet we have these schemes of regulation, these boards for regulation, that were created when the situation was utterly different from what it is today, and which have practically drifted from that time to this. Would it not be a most excellent thing for the railroads, a most excellent thing for this country and for every individual in this country, if there could be an intensive study made of the entire situation which would determine what, in view of the present conditions, is required by way of regulation, how far it should go, what is essential, what is unessential, what should be the nature and character of the regulation, what methods should be employed, and how the whole matter should be correlated in such a way as to fit present conditions. Now, such an intensive study as that, which I suggest, can never be made by Congress. Congress has too much to do. Its affairs are so complicated that it cannot deal with such problems with intelligence, and the result is sure to be a want of clearness, a want of certainty, want of sanity, such as I think you can see in the Esch-Cummins Bill, which to me, as I have already stated, is evidently the result of an effort on the part of Congress in the utmost good faith to help in this situation. The board that I would suggest is one that is made up of the best men in this country, not necessarily railroad men, not necessarily laboring men, not the favorite tripod organization of laboring men, railroad men and the public, but men who are selected because they are intelligent, because they are strong, because they are used to dealing with great questions, and because they have the ability and the power and the intelligence to get help from everybody, and after they have got the facts, have the power and capacity to study those facts and the imagination to devise ways and means for putting the matter in the best possible shape. The type of men I have in mind for such a board would be illustrated by Elihu Root and by Mr. Hughes, eminent public citizens. They were put into positions for which they had no experience, political, international, and they have made good, and they would have made good anywhere else. There are a good many such men in this country, and if there was a real effort made to find them, the responsibilities of such a job, the fact that it is a matter of such great public importance, would attract them. I respectfully submit, for your consideration, the desirability of an immediate complete survey of this whole situation by outside men, who will study it thoroughly and intelligently, and report, and, by their report, the public could be well informed. On their report, Congress could act safely, accepting or rejecting whatever their specific recommendations were, but in every

case finding recommendations that were the result of careful thought and so put that their validity could be measured.

Annual Business Meeting

The feature of the annual business meeting of the Association held on Wednesday morning was the passage of a resolution opposing the creation of a commissioner-general of transportation as proposed by the railroad committee of the Chamber of Commerce of the United States. (*Railway Age* of January 28, 1922, page 273.) The resolution which was adopted only after some discussion, concluded with the words: "An officer designated as the President's representative to discuss railway problems with committees of Congress and federal agencies, including the Interstate Commerce Commission, would be a wholly new feature in our government, for which we see no occasion and in which we fear the possibility of pressure tending to impair the independence of those charged with railway regulation or legislation."

The meeting received and acted on the report of the executive committee, the report of the committee on equipment policies, etc., and elected officers for the ensuing year.

The report of the committee on equipment policies dealt chiefly with the matter of automatic train control. With reference to the Interstate Commerce Commission's recent order, the report contained the statement, "Concerning . . . whether or not the time is suitable from the financial point of view for these installations, most, and we have no doubt all, of the carriers view with grave anxiety the confirmation of any such order at this time."

Resolutions

The resolutions which were adopted follow:

I. RAILWAY CREDIT

We welcome the growing recognition that the pervasive benefits to flow from resumption of large-scale railway buying can be brought within reach only through financial rehabilitation of the roads. An indispensable requisite is new capital and hence investors' confidence. Of such confidence the essential condition is that compared with other enterprises railroads shall yield an attractive income and that stability in this respect shall be forecast by the public and governmental attitude. Such attitude will take concrete form in the degree of steadfastness with which volunteers organize and labor to preserve in the Transportation Act and its administration the policy of rate-regulation designed to yield adequate railway income. Occupational groups are coming to a better understanding. This will bring fuller comprehension of the stake which each group has in enabling the railways to resume large buying and will promote harmonious action to accomplish the necessary reassurance of investors.

II. THE WAY TO BUSINESS RECOVERY

Return of general prosperity can in no way be so effectively promoted as through resumption of large railway purchases. Industrial, mercantile and agricultural shippers have a greater concern in adequate railway income than in lower rates. Factory and farm alike are suffering from curtailment of markets through impairment of buying power. The war abnormally enlarged mines and mills, which in many cases are letting demand approach existing capacity before creating new. The railroads on the contrary, due to restrictions affecting credit, came to the war period with serious arrearages of provision, which have been aggravated during and since federal control. A relatively small gain in traffic would overtax facilities again as in the fall of 1920. The underdevelopment and undermaintenance of the railroads warrant replacements, improvements and extensions vast enough to use all the capital which would be available under the best conditions. Large railway purchasing, in itself prudent and far sighted, would start up industry and trade. It would readjust prices by re-establishing a balanced relation between farm products and the manufactured goods for which they are exchanged. By reviving the pay-rolls in every community it would bring back the buying power throughout the United States which always and especially now is the farmer's chief reliance, and enable him to purchase miscellaneous commodities in normal volume.

III. TRANSPORTATION ACT

We favor a reasonable experience of the Transportation Act of 1920 without modification of the rule of rate-making. Since

the railways were relinquished to their owners conditions have been extremely abnormal and are unlikely to recur. The Commission has said "The rate adjustment cannot with advantage be made dependent upon fluctuations in traffic * * * The duty cast upon us by Section 15a is a continuing duty and looks to the future * * * What is contemplated by the law is that in this exercise of our rate-making power the result shall reflect our best judgment as to the basis which may reasonably be expected for the future to yield the prescribed return." Judgment requires experience. Experience should have time to develop before we subject the Commission, the users of transportation, the country and the railway managers to another legislative upheaval. Amendments can be intelligently considered only after a period of average tonnage and average gross earnings under moderate rates and under labor cost adjusted to levels prevailing in other employment.

IV. UNIFIED CONTROL

Proposals for repeal of the federal control established in some sections of the Transportation Act of 1920 show that certain misunderstandings are not yet obsolete. Congress has been urged to restore State control of car service and of rates. It is argued that State commissions give shippers more satisfactory response. The fact that the car supply is national, the seasonal mobilization at points of demand necessarily centralized and the State authorities helpless to conscript cars as the Interstate Commerce Commission can and does, for movement across State lines. What provides the national car supply is the financial strength of the individual road, whose revenue comes from its total traffic—about 15 per cent state hauls and the rest interstate hauls taking rates based upon the sum of the locals. Neither as to car service nor as to rates has the federal commission interfered with the state authorities except in major emergencies and then only after consulting them. We favor preservation of federal control where state regulation conflicts with federal.

V. RESPONSIBLE RATE REVISION

Many shippers and some leading traffic associations refrain, in our judgment wisely, from attempts at political pressure in rate revisions. They proceed instead in an orderly manner by negotiation with the carriers or on appeal from them by presenting testimony and argument before the Interstate Commerce Commission as before a court. Statements and proposals affecting rates which federal executive officials or members of Congress may present are apt to be ex parte and obstructive rather than helpful in the quest for wise action. In discouraging rate revision by influence and clamor nobody has a greater stake than the shippers. If the Commission succeeds in its task of establishing a rate structure stable as well as satisfactory in other respects the shippers will enjoy efficiency of transportation, regularity of railway purchases as an offset against business fluctuations and fixity of competitive rate relations made possible when general rate revisions are infrequent. The Commission can perform its function only if it has public support for an administration of the statutory policy based upon its long and wide experience and its continuous current survey of the situation as a whole.

VI. COMMISSIONER GENERAL OF TRANSPORTATION

Having considered the summary of recommendations reported by the railroad committee of the Chamber of Commerce of the United States to the board of directors for consideration at the meeting of the National Council to be held in Washington, D. C., February 8 and 9, 1922, at which time that body will be asked to advise the board of directors on the questions involved, the Railway Business Association opposes the creation of a Commissioner General of Transportation for the purposes set forth in that report. An officer designated as the president's representative to discuss railway problems with committees of Congress and federal agencies, including the Interstate Commerce Commission, would be a wholly new feature in our government, for which we see no occasion and in which we fear the possibility of pressure tending to impair the independence of those charged with railway regulation or legislation.

VII. THE LABOR BOARD AND THE COMMISSION

The Interstate Commerce Commission has said: "While the law makes no provision for co-ordination between the Labor Board and the Commission, the desirability of contact between the two bodies is appreciated. Since the creation of the Labor Board informal conferences have been held from time to time, and will without doubt be continued in the future. We have been particularly solicitous to procure and have at hand such statistical information as may aid the Labor Board in its work." We urge initiation and maintenance of such contact between the Labor Board and the Commission as will assure a relation of labor cost to net railway income fair alike to the employees, the railways, the shippers and the public.

VIII. SHIPPERS AND THE LABOR BOARD

In the adjustment of railway labor disputes shippers and other citizens are parties in interest. The public has a permanent stake in continuity of service. Its concern is supreme in the restriction of operating cost to a level which under rates that move the traffic will yield net income sufficient to support railway credit and so provide adequate facilities without resort to government ownership and deficits taken from the tax levy. Employers of labor in the field, forest, mine and mill are entitled to protection against government action which raises the cost of railway labor, for which they compete, above levels which other industries can pay and then pyramids their burden by assessing upon them in freight rates the increased cost of the railway labor. Cases before the Labor Board involve interpretation of the law and determination of administrative policy. The Labor Board should give shippers the fullest opportunity to be heard. Besides according shippers their clear right this course will give dignity and stability to the Board itself by bringing shippers' advocates off the hustings into a proceeding which will and should acquire a quasi-judicial atmosphere. We hope that the Board will hereafter permit shippers to intervene as parties.

IX. STABILITY OF RAILWAY PURCHASES

We reaffirm our conviction that railway purchases prearranged for periods when general business is dull would tend to stabilize prosperity in every field and promote economy in railway management. We note with encouragement the attention that the Department of Commerce, committees of Congress and business associations have been giving this subject, broadened to embrace public works and public utilities. Stable purchases by large buyers would minimize unemployment of labor in every occupation. It would cut down idleness of plant and of organization, permitting a smaller investment and overhead to do the total work of each decade. This would tend to reduce interest rates and to liberate capital for development of the country in other directions. It would enable the units which resorted to it to buy when cost of labor and materials is lowest. Public works would bear more lightly on the tax-payers, while railroads and public utilities could operate satisfactorily on lower rates. Facilities would be maintained and enlarged adequately for each recurring peak of load. By tending to keep normal the industrial and commercial payroll and hence general consumption of farm products it would help stabilize the farmer's output in volume of demand and in price. For realization of such a policy it is requisite that its desirability be generally recognized by those who have responsibility for construction programs and that advance financial provision be made possible by effecting in ways consistent with the public interest an accumulation and reservation of funds and credit in prosperous years to be drawn on for vigorous maintenance and improvements in dull years.

X. INCOME SURTAX RATES

It is of great public consequence that a clearer understanding should prevail concerning the taxation of large incomes. Many have an impression that income taxes in some way take money from the rich and spread it among the poor. Advocates of high surtax rates persuaded the Senate to raise the maximum from the House rate, 32 per cent, to 50 per cent, and the House to concur. As a class the supposed beneficiaries of this provision are its victims. The 50 per cent surtax little if any affects the incomes of the rich, who can invest their surplus in tax-exempt securities; but it takes away the whole income of the poor man who loses his job when the rich man's income is diverted from enterprises which otherwise would give the poor man work. What railroads pay for capital is increased and the supply diminished. Hence the public pays higher rates and yet suffers from famine in a prime necessity—transportation facilities. Directly affected is the farmer, whose dependence on transportation is special and the demand and price for whose goods are largely contingent upon the prosperity of the very industrial enterprises whose payrolls, with their buying power, are restricted through the surtax. At the earliest moment Congress should reduce the income surtax rates.

Election of Officers

Officers were elected as follows:

By the general executive committee, Alba B. Johnson as national councillor in the Chamber of Commerce of the United States.

The association in annual meeting re-elected the following: Alba B. Johnson, president, and W. W. Salmon, W. W. Willits, Knox Taylor, W. H. Woodin, S. G. Allen, Stephen C. Mason and Charles J. Symington, vice-presidents. P. Harvey Middleton was elected treasurer and will also serve as assistant secretary.

General News Department

The Central of Georgia reports that for the 12 months of the last calendar year 98.7 per cent of its passenger trains maintained schedule time.

The New York, New Haven & Hartford reports the total number of passenger trains run in 1921 as 505,853, of which 91.1 per cent, were on time.

The Great Northern ore dock No. 2 at Allouez, a suburb of Superior, Wis., was practically destroyed by fire on January 30, with a loss which may reach \$2,000,000.

The American Society for Steel Treating will hold a sectional meeting Friday, March 3, at the Engineering Societies' building, New York City.

The Western Maryland has let to W. K. Hosier the contract for the operation of its repair shops at Elkins, Va. About 100 men have been employed at these shops.

The American Wood Preservers' Association in the closing session of its annual convention which was held in Chicago on January 24, 25 and 26, voted to hold the next meeting in New Orleans, La., on January 23, 1923.

The engineman and fireman of an eastbound passenger train on the Baltimore & Ohio were killed and several passengers injured in a head-on collision with a westbound freight train near Noble, Illinois, on February 1.

A fire at Willis avenue and 132d street, New York City, on January 28, destroyed the brick office building of the New York, New Haven & Hartford Railroad at that point. This building was four stories in height and 200 feet long.

The presidents of the Eastern railroads, at a conference in New York City, on January 31, decided to appoint a committee of general managers to canvass the 52 principal roads east of the Mississippi river and north of the Ohio to determine the sentiments of the roads in regard to complying with the suggestion of the Secretary of Commerce for regional conferences with the leaders of the employing brotherhoods.

Inspectors of Locomotives are wanted by the Interstate Commerce Commission, salary \$3,000 a year. The United States Civil Service Commission announces that applicants will be examined on March 8 and 9 at the usual places throughout the country. Inspectors of safety appliances and inspectors of hours of service are also wanted, at the same salary, and examinations may be taken on March 22 and 23.

The Pennsylvania Railroad, looking for revenue from all practicable sources, offers to sell advertising space in some of its passenger cars and ferry boats; the coaches operated in electric service out of Broad Street Station and between Camden and Atlantic City, and the ferry-boats operated between Philadelphia and Camden and Jersey City and New York. Of the cars involved, 111 run between Philadelphia and Paoli, Germantown and Chestnut Hill, and 94 between Camden and Atlantic City. There are ten ferry-boats running between Philadelphia and Camden, and eight between New York and Jersey City.

Erie Contracts for Handling Freight

The Erie has contracted with the Consolidated Freight Handling Company, Youngstown, Ohio, to handle the road's less-than-carload freight through its freight houses at Cleveland, Akron, Youngstown, Warren, Barberton, Ashland and Mansfield in Ohio, Corry, Sharon and Meadville, in Pennsylvania, and Jamestown, N. Y. Under the terms of the contract, the freight handling company becomes the lessee of the freight houses and adjacent property required for such work.

Automatic Substations on Electric Line

The Oregon Electric Railway has placed a large order for automatic railway substation equipment with the General Electric Company. Manual operation will be changed to automatic in seven substations and with the exception of one station in the City of Portland, automatic substations will supply all of the power required for the 180 miles of track on this road. Power is supplied to the overhead wire at 1,200 volts.

More Common Officers and Directors Authorized

The Interstate Commerce Commission has issued an order authorizing common officers and directors among companies comprising the Erie system. L. F. Loree has been authorized to retain his offices and directorates in the Delaware & Hudson and subsidiaries, the Kansas City Southern, Seaboard Air Line, Wheeling & Lake Erie, and other companies, and to remain either as director and member of the executive committee of the Baltimore & Ohio or the Erie or the Pere Marquette.

Directors Moore and Stotesbury

The Interstate Commerce Commission has denied the application of William H. Moore for authority to retain the positions of director of the Lehigh Valley and of the Delaware, Lackawanna & Western. E. T. Stotesbury has been authorized by the commission to hold until further order the position of director of the Lehigh & Hudson River and either the position of director of the Lehigh Valley and certain named subsidiaries or positions with carriers of the Reading System including chairman of board of directors of the Philadelphia & Reading, and director of various subsidiaries. He is given 30 days in which to make his election as to which positions he will hold.

Southern Pacific Erecting Large Commissary Building

The Southern Pacific has under construction at West Oakland, Cal., what is probably the largest commissary department plant in existence. This establishment will include laundry facilities for the handling of one million pieces of linen a month, a butcher shop with cooling and chill room and a bake shop. About 250,000 meals are served each month by the different branches of the service under the Southern Pacific Commissary Department's jurisdiction. Waiters are schooled at the plant in their duties, examinations are held once a month and the successful applicants are given graduate waiters certificates. Monthly examinations are also held for chefs applying for certificates of a similar character as well as for cooks seeking promotions to the position of chef.

Progress in Engineering Standardization

Beginning with 1922, the Engineering Division of the American Railway Association became a member body of the American Engineering Standards Committee. E. A. Frink, of the Seaboard Air Line, who is chairman of the standardization committee of the division, represents the division upon the American Engineering Standards Committee.

Arrangements have just been completed by this organization whereby co-operation with the standardizing bodies in other countries will be made more effective. In order that all standards will be available to the industries of the various countries, each national body will sell the approved standards of the other bodies. The American Engineering Standards Committee, 29 West Thirty-ninth street, New York City, has available the publications of the standardizing bodies in Austria, Belgium, Canada, France, Germany, Great Britain, Holland, Sweden and Switzerland. Copies of the standards may be obtained at a nominal cost, or the copies on file may be consulted at the offices of the committee.

Tie Producers Meet in Chicago

The National Association of Railroad Tie Producers held its fourth annual meeting at the Hotel Sherman, Chicago, on January 26 and 27. Tie producers were present from all parts of the country. Consideration was given to the present purchasing policy of the railways and to other problems affecting the production of cross ties. The following officers were elected for the ensuing year. President, J. H. Johnson, B. Johnson & Son, Richmond, Ind.; first vice-president, Timmons Harcourt, Harcourt Tie & Lumber Company, Chillicothe, Ohio; second vice-president, H. M. Cochran, Union Lumber Company, San Francisco, Cal.; secretary, Warren Nixon, Western Tie & Timber Company, St. Louis, Mo., and treasurer, R. E. McKee, Long Bell Lumber Company, Kansas City, Mo.

Southern Pacific Stock for Employees

Employees of the Southern Pacific System, beginning on February 1, will be given the opportunity to buy shares of the capital stock of the company, at the market rate, without payment of commissions. The plan provides that, on application by the employee, the company will buy the stock in the open market, deducting the purchase cost from his monthly pay, at the rate of \$5 a month for each share. An employee may buy from 1 to 15 shares of stock, according to his ability to pay for it. It is also provided that, having completed a specified purchase, the employee may buy additional shares but at no time is he to be paying for more than 15 shares at one time. Failure to pay three successive installments will terminate the employee's rights to complete the purchase. The company will charge the employee 6 per cent interest on the cost of the stock bought for his account and will credit him with dividends paid on the stock held for him. With the stock selling at 81½ and dividends at six per cent, the employee makes a profit on the money advanced to him.

Expenditures for Valuations—\$75,000,000

In a bulletin issued by the Presidents' Conference Committee on Federal Valuation under date of January 20, the statement is made that a total of \$11,480,923 was expended for valuation work by Class I carriers reporting to the Presidents' Conference Committee, during the year ending June 30, 1921, making the total reported expended by these carriers for the eight years ending June 30, 1921 (with a few omissions) \$54,120,957. The expenditures of the Government's Bureau of Valuation for the year ending June 30, 1921, were \$2,728,656, while the total expenditures by the Bureau from the beginning of the valuation work to June 30, 1921, as reported in the annual reports of the Interstate Commerce Commission to Congress have been \$21,462,809. In this same statement there is quoted testimony, presented before a sub-committee of the House Committee on Appropriations by T. P. Artaud, executive assistant of the Bureau of Valuation, to the effect that the number of employees in the Division of Valuation has been reduced from 1,016 in December, 1920, to 553 in December, 1921.

Live Stock Claim Prevention

At a live stock loss and damage reduction conference held recently in Chicago, the freight claim division of the American Railway Association presented facts and figures showing what the railroads are doing to prevent loss and damage to live stock shipments. For the eight months ending August 31, 1921, the railroads expended \$2,567,309 for loss and damage of this character. Of this amount \$1,021,172 was the direct result of delay; \$3,037,718 was entered as damage; \$19,147 as unlocated loss; \$101,410 as resulting from train wrecks; \$91,425 loss due to errors of employees; \$54,030 from defective or unfit equipment; \$42,562 misrouted hay binn loading and unloading; \$12,076 robbery and \$3,337 for loss.

The report of live stock loss and damage expenditures during recent years shows that the situation has been improved materially and this is reflected both from the records of the various stock yards and of carriers handling different phases of live stock shipment matter. The Hartford Live Stock In-

surance Company finds its present claims the lowest in the history of the company. Reporting for 11 western markets, the Western Weighing & Inspection Bureau has prepared statistics showing that for the month of October, 1921, there was but one dead animal to each 4,734 stock shipped, as compared to one in 3,600 recorded for the same month in 1920.

Director General Proposes Modification of Equipment Trust Agreement

The director general has addressed a letter to all railroads of which the United States Treasury still holds issues of equipment trust obligations, no part of which has yet been sold, requesting modifications of the subordination terms of the trust agreement. Under the original terms the director general was authorized to subordinate only the last five maturities; namely, 1931 to 1935, inclusive, or any one or more of these maturities. Under the proposed amendment, the director general may subordinate such portion of the maturities of any year as he may determine.

The amended clause will read as follows:

"Eleventh: Upon request of the holder, or holders, of all the notes which by their terms shall be due and payable in any year, and upon presentation of such notes for that purpose the trustee shall stamp thereon, or upon such part thereof as said holder, or holders, may designate and request the following words:

"For value received and as an inducement to purchases of unstamped notes, the holder of this note has caused the same to be stamped pursuant to Article Eleventh of the Equipment Trust Agreement mentioned in the note and, as provided in said Article Eleventh, the unstamped notes shall be payable in preference and priority to the stamped notes out of any moneys received or collected by the trustee under said Equipment Trust Agreement upon enforcement of its rights or remedies in case of a default of the carrier."

For the present, it is the purpose of the director general, upon the execution of the supplemental agreements making the amended clause operative, to make sale of railroad equipment trust obligations under an arrangement to subordinate, on the part of the government, approximately 33½ per cent of the principal amount of each maturity; and the director general will be prepared to sell 66½ per cent of issues of equipment trust obligations, unsubordinated, at par and accrued interest to date of delivery. The Railroad Administration thus will retain the one-third subordinated part of all serial maturities.

Meetings and Conventions

The following list gives names of secretaries dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION—F. M. Nellis, 165 Broadway, New York City.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DIVING CAR SUPERINTENDENTS—L. A. Stone, C. & E. L. Ry., Chicago.
- AIR BRAKE APPLIANCE ASSOCIATION—J. F. Geitrus, The Ashton Valve Company, 318 W. Washington St., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF ENGINEERS—C. E. Drayer, 63 E. Adams St., Chicago.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS—F. L. Duncan, 333 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.
- AMERICAN ASSOCIATION OF PASSENGER TRAVEL OFFICERS—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION—J. W. Welsh, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER TIMMERS', COPPLERS AND PIPE FITTERS' ASSOCIATION—C. Horchardt, 202 North Hamilton Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.
- Division I—Operating Freight Station, Section (including former activities of American Association of Freight Agents), R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
- Medical and Surgical Section—J. C. Cawwin, 75 Church St., New York.
- Protective Section (including former activities of the American

- Railway Chief Special Agents and Chiefs of Police Association). J. C. Caviston, 75 Church St., New York, N. Y.
- Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Next meeting, March 21-23, Richmond, Va. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.
- Safety Section. J. C. Caviston, 75 Church St., New York.
- Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III—Traffic. J. Gottschalk, 143 Liberty St., New York.
- Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next convention, March 14-16, Chicago. Exhibit of National Railway Appliances Association, March 13-16.
- Construction and Maintenance Section. E. H. Fritch.
- Electrical Section. E. H. Fritch.
- Signal Section (including former activities of the Railway Signal Association). H. J. Baller, 74 Church St., New York, N. Y. Next meeting, March 13 and 14, Drake Hotel, Chicago. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.
- Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
- Equipment Painting Section (including former activities of the Master Car and Locomotive Painter Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). P. Murphy, General Store Keeper, New York Central, Collingwood, N. Y.
- Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Cincinnati, Ohio. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 14-16, Chicago. Exhibit by National Railway Appliances Association, March 13-16.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittlesey, Union Trust Bldg., Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio. Annual convention, September 25-30, 1922, Detroit, Mich.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26, 1922, Chalfonte Hotel, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chender (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- Railroad Division. A. F. Stuebing, Managing Editor, Railway Mechanical Engineer, Woolworth Bldg., New York. Next meeting, May 16, 1922, 29 W. 39th St., New York.
- AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Meter Company, 332 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrooke St., Montreal, Quec.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aron Kline, 626 North Pine Ave., Chicago, Ill. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koenek, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Iroquois, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesan Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.
- CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.
- EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.
- FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division II.)
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George T. White, 74 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 22-25, 1922, Auditorium Hotel, Chicago. Exhibit by International Railway Supply Men's Association.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Mahalia Ave., Winona, Minn.
- INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1922, Hotel Sherman, Chicago.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)
- MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)
- NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Sisco & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 499 Lafayette St., New York. Next convention, September 26, 1922, Detroit, Mich.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition, March 13-16, Coliseum, Chicago, at convention of American Railway Engineering Association.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 14, 1922, Cleveland, Ohio.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Corway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Mortenson, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.
- RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)
- RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Corway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.
- RAILWAY TREASURY OFFICERS ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Regular Ill. Annual convention, September 12-14, 1922, Cleveland, Ohio. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.—B. W. Fraenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. Wier, 9 N. Jefferson St., Chicago.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.
- WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago, Ill. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

No passports are now required at Laredo, Tex., for United States citizens entering Mexico.

Canadian Pacific passenger traffic officers, to the number of 60, held their annual conference in New York City this week.

Production of soft coal increased 6.4 per cent during the week ended January 21, according to the weekly bulletin of the Geological Survey. The total output is estimated at 8,838,000 net tons. The bulletin says that at the present rate production probably exceeds consumption.

The fourth annual convention of the American Fruit & Vegetable Shippers' Association was held at the Hotel Sherman, Chicago, from January 25 to 28, inclusive. More than 2,000 delegates representing shippers, brokers, jobbers and receivers were in attendance.

The Passenger Ticket & Freight Agents' Association of Texas, at its annual convention at Corpus Christi, on January 22 and 23, elected the following officers: President, E. Paul Junkin, Dallas; vice-president, Elbert Blair, Fort Worth, and secretary-treasurer, L. B. Sheppard, Dallas.

Reductions ranging as high as 33 1/3 per cent on many commodities moving from New York to California terminals and intermediate points, via the Southern Pacific Steamship Lines to Galveston, Tex., and thence west via the Southern Pacific, have been announced by the company and will shortly take effect. Items affected in this reduction, on a carload lot basis, are: canned goods, beverages, preserves, linoleum, green coffee, paint, dry or in oil, lead, twine, cordage and rope, bullets, loaded cartridges, etc.

The opening session of an investigation of the "Pittsburgh Plus" trade practice, which fixes the prices of steel products on the basis of a Pittsburgh (Pa.) price, plus freight to destination, no matter where the steel may be made or shipped from, began before John W. Bennett, examiner for the Federal Trade Commission at Milwaukee, Wis., on January 30. On the opening day, H. E. White, Minneapolis, Minn., rate expert for the Western Association of Rolled Steel Consumers, submitted figures showing the advantage the Pittsburgh manufacturer has over his competitors in the west. Further testimony showing the disadvantage under which the western manufacturer labors was given by H. W. Ladish, of Cudahy, Wis., president of the Ladish Drop Forge Company. The hearing is to continue at Milwaukee for several days and then will be continued at other centers of the steel industry.

N. I. T. L. for Repeal of Section 15-a

The National Industrial Traffic League, at a special meeting at Washington on January 27 adopted resolutions recommending the repeal of Section 15-a of the transportation act, which contains the percentage rule of rate making, but favoring a clear declaration of principle in the law that the railways are entitled to fair compensation. The league also went on record as opposed to the Capper and Nicholson bills, which would also repeal or modify Section 15-a particularly for the purpose of restoring the powers of the state commissions.

Portraits on Family Tickets

Portraits on family tickets (which are good for 50 rides within one year), are now required by the New York Central, a notice to that effect having been issued at New York City last week, applying to the New York suburban district. This action follows the use of portraits on individual monthly tickets which was put into effect a few months ago. With the fifty-ride tickets, which are good for the purchaser and his family and servants, only the purchaser's portrait will be required, but he must give the names of all the members of his family who will be entitled to use the ticket, and each of these other members, when he or she rides, will be obliged upon to write his or her name.

Labor Board Decisions

Seniority of Demoted Supervisory Officer

An assistant roadmaster on the Michigan Central was demoted to section foreman, displacing a foreman. The employees organization entered a complaint maintaining that, as an assistant roadmaster is outside the scope of the agreement, a man in that position has no seniority rights under the agreement. The decision of the board is that he is entitled to a position as section foreman by displacing the junior section foreman in point of service. *Decision No. 594.*

Employees Who Fail to Report for Work Not Entitled to Pay

Two bridge and building mechanics on the Nashville, Chattanooga & St. Louis were temporarily out of service and notices sent to them concerning a newly organized paint gang were not received. When they did hear of these positions, they applied for them but were denied employment because the quota was full. The railroad recognized their seniority and stated that they would have been accepted if they had applied for the positions in time. The board denied the claim of the two men for pay during the time that this gang was in service. *Decision No. 603.*

Train Dispatcher Can Displace an Agent-Telegrapher

A train dispatcher on the Wabash was permitted to displace an agent-telegrapher because of a reduction in train dispatching forces. An agreement between the employees and the carrier provides that employees assigned to official positions with the company shall retain their seniority so long as they remain in such official positions. The employees contended that these rules do not permit such officers who return to telegraph service to displace regularly assigned employees in that service. The carrier contended that its action was proper and in accordance with the agreement. The Labor Board sustained the position of the carrier.—*Decision No. 620.*

A similar dispute between the Order of Railroad Telegraphers and the New York Central regarding train dispatchers displacing employees in telegraph service when the positions of train dispatchers were abolished, was decided in favor of the carrier by the Labor Board.—*Decision No. 619.*

Carriers Sustained in Applying 10 Cents an Hour Decrease in Baggage Department

On April 1, 1920, the various classes of employees in the baggage room of the Union Station at St. Louis, Mo., received a uniform increase in pay of 17 cents an hour. Article 2 of Decision No. 2 of the Board provided for smaller increases for various classes of work, to be added to the rates established by or under the authority of the United States Railroad Administration, but the carrier allowed the 17 cent increase to stand, in consideration of the agreement made at the time when that increase became effective. After the passage of Section 4 of Addendum No. 1 of Decision No. 147, which authorized graduated decreases, the employees contended that this Addendum should be applied exactly as it read; that is 10 cents an hour for baggage and parcel room employees, 6 cents for foremen and sub-foremen, 6 cents for clerks with two or more years' experience, and 13 cents for clerks with experience of 1 year in railroad clerical work. The carrier contended that, as the employees were treated as one class in increasing their wages, to segregate them into different classes and apply the decrease authorized by Decision No. 147, would create differentials which had not heretofore existed; that they should be considered as one class in applying the decrease and that the 10 cents per hour was the proper decrease to be applied, which position was sustained by the Board.—*Decision No. 621.*

Foreign Railway News

Rail Strike in Germany

In spite of a presidential decree forbidding under heavy penalties any such action, a strike was declared on the railways of Germany beginning at midnight, February 1. Enginemen, trainmen and station masters are the employees affected, although other workers may join them. It is expected that the government will fight the strike with all its resources.

Financial Details of L. & N. W.—

L. & Y. Amalgamation

The following details of the merger of the Lancashire & Yorkshire with the London & North Western, previously mentioned in these columns, will convey in general the financial arrangements agreed to.

1. Holders of L. & Y. 3 per cent debenture stock will receive in exchange a like amount of London & North Western 3 per cent debenture stock.

2. Holders of L. & Y. 6 per cent minimum preference stock will for each £100 of such stock receive £150 L. & N. W. 4 per cent guaranteed stock (which, of course, will yield the same income). Since in the L. & Y. these stockholders were entitled to share pro rata with common stockholders all dividends over 6 per cent, a further £6 5s is added, allowing the holders of L. & Y. 6 per cent minimum preference stock a total of £156 5s of L. & N. W. 4 per cent guaranteed stock for each £100 of the former holding.

3. Holders of L. & Y. 4½ per cent minimum preference stock will receive £125 of L. & N. W. 4 per cent guaranteed stock for each £100 of the former, i. e., a yield of 5 per cent (the £25 in compensation for lower rate of dividend and relinquishing of rights to share with common stockholders all dividends over 4½ per cent).

4. Holders of L. & Y. 4 per cent guaranteed stock will receive a like amount of the same L. & N. W. stock.

5. Holders of L. & Y. 3 per cent preference stock will receive for each £100 thereof £75 of similar 4 per cent stock of the L. & N. W. (same dividend yield).

6. Holders of 5 per cent redeemable preference stock (redeemable June 30, 1926) of the L. & Y. will receive similar stock of the L. & N. W.

7. Holders of each £100 of L. & Y. ordinary shares will receive £73 of L. & N. W. ordinary stock.

8. Heretofore L. & N. W. preference shareholders had the voting power only in cases affecting their interests, while L. & Y. preference shareholders had full voting powers. Hereafter all preference shareholders will vote on all questions the same as the holders of ordinary shares.

The chairman of the London & North Western at the meeting of the L. & N. W. stockholders where the plan was announced, said in part:

"We took the earning capacity of the separate undertakings as the fair and only reasonable basis for amalgamation, and this basis has been adopted in the recent Railways Act as a direction to the Amalgamation Tribunal in assessing the value of the respective undertakings. We took the year 1913, which was the last complete year under normal conditions, when the North Western paid 7 per cent on its ordinary stock and the Lancashire & Yorkshire paid 4½ per cent and assessed the earning value of the two companies on that basis. We, however, as the company making the offer, added a small advantage to the holders of Lancashire & Yorkshire ordinary stock, which both companies considered only fair and reasonable. To sum up the position it is this: The boards of the two companies are mutually satisfied that the proposed amalgamation will be to the advantage of their respective stockholders. The London & North Western, as the larger of the companies, is practically absorbing the other, and as we were the wooing party, we have thought it well to deal perhaps somewhat generously on an income basis with the other party concerned."

Equipment and Supplies

Locomotives

WINSTON & Co., Kingston, N. Y., has ordered 1 Prairie type locomotive from the American Locomotive Company. This locomotive will have 16 by 24 in. cylinders and a total weight in working order of 107,000 lb.

THE STEWART JONES COMPANY, Rock Hill, S. C., has ordered 1 four-wheel type tank locomotive from the American Locomotive Company. This locomotive will have 14 by 28 in. cylinders and a total weight in working order of 79,000 lb.

THE UNIVERSAL PORTLAND CEMENT COMPANY, Chicago, has ordered 1 six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 20 by 26 in. cylinders and a total weight in working order of 142,000 lb.

TEXAS GULF SULPHUR COMPANY, 47 East Forty-second street, New York City, has ordered 1 Consolidation type locomotive from the American Locomotive Company. This locomotive will have 21 by 28 in. cylinders, a total weight in working order of 163,000 lb. and will be equipped with a superheater.

NEW YORK, ONTARIO & WESTERN, reported in the *Railway Age* of December 3, as inquiring for from 3 to 6 locomotives, has ordered 4 Mountain type locomotives from the American Locomotive Company. These locomotives will have 27 by 28 in. cylinders, a total-weight in working order of 317,000 lb. and will be equipped with superheaters.

Freight Cars

THE NORFOLK & WESTERN is inquiring for prices on a number of freight cars including 1000 gondola cars and 1000 hopper cars of 120 tons capacity.

THE CHICAGO, BURLINGTON & QUINCY is expected to place contracts the latter part of the week for a part of the 7,300 freight cars it has on inquiry.

THE EASTMAN CHEMICAL CORPORATION, New York City, has ordered from the General American Tank Car Corporation 1 tank car with a capacity of 6,000 gal.

Iron and Steel

THE MINNEAPOLIS & ST. LOUIS has ordered 3,000 tons of rail from the Illinois Steel Company.

THE CHICAGO UNION STATION COMPANY, which was noted in the *Railway Age* of January 21 as inquiring for structural steel, has placed an order for 17,000 tons with the American Bridge Company.

THE ILLINOIS CENTRAL has ordered 30,000 tons of 90 lb. rail, distributed as follows: 14,000 tons from the Tennessee Coal & Iron Company, 11,000 tons from the Illinois Steel Company, and 5,000 tons from the Inland Steel Company.

Machinery and Tools

THE VIRGINIA RAILWAY is inquiring for prices on 1 American ditching machine.

THE NEW YORK CENTRAL has ordered 1 40-ton gantry crane from the Niles-Bement-Pond Company, New York City.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 1 42-in. frog switch planer from the Niles-Bement-Pond Company and has also bought recently some tools including engine lathes, radial drills, a boring turning mill, wheel press, horizontal borer and a slotter.

Supply Trade News

Griffen S. Ackley, formerly from 1903 to 1909, president of the National Brake Company, Buffalo, N. Y., died in Brooklyn, N. Y., on January 23. Mr. Ackley sold his interests in the above company in 1909 and formed the Ackley Brake & Supply Corporation, with headquarters in New York City.

A. R. Hance has been appointed northwestern sales manager of the **Bucyrus Company**, South Milwaukee, Wis., with headquarters at 608 Pittock Block, Portland, Ore., succeeding **L. T. Russell**, who has resigned. Mr. Hance has been connected with the sales department of the company in the Central and Eastern territories for the past six years.

C. R. Naylor, of the western sales office of the **T. H. Symington Company**, at Chicago, has been appointed manager of sales of the **Forged Steel Yoke Corporation**, with headquarters in the Peoples Gas building, Chicago, effective February 1. The output of the Forged Steel Yoke Corporation will be sold and distributed by The T. H. Symington Company, which still retains Mr. Naylor's services.

A. W. Brown has been appointed assistant to the vice-president of the western district of the **T. H. Symington Company**, New York City, effective February 1. Mr. Brown will make his headquarters in the Peoples Gas building, Chicago. He was born on February 6, 1881, in New York City, and was educated at Trinity College of New York and Andover Academy, of Mass. Mr. Brown was connected with the Griffin Wheel Company from 1913 to 1919 and was then appointed manager of railway sales of the Air Reduction Sales Company, New York City, which position he now leaves to take up his new duties with the T. H. Symington Company.



A. W. Brown

The **Electric Storage Battery Co.**, Philadelphia, Pa., announces the consolidation of its various offices in New York City. That part of the sales force formerly located at the Exide factory branch, Sixty-fourth street and West End avenue, has been moved to the New York branch office at 23-31 West Forty-third street, which will hereafter be the headquarters also of the export sales department. Under the new arrangement, **F. L. Kellogg**, manager of the North Atlantic district embracing the New York, Boston and Rochester branch territories, **F. F. Sampson**, New York branch manager and **J. E. Kelly, Jr.**, export sales manager will be located at West Forty-third street offices. The change was effective February 1.

The **Doullut & Williams, Inc.**, the **Southern Lighterage & Wracking Company, Inc.**, and the **Shell Beach Land & Improvement Company, Inc.**, have been consolidated under the name of the **Doullut & Williams Company, Inc.**, New Orleans, La. The new company has a capital of \$1,000,000 and it will continue to carry on the different operations previously handled by the above-named companies. In addition to specializing in the design and construction of docks, wharves and industrial plants its operations include the undertaking and handling of various kinds of construction work in a department for each class of work, under the manage-

ment of a competent engineer of practical experience in the class of work handled by his department.

The **Northern Refrigerator Car Company** has been organized at Milwaukee, Wis., to operate 500, 40 ft. steel underframe refrigerator cars that are now being constructed by the **Haskell & Barker Car Company**, in addition to all of the cars heretofore operated by the **Cudahy-Milwaukee Refrigerator Line**, and the **Peacock Refrigerator Line**. The incorporators of the company are **Michael F. Cudahy**, **C. P. J. Kroeck** and **Charles O'Hara**, the latter serving as president of the company.

Ogle Construction Company

Carl F. Bledsoe, secretary of the **Ogle Construction Company**, Chicago, has been elected president succeeding **Robert A. Ogle**, deceased. **M. W. Powell**, vice-president, has been elected vice-president and secretary, and **J. G. Forster**, vice-president, has been elected vice-president and treasurer.

Carl F. Bledsoe was born in Texas in 1881, and after completing a collegiate course, enrolled as a student of the International Correspondence School, completing the course in civil engineering. He entered business with the **Gurley Engineering Company** at St. Louis, Mo., in 1904, as a draftsman and structural engineer. From 1906 to 1911, he was with the **Otto Gas Engine Works**, at Chicago, as a structural engineer in their railway construction department. During the latter year, he assisted in the organization of the **Ogle Construction Company** from which time he has served the company as secretary, in addition to supervising the engineering and construction policies of the company.

M. W. Powell, who has been elected vice-president and secretary, succeeding Mr. Bledsoe, as secretary, was born in Georgia, and is a graduate of the mechanical engineering department of the **Kentucky State University**, class of 1905. He entered business in the engineering department of the **Chicago & Alton**, in 1905, and during the next two years was employed by that company. During the latter year, he became office engineer with the **Chicago, Indiana & Southern**. From 1909 to 1913, he was designing engineer of locomotive fuel and water stations, for the **Otto Gas Engine Works** and the **T. W. Snow Construction Company**. In 1913, he became vice-president of the **Ogle Construction Company** in charge of engineering, which office he will continue to occupy in addition to his duties as secretary.

J. G. Forster, vice-president in charge of sales, who in addition has now taken over the duties of treasurer, was born in Baltimore, Md., in 1893. After graduating from the **Baltimore Polytechnic Institute**, he superintended the construction of the bulk sales distributing stations for an oil jobbing company at Baltimore, until 1917. During the war he served as officer in charge of fuel and forage, under the depot quartermaster at Atlanta, Ga. Upon his discharge in 1919, he became associated with the **Ogle Construction Company**.

Obituary

C. M. Woodruff, formerly railroad sales manager of the **B. F. Goodrich Rubber Company**, Akron, Ohio, was struck by an automobile truck on January 25, and died shortly afterward in the **Akron City Hospital**. At the time of his death Mr. Woodruff was 45 years of age and was business manager of the **Akron Board of Education**. Mr. Woodruff was a native of **Ashtabula county, Ohio**. He worked his way through **Oberlin College**, graduating in 1901, and then went to Akron and started as a trucker in the plant of the **B. F. Goodrich Company** in order to learn the business from the bottom up, from which position he was promoted to night foreman of the air brake hose department. From there he was taken into the railroad sales department as traveling representative. For a period of seven years he covered all the railroads in the South and Middle West, later being made railroad sales manager. He was elected a member of the **Akron school board** in 1917, and a year and a half later, after a service of 18 years with the **Goodrich Company** he accepted an appointment as business manager of the school board.

Railway Construction

CHICAGO, BURLINGTON & QUINCY.—This company, which was noted in the *Railway Age* of December 17 (page 1252), as contemplating the construction of a new passenger station at Aurora, Ill., has applied to the Illinois Commerce Commission for authority to proceed with this work.

CHICAGO GREAT WESTERN.—This company is accepting bids for the repair of its grain elevators at Omaha, Neb.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Miller Heating Company, Chicago, for the installation of a boiler washing system in its roundhouse at Chickasha, Okla., estimated to cost approximately \$30,000. A water treating plant will also soon be installed in connection with the above.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of a frame coaling station at Booneville, Ark., the cost of which is estimated at \$20,000.

CHICAGO UNION STATION.—This company will soon receive bids for the wrecking of the old baggage building on Canal street between Jackson and Adams streets. Following the wrecking of this building the concourse of the new union station will be constructed at that point.

GULF, COLORADO & SANTA FE.—This company, which was noted in the *Railway Age* of December 31 (page 1332), as contemplating the construction of a two-story freight station at Brenham, Tex., is now receiving bids for the building of this station. The work involved will include a two-story office building, 32 ft. by 36 ft., a warehouse, 32 ft. by 74 ft.; and a concrete platform 32 ft. by 128 ft. The building will be of brick construction, with concrete floors and a tar and gravel roof. The entire cost has been estimated at \$33,890.

ILLINOIS CENTRAL.—This company will construct a third track from Matteson, Ill., to North Junction, a distance of about 10 miles, and from Tucker to Kankakee, a distance of approximately 5 miles.

LOS ANGELES & SALT LAKE.—This company has awarded a contract to the Lynch-Cannon Company, Salt Lake City, Utah, for the construction of a two-story office building, 80 ft. by 200 ft., and a one-story freight station, 50 ft. by 600 ft. at Los Angeles, Cal. The structures will be of reinforced concrete and brick construction, the entire cost of which is estimated at \$210,050.

LOUISVILLE & NASHVILLE.—This company closed bids on January 30, for the construction of a Y. M. C. A. building at Hazard, Ky. The same company contemplates the construction of a packing and shipping shed at Biloxi, Miss.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company, in conjunction with the Chicago & Northwestern and the city of Ironwood, Mich., will receive bids until March 1 for the construction of a reinforced concrete viaduct, 1,500 ft. in length, over 23 tracks at Mansfield street, Ironwood, to cost \$220,000.

MISSOURI, KANSAS & TEXAS.—This company will construct a brick and stucco passenger station at Highland Park (Dallas), Tex., estimated to cost \$17,000.

MISSOURI PACIFIC. This company, which was noted in the *Railway Age* of January 21 as accepting bids for a reinforced concrete and stucco passenger station at Earle, Ark., has awarded the contract for this work to H. O. Hirsch & Company, St. Louis, Mo.

NATIONAL RAILWAYS OF MEXICO.—This company has awarded a contract to Dudley & Orr, El Paso, Tex., for the grading and the placing of corrugated iron culverts for 47 miles of railroad, extending from Lucero, Mex., to the property of the Erupcion Mining Company.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$615,592 for 15 years to pay back taxes due for 1921 in Alabama and Georgia and a short term loan.

BALTIMORE & OHIO.—*Authorized to Abandon Branches.*—The Interstate Commerce Commission has issued certificates authorizing the abandonment of the Pigeon Run Branch in Starks County, Ohio, 5.62 miles, and 2.76 miles of its Magnolia branch.

BOSTON & MAINE.—*Asks Government Loan.*—An application has been filed with the Interstate Commerce Commission for a loan of \$5,000,000 for 13 years for the purpose of refunding a loan to the company made last year from the revolving fund.

BUFFALO, ROCHESTER & PITTSBURGH.—*Six Months Guaranty Determined.*—The Interstate Commerce Commission has issued a certificate stating that it has finally determined the amount of the guaranty to this company for the six months period of 1920, amounting to \$1,693,771, of which \$161,271 is still due.

CENTRAL OF NEW JERSEY.—*Directors Resign.*—George F. Baker and Robert W. de Forest have resigned from the board of directors. The offices of chairman of the board, vice-president and general counsel and assistant to the president have been discontinued.

CHICAGO & ALTON.—*New Directors.*—Charles Hayden, chairman of the Chicago, Rock Island & Pacific, and Marcus L. Bell, vice-president and general counsel, have been elected to the board and executive committee of the Chicago & Alton. They succeed J. S. Mackie, who resigned because of ill health, and Roberts Walker, who withdrew because his duties in the bondholders' committee had ended.

CHICAGO & WESTERN INDIANA.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$223,000 of consolidated mortgage gold bonds to be delivered to the applicants' tenants in repayment of sinking fund advances.

CHICAGO, BURLINGTON & QUINCY.—*Band Issue.*—J. P. Morgan & Co., the First National Bank and the National City Company are offering the new issue of \$30,000,000 first and refunding mortgage 5 per cent bonds, due 1971, at 97, at which price the bonds yield approximately 5.17 per cent. The Interstate Commerce Commission amended its original order of January 17 fixing the price of these bonds at not less than 89½ per cent to provide that they should be sold at not less than 92½ per cent of par and accrued interest so that the total cost to the applicant would not exceed 5½ per cent. The bonds are issued under a new mortgage and cover by direct or collateral lien about 9,000 miles of road.

According to preliminary figures furnished the bankers by Hale Holden, president of the Chicago, Burlington & Quincy, the net income of the road for 1921, after deducting rentals and miscellaneous charges, was slightly over \$31,000,000, against interest charges on the company's funded debt of \$6,800,000. For the past ten years the Burlington has reported net income, after deducting rentals and miscellaneous charges, which has averaged more than four times the company's annual interest charges on the funded debt. With the exception of equipment trust certificates taken by the Railroad Administration, the Burlington has sold no bonds during the past seven years, and its funded debt today is nearly \$9,500,000 less than in 1909, with the result that its current interest charges are materially lower than those of ten years ago. Since 1901 the Burlington's surplus income and miscellaneous profits after charges have amounted to approximately \$466,000,000, of which \$223,000,000 has been paid out in cash dividends and about \$178,000,000 has been added to surplus. The bonds now being offered are not redeemable for twenty years, after which date the company has the option of retiring the issue as a whole at prices ranging from 107½ in 1942 to 103 for the last ten-year period prior to maturity.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Loan to War Finance Corporation Repaid.*—The War Finance Corporation has announced that its advance of \$1,400,000 to this company made on March 14, 1919, has been repaid in full. The railroad company has been authorized by the commission to procure the authentication and delivery to its treasurer of \$955,000 of first and general

mortgage 6 per cent gold bonds to be pledged from time to time as security for short term notes.

CHICAGO, ROCK ISLAND & PACIFIC.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$1,000,000 of general mortgage gold bonds to be used as collateral security from time to time for short term notes.

CHICAGO, ROCK ISLAND & PACIFIC.—Director Resigns.—John G. Shedd has resigned as a director in compliance with the Interstate Commerce Commission's ruling on interlocking directorates, and Carl Nyquist, vice-president, secretary and treasurer of the company, has been elected to succeed him.

Retirement of Notes.—The \$4,500,000 6 per cent collateral trust notes due February 1, 1922, were met by cash payment from the company's treasury.

COLORADO, WYOMING & EASTERN.—Receiver.—President F. B. Miller has been appointed receiver with headquarters at Laramie, Wyo. See *Railway Age*, November 19, 1921, page 1016.

DENVER & RIO GRANDE.—Reorganization Plan.—The reorganization plan, dated January 27, 1922, provides for the cancellation of the present first and refunding mortgage, the creation of two new mortgages, an exchange of the present first and refunding mortgage bonds for 50 per cent of the junior issue of the two new mortgage bond issues and 50 per cent in new cumulative preferred stock, and the provision of \$10,000,000 cash by the Western Pacific Corporation in exchange for new common stock of no par value.

An outline of the plan, as approved and adopted by the committee representing the holders of first and refunding mortgage five per cent bonds, follows:

During the last year at a judgment sale, the Western Pacific Railroad purchased the property of the Denver & Rio Grande Railroad Company through a new company, under the name of Denver & Rio Grande Western and with the approval of the Interstate Commerce Commission became the owner of the entire capital stock of the new company. This amounted to 300,000 shares of no par value. The new company acquired the property subject to the bonds of the old company, but did not assume their payment.

The Western Pacific is now making an offer to the holders of the Denver & Rio Grande refunding 5% under which the refunding bond holders are to receive in exchange for their bonds 50 per cent in a new sinking fund mortgage 5 per cent bond due 1935 and 50 per cent in a 7 per cent cumulative preferred stock of the reorganized company, an average return of 6 per cent. According to the plan the Western Pacific agrees to put \$10,000,000 in cash or property into the reorganized company, for which it will receive only common stock, "thereby increasing the amount of the equity behind the new securities." Future financing is provided for by a new senior unifying mortgage bond for the purpose of refunding of the underlying bonds for future additions and betterments. None of these bonds, however, are to be issued at present.

One of the important features of the plan is the reduction in bonded debt from \$125,956,000 to \$101,669,000, a decrease of \$23,387,000 and a reduction in the fixed charges from \$5,896,940 to \$4,613,160, a decrease of \$1,283,780.

It is provided that the plan shall not become operative unless the Western Pacific Corporation and the committee shall otherwise agree, unless the holders of at least 50 per cent of the outstanding refunding bonds, not including bonds on deposit under the adjustment mortgage, nor bonds held in the sinking fund under the refunding mortgage, nor bonds held in the treasury of the new company, shall become bound by the plan on or before May 28, 1922, or a later date fixed by agreement between the committee and the Western Pacific Corporation; and if the holders of more than 50 per cent and less than 80 per cent of the refunding bonds, as above specified, shall become bound by the plan prior to that date (or a later date fixed by agreement as aforesaid), the plan may be declared operative by the Western Pacific Corporation, by written notice to that effect given to the committee, and in the same event, upon the giving of such notice, the plan shall thereupon become operative; but if the holders of 80 per cent of the refunding bonds, as above specified, shall become bound by the plan prior to that date (or a later date fixed by agreement, as aforesaid), the plan may be declared operative by either the Western Pacific Corporation or the committee, by written notice to that effect given to the other party and in the same event, upon the giving of such notice to either party the plan shall thereupon become operative.

J. H. Young, the president of the new company, estimates that it will be necessary to expend upon road structures and equipment in the next five years, including a small expenditure for extensions, not less than \$20,670,237. For the eleven months ended November 30, 1921, the company showed net revenues of \$4,405,677, which, added to other income, made a total income of \$5,111,851. After allowing for various charges, however, the road showed a deficit amounting to \$3,328,105.

The 5 per cent refunding bondholders' protective committee consists of the following: J. E. Young, president of Brown Brothers & Co., chairman; Burton Carter, John D. Rockefeller, Charles Hasden of Hasden, Stone & Co., Andrew I. Miller of Boessevain & Co., Frederick Strauss of J. and W. Seligman & Co., Melvin A. Traylor, president, First Trust & Savings Bank, Chicago. The committee represents a very large amount of the refunding bonds and it recommends bondholders deposit under the plan.

New Committee Opposes Plan.—An independent committee representing the Denver & Rio Grande first and refunding

mortgage 5 per cent bonds and the adjustment mortgage 7 per cent bonds has been formed with James H. Perkins, president of the Farmers Loan & Trust Company, chairman.

The other members of the committee are R. Walter Leigh, of Maitland, Coppel & Co.; John G. Lonsdale, president of the National Bank of Commerce, St. Louis, and John H. McClement and Willis D. Wood, of Ladd & Wood.

The committee, headed by Richard Sutro, also representing the 7 per cent cumulative adjustment mortgage Denver & Rio Grande bonds, announced the receipt of a letter from Samuel Untermyer, counsel for the committee, advising against consenting to the proposal made by the Western Pacific. The committee also announced that it has arranged with the Farmers' Loan and Trust Company to advance the amount of the February 1 interest coupon on the 5 per cent bonds to depositing bondholders.

DETROIT, TOLEDO & IRONTON.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$451,000 of 5 per cent gold bonds maturing March 1, 1964, to reimburse the treasury for expenditures made between July 1, 1920, and July 1, 1921, for improvements, betterments and additions to permanent facilities.

GREAT NORTHERN.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$30,000,000 of general mortgage gold bonds to be sold at not less than 93 1/2 per cent of par and accrued interest. Of the proceeds \$15,000,000 is to be used to pay the note to the United States maturing March 1, \$2,800,000 for the retirement of bonds of the Minneapolis Union, \$4,170,000 for the purchase of equipment, and \$7,215,000 for additions and betterments.

ILLINOIS CENTRAL.—Asks Authority for Equipment Agreement.—This company has filed with the Interstate Commerce Commission an application for authority to execute an agreement with the Pullman Company under the terms of which the purchase price of 650 refrigerator cars being built by the Pullman Company, \$1,748,500, is to be paid in semi-annual installments at the rate of \$650 a day on a lease basis.

INTERNATIONAL & GREAT NORTHERN.—Protective Committee Asks Reorganization Plan.—Frederick Strauss, chairman of the protective committee of the three-year notes, after a meeting of the committee on Tuesday, announced that De Witt Millhauser of Speyer & Co., had been elected a member of the committee. J. & W. Seligman & Co. and Speyer & Co. were urged by the protective committee to submit a plan of reorganization of the International & Great Northern properties.

JACKSONVILLE TERMINAL.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$4,000,000 of refunding and extension mortgage bonds to be guaranteed by the Atlantic Coast Line, Florida East Coast, Seaboard Air Line and Southern. Part of the issue is to refund outstanding obligations and \$1,100,000 is to be sold bearing interest at 6 per cent at not less than 95 per cent of par.

KANSAS CITY & PACIFIC.—Bond Interest.—The New York Stock Exchange has received notice that the interest matured August 1, 1921, on the 4 per cent 100-year bonds, due 1990, will be paid on presentation of coupons on and after January 31, 1922. The committee on securities ruled that the bonds be quoted ex-interest on January 31, the August 1, 1921, coupon, and that thereafter the bonds will be dealt in "flat" and until further notice must carry February 1, 1922, and subsequent coupons to be a delivery.

MISSOURI KANSAS & TEXAS.—Reorganization. J. & W. Seligman & Co. and Hallgarten & Co., reorganization managers, have called the attention of bondholders to the fact that the extended period for the deposit of securities will expire on Saturday, February 4.

A few holders of certificates of deposit for the M., K. & T. second mortgage 4s, the first extension 5s, the first mortgage 5s and the M., K. & T. first 5s are still under the misapprehension that they need take no affirmative step in order to participate in the reorganization plan, but it is necessary for them to present their certificates of deposit to be stamped as assenting to the plan.

WISCONSIN CENTRAL.—Minority Holders Begin Inquiry.—W. J. Wollman and associates, representing the minority common stockholders, are planning an investigation of the road's financial condition to determine if its resources have been handled in any manner detrimental to their interests.

The road constitutes the Chicago entrance for the Canadian Pacific, being controlled through the Minneapolis, St. Paul & Sault Ste. Marie which owns 51 per cent of the Wisconsin Central common shares. The common stock has never paid a dividend, and the question has been raised whether the Wisconsin Central has not been made to bear too great a portion of certain charges thereby benefiting the Soo Line, and also the Canadian Pacific. The Wisconsin Central minority interest which proposes investigation represents 25,000 shares of common stock.

Tentative Valuations

The Interstate Commerce Commission has announced the tentative valuation of the property of the New York, Ontario & Western, including its leased lines, in which the final value as of June 30, 1916, is stated as \$34,495,193 for the property wholly owned and used, and \$10,556,177 for property leased, making a total of \$45,051,370 for the property used. The capitalization outstanding as of the valuation date was \$88,245,982.

The commission has also issued tentative valuations of the property of the Butler County Railroad as of 1916, in which the final value is stated as \$910,396 for the property used and \$907,490 for the property owned. The final value of the property owned by the Central Union Depot & Railway Company of Cincinnati as of 1915 is given as \$970,808 and the property used as \$1,095,678. For the Artesian Belt the final value of the property owned and used as of 1917 is given as \$443,281. The final value of the New Mexico Central as of 1916 is placed at \$1,365,024, and of the Southern Railway in Mississippi as of 1915 at \$4,678,545 for the property used and \$4,470,534 for the property owned.

Additional Equipment Trust Sales

The director general of railroads has announced additional sales, at par plus accrued interest, of railroad equipment trust certificates held by the government as follows:

To Lee, Higginson & Co., New York:	
Kansas City Terminal, 1923-27, inclusive.....	\$62,500
Terminal Railroad Association of St. Louis, 1923-1927, inclusive.....	114,000
Indiana Harbor Belt, 1923-1927, inclusive.....	196,500
Monongahela Railway, 1923-1927, inclusive.....	164,500
	\$337,500

To Guaranty Trust Company of New York and associates:	
Pere Marquette Railway Company, 1923-1935, inclusive.....	\$5,834,400
To Harris, Forbes & Co., New York:	
Maine Central Railroad Company, 1923-1935, inclusive.....	695,500

The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$218,132,100.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Colorado Midland	\$319,000
Carolina & Northwestern.....	95,000
Blue Ridge	5,500
Tallahassee Falls	3,000
Pacific Coast.....	25,000
Memphis Union Station.....	10,000

Dividends Declared

Cleveland & Pittsburgh.—Guaranteed, 1 1/4 per cent, quarterly; special guaranteed, 1 per cent, quarterly; both payable March 1 to holders of record February 10.

TREND OF RAILWAY STOCK AND BOND PRICES—AVERAGE PRICE OF 20 REPRESENTATIVE RAILWAY STOCKS.

Close of Business			
January 31	Last Week	Last Year	
56.35	56.97	57.76	

AVERAGE PRICE OF 20 REPRESENTATIVE RAILWAY BONDS

Close of Business			
January 31	Last Week	Last Year	
81.53	82.02	76.29	

Railway Officers

Executive

George F. Baker has resigned as chairman of the board of directors and as a director of the Central of New Jersey and the office of chairman has been abolished.

George A. Shwab was elected vice-president of the Tennessee Central, with headquarters at Nashville, Tenn., at a meeting held by the board of directors on January 26.

Financial, Legal and Accounting

Robert W. DeForest, vice-president and general counsel of the Central of New Jersey, has been appointed general counsel, the position of vice-president and general counsel having been abolished, effective February 1.

L. M. Hannaford has been appointed assistant real estate and tax agent of the Central of New Jersey with headquarters at New York, succeeding **Albert A. Hesser**, promoted to manager of the marine department, effective February 1.

Walter Stokes, general attorney of the Tennessee Central, was elected general counsel at a meeting held by the board of directors in Nashville, Tenn., on January 26. **P. D. Houston** was elected treasurer, **W. T. Hale**, secretary and **W. M. Mooney**, comptroller. **H. E. Norton** was appointed assistant treasurer and **A. R. Baker** assistant secretary. All of the above officers will have their headquarters in Nashville.

Operating

Charles H. Stein has been appointed general manager of the Central of New Jersey, with headquarters at New York, effective February 1. Mr. Stein will have charge not only of the operating department but of the engineering, mechanical and marine departments as well. Mr. Stein was born at Baltimore, Md., in 1871 and was educated in the Baltimore City College. He began his railroad career on December 7, 1889, as a rodman on the Western Maryland, and from that time until 1893 was transitman and assistant engineer on preliminary surveys and construction. From 1893 until May, 1903, he was assistant roadmaster on the same road and from then until June, 1905, was assistant supervisor for the Philadelphia & Reading at Reading, Pa. In 1905 he was promoted to supervisor. Two years later he entered the service of the Central of New Jersey as engineer, maintenance of way, and held that position until appointed superintendent in February, 1914. In 1918 he became assistant general manager of that road and of the Philadelphia & Reading. On March 1, 1920, he became assistant to the president of the Central of New Jersey, which position he was holding at the time of his recent appointment as general manager. The position of assistant to the president has been abolished.

F. J. Gavin, general superintendent of the Lake district of the Great Northern, with headquarters at Superior, Wis., has had his jurisdiction extended over the Dakota division.



C. H. Stein

J. L. Close, superintendent of the Breckenridge division, with headquarters at Breckenridge, Minn., has had his jurisdiction extended over the line from Wahpeton Junction, N. D., to Moorhead Junction, Minn., while J. E. O'Brien, superintendent of the Dakota division, with headquarters at Grand Forks, N. D., has had his authority extended over the Northern division. The jurisdiction of J. A. Frogner, superintendent of the Willmar division, with headquarters at Willmar, Minn., has been extended over the Sioux City division.

Albert A. Hesser, assistant real estate and tax agent of the Central of New Jersey, has been appointed manager of the marine department, effective February 1. Mr. Hesser was born at Mahanoy Plane, Pa., on July 8, 1886. He was graduated from Pottsville (Pa.) High School and from Lehigh University—from the latter institution in 1911 with a degree in civil engineering. In 1915 he received the degree of bachelor of laws from the Brooklyn (N. Y.) Law School and was admitted to the New York bar in 1917. Mr. Hesser entered the service of the engineering department of the Central of New Jersey in 1912, was transferred to the freight department in 1916 and later in the same year became an industrial engineer in the real estate and tax department. Mr. Hesser enlisted in the army in September, 1917, and was discharged in August, 1919, with the grade of captain of engineers. He returned immediately to the service of the Central of New Jersey and was appointed assistant real estate and tax agent on March 1, 1920, which position, as noted above, he was holding at the time of his recent appointment.

Traffic

J. F. Moses, division passenger agent of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., has been promoted to assistant general passenger agent, with the same headquarters.

William H. Millard, city freight agent of the Northern Pacific, with headquarters at Chicago, has been promoted to general agent, with headquarters at Cleveland, Ohio, succeeding R. J. Tozer, who has been transferred to Pittsburgh, Pa.

F. V. Martin, formerly agent in charge of the consolidated ticket office at Indianapolis, Ind., has been appointed general agent of the Chicago, Indianapolis & Louisville, with the same headquarters, the consolidated ticket office having been discontinued.

W. S. Ferstel has been appointed district passenger agent of the Illinois Central, with headquarters at Chicago. P. S. Mottz, traveling passenger agent, with headquarters at Chicago, has been promoted to special passenger agent, with the same headquarters.

Arthur B. Smith, whose appointment as passenger traffic manager of the Northern Pacific, with headquarters at St. Paul, Minn., was announced in the *Railway Age* of January 21 (page 256), was born at Boston, Mass., on September 15, 1861. He entered railroad service in 1880, as a clerk in the chief engineer's office of the Burlington & Missouri River (Chicago, Burlington & Quincy) at Omaha, Neb., and was successively division engineer, chief clerk to the chief engineer, chief clerk to the general superintendent, chief clerk to the general passenger agent, and assistant general passenger agent, until November 1, 1901, when he left to become auditor of the Yellowstone Park Company. He re-entered railroad service on May 1, 1904, as assistant general passenger agent of the Northern Pacific, with headquarters at St. Paul, Minn., which position he held until December, 1906, when he left to become general traffic manager of the Consolidated Railway at New Haven, Conn. In March, 1908, he was appointed general passenger agent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., which position he was holding at the time of his recent appointment.

Mechanical

Frederick A. Isaacson has been appointed assistant mechanical engineer of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan.

D. J. Durrell, master mechanic of the Pennsylvania, Southwestern Region, with headquarters at Cincinnati, Ohio, has been transferred to Lancaster, Ohio, succeeding R. J. Sponseller, who has been acting master mechanic.

W. C. Smith, assistant mechanical superintendent of the Missouri Pacific with headquarters at St. Louis, Mo., has been promoted to mechanical superintendent with the same headquarters succeeding J. E. O'Brien, resigned. Mr. Smith will be succeeded by Charles Harter who will also continue to perform his duties as mechanical engineer.

With the leasing of the Erie car shops at Youngstown, Ohio, to the Youngstown Equipment Company, W. W. Warner has resigned from the position of shop superintendent of the Erie to become manager of the Youngstown Equipment Company. Webster E. Harmison, master mechanic at Kent, Ohio, will have jurisdiction over all car department matters formerly handled by Mr. Warner.

Purchasing and Stores

E. R. Brinton has been appointed general storekeeper of the Chesapeake & Ohio of Indiana, and of the Cincinnati division of the Chesapeake & Ohio, with headquarters at Covington, Ky. J. P. Kavanaugh has been appointed general storekeeper of the Eastern division of the Chesapeake & Ohio, with headquarters at Clifton Forge, Va. The position of inspector of stores has been abolished.

G. W. Bichlmeir, whose appointment as general purchasing agent of the Union Pacific, with headquarters at Omaha, Neb., was announced in the *Railway Age* of January 28 (page 306),



C. W. Bichlmeir

was born at Cincinnati, Ohio, on September 10, 1886. He entered railroad service in 1906 as a clerk in the office of the purchasing agent of the Cincinnati, Hamilton & Dayton (Baltimore & Ohio). In 1909 he left to become a clerk in the supply department of the Missouri Pacific at St. Louis, Mo., and the following year he was promoted to chief clerk to the division storekeeper at Osawatimie, Kan., which position he held until January, 1911, when he left to become chief clerk to the general storekeeper of the Kansas City Southern at

Kansas City, Mo. Mr. Bichlmeir left railroad service in 1917 to engage in other business. He re-entered the employ of the Kansas City Southern in April, 1918, as chief clerk to the purchasing agent and, in August of the same year, he was promoted to assistant to the purchasing agent. He was promoted to purchasing agent with headquarters at Kansas City, Mo., in March, 1920, and in November of that year he left to become purchasing assistant of the Union Pacific, with headquarters at Omaha, Neb., which position he was holding at the time of his recent promotion.

Special

H. B. McCoy, director of the government-owned Manila Railroad, has been elected general manager of that road, succeeding E. J. Westerhouse.

Obituary

Herbert D. Howe, vice president and general counsel of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, died at his home in that city on January 29.

EDITORIAL

Railway Age

EDITORIAL

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Charles Hayden, chairman of the board of the Chicago, Rock Island & Pacific, recently sent a letter to the stockholders of

Stockholders Must Be Educated

that system which is well worth a wider circulation among those who are interested in the railway problem; it is reproduced on another page of this issue. Railroad credit must be improved and the roads must be placed in shape for the peak load that will surely come upon them sooner or later. The credit can only be restored when the public understands fully the facts of the railroad situation and the prime necessity, purely in its own interests, of strengthening and improving them. Mr. Hayden has shown excellent judgment in talking so frankly to the stockholders of his road. Secretary Hoover, representing the public and testifying before the Interstate Commerce Commission last week, was equally frank, as indicated by the rather complete draft of his statement which appears elsewhere in this number. If railroad credit is not restored and the transportation machine fails when business revives, then it is quite possible for industry to lose tremendous sums of money because of lack of transportation, as is so clearly indicated by Mr. Hoover. After all, the public, as well as the stockholders, are partners in the railroad game, and it is greatly to be regretted that so many interests are at work in distorting the facts about railroad operation and finance and misrepresenting the railroads to the public. More power to men like Mr. Hayden and Secretary Hoover who frankly and fearlessly state the real facts.

The main points in our editorial of January 14, on the lesson of the Woodmont (Pa.) collision, might be repeated this week

The Lesson of the Last Collision

in connection with a collision at Camps, Texas, reported in another column of this issue. We notice this report, at this time, as a reminder that our observations in the former editorial are neither untimely nor overdrawn. The emphasis placed by the federal and state inspectors on other lessons of the Woodmont disaster should not be allowed to obscure the immediate lesson; the lesson that the block system is needed everywhere, on thin lines, as well as on busier ones, and that the manual block system, *properly managed*, is the only satisfactory scheme where automatic signals have not been installed. The venerated American train-dispatching system has long since written its own epitaph. The qualifying clause which we have italicized is the main point of the present lesson, for the block system was ostensibly in force both at Woodmont and at Camps, but under such very inadequate rules that the system was little better than a farce. This has been the main feature in a great many other government reports of this kind. It is a feature in which a sweeping reform is needed. The annual government report represents a large mileage of railroad as operated by the block system, in name, but which is not thus operated in fact. At Camps the dispatcher changed meeting points at the last minute; one of those typical cases where, to the casual observer, trainloads of passengers seem to be moved with as much freedom and with as narrow margins of protection against collision, as though they were nothing but checkers on a checker-board.

On Monday of this week W. B. Storey, president of the Atchison, Topeka & Santa Fe, authorized the statement that

The Outlook Continues to Grow Brighter

that road will spend \$43,150,000 for improvements and additions to its property this year. Of this amount \$11,750,000 has been set aside for the completion of work held up during the depression, \$22,000,000 for new work and \$8,000,000 for equipment. Particularly significant is the appropriation of over \$6,600,000 for additional main lines and \$1,400,000 for the construction of a 55-mile extension in southwestern Kansas, which is understood to be the forerunner of other lines in contemplation later in the season. On the following day the Chicago, Burlington & Quincy placed orders for 7,300 cars, involving an expenditure of nearly \$15,000,000. Coming as these developments do after other large equipment orders of recent weeks and after the awarding of an increasing number of contracts for improvements to roadway and structures, they indicate that many of the roads are not only seeing indications of better earnings which are warranting them in making these expenditures, but that they also see a revival of business which will require these added facilities.

The proposed order of the Interstate Commerce Commission on train control calls for immediate intensive study

Train Control Demands Careful Study

of this subject by the roads affected and also by those which may be required to make installations later. Heretofore this subject has been given more or less desultory attention, even since the passage of the Transportation Act which empowers the Commission to issue an order such as has recently been prepared. The time is now here when certain railroads must consider train control carefully and in their choice of a device it is necessary that the costs of installation, operation and maintenance receive serious consideration. These points will no doubt exert a marked influence in the selection finally made. However, deliberation also should be given as to the manner in which train control may be applied for bettering the present train operating methods in the future through the medium of the proposed installations. The roads which attempt to meet an immediate need only by preparing plans with the idea of "getting by" will find this expensive when a re-arrangement is required to meet the advanced operating practices which are being advocated. The responsible executive officers will do well to see that proper consideration is given to this question now.

The cupola on a caboose is such an institution in this country that a suggestion that it be abandoned would be a bold one.

Why the Cupola?

Nevertheless on at least one important road the cupolas have for the most been boarded up. The contention is that the train crew can detect hot boxes and dragging brake rigging much better from the lower windows than they can from the top. Such a conclusion seems logical but, on the other hand, it might be said that conditions in the cupola are such that constant

watchfulness on the part of the crew can be obtained with a minimum of discomfort, whereas peering from one of the small side windows necessitates an unnatural, cramped position. This condition might be remedied by providing adequate facilities for observation from the side windows. Cross seats could be built and a larger window, perhaps slightly extended with a narrow pane to permit a view forward without opening the side window, could be installed on each side of the car. Cupolas are expensive to maintain and make the heating of the cars difficult in winter. Perhaps they should be done away with on some roads. The provision of equally adequate facilities for constant watchfulness at the side windows, however, would strengthen the argument of those who take this view.

The principles of adjusted tonnage rating are familiar to most railroad operating men and practically all roads use this method in making up trains. Like many other things which have become familiar through long use it is taken as a matter of course and usually receives little attention. There is reason to question whether tonnage rating as ordinarily applied gives the best results that could reasonably be expected. There is more to this method than mere trial runs will disclose. Both the resistance of the cars and the tractive effort developed should be carefully checked to insure that the full capacity of the locomotive is being developed. Such an analysis will bring out some surprising facts. On one road a new device was put in service. The railroad complained that it was not giving the economy that was anticipated. Investigations showed that the locomotive was hauling too light a train and was not being worked to capacity and therefore the device was not functioning properly. The same thing might happen on any road. The only certain way to fix a rating that will get full capacity out of the locomotives and insure economical operation is to check the performance with a dynamometer car. Where it is not used the rating of locomotives cannot be more than a guess. Surely every large railroad would find many uses for a dynamometer car. Yet the number of roads that own and operate such equipment could be counted on the fingers of one hand.

Present Cost of Living, Wages and Rates

A DEMAND FOR GENERAL reductions of railway rates, both passenger and freight, has been voiced in the recent hearings before the Interstate Commerce Commission. The spokesmen of the railways have indicated a willingness to make general reductions of rates, but they have claimed that to make general reductions of rates unaccompanied by reductions of wages would be injurious to the country; that it would wipe out the net operating income of the railways and render them unable to make needed increases in their facilities.

The most recent official statistics throw new light upon the important questions of the present relationships, first, between the cost of living and railway wages, and, secondly, between railway wages and railway rates. The statistics of the United States Bureau of Labor were used by the representatives of labor as the highest authority on the cost of living, when they were seeking advances in wages on the ground that the cost of living made them necessary. The Department of Labor has this week made public statistics showing that in December, 1911, the average cost of living in the United States was 47 per cent higher than in December

1910. This is the lowest figure for cost of living that the Bureau of Labor has reported since before the war in Europe began.

How does the relationship between the present wages of railway labor and the cost of living compare with the relationship that existed between railway wages and the cost of living in 1910? The latest available statistics regarding railway wages are those of the Interstate Commerce Commission for September, 1921, which have just recently been made public, and there has been no change in wages since then. These statistics show that in September the average hourly earnings of railway employees were 61.3 cents as compared with 27.8 cents in the year 1910, or 121 per cent more. The railways in recent months have been handling slightly less traffic than in 1910. They have reduced the number of employees and the amount of their purchases as much as is consistent with the maintenance of their properties in a safe condition—in some cases, perhaps, more than this. In September they had 440,550 less employees than in the same month of 1920, a reduction of 26 per cent. Even after this drastic reduction of employees, however, they had on the pay roll in September, 1921, 1,718,330 men, or 4.3 per cent more than the average number employed in 1916. In spite of all the retrenchments made and the maintenance deferred, the eight-hour day and other rules and working conditions make it necessary to employ more men to handle the business than in 1910.

The use of the average increase of 121 per cent in hourly wages to indicate how much higher wages are than they were in 1910 has been criticized on the ground that it gives a false impression because the wages of some employees are not anywhere near this much higher than they were in 1910. There is justice in this criticism. The average hourly earnings of enginemen and trainmen in road service are only from 20 per cent for passenger engineers to 52 per cent for passenger baggagemen higher than they were in 1910. The facts indicate that, measured by the cost of living, there would be little or no justification for reducing the wages of some classes of employees.

But when it is shown that the increases of some employees have been comparatively small and at the same time that the average increase is still 121 per cent, it necessarily follows that the increases of some employees are much greater than the average. Bearing in mind that the cost of living is now only 47 per cent higher than in 1910, attention should be forcibly called to the relatively very large advances in wages that some employees are still enjoying and which are greatly inflating the cost of railway operation.

In September, 1921, car inspectors earned an average of 74.2 cents an hour, which is 201 per cent more than they received in 1910. Switch tenders are getting 55.4 cents an hour, which represents an increase in their pay of 181 per cent. Air-brake men are receiving 76.2 cents an hour, which is 166 per cent more than they received in 1910. Car repairers are getting 75 cents an hour, an increase of 157 per cent. Yard firemen are getting 65 cents an hour, an increase of 138 per cent. Section laborers are receiving over 37 cents an hour, an increase of 126 per cent. Boilermakers are receiving 79 cents an hour, an increase of 93 per cent; and owing mainly to changes in rules and classifications, there are 55 per cent more of them employed than five years ago. Machinists are getting 78.3 cents an hour, or 91 per cent more than in 1910, and there are 48 per cent more of them on the pay roll. Yard conductors are getting 80.4 cents an hour, or 109 per cent more than five years ago, and there are 17 per cent more of them on the pay roll. Blacksmiths are receiving 78.6 cents an hour, or 100 per cent more than in 1910, and there are 14 per cent more of them on the pay roll.

Here are ten classes of employees, including about 500,000

ten, each class of which are receiving average hourly wages representing advances since 1916 at least twice as great as the increase in the cost of living, and some of them enjoying increases over four times as great as the increase in the cost of living.

Compare these advances in wages with the advances in rates which have been made. Average railway rates in 1916 were the lowest in the history of the United States. The average rate per ton per mile in September, 1921, was 80 per cent more than in the year 1916; the average rate per passenger per mile, 53 per cent more. Because the advances in rates have been so much less than the advances in wages, and because the wages of labor constitute the bulk of railway expenses, substantial reductions of rates are incompatible with the earning of adequate net returns by the railways unless reductions of wages are to accompany the reductions of rates.

Does the public prefer to have the railways continue to pay the present wages or to reduce both the wages and the rates? That is the practical question presented. The public might conceivably decide that maintenance of the present wage scales is desirable. In that case, it could not consistently object to paying the present rates. On the other hand, if it decides that the present rates must be reduced, then it must recognize the fact that this decision necessarily carries with it a decision that the present wages must be reduced. The rates and the wages must stand or fall together.

Fiction and Facts About "Weak" and "Strong" Railroads

ONE ceases to wonder that many of the people of the United States in general, and of the state of Iowa in particular, misunderstand the railroad situation and favor unfair and ruinous regulation when one reflects on the amount of incorrect information that constantly is given them. The Des Moines Register in an editorial in its issue of January 26, entitled "What Railroads Overlook", affords some striking examples of the kind of railroad "information" often given to the public.

Some time ago the Register published a statement based on computations by Clifford Thorne as to the market value of railway stocks and bonds in July, 1920, indicating that the value of the railways did not exceed \$13,000,000,000. The *Railway Age* criticised this. The Register now says: "The *Railway Age* did not dispute Mr. Thorne's figures. It merely contended that the selling value of the property at a time like this could not be made on the basis on which to fix earnings." This statement is highly misleading. What the *Railway Age* did was to show that a similar computation based on the prices of stocks and bonds on June 30, 1916, indicated that at that time the market value of all railway stocks and bonds was \$17,830,000,000, and that since then the investment made in railroad properties has been \$2,800,000,000. If the Register does not desire to mislead its readers regarding the valuation the railways are entitled to, why does it not give them the facts regarding what railway securities were worth before as well as after two years of government control had largely destroyed the earning capacity and credit of the railways.

The Register continues: "But leaving that and coming to the last six months' earnings of the railroads as the *Age* gives them, the point the Register makes against the railroads and against the *Age*, as the spokesman of the railroads, is that they do not meet their own problem, for it could be shown that the operating expenses of several of the strongest roads have not in the last six months run much above 55 per cent of their earnings, while the operating expenses of others have run into 90 per cent of their earn-

ings. Of what importance is the general average in the face of the fact that rates on the Union Pacific and Santa Fe are high enough to enable those roads to operate on nearly half of their earnings?"

There is not a correct statement in this quotation, except that the expenses of some roads have run into 90 per cent of their earnings. It is not true that the operating expenses of "several of the strongest lines" in the last six months of 1921 did not much exceed 55 per cent of their total earnings; there is not a single important railway system in the United States of which this is true. The Register specifically mentions the Santa Fe and the Union Pacific. Its examples are skillfully chosen. These two roads had among the lowest operating ratios in the months mentioned of any leading railways in the country. But in these six months the operating expenses of the Santa Fe System were 69.2 per cent of its expenses, and those of the Union Pacific System were 69.04 per cent of its expenses. The difference between 55 per cent and 69 per cent is important. If the operating ratio of the Santa Fe System, for example, had been 55 per cent instead of 69 per cent, its net earnings in these six months would have been \$16,000,000 larger than they were.

How about other so-called "strong" roads? The operating ratios of practically all of them were the lowest and their net earnings the largest in October that they were in any month of the year. Even in October, however, the operating ratios of nine of the strongest railways in the country were as follows: Delaware, Lackawanna & Western, 74; New York Central, 75; Pennsylvania, 83; Atlantic Coast Line, 85; Louisville and Nashville, 78; Illinois Central, 72; Santa Fe, 63; Union Pacific (not including system subsidiaries), 59; Burlington, 73.

Furthermore, the ratio of earnings to expenses does not correctly indicate how much a railway has remaining out of its earnings with which to pay interest and dividends and make improvements. To arrive at this, its taxes must first be deducted. The Santa Fe is one of the most prosperous railways in the country, yet in the last six months of 1921 its operating expenses and taxes took 77 per cent of its earnings, while in the entire year, 1921 they took 82 per cent of its earnings. The Register especially singles out the Santa Fe as a railway whose earnings are "twice what the service ought to cost." This road each year publishes in its annual report a statement showing the percentage of net return that it has earned annually on its investment in property since it was re-organized in 1896. This statement shows that never in any year has the Santa Fe system earned more than 6.85 per cent on its property investment and that its average return in 26 years has been only slightly over 5 per cent. In 1921 it was just about 5 per cent.

Having predicted that the *Railway Age* would not be drawn into a discussion of the relations between the weak and strong railways the Des Moines Register added: "Yet that is the very thing that has got to be met by the railroads themselves, for if they do not they are going to be judged by the earnings of the strong roads. . . . The people will not consent to rates to keep the Great Western on the profitable list. By doing so they enable the Santa Fe to take twice what the service ought to cost. . . . It would have been better for them (the railways) in the long run if they had permitted some sort of consolidation after the war. . . . They should be able to see clearly that in some way the unusual advantage of such roads as the Union Pacific has got to be used to maintain service on such roads as the Great Western."

The *Railway Age* has been discussing the relations between the "weak" and "strong" roads for years, and has no reason for hesitating to discuss them now. For many years railway financiers and managers voluntarily effected consolidations of weak and strong roads. Why are there still "weak" and "strong" roads in every part of the country?

Largely because the government of the United States, under the Sherman Anti-Trust Law, for almost 30 years, more and more strongly opposed all consolidations of railways which had even a remote tendency to reduce competition. The *Railway Age* criticised this policy for years because it prevented reasonable and desirable consolidation. Was not the Des Moines Register at that time opposing all consolidations that would reduce competition? Spokesmen of the railways, including the Railway Executives' Advisory Committee and the Association of Railway Executives, repeatedly presented to committees of Congress plans for changes in our system of regulation, and every one of these included modifications of the government's policy which would have authorized all consolidations of railways that the Interstate Commerce Commission might hold would not be prejudicial to the public interest. Nevertheless, the Sherman Anti-Trust Law, as it applied to the railways under private operation, was kept in full effect until March 1, 1920. How can the railways, in the face of this record, be justly criticised for not having "permitted some sort of consolidation after the war"?

On March 1, 1920, the Transportation Act went into effect with provisions requiring the Interstate Commerce Commission to formulate a general plan for consolidation of all the railways into a limited number of continental systems. Since then the railways have had no power to effect any consolidations not in accordance with the Commission's general plan, and the Commission has not yet adopted any general plan.

But, it may be said, at least the railways are opposed to any general scheme for consolidating all weak roads with strong ones. But "the railways" as a whole have never taken any stand either for or against such a policy. Railway financiers and executives are virtually unanimous in believing that to both the railways and the public it would be beneficial for weak roads and strong roads in many cases to be consolidated. They differ, however, as to just what consolidations should be made and on what terms. There is not a class of students of the railroad problem in the United States,—public men, economists or shippers,—whose members do not disagree among themselves on this same subject. Should railway financiers and executives be denounced for disagreeing among themselves on a subject on which every other well-informed class of persons disagree?

There is one point regarding this matter of the weak and strong roads which is very pertinent but which the Des Moines Register ignores. Its statements imply that a "strong" road may keep all the net return it may earn. But the Transportation Act provides not only that the Interstate Commerce Commission shall fix rates which will yield the railways of each territorial group a fair return on their aggregate valuation, but also that if any railway earns more than 6 per cent upon its own valuation it shall pay one-half of the excess to the government. If, for example, a strong road should earn 10 per cent it would be allowed to retain only 8 per cent and required to give 2 per cent to the government. While the so-called 5½ per cent "guarantee" provision expires on March 1, this provision for the recapture of one half of earnings over 6 per cent will remain in effect unless and until repealed.

When the Des Moines Register talks about some railways earning large returns why does it ignore the fact that regardless of whether the average return earned by any group of railways is 6 per cent or 3 per cent, if a single railway in the group earns more than 6 per cent, the government gets one-half of the excess?

Railways have no right to complain of criticisms of them that are based upon facts fully and correctly stated. But criticisms of them which are based upon the incorrect statement of some facts and the ignoring of others which are closely related and highly pertinent are unjust both to the

railways and the public. They tend to create a public sentiment which will prevent a solution of the railroad problem based on knowledge and reason. There is more misinformation, prejudice and fanaticism on the subject of railroads, per square mile of area, in the state of Iowa than in any other state in the Union. Editorials such as the one in the Des Moines Register from which we have quoted help to explain why this is the case.

Co-operation

A SHIPPING CLERK in a local freight office of an eastern road recently addressed a letter to his management in which he said, in part, "I have been watching with particular interest the efforts of the roads to reduce the loss of freight revenue resulting from freight loss and damage claims. I have read the ideas and suggestions of our loyal workers and have in my own way tried to find some solution to this trying situation.

"There never has been a time when the better elements necessary to make the *real man* are needed more than now. The keynote of the whole matter is, What can I do?"

What can *he* do? Here is an interesting example of an employee of lesser rank who, not satisfied with the usual method of handling freight on his line and believing the freight claim problem to be capable of solution, has taken steps on his own initiative to help eliminate this waste and to prevent a continuance of this loss to his company. How many workers are striving towards the same goal of betterment and success, and on the other hand, what are the railroads doing to encourage such worthy aims from the rank and file of their employees? The answer is "few," in both cases.

His letter continued, "I believe that co-operation is a good thing, but how many of us fully realize what it takes to make it? Without individual effort and interest, co-operation will accomplish very little. However, if every man who participates in the handling of a freight shipment would feel his responsibility, and make it a point to do his part so well and carefully that no trouble would result while the shipment was in his custody, there would be little likelihood of any negligence mistakes or errors causing loss or damage to the freight while in transit."

There is no doubt as to the correctness of this employee's statement. Co-operation is the cure of the freight claim ill and many other ills connected with the operation of railroads. However, the matter of most concern is, how to get this co-operation? One sure way is to encourage such worthy motives as described above. Monthly conferences, advertising, employee magazines, the suggestion box, new idea contests, just remuneration and promotion, and many other like means, are all possible ways of bringing together those who, in the past, have been somewhat unnoticed, for it is the shipping clerk and the freight handler who come in contact with the actual handling of the freight, not the office superintendent or other supervisors. It might be well in some instances to establish schools where the ambitious employee could become more proficient in railroad service and have the opportunity of greater advancement which otherwise might not come; other large industries have tried this method with success. At any odds, get the men in the frame of mind of this shipping clerk, and human nature indicates that they will endeavor to improve their service and thus better themselves; rather this perhaps, than abide by the slogan of their labor union chiefs—as little work and the highest wages possible. The transition will be slow but co-operation can only be brought about by effective counter-propaganda to the present labor doctrines, showing the way to success and self-betterment.

The Future of the

Automatic Hose Connector

JUST HOW LONG before public interest in the automatic hose connector as a safety device will manifest itself in some form of compulsory regulation no one can say with assurance, but it may safely be assumed that such a manifestation will eventually take place. That the railroads are not entirely unaware of this is evident from the growing interest in the connector which has been shown during the past seven or eight years. Since 1915 no less than seven such devices have been on trial in actual service and it is safe to say that no device with any reasonable probability of operating successfully has been deprived of its opportunity for a demonstration. At least two connectors seem to have passed the experimental stage so far as their essential features are concerned and their service indicates that, like all of the important safety devices so far developed, they can more than pay their way.

If then the railroads are aware of the value of the connector as a safety device the use of which the public eventually may demand and there are practical connectors in the field that have proved to be real economy devices, what ought the railroads to do? The answer would be obvious if it were not for one important consideration. Several types of connector heads have been developed; only one of them can ever be placed on freight cars in interchange if the connector is to prove a blessing and not a curse.

There will be no extensive application of connectors to freight equipment until through some agency all but one type of gasket face and one type of gathering device has been eliminated. But who ought to do the eliminating? The railroads, or the companies who have toiled and struggled, each in a different way, to solve a difficult problem for the benefit of themselves, the railroads and humanity? If no other method is developed undoubtedly the railroads, acting through the American Railway Association, eventually will settle the matter. But the task will not be altogether a pleasant one and there is little likelihood of any effective action until it is forced by compulsory public regulation.

The suggestion that the companies that have developed successful connector devices take up the task may appear unreasonable on casual inspection. But it will stand a closer examination. It is evident that before the connector can obtain commercial success all but one type of head must be eliminated. This may be accomplished by the arbitrary adoption of a standard by the American Railway Association or through a pooling or interchange of patents under pressure from that organization. The history of the development of the automatic coupler suggests the probability of the second solution. In that case no special advantage will be obtained by any organization unless it is perhaps by those with the least to offer. In the meantime, while waiting for the force of public opinion to bring the matter to an issue, the advantages of the connector are denied to the railways and there may be many lean years for those who have made it a practical device before its ultimate status is established. Since those most interested in the development of the connector must ultimately get together, is it not reasonable to suggest that they do so voluntarily, thereby greatly hastening commercial success for themselves, added safety for railway employees and the opportunity for the enjoyment of the economic advantages of a well developed connector for the railroads?

THE CHICAGO & ALTON SHOPS at Bloomington, Ill., which have been on a 3 day a week working schedule since December 28, 1921, were placed on a 5 day schedule, on February 1. Officers of the road state the change bids fair to be permanent.

New Books

Electric Arc Welding. By E. Wanamaker and H. R. Pennington. 254 pages. 167 illustrations. Size 5 in. by 9 in. Bound in cloth. Published by Simmons-Boardman Publishing Company, Woolworth Building, New York.

The average user of electric arc welding apparatus will find this book suited to his needs, for it treats the subject thoroughly in language that is easy to understand. The authors hold positions as electrical engineer and supervisor of electrical equipment and welding, respectively, on the Chicago, Rock Island & Pacific. They are leaders in making new and successful applications of the electric arc welding process and have an everyday working knowledge of conditions encountered in actual practice.

The subject matter in the book is confined to autogenous electric arc welding and no attempt has been made to cover electric welding in its broadest sense. The book covers descriptions of welding systems and their installations, phenomena of the metallic and carbon welding arc, training of operators, methods for applying metal to various types of joints and building-up operations, electrode materials used, weldability of various metals, weld composition, thermal disturbances of parts affected by the welding process, physical properties of completed welds, efficiency of welding equipments, welding cost, etc.

This information is that which is most in demand for practical purposes and the book is one of the unusual books that cover a scientific subject without the aid of mathematics. It should be found useful both as an instruction book for teaching the layman the principles of welding and as a reference book for the welding operator.

Principles of Railroad Transportation by Emory R. Johnson and Thurman W. Van Metre. 617 pages. 5½ in. by 8½ in. Bound in cloth. D. Appleton & Co., New York.

Neither of the authors of this book needs any introduction to students of transportation. Dean Johnson's work, "American Railway Transportation," is a classic of railway literature and both collaborators are well known for their successful academic work in railway subjects. Indeed, the present work is an outgrowth of Dean Johnson's efforts to bring his "American Railway Transportation" up to date. In doing so he found that it was advisable to rewrite the entire work and "Principles of Railroad Transportation" is the result.

We know of but one other general treatise on transportation which follows railroad development through the passage of the Transportation Act. Of the two this book will be found in most respects the superior. It is with assurance, then, that the work is commended to the attention of every careful student of railway problems and to every railroad man who would have a broad view of the railway business as a whole.

The so-called "intelligence" test has become such a fad of recent years that many have doubtless ceased to see in it any real worth. Nevertheless, there is nothing which can so effectively bring home one's ignorance along some line in which he supposes himself to be well versed than a series of questions, admittedly fair, put to him by a recognized master. Therefore, aside from the timeliness of "Principles of Railroad Transportation" and its thoroughness, the list of questions on each chapter which appears in the appendix to the book is its most noteworthy feature. Schoolroom practice? Yes. But a method of helping the uninformed man of affairs to master the subject as well as to guide the college student who is seeking the same goal.

"What is meant by 'a service of a public nature'? Why did the federal government stop constructing and later stop aiding road building? What two mechanical features made Stephenson's 'Rocket' a success? What was the origin of the

Reading: Discuss the relative value of highways, waterways and steam railroads as means of transportation. How does the capital invested in railroads compare with that of other industries? What is meant by 'community of interest' and what is its effect? Would it be a wise policy to permit complete territorial consolidation of railroads? Discuss the various views as to the proper basis for railroad capitalization. Why do a third of American railway stocks yield no dividends? Discuss the origin and development of freight classifications. From what sources are the accounts regarding traffic, receipts and expenditures compiled? Is the railroad business a complete monopoly? What are the main provisions of the Interstate Commerce Act as amended to date?"—These are fair examples of the hundreds of questions appearing in the appendix.

At no time has an acquaintance with facts about our railroads been so important as the present. Every friend of the railroads knows that on every hand he hears charges which he is sure are false against the status quo. Armed with facts easily obtainable in a work of this character no one need let such misstatements go unchallenged.

Principles and Design of Foundation Brake Rigging.—121 pages, 74 illustrations. Published by the Air Brake Association, F. M. Nellis, Secretary, 165 Broadway, New York.

This book is unique in that it is the only comprehensive treatise that has ever been issued covering the fundamental underlying principles and their application to the design of foundation brake rigging. The first chapter is devoted to the theory of friction, the factors which effect its amount, the meaning of coefficient of friction and the friction between the brake shoe and the wheel and between the wheel and the rail. Following this is an explanation of what actually stops a railroad train and the sequence of events which then takes place.

The subject next taken up is that of leverage, first simple levers and then levers combined into various systems. The meaning of leverage ratio is explained and rules are given for calculating leverage with examples of their application to various types of foundation brake rigging. The effect of angularity of levers is also shown. Braking power and braking ratios are defined and reasons are given for the commonly accepted braking ratios for passenger and freight cars. The underlying principles having been explained, the subject of foundation brake rigging is next treated in detail. Some of the points covered are four and six wheel truck brakes, single shoe and clasp brakes, empty and load brakes, hand brakes, locomotive driver brakes, piston travel, efficiency of brake rigging and design of rigging members.

A chapter on retardation, calculation of train stops and retarding force necessary to control a train on a grade is followed by clear and concise definitions of the terms commonly used in discussions of braking and brake rigging. This completes a book which will be found to be an invaluable reference work to those who are interested in the vital subject of the application and use of air brakes on all types of rolling stock.

FRIDAY THE THIRTEENTH OF FEBRUARY, a passenger was in a *single late* in reaching North Elizabeth Station and attempted to board a moving train. Unfortunately he came in contact with the fence at the end of the station platform, was dragged some distance and sustained injuries from which he died a few days later. This is the substance of a message, on a small slip of paper, which, by direction of P. I. Grove, superintendent, was handed recently to all passengers on suburban trains of the Pennsylvania Railroad between Elizabeth, N. J., and New York City. Other notes, concerning car-low conduct by passengers, are being distributed at the same way.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Lights at Highway Crossings

BOSTON, MASS.

TO THE EDITOR:

Every reader must sympathize with you in your effort (January 14, page 166) to get the automobile crowd to use fewer red lights; but what grounds have you for hoping for any success? None at all. People everywhere are so greatly in love with red that the use of red lights is likely to increase rather than diminish. Moreover, if you could induce autoists to try yellow they would make a bad job of it. They would come out, within less than a year, with a dozen different tints, from a common kerosene flame to glass as dark as a total eclipse of the moon.

The true remedy for your trouble is to have a light set from six to ten feet above the ground; one on each side of every crossing. Mr. Morrison of the New Haven road, and Mr. Rudd of the Pennsylvania, have started the right practice, as illustrated in your paper of September 3 and October 29, 1921.

When roads with such numerous and complicated problems as those which the New Haven and the Pennsylvania encounter, have decided on a style of construction or plan of procedure for general use, it is safe to say that their examples merit careful attention and study. These large roads cannot deal with such questions in a superficial way, and the rest of us should avail ourselves of the results of their investigations and experience.

P. S. C.

Col. Shaughnessy's Military Career

NEW YORK.

TO THE EDITOR:

Among the many communications which you will no doubt receive with regard to the sad death of Colonel Edward H. Shaughnessy, Second Assistant Postmaster General, I wish to record a few words. I was closely associated with him as a fellow officer of the 13th Engineers from May, 1917, until he returned to the States in September, 1919. In fact the Colonel, Major Thos. M. Horton and myself were the first three reserve officers to be attached to the 13th Engineers in the Monadnock building and on the Municipal Pier in Chicago, and received the first reservists.

The Colonel's rise from a lieutenant in the 13th Engineers to the position held at his death marks a course of consistent study, hard work and absolute fair dealing with his fellow men.

In the Monadnock building in May, 1917, reservists and reservist aspirants were coming in in droves, and the Colonel was assigned to the job of "hand picking" the kind of railway men which the service demanded for the future success of the 13th Engineers. As the regiment filled up, he was assigned to the acting command of Company E—the North Western Company—and proceeded to organize and drill this company to a point where it never had any superiors; moreover, it probably furnished more future officers to the regiment than any other company.

While the regiment at that time only consisted of two

battalions of about 550 men and officers, it was split up into three provisional battalions for the purpose of movement to France. The first battalion was sent out of Chicago July 19, 1917, and the second and third two days later, all three passing New York in the same order of separation. The first arrived in Liverpool, thence to Borden Camp, August 1, and the 2nd and 3rd battalions on slower passages nearly two weeks later. Our final consolidation at Borden, a parade in London, with the 12th, 14th, and 17th Engineers, also with the 11th Engineers at Borden Camp is a matter of history.

We finally landed in La Havre, August 17. Colonel Shaughnessy, Capt. Holmes, Major Walter Johnson and myself, with a selected detail of about a hundred amateur stevedores, were left behind to unload our engineering equipment from the boat and forward it to Chalons sur Marne. This consisted of about 60 wagon loads (wagons in the European sense). Colonel Shaughnessy called it the carnival company, and it looked more like it than anything else. The balance of the regiment went on ahead of us, we following in about 36 hours.

At Chalons the Colonel commenced immediately his hard work of organizing the regiment in a railway scheme of things, blended of course with the necessary military aspect. Three weeks later, when we finally arrived at our permanent stand with Fluery sur Aire as G. H. Q., nearly every man was ready to fit into the right place. The Colonel, I consider, was more to be credited in getting things going in an orderly railway sense than any other officer. And he did this with such diplomatic tact, that I do not think you could ever find an officer of higher or equal rank, in whom he inspired any jealousy. If there ever was such, the cold facts of the matter are just these—that any others who could have done the same thing were at the time thoroughly willing to “let Ed. do it,” while those who knew nothing about the job were equally well pleased to see things going so nicely.

Following this, Colonel Shaughnessy immediately addressed himself to the task of getting up a simple English condensed translation, in one consolidated pocket edition, of four important French Railway rule books. This was later used by the Railway Transportation Corps throughout France.

Always studying, he made wonderful progress with the French language, which early in 1918 won him a place with the French Regulating Station at St. Dizier, where he immediately availed himself of the opportunity of mastering the fundamentals of “supply regulation.” This schooling made him the man of the hour to be sent to Chateau-Thierry in July, 1918, where he did much good work in straightening out the confusion which was the natural consequence of that operation.

In September, 1918, he arrived at Is sur Tille, as General Superintendent of lines entering the advance section, and during the following six months took the same untiring interest in the success of the railway lines of communication in the advance section as had marked his past year's work. Here he utilized his extensive experience as chief train dispatcher and trainmaster, coupled with the nerve to put through any reforms or system that the circumstances required. And always with that same political tact, which aroused no one's envy. Many a man with possibly equal ability would and did fall down from lack of diplomacy.

In March, 1919, Colonel Shaughnessy was made Deputy Director General of Transportation for the Advance Section at Chaumont, having charge of the railway transportation for the evacuation of over a million men, which was successfully accomplished in April and May, 1919.

In June, 1919, he was made Director General of Transportation at Tours, and during June, July and August the complete evacuation from the SOS, and the surplus from

the Army of Occupation was accomplished to within a few casual detachments.

He returned in September, 1919, to his former occupation on the Chicago & North Western, leaving there some six months later to become Assistant Director of Transportation of the Petroleum Institute. The end of about a year's service with the Institute was marked by his selection for the post held at the time of his death.

As a transportation expert, Colonel Shaughnessy had as broad a vision as any man I ever knew. That was not all, for in most cases his nerve would successfully accomplish what his convictions indicated was necessary. But the best, and perhaps the most important of all, was his ability to do these things without exciting envy or friction.

F. A. PARKER,
Major, Eng. Res. Corps.

[Major Parker was at one time a train dispatcher on the Chicago & North Western, and later chief train dispatcher on the Missouri and Iowa divisions of the Chicago, Rock Island & Pacific. He was closely associated with Colonel Shaughnessy from May, 1917 to November, 1917; as lieutenant of the 13th Engineers; again as a trainmaster in the advance section from September, 1918, to March, 1919, and then as his first assistant, as Asst. Supt. Transportation, Advance Section, March to June, 1919; and finally as General Supt. Transportation at Tours, June to September, 1919.—Editor.]

Sleeping Cars Drastically Criticized

NEW YORK

TO THE EDITOR:

Your recent editorial “Are Upper Berths Too High?” and your description of new sleepers for the Canadian Pacific brings up again a question which occurs in the minds of many laymen—Why has there been so little real advance in sleeping car architecture?

It is true we have advanced considerably from the pioneer sleepers with their rows of shelves upon which human beings reclined.

We have designed the compartment and the drawing room, admirable in their way, but extravagant in their use of space, cost to the passenger, and operating cost to their owner. In the ordinary straight berth sleeper we have shown very little progress. This car is essentially what its forerunners were, saving numerous refinements of detail.

It is the detestation of travelers and a violation of all the nicer senses of modesty and comfort. A bed-chamber for both sexes in which the occupants are separated by flapping, ill-fastened curtains and in which these travelers are obliged to wriggle out of and into their clothing in a series of acrobatic movements, half of them climbing to their roosts by step ladders, is an institution which is hardly up to our twentieth century ideas of modesty or comfort.

It would seem that inventive genius which has evolved the “folding apartment” in our cities might overcome these crude and offensive conditions in our sleepers.

A series of extremely narrow staterooms with transverse berths and just sufficient floor space in which to stand on one's feet while dressing or undressing is one theory which it would seem might be put into practice by inventive genius. It would seem possible that such an arrangement might be worked out for single or double berth combinations and without a serious sacrifice of passenger carrying capacity. Solid partitions would of course replace the miserable makeshift of present curtains, and decency and comfort make a night journey a pleasure rather than the dreaded experience it is now.

Let there be some real progress in sleeping car interior layout.

TRAVELER.

The Improvement of Boiler Waters

OMAHA, Neb.

TO THE EDITOR:

Having read the article entitled "The Interior Treatment of Boiler Waters," by C. R. Knowles in the *Railway Age* of November 12, 1921, the writer has been interested in the various comments and criticisms that have appeared in subsequent issues. While being quite generally in harmony with the observations of W. H. Hobbs in the issue of December 10 and C. H. Koyl in the issue of December 24, there are certain phases of the subject as presented by Mr. Knowles that, for the sake of clarity, should be mentioned.

It is unfortunate that the discussions of anti-foaming treatment and anti-scale treatment were so interwoven in the original article as to result in possible misinterpretation.

The "hit-and-miss" treatment to which the author refers may be laid aside in this discussion as this is not boiler water treatment at all. Only the correct application of any method should be used in making comparisons, otherwise we might as well discuss the "hit-and-miss" method of train dispatching or train operation. The use of anti-foaming compounds is so different from the use of water softening plants and anti-scale compounds that this should be made clear. Anti-foaming compounds may be used as an auxiliary to either method of anti-scale treatment or it may be required on waters that receive no other treatment.

The following statement appears in the original article:

"An increased tendency to cause foaming is characteristic of all water treated with soda ash, and nearly every railroad using the lime and soda treatment finds it also necessary to apply interior treatment to the softened water to prevent foaming. It follows therefore that certain waters cannot be used successfully after exterior treatment without interior treatment to prevent foaming."

In this connection, certain facts concerning water treatment now under the direction of the writer, will be of interest. Seventy-five per cent of all the anti-foaming compound used on 9,500 miles of road is applied on a district 137 miles long where no water softeners operate and no anti-scale compound is used. The foaming is purely the result of natural water conditions. On one division having eight water softeners on the main line, the master mechanic in a report made on December 23 said: "It is not necessary to use anti-foam compound on this division. It is not very often that we have foamy boilers, and it is very easy for an engineer to give the boiler a blowing out." When two or three more water softeners have been installed on this division, in order to complete the treatment, the tendency to foam will be even less than at present, owing to the consequent reduction of concentration in the boilers.

It is true that "certain waters cannot be successfully used after exterior treatment without interior treatment to prevent foaming"; however, if anti-scale compound were applied to the same waters in the boiler, the foaming would be more severe. Anything that increases the concentration in the boiler and produces a sludge, increases foaming.

Mr. Koyl referred to boilers containing 1,000 grains of sodium salts per gallon without foaming. There are few boilers that do not have enough suspended matter to induce foaming in a water of this concentration.

The one fact that is paramount in Mr. Knowles' article is that anti-foaming compounds are a valuable adjunct to motive operation in bad water districts. This should not be confused with anti-scale treatment.

The railway water problem is too intricate and varies too widely on different roads for anyone to lay down rules for handling these problems with the expectation that they will be applicable in any number of cases. The problem is of such magnitude that it deserves careful study in every case by trained men who will attack all phases of the water problem with the view to effecting the greatest economies for the

road employing them. Other methods give but partial results and the old adage is as applicable here as elsewhere: "Anything that is worth doing at all is worth doing well."

WM. M. BARR,
Consulting Chemist, Union Pacific System.

Control of West Side Belt

PITTSBURGH, Pa.

TO THE EDITOR:

My attention has just been called to an article appearing in your issue of December 24, 1921, page 1263, entitled "Railroads May Not Evade Consolidation Provisions of Law," dealing with the recent decision of the Interstate Commerce Commission in Finance Docket 1108, an application by The Pittsburgh & West Virginia Railway Company for authority under Section 20-a of the act to issue certain additional capital stock to carry out a contract between it and the West Side Belt Railroad Company (controlled by it) for the purchase of the property of the Belt Company by The Pittsburgh & West Virginia Railway Company.

There was no attempt whatever on the part of this company to evade the consolidation or any other provisions of the Transportation Act. On the contrary, as a reading of the article in question will show, application was made under paragraph 18 of section 1 for authority to consummate the purchase, and that application was filed coincident with the application under Section 20-a to issue the stock.

The Interstate Commerce Commission held, upon the application under paragraph 18 of section 1, in Finance Docket 1107, that that section of the act was not applicable in the case of carriers already in operation. The commission might well have held—as it did in Finance Docket 1288, an application of the Soo Line to purchase the property of the Wisconsin & Northern, substantially similar in character, which was also made under paragraph 18 of section 1—that, while under its construction thereof that section was not applicable, the application would be considered and disposed of under paragraph 2 of section 5 of the act. This company is now making application under that section of the act and renewing the application in Finance Docket 1108.

The decision in Docket 1108 does not, as you seem to conclude, hold that a purchase of the character in question may not be consummated until the commission shall have formulated its general plan of consolidation contemplated by other paragraphs of Section 5. That question was not determined by the decision in Finance Docket 1108; but, unless the commission does find authority under paragraph 2 of section 5 to authorize purchases similar to that here contemplated (which it did find by its decision in the above-mentioned Soo application, Finance Docket 1288), none could be made until after the general plan is formulated.

There is substantial doubt whether authority could be obtained under the laws of Pennsylvania to merge the two companies, inasmuch as The Pittsburgh & West Virginia Railway Company is a consolidated corporation of the states of Pennsylvania and West Virginia, and it is doubtful whether a domestic corporation may merge with a consolidated corporation. A consolidation of the two companies would entail reissue and relisting of the capital stock of the consolidated company, involving, with other incidents an expense in the neighborhood of upwards of \$200,000. For these reasons, apart from several other important ones, the plan of purchasing the property of the Belt, for which there is clear statutory authority, was decided upon, rather than merging or consolidating the companies; and this conclusion was reached before the transportation act was passed, and obviously without regard thereto, and so, necessarily, without any attempt to "evade" the provisions of that act.

H. E. FARRELL,
President Pittsburgh & West Virginia Railway and West Side Belt Railroad

Increasing the Scope of Locomotive Cranes

Experiences of the Lehigh Valley Demonstrate that a Wide Range of Work Can Be Handled Advantageously

THE USE of mechanical equipment for all classes of railway work has been given a great impetus in the last three or four years, chiefly as the result of a distinct need brought about by the shortage of labor. This need has, in a way, abated and has been replaced by a more important one, that of doing the work at the lowest possible cost. This has resulted in the discovery of an increasing number of purposes for which different classes of equipment are adapted and has emphasized the fact that many forms of work heretofore thought to be solely in the realm of hand labor can be performed cheaper, better and quicker with machinery. The locomotive crane has been one



Unloading Rail with a Fleet of Locomotive Cranes



Swinging in New 136-lb. Rail with a Locomotive Crane

of these pieces of equipment which study has shown to be readily usable for a wide variety of purposes. On the Lehigh Valley, for instance, it has been profitable to use a larger number of cranes and no better evidence can be presented of the scope of such machines than the fact that this road has 47 locomotive cranes in service on 1,449 miles of line. This is probably more locomotive cranes per mile of road than any other road in the country.

Cranes Are Constantly in Demand

Where mechanical equipment is in use, the big factor to be considered, if strict economy is to be had, is the question of possible idle time. Each crane, for instance, represents an investment, the interest charge on which must be apportioned and carried as a part of the cost of the work which the crane performs. Other items also, such as depreciation, for example, must be taken into consideration and where the idle time is large they may possibly eat up any savings effected in doing a particular class of work which would otherwise accrue to the benefit of the road. This is a possibility which has acted as a deterring influence and has prevented many roads from securing enough equipment to carry out efficiently and economically certain phases of railway work which are more or less seasonal. The experience of

the Lehigh Valley has been, however, that there are so many tasks for which a locomotive crane can be utilized to advantage that the question concerned with their use has become one not of possible idle time but of enough cranes. In spite of the large number of cranes which that road employs, there is nearly always a waiting list of work. Thus the overhead on a crane is re-

duced to the minimum so far as any individual task is concerned, with a resultant economy in the performance of that task.

The cranes are used by the engineering, maintenance-of-way, mechanical, operating, traffic and other departments to advantage. In general they are assigned regularly in varying numbers to each of the divisions by the engineer maintenance-of-way who is responsible directly and indirectly for the care and operation of all cranes on the system. When assigned to the divisions they become a special charge of the division engineer whose duty it is to see that they are kept employed constantly and that an equitable distribution is made to the departments in need of them. This officer makes a weekly report to the engineer maintenance-of-way showing the number of cranes on the division, the assignment and location of each one and the class or classes of work on which they have been employed during that period. This information from each division office is then compiled in the office of the engineer maintenance-of-way into a system report. When calls are made for additional cranes



Locomotive Crane Handling Bridge Ties

on a division it is possible for the engineer maintenance-of-way to make the most economical and satisfactory assignment through the aid of the information which is thus placed in his hands every week.

The feature of particular interest in this article is the list of uses for locomotive cranes. Each item is, in the majority of instances, representative of a general purpose, which may, and often does, contain a number of specific uses which differ somewhat but may still be included under the one head. Practically no work is undertaken that is not preceded by a study to determine how much of it can be performed effec-

tively with cranes. The experience of the road indicates that the more the employees use the cranes, the more uses they find for them, and that this experience is not confined to any one department. In general the items listed are self-explanatory and may well serve as a guide to any road which has found it difficult to keep its cranes working steadily. A few of the items are so interesting that they deserve a little more complete treatment. For that reason additional details are given here.

The question of laying rail by locomotive cranes is fairly well known, the method having been described in detail in the December 10, 1920, issue of the *Railway Age*. A more recent development is the utilization of cranes equipped with clam shell buckets for cleaning ballast. With this method a gondola with a large screen mounted on it, is placed next to the crane. The ballast is forked out from between and down to the bottom of the ties. This foul ballast is piled in the track center, where it is picked up by the bucket and dropped on the screen. The dirt falls through and the cleaned ballast runs down the screen and, by means of chutes, is returned either to the track center or between the tracks. The ballast between the tracks is cleaned down to a depth of from 12 in. to 14 in. below the bottom of the tie.

Handling Bulk Freight to Release Cars

The Lehigh Valley has utilized locomotive cranes in varying numbers for the loading and unloading of bulk freight from open top cars. Generally this has been in place of or where gantry cranes are not already installed, but it has also been found advantageous to use them even where there are other facilities. The greatest use of cranes for freight handling purposes has been on the New Jersey waterfront at Black Tom—Pier 7—where lighterage freight is usually handled. During the period of heavier traffic it was not uncommon to have three or four cranes working regularly. The material handled covered all classes, from pig iron, billets, and rails to boxed automobiles and even loose sulphur.

As a measure of relieving congestion the cranes were employed extensively for unloading material from cars to open storage plots until, for instance, the necessary ships for loading were available. This allowed a quick release of the cars for other purposes. When ships were ready the cranes were run in again and the material reloaded into cars, brought to pier side and often placed directly on the lighter or whatever was there to receive it. Ordinarily the cranes unload the freight near the string piece where the floating hoists can reach it easily. In performing this and other work it is quite common for a crane to switch one or two cars by its own power. Commodities such as sulphur are loaded into box cars through the medium of a hopper and spout, the crane dumping the product into the hopper. Practically the only labor required outside of the crane operators is that of the men who stow it away in the car.

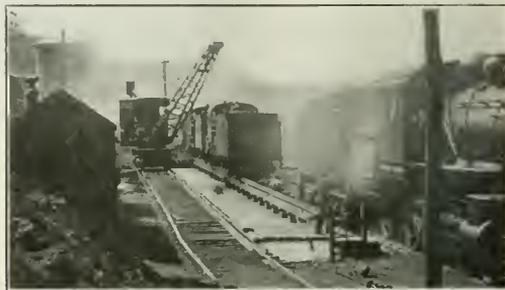
Crane Takes Place of Work Train

There is usually a variety of work around yards, shops, storehouses, and even out on the line, that ordinarily requires the service of a work train. Because of the self-propelling feature of the locomotive crane, it has been found possible to substitute it for a work train in a large number of instances. At the Lehigh Valley's shops and engine terminal at Sayre, Pa., for example, it is used extensively in this way, handling two or three cars at a time, even on grades. Loaded cars are spotted and often unloaded by cranes while the reverse is also carried out with equal satisfaction. One common way in which the crane is utilized for two purposes is in the cleaning up of refuse, scrap and other debris in yards and terminals. In this work the crane pulls or pushes the open top car or cars along by its own power, loading the refuse into them by means of a clamshell bucket and then moving along to the next pile to be loaded. Work train ser-

vice is thus eliminated entirely while an added advantage is gained by the fact that the crane is more flexible and faster than hand labor.

Work train service has been greatly reduced in connection with the renewals of bridge decking through use of the locomotive crane. In this work cranes are used to pick up the old ties, loading them on a flat behind the crane and, in turn, picking up a bundle of new ties from the same car and depositing them in the proper position for insertion. Rail, old and new, is likewise handled by the cranes with the result that this work is speeded up materially.

While this method is in a way a form of material handling, the list shows several more specific instances, one of the most interesting of which is the one referring to the load-



Crane Serving an Ash Pit

ing of track materials, such as splice bars, tie-plates, bolts and spikes. In common with many roads, the Lehigh Valley assembles its materials in designated store yards from which it is distributed along the line when needed. In piling splices, tie-plates, etc., in the yards, care is taken that each pile is kept within certain limits of size. Thus when it is necessary to load splices, for instance, a clamshell bucket handled by a crane is dropped over the pile and the splices picked up almost 100 per cent clean. The few that are missed are loaded into the bucket by hand after which it is unloaded into a car as usual. Kegs of spikes are handled in the same manner, the crane easily picking up one keg at a time, without damage, with the aid of a bucket. As may be surmised, the time saved in loading a car is large.

Numerous other items contained in the list which follows are equally and perhaps even more interesting, depending upon the viewpoint and the department under consideration, as for instance, the one dealing with the handling of signal bridges. It is, however, practically impossible to go into detail on all of the items and it is not necessary for the greater part of them are self-explanatory.

We are indebted to G. L. Moore, engineer maintenance of way of the Lehigh Valley, his staff at headquarters, and to all the division engineers for the information contained in this article.

Uses of Locomotive Cranes on the Lehigh Valley

Maintenance of Way

- (1) Laying rail
- (2) Cleaning ballast by means of large screens mounted in cars and by clamshell buckets.
- (3) Loading, unloading and placing tie tamper air compressor outfits.
- (4) Loading ties for local or other delivery by means of slings
- (5) Handling all sorts of scrap, refuse, sweepings and cleanings, etc., in terminals and yards.
- (6) Driving piles, being equipped with steam hammers
- (7) Handling frogs and switches at frog shops.
- (8) Removing old and laying new frogs and switches in yard and other tracks
- (9) Handling treated timber at the company treating plant at Manville, N. J.
- (10) Loading, unloading and placing snow fencing panels in final position.
- (11) Loading tie plates, splices, bolts and kegs of spikes. Used in connection with a bucket

- (12) Rocking turntables when necessary to replace or change centers.
 - (13) Wasting dirt in case of slides.
 - (14) Ditching along right-of-way, or in other places as desired.
 - (15) Cleaning or picking the right-of-way.
 - (16) Handling steel for bridge renewals and erection.
 - (17) Distributing stone ballast where it is uneconomical to distribute it by opening hoppers.
 - (18) Cleaning snow out of cuts.
 - (19) Setting up highway crossing alarms.
 - (20) Cleaning off tunnel portals—men shoveling into bucket.
 - (21) Dredging around pontoons and float bridges.
 - (22) Raising tracks, sidings, etc., either for a permanent raise or in sticking coals, etc.
 - (23) Shifting track or turnouts, etc., to new locations.
 - (24) Picking up, loading or shifting small buildings.
 - (25) Tearing down and distributing timbers in obsolete coal trestles.
 - (26) Raising small bridges where it is necessary to secure greater clearance. Used in place of jacks.
 - (27) Handling bridge timbers such as decking, ties, etc. Used to remove old and place new timbers in position.
 - (28) Erection of highway crossing bridges in connection with an extension of the boom.
 - (29) Lining tunnels. Steel sections carried in on top of boom and placed in position.
 - (30) Setting up stand pipes, water tanks, and pipe lines, etc., in water service work.
 - (31) Unloading and placing various classes of pumps. If unable to move the material into the building and place it in position it is moved as near to final position as possible.
 - (32) Cleaning out suction wells for fire protection pumps.
 - (33) Excavating trenches in water service and sewer work.
- Construction—**
- (1) Use in construction where bents and materials are framed in advance, moved in and placed in position by cranes.
 - (2) Laying new track on branch lines and sidings. Ties handled in bundles. Rails laid and cranes moved ahead.
 - (3) Placing pre-cast concrete slabs in bridge and other work.
 - (4) Setting up steel stacks of all dimensions and sizes up to the capacity of machine in tons, etc.
 - (5) Loading, distributing and installing reinforced concrete and other types of culverts.
 - (6) Erecting buildings and sheds, handling material, placing timbers or steel trusses, etc.
- (7) Picking up and loading gravel and sand at company pits.
 - (8) Distributing material and charging mixers in concrete work.
 - (9) Excavating for bridge piers and abutments.
 - (10) Digging for and placing cribbing and filling same.
 - (11) Grading for industrial tracks and other sidings.
 - (12) Grading approaches for overhead highway crossing bridges.
 - (13) Hooking up gears and frames at transfer bridges.
 - (14) Loading, unloading and placing steam boilers, etc., and drawbridges and power houses.
 - (15) Picking up, distributing and placing rip rap in the construction of retaining walls.
- Operation—**
- (1) Rerailing cars in yards, or other work.
 - (2) Handling freight at waterfront terminals.
 - (3) Handling sand at terminals, filling bins, etc.
 - (4) Wrecking work such as picking up and throwing aside or loading refuse, freight, coal, burnt timbers, car parts, etc., up to the capacity of the machines.
 - (5) Handling ashes at engine terminals in connection with various types of pits.
 - (6) Stocking coal.
 - (7) Coaling engines.
 - (8) Spotting cars around company shops and yards.
- Mechanical—**
- (1) Handling heavy material at locomotive shops with or without magnets.
 - (2) Handling wheels and axles, mounted or unmounted, in varying amounts at car shops and other locations.
 - (3) Dismantling and removing old condemned cars from trucks.
- Signal and Electrical—**
- (1) Loading and placing concrete telephone booths, battery wells, etc.
 - (2) Pulling up and loading or unloading telephone, telegraph poles, etc.
 - (3) Setting up telephone and telegraph poles, signal brackets and bridge warning signs.
 - (4) Erecting or moving signal bridges. New foundations made ready and bridges picked up as a unit where possible or in sections otherwise and moved to new location.
- Miscellaneous—**
- (1) At the general storehouse for handling timber in the lumber yards.
 - (2) Handling pig iron and scrap by magnets at outlying points where regular electric gantry cranes are not installed.
 - (3) Unloading coal at stations and other company buildings.

Plain Facts for Rock Island Stockholders

Chairman of Board Hayden Tells Them About Valuation and Other Public Relation Problems

CHAIRMAN Charles Hayden of the board of directors of the Chicago, Rock Island & Pacific recently sent a letter to the stockholders of that system in which he discussed with them frankly some of the more important problems confronting the railroad, and particularly those associated with federal regulation. Extracts from his letter follow:

"The paramount importance of the transportation problem makes it proper again to call to your attention certain phases of that problem directly affecting your interest as stockholders of this company, and as citizens of the United States.

The Federal Valuation

"After six years' work the tentative valuation of your company's properties was announced by the Interstate Commerce Commission in September at approximately \$335,500,000, as of June 30, 1915. This is for carrier property only.

"In order to make a comparison of the value announced by the commission with the company's present capitalization, it is necessary to exclude the value of certain leased lines whose capital stock is not entirely owned by this company and to bring the figures down to date by adding additions and betterments since the date of valuation. So stated, the comparison is as follows (see table in next column):

"This valuation, officially determined by the United States government, refutes for all time and for all purposes the suggestion sometimes made by the uninformed, that this company is overcapitalized. We regard the valuation established by the commission as being much less than the actual value of the property, and have filed the protest contemplated

by law in the hope that, upon a hearing, the commission will substantially increase its valuation; but, even on the commission's minimum basis, this valuation must be taken

PHYSICAL PROPERTY AS OF JUNE 30, 1915, AS ANNOUNCED BY COMMISSION	
(a) Carrier property (C. R. I. & P., C. R. I. & G., and Morris Terminal)	\$335,539,013
(b) Non-carrier property	5,745,895
Total	\$341,284,908
From the foregoing should be excluded the values of the following leased lines, which are not controlled through the ownership of entire capital stock:	
Keokuk & Des Moines	\$3,464,958
Peoria & Bureau Valley	1,650,000
White & Black River	700,000
	5,814,958
Balance, excluding these lines	\$335,469,950
There should also be deducted cash and materials on hand June 30, 1915, as found by the commission	9,022,288
Remainder, representing physical property owned directly or through stock ownership, as of June 30, 1915, as found by commission	326,447,662
Add: Additions and betterments July 1, 1915, to June 30, 1921	36,374,458
Cash and materials, June 30, 1921	25,455,222
Total, June 30, 1921	\$388,277,342
LIABILITIES JUNE 30, 1921, ACCORDING TO COMPANY'S BOOKS	
Long term debt	\$234,505,515
Loans and bills payable	14,930,000
Preferred stock	54,557,989
Total capital liabilities ahead of common stock	\$303,993,504
Common stock outstanding	74,482,523
Total capital liabilities	\$378,476,027
Amount by which minimum value as found by commission exceeds total capital liabilities as of June 30, 1921	9,801,315
Amount of equity represented by common stock (difference between property values of \$388,277,342 and total of senior obligations)	84,283,838
Same per share of \$74,482,523 of common stock	\$113.16

as establishing a property value behind our stocks and bonds, much in excess of their par value.

Rate of Return Under Transportation Act

"On account of the general business depression which has existed in the country during the last year, the rates fixed by the commission have failed by a very substantial sum to produce the return contemplated by the Transportation Act. For instance, the earnings of your property for the year ending September 30, 1921, were \$8,890,000 short of being six per cent upon its property investment, and your property's earnings were better than the average in the group in which it was placed. Notwithstanding this fact, many substantial reductions in rates have been made by the carriers in the country, partly under order of the commission, and partly voluntarily, with the idea that a reduction in rates would in some degree promote the movement of traffic. Unless the effect of these rate reductions is counterbalanced by an increase in traffic, it is reasonable to anticipate a substantial reduction in the company's net revenues in the coming year, because the reductions ordered by the commission in one case alone (the hay, grain and grain products case, I. C. C. docket No. 12929) will amount in the case of the Rock Island to \$3,500,000 a year, all of which comes out of net revenue. Consequently, it is of the utmost importance to you, as stockholders of this company, as well as to the public at large, that the commission shall not reduce the rate of return below the existing standard. In view of the fact that the government itself is now charging us six per cent upon money loaned to us for additions and betterments, it would seem that the commission will have little ground for reducing this rate, but nevertheless it is being urged to reduce it. A decision is expected about March 1.

"Of equal importance is the danger that Congress may repeal that section of the Transportation Act which imposes this duty upon the commission. While the responsibility of fixing rates to provide a fair return was on the commission even under the old law, there was no specific mandate to this effect, and it is very important that the positive direction contained in the Transportation Act should not be disturbed.

Labor Conditions

"The great obstacle to a further reduction of rates is the cost of labor. The Labor Board has made substantial reductions in the last few months, which were anticipated, however, in the reductions of rates mentioned above. The carriers now are proceeding to ask for additional reductions, which will have to be made if the labor cost of transportation is to be reduced to a basis comparable to that in other industries. For instance, unskilled labor is now costing the railroads approximately 40 cents an hour, which is a uniform rate for all portions of our system; whereas at many points on our road the current rate for unskilled labor in industrial occupations is 22 cents to 30 cents an hour. The Labor Board also has eliminated some of the burdensome rules left in force by the Railroad Administration, though not to the extent hoped for by the carriers. Many classes of work are still performed by unskilled labor, classified as mechanics or in other classifications taking higher pay.

"We must not be understood as objecting to fair pay for our employees, but the country is in a process of post war liquidation. Railroad investors, as a class, received probably less of an increase in their return as a result of high war prices than any other element in the community, whereas railroad labor was very handsomely treated by the government acting through the Railroad Administration. The stockholders are now doing their full part in the process of deflation by accepting substantial reductions in income, and it is only equitable that labor, which profited so largely, also should contribute to the process.

"There has been much discussion in the public press of

the Labor Board and its usefulness. Your directors are firmly of the opinion that the Labor Board is an excellent institution, because it places labor costs under the control of a public body. Sooner or later the public will come to realize that its decrees have the force of law, and public sentiment will not support an attempt to settle any labor controversy otherwise than through its processes. In addition, the government itself cannot in fixing rates ignore the wage costs determined by a tribunal of its own making. The whole Transportation Act is new, and it can hardly be said to have had a thorough trial; and particularly is this the case with these provisions relating to the Labor Board.

State-Made Rates

"A bill is pending in the United States Senate (Senate Bill 1150), introduced by Senator Capper of Kansas, which, if passed, will undo a large part of the good accomplished by the Transportation Act, and constitute a long step backward in railway regulation. Its purpose is not only to repeal the section of the Interstate Commerce Act requiring the commission to fix rates at a prescribed level, but to deprive the Interstate Commerce Commission of all jurisdiction over rates within a state, no matter how seriously such rates may discriminate against the interstate rates. The effect would be to give every state commission practically exclusive jurisdiction over rates within the state, with no remedy whatever to the carriers to protect the revenues provided by the Transportation Act, and a result which may be forecast by reference to the long series of adverse state regulations beginning in 1907, and ending in the cataclysm of federal control.

Partners Rather Than Creditors

"We call these things to your attention, because it is to your interest as a stockholder, as well as to the interest of the public, that railroad credit shall be maintained. It is essential that the public shall have such confidence in the railroad managements and in the way in which the railroad problem is being handled by the government, that it will be willing to provide on favorable terms the new capital, which is necessary not only to protect the existing investments but to finance the expansion of our transportation system.

"The Rock Island should be financed by increasing the number of its partners rather than by increasing the number of its creditors, that is, with stock rather than with bonds. This means that we must be allowed a more liberal basis of earnings than a maximum which merely yields the cost of operation plus the going rate for borrowed capital and leaves the risk with the investor. It is obvious that such a limited return will not allow any railway company to attract necessary capital in competition either with tax-free public securities or with industrial stocks which offer equal security with a much larger opportunity for profit, no greater risk and a freedom from the depression of constant regulation. This problem is of vital and immediate consequence to every stockholder, for so long as the Rock Island must finance its improvements and extensions through a constant increase of its debt, carrying a fixed charge, both the market value of your holdings and the return, which you can hope to realize thereon, are bound to diminish.

"These elementary propositions are so simple that they are often forgotten by those who are charged with public duties concerning the railroads, and yet the public will suffer most if they are ignored. With every phase of a railroad's operations and financing regulated to the point of suffocation and with the public interest overguarded at every turn, it ought to be clear to those in charge of our national policies that there can be no danger in treating a railroad like any other business enterprise and allowing it a return which will attract new capital; and that the failure to do this means the failure of private ownership and the breakdown of our transportation system."



Creosoted Piling at the Somerville Plant of the Santa Fe

The Story of Creosoted Trestles on the Santa Fe*

This Road Now Has 370,515 Track Feet of Wooden and Steel
Bridges with Ballasted Decks

By A. F. Robinson

Bridge Engineer, Atchison, Topeka & Santa Fe System, Chicago

THE FIRST creosoted piles were used in 1875 in an open deck pile bridge built across Galveston Bay. The first creosoted ballasted deck pile bridges were put into service on the Santa Fe late in 1899. The same season creosoted timber flooring was used on a ballast deck steel bridge at Los Angeles. When the joint track elevation bridges were built in Chicago, creosoted timber flooring was used for supporting the ballast. Following 1900 the use of creosote increased very rapidly and by 1908 almost all the timber used in bridges was creosoted.

From 10 to 12 lb. of creosote per cu. ft. of timber was first used for structures on land or in fresh water. For structures in salt water a much heavier treatment was required. At present piles for marine service receive a light steaming and then from 20 to 25 lb. of creosote per cu. ft. of timber is forced in, or all the creosote the timber will take. For about 10 years, southern pine has been treated by the full cell process, some 14 to 16 lb. of creosote per cu. ft. of timber being used. At all of the Santa Fe treating plants southern pine for land structures is air seasoned and then creosoted without steaming. When we commenced using creosoted material the treating was done at commercial plants and the timber was steamed.

Our bridge list as of January 1, 1921, shows the following single track lengths of bridges with arches, boxes and pipes omitted but T-rail bridges included:

498,757 lin. ft. open deck timber bridges
222,520 lin. ft. ballast deck timber bridges
120,307 lin. ft. open deck steel bridges
147,995 lin. ft. ballast deck steel bridges
2,411 lin. ft. reinforced concrete bridges

991,990 lin. ft. all bridges—equals about 188 miles.

Almost all of the ballast deck steel bridges have creosoted timber floors.

The creosoted ballast deck timber bridges from 16 to 20 years old seem to be in perfect condition and give promise of being good for from 15 to 20 years more. These may, therefore, be considered as permanent structures. Some 38 per cent of all our bridges are ballast deck and almost 50 per cent can be termed permanent structures. For main lines alone, the percentage of ballast deck bridges is now 68 per cent. No open deck bridges of any kind have been built on the main lines during the past 10 years, except after wash-outs or burnouts.

Early Difficulties

Creosoted timber bridges had not been in service very long before we found there were many things to be learned about cutting, handling and curing before treatment; and also about handling the treated material and building the bridges. During 1909 and 1910 there were many complaints about rotten piling on the Beaumont division, which extends from Somerville, Tex., to Longview, Oakdale, Beaumont and Port Bolivar. In this territory the timber seems to be affected more readily by decay than in any other part of the country traversed by the system lines.

A few miles east of Cleveland, Tex., we have what is known as an experimental section, where all kinds of treatment on ties, fence posts, etc., are tried out. This section was taken because the soil and climate seemed to be adapted especially to produce rot in both treated and untreated timber. On this section I found at least 2,000 piles that were rotting very badly. The piling and timber used had been treated in commercial plants between 1900 and about 1907. Up to that time no rules had been made covering the time the material might be left in the woods after cutting or the time

*Abstracted from a paper presented before a joint meeting of the Western Society of Engineers and the American Wood Preservers' Association, at Chicago, on January 25, 1927.

it was to be cured before treating and I think many piles had been left in the woods several months and the material had actually commenced to decay before it was taken to the treating plant.

Piles after being driven in the bents, are sawed off for capping and our plans call for these freshly cut surfaces to receive a heavy treatment of hot creosote before the caps are applied. Notwithstanding this we found a large per cent of the piles were beginning to fail at the caps. There would be an outer layer or ring of creosoted sap wood which was good, but inside this there would be a ring of untreated sap wood which was rotting very rapidly. In many cases a great deal of load was being carried by the outer creosoted ring of sap wood and but very little by the heartwood. We found a good many cases of rot starting at or near the ground surface.

Another source of trouble was the driving of the piles. I found a good many cases where the heartwood had been broken loose from the sap. The ordinary steam hammer has the lower end about 12 in. in diameter projecting through the driving block and striking the pile. A circle 12 in. in diameter has a little more than one-half the area of a 16-in. circle and only about two-fifths the area of one 18 in. in diameter. From this you will note the blow from the hammer was being delivered into the pile over an area of less than one-half its surface. The skin friction on the outer surface of the pile would hold it up and the hammer would drive the heartwood loose. This was overcome by providing a driving head 18 in. in diameter which rested squarely on the head of the pile and so arranged that the blow from the hammer must be distributed over the entire surface of the pile.

Irregular Penetration

When these piles were cut out, the cross sections were examined very carefully and it was found that the creosote had penetrated very irregularly. On one side the treatment would be almost as thin as a sheet of paper and on the other side it might be two inches thick, the thickness of treatment varying all around the surface of the piling. We figured that this was due to moisture in the piling, which resulted from the steaming and the improper seasoning. At our own treating plant at Somerville all material except that used in marine work is carefully air-cured and receives no steaming of any kind. As the result of this handling, we have been able to get a very uniform penetration of the creosote. On the other parts of the Santa Fe system we have had very few piles failing at the caps.

Examination of the stringers in ballast deck bridges where steaming was done in treatment showed a similar condition to the piling, but it was not so extensive. In a very few cases outer stringers were decayed on the upper surface, as a result of the irregular penetration of the creosote.

Close attention is necessary in the air-seasoning of timber piling. If the sap has commenced to turn or sour, the treating will not be effective. It is probable that different curing rules will be required in different sections of the country where the moisture conditions vary.

As the result of our trouble from the rotting of piles at the caps we made an extended test on a field treatment of piles when cut for caps. With the first apparatus we were able to get about 3/8 in. end penetration of the creosote. Several first class creosoted piles were cut into lengths of about three feet and also a similar number of untreated piles which were reasonably well seasoned. A part of these short creosoted specimens received the end treatment with our pressure apparatus. The other samples were painted with various kinds of preserving material and also several kinds of "R I W" paint. After the coatings had properly dried, these short pieces of piling were set up in a trench in the ground on the right-of-way two miles east of Cleveland, Tex. These pile butts were set in an exact line and at the same elevation.

A cap 12 in. wide and 4 in. thick was placed on top of the row of pile butts so that the test would be relatively the same as in the bent of a pile bridge.

These pile heads have been examined annually for eight years past. At present the samples of creosoted pile having pressure treatment on the ends and several of those receiving brush coatings on the ends are still in good condition. These investigations lead me to feel that a brush coating of hot heavy creosote, of Reeves' Wood Preserver and Toch's "R I W" paint will protect the freshly cut head of a creosoted pile for a long time. I am not as yet certain whether it will be necessary to use the pressure treatment for the ends of piles, since the brush coating seems to be giving extremely good results thus far and the application of this brush coating will cost considerably less than the pressure treatment.

Investigations made seem to show that the following rules must be adhered to absolutely in handling treated timbers:

1. Treated timber must not be cut, bruised or handled in a rough manner. Grab hooks or dogs should not be used in handling the material, unless the holes made by the hooks are carefully plugged with creosoted pins.
2. The driving of piles must be done with a hammer which will not split them or break the sap loose from the heartwood.
3. Any cut surfaces or bored holes must be carefully treated with hot creosote and holes plugged.
4. Where solid stringers are used in ballast deck bridges without any cross planking it is necessary to make end cuts on some of the sticks on account of the variation in panel lengths of bridges due to driving of piles. These freshly cut ends must be thoroughly coated with creosote before the stringer deck is placed.

Treating Plants

The Santa Fe has built four treating plants. In 1885 a plant was opened at Las Vegas, N. M., but it burned down in 1908. In 1898 a plant was opened at Bellemont, Ariz., and this burned down in July, 1906. Both of these plants were designed for the zinc chloride treatment although some creosoting was done. The buildings for these two plants were temporary wooden structures of great fire hazard.

The present plant at Somerville, Tex., was opened in 1907 and the Albuquerque plant in 1908 or 1909. The buildings for these two plants are reinforced concrete, thus reducing the fire hazard to a low figure. Both of these plants were designed exclusively for creosoting. During the late war period and for nearly two years thereafter ties were treated by the zinc chloride process, but all the bridge timbers and the piles were creosoted. The total output from the four treating plants above noted is as follows:

	Ties	Timber, board feet	Piling, linear feet
Las Vegas	6,231,598	22,575,400	790,729
Bellemont	2,123,519	9,607,215	224,521
Albuquerque	7,346,245	20,667,932	512,580
Somerville	43,423,230	213,411,285	8,172,169
Total	59,114,597	265,661,932	9,609,999

Some 380,300 linear feet of the above piling was treated by the Rueping process at the Somerville plant in 1906 and 1907.

A great deal of creosoted Oregon fir timber and piling has been used on our coast lines. This material was treated in commercial plants in Oregon and Washington and delivered to the railroad via water at National City, Cal., and San Francisco.

A good deal of timber has been used for the floors in ballast deck bridges. When we figure interest on the excess cost of the ballast deck over the open deck structure and also the cost of maintenance we can show a very interesting saving from the use of the ballast deck bridges. A feature of the ballast deck bridge is the very low maintenance cost. When the track has been thoroughly bedded and properly lined and surfaced, almost no further expenditure is required during the life of the track tie. We have bridges above 100 feet in length which we have run from three to seven years without receiving any attention other than the lifting of a few joints at very rare intervals.

W. G. McAdoo Defends Railroad Administration

Concluding Testimony, the Major Portion of Which Was Abstracted in Last Week's Railway Age

IN THE *Railway Age* of February 4, page 327, was published in abstract the testimony of W. G. McAdoo, formerly director general of railroads, defending his administration before the Senate committee on Interstate Commerce. Because of the length of Mr. McAdoo's statement it was impossible to include in last week's issue all the matters of importance covered by him. Essential parts of the testimony omitted last week are, therefore, given herewith.

Mr. Kruttschnitt's Charges

Mr. Kruttschnitt, in an article published in the *Atlantic Monthly* for January, 1922, is even more specific than in his testimony before this committee in declaring that the government's promises to maintain "the roads in as good repair and as complete equipment as when taken over, were completely ignored" and says that "renewal of rails, ties and ballast was skimmed to the danger point, and the equipment, scattered all over the United States, had been given scant attention and was in the worst condition ever known."

The charge that the ties were "skimmed to the danger point" is flatly contradicted by the facts, especially so far as the Southern Pacific is concerned. The tie renewals of the Southern Pacific for 1917 were 3,186,447, while for 1918 they were 3,981,107. In other words, during 1918 the government laid 794,660 more ties on the Southern Pacific than Mr. Kruttschnitt laid in 1917, an increase of 25 per cent.

Statements have been made, I believe, before this committee to the effect, or at least it seems to have been assumed, that the government was under obligation to put back into the track each year as many new ties as represented the average tie replacements made by the railroads during the three years preceding federal control. There is nothing in the contract to justify this assumption or assertion. The government's obligation was to expend "such sums" * * * "as may be requisite in order that such property may be returned to the companies at the end of federal control in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918,"—the cost of labor and materials being equated. It would have been foolish to assume an obligation to replace as many ties and rails in a piece of track as represented the average for a three-year test period, because it might have been unnecessary to do so whereas expenditures in other directions necessary to maintain the properties in substantially as good condition as when received, might have been desirable and as to these the director general was given discretion.

Assuming, however, for purposes of illustration, that it was the duty of the Railroad Administration to put in as many cross ties and new rails as were represented by the average of the so-called three-year test period, let us judge from the facts how well the Railroad Administration complied even with this fictitious requirement.

For the whole country, from the annual reports of the Interstate Commerce Commission for Class I railroads, there were laid during 1918 only 2,930,891 or 2.3 per cent less cross ties on previously constructed tracks than in 1917, while there was an increase in the number of switch and bridge ties laid in previously constructed tracks of 14,401,163 feet, or 6.9 per cent. In the light of these facts, what becomes of Mr. Kruttschnitt's charge that ties were "skimmed to the danger point" during federal control?

Mr. Kruttschnitt's charge that ballast was skimmed on the railroads is also contradicted by the facts because, in 1918, the Railroad Administration applied on Class I Railroads, 18,863,344 cubic yards of ballast while in 1917 the corporations applied, on Class I railroads, only 18,262,503 cubic yards of ballast. Thus the government applied 600,841 cubic yards more ballast in 1918 than the corporations applied in 1917.

The annual report of the Interstate Commerce Commission for Class I railroads shows that there were only 163,182 tons less rail laid in replacement and betterment in 1918 than in 1917, or a decrease of only 8 per cent. So far from "skimming" the Southern Pacific System for rails, the government (despite the demands of General Pershing for rails in France) in 1918 laid 436 more tons of new rails on the Southern Pacific System than Mr. Kruttschnitt laid in 1917.

There is filed herewith an exhibit, a table taken from a statement prepared by the Division of Operation of the United States Railroad Administration dated May 15, 1919, showing the number of cross ties used in maintenance for the annual average of the test period and that of the calendar year 1917 and 1918 on typical systems.

For the 18 typical roads shown the Railroad Administration in 1918 laid 2.9 per cent more ties than the 18 corporations laid in 1917, and fell short of the test period only 15.2 per cent, while in 1917 these corporations fell short of the average for the test period 17 per cent.

Early Days of the Railroad Administration

For nearly five months the full power of the government was put behind these corporations. These executives were backed to the limit in what they, and the Railroad War Board, had declared necessary to operate the railroads successfully.

The conditions on the Pennsylvania, the B. & O., the Reading, and the Central Railroad of New Jersey were so unsatisfactory because of the congestion on these lines and their failure to produce the requisite amount of transportation, in effect paralyzing transportation all over the Eastern territory, that I became convinced that the managements were not efficient. On the 17th of January, 1918, I addressed letters to the presidents of each of these railroads in which I stated to them frankly that, as we were in the midst of a great war, the public interest and the life of the Nation demanded that these railroads should be operated efficiently and that excuses were worth nothing; that only results would tell; that unless there was a decided improvement a change in the management of these properties would become inevitable.

[Mr. McAdoo here presented copies of his letters of which the following is a sample, together with their replies:]

"I make due allowance for storms and the elements and for other things that I know complicate the railroad situation. Nevertheless, we are in a great war, and excuses are not worth anything. The only thing that tells now is results. The public demands them and the life of the Nation demands them.

"I would not be candid if I did not tell you that I am not fully satisfied with the efficiency of the management of the ——— Railroad. I believe that great improvement can be made, and I look to you and the officers of that system to bring that improvement about at the earliest possible moment.

"My personal regard for you is an assurance that I would not consciously criticize unfairly, and that same personal regard makes me anxious for your success. But I would not be frank if I did not tell you that unless there is a decided improvement in the efficiency of the ——— Railroad system, a change in the management will become inevitable. This I should deeply regret."

In these replies from Messrs. Rea, Willard, Dice and Besler, we find the same complaint of (1) lack of locomotives, (2) shortage of labor, (3) reduced efficiency due to lack of skilled labor, (4) unprecedentedly severe weather, and lastly, a pledge of loyal co-operation and support.

It is reasonable to assume that, in view of the assurances of co-operation and support given by railroad officials throughout the country to make government operation successful for the purposes of the war, and in view of the exercise of all the powers of the government to help the railroad corporations operate the railroads at the highest point of efficiency, the executives did their best to manage these properties efficiently and successfully, and yet during the first five months of 1918, when they operated the railroads as agents of the director general, results were most disappointing.

On May 18, 1918, the railroad presidents were released and federal managers substituted for them. These federal managers were chosen from the railroad officials according to their ability and their knowledge of the properties. In each instance the federal manager was a former president or general manager or some high official of a railroad company. At the same time the country was divided into seven regional districts and a regional director was appointed in each and had control of the general operations of all the railroads in his territory. Under him were the federal managers. The seven regional directors appointed, were recognized as being among the ablest men in the railroad profession.

Each of these regional directors was required to resign from the presidency of his company. Smith gave up a salary of \$87,000 per year and accepted \$50,000 per year as regional director.

Aishton and Holden and Markham gave up \$60,000 or more per year to accept \$50,000. Winchell and Maher each received \$40,000 as regional directors, the same or less than they were receiving as officials of their respective companies. These seven men I wish now to say served their country with patriotism, fidelity and ability. Every criticism against the Railroad Administration is in effect a criticism against them because if the railroads were not efficiently operated the responsibility was largely theirs. I have denied heretofore, and I deny now that they ran the railroads inefficiently. The best vindication of their ability as railroad men is the record of railroad operation from the 21st day of May, 1918, when the corporations were relieved of control.

These seven eminent railroad men can not be accused of being faithless to the railroad interests of the country when they pointed with pride to the *efficient operation* of the railroads during 1918. Criticism of the Railroad Administration is an attack upon the ability, capacity, and patriotism of these men, and upon all the subordinate railroad officers and men who were retained to operate the railroads under federal control.

It is pertinent at this point to examine the various annual reports of these regional directors made to the director general touching the operation of the roads under their control. These reports disclose with definite clearness that the unification of the railroads under federal control resulted in the saving of millions of dollars which would not have been possible under operation by their owners. (Here follows a number of extracts from the reports of the regional directors.)

It may be said in criticism of these comparisons that the higher wages of labor, as well as higher freight and passenger rates since 1920 were an inheritance of private management from the Railroad Administration. To this the obvious answer is that it does not necessarily follow that such advances would have been made under a continuance of federal operations, but even so, the Railroad Administration in 1918, as I have pointed out, inherited the necessity of equally as large wage increases from private management before the war and had to make corresponding increases in freight and passenger charges.

Increase in Rolling Stock Under Federal Control

In three and one-half years from June 30, 1914, to December 31, 1917, the total increase of tractive power for all locomotives amounted to 193,320,820 pounds. This represents an average annual increase of 55,234,520 pounds for the three and one-half years in question. During the period of federal control there was an increase of 254,495,000 pounds tractive effort. This represents an average annual increase of 117,460,000 pounds as compared with the average annual increase of 55,234,520 pounds for three and one-half years prior to federal control.

From June 30, 1914, to December 31, 1917, the total increase in the tonnage capacity of freight train cars amounted to 4,283,050 tons, or an annual average increase of 1,223,728 tons. During the period of federal control there was an increase of 7,801,106 tons capacity. This represents an average annual increase of 3,649,664 tons capacity as compared with the annual average increase of 1,223,728 tons capacity for the three and one-half years prior to federal control.

The Proposed 5-Years Test Period

It will be remembered that in December, 1918, I had announced my conviction that the roads should be returned as promptly as possible unless the Congress authorized their retention for a sufficient length of time to test under normal conditions the value of unified control and direction. I suggested a five-year test period for this purpose.

Congress refused to approve my suggestion and following the insistent demands of the railroads, provided that they should be retained until March 1, 1920, and in addition guaranteed to them for the first 6 months after their return, an income equal to one-half of the yearly income during federal control.

I do not wish to be understood as renewing the suggestion for a five year test period, because the time for it has gone by—continuity of operation having been broken, but, speaking on the general results and efforts of restored private control and the return to the old so-called competitive system of railroad operation with its great wastes and inefficiencies, with the tremendous burden imposed on the public of increased freight and passenger rates, the evil consequences of which are reflected in the prostration of agriculture, labor and industry, and of the colossal claims made by the railroad corporations against the government for alleged under maintenance, inefficiency of labor, etc., I am convinced that it would have cost the American people far less money to have controlled the railroads for said test period than has resulted from their return to private control. Whatever of under-maintenance may have existed, the government could have overcome at reasonable cost during the five-year test period and whatever conditions have arisen on this score, out of their earlier return

would have been eliminated at the end of the five years because there would have been ample time to equalize over-maintenance, of which there was a great deal on some lines, with the under-maintenance on others and to bring the properties up to a high standard of construction and efficiency.

I am also convinced that the present level of freight and passenger rates would have been unnecessary because there is no question in my mind that a well-directed and unified operation of the railroads would enormously reduce the cost of operation and greatly increase efficiency. Again, the cost of credit for capital expenditures and refunding of maturing obligations would have been less than under private control. During such a test period the existing investments in the railroads would have been protected, labor problems would, in my judgment, have yielded to more reasonable treatment, and the common use of terminal facilities, not possible under diversified competitive control, would have constantly tended toward a lowering of the cost of transportation since the terminal costs constitute such a large percentage of the total.

Railroad Administration's Labor Policy

Upon my assumption of the duties of director general, January 1, 1918, I was confronted with the tremendous problem of relieving the unprecedented congestion of traffic and restoring efficient operation of the railroads. An absolute essential to the achievement of these imperative needs was to satisfactorily dispose of the labor problem, which was then acute and menacing. Railroad employees throughout the country were thoroughly discontented and strikes were impending everywhere. The railroad executives had testified before the Interstate Commerce Commission and elsewhere that railroad wages were below the scale paid in competitive industries and had been seeking increases in rates in order that they might increase wages, and without which increases of rates they said that it was impossible to do so. My railroad advisers urged that I give immediate attention to the labor question. Railroad labor was grossly underpaid and there were many grave abuses in the matter of working conditions on the railroads which needed correction.

Among other things, the U. S. 16-hour law was being constantly disregarded. Railroad executives claimed that this was necessitated by the shortage of labor and other abnormal conditions. It was clear that railroad employees could not be expected to work for the railroads at lower rates of pay than they could command in competitive industries throughout the country. The high cost of living had made it impossible for many of them to live on the wages they were receiving, and it was clearly in the interest of justice and right, to say nothing of the wisdom and reason of the policy, to bring their wages to a level which would enable the railroads to command the requisite amount of service and to prevent the continued depletion of their forces with the constant labor turn-over which railroad managers themselves had insisted was one of the reasons why they were unable to make the railroads function efficiently.

The labor problem had to be settled from three angles, first, from the standpoint of railroad management, and second, from the standpoint of labor, and third, from the standpoint of the public. In order to meet the management phase of the problem I selected as the director of the Division of Operation (the most important division in the Railroad Administration) Carl R. Gray, whose long experience as a railroad executive and practical railroad man pre-eminently fitted him for this responsible task. Second, from the standpoint of labor, I appointed, as director of the Division of Labor, W. S. Carter, at that time president of the Brotherhood of Locomotive Firemen and Enginemen. No orders affecting wages or conditions of railroad labor were ever made by me except after full discussion with them and, while it was not always possible to reconcile differing views, I may say that no order was ever made by me concerning wages or working conditions except upon the recommendation of these men or with their approval. I wish, however, to say that I accept full and complete responsibility, notwithstanding, for every order that was made by me as director general of railroads, whether upon the approval of any members of my staff or not. I always took the best advice I could get and then, as the responsibility for making the decision was mine, I did not hesitate to make the decision. Third, from the standpoint of the public. The director general was supposed to represent the public interest as well as all interests, and I created a Division of Public Service and Accounting and put at the head of it Charles A. Prouty (now deceased) for many years a member of the Interstate Commerce Commission.

Railroad Wage Commission

There was only one way to compose the disturbed labor situation on the railroads and that was to appoint immediately a railroad wage commission to investigate the subject, as I was unwilling to act solely upon my own judgment about so important

a matter, and to have it report after a careful investigation as to wages and working conditions with recommendation as a basis for action. As some months would be required to make these investigations, it was necessary to give railroad employees the assurance immediately that the delay would not operate to their disadvantage and that, if increases of wages were recommended by the commission and were put into effect by the director general, they would be retroactive to the 1st of January, 1918. This course was adopted after consultation particularly with A. H. Smith.

This commission upon exhaustive investigation found that railroad labor had been deplorably underpaid and recommended an increase ranging from 43 per cent for the lowest paid to nothing for the highest paid. In this connection, the findings of this commission utterly refute the charges that railroad employees took advantage of the war emergency to wring undeserved and unreasonable concessions in wages from the government.

The Wage Commission made its report on April 30, 1918, and upon its consideration and in accordance with its recommendation 1 promulgated, May 25, 1918, General Order No. 27 granting the suggested graduated increase of 43 per cent for the lowest paid to increase for employees receiving \$250 per month and over. This increase was below the wages of corresponding groups of other industrial workers.

Until recently no question was ever raised as to the justice and propriety of the increases in wages so made. In fact, the wisdom and necessity of these increases was generally conceded at the time. The increases granted by the United States Railroad Labor Board in 1920 are reflected in the payrolls of seven months only of the year 1920, but if the estimates submitted by the Association of Railway Executives are correct, as to what the full effect of this increase would have been if distributed over the whole year 1920, the added labor outlay would have been approximately \$1,147,000,000, as compared with only \$866,000,000 for the entire year 1918, or \$281,000,000, more than the total increases in the payroll in the year 1918. There was not the slightest complaint from any railroad executive that the wage increases promulgated in General Order No. 27 and in the supplements thereto were too high; and never at any time during that year were railroad wages too high. The fact is that railroad employees worked for less pay during the war than any other class of industrial workers doing similar work. The further fact is that no fair complaint can be made of the part the railroad employees performed during the war.

Railroad Executives Urged Wage Increases

Not only did no railroad executive complain that the scheduled wages in General Order No. 27 was too high, but the contrary was true. Time and again railroad executives appealed to the Railroad Administration at Washington to increase wages in order that the munitions factories, shipbuilding plants and other industries should not draw from the roads their skilled labor. The correspondence between Regional Director A. H. Smith, and Director of the Division of Transportation, C. R. Gray, with the accompanying letter from President Rea of the Pennsylvania Railroad, conclusively show that the Pennsylvania officials were not satisfied with the award of the Railroad Wage Commission because the increase was not sufficient. President Rea, particularly complained of the basis upon which the Railroad Wage Commission made its award, to wit: that railroad labor was entitled to a living wage, saying in effect, that while this was a deciding factor, another factor should very largely govern and that was the wages paid in other industries, pointing out that by virtue of the higher rate paid by other industries his road had lost a large number of its employees.

Immediately upon the issuance of General Order No. 27, the Board of Railroad Wages and Working Conditions was directed to give consideration to the rates of pay and working conditions of shop crafts so that a supplement might be issued promptly establishing a rate more nearly equal to the rates paid by private industries, shipyards and other government departments. It was necessary for the board to define the work of the various crafts so that each might receive the proper rate; otherwise the purpose of the order might be entirely defeated if on any railroad the men were given improper classification. On the other hand, it would be possible for the officials to classify mechanics as handy-men or helpers and thereby decrease their rates below those which were intended to be paid them. Therefore, for the protection of the administration against excessive charges, as well as for the protection of the employees against discrimination, it was necessary for the board to define the work of each craft. On July 8, 1918, the three railroad members of the Board of Railroad Wages and Working Conditions submitted to me one recommendation and the three labor members of this board another.

At the hearings held by this board the representatives of the federated mechanical crafts had demanded the allowance of a universal minimum rate of 75 cents per hour for the seven federated

metal workers, electricians, molders and carmen; an eight-hour day, time and one-half for overtime, a minimum guarantee of \$6 per day of eight hours, a minimum rate of 56¼ cents per hour for all helpers of the indicated seven crafts, and that no rate for the above crafts should carry an increase of less than 25 cents per hour. The railroad men and the labor men on the board could not agree on a report and submitted separate reports. They differed both as to the classification of the employees and as to the rate of compensation. After full consideration of these reports with Director of Operations, Carl R. Gray, and Director of Labor, W. S. Carter, and Assistant Director of Operations McManamy, and upon their advice, Supplement No. 4 to General Order No. 27 was promulgated July 25, 1918. This supplement was based almost entirely upon the recommendations made by the railroad members of the board as will be disclosed by the comparison between this supplement and the two recommendations aforesaid.

Recommendations of Railroad Members of Wage Board Followed

There was no general reclassification of railroad employees under Supplement No. 4, but the regular classification of railroad employees in the mechanical crafts that was in general use on all railroads was uniformly applied to individual employees who were performing the work of the various crafts. Further than this, Supplement No. 4 adopted the classification recommended in the report of the railroad members of the Board of Railroad Wages and Working Conditions and approved by Director of Operations Gray, his assistant, McManamy, and Director of Labor Carter.

Manifestly, the wage scales could not be applied unless the same classification of railroad employees existed everywhere, and since all the railroads were under federal control and the government was a common employer, it was impossible to pay shopmen on the Erie Railroad, for instance, working alongside shopmen on the Pennsylvania Railroad, a different rate and to give them a different classification.

However, after the promulgation of Supplement No. 4, it was soon found that on a number of railroads men who were doing mechanical work were classified as helpers and men doing helpers' work were classified as mechanics; therefore, Interpretation No. 1 to Supplement No. 4 was issued, the purpose of which was to pay each employee in accordance with the work he was doing. This was to protect the administration as much as to protect the employee, and many cases exist where employees' classification was reduced, thereby resulting in enormous savings. As a matter of fact, the classification of some 2,254 men on the Pennsylvania Lines West was reduced at one time, thus effecting a saving to the administration of \$3,426 per day, \$1,041,504 per annum, which was being wrongfully paid out by the officials in charge of that road.

In a similar case Regional Director Hardin, who succeeded A. H. Smith, at New York, protested against decisions made by the Railroad Administration because they would force him to reduce the classification of some 2,000 men on the New York Central Railroad who were being overpaid, and appealed to the director general to set aside such decision. However, the decision was sustained and the men's classification was made to correspond with the work they were actually doing, thereby effecting a large saving to the administration.

John G. Walber, secretary of the Bureau of Information of the Eastern Railroads, was one of the last witnesses called before this committee by the railroads in the hearings of last June. He was a member of the Board of Adjustment No. 1 during 1918 and handled during the last three months of federal control labor matters for the Eastern Region as labor assistant in the Division of Operation. He discussed at length the increases made in wages by supplement No. 4 to General Order No. 27. He says that this order was the beginning of reclassification of employees in the mechanical department. He failed, however, to inform this committee, although discussing very fully the results of the so-called reclassification of employees in the mechanical crafts, that I adopted the identical classifications recommended by Messrs. Gaines, formerly of the Georgia Central, Morse of the Chicago & Northwestern and Denver & Salt Lake, and Lindsey of the New York Central, as railroad members of the board, and upon the advice of Carl R. Gray, W. S. Carter, and Frank McManamy. As a matter of fact, 142 railroads had signed agreements with their shop employees prior to federal control, in which there were substantially the same classifications.

Again Mr. Walber calls to the attention of the committee the fact that before the promulgation of Supplement No. 4 certain railroads did not pay punitive overtime, for which this order provided. The clear inference from this testimony is that the payment of punitive overtime was forced upon the Pennsylvania and Philadelphia and Reading against their wishes. Mr. Walber, however, failed to tell the committee that time and a half for

overtime on the Pennsylvania was granted by Regional Director Smith, without authority from the Railroad Administration, at the request of President Rea and upon the recommendation of Mr. Walber himself.

The scale of wages put into effect by Supplement No. 4 was unsatisfactory to the shop crafts generally and their representatives and the heads of their organizations on August 2, 1918, filed a protest against it. This was not unnatural in view of the recommendation of a higher scale by the labor members of the Board of Railroad Wages & Working Conditions, and in view of the further fact that the scale of wages being paid in shipyards and war industries was higher than the scale established in Supplement No. 4. I felt that there was genuine merit in the contentions of the men, but upon a full consideration of the matter and in view of all the conditions prevailing, I felt obliged to refuse their request for a reconsideration of the case and decided that the scale established in Supplement No. 4 must stand. I outlined my position and my decision in a letter I addressed to them under date of August 28, 1918.

The shop crafts accepted this decision and throughout the entire period of the war their members stood by their jobs and worked for less pay than was offered to them in competitive industries. No stronger refutation of the charge that railroad men were inefficient or indifferent to the interests of the Railroad Administration and of their country in its great emergency could be adduced than this incident. What I have said about the shop crafts applies to all the other employees of the railroads who, with like patriotism and zeal, served their country in that great time.

Other Wages Higher Than Paid

by Railroad Administration

The charge that the wages of railroad labor were unnecessarily raised and that wages were thereby elevated throughout the country is false. The schedules of wages promulgated by the Railroad Administration during 1918 were generally below those in other basic industries and well below the rates fixed by the navy yards, by the National War Labor Board and by the Shipbuilding Labor Adjustment Board.

The extraordinary orders for munitions and supplies of all kinds placed in this country by allied governments during the calendar years 1915-1916 led to an unprecedented demand for labor, which in turn, was followed by remarkable increases in rates of pay for all classes. With our advent into the war these conditions were intensified. To secure workmen for the shipbuilding plants, rates of pay were further increased and standardized for the entire country by the Shipbuilding Labor Adjustment Board during the autumn of 1917 and the winter of 1918. During the early spring of 1918, the Taft Walsh Board sanctioned large wage increases in all branches of industry and through its support of the principle of a living wage gave an unusual impetus to the rising rates of pay of unskilled workers.

These conditions necessarily caused advances in the rates of pay of railway workers. The Railroad Administration itself was a conservative instead of an imitating influence in the general advances in wage payments. The award of the impartial Railroad Wage Commission in March, 1918, according to the experience and insistence of the railway executives themselves, did not go far enough in meeting competitive conditions in increasing rates and classifying certain classes of workers. Subsequently, almost without exception, the recommendations of the railroad representatives of the Board of Wages and Working Conditions were accepted as a basis for further wage adjustments. The Railroad Administration's general actual lagged behind the rates of pay established by the Shipbuilding Labor Adjustment Board and the National War Labor Board.

Piece Work

The railway executives have laid great stress on the abolition of piece work, claiming that maintenance costs were largely increased thereby, piece work was abolished only after an extensive investigation covering a period of months in which a comparison of the results obtained in a region working day with a region working piece work had shown:

1. There was no advantage from efficiency standpoint in piece work over day work in locomotive repair shops.
2. That locomotive maintenance costs per 1,000 pounds of motive power mile were greater in the region working piece work than they were in the region working day work.
3. That it was not possible under piece work system to avoid large payments to workmen for work which was not performed. In fact on the Pennsylvania Railroad it was found that the officials had voluntarily overpaid piece workers to the extent of more than two and one-half millions of dollars.
4. No substantial difference in the general condition

of equipment was found in the piece work region as compared with the day work region on roads where work was properly supervised and a high standard of maintenance required.

Less than 10 per cent of all the employees in the maintenance of equipment department were at any time, during federal control, working on the piece work plan; therefore, authorizing it to be discontinued could not have seriously affected maintenance costs either during or since federal control. For the information of the committee the reports of the investigations and the recommendations upon which I authorized piece work be abolished are herewith attached.

Report on Head-on

Collision at Camps, Texas

THE inspectors of the Interstate Commerce Commission have made a report on a collision on the Texas & Pacific, in Texas, on November 10, where six or more persons were found chargeable with negligence or misconduct.

The collision occurred near Camps, Gregg County, about 50 miles west of Marshall, and the trains were westbound passenger No. 3 and eastbound freight No. 66, first section. The fireman of the freight train was killed and 43 passengers and four employees were injured. The collision occurred at about 5:11 a. m., one mile west of Camps, which station No. 3 had passed because of disregard of a train order. At Longview Junction, eight miles east of Camps, the conductor of No. 3 had received a number of train orders, one of which, No. 8, would have allowed train No. 3 to go beyond Camps; but another, No. 14, received later, required it to wait at Camps until 5:15.

Order No. 14 was on Form 19, but the other was on Form 31. With No. 14, the operator was instructed to issue a caution card, Camps being, apparently, in the middle of a manual block signal section. The engineman declared that he did not receive order No. 14 and that it was not listed on the clearance card he received. This clearance card appears to have been lost.

Summarizing a long statement of irregularities, the report of the inspector says that Conductor Turner of No. 3 knew that he should wait at Camps until 5:15, yet allowed his train to pass at 5:10.

He said that he did not know the train had passed the station. Also there is no evidence, except Turner's word, that order No. 14 was given to the engineman or to the fireman. Conductor Turner and the engineman made no effort to compare their orders.

The conductor and the engineman of the freight are also at fault for starting for Camps with insufficient time from the last preceding station. The operator at Longview Junction is at fault for issuing a clearance card saying that the block was clear when it should have stated that the block was occupied; also for failing to issue a caution card after being so instructed by the dispatcher. Conductor Turner should have refused to accept the clearance card improperly filled out.

The dispatcher is criticized for encouraging the freight to run at excessive speed to reach the meeting point and for issuing order No. 14 on Form 19, which form is not allowed to be used to restrict the superiority of a train at a station where there is no telegrapher.

The engineman of the freight claims that he did not need to clear the superior train by five minutes, which ignorance or misunderstanding of rules is a reflection upon the officers, says the report. Five persons, altogether, are censured in connection with order No. 14, and the conductor of the freight for sending orders to the engineman by the flagman instead of delivering them personally. All of the employees involved were experienced men.

Recent Changes in American Hose Connectors

Passenger Heads Interlocked Under Pressure—Permanently Attached Freight Interchange Adapter

THE AMERICAN automatic hose connector is one of the few connector devices placed on trial during the past seven years, the practicability and reliability of which has been indicated by an extensive period of service. It is now in service on the equipment of eight steam railroads and two industrial roads in the United States and installations are now under way on several other steam railroads.

The American connector is manufactured by the American

ment the lugs may readily be welded on, while new couplers may be secured with the lugs cast on. The standard arrangement of hose connections remains undisturbed.

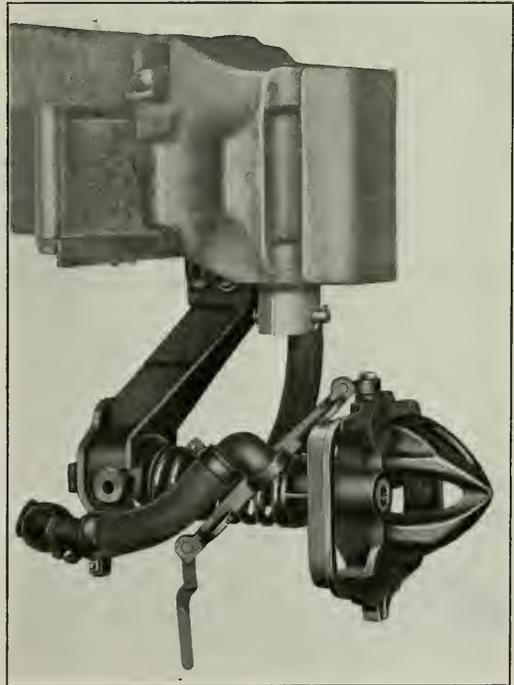
The first extensive installation of American connectors,* comprising 100 freight cars, 18 locomotives and 24 passenger cars, was made on the Copper Range Railroad at Houghton, Michigan, early in 1919. These connectors have been thoroughly tested under severe conditions as to climate and curvature and are still in service.

Since that installation a number of improvements, either in the head itself or its attachments, have been made to insure positive maintenance of vertical alignment, the automatic locking of the heads under high steam pressure in passenger service and to provide a convenient freight interchange adapter.

The application of the chain suspension to both passenger



Face of Passenger Connector Head; Brake Pipe and Signal Adapter Is Attached Direct to the Head, Steam Heat Adapter to the Hose



American Freight Connector with Permanent Interchange Adapter

Automatic Connector Company, Cleveland, Ohio. It is of the butting joint type with a so-called pin and funnel type gathering and registering device, and the head is designed to provide a gathering range of $7\frac{1}{2}$ in. vertically by 7 in. horizontally, a range materially greater than that of the standard coupler. Each connector complete consists of six parts and weighs 50 lb. As shown in the illustrations, the brake pipe is in the center of the bearing face of the connector head; on passenger heads the center of the signal port is located $3\frac{1}{2}$ in. above and the center of the steam heat port 4 in. below the center of the brake pipe port. The ports normally lie in the same vertical plane as the center line of the drawbar, with the pyramidal or projecting guide at the right and the receiving guide at the left when facing the end of the car.

When two connectors are joined the gaskets are slightly compressed and the contact between the heads is made at four points. These points are 11 in. apart horizontally and 15 in. apart vertically, a spread of bearing that assures freedom from leakage in going around sharp curves or over rough track with frozen hose.

The connector is suspended from a malleable iron bracket which is either bolted to a lug on the coupler head or directly to the coupler shank. For installations on existing equip-

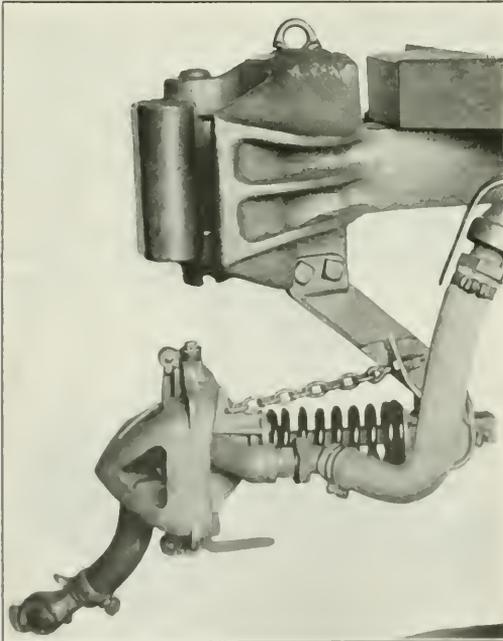
and freight connector heads, by which accurate vertical alignment of the head is assured while in its free position, is shown in the drawing and in one of the photographs. By referring to the drawing it will be seen that the length of the chain is so adjusted that when the head is free the center line of the connector is raised at an angle such that the nose of the projecting guide is held $\frac{7}{8}$ in. above the horizontal line through the pivot center. In this position the bearing

*The connectors applied to this equipment were briefly described in the *Daily Railway Age*, June 18, 1919, page 1477.

face of the connector head projects $1\frac{1}{2}$ in. beyond the inside face of the coupler knuckle. The angle of the chain is such that when connector equipped cars are coupled the slack produced by the $1\frac{1}{2}$ in. compression gives the heads complete freedom of angular movement within the full range of movement of the car couplers, both angular and vertical.

In passenger service the use of high steam pressure on the steam heat line, particularly between the locomotive and a baggage car equipped with head end lighting equipment, produces a severe reaction tending to separate the heads unless springs of higher capacity than those used in freight service are included in the equipment. As the steam heat connection is at the lower port in the face of the connector, the tendency is to open up the connectors at the bottom around the top bearing surfaces as a pivot. This tendency has been utilized to produce a positive lock which holds the connectors tightly engaged, irrespective of spring tension, so long as the heads are under pressure.

By referring to the drawing it will be seen that the lower gathering surface of the projecting guide has been extended to form a slight shoulder or permanent latch. On the corresponding surface of the receiving guide is a similar shoulder, the two being in such relation to each other that when ad-

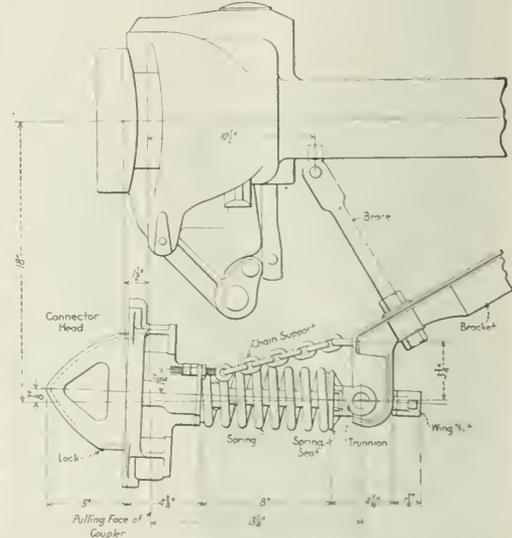


Application of Freight Connector with Chain Suspension; Interchange Adapter in Service Position

joining heads are brought together they interlock. Any tendency of the heads to open at the bottom therefore automatically brings together the faces of these two projections and effectively prevents further opening. When the cars are uncoupled, however, the first separation of the connectors is at the top; this is insured by the slight elevation of the connector heads effected by the chain adjustment. This angularity of the heads disengages the interlocked lugs so that they cause no interference with the normal operation of the connectors.

One of the problems of connector service is the convenient

adaptation of connector cars to operate with cars equipped with standard hose connections. An interchange adapter for freight connectors has been developed by the American Automatic Connector Company, which is permanently attached to the connector head and can be placed in or removed from the interchange position in a few seconds without tools. In one of the illustrations the adapter is shown clamped in operation position and in another it is swung back out of the way. The adapter is locked in service position by means of a lever at the bottom which is engaged in a slot between two lugs at the bottom of the connector head. Laterally projecting shoulders on the lever engage the rear surfaces of the



Application of Passenger Connector with Chain Support and Automatic Pressure Lock

lugs. In closing the lever these projections, in passing the corners of the lugs, compress the gaskets in the face of the connector, the pressure being slightly relieved when the lever has been fully raised. The lever is thus held in the locking position without the use of mechanical fastenings which materially simplifies the operation of applying or removing the adapter.

The American connector has been thoroughly tested on the Copper Range Railroad under particularly severe climatic conditions, in both freight and passenger service. While the connector may be considered primarily a safety device, the results of these tests indicate that its application was fully justified as an economy measure. Air hose renewals on the 100 Copper Range freight cars equipped with the connectors were reduced from \$80.50 in 1918 to \$1.15 in 1919 and gasket renewals were reduced from \$4.80 in 1918 to \$3.32 in 1919. On 20 passenger cars no air hose renewals were made in 1919, while in 1918 they cost \$16.10. Steam hose renewals were similarly reduced from \$154.00 to \$6.60. On the average it is conservatively estimated that the connectors may be expected to effect a reduction of 60 per cent in hose and gasket renewals. The total cost of maintaining connector service on 100 freight cars and 20 passenger cars for a period of 8 months was \$40.63. This included hose and gasket renewals as well as damage to connector heads caused by striking bumpers at mills, and other obstructions, before proper clearances were established for the connectors.

The connectors greatly reduce brake pipe leakage. This improves the operation of the brakes, saves fuel and air pump maintenance and materially decreases the damage to equipment from undesired slack action. Air pumps maintenance was reduced 50 per cent on engines regularly handling connector equipped cars.

On the Copper Range, ore cars move between the mines and mills and are uncoupled twice each day, once at the mine and once at the mill. Some of these cuts require coupling on curves as sharp as 19 deg. and the gathering range of the connectors has been found to exceed that of the car couplers. In this service the connectors effect a saving in crew time of one-half hour a day for each 40 car train.

During the tests conducted in 1919 on the Copper Range by the Bureau of Safety of the Interstate Commerce Commission, the ability of the American connector head to withstand abusive treatment was clearly demonstrated. In a number of coupling tests with connector equipped cars on sharp curves and with abnormal conditions of vertical alignment artificially created to place the connectors beyond their gathering range, the only damage suffered by the connectors was the bending of the shafts. Following each of these tests the heads were allowed to return to their normal position and the cars again coupled. In all cases the connectors then performed their intended functions of gathering, registering and maintaining tight brake pipe joints. The gasket faces are completely protected from injury by an adjoining head under conditions which prevent the heads from gathering and registering, and the form of the projection guide is such that it is not susceptible to injury unless from a cause serious enough to destroy the entire connector and its attachments.

Since the first trial installation of American connectors on the New York Central at Chicago late in 1918, trial installations have been placed in service on the Copper Range Railroad; the Erie; Baltimore & Ohio; Detroit, Toledo & Ironton; Nashville, Chattanooga & St. Louis; the Chicago Great Western and the Monon. A number of industrial cars of the American Steel and Wire and the Carnegie Steel Companies have also been equipped. All of these installations are still in service, except that the original installation on the New York Central was removed and substituted by improved connectors which are now in service on the Lansing division.

Wage Reduction Disputes Now Before the Labor Board

THE CONTROVERSY between the railroads and practically all classes of their employes over proposals made some time ago for further reductions in wages will soon be in the hands of the Railroad Labor Board, according to present indications. Approximately 50 disputes between individual carriers and various groups of employes have already been certified to the Board.

Among the carriers which have submitted their cases to the Board are the Atchison, Topeka & Santa Fe and subsidiaries; Baltimore & Ohio; Chesapeake & Ohio; Gulf, Colorado & Santa Fe; Gulf Coast Lines; Illinois Central; Lake Erie & Western; Lehigh Valley; New York Central; St. Louis-San Francisco; Wabash; Yazoo & Mississippi; Buffalo & Susquehanna; Grand Trunk; Northern Pacific; Minneapolis & St. Louis; Chicago, Burlington & Quincy; Cincinnati, Indianapolis & Western; Kansas, Oklahoma & Gulf; Los Angeles & Salt Lake; Oregon-Washington Railroad & Navigation Company; Baltimore & Ohio Chicago Terminal; Chicago, St. Paul, Minneapolis & Omaha; Duluth, South Shore & Atlantic; Oregon Short Line; Texas & Pacific; Chicago Great Western; Western Pacific; Missouri Pacific;

Southern Pacific; Minneapolis, St. Paul & Sault Ste. Marie; Chicago, Indianapolis & Louisville; Union Pacific and subsidiaries; Missouri, Kansas & Texas; Buffalo, Rochester & Pittsburgh; Louisiana & Arkansas; Colorado & Southern; Peoria & Pekin Union; Kanawha & Michigan; Kanawha & West Virginia; Kansas City, Mexico & Orient and subsidiaries; International & Great Northern; Minnesota Transfer; St. Paul Bridge & Terminal Company; Ann Arbor; Chicago, Peoria & St. Louis; Fort Worth & Denver City; Wichita Valley; Mineral Range; Union Stock Yards of Omaha; Ogden Union Railway & Depot Company; Gulf & Ship Island; Keokuk Union Depot, and the Toledo, Peoria & Western.

An analysis of the submissions which have already been made to the Board shows that more carriers have requested reductions in wages of those employees represented by the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers and the Order of Railroad Telegraphers than of any other classes, 43 carriers submitting requests for reductions in wages for these employees. Submissions involving requests for reductions in the wages of employees represented by the Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees and the Federated Shop Crafts have been made to the Board by 42 and 41 carriers respectively. The following analysis of the submissions made so far shows the number of carriers requesting reductions in the wages of the employees represented by the organizations indicated:

Organization	No. of carriers filing submissions
Brotherhood of Locomotive Engineers.....	19
Brotherhood of Locomotive Firemen and Enginem.....	36
Order of Railway Conductors.....	35
Brotherhood of Railroad Trainmen.....	37
Switchmen's Union of North America.....	7
Order of Railroad Telegraphers.....	43
Federated Shop Crafts.....	41
Brotherhood of Maintenance of Way Employees, etc.....	43
Brotherhood of Railway & Steamship Clerks, etc.....	42
Brotherhood of Railroad Signalmen of America.....	26
International Brotherhood of Firemen and Oilers.....	21
American Train Dispatchers Association.....	14
National Brotherhood of Dining Car Employees.....	2
Brotherhood of Dining Car Conductors.....	2
Dining & Sleeping Car Employees Union.....	2
American Association of Engineers.....	1
Railroad Yardmasters of America.....	1
International Association of Supervisors & Mechanics.....	1
Unorganized Police Employees.....	1
Unorganized Red Caps.....	1
Marine Culinary Workers Association of California.....	1
International Union of Steam Operating Engineers.....	1
Stewarts, Porters, Cooks and Waiters.....	1
Special Agents, Special Watchmen and Officers.....	1
Switch Tenders.....	1
American Federation of Railway Workers.....	1
Unorganized Storekeepers.....	1
Marine Employees.....	1

Labor Organizations Bring Requests for Wage Increases Before Board

As a result of the announced intention of several labor organizations to meet the requests of the carriers for wage reductions with demands for wage increases, several of the labor organizations have also submitted disputes to the Board. Submissions have been filed by the American Train Dispatchers' Association covering disputes of this character with the Oregon Short Line; Chicago, Indianapolis & Louisville; Duluth, South Shore & Atlantic; Mineral Range, and Texas Pacific. The Federated Shop Crafts have filed submissions involving disputes with the Lehigh Valley; International & Great Northern; Trinity & Brazos Valley, and Chicago Junction. The Order of Railroad Telegraphers similarly has filed submissions regarding disputes with the Wabash; Gulf Coast Lines; Minneapolis, St. Paul & Sault Ste. Marie; Trinity & Brazos Valley; Chicago, St. Paul, Minneapolis & Omaha; Fort Worth & Denver City; Wichita Valley, and Oregon Short Line. The Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees has also filed submissions covering disputes with the Baltimore & Ohio Chicago Terminal; Minne-

apolis, St. Paul & Sault Ste Marie; Fort Worth & Denver City; Wichita Valley; Gulf, Colorado & Santa Fe; Beaumont Wharf & Terminal Company; Minnesota Transfer; Southern Pacific Lines in Texas and Louisiana, and Union Pacific.

No action has been taken by the Board as to docketing or consolidating these cases, but it appears from the number and character of the submissions already made and from the progress of the negotiations on individual carriers that have not as yet filed their submissions, that the entire controversy will be in the hands of the Board before the end of February.

Work has practically been completed on the new rules to cover the working conditions of signal department employees and these are to be announced in the near future, leaving only the disputes involving smaller groups of employees to be disposed of.

Freight Car Loading

WASHINGTON, D. C.

DUE PRINCIPALLY to increased shipments of coal, loading of revenue freight totaled 743,728 cars during the week which ended on January 28 compared with 738,275 cars during the previous week or an increase of 5,453 cars, according to the report of the Car Service Division of the American Railway Association. This was also an increase of 42,123 cars compared with the corresponding week in 1921, but a decrease of 59,604 cars compared with the corresponding week in 1920.

Coal shipments during the week of January 28 totaled 180,966 cars, which was an increase of 16,875 cars over the week before, and 17,536 cars in excess of the corresponding week in 1921. It was, however, 7,949 cars below the number shipped during the same week in 1920. Coke shipments also increased 235 cars over the week before which brought the total to 7,502.

There were 32,590 cars loaded with live stock, an increase of 629 cars over the week before and 213 cars more than were loaded during the corresponding week last year. Shipments of grain and grain products amounted to 50,880 cars, 1,301 cars less than were shipped the week before. This was 10,916 cars more than were loaded during the same week in 1921 and 14,376 cars more than during the same week in 1920.

Forest products also showed a reduction of 2,955 cars under the week before, the total being 47,373 cars which was

5,000 less than the corresponding week last year. Merchandise and miscellaneous freight, which includes manufactured products, totaled 420,410 cars, a reduction of 7,768 under the previous week. This was 24,703 cars above the total for the corresponding week in 1921, but 43,804 under the corresponding week in 1920.

Compared by districts, increases in the loading of all commodities over the week before were reported in all except the Eastern and Southern districts, while the Southwestern district was the only one to show a reduction compared with the corresponding week in 1921.

Accounting for Settlements With Railroad Administration

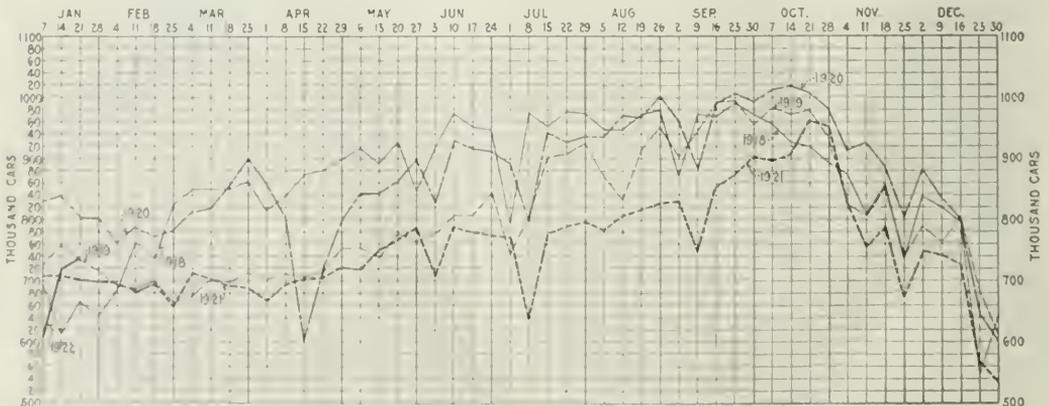
THE Interstate Commerce Commission, having under consideration the procedure to be observed by carriers whose systems of transportation were under federal control, in accounting for the amounts receivable from or payable to the director general of railroads in final settlement for the use and operation of their property during federal control has ordered that the following accounting procedure be observed by such carriers:

(1) All ledger accounts with the United States Railroad Administration covering items adjusted in such final settlement shall be considered as liquidated and shall be closed.

(2) Items on which the amount of settlement may be mutually agreed upon between the director general and the carrier whether or not previously recorded in the accounts, shall be recorded in the accounts in accordance with the effective accounting regulations on basis of settlement agreed upon.

(3) Any difference between amounts adjusted in accordance with the foregoing and the amount collected or paid by the carrier in such final settlement shall be cleared to profit and loss account 607, "Miscellaneous credits," or 621, "Miscellaneous debits," as may be appropriate, provided that the use of profit and loss in clearing balances shall not operate to relieve carriers of the observance of classification rules applying to additions to and retirement of physical property and the maintenance of adequate depreciation reserves for equipment.

EIGHTY-FIVE PER CENT of the 160 married employees of the Chicago, Rock Island & Pacific at Pratt, Kan., who have been in the company's service one year or longer are home owners.



Revenue Freight Car Loadings to January 21, 1922

Real Program of Railroad Construction Needed

Tremendous Losses Suffered Because of Lack of Foresight and Antagonism to Railroads

By Herbert Hoover, Secretary of Commerce*

IN RESPONDING to the invitation to discuss some of the problems present in your general railroad investigation, I shall devote myself to three of the railway topics which especially arise from the present economic situation.

I do not need to review at length that we are recovering from the destruction and inflation of the greatest war in history; that we are suffering from the waste, the extravagance, and over-expansion of the post-war boom, and that the war has brought about great shifts in the movement and price levels of commodities between nations.

I would, however, suggest that it might be profitable for our people to get a somewhat clearer perspective of our own, and the world's, troubles and problems. Even a superficial survey must bring us out of an atmosphere of gloomy introspection into an assuring realization that, great as our dislocations may seem to be, we relatively are in an enviable position. Our nation is unshaken and as a people we are getting our bearings in a world of perplexing economic adjustments. While there is unemployment and lack of profit taking, we are free of panic. We are comparatively more restless than injured. For instance as heavy as our tax burden is it is still less than one-half as great in proportion to our national productivity as the other states in the war.

The violence of our readjustment, however, is without parallel and we sometimes tend to color our measures for the future by the depression we are in. The fact is that we must predicate all plans for the future on the ultimate return of the American people to a normal economic activity, with our annual progress in the expansion of our production, of our plant and equipment, of our skill and our efficiency. There can be no question that this return will take place, and no responsible body will approach our problems on any other basis. Not one of us would submit to the charge that we were not prepared to bet against any odds upon the future of the United States. Our problem is to expedite this recovery—to speed up employment of our workers, and thereby find market for our farmers.

If we look at the national economic situation as a whole, the greatest impulse that can be given to recovery from any source whatever is a reduction of rates on primary commodities combined with the immediate resumption of railway construction and equipment. The first depends upon reduction of operating costs, the second upon restoration of credit for our railways.

One thing is absolute. Our transportation facilities are below the needs of our country, and unless we have a quick resumption of construction, the whole community—agricultural, commercial, and industrial—will be gasping from a strangulation caused by insufficient transportation the moment that our business activities resume. For the past five years we have had no consequential expansion to our railway transportation machine. With but one interval of nine months in 1918 and 1919 we had a car shortage throughout the whole of the years 1916-17-18-19 and '20. This shortage rose to as high as 160,000 cars with a corresponding shortage of motive power. We paid tremendous sums in commercial losses and unemployment in consequence. We laid it onto the war. We should lay it onto our lack of foresight and antagonism to railroads.

Railways Need 4,000 Locomotives and 200,000 Cars

Few people seem to realize the amount of expansion in our transportation machine necessary to keep pace with the growth of the country. And an equal few seem to have any notion of the price we pay for not having it. Our country is more dependent upon railway transport than any other. All others have comparatively greater coast lines and internal waterways. The experience of the 20 years before the war has shown that we must build an extension of lines, including terminal facilities, additional sidings, etc., every year equal to the construction of a new railway from New York to San Francisco. We must add at least 120,000 cars and 2,500 locomotives annually to our equipment. Since we entered the war in 1917 we have constructed at least 10,000 miles of railways less than our increasing population and economic development called for and we are behind in rolling stock by about 4,000 locomotives and 200,000 cars.

I wish to emphasize that unless we can have an immediate resumption of construction and equipment, our commercial community will pay treble the cost of the whole of them in their losses of a single season. The very moment that we reach anything like normal business we shall see a repetition of car shortages, followed by an increase in the cost of coal to the consumer from one to three dollars a ton; we shall again see premiums of 20 cents a bushel for the use of cars for moving grain; we shall in fact see a shortage of commodities to the consumer; and we shall see gluts upon the hands of the producers. We shall see factories filled with orders again closed for lack of cars; we shall see large intermittency in employment; and we shall see the usual profiteering in commodities due to a stricture between the producer and consumer.

There would be no difficulty whatever, by basing such losses on the experiences we have already had, to calculate a loss to the American people of a billion dollars for each one of these periodic transportation shortages.

Furthermore, there is nothing that is so irrecoverable a loss to the nation as idle shops and idle men. To-day we have both. There is nothing that will so quickly start the springs of business and employment as an immediate resumption of construction and equipment of the railways. When business does resume, we shall need all of our capacity for the production of consumable goods. We shall not only find it strangled for lack of transportation, but we shall find ourselves plunging into the manufacture of this very railway equipment and construction in competition with consumable goods for materials and labor. Herein lies the basic cause of destructive price inflation and booms, with all their waste and over-expansion. In times of depression, we should prepare for the future and by doing so we can cure the depression itself.

If we examine the fundamental reasons for failure to resume equipment, we will find them in the loss of confidence in railways as an investment and the competition of tax free securities. We have passed the period of credit strain in this depression. Surplus capital is pouring by hundreds of millions monthly into tax free securities and foreign loans, and yet our railways are unable to finance the most moderate of construction programs. The confidence of the public in railway investments was at so low an ebb before the war that finance by the issue of common and preferred stocks had

*Statement before the Interstate Commerce Commission on February 3, 1922.

become impossible and railway expansion was living on bond issues. The confidence of an assurance and continuity in earning power to cover this burden of bonds has been even lowered since the war began, because of the uncertainties of both rising and falling prices, of rising and falling wages, of rising and falling rates preventing all regularity of earnings upon which an investor could be convinced, even if no other difficult factors entered into the problem. I see no occasion to go into the labyrinth of past railway finance, its propriety, or lack of propriety, its foolishness or its skill. This commission approaches the financial problems of the railways upon the actual value, not upon their issues of securities and I take it we are living for the future, not the past. We want transportation, and we want it with the values of private initiative and clean public service.

If we look to the immediate future with its complete necessity of paring the railway earnings down to little more than bond interest, until we give relief to the shipper (and thus the primary foundation to business recovery) I can see little likelihood of convincing the investor as to his margins of safety. There is an atmosphere that our railways will never again earn profits, and that they are not as an industry worthy of investment, and that because private investors will not come to their assistance nobody can do anything.

Driving Headlong for a Setback

Far from it being impossible for our railways again to return to a profitable footing, I believe it is possible to demonstrate that on an average they will become very profitable. If we assume that the reduction of prices and wage levels will settle at a plane no lower than 50 per cent over pre-war, and if we assume that the present rates are to maintain, and if we assume restored traffic, then the earnings of our railways would exceed 15 per cent on the whole of the commission's tentative valuation. Surely there is room here for safety to investment, as well as relief to the shipper.

But the circumstances being as they are, confidence being at a low ebb, we do not have the equipment necessary for our business. We are driving headlong for a setback to our whole commerce the very moment that we begin to get on our feet.

In these circumstances it seems to me vital that the railways as our greatest industry should propose a courageous program of broad visioned betterments and if necessary the government should consider giving the use of its superior credit. It would not cost the taxpayer a cent to give the government guarantee to equipment trusts upon the primary responsibility of the railways, the proceeds devoted entirely to improvement and equipment. This is no proposal to take money from the taxpayer. It is a proposal to save him from paying treble the amount of his guarantee in profiteering and losses. It will render a reduction of rates earlier, or unless something is done the improvement will have to be paid over years out of increased rates. Nor would we lose a cent upon the guarantee, for if American railways can not earn interest upon their borrowings let us throw up our hands and prepare for a second Russia.

A real program of construction would in its various ramifications give relief to five or six hundred thousand of our unemployed. It would enable even added numbers to increase their standard of living, and thus give increased market to the produce of our farmers. Our farmers who look to foreign markets for their surplus should stop to consider that our home consumption of meat decreased nearly seven pounds per capita in 1921, mostly owing to unemployment and that if this decrease could be overcome it would be worth more than a 35 per cent increase in exports.

We talk glibly of giving billions of credits to foreign countries, to increase our farm exports. I wish to say with all responsibility for the statement that a billion dollars spent upon American railways will give more employment to

our people, more advance to our industry, more assistance to our farmers, than twice that sum expended outside the frontiers of the United States—and there will be greater security for the investor.

Time to Call Off the Witches

Finally, I want to refer to the veritable witches cauldron being fed constantly with hates distilled from the misdeeds of railway promoters in the past, from the conflicts between the railways and the farmers, between the railways and their workmen. From all the confusion that arises from it we destroy our railways and destroy ourselves. With this commission on one hand assuring honesty in finance, justice to the shipper and the railway investor, with the Railway Labor Board assuring justice to workers and, above all, with a great spirit of public service in our generation of railway managers, it is time to call off the witches and take some vision of our national situation if we are to pull ourselves out of this depression.

Railway Rates

Before entering upon the question of readjustment of rates, I wish to set out some factors in the present economic situation that bear upon the entire question.

The following table shows a few commodities and service groups, compared to 1913 as 100:

Farm crops, at the farm.....	98
All animals, at the farm.....	92
Retail food stuffs.....	150
Cotton, at the farm.....	136
Wool, at the farm.....	101
Retail clothing.....	213
Steel billets, Pittsburgh.....	113
Copper.....	86
Zinc.....	90
Pig iron, Pittsburgh.....	128
Bituminous coal, at the mine (estimated 4 districts).....	160
Bituminous coal (retail various localities).....	198-220
Yellow Pine Lumber (at the mill).....	189
Douglas Fir Lumber (at the mill).....	125
Lumber (retail) partly estimated.....	200
Cost of Living variously estimated from Wage Scales (approximate).....	162-180
Farm labor.....	135
Textile industries.....	210
Steel industries.....	150
Railways.....	200
Metals trades.....	218
Building trades.....	176
Coal mining scales.....	173

This table at once demonstrates

- (1) The inequality in prices and wages between different groups of commodities.
- (2) The great increase in spread between "producer's" and "consumer's" goods.
- (3) The lag in wage scales.

As the population engaged in the "deflated" producer's goods—agriculture, and metals, wool, etc.,—comprises one-half the total in number of the nation, their power to buy the same ratio of consumer's goods has been reduced to less than 70 per cent of pre-war, and is the consequent cause of a large part of the industrial and commercial unemployment and stagnation in our cities and our transportation.

Spread in Prices

I wish to especially call your attention to the indicated enormous increase in spread between primary producer's and ultimate consumer's goods. In considering it, we must bear in mind that when we use 100 for both consumer's and producer's goods of 1913, we have already included the spread between producer and consumer at that period. I therefore believe that the index numbers indicate an increase of 100 per cent in the actual spread. It is right here where the most of our economic difficulties lie today. Our increased cost of manufacture and distribution bears two relations to the rate question—first, that the increase of rates of from 30 per cent to 100 per cent in different commodities are part of it, and are in turn part caused by it; and second, the increased rates bear very unequally on different groups in the community.

If we search for the cause of this increase of spread we shall find therein a vast complex of increased taxation, increased wages, rents, and a dozen items, all reacting upon each other, and also expressing themselves in increased cost of operating the railways. For instance, the total increase in national, state and municipal taxes since 1913 is approximately \$5,640,000,000. At the present purchasing power of the dollar, our total national productivity is probably somewhere around 50 billions of dollars, of which over 10 per cent must now be devoted to increased taxes. This sum of money must be obtained either from the producer or the consumer and in any event a considerable part of the taxes contributes to widen the spread. Because the increase in spread due to taxes necessitates a spiral of increased wages, rents, etc., and before its force expends itself my own opinion is that possibly 20 points in the distorted index number flows from increased taxes.

The increase of railway rates since 1913 in Class I railways to 1921, is about \$2,600,000,000, of which about \$1,400,000,000 are due to wage increases and about \$160,000,000 to tax increases. If our traffics were normal the total increase of rates would be more like \$3,500,000,000. These sums enter into this increase in the spread and carry with them a further trail of increased living costs and again a spiral of higher wages, rents, etc., in all other branches of manufacture and distribution.

There are other causes of the increased spread, some of which will be mitigated with time.

No one can say to what particular table-land of prices and wages we may settle upon, but it is a certainty that the exchange value of producer's goods will not again line up with consumer's goods unless we can decrease the costs and eliminate the wastes of our whole manufacturing and distribution trades. And unless we can secure their nearer proximity we will retard a return of employment and prosperity.

I wish to digress for just a moment from railway to agricultural subjects, to point out that the recent project for fixing farm prices by law are apparently founded on the notion that by raising agricultural prices up to the levels of consumer's goods we can remedy the extreme hardship of our farmers. Even if it be possible to raise the prices, much less advantage would accrue to the farmer than anticipated. Unless the "spread" is decreased by actual savings, the costs of manufacture and distribution would be at least partially increased by higher prices of producer's goods. The spread is fundamentally due to increased cost of manufacture and distribution, not to the fall in producer's goods. The real remedy is an attack upon the causes of the spread and thereby to bring consumer's goods down to the producer's buying power.

It is a certainty that in order to decrease the spread, railway rates must come down and for rates to come down costs of railway operation in wages and prices of supplies must be reduced. Until this adjustment is secured the economic machine will continue to move slowly. We cannot and should not expect wages to come back to pre-war levels. Many of our wage scales were too low in pre-war times. They can follow down step by step with the cost of living, but there are permanent charges in this spread, such as taxes, which will hold the cost of living above pre-war levels. We must gain our other reductions in the spread by increased national efficiency.

The Method of Readjusting Rates

The involved complex of transportation rates was obviously originally based on some relationship to the value of commodities, mitigated by competition. In other words, the old slogan of "what the traffic will bear" had some economic background. But this entire conception of ratemaking was destroyed by horizontal raises. We have rates clearly beyond what the traffic can bear.

The increases in railway rates during the past five years have fallen with extraordinary inequality on different commodities and different groups of people in the community. The country grew up, its industries were distributed under ratios of costs between different commodities, ratios between raw materials and finished goods, ratios between the farm and city. These have all been distorted by the horizontal rises. The increases in rates since 1914, for instance, have added probably less than 1 per cent to the price of cotton goods on the average haul but it has added probably 60 per cent to the price of coal. The increased rates since 1914 have added nearly 100 per cent to the cost of assembling the materials for pig iron.

All this is artificially forcing our industry to move toward their raw materials. This does not alone represent the starting of a new factory; it is a movement of the whole mechanism of the community, labor, homes, schools, railways and whatnot—an enormous duplication of plant and loss of capital. We will ultimately have the rates readjusted and then we will destroy the new industries created under it.

Of equal importance there is a new economic light on this distortion of rates evident under the stress of the last few years. That is, the better realization that some increases of rates come mostly off the producer while others are paid by the consumer. Increases in spread between producer and consumer do not fall equally upon each of them. In primary commodities where the price is fixed by international competition, the increase or decrease in rates is a deduction from the producer. Take wheat, for instance, the point of competition with foreign produce lies at Liverpool. The net to the producer is Liverpool less transportation and other handling charges. Therefore increases of rates are a deduction from the farmers' price. The same thing applies to the producer in certain cases of domestic competition. Also where there is rapid turnover, as in manufacture, and consequent ability to reduce supply, the consumer pays the freight, as processes of productivity will not continue below profit point. In most manufactured commodities the consumer pays the freight, for production quickly shrinks when prices at the factory become unprofitable and the price to the buyer is the factory price plus the freight. For instance, in hides, the farmer gets the international price less freight. On boots he pays the manufacturer's cost, profit and freight.

It appears to me that with the paralysis induced by the increased spread, we have to take a broader vision of what part of the community is suffering most and direct such concessions through the railway rates as can be given to that group—if we would better equalize the whole economic load.

During the past eight months the railways have made many thousand readjustments of local rates in endeavoring to heal local distortions, but I am convinced that the whole railway rate structure needs a most systematic overhaul in the light of these new economic forces that have been brought into play.

We obviously must maintain the average rate that will support our transportation systems adequately and such an overhauling of rates might quite well mean the advancement of rates in certain commodities in order that compensation can be given to others where there is undue duress.

If I were to discuss the rates charged today I should say at once that a decrease in passenger rates is not nearly so vital to the community as freight rates, for passenger rates do not enter into the "spread" in proportion to the relative volume of earnings. If I were examining the freight rates I should at once say that coal, metals, wood, and agricultural and other producers' goods should be reduced to the bottom before l. c. 1. and class rates are touched.

I would be willing to go even farther and say that I am convinced that even if the commission cannot at the present moment justifiably reduce railway incomes a single dollar, it is warranted in investigating the possibility of some relief

to the more distressed commodities by a revision of some rates upward. There is perhaps no great field for changes in this direction but it is worth inquiry. As mentioned above, an economic analysis of our industry will show that l.c.l. and class rates are far too low compared to the rates on primary commodities.

With the gradual return of the traffic to normal, with decreased operating costs, relief in rates will be available, and it would be an economic crime to apply such relief by horizontal reductions to all rates thus giving relief to higher priced goods and travel, when the vital mainspring of our economic life, our agriculture and fuel and metals are choked.

The Present Rate Situation

Determination of anything in the nature of permanent rate basis is in my own view impossible at the present time because:

The last five years of changing administration, irregular traffic and wildly fluctuating wages and prices of materials give us but little reliable historical criteria upon which to base the future. We are in the midst of violent economic readjustments, of a profound industrial depression. No one can determine to what plane the reduction in operating costs will settle. No one can estimate the volume of traffics that are probable for any particular period ahead. It appears to me, therefore, that the commission will need to temporize with the situation for some time, and that its conclusions may well fall into three periods:

First—The immediate present.

Second—During the early period of decreasing costs and increasing efficiency and slowly recovering traffics.

Third—Normal operations.

THE IMMEDIATE PRESENT

If we survey the results of the past year in the application of present costs and rates, we find many railways failing to earn interest upon their borrowed capital; we find some others more fortunately situated who have earned dividends on their share capital.

One or two exceptions of low bonded indebtedness have done extraordinarily well on their share capital. If we survey the situation by districts, in order that single instances do not mislead us, we will find that the whole of the Class I southern roads barely covered bond interest, while the most fortunate group, the western roads, show an earning of only four per cent in 1921 upon their tentative valuation. Moreover, it is obvious that maintenance has been held to a low level and new equipment and extensions practically nil.

The present earnings in their perilous closeness to bond obligations seem to me to dispose of the question of immediate important rate relief, if we do not wish widespread receivership and shocks to our whole commercial fabric.

I believe there are cases where earnings could be increased by lower rates. I know that it is contended that such opportunities do not exist, but no one can review the testimony given here during the past few weeks without concluding that the rates in special instances are stifling business. These directions are perhaps not important in the whole problem of rates, but I am convinced that lower rates would recover lost traffic, such as export coal, substitutions in building materials, gains in water competition, etc.

THE SECOND PERIOD—DURING 1922

We must assume that those railway wages and supplies which are out of line will at least in part follow down to the levels of decreased cost of living; we must assume that the efficiency that is slowly emerging after the government management will still further increase; we must assume that the volume of traffics will increase toward normal.

I have the feeling that the railways being our greatest

business, will agree that all these savings should be instantly devoted to relief in the rates on primary commodities in order that we should expedite the recovery that can only come through decreased spread between producer's and consumer's goods.

I recognize that the uncertainty and slow reduction of rates in this fashion will itself delay business recovery because of the uncertainty of business as to its future costs. If our railways were in position to stand the temporary shock it would be infinitely better to drop the rates on primary commodities tomorrow—our business recovery would come faster. But we cannot ask the impossible.

THIRD

If we look further to normal times, we could make a rough calculation that present wages and costs at say 50 per cent above pre-war would show that the railways can earn somewhere around \$1,500,000,000 in excess of the six per cent minimum upon tentative valuation. As I have stated, relief is first more critically needed in the rates on primary commodities.

Some estimates given to me indicate that approximately 35 or 40 per cent of revenues are involved in the groups more urgently needing relief. I think it will also bear calculation that in the income assumed above primary commodities can eventually be reduced to pre-war rates, and still place earnings upon a basis that will inspire such confidence in investors as will secure the free flow of investment capital into construction. It is not to be expected that capital for these purposes will be available at the rate that does not exceed the taxfree securities at least two per cent to three per cent.

Efficiency of Railways

A great deal has been said about the inefficiency of our railway system. I do not sympathize with these statements. Comparison with foreign railways of the fundamental criteria of per ton-mile costs, train loading and so forth, in the light of our cost of living, will demonstrate that our railways are of higher standards, better in methods than others and are growing in efficiency.

The consolidation of our railways into larger systems has been contemplated in our legislatures for some years past as a gain in efficiency. Its value can be overestimated—it is not a panacea for all trouble. It does give hope, however, of economies in further efficiency from more complete utilization of rolling stocks and terminals, some small degree of saving in overhead, saving in current inventories; but its probable great saving would be decreased cost of proper finance, increased financial stability and fuller independence from the supply companies.

It is probably unnecessary to refer to the question of government ownership. No one with a week's observation of government railways abroad, or with government operation of industry in the United States, will contend that our railways could ever be operated as intelligently or as efficiently by the government as through the initiative of private individuals. Moreover, the welfare of its multitude of workers will be far worse under government operation.

We are struggling with the great problem of maintaining public control of monopoly, at the same time maintaining the initiative of private enterprise. I believe that we are steadily progressing to solution.

Great social and economic problems find their solution slowly and by a process of trial and error. We have tried unregulated monopoly, and have tried government operation, and found the error in them. We still have much to solve if we are to maintain our transportation. Much of this solution depends upon the successful initiative of the railways themselves and much of the shaping of these matters lies fortunately in your able hands.

The I. C. C. General Rate Investigation

Commission Concludes Hearing on General Aspects of Case— Testimony of Secretary Hoover, Pullman Company, Etc.

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on February 4 concluded that part of its hearings on the general aspects of the rate case from the point of view of representatives of the public and shippers interested in rates generally rather than those on particular commodities. An adjournment was taken until February 8 to allow two days for the conferences which the commission holds at the beginning of each month.

The feature of the hearing during the past week was the statement made by Secretary Hoover of the Department of Commerce, who appeared at the invitation of the commission on the suggestion of the Chamber of Commerce of the United States, to give his views as to the railroad and rate problems. Mr. Hoover's statement is printed in full elsewhere in this issue. He did not attempt to give direct advice as to how rates should be adjusted, although he said that rates on primary basic commodities should be reduced as soon as possible and if they cannot be reduced without reducing the income of the railroads the commission would be warranted in investigating the possibility of some relief to the more distressed commodities by a revision of some rates upward.

Before discussing rates, Mr. Hoover emphasized strongly the necessity for an adequate return for the roads to encourage the development of adequate railroad facilities so that they may be able to handle the normal volume of business which is to be expected. He pointed out the enormous losses to the public which result from the periodic shortages of transportation and declared that such shortages in the past should be attributed not to the war but to "our lack of foresight and antagonism to railroads." Obviously, therefore, he said, we must maintain the average rate that will support the transportation systems adequately. He believed that there are cases where earnings could be increased by lower rates but said that complete relief must await a further period of gradual readjustment and it would be "an economic crime" to apply a horizontal reduction.

Mr. Hoover's appearance attracted a large audience to the commission's hearing room and the expressions heard afterward indicated that nearly all the various elements in it found something in his statement to approve. Paul A. Walker, representing the state commission group, arose and said Mr. Hoover's statement was "the best thing he had ever listened to" and asked if it might not be printed for wide distribution.

Hoover Cross-Examined by Thorne

Clifford Thorne cross-examined Mr. Hoover, but the secretary declined to admit that he did not know what he was talking about because he had not brought with him all the figures on which his conclusions were based. He offered to send them to Mr. Thorne if he desired them. Thorne began by asking the witness if he had the idea that the proportion of bonds to stock was greater than it was 10 or 15 years ago. Mr. Hoover said no, but he believed it is too high and a high proportion of bonds gives less flexibility to the whole economic situation than is desirable. The higher the proportion of share capital, he said, the better.

Mr. Thorne asked if he did not know that most of the railroads were financed by giving stock bonuses with the bonds.

"Oh, yes, I have been hearing about that ever since I was a boy," replied Mr. Hoover, "but we have got to live for the future and not rehash the past. I believe the present amount of stocks and bonds is less than the tentative value fixed by the commission. We are faced with a practical question and

the commission is dealing with value, not the mass of paper in the markets."

Mr. Thorne then asked his favorite question as to whether the railroads are not earning as good a return and are not able to raise capital on as favorable terms as industrial and public utilities.

"I don't consider the comparison between the returns of the railways and other industries a fair comparison," said Mr. Hoover, "but the practical fact is that the railways have been unable to secure capital in competition with other industries and tax free securities." He added by way of illustration that the director-general of railroads has a large parcel of very good 6 per cent railroad securities which he would like to sell and he has been able to "peddle out" some of them during the past six months, but not enough to finance the requirements for new equipment for one month. The question is not whether railway securities can now be sold as easily as industrial securities, he said, and public utilities are in much the same condition as the railways.

Mr. Thorne, who numbers among his clients the National Wholesale Grocers' Association, asked if Mr. Hoover was aware that large advances had been made in l.c.l. rates on food articles since the war. He replied that only a very small percentage of food products moves l.c.l. When Mr. Thorne asked if he had made any analysis of the canned goods and other food products that moved l.c.l. as compared with the carload movements, Mr. Hoover said he had made enough of an analysis to know that it would be better for the farmer to have a reduction in his primary rates than in l.c.l. rates.

Pullman Company Objects to Surcharge

L. S. Taylor, vice-president and comptroller of the Pullman Company, presented a statement on February 3 to show that the application of the commission's order in Ex Parte 74 providing for a surcharge to accrue to the railroads amounting to 50 per cent of the charge for space in sleeping and parlor cars had caused an immediate marked reduction in passenger traffic in Pullman cars, and a consequent serious decrease in revenue, not only to the Pullman Company but also, as the company believes, to the railroads, and which has continued since that time.

He presented a statement of gross revenue by months from May 1, 1920, to October 31, 1921, showing a reduction in revenue in September, 1920, as compared with August, 1920, amounting to \$1,418,057.54, and a further decline in October and succeeding months. This decrease between the two months named amounted to 15.43 per cent, whereas over a series of years from 1917 to 1921, inclusive, there was a variation between those two months of less than 1 per cent, except in 1920, when the decrease amounted to 15.43 per cent in September, the first month after the surcharge took effect. In 1917, 1918 and 1919 there was a variation of only \$23,000 to \$33,000 in revenue between August and September; in 1920 the decrease in September under August was \$1,418,000, while in 1921 the variation was again normal, amounting to less than \$25,000.

"It necessarily follows," Mr. Taylor said, "that some change of importance seriously affecting travel caused the immediate marked drop of \$1,418,000 in September, 1920, as compared with August, 1920, and no other explanation can be offered than the application of the surcharge at that time. A new lower level of revenue then resulted which still further declined in succeeding months, and while the general business depression throughout the country had its influence on

the further decline, the fact remains that the sudden decrease of more than 15 per cent at that time, not noticeable in any other year, was coincident with the application of the surcharge.

"As further illustrating the change taking place at that time in traffic conditions, a statement of passengers in Pullman cars from August, 1920, to November, 1921, inclusive, has been compiled. There was a reduction of 17.05 per cent in number of passengers in September, 1920, as compared with August, with increased percentages of reduction in succeeding months. Such reduction was not reflected in car miles, the decrease in car miles being much less than the decrease in number of passengers. This shows that the number of cars operated has not decreased in proportion to the decrease in number of passengers and in revenue. At the same time, the expenses per car have remained fully as great, and operating expenses have not decreased with the decrease in operating revenue.

The 1918 Surcharge

"The commission's report in Ex Parte 74 states that The Pullman Company opposed the re-establishment of the surcharge on the ground that it would reduce travel in Pullman cars, and referred to the showing made by the company with reference to the surcharge imposed by the director general in 1918. A further study of the effect of the surcharge at that time shows that the marked falling off in travel in Pullman cars in June, 1918, was followed by a perceptible increase in December when that surcharge was taken off. Attention is invited to the statement submitted showing comparisons of revenue of the month of June with the revenue of May for a series of years. Normally there is always some increase in June on account of summer tourist travel. The exhibit shows increases in June over May for the years 1915 to 1921 varying from 10 to 20 per cent, with the exception of 1918 when the surcharge was in effect from and after June 10, and in that month there was a decrease of 6.24 per cent. That is, instead of a normal increase of at least 10 per cent there was a decrease of more than 6 per cent, or a total decrease of more than 16 per cent as compared with 1917, and of 20 to 25 per cent as compared with other years shown on the statement. The actual decrease in revenue for the one month in 1918 was at least three-quarters of a million dollars. And this decrease continued throughout the time the surcharge was in effect.

"The 1918 surcharge was taken off November 30 of that year. A comparative statement of revenue of December with that of November, for the years 1915 to 1921, is also submitted. This shows that normally there is some increase in December over November due in part to increased travel on account of the Christmas holidays. The increase varies from less than 1 per cent to 16 per cent, except in 1918, when in December, the first month after the removal of the surcharge, the increase was 39.67 per cent, more than double that of any other year. The increase in gross revenue was between \$800,000 and \$900,000 over the normal increase of the month of December as compared with November, and more than a million dollars greater than the normal increase in that month in any year since.

"Plainly, these figures cannot fail to show that the imposition of the surcharge caused a very noticeable decrease in travel in Pullman cars, and we believe in passenger travel generally, during the time the surcharge of 1918 was in effect, with a repetition of the same decrease in travel at the time the surcharge of 1920 was imposed, which has continued to the present time. The consequent loss of revenue to The Pullman Company since August, 1920, without possibility of corresponding reduction in expenses has resulted in a net operating loss.

Sleeping and Parlor Car Business Shows a Loss

"The net results from operation of The Pullman Company's sleeping and parlor car business for the year ended October 31, 1921, shows a loss of \$2,856,702.80, against a capital investment in that portion of its business much in excess of \$100,000,000. This does not mean a decrease in revenue of that amount, but an actual loss, an excess of expenses over income. The operating ratio for that year was 99.65 per cent without taxes; including taxes, the ratio was 104.15 per cent.

"The company has not found it possible to reduce operating expenses to meet the constantly decreasing revenue. One of the principal reasons is that the decrease in the number of cars operated has not been proportionate to the decrease in gross revenue

and passengers carried. The expenses per car have not decreased; in fact, during the last months of 1921 the expenses per car increased, notwithstanding reductions in wages, on account of additional heavy repairs after the close of the summer season.

"The decision of the United States Railroad Labor Board authorizing a reduction in wages of employees effective July 1, 1921, has resulted in the saving of only a small proportion of the very large increase in the company's payroll expenses of the past three or four years.

For the year ended December 31, 1917, The Pullman Company's operating department payrolls (this includes only the sleeping and parlor car business) aggregated.....	\$16,977,543.04
For the calendar year ended December 31, 1920, they were.....	32,986,260.12
For the calendar year ended December 31, 1921, they were.....	30,676,821.76

"To show the situation with respect to reductions in wages more in detail a statement of decreases in operating expenses due to reduction in force or reduction in wages is attached. This gives the increase in wages in June, 1921, over June, 1920, as showing the effect of the increase of July 1, 1920. It also shows the decrease due to reduction in force and reduction in wages during the last five months of 1921 as compared with the corresponding months of 1920. The average of these five months in reduction due to reduction in wages amounts to \$153,000 a month or approximately \$1,800,000 a year. That is, during the last five months of 1921 the decrease on this account was at the annual rate of about \$1,800,000 a year. The reduction in force, varying from 2,400 to 4,100 employees in different months, was largely due to the decrease in business.

Pullman Revenue Reduced \$1,000,000 a Month

"The decrease in passenger traffic in Pullman cars since the application of the surcharge in 1920 has resulted in a reduction of revenue to The Pullman Company of about \$1,000,000 a month. The average reduction in number of revenue passengers has been over 600,000 passengers a month. The average distance traveled by passengers in Pullman cars is over 360 miles, year by year, or nearly 10 times the average distance traveled by all passengers on all railroads, according to well known statistics. It is obvious that a decrease of this extent must have had a material effect on rail transportation, partially offset, of course, by the amount of revenue derived from the surcharge accruing to the railroads."

Commissioner Aitchison asked Mr. Taylor if he had any opinion of the comparative merits of the plan of selling a separate ticket for the surcharge at half a cent a mile that was used by the Railroad Administration and the present plan of adding the surcharge to the price of the Pullman ticket. Mr. Taylor said the present plan creates antagonism because the public thinks the Pullman Company gets the money, but when Mr. Aitchison suggested that this be weighed against the fact that the public found the former plan an "infernal nuisance" he said the convenience of the public must be given first consideration. Commissioner Esch asked whether any of the railroads desired to have the surcharge taken off. Mr. Taylor said he thought a number of roads feel it should come off.

Discussing the operating expenses of the Pullman Company, Mr. Taylor said that maintenance expenses were very heavy last year, partly because the company had had to rebuild a large number of steel cars that were less than 10 years old. The principal cause, he said, was corrosion. Some of the trouble was probably due to the fact that when the first steel cars were built the necessity of protection against climatic changes was not well understood. "Some of our people thought the steel cars would last 50 years," Mr. Taylor said, "but our experience indicates that a steel car has not the life of a wood car."

Mr. Taylor said his company thought that about half of the falling off of Pullman travel was due to the surcharge and the other half to business depression. He was convinced that the railways are losing twice as much money as a result of the surcharge as they are making by it.

E. A. McElroy, representing the National Retail Drygoods Association, comprising 2,200 stores, presented a petition to the commission urging a general horizontal reduction in rates, saying it was believed that this would benefit the railroads. He presented the results of a questionnaire addressed

to the members, saying 99 per cent of the replies were in favor of a reduction in rates and 86 per cent in favor of a general reduction.

F. H. Wood, representing the roads, asked whether retail prices had been reduced as much as wholesale prices. The witness replied that retail prices had come down more than wholesale prices and proved it by saying that silk stockings have come down from \$2.50 to \$1.00.

State Commission Wants Fares Reduced

A number of representatives of the state commissions who testified on February 2 and 3 seemed to be more interested in a reduction in passenger fares than in freight rates, although they also urged freight rate reductions. In addition to trying to show that passenger rates are too high, they had a large amount of statistical testimony to show that the railways are more prosperous than they are willing to admit, and they were especially optimistic in building up constructive years to show that on the present basis of rates and wages the railroads will soon be earning more than 6 per cent. One set of exhibits showed that during the year ending October 31, 1921, after adjusting for present rates and costs, the southern roads would earn 6.75 per cent, the eastern roads 8.06 per cent, and the western roads 6.34 per cent. Exhibits were also made up to show that the railroads have not curtailed their maintenance unduly.

Constructing a Valuation on Reports of

10 Per Cent of the Mileage

Fred Pettijohn, vice-president of the Roberts-Pettijohn-Wood firm of accountants, testified on February 3 and 4 as a witness for Clifford Thorne and presented exhibits to show the returns earned by the railroads on a valuation made by applying to the property investment accounts of 1921 the percentage of the railroad property investment accounts shown by the final values as reported by the commission in the tentative valuations of 182 roads. On this basis he arrived at a valuation for all the roads of \$16,000,000,000 as compared with the figure of \$18,900,000,000 used tentatively by the commission for the purposes of the 1920 rate case.

Fred H. Wood, of the Southern Pacific, said that if the purpose was to attack the commission's valuation, he would feel compelled to lodge an objection, as the issue was not pertinent to this case, the commission having already denied motions to reopen Ex Parte 74.

Mr. Thorne denied that he intended to "attack" the valuation, saying he wished only to submit "additional cumulative evidence" on the subject, as the commission has served many tentative valuations since 1920. After some discussion Commissioner Hall ruled that the witness might answer the questions and present his figures. These showed a ratio of final value to property investment of 73.3 per cent.

Commissioner Aitchison, however, pointed out that the valuations were as of various dates back as far as 1914 and that no adjustment had been made for additions and betterments since. "If there was inflation in the property investment account as of the valuation date," he said, "you have assumed a similar inflation in the money spent since, instead of allowing the full amount of the additions and betterments."

The witness replied that this was so but that his figures represented a fair approximation. Mr. Aitchison pointed out that the New York, Ontario & Western property account as shown in the tentative valuation was \$92,000,000 as against a final value of only \$44,000,000, and that, therefore, if the road had spent \$10,000,000 since it would have been allowed only about half of it. Mr. Thorne said that the purpose was to get an approximation and that if it were desired the figures would be adjusted.

On cross-examination Mr. Wood brought out from the witness that the 182 tentative valuations represent only about

10 per cent of the total mileage and asked if he thought these figures represent a reliable guide to the total. With certain corrections suggested by Mr. Aitchison, Mr. Pettijohn said he thought they were. Mr. Wood then pointed out that the New York, Ontario & Western report was served only about a week ago and asked what the percentage for the eastern district would have been without that report. The witness replied that the inclusion of that road had reduced the eastern percentage from about 80 to 72. Similarly, it was shown that the exclusion of the Rock Island report in the western district would have reduced the percentage from 71.2 to 54.7.

"Would your study have been equally reliable and valuable if it had been made a week ago without the New York, Ontario & Western?" asked Mr. Wood. The witness replied that it would have been fair in including all the reports available, but as to whether 10 per cent of the mileage is representative or not "only time will tell."

"I think we can agree that only time will tell," said Mr. Wood. "Then do you still think that the conclusions you have reached from 10 per cent of the mileage have any great value as against the commission's tentative valuation for all the roads?"

"They are the best available figures I know of," replied Mr. Pettijohn. He said he had not read the statements made by Commissioners Hall and Clark in testimony before committees of the Senate regarding the methods used by the commission in reaching the \$18,900,000,000 figure.

Mr. Pettijohn also had exhibits regarding the maintenance expenditures of the roads, to show that they had not been unduly curtailed as compared with previous years. He also had exhibits comparing the efficiency of labor on the basis of ton-miles per man-hour.

H. W. Bikle asked if the increase in ton-miles did not rather reflect the results of the increased traffic, the heavy loading campaign and the efficiency of management rather than the efficiency of the employees. Mr. Pettijohn replied that management undoubtedly entered into it.

Reed Speaks for the Kansas Commission

Clyde M. Reed of the Kansas Public Utilities Commission, took the stand with a number of exhibits prepared jointly for the state commissions and Mr. Thorne to show the comparative yields on railroad, industrial, public utility, and government securities, together with other similar information intended to show the comparatively good credit of the railroads. Another exhibit showed a reduction in the mileage of railroads in receiver's hands from 37,353 in 1916 to 14,502 in 1921. Other exhibits showed large increases in the failures and liabilities in business in 1921 and the net losses of a number of prominent industries.

Mr. Reed said that farm prices had been deflated to an amount estimated by him as aggregating seven billion dollars, and that farm operations were now and had been conducted at a loss. He pointed out that the business failures in 1921 aggregated 19,982, a larger number than has occurred in any year in the history of the country. The total liabilities involved in the failures of 1921 amounted to \$750,300,000. This sum has doubled the liabilities of any previous year, with one exception. In the face of the most disastrous year in American business, Reed pointed out that the railroad mileage in the hands of receivers at the close of 1921 was the smallest of any year since 1912, and less than half of the receivership mileage in 1915, 1916 and 1917.

Some of the strong railroads made their full return in 1921, he said, and the railroads as a whole made some return in that year, as contrasted with the general losses sustained by farmers and business men, and enormous losses shown in the operations of such industrial concerns as Armour & Co., Swift & Co., Sears, Roebuck & Co., Cuba Cane Sugar Corporation, Consolidated Gas Company of New

York, Fisk Rubber Company, Firestone Tire & Rubber Company, and others.

Quoting such financial authorities as Bradstreet, the Commercial and Financial Chronicle of New York, the Harvard Review of Economics Statistics, Mr. Reed claimed the railroads were able to borrow money and float refunding and new securities at a lesser rate of interest than public utilities or industrial concerns. The 1921 capital flotations of long-time securities for railroads carried 5.30 per cent, as against 6.66 per cent for public utilities, and 7.10 per cent for industrials.

"As a matter of fact," Reed stated, "the decline in the value of railroad securities as related to the net rate of return was not materially greater than government bonds, with particular reference to the Third and Fourth Liberty Loan issues. At the close of 1921 railroad securities were in as good a relative position as the government securities named." He pointed out that in 1921 the railroads, for new capital purposes and to meet maturing obligations, issued \$655,289,500 in securities, which were absorbed by the market. This was more than one-fourth of all the capital flotations in 1921, and these securities were floated at a lower rate of interest than securities of industrial, public utilities and other concerns. Reed claimed that railroad credit had not been impaired.

Pointing out that the tractive power of locomotives now on American railroads had increased 60 per cent since 1910, and that the carrying capacity of freight cars had increased 20 per cent, Reed claimed that the railroads were not candid with the country in constantly conveying the impression that railroad facilities were inadequate. "Car shortages have occurred and will occur again," he said, "but the fact is that the peak loads of the traffic in 1918 and 1920 were higher than the normal tonnage is likely to be up to 1929. Therefore, altogether too much emphasis is being laid by the railroads upon their new capital needs. Their refunding needs for the years 1922, 1923 and 1924 aggregate only \$207,000,000, as against \$302,000,000 in the year of 1921 alone. There has been much misunderstanding in the country on the railroad financial standing, much of which has been fostered by the railroads for the purpose of creating a public sentiment that will sustain the high rates now being charged for the transportation of passengers and property."

One point upon which Reed laid emphasis was the comparison of American and English railroad rates. President Willard, of the Baltimore & Ohio, had referred to the lower rates charged for the transportation of freight in the United States as compared with England. "There is no proper basis of comparison and the impression that American rates are lower is wrong," Mr. Reed said, "for two reasons: First, the average haul per ton in England is less than 60 miles; in the United States it is 325 miles. Therefore, the average rate charged per ton-mile on distances so widely apart has no significance.

Secondly, it is not true that American freight rates for the same length of haul are lower than English rates. On the contrary, they are substantially the same, the American rates being a trifle higher."

Mr. Reed did not state definitely what percentage he thought the commission ought to allow as a fair return after March 1. Commissioner Aitchison asked if he had ever heard of any court or commission fixing less than 6 per cent as a fair return. He said he had not but that the roads had never got above 6 per cent before the war, yet they had built up the greatest railroad system in the world, but he said the fact that much of the outstanding capital of the roads carries only about 4 per cent should be considered and it is not necessary to fix the rate on the basis of the cost of new money.

A point of view considerably different from that presented by most of the shippers was given by R. C. Fulbright, representing the Southwestern Traffic League.

"We do not believe this commission should undertake to compel the carriers to reduce rates generally, or on any given commodity, merely because shippers generally or the shippers of such commodity are not prospering," said the witness. "However great may be the economic demand for the reduction of rates, we believe this commission should see that any reduction is a logical one from a transportation standpoint in order that the rates may be reasonable, just and non-discriminatory.

"There is a distinction between the considerations of economic questions which bear upon traffic and those which affect the public welfare more generally. For example: The commission has always permitted a showing of an economic situation in so far as the same bears upon the question as to whether or not traffic will move under a given set of rates, or upon the question of whether or not the adjustment of the rates as such, unduly restricts the movement of traffic. It has also given consideration to production, consumption, and distribution for the purpose of ascertaining the character and volume of traffic at a given time or that which may be expected for a future period."

Mr. Fulbright said he believed it was fallacious to plead for reductions in rates on certain commodities because of the prostrate condition of the industry producing such commodities. He continued:

"When once the commission orders a rate reduction on the ground that the shippers interested in such rates are losing money and need help, the door will be at once open to the plea of all who feel that they are in any way oppressed. When once the public concludes that this commission will order freight rate reduction to relieve economic distress, the door will be open to every kind of public pressure which may be invoked by various classes of the shipping and consuming public. We will rapidly pass into an era where political issues will be framed upon agitation for reduced freight rates.

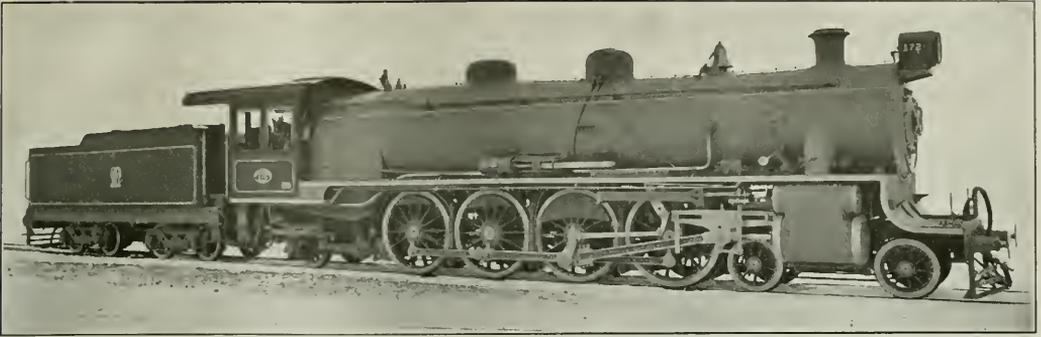
I am surprised that representatives of the carriers have indicated that this proceeding is primarily an economic case. Such would be a most dangerous precedent and undoubtedly would lead to political interference, to the great detriment of the transportation system.

I have made this statement to the end that there should be no misunderstanding of our position in introducing certain economic testimony in this case. Let it be understood at the outset that our position is that freight rates should be reduced only so far as there is a reasonable outlook for a resumption of normal traffic and a reduction of operating expenses. I will go further and say that if we could not normally expect a greater traffic than that handled in 1921 or a reduction of operating costs below the level for that year, most assuredly no general reduction of rates should be undertaken.

We believe that there can be a general reduction of rates in western territory without impairing the carriers' revenues in the future. There are many fallacies in the case which has been presented by the railroads, but most of these should be pointed out in argument rather than brought to your attention during the taking of testimony.

I cannot refrain from calling your attention to the fact that the carriers have predicated this case upon a constructive year which represents the lowest ebb of traffic for a period of several years, and at a time when general deflation has resulted in paralyzed industry. It also is shown by their own testimony that by reason of their method of charging in materials when they are applied to maintenance or operation at the average price of all such materials then in stock, the operations for the constructive year have been virtually upon peak prices. This is well illustrated in their exhibits as to coal prices, coupled with their testimony that coal may now be obtained at practically one-half the average price shown for the constructive year. The same is true as to labor costs for two-thirds of the constructive year. Great saving has already been effected in these costs and large additional savings should be effected when the present applications of the carriers for further reduction of labor scales are acted upon.

The interests represented by me believe that a general reduction, if not more than 10 per cent, would of itself greatly stimulate development of traffic in the southwestern territory. This is not necessarily true as to every commodity, but it is true as to numerous commodities and class traffic generally. The very fact that railroad rates are virtually at their peak, while other costs have been greatly reduced, creates the conviction on the part of the shipping and buying public that it is only a matter of a short time until reductions will be made, and there is a disposition to buy only as absolute necessity requires.



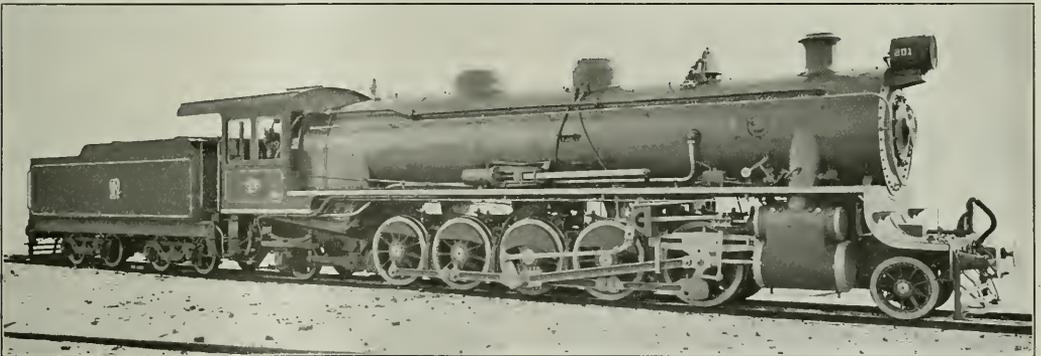
Mountain Type Passenger Locomotive

American Locomotives for the Manila Railroad

Mountain and Santa Fe Types Have an Unusual Number of Interchangeable Parts to Facilitate Maintenance

RAILROAD DEVELOPMENT in the Philippine Islands has been quite meagre. The largest island, Luzon, is served by the Manila Railroad with headquarters at Manila. This road is 665 miles long and has a north and a south line with branches. The rolling stock, including the new locomotives now being received, consists of 145 locomotives, 240 passenger cars and 1,675 freight cars. The only other railroad in the Philippines is the Philippine Railroad on the islands of Panay and Cebu, with 295 miles of line authorized

The Manila Railroad distributes a large part of the imports, a considerable proportion of which are from the United States. On the north line there is inter-island passenger traffic, while the freight tonnage consists largely of sugar and tobacco. On the south line the traffic handled includes coconut, copra, coconut oil, hemp and lumber. There is also the passenger traffic to and from the south and the southern islands, connection being made by boat at Hondagua. There are no large cities along the line of the road, but there



Santa Fe Type Freight Locomotive

and 133 open. This is an American enterprise and at present has 15 locomotives, 50 passenger cars and 198 freight cars in service.

The Philippines have a population of 10,350,000 and a total area of 115,026 square miles, of which 41,000 square miles comprise the island of Luzon. Practically all of the imports and exports, to the annual amount of \$137,461,766 for imports and \$142,190,563 for exports, pass through the port of Manila. The principal imports are wheat flour, cotton goods, chemicals, automobiles, fish, paper, silk, iron and steel, while the exports consist largely of copra, coconut oil, hemp, maguay, embroideries, sugar centrifugal, raw sugar, tobacco leaf and cigars.

are many small native towns. The large majority of the passengers are natives who travel third class, but excellent first-class coaches are provided also, although they are rarely filled.

The track gage of both Philippine roads is 42 in., which is the standard gage in Japan and is also frequently used in many other eastern countries.

Much of the equipment on the Manila Railroad is quite antiquated but the lack of necessary capital made it impossible to replace the present facilities by anything like the amount of new equipment needed. The situation, however, is being greatly improved by the addition of 10 new Mountain (4-8-2 type) locomotives for passenger service and 10

Santa Fe (2-10-2 type) locomotives for freight service, built at the Brooks works of the American Locomotive Company. In addition, the road received 10 locomotives last year from the H. K. Porter Company and is now receiving an additional lot of 10 more.

These are not the first locomotives on this road from the United States, as the American Locomotive Company delivered 10 to the road in 1913. The old locomotives have made 140,000 miles between shoppings, which is an excellent record and in excess of that ordinarily obtained by American roads, 80,000 miles being considered a good general average.

In designing the new locomotives the American Locomo-

lb. on the front truck and 24,000 lb. on the trailing truck. The engine wheel-base is 34 ft. 41 in., driving wheel-base 18 ft. 4 in. and rigid wheel-base 13 ft. 6 in.

The 4-8-2 type locomotives, which are capable of exerting a tractive force of 28,600 lb., have 60 in. drivers and weigh 183,000 lb., 119,000 lb. being on the drivers, 34,000 lb. on the front truck and 30,000 lb. on the trailing truck. The engine wheel-base is 34 ft. 7 in. and driving wheel-base, 15 ft. 9 in. The tenders have a capacity of six tons of coal and 5,000 gal. of water.

The road on which this equipment is to operate includes $1\frac{1}{2}$ per cent grades and curves of 150 meters (492 ft.) radius.

The locomotives are provided with screw type couplings having the hook, screw, clevis, links and screw crosshead made of chrome-vanadium steel. The bumper and sills on the front end of the locomotive and rear end of the tender



Station at Hondagua

otive Company arranged to have as many as possible of the detail parts of the two types the same to facilitate maintenance and reduce the number of extra parts which would have to be carried by a road situated so far from the point of manufacture. That the designers succeeded to a high degree is evidenced by the fact that the interchangeable parts include the boiler complete with fittings; cylinders complete, except height; valve motion parts with exception of eccentric cranks; trailing truck; cab; tender; cocks; valves; fittings and brake cylinders. The following parts also are interchangeable except for the modifications required because of the use of lateral motion driving boxes on the forward axle of the 2-10-2 type locomotive: Rods, crank pins, driving axles, driving boxes, driving box saddles, shoes and wedges, equalizing arrangement details and spring hangers.

Both types of locomotives have 20 in. by 28 in. cylinders,



Engine House at Hondagua

11 in. piston valves with $5\frac{1}{2}$ in. travel and an extended wagon top boiler carrying 180 lb. steam pressure. The inside diameter of the first ring of the boiler is 63 in.; the firebox is 84 $\frac{3}{16}$ in. long by 60 $\frac{1}{4}$ in. wide with 1.50, 2-in. tubes and 22, 5 $\frac{1}{8}$ -in. flues, 15 ft. 6 in. long. The heating surface is 176 sq. ft. for the firebox, combustion chamber and arch tubes and 1,823 sq. ft. for the tubes and flues; the superheater surface is 493 sq. ft. and the grate area 35.2 sq. ft.

The 2-10-2 type locomotives, which are capable of exerting a tractive force of 35,700 lb., have 48 in. drivers and weigh 188,000 lb., 148,500 lb. of which are on the drivers, 15,500



Construction Work on Southern Extension to Guinayangan

have been designed, however, to allow for a future application of M.C.B. couplers. The brake equipment was furnished by the Vacuum Brake Company of England and in addition to the ejector and apparatus for controlling the train brakes, the locomotives are equipped with steam driver brakes while independent hand brakes are used on the tender.

The equipment throughout is strictly modern and includes Locomotive Superheater Company's superheaters, pyrometers, Security brick arches, Worthington feedwater pumps and heaters, Alco 7 in. type E-3 steam power reverse gear, Pyle-National electric headlights and Barco flexible connections in the vacuum brake piping between the engine and tender.



Photo by K. R. V. S.

Over the Zambesi River Near Victoria Falls, Africa

Chamber of Commerce Discusses Railroad Problem

Railroad Committee Proposal for Commissioner General of Transportation Is Vigorously Opposed

WASHINGTON, D. C.

THE RAILROAD question was the chief subject considered at a two-day session of the conference of the national council of the Chamber of Commerce of the United States held at Washington on February 8 and 9. The discussion centered around a report of the railroad committee proposing the creation of a commissioner general of transportation, to be appointed by the President, whose duty would be to present the public interest before government bodies responsible for the formulation of policies having to do with transportation. This proposal was vigorously opposed by Howard Elliott, chairman of the Northern Pacific; Alba B. Johnson, president of the Railway Business Association, and others.

Report of the Railroad Committee

The report was presented by George A. Post, president of the Hudson River Bridge & Terminal Association, chairman of the railroad committee. The report said in part:

Your committee is much impressed by the fact that at the hearings before the various governmental bodies that are constantly dealing with matters affecting interstate commerce no witness ever appears who is authorized and equipped to present the matters under consideration from the standpoint of the public as a whole. There are usually able representatives of the various special interests, but there is no official representative of the public—no one who is charged by the government with responsibility for making an independent study of the transportation needs of the American people, and then making at the discretion of the President of the United States the results of that study, available to the rate making and wage fixing powers to neutralize the influence of those whose attitude and contentions are liable to have their bases in their desire to promote their own interests without due regard for the interests of the public as a whole.

In its review of the transportation situation the committee says:

Nearly two years have elapsed since Congress passed the Transportation Act returning the railroads to private operation. At no time during that period have conditions been normal either in the United States or in the world at large. As a result of the great war there has been a world-wide depression in business and a great decrease in the volume of railroad traffic and in the net earnings of the roads. The gross revenues of the roads have considerably increased under the new rate schedule established in 1920, but the cost of operation has remained so high that the net operating income of the railways of the country as a whole has remained very inadequate. In 1921, for example, the net railway operating income was only 2.9 per cent of the tentative value of the property as determined by the Interstate Commerce Commission—less than one-half of the 6 per cent authorized in the act, and an amount quite insufficient to furnish an adequate basis for the re-establishment of railroad credit.

Many of the conditions which limit the earnings of the railroads are entirely beyond the direct control of Congress or of the Interstate Commerce Commission or the Railroad Labor Board or the railroads themselves. Nevertheless, each of these agencies is now engaged in making a comprehensive and nation-wide effort to bring together information and develop constructive proposals in the hope of restoring normal conditions in the transportation industry.

The Senate Committee on Interstate Commerce has just completed a series of hearings on "Modifications of the Transportation Act," at which proposals to repeal the statutory rule of rate-making and to repeal the authority of the Interstate Commerce Commission to regulate interstate rates when they discriminate against interstate commerce were carefully considered. The committee has not yet submitted its report, but the official record of the hearings contains a large amount of testimony which tends to show that these two provisions of the act are in the public interest and that they have been administered by the Interstate Commerce Commission in accordance with the intent of Congress when it included them in the act.

The Senate Committee on Interstate Commerce is also conduct-

ing a series of hearings on railroad revenues and expenses with a view to determine what are the facts in regard to the financial operations of the railroads since March 1, 1920, and what would be the best means of bringing about a condition that will warrant the Interstate Commerce Commission in reducing freight and passenger rates. The testimony of railroad executives and the testimony of railroad security owners at these hearings have been carefully reported to members of the Chamber of Commerce of the United States in special publications issued by the Department of Transportation and Communication, and the testimony of railroad employees, railroad shippers, and other witnesses at the hearings will be reported as soon as possible after it is completed.

Almost every interest affected by railroad transportation has already submitted voluminous testimony to the Senate committee during these hearings, and has brought to its attention a great variety of plans for improving the situation by amending or repealing certain provisions of the act. In December, 1921, a representative of the Chamber of Commerce of the United States appeared before the committee, but not for the purpose of criticizing the act. On the contrary, he declared in his testimony that the business men of the country regard the act as a strong piece of constructive legislation and on their behalf urged Congress not to amend any of the provisions of the act until they have been tested under normal peace conditions.

The Joint Commission of Agricultural Inquiry appointed by Congress in July, 1921, is also holding a series of hearings that have an important bearing on transportation. This commission is investigating the causes of the present condition of agriculture, giving special attention to the marketing and transportation facilities of the country with a view to recommending legislation which will in the opinion of this Congressional body tend to remedy existing conditions. As yet it has submitted only a preliminary report, but it has announced that in its final report it will include the results of a nation-wide study of transportation conditions as they affect agriculture.

The Railroad Labor Board is sitting in almost continuous session in its effort to fix wages and working conditions that will be just and reasonable, not only to railroad employees, but to the railroads themselves, to users of railroad transportation, and to the general public. The board has already made substantial reductions in the scale of wages paid to large classes of railroad employees, and it is now considering the possibility of further reductions. It has set aside many of the rules included in the national agreements governing working conditions that were in effect during the war, and has formulated new rules to take their place. The board is proceeding in an orderly way to discharge the responsibilities placed upon it by the Transportation Act, and it seems reasonable to expect that if given an opportunity to continue its work with full public support it will be able to bring about a reduction in railroad labor cost that can and will be translated into a reduction in freight rates.

Further Investigations

The Interstate Commerce Commission commenced on December 14, 1921, a general investigation to determine whether and to what extent, if any, further reductions in rates *** can lawfully be required by order of the commission *** upon any commodities or descriptions of traffic and also to determine what will constitute a fair return from and after March 1, 1922, under section 15a of the Interstate Commerce Act. The railroad executives have already completed their testimony at these hearings. They maintain that the revenues of the railroads in each important traffic section of the country are at the present time wholly inadequate, and that if these revenues are further reduced by a reduction in rates it would inevitably result in financial disaster for many of the railroads without bringing any corresponding advantage to the industries. They assert that a general reduction of rates at this time would prevent the railroads from making adequate preparation for the expected revival of business, and would tend to make it impossible for the industries to obtain necessary transportation service when normal traffic is restored.

Representatives of the shippers are now testifying before the commission. In almost every instance they urge large and immediate reductions in freight rates, expressing the belief that such reductions would result in an increase in traffic and presumably in an increase in the revenues of the roads. The railroad executives do not share this belief.

Your committee has given careful consideration to the proceed-

mings of these various investigations as far as they have gone. We do not presume to offer a solution of the difficult questions now confronting the official agencies that have been established to regulate interstate commerce. In due time these questions will be settled by these agencies according to their best lights. Your committee is much impressed, however, by the fact that at the hearings before the various governmental bodies that are constantly dealing with matters affecting interstate commerce no witness ever appears who is authorized and equipped to present the matters under consideration from the standpoint of the public as a whole. There are usually able representatives of the various special interests, but there is no official representative of the public—no one who is charged by the government with responsibility for making an independent study of the transportation needs of the American people and then making, at the discretion of the President of the United States, the results of that study available to the rate making and wage fixing powers to neutralize the influence of those whose attitude and contentions are liable to have their bases in their desire to promote their own interests without due regard for the interests of the public as a whole.

The specific recommendations of the committee were published in the *Railway Age* of January 28, page 273.

Railway Business Association Opposes Report

Mr. Johnson said the Railway Business Association unanimously adopted in annual meeting on February 1 a resolution opposing the creation of a commissioner general of transportation for the purposes set forth in the report of the railroad committee, and specified the following reason: An officer designated as the President's representative to discuss railway problems with committees of Congress and federal agencies, including the Interstate Commerce Commission, would be a wholly new feature in our government, for which the association sees no occasion and in which it fears the possibility of pressure tending to impair the independence of those charged with railway regulation or legislation.

The general executive committee, which on January 31 unanimously recommended such action, requested him to appear at this meeting, support that resolution and advance an alternative proposal for a channel through which organized business can impress its views respecting railways upon federal officers and agencies.

Mr. Johnson said in part:

Congress or its divisions from time to time receive communications from the President in his official capacity. Hitherto such advice has come either directly from the President or through executive officials exercising power over the subject and owing responsibility therefor directly or indirectly to the President. Members of Congress on the other hand, are sometimes informed of the President's views through channels other than these. When that course is pursued it is in his capacity not as President but as party leader or as a citizen. In that case, the emissary, whatever may happen to be his official status, if any, is acting for the moment unofficially and without government responsibility.

What is now proposed is that an individual shall express the President's views to committees of Congress on a subject in relation to which the emissary has no official power of responsibility. Yet he is not an employee of the President's party or of the President personally but an employee of the government. He has authority to require information from all departments. He has the explicit duty of reporting recommendations to the President.

The Interstate Commerce Commission has statutory power and duty. It is responsible for the results of its course. Its administration of the law is theoretically based upon its independent judgment. In adjudicating the rights of those who complain of discriminations it is in effect a court. Whether exercising business judgment as to wise rate level or judicial authority in the correction of discriminations, the commission has enjoyed until recently a large degree of immunity from executive suggestion. The fact when a President transmitted views upon rate cases has been to anger but great pains to emphasize by secrecy the unofficial character of the message. Knowledge of it reached the public only by whispered rumor. During federal control the director general made the rate, but this was under a war emergency measure which placed the commission not to subordinate but to supervise.

Re-appointment of the roads to their owners restored the previous legal status. Unfortunately the previous practice was not fully restored. Executive suggestion, both Presidential and cabinet, has been frequent and open. A week ago today it was made formal by the secretary of commerce making oral recommendations to the commission regarding its rate policy. It is this tendency

which is sought to be made official, formal and permanent through the creation of a commissioner general of transportation. As applied to the commission it is a departure in our process of government.

So long as we keep our legislative and executive separate, Congress has an independence for us to maintain. Executive pressure tends to break down that independence. Administrative boards like the Interstate Commerce Commission by the terms of their establishment are still further protected. Such boards are quasi-judicial and quasi-expert. They adjudicate right and wrong and they also exercise business discretion. Either function involves judgment. The commissioners concentrate upon their subject. They have a cumulative experience. They have a broad basis of comparison and familiarity with precedents. They carry a responsibility for the aggregate results of their work. Their judgments are those of an authority. Not even the Supreme Court reviews those judgments except as to the single aspect of jurisdiction. Either the statute bestows a given power or it does not. If it does, the board has the last word.

Orderly procedure is of the essence. Independence is vital. Clamor is the petulance of those seeking privileges. Pressure is scandalous. To Congress the President or his subordinates may suggest policies, but contrary to the common habit of thought the Interstate Commerce Commission is an arm not of Congress but of the government as a whole, created by joint action of Congress and the President, and its limits defined by the Supreme Court. If the proposed commissioner did not exert influence he would be useless. If he did, he would be mischievous. The basic idea is meddlesomeness. If the executive department has jurisdiction it can carry out its views without appeal to any other branch of the government. If the executive department lacks a jurisdiction which it ought to have the remedy is to confer the jurisdiction with power, not to set up advisory functions. If a branch of the government other than the executive has jurisdiction and this is a mistake the jurisdiction should be placed elsewhere or the function abolished. If it is where it belongs the tribunal carrying the responsibility should be respected and kept free from executive encroachment.

Co-ordination is a ghastly nightmare. As we learned in the war, attempts at it brought us to the brink of disaster. The only workable course when two authorities conflict is to place one above the other with power not to advise but to decide. The most conspicuous field of conflict actual or apprehended is between the commission and the labor board. We doubt that public opinion is sufficiently crystallized to formulate a remedy but whatever the remedy the co-ordination should unify power and not amplify advice.

Outcome Government Ownership

If we fail in the present experiment with regulation, the outcome will be government ownership. I do not know of any competent observer who doubts it. If we cannot regulate railroads we cannot regulate banking or business or agriculture or labor. If the government cannot regulate, it must own and operate all these activities. When that time comes the map-makers may continue to label a certain North American area the United States, but it will not be the kind of United States you and I think worth living in or preserving. The background of this railway problem is our whole political and economic life. The railroads are the first trench. We must hold it.

Whether we hold that trench or not will depend upon our railway policy and its administration. Adequacy of income as a statutory aim of regulation is fighting for its existence against the forces of repeal. The chamber stands solidly against such repeal.

Adequacy of income in its practical application by the Interstate Commerce Commission is fighting for its life against the forces of special interest and irresponsible pressure. Upon this aspect the chamber has not spoken. There is need for it to speak.

Organized business should provide and maintain means of its own for presenting business opinion upon railroad questions to those charged with regulation or legislation. In that direction the chamber has done much. It could do much more. It would be a great piece of good fortune if the discussion of the railroad committee report should lead to the development of a more comprehensive plan. Such a result of this debate would be logical, since we all know that the object in the minds of the railroad committee was and is an improvement in the means for attaining and preserving the vigor of our transportation system.

Alexander W. Smith Favors Report

Alexander W. Smith, of Atlanta, Ga., spoke on behalf of the committee in advocating the report. The right solution of the railroad question, he said, involves ultimately the existence of the government of the United States. The greatest defect in our system of railway regulation has been that the

regulating body has had presented to it a mere contest between selfish interests and the general good has had no counsel in court to represent its interests. That process of continual contest before regulating bodies has been the greatest enemy the carriers have had to confront. He said the plan was not original with the committee and quoted statements by Alfred P. Thom advocating the creation of a commissioner of transportation, a bureau of transportation or some agency to present the public interest to the rate-making power. Mr. Smith said there is absolutely no co-ordination and co-operation between the innumerable agencies that are dealing with various phases of transportation. He had ascertained that there are 42 separate federal agencies that have some functions to perform with reference to transportation, besides the regulating bodies of 48 states. Yet, he said, the great problem that stands behind it all goes by default and decisions are rendered without its ever being heard. How can there be a readjustment of rates and costs, he asked, with one body determining 60 per cent of the costs and another fixing the rates? "We have a beautiful machine, but no driver at the wheel, and we are getting nowhere. The great problem facing the country is the problem of public control coincident with private initiative and enterprise. In self-preservation we will have to have government ownership unless that problem can be solved. The idea of the committee is to put upon the President the responsibility of selecting some one who can act for him in studying how to bring to a common purpose the work of the various agencies."

In reply to the suggestion that the plan would inject politics into the situation, Mr. Smith said there has been a good deal of politics in the transportation question for several years. He argued that the recommendation does not provide for a political officer and said that for that reason it was not proposed that the commissioner be subject to confirmation by the Senate.

It must be assumed that the President will have ordinary intelligence enough to select a man who will be a credit to himself, because what he does would be the direct act of the President. He referred to the fact that when President Harding came to appoint a new director general of railroads the proclamation was filled out and signed before he ever saw the man. The appointment was made because of his previous familiarity with the problems connected with the liquidation of the Railroad Administration and without any question of political consideration.

Redfield Says Department of Commerce

Now Has Authority

W. C. Redfield, former Secretary of Commerce, said that he violated no confidence in stating that the committee had consulted Secretary Hoover on the subject and that he thought the functions proposed might well be reposed in the Department of Commerce. However, Mr. Redfield said, both the committee and the secretary seem to have overlooked the fact that the organic act creating that department makes it its duty to foster, promote and develop various things including "the transportation facilities of the United States." He recalled the fact that while he was secretary the department had intervened in the rate case of the Solvay Process Company against the Delaware, Lackawanna & Western and the director general on the ground that the increase in the rate against which the company was complaining was a matter that interested the entire public. Mr. Redfield said the department also has authority to make from time to time investigations and reports concerning commerce and transportation and its powers in this respect are very broad and comprehensive, being stated in language very similar to that of the committee's recommendations.

Elliott Opposes Reopening of Congressional Debate

Howard Elliott, chairman of the Northern Pacific and chairman of the Chamber's committee on transportation and

communication, earnestly opposed the adoption of the report at this time without full and careful consideration in connection with the work of other organizations which are studying the same question. Without discussing in detail the merits of the proposal itself, he opposed reopening the discussion in Congress on the transportation act because of the danger, if the door is once opened, of demolishing the entire act before there has been an opportunity to fully try it out. The act is not perfect, he said, but it is the result of five or six years of nationwide debate and now represents a guidepost. To tell Congress now that it should be changed would be to reopen the entire question. "Once open Pandora's box," he said, "and you do not know what you will get out of it." The Association of Railway Executives is now at work studying what changes in the transportation act may be worth considering in the future, and organizations of bankers and farmers are studying the same question and there is consultation among them.

In conclusion Mr. Elliott said: "The railroads are common carriers of people and property, but they are not common carriers of all the economic troubles of this country. Let us have a holiday for two years in the discussion of the railway problem and let us go ahead and tend to business."

Emil P. Allrecht, president of the Philadelphia Bourse, opposed the plan on the ground that it would merely increase the number of regulating bodies instead of helping in the solution of the problem. His organization for four years has voted in favor of discontinuing some of the regulatory bodies and "letting business take more care of itself." The proposed commissioner, he said, would not have any authority except to meddle with other legally constituted authorities.

W. H. Chandler, president of the National Industrial Traffic League, also opposed the report, saying he agreed with Mr. Elliott.

Following the conference the board of directors is to decide, after having ascertained the reaction of the council, which was plainly unfavorable, whether the recommendations of the committee shall be submitted to a referendum vote of the chamber.

At the evening session on Wednesday, Herbert Hoover, Secretary of Commerce, discussed the subject of "Consolidated Transportation," and Senator A. B. Cummins, chairman of the Senate committee on interstate commerce, spoke on "The Transportation Question from Different Points of View."

At the session on Thursday, T. C. Powell, vice-president of the Erie, was to speak on the transportation question from the point of view of the railroads, and W. S. Dickey, president of the W. S. Dickey Clay Products Company, was to discuss it from the point of view of the shipper.



A Signal Box on the Midland Railway, England

Hearings Before Committee on Interstate Commerce

McAdoo Makes Supplementary Statement—Manufacturers Urge Consolidation of Labor Board and I. C. C.

WASHINGTON, D. C.

W. G. McADOO, former director general of railroads, completed his statement before the Senate committee on interstate commerce on February 2. He made an addition to the statement which was abstracted partly in last week's issue and partly elsewhere in this week's issue, but he was questioned very little by members of the committee. At the conclusion of the statement Senator Cummins said that Mr. McAdoo had been devoting much of his statement to the more extreme criticisms that had been made of federal control, but that criticism of inefficiency of the Railroad Administration was not the prominent note taken by the railway executives in their testimony before the committee. Their testimony was directed to showing that the large increase in expenditures in 1920 could not have been avoided by the railroads because of conditions created by the Railroad Administration and they were attempting to justify their own expenses.

Senator Cummins also referred to Mr. McAdoo's statement of the cost of railroad service under federal control in which he had used the figure of \$714,000,000 as representing the deficit of the Class I roads. He pointed out that this did not measure the entire cost of federal control, as indicated by the larger figures since used by Director General Davis. Mr. McAdoo replied that the \$714,000,000 was, of course, merely the deficit from the operation of the Class I roads and that Mr. Hines' report had shown a deficit of some \$900,000,000 when the losses from water lines, the Pullman Company and the express company were taken into consideration. He understood Director General Davis had added some \$300,000,000 in his estimate of the cost of liquidation and that this included payments to short lines, a large item on account of the Minnesota fires, the adjustment of materials and supplies, etc., as well as undermaintenance, etc. Senator Cummins said he still thought that when the accounts were finally settled the government would still be behind at least \$1,300,000,000.

Increased Costs Not Exceptional

Mr. McAdoo in the concluding part of his statement also gave some comparisons of the increased cost of production in numerous large industries, to show that increased cost of operation of the railroads under federal control was not exceptional. He said that in his opinion the two outstanding reasons for the increased cost in 1920, aside from the additional wage increases, were the loss of economies resulting from unified operation and the fact that the railroads greatly increased their maintenance expenditures during the six months' guaranty period. He said the figures showed an increase of \$402,000,000 in maintenance expenditures during that period as compared with 1919. In this connection he read from a letter written by W. G. Besler, president of the Central Railroad of New Jersey, to his superintendent of motive power urging him to hurry up the repair of locomotives that had been sent to outside shops in order that the bills might surely be in by September 1, when the guaranty period would expire. He said this letter was brought out at a hearing before the Interstate Commerce Commission in its investigation of repairs in outside shops. Mr. McAdoo also said that the program of restoration of the railroads ceased with the guaranty period and since that time the maintenance expenses have been greatly reduced.

In his conclusion Mr. McAdoo said that the taking over of the railroads had stabilized labor conditions, given adequate service to the public, satisfied the needs of the military

arm of the government, protected the stock and bondholders and had saved the railroads instead of ruining them as asserted. He said that one of the most serious defects about the railroad situation at the present time is that the railroad transportation machine is in large part obsolete.

Senator Cummins has indicated that an opportunity will be given the railroads to introduce rebuttal testimony in reply to that of Mr. Hines, Mr. McAdoo and the labor representatives.

Manufacturers Urge Consolidation

of Labor Board and I. C. C.

The consolidation of the functions of the Railroad Labor Board with those of the Interstate Commerce Commission, so that a single tribunal composed exclusively of representatives of the public and regulating railroad expense as well as income through a single body, was advocated on February 3 before the committee, on behalf of 50,000 manufacturers throughout the United States, by a committee of the National Industrial Council. The committee, headed by C. S. Walker, director of the Iowa Manufacturers' Association, said in part:

Uninterrupted and efficient transportation at reasonable cost is as essential to the vitality of our industrial and commercial life as the unimpeded circulation of the blood to the health of the human body. The technical problem must be met by railway management, but there are certain principles in which every citizen should be interested because they affect the integrity of his social life. These the industrial associations of the United States have endeavored to assemble and state in simple terms that we may have a common starting point from which to approach this great question.

These conclusions are not hastily expressed but were carefully formulated after study by a conference committee and were submitted to each state organization, subjected to analysis and discussion, and are approved and presented on behalf of industrial associations authorized to speak for substantially 50,000 American manufacturers.

They are not submitted as representing merely a manufacturer's viewpoint but that of citizens whose active business life has led them to realize the necessity for securing effective recognition of certain essentials in American transportation. By that form of communication we live and move and have our being. The quicker our people recognize the necessity for preserving its integrity of operation, the protection which must be given our carriers and the recognition of social obligation which must be exacted from management and men in that service, the more quickly we will stabilize the conditions under which this great social instrumentality operates and relieve ourselves of the overshadowing dread of its financial breakdown or the arbitrary interruption of its service.

To produce this result the committee urged that the following affirmative principles be recognized:

(1) The deliberate interruption of railroad service being socially destructive, disputes between the carriers and their employees should be ultimately determinable by a public tribunal, without stoppage of service.

(2) The members of such tribunal should possess the highest personal qualifications and represent the public exclusively.

(3) That such tribunal should be affiliated with, or function as a part of the rate-making authority.

(4) That each carrier should be regarded as the primary unit of joint interest and co-operation in the establishment and maintenance of employment relations between the employees and the management of such carrier.

(5) That arbitrary discrimination between organized employees and unorganized employees or between those who desire to bargain collectively and those who desire to bargain individually is intolerable in the regulation of the railroads.

(6) That while the carriers and their employees should be afforded the widest opportunity to fix the terms of their employment relations, no form is desirable or permissible that does not assure to management the opportunity to fulfill its primary public

obligation to give uninterrupted and efficient service at reasonable rates.

(7) That the right of intervention by representatives of the public, for good cause shown, before federal administrative tribunals, including the Railroad Labor Board, ought to be affirmatively recognized by appropriate amendment to existing legislation.

(8) That National transportation ought to be regulated by Congress exclusively, and any recession of authority in such field, to state tribunals, is retrogressive and injurious to industrial development, as well as to orderly expansion of transportation facilities.

(9) That all National or State legislation imposing artificial economic burdens upon the cost of transportation, of which the Adamson Act and "full crew" laws are typical National and local examples, ought to be repealed.

Objects to Classification of Officers

Charles G. Poirier, vice-president of the Grand Order of Supervisors, an organization of some 5,000 supervisory officials, testified before the Committee on February 8 and urged the elimination of the classification of "subordinate officers" in the transportation act on the ground that the effect of this classification has been to give the shop crafts and the American Federation of Labor an opportunity to assert jurisdiction over the supervisory officials, such as foremen, destroying the status which many of them had claimed as officials, and that this is the cause of inefficiency in railroad operation because it tends to deprive the foremen of any control over the employees. Senators Cummins, Poindexter and Fernald expressed great interest in this testimony, saying that if this has been the effect it is exactly opposite to that intended by the classification of subordinate officers, which was put into the act at the instance of organizations of train dispatchers and yardmasters on the ground that it would tend to differentiate an intermediate class of men who were between the recognized official class and the employees.

Mr. Poirier said that the supervisory officers lost control of their men to a considerable extent during federal control, because it was impossible for them to retain the respect of the organized employees when the latter, if dismissed for cause, were able through their organizations to get themselves reinstated with pay for the time lost. He estimated the efficiency of the employees under these conditions at 70 per cent, and said that after the signing of the national agreements it dropped to 60 or 65 per cent. "Labor felt supreme," he said, "and their power and influence were felt on all sides. The American Federation of Labor gave notice that all employees and all foremen, unless they became members of the crafts, would lose their jobs. Then the Interstate Commerce Commission, acting under the law, placed the supervisory fore-

men on a plane with the labor organizations under the guise of "subordinate officials," which classification had been placed in the law at the instance of the labor organizations and certain organizations of disloyal supervisory officials whose motto was that they couldn't get any thing for their members unless they were so classified. A large part of the increase in operating expenses into which this committee is inquiring results directly from this separation of the supervisory officers from the official family to which they rightfully belong.

Purpose of Organization

"Our organization was formed in 1918 for self-protection by the conservative and progressive class of supervisory officials who objected to being separated from the official family and forced into the ranks of the crafts of the men we supervise. We objected strenuously to the Spencer amendment which placed the classification of subordinate officials in the act but the yardmasters, train dispatchers, storekeepers and some others formed their own organizations, and if the committee will allow me to express my own opinion or perhaps my imagination, I may say that the purpose is to hand those organizations over to the federation later just as the shop crafts were first organized separately and then taken over.

"Unless we can correct this situation we must go into the crafts, too. The recognition of subordinate officials as a separate class has given the federation an opportunity to dominate the supervisory officials whom it has placed on the same plane with the employees. It is legislating for them, it calls them 'scabs' in case of a strike, which it could not do if they were considered as officers, and we can do nothing to help ourselves. We are losing members daily."

When Senator Cummins said that the separate classification had been adopted for the purpose of making nominations to and giving representation before the Labor Board, Mr. Poirier said his organization does not want to go before the Labor Board. Its members consider themselves as officers, although certain organizations, such as the train dispatchers, prefer to use labor union tactics and go before the board. He insisted that the term subordinate officials is a misnomer, that all officers are subordinate to some one, from the vice-president down to the section boss.

"As it stands today the federation can say that we are no different from the crafts, and we can't hold our jobs much longer unless we affiliate with the crafts. We have tried to assert our status as officers but the pressure is getting too hot. This committee must help us out if the railroads are to be saved," Mr. Poirier said.

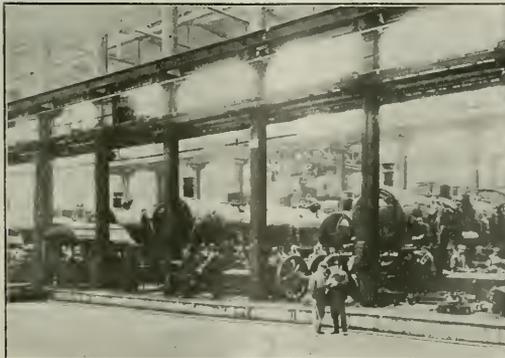


Photo by Underwood & Underwood

Krupps, Essen, Germany, at Work

General News Department

Employees in the offices of the Chicago & North Western at Chicago, have been notified that they will have to work Saturday afternoons. It is reported that vacations will also be curtailed.

The Maintenance of Way Club of Chicago will hold its next meeting at the Auditorium Hotel, Chicago, at 6 p. m., on February 15, at which time E. D. Swift, engineer maintenance of way of the Belt Railway, Chicago, will present a paper on the maintenance of railroad crossings.

The Repeal of the Full-crew Law, of New York, which has been in force since 1913, is proposed in bills introduced in the Legislature last week by Senator Wiswall and Assemblyman Mastick. These bills provide that the Public Service Commission shall be authorized to determine the number of men to be required in a train crew.

J. G. Sullivan, consulting engineer, Winnipeg, Man., formerly chief engineer of the Canadian Pacific Railway, Lines West, was elected president of the Engineering Institute of Canada at its annual meeting in Montreal, Que., on January 24 and 25. Mr. Sullivan was president of the American Railway Engineering Association during 1917-18.

A New Thawing Shed has just been put in service at the Pennsylvania Railroad coal terminal, at South Amboy, N. J., where coal for New York City and the Atlantic Seaboard is delivered to boats. This shed accommodates 20 cars at one time and cost about \$100,000. It is 448 feet long and contains two tracks. The cars being placed inside the shed, the doors are locked, and air is forced by powerful blowers over steam radiators and heated to between 200 and 250 degrees. It is forced through long concrete ducts which have outlets underneath the cars, located at intervals of about six feet. The thawing takes from one to twelve hours, the average time being about three hours.

John N. Hasson, of Tyrone, Pa., locomotive engineman of the Pennsylvania Railroad, who was retired on February 1, after an active service of 41 years on the Tyrone Division, 32 years of which he was a passenger runner, says that he has worked 41 Christmas days and 40 New Years, having missed New Years of this year owing to illness. Of all the other holidays in this time, he worked all but three. He was never disciplined for an infraction of the rules of the company, and has been in only one accident of any account. That was when he was a passenger engineman on the Moshannon Branch. While running at regular speed the engine suddenly turned over and rammed her stack in the ground. Mr. Hasson suffered injuries about the hand, but was off duty only two days.

Additional Directors of A. R. A.

Additional directors of the American Railway Association, to enlarge the board, have been elected as follows: for the term expiring November, 1924, Julius Kruttschnitt, Southern Pacific, for the term expiring November, 1923, E. E. Loomis, Lehigh Valley, for the term expiring November, 1922, Howard Elliott, Northern Pacific.

Erie Shops Leased

The car shops of the Erie Railroad at Buffalo, N. Y., have been leased to the Seminole Construction Company, and the new management began operations on Monday, February 6. The shops of this road at Jersey City, N. J., have been leased to the Wagner Construction Company, the new arrangement taking effect on February 12. This contract includes also the shops at North Paterson, N. J.

Reports on Excess Earnings Due April 1

The Inter-state Commerce Commission has extended the date on or before which railroad returns showing any excess earnings above 6 per cent on the value for the period ending December 31, 1920, shall be filed, from February 1 to April 1. Representations were made to the commission that the time fixed in the order of January 16 for the filing of returns was not sufficient.

Tentative Valuations

The Interstate Commerce Commission has issued tentative valuations in which it reports the final values as follows: Franklin & Pittsylvania, 1916, property used, \$404,308; property owned, \$328,308; Fort Worth Union Passenger Station, 1916, property owned, \$210,230; Greenwich & Johnsonville, 1916, property owned, \$901,912; Gainesville & Northwestern 1916, property owned, \$517,248.

Railway Revenues for December

A preliminary compilation of railway revenues and expenses for December for 163 roads gives a net operating income of \$39,555,000 as compared with \$3,930,000 for December, 1920. For these roads the revenues decreased 23 per cent but the expenses show a decrease of 31.2 per cent. The December returns have been difficult to estimate. A smaller number of roads showed a greater net operating income than is shown for 163 companies but many of the reports received later showed deficits.

Employees Fined for Theft

Eleven employees of the New York Central, arrested last September on charges of theft of goods from freight cars, were last week fined in the Supreme Court at White Plains, N. Y., in amounts from \$100 to \$300 each, with the alternative of serving jail sentences if the fines were not paid. Most of the men have families and they were allowed to plead guilty to the charge of receiving stolen goods. Some of them said it was necessary to join the company of thieves in order to hold their jobs; and it was stated that one of them had resigned his place in order to escape the "system." Two of the culprits were passenger conductors and one was a yardmaster.

Proceedings of the American Welding Society

The first monthly issue of the proceedings of the American Welding Society, dated January, 1922, has recently been published. The proceedings are 6 in. by 9 in. in size and the first number contains 44 pages. Copies of each issue will be mailed to each paid-up member.

A regular program has been laid out for the proceedings and each issue will contain editorials, news of the various local sections, activities of the American Bureau of Welding, a list of new members, an employment service bulletin, important technical papers presented to the society, a question and answer column, technical items of interest to the society and the industry, and a bibliography of current welding literature.

Requiring Omnibuses to Stop at Crossings

J. C. Caviston, 30 Vesey street, New York City, secretary of the Operating Division of the American Railway Association, has sent to all members of the association a copy of the order recently issued by the State Railroad Commission of California, requiring that stages and omnibuses be stopped before passing over railroad crossings; and with this a message from the committee on grade crossing protection, C. L. Bardol, chairman, suggest-

ing that railroads bring this matter to the attention of state commissions to see if action in this direction cannot be obtained in all of the states. A similar order has been issued by the Public Service Commission of Nevada; and it applies the rule not only to automobile stages (passenger-carrying vehicles) but also to trucks engaged in the transportation of explosives or inflammable liquids.

Pennsylvania-Labor Board Case Delayed

The controversy between the Pennsylvania and the Railroad Labor Board has been again postponed; hearings will be had before Judge K. M. Landis, of the United States District Court at Chicago on February 17. The developments in this controversy, including the temporary injunction obtained from Judge Landis by the Railroad to restrain the Board from issuing an order which that carrier believed to be unfair and unjust, have been described in previous issues of the *Railway Age*. Later, attorneys for the Labor Board filed a plea to dissolve this temporary injunction. Judge R. M. Barton, chairman of the Board, informed Judge Landis, when the last postponement was made, that the Board was anxious to have the case settled.

Automatic Train Stops in New York

The number of automatic train stops in use in and around New York City, mainly in subways, aggregates about 3,700, divided as follows:

Brooklyn Rapid Transit Company (including New York Municipal Railways) 1,077, divided as follows: General Railway Signal Company, electric motor apparatus, 950; Federal Signal Company, electric motor 19 and electro-pneumatic 68; Union Switch & Signal Company, electro-pneumatic 40.

Hudson & Manhattan, electro pneumatic, 244.

Interborough Rapid Transit Company, electro-pneumatic, 2,355. To these must be added a small number, about 20, Hill automatic stops, in use on the Pennsylvania at its tunnels under the East and North rivers and at the drawbridge between New York and Manhattan Transfer.

Santa Fe Announces Budget

The Atchison, Topeka & Santa Fe has appropriated \$43,150,000 for equipment, improvements and betterments for 1922. Of this amount \$11,750,000 will be for the completion of work in hand; \$22,000,000 for new work including 75 miles of new second track from Yampai, Ariz., to Griffith; \$8,000,000 for new equipment; and \$1,400,000 for a new line from Satanta, Kan., west 55 miles. Following are some of the larger items in the budget:

Additional main line.....	\$6,662,298
Satanta branch line.....	1,400,000
Bridges, trestles and culverts.....	1,512,893
Rails and other track material.....	1,101,868
Stations and office buildings.....	1,056,639
Shop buildings.....	1,041,350
Additional yard tracks and sidings.....	946,148
Shop machines and tools.....	724,281
Assessments for public improvements.....	533,633
Widening cuts, fills, etc.....	459,701
Signals and interlockers.....	446,289

Eastern Managers Meet

Managers of 55 railroads in the Eastern conference territory, in a meeting at New York on February 8 decided that the conference committee should begin next week negotiations with the Big Four brotherhoods on adjustment of rules and wages, as proposed at Chicago some weeks ago. The conductors and trainmen were notified that they would be met on February 16, and the enginemen and firemen were asked to appear on February 20. The conference committee of officers consists of P. E. Crowley, N. Y. C., chairman; Elisha Lee, Penna.; C. W. Galloway, B. & O.; Charles H. Ewing, P. & R.; C. L. Bardo, N. Y., N. H. & H.; M. S. Connors, I. V., and John G. Walber, chairman of the bureau of information. The roads joining the negotiations will be those on which are employed from 80 to 90 per cent of the brother-

hood memberships. The roads that are not expected to participate are the Bangor & Aroostook; the Pere Marquette; the Cincinnati, Indianapolis & Western; the Toledo, St. Louis & Western, and the Bessemer & Lake Erie.

All Exhibit Space Reserved

One index of the general feeling in the railway appliances' field is to be noted in the present status of plans for the fourteenth annual exhibit of the National Railway Appliances' Association at Chicago, March 13-16. The regular meeting for the allotment of space, held last November, closed with 22 spaces still unreserved and there was at that time some feeling of uncertainty on the part of the members of the association as to the success of the coming exhibit. However, all question of doubt has been eliminated by the fact that all available space has since been taken up and C. W. Kelly, secretary of the association, is being embarrassed by requests from a great many companies for space which he is unable to provide. The association is in a position to take on additional non-exhibiting members who are always given the preference in the allotment of space in case any vacancies occur.

Safety on the New Haven

The New York, New Haven & Hartford reports that in January for the third time the 38,000 employees of the system passed through an entire month without a fatal injury. The two previous months when this record of safety was achieved were May, 1920 and August, 1921.

The New Haven's Bureau of Safety was established in April, 1914, with a central committee and fourteen subordinate committees and there are now altogether 34, with a total membership of 557. Representatives of the safety department keep in constant touch with employees by personal interviews, and by means of 250 bulletin boards. A friendly rivalry is maintained between divisions and shops. Through the courtesy of school authorities in the cities and towns, children have been taught the danger of playing on railroad property, stealing rides, etc., and manufacturers have co-operated with the Safety Bureau in warning their employees of the danger of trespassing on the tracks.

A cause of continued grave concern is the careless operation of automobiles at grade crossings. During 1921, 27 automobilists were killed and 90 injured at crossings on the New Haven road and 177 automobiles were driven through gates and into the sides of passing trains, resulting in 10 deaths and 25 injuries.

Since 1913 the number of persons killed on the road (all classes) has decreased 57 per cent, while the number of employees killed has decreased 62 per cent.

Illinois Central Discusses State Rate Control

Proposed legislation in Congress to take away from the Interstate Commerce Commission authority over state rates is characterized as unprogressive, impracticable and illogical in the latest advertisement of the Illinois Central in its publicity campaign. The article states that the federal constitution grew out of a generally accepted feeling on the part of the people that commerce among the states should be free. "The federal government," the article continues, "was founded upon the theory that commerce and trade were national subjects and should not be subjected to local conditions. To that end the constitution confers exclusive power on Congress to regulate commerce among the states. By a long life of supreme court decisions it is now thoroughly settled that a state must not be permitted to make any rates or regulations which will interfere with Interstate Commerce. The power of the Commission to condemn rates which discriminate against interstate commerce, has been repeatedly upheld. In the case of the Illinois Central System, passing through and touching 14 different states, it is obvious at a glance that it ought not to have 15 systems of rates, one applicable to interstate commerce, and 14 others applicable to the commerce of the different states which it serves.

"Railroads in the United States have for a long time struggled against a divided authority of intrastate and interstate traffic and they have been subjected to a number of conflicting regula-

tions and have been greatly embarrassed and inconvenienced by the necessity of obeying the mandates of various state commissions on the subject of rates many of which conflict with one another. In some instances, state commissions have frankly announced the purpose to give to the people of their own state an advantage over the people of another state by making a discriminatory rate adjustment. While present legislation does not go so far as to make it necessary for all states to contribute their fair share toward the expense of maintaining the transportation machine, yet it is recognized by all thoughtful students of the problem that there should be but one body with power to regulate rates and that the national body. There would still be left to the state commissions many important duties in connection with their police power. Their jurisdiction would be unimpaired as to service matters such as operation of intrastate trains, character of station facilities, crossings, etc. It is a great mistake to suppose that the control of rates by the Interstate Commerce Commission would make it more troublesome and expensive for patrons of the railroads to give relief."

Illinois Manufacturers' Association Considers Capper Bill and Railway Wages

The Illinois Manufacturers' Association passed a resolution on January 6, protesting against that part of the Capper Bill restoring the jurisdiction of the state commissions and repealing the rate-making section of the Transportation Act of 1920, and a second resolution calling upon the Labor Board to render a clear cut decision that will bring about a readjustment in railroad wages. The first resolution states that the passage of the bill, by seriously impairing the financial stability of the roads, would place them in a more acute condition than they have been at any time in the past, and that such complicated authority over the roads would react seriously upon the manufacturers and all other interests. The second resolution calls attention to the fact that manufacturers are particularly concerned with the application by the railroads for the readjustment of wages of their employees, including shop and common labor, both of which, under the schedules of the United States Railroad Labor Board, are far in excess of wages paid in industrial lines and seriously affect manufacturing enterprise; that excessive war-time wages as well as uneconomic working rules have so raised the cost of railroad operation that freight and passenger rates cannot be reduced to the level needed to stimulate manufacturing, commerce and agriculture; that therefore, the Labor Board should bring about a readjustment in railway wages, to a basis of that paid labor in the vicinity for similar work, and also abrogate uneconomic working conditions.

Successful Santa Fe Land Development

The Atchison, Topeka & Santa Fe, believing that there were great possibilities in the agricultural development of the southwestern counties in Kansas, purchased some 340,000 acres of land in this territory in 1909 from a holding company, and placed it on the market at a little above cost. A nation-wide advertising campaign was inaugurated to sell the land to young men who would be willing to buy it and farm it according to a scientific system which was established by the company's agricultural department—a system which had been demonstrated successfully by the Kansas Agricultural College. The land sold for \$1,200 to \$3,500 per quarter section and the settlers were permitted to pay down one-eighth of the purchase price and the remainder in annual installments for not to exceed nine years, until the entire indebtedness had been removed, at which time the deed was transferred to the owner. Some completed their payments within two or three years, while the majority made their final payments before the expiration of the time specified in the contract. It was necessary for the company to grant extensions of time in only a very few instances and there has not been a single foreclosure suit.

In connection with this venture the railroad built a new line extending from Dodge City, Kan., to Elkhart, a distance of 125 miles, to provide the needed transportation facilities for the newly opened territory. The project is considered to have been a complete success, not only through the financial return on the land investment, but also from the new and steadily growing business of a rapidly developing country.

Traffic News

The Interstate Commerce Commission has changed the effective date of its order prescribing the terms of an export bill of lading from February 15 to March 15.

Senator Robinson of Arkansas has introduced in the Senate a bill to require the discontinuance of the surcharge on fares of passengers riding in sleeping and parlor cars.

Rice and rice products are to be included in the 10 per cent. reduction in transcontinental freight rates on farm products, granted the first of the year by the carriers.

The Public Service Commission of Alabama began this week public hearings in connection with its proposal that the railroads should make a general readjustment of the freight rates in that state. The carriers are called upon to give detailed information concerning each one of about forty prominent commodities.

The Southeastern Express Company, operating over the lines of the Southern Railway Company, announces that its service has been extended over the Tennessee Central, between Harriman, Tenn., and Hopkinsville, Ky. This extension took effect on February 1, the day on which the Tennessee Central was delivered by the Receiver to the new owners.

Freight carried through the Panama Canal in 1921 amounted to approximately 10,708,338 long tons. The decrease in the number of ships as compared with 1920 was 1.1 per cent and in cargo 4.7 per cent. The net tonnage of vessels in the year 1921, however, exceeded that of 1920, as there was 11,435,811 tons, Panama Canal measurement, for 1921, and 10,378,365 for the previous year. Tolls aggregated \$10,325,718 in 1921, as compared with \$10,295,362 in 1920.

The new officers of the Traffic Club of Minneapolis, Minn., are as follows: president, Charles L. Kennedy, assistant general freight agent, Chicago, Milwaukee & St. Paul; vice-presidents, W. H. Perry, general traffic manager, Pillsbury Flour Mills Company; George A. Upton, general agent, Baltimore & Ohio; secretary, W. W. Gibson; treasurer, L. H. Caswell; directors, W. H. Perry, Paul Scheunemann, S. A. Eddy and George V. Thomson.

Officers of the Traffic Club of Kansas City, Mo., for 1922, are president, John D. Yates, assistant general freight agent, Missouri Pacific; vice-presidents, Charles D. Dooley, traffic manager, Peet Brothers Manufacturing Company; R. F. Atwood, division freight agent, Chicago, Rock Island & Pacific; secretary-treasurer, Peter J. Rose, general agent, Cincinnati, Indianapolis & Western; directors, George H. Hamilton, general freight agent, Missouri Pacific; Charles W. Miller, traffic manager, Swift & Co.; Oscar H. Poehler, traffic manager, Dierks Lumber & Coal Company; W. D. Wells, traffic manager, W. S. Dickey Clay Manufacturing Company; L. E. Ayer, general agent, Canadian National System; Fred B. Blair, traffic manager, Hoyalnd Flour Mills Company; M. A. Gray, traffic manager, H. E. Lee Mercantile Company; E. G. Woodward, general agent, passenger department, Chicago, Milwaukee & St. Paul.

Commercial Stocks of Anthracite

and Bituminous Coal

At the beginning of the new year American consumers had on hand approximately 47,000,000 tons of soft coal, according to a report of a survey made by the Bureau of the Census and the Geological Survey. This was a million tons less than the revised figure of stocks on November 1. While much above the low mark of June, 1920, it was still 16,000,000 tons, or 25 per cent, below the maximum of 63,000,000 tons reached on the day of the Armistice.

In terms of days' supply the present stock appears larger than it would in times of normal business. At the rate of consumption prevailing during December, the reserve was sufficient to last 41 days, if evenly divided. Were business active, the present stocks would last not more than 32 days, if evenly divided. But the stocks are never evenly divided. In every community there

are consumers who store virtually no coal. Therefore, as experience has shown, symptoms of a shortage develop in a very few days, if the delivery of coal is interrupted. Such interruptions have occurred in the past through mine strikes, traffic congestion on the railroads, or severe winter weather. Today the trend of production is upward and coal is being added to storage. In the last week of January 9,626,000 net tons were produced, and not more than 9,000,000 tons consumed and exported.

Retail coal dealers' stocks of anthracite on January 1 were smaller than on November 1 last, but larger than at any time in 1919 or 1920. It is the opinion of the trade that the quantity in the possession of householders is below normal. Incomplete reports on the quantity held in storage by producers indicate little change since November 1. Nearly a million tons of by-product coke is on hand at coke plants, much of which can be used for domestic fuel.

According to reports received from the American Railway Association, the carriers had about 35 days' supply on hand at the beginning of the year, allowing for the present reduced rate of consumption. The roads already heard from show a total in storage of over 13,000,000 tons, and it is possible that complete returns will indicate a total stock above even the maximum of 13,644,000 tons on January 1, 1919. A large amount of this railroad-fuel coal is held in cars.

Coal Production

A further increase marked the production of soft coal during the week ended January 28, according to the weekly bulletin of the Geological Survey. The total production is estimated at 9,626,000 net tons or 9½ per cent over the week preceding. For the first time since mid-November the output was large enough to meet current consumption and add materially to the reserve of coal in storage.

Shipping Board Seeks Cancellation of Contracts With Japanese Steamship Lines

The preferential traffic contracts between the Chicago, Milwaukee & St. Paul and the Great Northern railways and Japanese steamship lines, covering export and import traffic to and from the Orient, which the Shipping Board is insisting that the railroads abrogate in order to give Shipping Board vessels a chance for a share in the business, were the subject of an informal conference at the Shipping Board offices on February 2, attended by Chairman Lasker and Commissioners Thompson and Lissner of the Shipping Board, Chairman McChord and Commissioners Campbell and Potter of the Interstate Commerce Commission, Ralph Budd, president of the Great Northern, H. E. Byram, president, and R. M. Calkins, vice-president of the Chicago, Milwaukee & St. Paul, and representatives of the Seattle Chamber of Commerce.

The Shipping Board reaffirmed its position that all preferential contracts between railroads and foreign steamship companies must be abrogated and stated that it could not enter into a contract with the rail lines to take the place of the foreign contracts. The railroad officers expressed their desire to aid the American merchant marine, but reaffirmed their previous position that the abrogation of the contracts would only deprive them of revenue with no assurance that the business would go to the American boats, because of the control of a large part of the traffic by the Japanese soliciting agencies and the probability that the contracts would be transferred to Canadian lines. It is understood that Mr. Budd proposed as a compromise that the contract be abrogated and that the road agree to turn over to the Shipping Board vessels one-half of the unrouted traffic, giving the other half to Japanese lines in return for the business which they can give to the road. Commissioner Potter is said to have taken the position that the railroad officers would not be warranted in voluntarily giving up the contracts and thereby sacrificing their revenues. Members of the board claim that they have legal authority to compel the cancellation of the contracts but have preferred to try to persuade the roads to cancel them. The railroad representatives will meet again with members of the board on March 1 with a view to giving their final answer at that time.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from February 5 until June 5, the operation of certain schedules published in tariffs issued by agents E. B. Boyd, W. P. Emerson, W. J. Kelly and F. A. Leland, which propose increases and reductions in rates on green coffee from New Orleans, Galveston, and other Gulf ports to various destinations in Oklahoma, Kansas, Texas, Arkansas, Missouri and other states.

The commission has suspended from February 6 until June 5, the operation of schedules which propose proportional class rates from Seattle and Tacoma, Wash. to Portland, Ore., applicable on shipments destined to points on the Oregon Electric Railway, south of Portland, to and including Eugene, and points on the Southern Pacific south of Portland, to and including Roseburg, and the same proportional rates from Portland to Seattle, which rates are published to expire May 31, 1922.

United States Supreme Court

Interstate Commerce Commission's North Dakota Order Held Enforceable

The rate case of the State of North Dakota, briefly reported in a previous issue was in the shape of a bill in equity brought by the State in the United States Supreme Court against certain named railroad companies to prevent their obeying an order of the Interstate Commerce Commission until the Supreme Court can review the decision upon which that order was made. The order increased intrastate freight rates in North Dakota upon a finding that the present rates were an unjust discrimination against interstate commerce within the meaning of paragraph 4 of section 13 of the Act to regulate commerce as amended by the Transportation Act of February 28, 1920, c. 91, Title IV, § 416, 41 Stat. 456, 484, North Dakota Rates, Fares and Charges, 61 I. C. C. 504. Increased Rates, 1920, 58 I. C. C. 220.

The Supreme Court dismissed the bill, holding that the State should be remitted to the remedy offered by the statutes—a suit in the District Court in which the United States is made a party. The court said, by Mr. Justice Holmes: "Complete justice requires that the railroads should not be subjected to the risk of two irreconcilable commands—that of the Interstate Commerce Commission enforced by a decree on the one side and that of this court on the other. The decision in this case, although an authority, would not be *res judicata*, and the Commission would not be concluded from rearguing the whole matter. As to public policy, Congress has indicated the policy of the United States. For although it is argued that the requirement that the United States should be made a party is a mere matter of procedure for the purpose of giving the Department of Justice control, we cannot limit the significance of the Judicial Code, section 211, by such a speculation. The language of the section shows that public interests were before the mind of Congress, and that in its opinion an order made in the public interest should not be hindered from going into effect until the representative of the public had been heard. It appears to us that this view is so reasonable that it should be accepted by this Court even if not bound.

"There is no doubt that a State can sue in the District Court when the United States is a party and has consented to be sued there and has not expressed its consent to be sued elsewhere. *United States v. Louisiana*, 123 U. S. 32; *Ames v. Kansas*, 111 U. S. 449. For the reasons that we have indicated it is equitable that a decree should not be entered except in such form as to bind the Interstate Commerce Commission and the United States and therefore this bill must be dismissed. The right of the State is sufficiently protected by the right to appeal from the decision of the District Court."—*North Dakota v. Chicago & North Western*. Decided January 23, 1922.

Labor Board Decisions

Seniority Rights Not Allowed Express

Messenger Living Outside Terminal Point

An express messenger of the American Railway Express Company, owning his home at Fulton, Ky., and residing there, was refused the right to exercise his seniority rights by the Board on runs from Cairo, Ill., to New Orleans, La., after he refused to move to Cairo. The contention of the carrier that it was necessary to call upon train employees for extra service and that they should reside at the home terminal where they would be available when desired on important runs, was upheld.—*Decision No. 661.*

Differential Rates of Pay for

Express Messengers Upheld

Express messengers on trains of the Chesapeake & Ohio, operating between Cincinnati, Ohio, and Chicago, Ill., requested the same rates of pay as express messengers on trains on the Cleveland, Cincinnati, Chicago & St. Louis, operating between the same points. The carrier, admitting the disparity, contended that such differentials had always existed and were warranted by differences in working conditions and the greater importance of the higher paid runs. The Board upheld this contention. *Decision No. 638.* Like rulings were made in *Decisions 653, 654, 655, 656 and 659*, in which employees on other roads sought equalization of wages on the same basis.

Board's Authority to Decide Claims for Overtime

for Period from March 1, 1920, to December 1, 1920

Although the claim of clerks in the Chicago, Indianapolis & Louisville, in the local freight office at Chicago, for payment for overtime work in excess of 8 hours a day in connection with the establishment of a 45-hour week, was denied by the Board, the contention of the carriers, that the Board had no jurisdiction in the case, was denied. The carrier contended that inasmuch as the claim was for wages alleged to be due, the Board had no authority to make any decision either denying or sustaining it; that it was a matter for the courts to determine under the working agreement in effect during the period for which the claim was made; and that the board had no authority to decide the claim for the period of federal control, January 1, 1920, to March 1, 1920. The Board over-ruled this contention. *Decision No. 607.*

Boilermaker Not Responsible for Violation of

Federal Boiler Inspection Rules

A boilermaker in the employ of the Fort Smith & Western, was dismissed on February 27, 1921, for alleged violation of rule 25 of the federal locomotive inspection laws. The employees contended that his dismissal should have been on the grounds of incompetency and not on the charge that he violated this rule. In its decision the Board stated that the evidence shows conclusively that the conditions on which the dismissal was based were entirely within the control of the carrier; that the employee in question was not the responsible party, and his reinstatement with seniority rights, unimpaired and pay for time lost was ordered.

A dissenting opinion was filed by Horace Baker, in which he said: "In my judgment the responsibility for proper boiler inspection is a very important one that devolves upon the carrier, which must rely on its supervising forces to see that proper inspection is made. To absolve from blame a man who failed by reason of incompetency, neglect, or otherwise, to properly inspect boilers and report those which need attention, places a responsibility upon the Labor Board not contemplated by the Transportation Act, 1920. Action taken in this case is not only an injustice to the carrier, but may result in a serious menace to the public and employees of the carrier, to say nothing of damage to property."—*Decision No. 598.*

Foreign Railway News

Swedish Electric Locomotives for France

The Allmänna Svenska Elektriska Aktiebolaget—the well known "A. S. E. A."—has recently secured a contract from the French State Railways for construction of 30 electric locomotives at the company's works at Vasteras, according to information from Consul D. I. Murphy, at Stockholm.

India to Order Railway Equipment Once a Year

LONDON.

The Government of India, it is reported, beginning with the year 1923, will invite bids annually for all the railway locomotives and stocks required during the ensuing twelve months. The average annual requirements will be 160 locomotives and 160 additional boilers during 1923 and 1924, and thereafter 400 locomotives and 400 additional boilers.

Avalanche Buries Japanese Train

The burial of a railroad train in an avalanche, reported in a press dispatch from Tokio, Japan, on February 4, is said to have resulted in the killing of 110 persons and the injury of numbers of others. The accident occurred at Itoigawa. The statement is not clear whether or not the train was a passenger train, the victims being, it is said, mostly farmers, workmen and men engaged in clearing snow from the track.

Britain Lands South African Electrification Contract

Cable advices from Commercial Attaché Walter S. Tower, of London, announce that the contract for electrification of 170 miles of single track of the South African Railway between Pietermaritzburg and Glencair has been given to the Metropolitan Vickers Electric Company of Manchester. The cost of this work will be about 750,000 pounds sterling, being based on a revision of the British bids as of January 1. No new bids were asked for, since the old ones were reduced in amount on account of wage cuts in the electrical industry and other reductions in cost items.

New Short Line Railroad in Mexico

Contracts have been awarded to a firm in El Paso, Tex., for the construction of a new railroad, 47 miles in length, called the Ferrocarril de Chihuahua y Oriente, to run from Sierra Los Lamentos and Erupcion mine to the Mexican Central, at Candelaria, 65 miles south of Juarez, according to Vice-Consul Oscar Cole Harper, Ciudad Juarez. The contract calls for the completion of the roadbed and bridges within 150 days, it being understood that the railroad company will lay the steel. It is planned to have the road in operation by August, 1922, or sooner. The line will be of standard gauge and will carry passengers and freight. The main traffic, however, will consist of lead and silver ores from the Erupcion mines, which in magnitude of ore deposits are likened to the famous ore deposits of the Santa Fulalia district near Chihuahua, Mexico.

Condition of Polish Railways Improves

LONDON.

In March, 1919, the total mileage of the Polish railways in operation amounted to approximately 3,225 miles, whereas in March, 1921, there were approximately 9,750 miles in operation. In July, 1919, they had 2,127 locomotives, 4,859 passenger cars and 41,953 freight cars. In July, 1921, these had increased to 3,696 locomotives, 8,489 passenger cars and 87,901 freight cars and Germany has recently delivered to Poland under the reparations treaty 300 locomotives.

In 1919, 49 per cent of the locomotives and 32 per cent of the passenger cars were under repair, while at the present time only 37 per cent of the locomotives and 20 per cent of the passenger cars are under repair. Eleven per cent of the freight cars were under repair in 1915, while today there are only 8 per cent.

German Railway Strike Ended

The strike on the railways of Germany has ended, according to press dispatches from Berlin. The workers return on the sole condition that there will be no wholesale discharges from the service. For a week transportation was virtually paralyzed and there seemed to be a grave danger of a general strike. The government fought the strike with every means available and the outcome would seem on its face to be a government victory.

Wage Reductions in Scotland

The National Wages Board, sitting in London, has announced certain modifications in wage scales and working conditions on the Scottish railways as follows:

1. Wages shall be decreased 2 shillings per week for every drop of 5 points in the cost of living index number (instead of one shilling as at present), provided that the present "B" or "stop" rate (beyond which wages may drop) will be maintained.
2. Adult rates shall be paid to employees when they attain 20 years of age, instead of 18 as at present.
3. Where economy will accrue, men may be worked regularly 9 hours a day, but with regular overtime pay.
4. Employees may be required to work their 8 hours in a spread of 10 or 12 hours under certain conditions.

While the new rulings take some favorable conditions away from the employees, they do not in any way meet the demands of the Scottish railway companies, which were:

1. An out-an-out reduction in wage rates to bring them back to the scale prevailing before the June, 1920, award—an average reduction of 5s. weekly.
2. The discontinuance of extra payment for night duty.
3. The payment of adult wages at the age of 21.
4. Increasing the hours of service over 8 hours in some cases and allowing split tricks over a 12-hour period.

Cheap Sleeping Accommodations on German Railways

The German State Railway has recently experimented with a new type of third-class compartment on the sleeping cars on the Berlin-Jena line, according to the Engineer (London).



The Three Berths

The new compartments do not contain beds, but have three sloping shelves placed one above the other, the lowest of which during the day is converted into an ordinary seat, the middle one into a back, while the upper one is used as a rack for parcels. The occupant of the upper shelf climbs into position by means of a folding ladder. The administration intends to place these sleeping compartments on three lines, between Berlin and Cologne, Berlin and Munich, and Berlin and Königsberg. In view of the low price of the sleeping ticket, 40 marks per person, a great demand for the accommodation thus provided is expected.



The New Third-Class Sleeping Car

Equipment and Supplies

Freight Cars

THE NORTHERN PACIFIC is inquiring for 500 refrigerator cars, of 70 ton capacity.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 1,000 or more 40-ton box cars.

THE WESTMORELAND COAL COMPANY, Philadelphia, Pa., is inquiring for 100 cars of 55-ton capacity.

THE CANTON HANKOW is asking for prices through export houses in New York City on 10 open freight cars.

THE WARNER SUGAR COMPANY, 99 Wall street, New York City, has ordered 10 logging cars from the Magor Car Company.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 500 automobile cars, which inquiry has been substituted for 500 40-ton box cars inquired for previously.

THE ARGENTINE STATE RAILWAYS are asking for bids until March 1, at Buenos Aires, for 750 narrow gage cars to include flat cars, gondolas, box, tank and passenger cars.

THE DELAWARE, LACKAWANNA & WESTERN has placed orders for the repair of 700, 30-ton box cars with the Magor Car Company and for 500 with the American Car & Foundry Company.

THE SEABOARD AIR LINE, reported in the *Railway Age* of January 7 as having placed orders with the Chickasaw Shipbuilding Company, Birmingham, Ala., for new freight cars, has ordered 1,750 new steel underframe freight cars from this company and will have repairs made to 3,000 freight cars.

THE CHICAGO, BURLINGTON & QUINCY has ordered 6,800 freight cars of the 7,300 on inquiry, distributed as follows: 1,000, 40-ton, steel frame box cars from the Mt. Vernon Car Manufacturing Company, 500 of this type from the Pullman Company and 500 from the General American Car Company; 500, 30-ton refrigerator cars with 40-ton trucks from the American Car & Foundry Company, 400 from the General American Car Company and 400 from the Pullman Company; 500 stock cars from the American Car & Foundry Company; 1,000, 50-ton composite gondolas from the Western Steel Car & Foundry Company, 500 from the Pullman Company, and 500 from the American Car & Foundry Company; and 1,000, 16 door, steel gondola cars from the Bettendorf Company.

Passenger Cars

THE PENNSYLVANIA RAILROAD reported in the *Railway Age* of January 14 as inquiring for 20 all steel dining cars will build these cars at its Altoona, Pa., shops.

THE CENTRAL OF NEW JERSEY is asking for prices on about 50 cars for passenger service, to include 25, 63-ft. steel passenger cars, 10, 63-ft. combination passenger and baggage cars and 10 baggage cars.

THE UNION PACIFIC, reported in the *Railway Age* of December 24, as inquiring for 25 baggage cars, 20 coaches and 18 steel observation cars, has ordered 25 steel baggage cars from the American Car & Foundry Company, and 20 coaches from the Pullman Company.

Machinery and Tools

THE DELAWARE, LACKAWANNA & WESTERN recently ordered a Ryerson-Conradson engine lathe, for its Dover, N. J., shops.

THE SHIBAURA ENGINEERING WORKS, Tokyo, Japan, is inquiring through Mitsui & Co., New York City, for 48 machine tools.

Iron and Steel

THE JAPANESE GOVERNMENT RAILWAYS will receive bids up to February 13, at Tokyo, Japan, for 10,000 tons of 60-lb. rail, together with 500 tons of splice bars.

Track Specialties

THE LOUISVILLE & NASHVILLE has ordered 2,700 tons of splice bars from the Inland Steel Company; 7,500 kegs of spikes from the Jones & Laughlin Steel Company; and 3,500 kegs of bolts from the Illinois Steel Company.

Miscellaneous

THE GREAT NORTHERN is asking for prices on 450,000 tie plates.

THE GREAT NORTHERN is inquiring for two motor buses, each with seating capacity for not less than 40 persons, with 10 ft. space for haggage and express.

Signaling

NEW YORK CITY export houses are asking for prices on 200 complete sets of color light signals; also on another lot of 52 complete sets, for export to Japan.

THE WESTERN PACIFIC has ordered from the General Railway Signal Company a mechanical interlocking plant, 24 levers, to be installed by the signal company, at San Jose, Cal.

THE UNION PACIFIC has ordered materials from the Union Switch & Signal Company for the installation of a d. c. 110-volt Type "F" electric interlocking at Council Bluffs, Iowa; 8 switches, 8 signals and 4 traffic control levers. Installation by railroad forces.

THE WABASH has awarded a contract to the Union Switch & Signal Company for the complete installation of an electric interlocking at Rouge river drawbridge near Detroit, Mich. The interlocking includes 22 functions which will be controlled by 10 working levers in a 15 lever frame.

THE MISSOURI PACIFIC has ordered from the General Railway Signal Company the material for a mechanical interlocking, Saxby & Farmer, 28 levers, to be installed at Hiawatha, Kan.; and has given a similar order for Dudley, Mo., 24 levers, the apparatus in both cases to be installed by the railroad company's forces.

THE PHILADELPHIA & READING has ordered from the Union Switch & Signal Company, a complete style "P 5" electro-mechanical interlocking for a drawbridge at Darby Creek, Pa. The layout consists of a double track with one turnout, necessitating 5 smash board signals. The signal company is to construct the entire installation

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\$4,800,000 of Silk En Route from Japan to New York on the C. M. & St. P.

Supply Trade News

M. C. Davidson, works manager of the Ryan Car Company, has been elected a director and second vice-president of the company.

The Rathbun Jones Engineering Company, Toledo, Ohio, has appointed the Ingersoll-Rand Company, New York city, general sales agent for Rathbun gas engines.

The Hauck Manufacturing Company, Brooklyn, N. Y., manufacturer of portable oil burners, furnaces, torches, etc., has moved its Philadelphia, Pa., office to 1726 Sansom street. Herbert Vogelsang, who has been connected with the company for six years, is in charge of this office.

John Harvey Bryan, representative of the Apollo Steel Company, Apollo, Pa., manufacturer of steel sheets, has been appointed also representative of the Gulf States Steel Company, Birmingham, Ala., manufacturer of wire products and bars. Mr. Bryan's headquarters is at 50 Church street, New York city.

Frank M. Morley joined the service department field staff of the Franklin Railway Supply Company, New York City, on January 1. He was born at Smithboro, N. Y., on January 31, 1884, and was educated in the public schools of Auburn, N. Y. and Sayre, Pa. After completing an apprenticeship in the Sayre, Pa. shop of the Lehigh Valley Railroad, he joined the Ingersoll-Rand Company. Mr. Morley has also been connected with the Seaboard Air Line, the United States Navy Yard at Norfolk, Virginia, the Washington Navy Yard and was at one time a field engineer for the Standard Stoker Company.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., inspecting engineers and chemists, announces the retirement of its president, George H. Clapp, and his reappointment as a member of the board of directors of the company, and the election of Col. James Milliken to the presidency of the company. This corporation devotes special attention to the inspection of railroad locomotives, cars, steel rails, track appliances, bridges, etc. Expert inspection is now given in a large way in the building of all kinds of good roads. Its chemical department specializes in the analysis of metals, coals, cement, etc., and gives particular attention to the analysis of imported food products. Col. Milliken was born on February 19, 1865, at Newton, Bucks County, Pa. He was educated in the Philadelphia schools and also took a course at the University of Pennsylvania and holds an honorary degree of mechanical engineer. In September, 1885, he entered the service of the Pennsylvania Railroad. In January, 1903, he was appointed superintendent of motive power of the Philadelphia, Baltimore & Washington. In May, 1917, he was relieved of his duties as superintendent of motive power on the Pennsylvania to assist Col. Deakne, commanding officer of the 19th Engineers in recruiting a regiment of locomotive repairmen for service in France. The following July he was appointed mechanical aid to S. M. Felton, director general military railways at Washington, D. C. and was given charge of the design, purchase, production and shipment of locomotives, cars, shop and engine house equipment. In June, 1918, he was placed in charge of the engineering and purchasing work of the railway equipment and track materials. On October 18, 1918, he was commissioned a colonel in the Corps of Engineers, with the same duties as previously and in addition assisted in selecting the officers in mechanical regiments that were sent overseas. Colonel Milliken was honorably discharged from the service in April, 1919. On July 14, 1919, he was made an officer in the Loyal Legion d'Honneur. Since 1919 he served as president of the Industrial Car Manufacturers' Institute.

Obituary

Harry Frankel, president of the Frankel Connector Co., Inc., died at his home in New York City, on February 3, at the age of 55.

Don H. Amsbary, Pittsburgh district manager of the Dearborn Chemical Company, Chicago, died on January 25, at his home in Pittsburgh, Pa. Mr. Amsbary was born on March 3,

1869, at Pekin, Illinois, and was educated at the Cathedral Grammar School of his native town. He began work with the American Water Works and Guaranty Company of New Castle, Pennsylvania, at the age of 21 and was in that company's service until 1907. He then entered the employ of the Dearborn Chemical Company, in the Pittsburgh district, and for the past seven years was district manager of that company. Mr. Amsbary was identified with many business and social organizations including the



D. H. Amsbary

Railway Club of Pittsburgh, Pennsylvania.

Trade Publications

GUNITE.—The Cement Gun Construction Company, Chicago, has issued a 32-page bulletin containing photographs showing methods and results secured in the application of gunite or cement mortar applied with a cement gun. The work illustrated covers a wide variety of structures including the encasing of structural steel bridges, the coating of masonry arches and tunnel linings and the construction of small concrete units such as telephone booths.

MOTOR CARS.—In a 20-page booklet recently issued by the Fairmont Gas Engine and Railway Motor Car Company, Fairmont, Minn., an interesting account is given of the Fairmont motor designed for application to section gang cars. The illustrations in this pamphlet show views of these motor cars in use by track and bridge and building gangs for hauling both men and materials and also show various mechanical parts of the equipment. The text consists primarily of the exposition of the mechanical and operating advantages of this form of equipment.

CONCRETE PLACING EQUIPMENT.—The Lakewood Engineering Company, Cleveland, Ohio, has issued a 64-page descriptive booklet on the various types of concrete chuting plants which it carries along with other equipment for use in concrete construction work. Detailed specifications are given for all types and sizes of the Lakewood chute sections, steel towers, sliding frames, elevator buckets, tower and floor hoppers, concrete carts, etc. The booklet is well illustrated with photographs of construction projects showing the various ways in which the chuting plants are used. The dimension sketches of the plants are reproduced in blueprint form, showing complete details. The booklet also includes tables of practical help in laying out such plants on various kinds of work.

UNLESS THE AMERICAN PUBLIC led by American financiers, becomes interested in investing money in foreign securities, American exporters are bound to be handicapped. Many European countries habitually buy large amounts of such securities each year and the money thus raised is naturally spent in the country of its origin. We have made great strides in this direction as the numerous foreign loans floated here testify, but there is still ample room for constructive educational work on the part of bankers along these lines.—E. D. Kilburn, *Westinghouse Electric International Company.*

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the construction of 75 miles of second track between Yampai, Ariz., and Griffith, including the reduction of grades.

ATCHISON, TOPEKA & SANTA FE.—This company closed bids on February 9, for the construction of three stations, several section houses, and other necessary buildings on its new branch line which will extend westward from Satanta, Kan.

ATCHISON, TOPEKA & SANTA FE.—This company closed bids on February 9, for the construction of a branch line to extend from Satanta, Kan., to a point 55 miles westward, the cost of which is estimated at \$1,400,000.

ATCHISON, TOPEKA & SANTA FE.—This company is constructing an additional jetty in Red Deer Creek, in order to protect its roundhouse and other terminal property at Canadian, Tex., from floods.

CANADIAN PACIFIC.—This company will construct a large pier on the Burrard Inlet waterfront at Burrard, B. C., the dredging and filling for which was done in 1921. It is expected that it will be about 18 months before the pier is completed.

CANADIAN PACIFIC.—This company will construct an additional ice storage building at Okanagan Landing, B. C.

CHICAGO, BURLINGTON & QUINCY.—This company which was noted in the *Railway Age* of January 21 as receiving bids for the construction of a 45-room hotel and alterations to its eating house at Cody, Wyoming, estimated to cost \$25,000, has awarded the contract for this work to F. Jacoby, Billings, Montana.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has prepared plans for the construction of a Y. M. C. A. building at Bellefontaine, Ohio, estimated to cost \$100,000.

DARCO CORPORATION.—This corporation contemplates the construction of a line of railroad to extend from Marshall Texas, to the Darco lignite territory, which is a distance of about ten miles.

DENVER & RIO GRANDE WESTERN.—This company contemplates changing its lines in New Mexico, from narrow gage to standard gage with the possibility of also extending them. No definite decision has yet been reached as to when this work will be undertaken.

DODGE CITY & CIMARRON.—This company has applied to the Interstate Commerce Commission for authority to construct an extension to its lines from Satanta, Kan., through Haskell, Grant and Stanton counties, a distance of approximately 55 miles.

ERIE.—This company has awarded a contract to Foley Brothers, St. Paul, Minn., for the construction of a freight pier 100 ft. by 842 ft. at Weehawken, N. J. The pier dock, retaining walls and platform will be of concrete construction with a superstructure of wood sheathed with zinc.

GREAT NORTHERN.—This company, which was noted in the *Railway Age* of December 24 (page 1286), as contemplating the construction of a second main track between Lamona, Wash., and Blustem, a distance of 22 miles, has awarded the contract for this work to Grant Smith & Co., Seattle, Wash. This same company contemplates the construction of a second main track between Welliston, N. D., and Spring Brook, a distance of about eight miles.

GREAT NORTHERN.—This company, in conjunction with the Northern Pacific, contemplates the construction of a viaduct over the tracks at its Bay Front yard, Superior, Wis., although this work has not as yet been authorized. The same company is making extensive repairs to its Interstate Bridge in that city, including the rebuilding of Superior approach, which is used for street railway and highway traffic.

Railway Financial News

INDIANAPOLIS & CINCINNATI TRACTION.—This company will construct an extension to its lines from a point in Indiana to Cincinnati, Ohio. The rapid transit commission of Cincinnati will undertake the construction of a 17-mile approach to the city from the point of intersection with the Indianapolis & Cincinnati Traction. A 2½-mile tunnel through which the interurban will gain entrance into the city has been completed.

JACKSON & EASTERN.—This company has awarded a contract to J. N. McLeod, Jackson, Miss., for the construction of a railroad from Currans Crossing, Miss., to Pelahatchie Creek, a distance of 11 miles. This is part of a 61-mile extension program which was recently authorized by the Interstate Commerce Commission, and which will be completed during the present year. It is expected that contracts will be awarded in the near future for the construction of the remainder of the extension.

MINNEAPOLIS & ST. LOUIS.—This company, in conjunction with the Great Northern, has prepared plans for the construction of a steel bridge approximately 520 ft. in length over the tracks of both railroads at Fifth street, North Minneapolis. This work is estimated to cost about \$200,000.

MISSOURI PACIFIC.—This company closed bids on February 10 for the construction of a service building at Little Rock, Ark., estimated to cost about \$12,000.

PACIFIC FRUIT EXPRESS.—This company contemplates the construction of an ice plant at a location which has not as yet been announced.

OKLAHOMA RAILWAY.—This company contemplates the construction of an extension to its lines, from Guthrie, Okla., to Stillwater, a distance of about 30 miles, the cost of which is estimated at \$1,200,000.

OREGON SHORT LINE.—This company has been petitioned by the farmers in southwestern Idaho, to extend its Homedale branch line from Homedale, Idaho, to Butte, a distance of about 7 miles.

SALT LAKE & UTAH.—This company, in conjunction with the Bamberger Electric, contemplates the construction of a two-story reinforced concrete and steel terminal building, 170 ft. by 184 ft., including stores, offices and train sheds, at Salt Lake City, Utah, the entire cost of which is estimated at \$250,000.

SOUTHERN PACIFIC.—This company, in conjunction with the city of Houston, Tex., is receiving bids for the construction of a subway to replace the old North Main street tunnel in that city. The subway will be under 19 tracks and will provide two passageways, 21 ft. in width, for highway traffic, and one 8 ft. in width, for pedestrians. The work is estimated to cost approximately \$200,000 of which the city will bear one-half.

ST. LOUIS-SAN FRANCISCO. This company contemplates the extension of its lines from Vinita, Okla., northwest into the coal fields of the Central Coal & Coke Company, of Kansas City, Mo., a distance of about 20 miles. Surveys for this extension are now being made.

ST. LOUIS-SAN FRANCISCO.—This company will receive bids until February 20 for the construction of a 4-story brick hospital at Springfield, Mo., estimated to cost \$700,000.

UNION PACIFIC.—This company closed bids on February 10 for the construction of a new station and rooming house at Yermo, Cal.

WENATCHEE SOUTHERN. This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line from Wenatchee to Beverly Junction, a distance of 53 miles (partly over the tracks of the Chicago, Milwaukee & St. Paul from Beverly Junction to Hanford, Wash., 46 miles), the construction of a new line from Hanford to a point on the Oregon-Washington Railroad & Navigation Company's 29-mile line, and use of the latter's tracks to Kennewick, Wash.

WACUPA & NORTH WESTERN. The Interstate Commerce Commission has received an application of this company for a certificate authorizing the construction of an extension of 14 miles from a point near Nevada to La Grange, Kans. The commission says it is unable to find that present or future convenience and necessity require the construction of the extension.

ATCHISON, TOPEKA & SANTA FE.—*Budget for 1922.*—This company will spend \$43,150,000 for improvements and betterments in 1922 according to President W. B. Storey who is quoted as follows:

Probably \$60,000,000 a year for the next three years ought to be spent. Of the 1922 expenditures \$11,750,000 will be for the completion of work in hand, \$22,000,000 for new work including 75 miles of new second track in Arizona from Yampai to Griffiths; \$8,000,000 for new equipment, and \$1,400,000 for a new branch line from Satanta, Kan., 55 miles west. Additional maintenance will require \$6,662,236; bridges, trestles and culverts, \$1,318,893; rails and other track material, \$1,101,868; stations and office buildings, \$1,056,639; shop buildings, \$1,041,350; additional yard tracks and sidings, \$946,148; shop machines and tools, \$724,281; assessments for public improvements, \$533,633; widening cuts, fills, etc., \$459,701; signals and interlockers, \$446,288.

CHICAGO & INDIANA COAL RAILWAY.—*The Sale of Brazil Branch.*—The line known as the Brazil Branch, which was formerly owned by the Chicago & Indiana Coal Railway, was sold at foreclosure on January 16, 1922, for \$15,000 to attorneys for the Metropolitan Trust Company of New York. When the Chicago & Eastern Illinois was re-organized recently the new company did not acquire this former Chicago & Indiana Coal Railway Company property.

DENVER & RIO GRANDE.—*Hammond Committee Defends Reorganization Plan.*—The committee of Denver & Rio Grande refunding 5 per cent. bondholders, of which John H. Hammond is chairman, has issued a reply to the committee headed by James H. Perkins, which latter committee, in inviting deposits of the bonds with it, expressed the opinion that the plan of reorganization agreed upon by the Hammond committee with the Western Pacific was unsatisfactory and said that the Perkins committee purposed to obtain better terms by arrangement with one or more connecting lines. Mr. Hammond says his committee has recommended a definite and constructive plan which includes the provision that the Western Pacific furnish \$10,000,000 for the improvement of the Denver & Rio Grande property and the turning over to the re-organized company of all unencumbered assets of the old company in exchange for common stock after new securities are offered for the bonds.

The Hammond committee says further that the Perkins committee's reference to connecting lines is unquestionably to the Missouri Pacific and adds:

Interests connected with that line have been aware for more than two years that this committee has been endeavoring to arrange a plan. They have been given every opportunity to submit a proposal to this committee and have failed to do so.

If these interests have any intention of submitting a proposal they have had ample time to formulate it and can submit it promptly. Consequently at the announcement of the Perkins Committee is not followed up promptly by a definite plan, it will be apparent that the purpose of its announcement is only to prevent the deposit of bonds under the plan within the time limit therefor (March 1 next) and thus cause the plan to fail.

If the plan of this committee should fail the Perkins may have a less favorable plan to offer or it may have no plan at all. In the latter case the refunding bondholders would be forced to an independent reorganization of the property which would necessitate their raising themselves at least the \$10,000,000 which the Western Pacific now offers. Such independent reorganization would involve either an assessment on the bondholders or probably at least 25 per cent. or the acceptance of new securities much less desirable than those now offered under the plan of this committee.

The Perkins Committee has arranged to lend bondholders \$25 per bond (the equivalent of the February coupon) in the security of their bonds. Under the offer of the Western Pacific, the February coupon is purchased by it, and whether the plan fails or succeeds, the bondholder has no liability for repayment. The like offer is made in respect of the August next coupon if the plan is then operative. Coupons so purchased are subordinated to the principal and future interest of the refunding bonds. Finally, the Perkins Committee offers a thing but a possibility. We offer a concrete, definite and constructive plan. If not accepted by the assent of the requisite number of bonds in the short time limited, prior to March 1 next the offer may have to be withdrawn. In such case the bondholders may be left at the mercy of such offer as "one or more connecting lines" may then be willing to make, or perhaps to be driven to the necessity of an independent reorganization.

James H. Perkins, chairman of the so-called Perkins committee for the Denver & Rio Grande refunding 5s and adjustment 7s, said:

I have read the statement of the Hammond committee. The committee to which I belong is not a Missouri Pacific committee. It is a committee representing bondholders of the Denver road. It was not formed until the Western Pacific plan was published, and was formed because

The Western Pacific plan did not seem fair to the Denver bondholders. Our committee believes the Denver is a very valuable property, and that the Denver bondholders have a right to a plan which will properly reflect that value. Our committee will, therefore, oppose any effort to jam through before March 1st a plan which it regards as unfair and unjust in the interests of the Western Pacific. Deposit with the Hammond Committee now means that the bondholder irrevocably consents to the Western Pacific plan before he knows whether he has got the best terms available.

The Western Pacific Railroad Corporation is offering to holders of Denver & Rio Grande adjustment mortgage 7 per cent bonds of 1932, both on account of principal and unpaid interest, 50 per cent of new sinking fund 5 per cent bonds and 50 per cent of new 7 per cent cumulative preferred stock of Denver & Rio Grande Western or of a new company to be organized in its stead. The offer is made contingent on the effectiveness of the proposed plan of reorganization, which hinges on the deposit of 80 per cent of Denver & Rio Grande first and refunding 5s. This is virtually the same offer made to the holders of 5 per cent bonds, except that they receive their interest in cash, while the interest on the adjustment 7s is payable in new securities.

The Western Pacific owns \$5,175,000 adjustment 7s out of a total issue of \$10,000,000, and has issued its ten-year 4 per cent notes against them. These noteholders are offered the privilege of exchanging their notes for the new securities of Denver & Rio Grande Western or its successor on the same terms with respect to principal accorded holders of adjustment 7s.

ERIE.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$5,000,000 from the revolving fund to assist it in meeting the maturity of \$15,000,000 of three-year notes which come due on April 1.

Earnings in 1921.—This company showed a net railway operating income for the year 1921 amounting to \$2,133,697, after charging in for 1921 approximately \$3,000,000 on account of transactions applicable to the guaranty period. Excluding such charges, the net railway operating income for the year would have been \$5,062,541. As compared with the company's report to the Interstate Commerce Commission in 1920, showing a net railway operating deficit of \$16,994,118, the Erie's 1921 record represents an increase of \$19,127,815.

In 1920 surplus over charges, based on federal compensation for eight months, was \$4,438,585, equal to \$1.67 a share on the \$112,481,900 common stock after preferred dividends. Its earnings last year were equivalent to 4 per cent dividends on both classes of preferred stock, with a balance of \$138,265.

GREAT NORTHERN.—Bond Sale.—A syndicate headed by J. P. Morgan & Co., has sold \$30,000,000 5½ per cent, 30-year general mortgage series B bonds, maturing January 1, 1952, at 96½ and interest, to yield 5.75 per cent.

GULF, MOBILE & NORTHERN.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$1,088,188 for 15 years from the revolving fund.

ILLINOIS CENTRAL.—Asks Authority to Issue Equipment Trust Certificates.—Application has been filed with the Interstate Commerce Commission for authority to issue \$3,255,000 of equipment trust certificates at 5½ per cent, which it is proposed to sell to Kuhn, Loeb & Co., at 97½, for the purchase of 350 refrigerator cars from the General American Car Company, 2,000 gondola cars, including 500 from the American Car & Foundry Company, 700 from the Pullman Company, 400 from the Western Steel Car & Foundry Company and 400 from the Standard Steel Car Company.

KANSAS CITY NORTHWESTERN.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$1,300,000 for 15 years.

MANISTIQUE & LAKE SUPERIOR.—Asks Authority to Abandon Line.—This company has applied to the Interstate Commerce Commission for a certificate authorizing abandonment of its McNeil branch in Schoolcraft County, Mich., 7½ miles.

MISSOURI & NORTH ARKANSAS.—Sale Ordered.—Sale of this road, which suspended operation last July, was ordered in a decree issued by United States District Judge Jacob Trieber at Little Rock, Ark., February 7. The decree provides that 30 days may be given for the settlement of as many claims as possible, and that 30 days more for advertising the sale must ensue before the sale takes place. The minimum bid which may be accepted

for the road under the order is \$3,000,000. The sale will be held at Harrison, Ark., its headquarters.

The Missouri & North Arkansas extends from Joplin, Mo., to Helena, Ark., 368 miles. The road has been in the hands of a receiver since April 1, 1912 and was forced to cease operations when its officers failed to raise money needed to run it. Various plans have been attempted to bring about the resumption of operation, including the request of a loan of \$3,500,000 from the government, most of which would be used to pay indebtedness.

MISSOURI, KANSAS & TEXAS.—Suit Filed.—The Central Trust Company of New York filed a suit in the United States District Court at Topeka, Kans., on February 4, to foreclose the first extension mortgage bonds and seven subsequent issues of this company, which has recently been reorganized. The face value of the outstanding extension bonds is given as \$3,253,000. Permission to file the suit was obtained from Judge Walter H. Sanborn at St. Louis January 23. The petition alleges the railroad company executed a mortgage on certain of its branches, franchises and other property on November 1, 1894, on which interest has been unpaid since 1915.

NORFOLK & WESTERN.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$666,000 of first consolidated mortgage 4 per cent bonds now held in its treasury for the purpose of reimbursing the treasury for expenditures. The bonds are to be sold at not less than 90.

NORTHERN PACIFIC.—Earnings in 1921.—The preliminary earnings statement for the year ended December 31, 1921, shows net income after taxes and charges of \$22,065,399, equivalent to \$8.89 a share earned on the outstanding \$248,000,000 capital stock against \$7.69 a share in 1920 with the assistance of federal compensation and guaranty. Without federal credits earnings in 1920 were equal to \$1.14 a share.

The preliminary income account compares as follows:

	1921	1920	Changes
Gross	\$94,538,059	\$113,084,407	Dec. \$18,546,348
Expenses, taxes, etc.	86,662,883	111,111,029	Dec. 24,448,146
Operating increase.....	\$7,875,176	\$1,973,378	Inc. \$5,901,798
Equipment, rents, etc.	2,968,650	5,976,680	Dec. 3,007,430
Net operating increase. .	\$10,843,826	\$7,949,458	Inc. \$2,894,368
Other income.....	26,552,682	7,549,833	Inc. 19,002,849
Total income.....	\$37,396,508	\$15,499,291	Inc. \$21,897,217
Interest, rentals, etc.	15,331,109	12,668,240	Inc. 2,662,869
Net income.....	\$22,065,399	\$2,831,051	Inc. \$19,234,348
Dividends	17,360,000	.....	.....
Surplus	\$4,705,399	.....	.....
Inv. in road and equipment.	3,525,048	.....	.....

*Includes \$12,451,530 for additional dividend received from Burlington in December, 1921. This payment was made out of savings accumulated since purchase of an interest in the Burlington in 1901.

During the year the company has paid obligations as follows: Five-year 6 per cent note to government, not due until November 23, 1925, \$6,000,000; St. Paul-Duluth Division 4 per cent bonds, \$2,403,000; 7 per cent equipment trust certificates, \$450,000; prior lien bonds, \$276,000; and St. Paul & Northern Pacific bonds \$36,000, making a total of \$9,165,000.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—Bond Offering.—A syndicate headed by Harris, Forbes & Co. and including the Guaranty Company, Kissel, Kinnicut & Co., White, Weld & Co., the National City Company, and Clark, Dodge & Co. are offering \$8,800,000 first and refunding 4s, due 1961, at 78½, to yield over 5.30 per cent.

SEABOARD AIR LINE.—Condition of Equipment After Federal Control.—Seaboard-Bay Line Company Organized.—This company has taken steps of importance to its security owners in making provision to relieve the condition in which its rolling stock was returned from federal control. In a statement issued February 3, President Warfield points out that over 5,000 cars, or 30 per cent of the Seaboard's freight car ownership, were returned unfit for use, with little progress thus far made with the United States Railroad Administration in recognition of this condition.

A corporation known as the Seaboard-Bay Line Company is being organized by Seaboard interests to provide the means for purchasing, rebuilding or otherwise acquiring or providing for the reconstruction of cars and equipment for the Seaboard Air Line

and equipment for the Baltimore Steam Packet Company (Old Bay Line), the stock of which is owned by the Seaboard. The new company will have a capital of \$1,500,000 paid in from the resources of the two companies by which the stock will be owned.

S. Davies Warfield, who is also president of the Seaboard-Bay Line, explained the purposes of the new company as follows:

Five thousand freight cars—over 30 per cent of the total freight car equipment of the Seaboard Air Line—were returned from federal control unfit for service. This railroad has thus been compelled to pay per diem charges of over a million and a half dollars per annum for the use of foreign cars, because of the condition of its own cars returned. This has been reflected in operations and has resulted in heavy market depreciation of the securities of the company.

In addition, the Railroad Administration during federal control diverted more locomotives from this railroad to other roads than from all railroads of the South combined. By this diversion—which included 26 new locomotives then being delivered—those remaining were not given classified repairs. During federal control over one hundred million tractive ton miles were run out of the railroad's locomotives without substantial repairs, in excess of the mileage run up when taken over. No adequate adjustment has yet been offered by the Railroad Administration for either their use or repairs. Half a million dollars had to be spent to quickly repair locomotives in outside shops to enable the railroad up its return to begin to perform its duty to the public. These conditions have otherwise had to be relieved.

Arrangements have been completed to reduce or wipe out per diem charges, also to provide Baltimore Steam Packet Company (Old Bay Line), owned by the Seaboard, with two steamers, one additional steamer to be added to the fleet, the other to replace the one destroyed by fire during federal control through what Circuit Court Judge Rose termed gross negligence. The Steam Packet Company was returned with two steamers only, no relief steamer, and the property otherwise set back under federal control.

The new company—the Seaboard-Bay Line Company—will issue, and has arranged to place \$4,600,000 6 per cent 15-year equipment trust certificates at par. The proceeds, together with the other resources of the new company, will be immediately reconstructed by the Chickasaw Car & Shipbuilding Company, located on Seaboard rails at Birmingham, Ala.; also 1,750 new steel under-frame freight cars; 25 Mikado locomotives nearing completion by the American Locomotive Company, and two twin-screw, steel, combination passenger and freight steamers ordered from Pusey & Jones Company, Wilmington, Del., for the Baltimore Steam Packet Company far use between Baltimore and Norfolk, Va.—these steamers will be the last word in marine construction, and will be delivered in the fall.

Delivery of the 3,000 reconstructed cars will begin in 60 days and completed in six months. To reconstruct these cars and complete necessary work on others would require two and a half years in the Seaboard's own shops, which compares favorably in capacity with shops of similarly situated railroads. Per diem charges against operation will thus cease two years earlier, and the work done at much less cost than if performed in Seaboard shops.

When the increased locomotive power and the reconstructed and additional new equipment is in operation, a substantial change may be looked for in the net operating results of this railroad in the saving of per diem alone.

The letting of this work on competitive bids to car builders at much lower cost and much earlier delivery than is possible in Seaboard shops is no reflection on any class of Seaboard employees. This railroad's men are earlier, and the work done at much less cost than if performed in Seaboard shops.

SEABOARD-BAY LINE.—*New Company.*—See Seaboard Air Line.

WESTERN PACIFIC.—*Reorganization of D. & R. G.* See Denver & Rio Grande.

WICHITA FALLS & SOUTHERN.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue \$144,000 of capital stock and \$1,556,000 of first and second mortgage 6 per cent. gold bonds.

Additional Sales of Equipment Trusts

The director-general of railroads has confirmed an additional sale of railroad equipment trust certificates to the Girard Trust Company of Philadelphia; Chicago & Eastern Illinois, 1923 to 1935, inclusive, \$429,000; Missouri, Kansas & Texas, 1923 to 1935, inclusive, \$728,000. Total amount of these sales \$1,157,000. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$219,289,100.

Dividends Declared

B. & O., Rochester & Pittsburgh—Common, \$2, semi-annually, preferred \$1, semi-annually, both payable February 15 to holders of record February 1.

Crocker-Corbin Central—Preferred, 1 per cent, quarterly, payable March 1 to holders of record February 15.

Trend of Railway Stock and Bond Prices

	Feb.	Last week	Last year
Average price of 100 preferred railway stocks	79.8	56.15	57.42
Average price of 100 preferred railway bonds	81.00	81.50	75.74

Railway Officers

Executive

Hugh Wright Stanley, whose election as president of the Tennessee Central, with headquarters at Nashville, Tenn., was announced in the *Railway Age* of January 28 (page 304),



H. W. Stanley

was born on February 13, 1874, at Petersburg, Va. He entered railroad service in May, 1890, as a telegraph operator on the Norfolk & Western, and was successively telegraph operator, stenographer, and chief clerk until 1895, when he left to become chief clerk to the superintendent of the Southern at Knoxville, Tenn. In May, 1897, he became secretary to the general superintendent of the Seaboard Air Line at Hamlet, N. C. He served successively as chief clerk to the general superintendent

from 1900 to 1903; trainmaster from 1903 to May, 1906; division superintendent from May, 1906 to February, 1907; superintendent of transportation, with headquarters at Norfolk, Va., from February, 1907 to March 1, 1910; general superintendent of transportation from March 1, 1910, to October 1, 1911; assistant general manager from October 1, 1911, to May 1, 1912; general manager from May 1, 1912, to October 1, 1914, and assistant to the president from October 1, 1914, to June, 1916. He was then engaged in special work for the National Conference Committee of the Railways and the A. R. A. and was later made assistant to the chairman of the commission on car service, at Washington, D. C. In July, 1917, he was made receiver of the Tennessee Central, which position he held up to the time of his recent election.

Financial, Legal and Accounting

Eugene Wright, whose appointment as secretary of the Long Island was announced in the *Railway Age* of January 28, page 304, was born at Flushing, L. I., on May 8, 1871.



E. Wright

He attended the public and high schools there and in January, 1889, entered the employ of the Long Island as messenger boy in the accounting department. Until February, 1893, he served in various clerical capacities and from that time until June, 1897, was clerk and bookkeeper to the cashier. From the latter date until April, 1906, he was bookkeeper and chief accountant in the accounting department. In April, 1906, he was appointed paymaster, which position he held until February 1, 1919, when he was promoted to general storekeeper. He was serving in this position at the time of his recent appointment.

E. J. Lawler, has been appointed freight claim agent of the Columbus & Greenville, with headquarters at Mobile, Ala., succeeding **J. H. Patterson**, resigned.

A. M. Warren, chief claim agent of the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed assistant district attorney of that road for Kentucky and Virginia, with the same headquarters. **H. T. Lively**, freight claim agent, with headquarters at Louisville, has been promoted to general claim agent with the same headquarters. He will have jurisdiction over claims for loss and damage to freight, personal injuries, damage to property, including live stock killed or injured on the right of way, and the prevention of causes for loss and damage freight claims. The positions of chief claim agent and freight claim agent are abolished.

Operating

G. W. Bradley has been appointed trainmaster of the Fort Wayne division of the Pennsylvania, with headquarters at Fort Wayne, Ind.

David E. Nichols, trainmaster of the Northern Pacific, with headquarters at Duluth, Minn., has been transferred to the Pasco division, with headquarters at Spokane, Wash.

W. E. Rominc has been appointed trainmaster of the Missouri Pacific with jurisdiction over the Wagoner, Greenwood and Fort Smith districts and the Central division, with headquarters at Van Buren, Ark.

M. F. Weeks has been appointed assistant superintendent of the McGehee district of the Missouri Pacific, including the McGehee yard, the Hamburg district and the Louisiana division, with headquarters at McGehee, Ark.

J. M. Sommers, chief dispatcher of the Grand Trunk, with headquarters at Battle Creek, Mich., has been promoted to trainmaster, with headquarters at Elsdon (Chicago) Ill. He will be succeeded by **B. L. Tyler**, at Battle Creek.

C. A. Veale has been appointed trainmaster of the Southern Pacific, with headquarters at Oakland Pier, Cal., succeeding **W. G. Crocker**, who has been assigned to other duties. The position of assistant trainmaster of the East Bay Electric division has been abolished.

C. A. Cotterell, assistant general superintendent of the Canadian Pacific, with headquarters at Vancouver, B. C., has been appointed acting general superintendent with the same headquarters, succeeding to the duties of **F. W. Peters**, who has been granted a leave of absence.

H. H. Brown, assistant general manager of the St. Louis-San Francisco, with headquarters at Springfield, Mo., has been granted a leave of absence until March 1, after which date the position of assistant general manager will be abolished and Mr. Brown will be assigned to other duties.

J. Leppla, superintendent of the Galena Division of the Chicago & Northwestern with headquarters at Chicago, has been transferred to the Ashland Division with headquarters at Antigo, Wis., succeeding **G. J. Quigley** deceased. He will be succeeded at Chicago by **P. G. Campbell**, assistant superintendent of the Galena Division, who will be succeeded by **F. R. Loyd**, assistant superintendent of the Iowa Division, with headquarters at Clinton, Iowa. **A. R. Pelnar** will succeed Mr. Loyd.

H. E. McGee, general manager of the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Tex., has been appointed general manager of the Missouri, Kansas & Texas, with headquarters at Parsons, Kan., succeeding **A. S. Johnson**, who has been appointed superintendent of the consolidated Smithville and Texas Central districts (South Texas district) of the Missouri, Kansas & Texas of Texas, with headquarters at Waco, Tex. The position of general manager of the Texas lines has been abolished. **J. W. Evens**, has been appointed trainmaster of the new South Texas district, with headquarters at Waco, and **O. W. Cambell** trainmaster, with headquarters at Smithville, Tex.

Traffic

O. C. Walker has been appointed chief supervisor of perishable traffic and weighing of the Canadian Pacific, with headquarters at Montreal.

Joseph Rankin has been appointed general agent of the Gulf Coast Lines and **J. R. Yore**, commercial agent, both with headquarters at St. Louis, Mo.

W. H. Deacon, traveling passenger agent of the Canadian Pacific coast steamship service, with headquarters at Vancouver, B. C., has been promoted to general agent, with headquarters at Portland, Ore., succeeding **E. E. Penn**, deceased.

R. D. Williams has been appointed traffic manager of the Sacramento Northern, with headquarters at Sacramento, Cal., succeeding **Z. T. George**, who has resigned to enter other business. **J. J. Harris** has been appointed general passenger agent with the same headquarters.

William C. Bowles, whose appointment as assistant freight traffic manager of the Canadian Pacific was announced in the *Railway Age* of January 14, page 210, was born in Montreal on June 3, 1875.



W. C. Bowles

He entered railway service with the Canadian Pacific as a clerk in the general freight office at Montreal. In 1896 he was in Chicago as chief clerk to the general agent, freight department, and in 1897 he was in Montreal in the office of the general freight agent. From the latter date until 1903 he was chief clerk to the trainmaster and general freight agent at Winnipeg, when he was promoted to assistant general freight agent at Calgary, Alta., being transferred later in a similar capacity to Vancouver.

In 1907 he was appointed general freight agent at Winnipeg and served in that capacity until the time of his recent promotion.

Clarence E. Jefferson, whose appointment as general freight agent of the Canadian Pacific, with headquarters at Winnipeg, Man., was announced in the *Railway Age* of December 24 (page 1291), was born at Boston, Mass., on September 6, 1889. He entered railroad service on September 10, 1906, as an office boy in the traffic department of the Canadian Pacific Dispatch at Boston, and he was successively office boy, billing clerk, tracing clerk, and tariff and percentage clerk until November, 1911, when he left to become tariff clerk in the freight traffic office of the Boston & Maine at Boston. He later consecutively held the same position in the service of the Maine Central and the New York, New Haven & Hartford at Boston. In March, 1913, he was made percentage clerk in the freight traffic office of the Canadian Pacific at Montreal, Que., which position he held until December, 1915, when he was promoted to assistant general freight agent, with headquarters at Montreal. From June, 1921, to December of the same year, he was acting general freight agent, Eastern lines, with the same headquarters, which position he was holding at the time of his recent promotion.

Mechanical

A. B. Shanks, master mechanic of the Missouri, Kansas & Texas of Texas, with headquarters at Smithville, Tex., has been appointed master mechanic in charge of the newly created South Texas district, with headquarters at Waco, Tex.

T. F. Howley, special agent for the Erie, has been appointed superintendent of locomotive operation, with headquarters at New York.

H. K. York, car foreman of the Canadian Pacific, with headquarters at Alyth, Alta., has been promoted to general car foreman, with headquarters at Moose Jaw, Sask.

G. Moth, division master mechanic of the Canadian Pacific, with headquarters at Edmonton, Alta., has been appointed to the advisory position of district master mechanic of the Edmonton, Dunvegan and British Columbia, with the same headquarters.

William C. Smith, whose appointment as mechanical superintendent of the Missouri Pacific, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of February 4 (page 356), was born at Detroit, Mich., on September 25, 1869. He entered railroad service in December, 1887, as a machinist's apprentice on the Missouri Pacific. He left in April, 1895, to enter the service of the Atchison, Topeka & Santa Fe as a machinist. In December of that year he returned to the Missouri Pacific as a gang foreman and, in January, two years later he was made a machinist. He was promoted to shop foreman in September, 1897, and to division foreman in January, 1902, which latter position he held until January, 1905, when he was promoted to master mechanic. In July, 1912, he was promoted to general master mechanic and in September, 1915, to assistant mechanical superintendent, with headquarters at St. Louis, which position he was holding at the time of his recent promotion.



W. C. Smith

Engineering, Maintenance of Way and Signaling

F. J. Nevins has been appointed valuation engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago.

D. C. Fenstermaker has been appointed principal assistant engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, and with such duties as may be assigned to him by the chief engineer, effective February 1. Mr. Fenstermaker was formerly district engineer of the Southern district of this road but has been on leave of absence since April 16, since which time he has been engaged in the construction of a railway for the United Fruit Company in Cuba.

E. L. Martin, engineer maintenance of way of the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Tex., has been appointed engineer maintenance of way of the Missouri, Kansas & Texas, with headquarters at Parsons, Kan., succeeding H. H. Jolnitz, who has been assigned to other duties. **W. W. Marshall**, district engineer, Texas lines, with headquarters at Waco, Tex., has been appointed district engineer in charge of the newly created South Texas district, with the same headquarters.

Obituary

C. J. Quigley, division superintendent of the Chicago & North Western, with headquarters at Antigo, Wis., died of pneumonia at Lyons, Wis., on September 15, 1861. He entered railroad service in February, 1881, as a station helper on the Chicago & North Western, since which time he has been successively telegraph operator, agent, general yard-

master at the Chicago terminal, assistant division superintendent with headquarters at Chicago, and division superintendent, which latter position he was holding at the time of his death.

William F. Merrill, formerly a vice-president of the Erie and of the New York, New Haven & Hartford, died at his home in Plainfield, N. J., on February 3. Mr. Merrill was born on July 14, 1842, at Montague, Mass., and was educated at Amherst and Harvard Universities. In 1866 he entered railway service in the engineering department of the Chicago, Burlington & Quincy. From 1873 to 1875 he was resident engineer of the Erie at Buffalo, N. Y. Then for five years he was with the Toledo, Peoria & Warsaw (now Toledo, Peoria & Western), consecutively as assistant engineer, assistant to the receiver and superintendent. From 1880 to 1882 he was general superintendent of the Wabash. The following year he was general superintendent of the Chicago & Alton. From 1883 to 1887 he was superintendent of the Iowa lines of the Chicago, Burlington & Quincy. He then became general manager of the Hannibal & St. Joseph and the Kansas City, St. Joseph & Council Bluffs (both now a part of the Chicago, Burlington & Quincy). In 1890, he went to the Chicago, Burlington & Quincy in a similar capacity and remained in that position until 1896 when he was elected second vice-president of the Erie. In 1900 he became first vice-president of the New York, New Haven & Hartford and in 1903 retired from railroad service.

E. H. Shaughnessy, second assistant postmaster general in charge of the railway mail service, died at a hospital in Washington, D. C., on February 2, from the effects of injuries sustained in the Knickerbocker theatre catastrophe in that city on January 28. Mr. Shaughnessy was born in Chicago on October 26, 1882. He entered railroad service in July, 1899, as a telegraph operator on the Chicago & North Western and during the following 18 years he served continuously in various capacities on this road, both in Chicago and at other points on the line. On May 28, 1917, while trainmaster at Chicago, he was granted a leave of absence to enter military service. He rose from the rank of first lieutenant to lieutenant-colonel, and was assigned in France to the transportation corps, successively serving as general superintendent, assistant general manager, general manager and acting deputy general of transportation of the advance section. While "over there" he collaborated with the French military and civilian railway men in the preparation of a French-English book of rules for railway operation. He was commended for conspicuous service at Chateau Thierry, awarded the distinguished service medal and decorated with the Legion of Honor by the president of France. Upon his return from overseas, in September, 1920, Colonel Shaughnessy resumed his duties with the Chicago & North Western, as trainmaster on the Galena division, with headquarters at Sterling, Ill. He soon left railroad service to accept an appointment as assistant director, division of transportation, American Petroleum Institute, with headquarters at New York. He was appointed second assistant postmaster general in April 1921, which position he was holding at the time of his death.



E. H. Shaughnessy

THE RATE OF EXCHANGE on freight shipments between points in Canada and the United States will be 4 1/2 per cent and the surcharge 3 per cent from February 1 to February 14, inclusive. The rate of surcharge on inter-sectional passenger business will be based on a 4 per cent exchange.

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Railway Age

EDITORIAL

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As will be noted on another page of this issue, a bascule bridge of an entirely new type was recently placed in service on the Wabash at Detroit. This structure is of interest as marking the first important innovation in bascule bridge design for a number of years. About 1900 new developments in bridges of this class were rather common but for the last 10 or 15 years the structures built have been limited almost entirely to two or three types. These have not competed with new bascule designs but with vertical lift spans, a class of movable bridge in which the development during the last 10 years has been much more active. The fact that a new design of heel trunnion span has been evolved serves to indicate that the last word has not yet been said in the development of the bascule bridge.

A New Type of Bascule Bridge

The effectiveness of an army is largely dependent on the quality of its subalterns; that of a railroad depends largely on its foremen. Given a corps of intelligent, thoroughly-trying foremen, whose energies are being directed by a loyal enthusiasm for the company which employs them, and efficiency of work is assured. Times like these are exceedingly trying for the spirit of these foremen. "I was put back to painter early last year," writes one of them, "but was reinstated as foreman in July. The first of this year I was set back to assistant foreman with only three men, but I hope it will not last long." This is not from an employee of limited service, but from one who has given at least 25 years of his life to the railroad. Surely these vicissitudes must sorely try his loyalty, must make him feel that he is but a pawn on a great chessboard. Retrenchments are necessary and will continue so as long as our economic life is marked by waves of expansion and depression. But would it not be possible to carry out the drastic reductions in force with a greater manifestation of sympathy for those who suffer hardships in consequence? Explanations to these loyal foremen of the conditions that make it necessary to lay them off, together with assurances of restored positions as soon as conditions change for the better, would bring a return in sustained good will far exceeding any outlay involved.

The Human Side of Railroading

The general character of the motive power operating problem on the small road is not essentially different from that on a large system. The number of locomotives may be comparatively small but the changes that have taken place in economic conditions, the increased size of bills for fuel and maintenance, coupled with inadequate revenues, have rendered it just as essential that every step possible be taken to reduce the cost of locomotive operation. The small road may not be called upon to haul long and heavy trains, and relatively light locomotives may furnish adequate power, but the locomotives on such roads are usually notably inefficient and frequently quite old. It may not, and generally will not be feasible at

Locomotives for Small Roads

the present time to order new and modern locomotives. However, some small roads have made remarkable reductions in fuel consumption and in maintenance costs by replacing their worn-out locomotives by rebuilt locomotives purchased from larger roads. There are thousands of locomotives which no longer are capable of economically handling main line traffic, but which, if rebuilt and equipped with superheaters and other fuel economizers, are capable of efficiently meeting all the requirements of the average small road.

This phrase is used in England to describe the constant increase in the number of conditions under which reduced passenger fares are applied. The railways have not made any reductions in basic rates, yet they announce at frequent intervals additions to the imposing list of conditions under which reduced rates apply. There would be few to contradict the statement that in this country reductions in freight rates are of greater economic importance than reduced passenger fares. Any changes that may be made in passenger rates, then, should not be concessions to the traveling public resulting in reduced earnings for the carriers—if such sacrifices are made they should be in freight rates. The only justification for alterations in our passenger tariffs should be to increase—not reduce—railway revenues. In other words, what our railways need is to fill the vacant seats in trains now running—by the extension of the sale of excursion and tourist tickets at reduced rates, if necessary, and without permitting ordinary traffic to move under the lower rates. Our roads have taken some steps in this direction, but the British railways have gone farther and are making a thorough experiment with these rates which can well be followed with interest. If "reductions by installments" can be made to increase net earnings and at the same time to build good-will for the railways in the minds of the public, then the practice should be given wider application in this country.

"Reductions by Installments"

The railroad problem in the United States would be fairly easy to solve were it not for the labor situation. The roads will never succeed if they do not have the hearty co-operation of their employees. Do the labor leaders want to destroy the roads? Are they doing anything to help to bring about the right sort of co-operation? Fairness and frankness must characterize all negotiations and intercourse between the managements and the men—any other course followed by either the managements or the men is suicidal. The labor union leaders for some years, for reasons best known to themselves, have apparently believed that it was good policy to throw mud at the railroad managements; sometimes referring to misdeeds of the past, sometimes through misrepresentation by skillful juggling with figures in the hands of the so-called expert labor economists. Secretary Hoover, when cross-examined in the Interstate Commerce Commission general rate investigation, neatly called the turn on

Time to Play Fair

The general character of the motive power operating problem on the small road is not essentially different from that on a large system. The number of locomotives may be comparatively small but the changes that have taken place in economic conditions, the increased size of bills for fuel and maintenance, coupled with inadequate revenues, have rendered it just as essential that every step possible be taken to reduce the cost of locomotive operation. The small road may not be called upon to haul long and heavy trains, and relatively light locomotives may furnish adequate power, but the locomotives on such roads are usually notably inefficient and frequently quite old. It may not, and generally will not be feasible at

Clifford Thorne, who represented certain shippers, when he referred to past financial transactions. "Oh yes," Mr. Hoover said, "I have been hearing about that ever since I was a boy, but we have got to live for the future and not rehash the past." One of the nastiest critics of railroad managements is the Plumb Plan publication known as "Labor." It is not only poisoning the minds of railroad employees but, through the influence of the labor unions, is being widely quoted in the daily newspapers and is carrying on a most unfair propaganda against the railroads. Possibly it is not out of place in this connection to take another quotation from Mr. Hoover's testimony: "Finally, I want to refer to the veritable witches' cauldron being fed constantly with hates distilled from the misdeeds of railway promoters in the past, from the conflicts between the railways and the farmers, between the railways and their workmen. From all the confusion that arises from it we destroy our railroads and destroy ourselves. With this commission on one hand assuring honesty in finance, justice to the shipper and the railway investor; with the Railway Labor Board assuring justice to workers and, above all, with a great spirit of public service in our generation of railway managers, it is time to call off the witches and take some vision of our national situation if we are to pull ourselves out of this depression." Is it not fair time that the reactionaries among the railroad executives and the radicals in the ranks of railroad labor awakened to the disaster that surely lies ahead unless they get together on a common basis and stop trying to cut each other's throats?

In considering the proposed order for train control prepared by the Interstate Commerce Commission, the railroads must necessarily be guided largely by the specifications contained in it. However, it would appear that these specifications were prepared with the idea that many changes will be found necessary after more extensive service installations have been made. Inasmuch as they appear to represent what are considered as the theoretically ideal requisites it would seem that the Commission must allow the carriers considerable latitude in the selection and installation of devices which they think will best meet their respective operating conditions. One road may desire a device having speed control and a positive stop; another may desire one without the speed feature and with a permissive stop, while still other carriers may desire different combinations. If progress is to be made in this development and experimental work it will be for the railroads to be allowed a certain degree of freedom and it is to be hoped that the officers studying this problem will be encouraged to interpret the specifications liberally in order that the maximum information may be secured.

A picture was recently received in this country from Japan showing two Japanese laborers shaping a long bridge timber with a cross-cut saw. The timber was supported above the ground and one bare-footed sawyer stood on it, the other working from underneath. While this method of sawing lumber may be economical and satisfactory in countries where laborers can live on a few ounces of rice a day, the standard of living in America is higher, labor receives relatively greater pay, and economical operation in most industries can be secured only by utilizing labor-saving machinery wherever possible. Owing to the greatly increased use of steel in bridge, car and building construction and repair work during the past few years, many people forget how much wood is still used for

these purposes. Consequently they fail to appreciate the need of modern woodworking machinery in car shops. Mill room equipment receives far less attention than formerly and less, in fact, than it deserves. A single large eastern railroad, for example, uses approximately 100,000,000 board feet of lumber annually for bridge timbers, car sills, framing, flooring, roofing, siding, lining, etc., exclusive of ties. When it is remembered that there are about 200 Class I roads in the United States some of which use less but others probably more lumber than the road quoted, some conception is reached of the enormous total consumption. The need of modern efficient woodworking machinery for finishing this lumber is self-evident.

The electrical illumination of passenger car equipment has been established for years. However, far too many roads accept the charges for this service as necessary without ascertaining the actual cost of lighting a car each month. On a certain large western road an officer inquired recently regarding the car lighting costs only to learn that no one had checked such charges lately. A hurry-up call was then sent out to assemble all charges for battery renewal parts, jars, generators, belts, and other equipment. Time-books of various electricians and car repairs were checked, etc. The result of the accounting showed that while the average cost of car lighting was well within reason certain excessive expenditures were very evident. Having inaugurated an accounting system for various car lighting equipment and parts, this road is now in a position to introduce numerous economies. Another road discovered that the charges for repair parts and labor for the maintenance of the batteries on a certain car were three times what they should have been. This road also is now delving into the detailed charges of its car lighting service. One expert claims that over \$10,000,000 is spent annually for car lighting equipment and repairs; every road should know where its share is going. Some roads prefer to have all car lighting equipment furnished and maintained by a supply company on contract at a certain price per car per month; the Pullman Company also has a fixed rate for lighting cars furnished to the railroads. A comparison of these figures with the actual charges on many roads should show that extensive economies in car lighting service are possible.

**Car
Lighting
Costs**

The discussion of the question whether train orders may safely be intrusted to station operators, to be delivered without requiring conductors to sign them,

**The Argument for
Train-Order
Form 19**

which was continued through a half dozen issues of the *Railway Age* last autumn, was unavoidably suspended in December, while yet unfinished; but it is resumed this week, and the article from F. W. Weston, of the Northern Pacific, now presented, may well serve as a concluding chapter. (The articles referred to appeared in the issues of September 10, pages 474 and 479; September 24, pages 557 and 562; October 8, page 662; October 15, page 703; November 12, page 933; December 3, page 1107 and December 10, page 1129.) It seems to us that the advocates of Form 19 have won their case. Mr. Weston clinches his argument with a statement, quite conservative, of money saved, but he has a strong case aside from that. On a busy single-track line simplicity and celerity are important elements in train operation, even if they were costly. The punctuality and regularity of passenger trains, promoted by improving the movement of all trains, is a valuable asset, even though it cannot be financially measured. The experiences of the Great Northern and the Hocking Valley confirm

**Don't Neglect
Mill Room
Equipment**

the Northern Pacific's report. It should be noted in particular that neither Mr. Forman nor Mr. Weston rests his argument on having the train order system reinforced by the block system. The block system should be used everywhere; and those roads which have discontinued Form 31 only where they have automatic block signals cannot claim to have done any great thing. We say that our friends have made out their case; but this does not mean that there can be mathematical proof. These experienced observers are, indeed, perfectly satisfied that fewer failures have occurred with Form 19 than with Form 31, and that in the nature of the case the conditions in the future must be like those of the past; but, as everybody knows, a disastrous collision always gives a black eye to all those features connected with its cause which are not ideally perfect, whatever may be the main cause; and therefore it is proper to bear in mind that those dispatchers who argue for Form 19 make no claim of infallibility. The best thing for the doubter to do is to read the arguments over again, and do the whole job at one sitting.

Efficiency of Government and Private Operation

THE most striking fact in the railroad history of the year 1921, except the decline of traffic, was the large reduction of operating expenses. The most striking feature of the reduction of expenses was the very large part of it which was effected by reducing the number of employees.

Two former director generals under government operation, W. G. McAdoo and Walker D. Hines, recently have been testifying before a Senate committee in an effort to show that the railways were operated with the greatest efficiency practicable under government control. They made special efforts to vindicate the Railroad Administration's labor policy. Meantime, the railways under private operation have been effecting increases in efficiency and economy which afford the best answer to the statistics and arguments of Messrs. McAdoo and Hines.

The defenders of government operation have made much use of comparisons of the operating expenses under government control in 1918 and 1919 and under private operation in 1920 to support their claim of relatively great efficiency under government control. But, as has repeatedly been pointed out, when the railways were returned to their owners their operating expenses had been increased under government control until they were on the highest level ever reached up to that time. The companies had to operate them with working conditions for employees which had been established by the Railroad Administration. They had to pay until May 1, 1920, the highest scale of wages that was paid at any time under government control, and the rest of the year the still higher wages fixed by the Railroad Labor Board. They had to charge into their accounts materials and supplies at prices which had been paid by the Railroad Administration, and to pay prices for coal which also had been largely established by the government. They had to fight the outlaw switchmen's strikes and to deal with the demoralized transportation conditions which they caused. They had to handle the largest traffic ever moved in a single year.

For these reasons, to compare the operating expenses of 1920 with those under government control is likely to lead to unreasonable and unjust conclusions. The private managements did not have a fair chance in 1920 to make improvements in operating methods which would show the relative economy of private as compared with government operation.

The railways were operated by the government 26 months, during 16 months of which the country was at peace. It is now almost 24 months since they were returned to private

operation. The government had ample opportunity between the signing of the armistice and the return to private operation to show what it could do in operating the railways under conditions of peace. The companies have now had almost two years in which to show whether they can operate the properties more efficiently and economically than the government. The operating results of the closing months of government control and of recent months under private management, therefore, afford material for an instructive comparison of the relative efficiency of government and private operation.

The most outstanding fact about government operation is that under it the operating expenses of the railways were always increasing whether the traffic handled was increasing or not. The traffic handled in 1919 was less than in 1918, but this decrease in the traffic handled was accompanied by an increase in operating expenses. On the other hand, while under private operation in 1920 an increase in traffic was accompanied by a large increase in expenses, as soon as the traffic began to decline the operating expenses began to be reduced, and in the first eleven months of 1921 the total operating expenses were \$1,070,000,000 less than in the same months of 1920.

Furthermore, this reduction of operating expenses has grown relatively greater month by month. Every business man knows that it is extremely difficult in a period of declining business to reduce expenses, and especially labor costs, in proportion to the decline of business. This is especially true in the railroad business. A manufacturer can close his plant and stop most of his expenses. A railway must continue to operate regardless of how much its business declines, and, therefore, most of its expenses must go on. The railways, under private operation, have, however, reduced their expenses almost in proportion to the decline in their business in spite of the fact that the decline in business has been the greatest that ever occurred. They have been rendering more passenger train service than in 1919. They have been handling only about 12 per cent less freight. Wages are the largest item of railway expenses, and the cost of fuel is one of the largest items. They are paying higher scales of wages and higher prices for coal than in 1919. Nevertheless, in the last three months for which complete statistics are available, September, October and November, their total operating expenses were less than in 1919. Their total operating expenses in these months of 1919 were \$1,196,000,000, and in 1921, \$1,142,000,000.

The principal cause of the large and practically uninterrupted increase of operating expenses under government control was the Railroad Administration's labor policy. Mr. McAdoo has attempted to show that if the railways were not operated with the highest efficiency under government control it was largely the fault of railway officers trained under private operation, since they constituted most of his staff. But these railway officers were not responsible for, and most of them were not in accord with, his labor policy, and it was the increase in the number of employees as well as in their wages that caused most of the increase in operating expenses. In December, 1917, when the government took over the railways, they had 1,703,748 employees. In January, 1920, a month before they were returned to private operation, they had 1,953,571 employees, an increase of 249,823. The average number of employees in 1919 was 1,913,422. As already indicated, the railways in 1921 rendered more passenger service than in 1919, and in the first ten months of the year 1921 rendered only 12 per cent less freight service than in 1919. The average number of employees in these months, however, was only 1,656,615, or 13½ per cent less than the average number in the year 1919. The reduction in the number of employees was actually greater than the reduction of freight business handled.

The latest month for which we have complete statistics of railway operation is October, 1921. The railways rendered 371,000 more train miles of passenger service in that month

than in October, 1919. They handled only ten per cent less freight. In October, 1919, however, the number of employees was 1,977,616, while in October, 1921, it was only 1,754,136, a reduction of 223,480, or over 11 per cent. The scale of wages paid was higher than in 1919; and yet the reduction in the number of employees was so great that whereas in October, 1919, the total wages paid were over \$253,000,000, in October, 1921, they were only \$257,600,000.

While the freight business handled in 1921 was less than in 1919, the amount of freight business handled per employee was greater. The number of ton-miles per employee in the first ten months of 1919 was 171,309, while in the first ten months of 1921 it was 174,670. The railways have not only within the last year greatly reduced the number of employees, but they have increased the average miles run by freight trains and adopted numerous other methods which have resulted in greatly reducing the amount of overtime for which they have had to pay. This elimination of overtime paid for at punitive rates helps to account for the reduction in the total wages paid.

It may be said that a large part of the reduction in operating expenses, and especially in the number of men employed, has been due to the reduction and deferring of maintenance work. This is true, but the Railroad Administration was not in the latter part of 1919 using for maintenance relatively any more of the money spent for operation than the railway companies have been recently. In both October, 1919, and October, 1921, the expenditures for maintenance were 46 per cent of the total expenses of operation. The fact is that under private operation the railways have made almost as large reductions in transportation expenses, which represent a real economy, as in maintenance expenses which do not always represent a real economy.

The Interstate Commerce Commission publishes monthly the unit costs per train mile for locomotive repairs, wages of engineers and trainmen, fuel, engine house expenses and other locomotive and train supplies. These "selected accounts" are partly maintenance but chiefly transportation expenses. It is a notable fact that the totals of these "selected accounts" per freight train mile increased from \$1.674 in March, 1919, to \$1.923 in February, 1920, the last month of government control. They were never so high again until after the wage advance granted in July, 1920. They reached their maximum in August, 1920, when they were \$2.40, and after that they were reduced until in June, 1921, although the high wages fixed by the Railroad Labor Board were still in effect, they were \$1.753. In October they were only \$1.639. They had been reduced to almost the same amount as in October, 1919, when they were \$1.617, in spite of the fact that both the wages of engineers and trainmen, and the price of coal were higher in October, 1921, than in October, 1919.

The railways have benefited by the large economies in operation which have been effected under private management. The fact that within recent months they have been earning larger net returns than a year ago is mainly due to the economies that have been made. The public also is benefiting by them. It is an actual fact that although railway labor is being paid a higher scale of wages, the coal operators are being paid more for coal and the public is being charged higher freight and passenger rates than two years ago under government control, the public is really paying practically no more for its freight and passenger transportation than it was two years ago. The last month for which statistics of railway earnings and expenses are available, is November. The total cost of railway transportation to the public in November, 1919, including earnings derived from their rates, with the deficit incurred by the Railroad Administration added and the taxes paid by the railways subtracted, amounted to \$481,000,000. The total cost to the public of railway transportation in November,

1921—that is the total earnings derived from the rates charged, with the taxes paid by the railways subtracted—was \$440,000,000, or 8½ per cent less than in 1919. The number of tons of freight carried one mile was only 10.4 per cent less than in November, 1919. In other words, the railways paid a higher scale of wages to their employees and higher prices for fuel, and yet earned a larger net return and rendered service at a smaller net cost to the public than in November, 1919.

The outstanding things shown by the facts which have been stated are that under government operation, even after the war was over, the general tendency was for the number of men employed and the expenses incurred to increase faster relatively than the traffic increased, while under private operation, both before and since government control, the general tendency always has been for operating expenses and the number of men employed to increase less in proportion than the traffic when the traffic is increasing, and to decline sharply when the traffic declines. The year 1921 was an extremely hard one for the railway companies, but the increases in efficiency and economy secured in that year are the best possible answer to the claims of the defenders of government operation as to its superior efficiency.

On "Selling" the Railroads

THE railways of the United States make as good transportation as any railways in the world. They sell it cheaper than any other railways in the world. They are selling their commodity relatively more cheaply to-day than most other commodities are being sold in this country.

In spite of these facts the management of the railways and their rates are the objects of general and even bitter attack. They are constantly misrepresented, and many people believe the misrepresentations.

What is the reason for this condition of affairs? There can be only one answer. The railways have not been and are not being properly "sold" to the public.

What is wrong with the way they have been and are being sold? The answer to this question might be found in a study of the selling methods of many other classes of concerns which do not make relatively as essential or as good commodities as the railways do, which charge relatively much higher prices for them, make many times as large profits and yet escape all the attacks, all the trials and tribulations from which the railways suffer.

For example, look through the advertising columns of any large magazine or newspaper. Note the large amounts of space which are occupied by the advertisements of automobile companies, chewing gum companies, oil companies, telephone companies and concerns of almost every other kind. Note also that this is "institutional" advertising as well as commercial advertising—advertising intended to "sell" the concern itself as well as its product.

Then look for the railroad advertising. Having found it, if you can find any, compare—or contrast—it with the advertising of other classes of concerns. What you will find of it is good. But you won't find much.

We mention advertising only as an example.

The railways are not "selling" themselves to the public. The trouble is that most of them are not even trying to. If the railways would make relatively as great efforts and spend relatively as much of their earnings in selling themselves to the public as most other classes of concerns do, the railroad problem would speedily be advanced a long way toward solution. If the railways were as efficient in selling themselves to the public as they are in serving the public they would soon be the most popular and among the most prosperous concerns in the United States.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Ammunition for Lauck and Plumb

PHILADELPHIA, Pa.

TO THE EDITOR:

Your columns abound with eulogies for the railroad officials and with condemnation for government ownership and labor unions; therefore, I would like to have you ask this question of railway executives through your columns:

"Why is it, if net returns do not cover operating expenses, that they are continually making capital expenditures for improvements and charging the material and labor to operating expenses? This is in strict violation of I. C. C. Rules and the law governing. Is this done to increase the cost of operation so that they can advertise the facts before the public and better fortify their contention for another wage reduction and hold on to their high rates?"

This practice is being carried out on nearly all railroads and the employees are gathering all the information they can for Jett Lauck and Mr. Plumb's paper "Labor".

I should like to see this answered through your columns by some railway executive. "AN OBSERVER."

College Training Does Not Make the Man

BOSTON, MASS.

TO THE EDITOR:

"One Who Has Seen" (*Railway Age*, December, 10, 1921), still has the Missouri delegation to convince. The Romans gathered "not to bury Caesar but to praise him"; had "One Who Has Seen" been at the gathering, his interest would have doubtless centered on the interment. Having satisfactorily sung the obsequies for the railroad and semi-other-business demise of 61 of his railroad service co-starters; thrown the spotlight on six and the dimmed spotlight on one of the remaining co-starters whom he can recall; lilted his paean of hate for colleges, college education and college men in general; and having placed the other "granger" starter who began his railroading in the president's office at the behest of an influential, interceding friend in a strategic position to finally accept modest praise at the call of "Gunga Din," our college man's friend states—"After all is said and done, the qualities which help men to succeed in life are *born in them* and not taught them," and then naming "two qualities most necessary to success in railroad work," we find that "the 'Call Boy' has these *driven into him* from his start at 16 years of age."

What is this? A case of "Ye must be born again! 'Call Boy,' Ye must be born again!"

No! Our friend "Who Has Seen" and "A. R. A. Clerk" who appeared in *Railway Age* of October 8, are not temperamentally qualified—the former to give an unbiased opinion of the present day representative college and college man, or the latter to give an unsoured estimate of the real non-college railroad man.

A man is a man be he college or self-educated, or be he without education at all; nor can criticism from an embittered viewpoint harm him. "SHOW ME."

Speeding Up Car Movements at Terminals

NORTHWEST REGION.

TO THE EDITOR:

What Mr. Ford is reported to have accomplished on the D., T & I. in the way of speeding up the movement of cars and in getting a full day's work for a day's pay is no more than can be accomplished on other roads and what has been accomplished on some of them. As proof of this I will cite my own experiences in revising the methods of operation of a large terminal.

I came to this railroad about two years ago and had some trouble in getting established, as I was a rank outsider. I used all the diplomacy that I knew, and had to go a little slow for 60 days until I had my bearings and learned the operation of the division. Then I commenced to make changes in the method of operating the terminals. Trains, both inbound and outbound, were being handled from several different yards, cars were being cross hauled and thus delayed, yard power was being worked practically without system and engines were loafing on the job everywhere.

My first move was to line up a system of handling transfer crews connecting with time freight trains, getting them running on a tight schedule so that they had no time to loaf and insisting that time freight trains should run on time every night. The result was that some transfer crews were taken off and our time freight trains moved on time and ahead of time every night. Then I gave the work each engine was doing some study and found out that in some yards power was being milled around, several engines being sent into the same territory to do work that one crew could have done if it had been properly lined up at the start. This resulted in taking off more power, as I was getting more work out of every engine. At the same time I was checking up loaded cars left off time freight trains, cars not placed on repair tracks promptly, and empty cars not moved up and classified, and found that cars were being delayed badly because we had no follow-up system in effect so that we would know just what was being left over after each fast freight train and why.

We started a system under which the agent and yardmaster in each yard kept a check of every car in his territory that would be ready by 5:30 p. m. for the night time freight trains, and also made arrangements with connections so that we knew what loads they were going to deliver us for the night trains. Each yardmaster was held responsible for seeing that every train load in his territory was switched out, weighed and brought to the classification yard in time to connect with the night trains. This was no small job as every time a car was passed up there were any number of excuses as to why the car was not gotten out. By checking each car and demanding an explanation on it, it was not long until every one understood that no excuses would be taken for delayed cars and, like the reduction of power, it now comes easy.

The moving of loaded cars to and from repair tracks was handled in the same way, and a recent check of all of our time freight trains for a period of one week showed that out of all the cars handled on these trains there were but four that did not move on the first train after they were loaded, billed and ready to move, two of these having been held for daylight inspection of contents.

As to getting a full day's work for a day's pay, our record of cost per car as reflected by reports furnished by the auditor for the month of July as compared with previous years shows a decrease in the cost of handling cars of 22 per cent as compared with July, 1918, while since that time men in yard service have received about 58 per cent increase in wages. This has been brought about not only by demanding but getting a full day's work for a day's pay and at the

same time so changing the method of operation and cutting corners in every direction, as not only to speed up the movement of cars, but at the same time to speed up the movement of freight trains over this division; the reduction in the cost of handling cars is thus only a small proportion of the total amount of money saved.

ASSISTANT SUPERINTENDENT.

An Advocate of Soda Ash

INDIANAPOLIS, IND.

TO THE EDITOR:

There is no question about the value of water treatment, for water treating plants have been used by railroads for more than 20 years. Figures compiled by the writer from shop records for switch engines using untreated water showed, in pre-war times, a boiler repair cost of 0.0153 cents per locomotive mile, while switch engines using water of the same chemical character treated in a treating plant showed a boiler repair cost of only 0.0055 cents per locomotive mile. These figures include only shop work and exclude the cost of calking flues between shoppings on the locomotives using raw water, the loss of locomotive time for such work, or the loss in fuel due to scaled heating surfaces. In another instance, a switch engine using a 40 gr. water showed a boiler repair cost 18 times greater than an engine using a 30 gr. water treated in a treating plant. The cost of treated water at the present time, including interest and depreciation on the plant, cost of chemicals, operator's wages, averages about 3½ cents per 1,000 gallons.

It is found that water from deep wells at Streator, Urbana, Sidney, Arthur, Lovington and many other points in Illinois and other states contain some natural bicarbonate of soda in addition to the usual 15 to 25 grains of bicarbonate of lime and magnesia. Inspection of the stationary boilers at any of these points shows them to be free from scale, pitting, corrosion or other evils noticed in boilers using water containing the same ingredients in the absence of bicarbonate of soda. It is natural that, upon finding these conditions and their effects, soda ash should be introduced to other waters not containing it to prevent the formation of scale and its evils. The most notable example of such application of which I know is on the Wabash, where soda ash is added in the tub to all waters not containing it naturally in quantity slightly in excess of enough to remove the sulphate hardness. Beginning in 1914, this road was able to show a reduction of 96 per cent in flue failures and a decrease of 88 per cent in firebox renewals. The writer's own experience with a limited use of soda ash on two divisions, each of which had treated water at one terminal, where formerly considerable trouble had been experienced with leaky flues and fireboxes, showed a reduction of 70 per cent in failures on the road with no increase in washouts and no noticeable increase in priming tendencies of the boilers, and the boilers are reasonably free from scale. This was accomplished at a cost of about \$1 per 1,000 freight train miles.

Boiler compounds are numerous and of many kinds. For the purpose of this discussion they will be understood as meaning only those of reliable make and of national reputation, used for the prevention of scale. Such compounds consist of soda ash with small amounts of weak organic acids or other substances to hold the surface tension of the water. They have been in use more or less since the advent of boilers, and if applied in the proper quantity and used commonly as directed they will keep boilers reasonably free from scale. In doing this, they largely prevent leaky flues and leaky fireboxes since these conditions are usually caused by scale. On a division which came under the writer's observation, where a boiler compound was used in accordance with the manufacturer's instructions there was a reduc-

tion of 60 per cent in boiler failures, a decrease in the terminal boilermaker forces, and engines were turned and dispatched with less loss of time. The cost was \$3 per 1,000 freight train miles. Boiler compounds are expensive and roads employing chemists cannot afford to purchase such materials when soda ash can be used at about one-fourth the expense with greater efficiency and good results. Those roads that do not employ a chemist or have no one in charge of water treatment and directly responsible for the work, can often use boiler compounds purchased from reliable manufacturers to advantage. The reliable manufacturers have experts who follow the use of the compound and obtain results. This service is, of course, added to the cost of the compound and is one of the reasons for its being so much more expensive than chemicals purchased in the open market.

Water treating plants are expensive to install and to operate. They have the advantage over other methods because they remove 80 per cent of the scale-forming solids from the water. This reduces the amount of blowing down necessary on the road and the priming tendencies of the boiler. The water consumed at terminals is a large part of the total, and the water at those points should have first attention. Where the water there needs treatment, it is important to treat it by the most efficient methods. Usually this can best be done by installing a treating plant. Since a treating plant represents a considerable outlay of money, its design is a matter that must be given careful attention so that it will deliver a water uniformly treated and properly clarified of the resultant precipitate for delivery to the locomotives.

At stations between terminals where the incrusting solids are not high and comparatively small quantities are taken, the water can often be treated with soda ash more economically than by other methods, the soda ash being fed to the storage tank by a small auxiliary pump, the character of the pump depending on the methods of pumping the water. The soda ash costs less than 2½ cents a pound and no additional expense is incurred in labor applying it. The cost of apparatus to feed soda ash usually does not exceed \$150 per station. A distinct advantage is gained by feeding the soda ash into wayside tanks as compared with its use in the tender, since it usually gives the time necessary for chemical reaction before entering the boiler. The responsibility for application is placed upon the pumper where it is more easily supervised.

It should not be many years before even on roads of very light traffic it is universally understood that hard scale in a locomotive boiler is an extravagance not to be tolerated. More important than the costs ordinarily figured as due to bad water is the consequent uncertain road performance.

R. W. CHORLEY,
Mechanical Inspector, Pennsylvania System Southwestern Region

Will Religion and Railroadng Mix?

CONCORDIA, KANSAS.

TO THE EDITOR:

Will religion and railroadng mix?

Carlyle has said: "It seems to me a great truth, that human things cannot stand on selfishness, mechanical utilities, economics, and law of courts; that if there be not a religious element in the relations of men, such relations are miserable, and doomed to ruin."

Does our present situation in the railroad world demonstrate Carlyle's seeming great truth?

I have taken the privilege on several occasions during the past year, at our class and safety first meetings, of trying to inject this idea; some claim it would be a fine thing if—others say it will not work. To my mind there are no ifs or will nots in it; it has been a demonstrated fact in other industries, why not railroadng?

I would like to know just what per cent of railroad men are proud of their calling and take into it the spirit of the brotherhood of man, instead of the brotherhood of crafts; it seems to me that our railroads are brotherhooded to death, except the right kind of brotherhood. Is not the lack of this spirit, as taught by the Man of Galilee, the reason that railroad men as a class are looked upon by the general public as a lot of roughnecks?

At our class meeting I read the communication from "An Old Railroader" in the December 3 issue of the *Railway Age*, and made this statement: "If we could Christianize this division of this railroad system it would be but a little while until the eyes of all other divisions would be turned this way to see what was happening."

The Christian religion is the biggest business in the world today, and I believe railroading is the next; the two combined would make a force so great that the kingdom would come before some of us were ready for it, for every man in the employ of the company from the president down to the track walker would be an evangelist to the community, and a booster for the railroad.

This may all seem visionary, but who ever did anything without a vision. When one looks at the bigness of it, he is tempted to exclaim, "Oh Lord, how long!"

TRAIN DISPATCHER.

Cut Out the Knocking

GREENVILLE, TEXAS.

TO THE EDITOR:

As an introduction to what I wish to say, I quote the following from Elbert Hubbard:

"If you work for a man, in Heaven's name work for him. If he pays you wages that supply you bread and butter, speak well of him—stand by him and by the institution he represents. If put to a pinch, an ounce of loyalty is worth a pound of cleverness. If you must vilify, condemn and eternally disparage, why, resign your position, and when you are on the outside, damn to your heart's content. But while you are a part of the institution do not condemn it; if you do, you are loosing the tendrils that hold you to the institution and the first high wind that comes along you will be uprooted and blown away and probably you will never know why."

The habit of knocking seems to be second nature with most railroad men. I have been in the business a long time and have worked in a good many division points for various railroads; but it is the same wherever you go. When not finding fault with a brother workman in our own line, such as trainmen and enginemen, we have serious complaints to make about the "boneheaded" dispatcher, the chief dispatcher and nearly all the minor officials. We also take a fall out of the management, and wind up by telling how the railroad should be run.

I often wonder why so many of us have gone so far through life, and have not been picked up to manage some large railway system. The directors are certainly letting some high class talent get away from them. Many of us are wise enough to tell them how to run the railways for profit, even in these dull times, and never cut the forces.

There are men that we work with that are as different in their line of work as white is from black; some men are strictly first-class in their line of work; some about the average, while others just get by and yet are equally paid for the line of service they perform. Railway managers are not alike either, but each one has to make a creditable showing or he won't last. Many of them have been connected with their company for years; others four or five years, and I have known of cases where they wound up their career in less than a year.

When one of them fails to be a financial success or is unwilling to play the game fair, he is asked to resign. (A privilege given to distinguish them from an ordinary workman.)

As for our minor officials, they too have to make a show-

ing. If they are not as efficient as their predecessors, or cannot show some improvement over them, they do not last long. So why should we always be condemning them for doing their duty? We might as well find fault with an officer of the law for doing his sworn duty. In nearly every case these same officials were one day in our ranks and we should gladly help them make good. If the men that do not suit us were removed at our request, we would be forever working for a new boss, and if there is any one thing that will disrupt the service, or injure the organization, it is the continual changing of officials. For these reasons I do not think we should be always fault finding.

If we are to make our best records, it will be with the co-operation of our officials and not by antagonizing them—neither will it be under new men whom we do not understand and whose ideas of good railroading are unfamiliar to us. The good officials of any large concern are like good teachers; they are judges of human nature, they know how to handle men so as to bring out the best that is in them. Such officials rarely have trouble with their men.

Railway employees are not disloyal—they are generous to a fault and the better side of their natures is easily reached, but the old worn out customs have got most of them. They will knock; when they meet in bunches they air out their troubles, and in doing so they often say more than they really mean.

They oftentimes speak disrespectfully of the officials of the company they work for; there are always outsiders who prove to be good listeners and go away with the impression that we railroad men are terribly mistreated and in many cases they think we are working for a lot of slave drivers. Since this impression is false it not only hurts railway business, but also the individual. Let us get out of this habit of knocking—get on the other side of the fence—let us try boosting awhile. It will not only help business and make us feel better, but also the men we work for will not appear as heartless as we thought.

Everything is changing so why not change this bad habit for a good one? If we cannot do this, but feel that we must knock, I would suggest we memorize the following:

"We would have less worldly clamor
And more roofs to shield our 'domes'
If the fellow with the hammer
Used it in constructing homes."

P. CAIN,

Dispatcher, M. K. & T.

A Correction

IN THE editorial, entitled "Present Cost of Living, Wages and Rates," in the *Railway Age* of February 11, it was shown that according to a recent report of the Bureau of Labor the average cost of living in the United States in December, 1921, was 47 per cent higher than in December, 1916. The following comment was made upon this figure:

"This is the lowest figure for cost of living that the Bureau of Labor has reported since before the war in Europe began."

This statement is erroneous. The cost of living, as shown by the Bureau of Labor's report, was about 70 per cent higher in December, 1921, than in December, 1914. The statement should have been that this was the lowest figure for cost of living at the end of any year since 1917.

THE ALABAMA, TENNESSEE & NORTHERN, operating 186 miles of road and running (on the average) a freight each way six times a week and a passenger train each way seven times a week, reports, for the year 1921, that every train crew completed every trip within 16 hours, leaving nothing to report to the government under the Hours of Service Law.



View of the Bridge Just After It Was Opened for Traffic

A New Development in Bascule Bridge Design

Old Wabash Swing Span Over River Rouge Was Replaced by a
New Structure on January 26

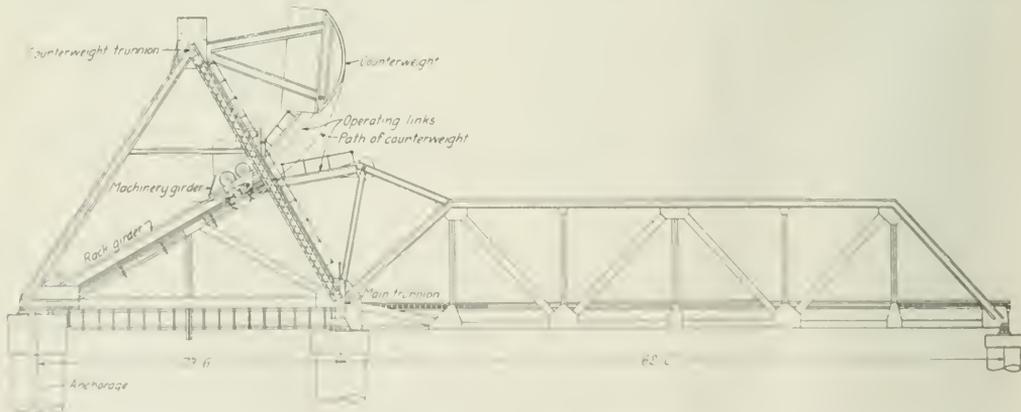
ON JANUARY 26 a bascule bridge of an entirely new design was placed in service at the Wabash crossing of the River Rouge at Detroit, Mich. The bridge comprises a single leaf span of 162 ft., a tower span of 73 ft. 6 in. and a deck girder approach span of 53 ft. 2 in. It replaces a double-track swing span which would not fulfill the requirements of a statute passed by Congress in 1917 providing for the improvement of the River Rouge to afford a waterway 200 ft. wide with 125 ft. clear openings at

(1) A plan prepared by the engineers of the Wabash of a bascule bridge with a counterweight attached to the bridge.

(2) A bascule bridge invented by C. G. E. Larsson, assistant chief engineer of the American Bridge Company of New York, which required no counterweight and which was operated by combined pneumatic and hydraulic machinery.

(3) A Strauss bascule bridge.

(4) The Cummings type, patented over 20 years ago and since expired, was proposed by the American Bridge Company, but Mr. Cunningham would not accept this unless so designed



General Elevation of the River Rouge Bridge

bridges. This same project was responsible for a similar replacement of the Michigan Central bridge over this waterway, completed some time ago.

The selection of the type of structure was made after a consideration of four designs of bascule bridges and a vertical lift span. The designs considered and the conclusion reached by A. O. Cunningham, chief engineer of the Wabash, under whose direction the design and construction of the bridge were carried out, were as follows:

that the counterweight was attached to the moving leaf by links. After making a thorough study, the American Bridge Company finally submitted a design, which met these requirements and which is now known as the "Abt type." The design so submitted being acceptable, the contract for the superstructure was awarded to the American Bridge Company.

In this type of bascule bridge the counterweight is suspended from a trunnion located at the apex of a triangular-shaped counterweight tower. The linkage mechanism by

which this counterweight is connected to the bridge span is a novel part of the design, giving to the contra-rotating counterweight the same angular velocity as the span. Expressed in other words, this means that the angle between the horizontal (or vertical) and the line connecting the pivot with the center of gravity of the counterweight is always identical with the angle between the horizontal and a line connecting the main trunnion with the center of gravity of the leaf. One of the links acts as a strut supporting the counterweight while its fellow is a tension member connecting it to the movable leaf.

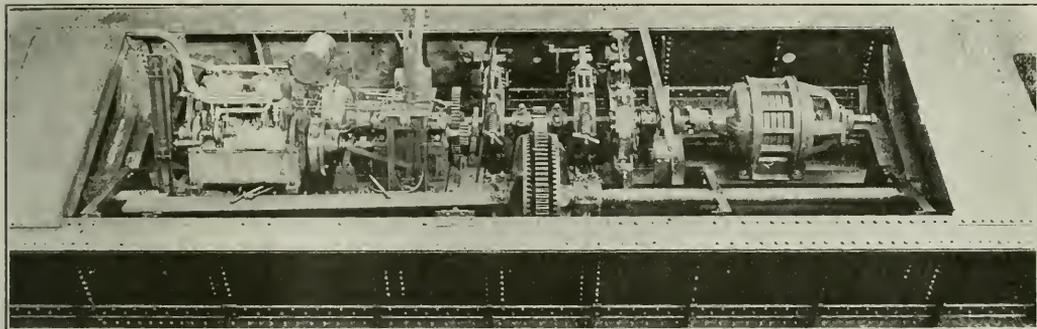
The counterweight consists of a basket of structural steel filled with concrete and suspended from the counterweight trunnion by stiff hangers. This basket is enclosed on all sides, except on the side toward the pivot. This form of construction has the advantage, therefore, that it may be erected in the hanging position by a locomotive crane without

entirely independent of the brakes to the motor shaft. All the brakes have been designed to set slowly and to release quickly.

The air for the brakes is supplied by a compressor rated at 25 cu. ft. of free air per minute, with a governor to insure uniform pressure. The bridge is operated by remote control from an operating house located south of the bridge, which also contains the interlocking machine.

The masonry supporting the A-frame and main trunnion consists of four cylinders 12 ft. in diameter sunk to rock by the pneumatic process and connected crosswise of the bridge by a pier and abutment resting on the cylinders. The rest pier is of concrete extending below the bed of the river and supported on piles driven to rock.

The new structure was erected in the open position so as to clear the old swing span. When the new structure was ready for service, operation of trains across the bridge was



The Operating Machinery Assembled in the Machinery Girder

the use of any falsework. Also the necessary concrete may be poured inside the structural steel basket without the aid of any forms.

The bridge is operated by machinery mounted on a cross girder of structural steel which travels up and down two inclined members equipped with racks. This cross girder is joined to the compression and tension links at their common pivot.

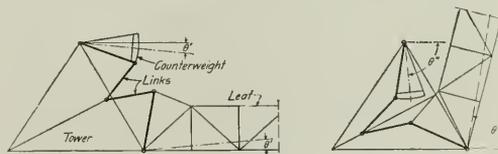
The machinery required for operation was assembled complete inside the girder at the shop and subjected to tests before shipping it to the site of the bridge. This arrangement greatly reduced the amount of assembly work necessary at the bridge site.

The main power equipment of this bridge comprises two 100-hp. electric motors operating on three-phase, 60-cycle, 440-volt alternating current. Either of these motors is capable of operating the bridge alone and is connected to the operating shaft by separate clutches, the object being to use these motors alternately, thereby giving greater assurance that one motor will always be in working order. To allow for failure of electrical power, a 58-hp. gasoline engine is provided as an auxiliary unit. The power equipment has been geared so that either of the motors will open or close the bridge in less than 1½ minutes and the gas engine in about eight minutes.

Each electric motor has a solenoid brake for full torque, one of these brakes having an attachment to transform it to a hand brake if the gasoline engine is to be used. On the motor shaft an air brake has been installed for full torque of the two motors; also two emergency brakes entirely independent of the machinery, arranged to grip I-beams attached to the inclined girder. These brakes can develop 175,000 lb. holding power and are supplied with air from a line

abandoned for a period of about eight hours during which the old span was shifted sidewise on falsework, the new approach span was erected for one track and the rest pier put in condition to receive the new span which was then placed in the open position. During the time that the bridge was out of service, one or two through passenger trains were detoured over other lines, while service for local passenger trains was maintained by hauling passengers between Detroit and the site of the bridge in motor buses.

The bridge was fabricated at the Gary plant of the American Bridge Company with Albert Reichmann, western division engineer, in charge. The erection was under the direc-



Relation of Parts in the Open and Closed Positions of the "Abt Patent" Bascule

tion of James L. deVou, Pittsburgh division erecting manager of the American Bridge Company. The electrical, air and gas engine equipment was furnished and installed by the Norwood-Noonan Company of Chicago. The substructure including all foundation work was done by the J. W. McMurry Contracting Company, Kansas City, Mo., this contractor also removing the old masonry. A new electric interlocking plant is being installed by the Union Switch & Signal Company.

Should the Cost of Treating Ties Be Charged to Maintenance?*

By Earl Stimson

Chief Engineer Maintenance, Baltimore & Ohio

A RAILWAY'S FUNDS can be obtained either from moneys earned or from moneys borrowed. The relative durability of these ways from the railroad standpoint depends upon the degree of prosperity of the road or the state of its credit. If the earnings are large, it is desirable to put a portion back into the property and in what better way can it be returned than to invest in treatment for prolonging the life of ties. If the earnings are low, resort to capitalizing of the excess cost of the ties due to the treatment would be a means of meeting the expense, as the road of low earning power would likely have poor credit and consequently difficulty in securing the necessary funds.

The manner of providing for this expense, however, has been prescribed by the Inter-state Commerce Commission. Under Account No. 8—Ties, of the Classification of Investment in Road and Equipment, Issue of 1914—we find in this connection, mention made only of including "the excess cost of metal ties used in repairs of track over the cost to replace in kind wooden ties removed." Under Account No. 212, Ties—Classification of Operating Revenue and Operating Expenses of Steam Roads, Issue of 1914, we find—"This account shall include the cost of cross, switch, bridge and other track ties used in the repairs of tracks." Note B under this account states that, "the excess cost of metal ties applied in the place of wooden ties over the cost at current prices of replacing in kind the wooden ties removed shall be charged to road and equipment account No. 8, Ties."

While no specific mention is made of treated ties, it is plainly evident that the commission does not consider the treatment of ties a "betterment" in the sense in which that word is defined by the commission. Such definition is given as: "Betterments are improvements of existing facilities through the substitution of superior parts for inferior parts retired, such as the substitution of steel-tired wheels for cast wheels under equipment, the application of heavier rail in tracks, and the strengthening of bridges by the substitution of heavier members. The cost chargeable to the accounts of this classification is the excess cost of new parts over the cost at current prices of new parts of the kind retired."

The argument may be put forth that if the substitution of a metal tie for a wooden tie is a betterment, why is not the substitution of a wooden tie which has had the length of its serviceability increased by chemical treatment also a betterment? This may be answered by stating that there is no reason why the treatment should not be classed as a betterment, as the treatment undoubtedly makes the treated tie superior to the untreated tie, as far, at least, as its life as measured by its resistance to decay is concerned. On the other hand, it may be answered that there is sufficient reason why the treatment should not be classed as a betterment. In the case of the metal tie substituted for a wooden tie, there is unquestionably a substitution of a superior part for an inferior part, as the tie is made of a radically different and structurally superior material.

The commission evidently considers a wooden tie as a wooden tie, whether of soft or hard wood—whether untreated or treated. A wooden tie structurally is no better after treatment. It will carry no greater load and will not hold the spikes better. Under severe usage it will resist rail and spike cutting, and other forms of mechanical wear, no better unless specially protected with tie plates and screw spikes at considerable additional expense. Under very severe usage the treated tie is destroyed as quickly as the untreated tie. The

increase in the length of life of the treated tie is the only point upon which its superiority can be based. The same point can be raised in favor of the white oak or long leaf yellow pine tie, substituted for a red oak or short leaf pine tie.

There are many kinds of treatment, varying widely in cost and effectiveness, the effectiveness not always being in direct ratio to the costs. The effectiveness of treatments varies also with the kinds of wood. It is difficult after a few years to identify a tie being removed from the track as a treated or untreated tie, and if the former, the process of treatment used, unless a very elaborate record and method of marking for identification is initiated concurrent with the authority to charge the cost of treating to investment in road, that is to capital account. Otherwise it would be impossible to separate the charges accurately.

The rapid rise in the price of timber has increased the price of the tie in much greater proportion than the cost of treatment has increased. Less expensive treatments that have been found adequate, are being used more and more in place of the more expensive treatments formerly considered necessary. The result has been that the ratio of the cost of treatment to the price of the tie has decreased greatly, making the use of treatment not only show greater economies but also reducing the proportion that the excess cost of treatment bears to the total cost of the treated tie. This should in itself stimulate the use of treated ties and not make necessary resorting to the doubtful expedient of capitalizing.

The steady increase of the use of treated ties, until now a large percentage of the ties used are treated, rather nullifies the idea that the present method of charging out the cost of treatment to maintenance is preventing a more liberal use of treated ties. Nor does it appear that charging to investment in road—that is capitalizing—the excess cost of the metal tie has brought about the extensive use of that tie, or made it even a competitor of the treated tie. Millions of treated ties are used to thousands of metal ties.

The writer has treated this subject not from the standpoint of the accountant or the financier, but rather from that of the maintenance engineer. He has cheerfully taken into his maintenance costs the expense of treating some 12,000,000 ties to date. He is even now reaping to no inconsiderable extent the full benefits of the price paid. He is not and will not be compelled throughout all time to give up some portion of those benefits in the payment of interest charges, or in other words, to pay tribute to capitalizing. The writer favors the present practice of charging the cost of treating ties to maintenance.



Photo by Underwood & Underwood

A Scene in Trieste

*A paper read before the annual convention of the American Wood Preservers Association at Chicago, in January, 1917.

Further Testimony on Merits of Form 19 Order

The Conscientious Dispatcher—Views of a Dozen Competent,
Experienced Observers—Money Saved

By Edgar W. Weston

Inspector of Train Dispatching, Northern Pacific Railway

WHEN I WROTE the article which was published on December 3 about Form 19, I had not seen Mr. Forman's letter in the *Railway Age* of October 8, or Mr. Nichols' in the issue of October 15. I cannot bring myself to agree that dispatchers should be allowed to instruct operators to clear the order signal so that trains for which there are no orders may pass. Decidedly, it would be a violation of the rules and should not be countenanced.

Now, allow me to put myself in the position of what Mr. Nichols calls the "over-zealous train dispatcher." He will say, no doubt, that when I conceded two occasions where signatures should be required I was trying to hedge. I am inclined to take the position that in even those two cases a plan can be devised which will insure delivery of a 19 form, and the train dispatcher be assured of the fact, without taking signatures. For the present, however, let it go, with the understanding that when delivered at a non-telegraph office restricting orders must be signed; also when the train has already passed the train order signal.

The train dispatcher is never immune from responsibility for the delivery of a train order. Where Form 19 with a clearance is used the dispatcher must know that all orders for the train are included when the operator gives him the order numbers and he approves them. If he does not use the same care in this that he does in recording and checking the signatures given him for 31 orders, he is not a reliable dispatcher. The unreliable train dispatcher, when he has a 31 order out for a train that he is anxious to keep moving, will say to the operator: "Conductor Jones is on No. 51. Sign up and keep them going." Thus he encourages and expects the operator to violate rules by signing the conductor's name, securing "complete" and handing it up to the passing train as if it were Form 19.

As to the work extra between B and D, which the dispatcher wants to have protect itself against an extra after a specified time, he surely will not put out either a 31 or a 19 restricting order for the work extra if the train is so situated that delivery of the order is uncertain. When the work extra comes to a point where an order can be delivered and the delivery is accomplished why is not Form 19 just as safe? Until then the extra will not, of course, be permitted to enter the work extra's limits, no matter which form of order is used. The same is true when it is desired to annul the work order of the work extra.

There is no argument for Form 31 in the two paragraphs where Mr. Nichols calls attention to reducing a time order and giving an extra right over all trains. As the train dispatcher must know that the restricting order is delivered, be it Form 31 or Form 19, before allowing the inferior train to enter the restricted territory, why insist upon Form 31 when the dispatcher is more certain of delivery by using Form 19 and a clearance?

If a restricting order, Form 19, is out for delivery, at the point of restriction, the rules require that the train order signal be displayed at "stop." If the engine man should pass this signal without stopping, or the operator hand up the restricting order before the train is stopped both violate a rule, and give evidence of a lack of proper supervision. Thus far, have I hedged, or clouded the issue?

Surely, Mr. Nichols will not accuse superintendents of being over-zealous when they advocate the exclusive use of Form 19 or say that it is because they wish to lessen their own responsibility. I believe he will admit that it is because they want to improve operating conditions. Let me quote expressions from a number of superintendents as to what they think after nine years' experience. Not all of these superintendents are ex-train dispatchers.

Views of Northern Pacific Superintendents

A—"The use of Form 19 for restricting the rights of trains has been in use about 10 years, and I cannot recall an instance of where hazard could be charged to such use. This use is a great help in keeping trains moving, especially in extremely cold weather. When Form 31 was used for restricting rights, it was nothing unusual during the winter months to have trains freeze up before getting started again."

B—"To use Form 31 on this division would mean more expensive operation in loss of time, more fuel consumed, and in cold weather many tie-ups, because of the 16-hour law. As a safety proposition, I believe the 19 order is fully as safe as the 31."

C—"I do not know of any case where hazard has been created that could be chargeable to the use of the 19 order. The greater hazard is with the 31 order. There have been more cases of trains leaving stations without their orders where the 31 is used. The delay incident to the use of Form 31 is not tolerable; it means stopping trains and waiting for conductor to sign the order, dispatcher to complete it after signature is transmitted, then clearing the train."

D—"I do not recall any instance where hazards could be charged to the 19 order. By using this form we do away with the stopping of trains, thereby eliminating the chances of breaking in two, and expedite movement by not requiring them to stop."

E—"The strongest argument in favor of the use of Form 19 is the saving of time and expense caused by stopping trains to sign restricting orders. I believe that we could not handle the same volume of business using Form 31. I do not remember a hazard chargeable to Form 19 being used in this manner."

F—"I do not recall any hazard chargeable to the 19 order. After a good many years' experience with Forms 31 and 19, I wish to go on record as saying for all purposes Form 19 has proved its worth as a time and fuel saver. Its abuse has only been caused by excessive speed and failure on the part of certain employees to confine themselves to rules in connection with the operation of train order signals at the caution position."

G—"There has been no instance in my recollection where a hazard of accident has been created, because we use the Form 19 in place of the 31. There would be a very considerable increase in the time of men on duty if we used the 31 form, because it means the stopping of long freight trains for the conductor to sign the order and then take it to the engineer for delivery."

H—"I cannot recall any case where a hazard or near hazard could be attributed to the use of Form 19. It is not good practice to stop a 99-car train and expect the conductor to walk from the rear to the station and sign a 31 train order, when the same result can be obtained by the use of a Form 19 with equal safety."

I—"I have never felt that a train order signal is any more effective when displayed for a 31 order than when displayed for a 19 order. To go back to the 31 order would mean expensive long delays to our freight trains. I do not know of any hazard that has occurred from the use of Form 19 as we are now using it."

J—"It seems to me the best argument for the 19 order is the fact that we have safely operated for a good many years with it. I do not know of any hazards under the 19 order, except those which are due to conductors and engine men overlooking or forgetting their orders. It seems to me that they will forget a 31 as quickly as a 19."

K—"Since we began using Form 19 orders, I know of no hazards that can be charged to this form. It is certainly a great time saver in getting trains over the road, particularly our long freight trains. We are handling many freight trains of from 90 to 99 cars, and if these trains were required to stop with the engine at the train order signal and the conductor required to walk 99 car lengths from the caboose to the office to sign a 31 train order, it would cause a delay of from 15 to 30 minutes to such trains, and would cause congestion on a busy piece of single track."

If the train dispatcher is obliged to use Form 31, he will endeavor to avoid extra stops by placing the order where the train stops for coal or water or makes regular station stops. If, in doing this, he has the order delivered too long a time before it is to be executed the chance of a hazard

is increased, because the conductor or the engineman is more likely to overlook an important part of the order than if it were placed close to the point of execution. Of course neither form of order should be condemned because someone forgets or disobeys the rule, but the form that will reduce the chance for hazard should be used.

Where Form 31 was used two hazards occurred which anyone must admit would probably have been avoided had Form 19 been used. A schedule order on Form 31 is addressed to No 20 at G——. The conductor comes to the telegraph office, signs the order, then goes outside, intending to return for the order when it is completed. For some reason he forgets it, gives the engineman the signal to go and the train leaves, both conductor and engineman overlooking the train order signal at "stop."

In another case a meet order is put out on Form 31 to No. 870 at B——. The train passes the order signal at "stop" to do some station switching. As soon as the switching is finished, No. 870 pulls out without the conductor's having returned to the telegraph office to sign and receive the completed Form 31 meet order. In both cases had the restricting orders been on Form 19 instead of Form 31 the operator would have been out on the platform and would have delivered the orders when the train passed the telegraph office.

The Superintendents' Experiences

As giving a little more reality to the quotations which I have made from the statements of our superintendents I may be permitted to comment briefly on the locations and circumstances which constitute the background of their utterances. The paragraphs are lettered to correspond with the quotations.

A—When this superintendent was a dispatcher it was considered that Form 31 was the only safe order to use in restricting rights. His division has 204 miles of main line and 117 miles of branches, with a traffic movement characteristic of a trunk line leading out of a large city.

B—This superintendent was a train dispatcher when only Form 31 was used for restricting purposes. His division has 360 miles of main line and 112 miles of branches. There are two dispatching districts, and during portions of the year the main line traffic is very dense. Through the winter months there is plenty of snow and severe cold water to contend with.

C—This division has 100 miles of main line, parts of it double track because of dense traffic, and 271 miles of branches. Train movement on both main line and branches is particularly heavy during the months when grain is moving. The superintendent is neither an ex-train dispatcher nor a conductor.

D—This is another division with its mileage in the northwest wheat region which provides very heavy traffic, while the wheat is moving, in addition to the usual through traffic. There are 106 miles of main line and 671 miles of branches. The superintendent is a former train dispatcher of more than ordinary ability.

E—This is from a former train dispatcher, now superintendent of a heavy mountain division where only the very best and safest methods of operation should be used. It has 346 miles of main line and 327 miles of branches.

F—This comes from the superintendent of another heavy division in the Rocky Mountains, 331 miles of main line and 223 miles of branches. He has never been a train dispatcher or conductor, but his experience makes him competent to say what is safe operation for any division.

G—This is a division of 293 miles of main line and 384 miles of branches, with heavy traffic on all of it. The superintendent has had experience as a train dispatcher and as conductor.

H—This division has 303 miles of main line and 373 miles of branches, and in addition to taking care of a heavy through traffic is in the heaviest fruit and wheat region of the west. The superintendent is a former conductor of many years' experience.

I—The division is 317 miles of main line and 140 miles of branches leading two ways out of a large city to and over the Cascade Mountains. The superintendent has had wide experience as a train dispatcher and in other capacities on both main line and branches.

J—The division has 44 miles of main line and 80 miles of branches through a portion of the Northwest where the casual and varied weather makes the train dispatcher's operation difficult. This man has never been a train dispatcher.

K—This is a division with 40 miles of branches and 103 miles of main line, double track and dense traffic. The superintendent is a former train dispatcher and is well up on the committee that formulated our present book of rules.

Value of Time Savings With Freight Trains

I think I have proved the safety of using Form 19 for restricting the rights of trains. What more does it mean

to a busy division? I recall a division 140 miles in length where westward freight trains are unavoidably delayed from two to four hours from the time the crew is on duty until departure from the terminal. As a result in the winter months the margin for reaching the farther terminal inside the 16-hour limit is very small. If the average daily number of these trains were 15 (and frequently it is many more), and we had to use Form 31 instead of Form 19, a train making a trip over the division would ordinarily be stopped not less than five times on purpose to sign an order. Each stop would result in a delay of 30 minutes or more—a total delay of two hours and thirty minutes to each train. Because of this at least eight of the fifteen trains would have to be tied up before reaching the terminal to avoid violating the 16-hour law.

The reader can figure for himself what this means in additional expense to the eight trains, as well as the cost of overtime imposed on the other seven trains that were able to scratch into the terminal within the 16-hour limit. On other divisions the average number of tie-ups is not likely to be so great, but on 12 divisions I believe there would average for three months of the year two tie-ups or their equivalents, sending out relief crews, the daily unnecessary expense of 24 trains delayed and tied up because of using Form 31.

A careful check made for three days on four divisions gives the information that, had they been using Form 31, 20 trains on each division every 24 hours would have made otherwise unnecessary stops. Five such unnecessary stops for each train would be a fair average over the division. Thus, the use of the 31 order on these divisions would result in 100 unnecessary stops per day on each division. A train so stopped consumes, in getting under way again, from 800 lb. to 1,500 lb. of additional coal. If we say the average per train for each stop is 900 lb., we should have a total of 45 tons for each division; or for 12 divisions 540 tons of additional coal consumed daily.

If the average cost of the coal is \$4.66 a ton placed on the dock it means the tidy sum of \$2,516 spent daily without an adequate return.

MEDICINE HAT, ALBERTA, makes flour, and its mills report that they have shipped 1,760 tons of flour to Europe, which is moving via Vancouver and the Panama Canal. They have yet to ship by that route 2,498 tons. The mills have also shipped 80 tons of flour to China and expect to send 300 tons more. Medicine Hat is 818 miles east of Vancouver.



Southern Railway Block Signal Station, Copper, Virginia

The I. C. C. General Rate Investigation

Frank J. Warne Testifies for Railroad Labor Organizations— Additional Testimony on Behalf of Shippers

WASHINGTON, D. C.

FRANK J. WARNE testified before the Interstate Commerce Commission at the rate hearing on February 10 and 11 as an economist representing the railroad labor organizations. He was introduced by Glenn E. Plumb, who acted as his counsel, and read a list of 17 organizations on whose behalf he said he appeared, without calling attention to the fact that the Brotherhood of Railroad Trainmen was not included. The commission had set aside two days for testimony on behalf of the labor organizations, and as Mr. Warne was the only witness he received the full time.

Mr. Warne stated that the employees did not appear to advocate either a reduction or an increase in transportation rates. With rates as rates the employees are not concerned, he said. "They do not believe their wages should be affected whatever the decision of this commission. They believe there is no economic law that establishes any relation whatsoever between rates as such for transportation and rates of wages for services performed."

Mr. Warne submitted as exhibits numerous charts and statistical tables such as he had used in his more protracted testimony recently before the Senate committee, but he found the commissioners somewhat more critical of his peculiar methods of handling statistics than were most of the senators. The questions asked and the expressions on the faces of the commissioners indicated amazement and at times amusement at some of the claims made by the witness. Frequently he replied to demands for explanations by promising to come to that point "later." His statistics and charts proved, he said, that in 1920 operating revenues increased by a much greater amount each month from May to September than did compensation to employees, notwithstanding there was no change in the transportation rate although the rates of wages were increased. From October to the close of the year, he claimed, operating revenues decreased notwithstanding a large increase in the rates, while total compensation to employees decreased due to a less number being employed. He also showed how operating revenues decrease in one period compared with another, although the transportation rate remains the same.

The railway employees' participation in the present rate case, Warne said, was due to the claim of railway executives, "in alliance with large corporation shippers," that a wage reduction must precede a rate reduction. He quoted from Senator La Follette's speech in the Senate last December regarding the alleged agreement between certain representatives of the railroads on the one side, and steel, coal, lumber and other producing and manufacturing interests and farm organizations on the other. This understanding between these interests, the speech said, provided for a reduction in the wages of railway employees. It was to oppose and to prevent, if possible, "such an uneconomic solution of the railroad situation" that the employees appeared before the commission, the witness said.

Commission Wants Facts

If the agreement resulted in a reduction in the wages of railway employees, Warne claimed, the economics of railway operation were such that there could very easily result, and under conditions of early future increases in volume of traffic there would likely result such an increase in total operating revenues as to cause the reduced rate to produce an even larger total operating revenue than resulted from the higher rate. So that at the same time they claimed credit for the

reduction in the transportation rate, the railroad corporations would actually be receiving larger revenues, while the employees were receiving the lower wages.

When Mr. Warne read from a newspaper story quoted by La Follette, saying that the railroads and the shippers at the meeting on December 9 had agreed to "bury the hatchet;" Commissioner Aitchison asked if he thought the present proceedings bear out that statement, and Commissioner Hall interrupted to say that so far as the commission is concerned the witness might dispense with newspaper articles and Senate speeches. "We want facts," he said, "and you may confine yourself to what you know of your own knowledge."

Mr. Warne said he was trying to establish the fact that the railroads and shippers have agreed to try to reduce wages. "Is this commission not interested in agreements made outside affecting rates and wages?" he said. "If you were present or have authentic copies of the agreements or the minutes you can present them," said Mr. Hall, "but this commission will not be swayed by speeches and newspaper articles." Mr. Warne then omitted further reference to Senator La Follette's speech.

Mr. Warne attempted to explain the increased proportion of the wage bill to total operating expenses by saying that the greater part of the cost of utilizing a greater percentage of the capacity of the railroad plant is naturally labor cost. He presented a chart which showed a sharp increase in the operating expenses other than compensation about August, 1920, which he explained by saying it was due to the fact that August was the last month in which the railroads could get in their estimates of expenditures before the close of the guaranty period.

Commissioner Aitchison asked if the cost of moving trains of empty cars under the commission's emergency car service orders of 1920 did not have something to do with it, and whether the railroad plant was not so overloaded at that time the law of decreasing returns was in operation. He also cited the large increase in the cost of railroad fuel at that time, particularly in the case of railroads which had to purchase coal outside of their contracts during a runaway market. Mr. Warne preferred to believe that the railroads were crowding all possible expenses into the guaranty period, although he said he was not "questioning the motives" of the railroad managers.

Commissioner Esch asked the witness if he thought the railroads had put in an overestimate of their expense in the face of the provision of the law that required the commission to police the accounts and to readjust them if necessary in order to safeguard the treasury against the possibility of just what Mr. Warne had expressed. Mr. Warne replied that the reports were made by the roads in self-protection; they probably knew the amounts would be cut down, but they knew they would not be increased above their figures.

Discussing the proportion of each dollar of operating revenue that goes to labor Warne said that an increase in this is entirely consistent with an increase in the amount going to investment. For illustration he stated that "in 1915 labor received 41.5 cents out of every dollar of revenue, and in 1913 it received 43.1 cents out of each dollar. But in the latter year, with labor receiving 1.6 cents more out of every dollar than in 1915, there went to investment 104,515,602 more dollars in 1913 than in 1915.

"Widely published figures of railway executives give the proportions going to investment in 1920 as 1 cent out of each

dollar. The inclusion of the amount of the standard return increases this more than elevenfold—to 11.4 cents. For 1919 investment received 16.2 cents out of every dollar, instead of 8.8 cents, and in 1918 the amount going to investment out of each dollar was 17.6 and not 13.1 cents.

"The 11.4 cents out of every dollar that in 1920 went to investment, a relatively low return compared with 1919 and 1918 because of much greater maintenance expenditures in 1920 out of revenue, is equal to 105,528,216 more dollars than the 23.8 cents out of every dollar in 1915; it is \$127,-614,902 more than the 21.8 cents going to investment in 1914; it is even greater in total amount by \$80,148,666 than the 25.2 cents received by investment in 1912.

"The 16.2 cents in 1919 and the 17.6 in 1918 received by investment out of every dollar are \$223,419,659 more than the 23.8 cents in 1915. They are \$245,506,345 more than the 21.8 cents in 1914; \$188,040,109 more than the 25.2 cents in 1912. They are only \$78,348,467 less than the 29.1 cents in 1916, this latter standing for the largest proportion out of each dollar received by investment in any one of these years from 1912 to 1920.

"With labor receiving 53.6 cents out of every dollar in 1920, the largest proportion in any one of these nine years, there went to investment a much larger sum, not taking into consideration the large income to capital through excessive maintenance, than in either 1915, when labor received only 41.5 cents, or in 1914, when it was paid 44.1 cents, or in 1912, when the proportion of each dollar was 43.1 cents."

Criticising the statistical testimony presented by railway witnesses as to the rate of return on capital, Warne charged that the figures of their property investment account were very greatly inflated—that the amount of capital invested was considerably less than that upon which the roads claimed they should receive a return in interest and dividends. He also charged that the net operating income statistics of the railway witnesses were "highly deflated," particularly during the years of federal control.

Warne "Proves" the Rates Have

Increased More Than Wages

Mr. Warne produced a complicated series of statistics, estimates and assumptions on which he based the assertion that the average increase in freight rates from 1913 to 1921 was 113 per cent. "If this increase be applied to the total freight operating revenues for Class I carriers for 1913, the increase in freight revenue due to the 113 per cent increase would be \$2,420,434,318. The same percentage increase applied to the tons moved one mile for the calendar year 1920 shows freight revenue on Class I roads to have been increased \$3,341,205,503, assuming the same earnings per ton-mile as those of 1913." He did not say what the actual increase in earnings was, but after another calculation to show that the rate reductions made since 1920 amount to a very small percentage, he proceeded to contrast the freight rate increase with the increase in employees' wages.

First he quoted from a statement of the Railroad Labor Board to the effect that "from August, 1914, to December, 1917, the wage of railroad employees remained substantially unaltered." Then he referred to the increases made during federal control and by the Railroad Labor Board in 1920, and the reduction in 1921, but, he declared: "When an attempt is made to ascertain the per cent increase in the rate of wages of railroad employees from 1914 to 1921 almost insurmountable obstacles are encountered, partly owing to the innumerable classes of employees, changes in rules and conditions of employment which resulted in increases in pay, and also in large part to the absence of basic statistical data in the reports to the commission by the railroads of compensation and number of employees and so on."

In reply to questions by Commissioner Hall, Mr. Warne said no one could estimate how much the wage increase

made by General Order No. 27 of the Railroad Administration would amount to and he would not attempt to estimate it within a hundred million dollars. However, he said, the "highest estimate of the total percentage increase in wages from 1916 to 1920 for the entire country" that he had seen was stated as being 84.6 per cent in the testimony of J. G. Walber before the Senate committee. This estimate, he said, was for the engine and train service class of employees and was based upon "the inadequate statistics reported by the carriers to the Interstate Commerce Commission and also upon the inaccurate average annual compensation per employee."

Accepting for comparative purposes "even this exaggerated estimate," Mr. Warne found it to be the fact that the percentage increase in the rate of wages has been less than the 113 per cent increase in the freight rate, and "as the same percentage increase in wages is equal in amount of dollars to only one-half that of freight rates, it is clear that freight rates advances have been very much greater than wage increases over the same period. Freight rates alone have increased in amounts of dollars since 1914 from two to three times the increases in wages of employees."

"How do you get that?" asked Commissioner Hall. "You said you couldn't estimate the wage increase within a hundred million dollars; now are you going to give it?" Mr. Warne explained all over again that it was impossible to give the wage increase, but that he had used Mr. Walber's percentage for train and enginemmen to measure it, and that a given percentage of increase in wages is only about half as much in dollars as the same percentage applied to the payroll. "Do you see my point?" he asked.

"Yes, I see your point," replied Mr. Hall, "but it isn't so."

"Most assuredly these comparative percentage increases, and the increases in dollars since 1914, of freight rates on the one hand and wages on the other, justify the statement, as representative of the facts, that there can now be a considerable reduction in transportation rates without any decrease in the wages of railway employees." Mr. Warne continued: "Notwithstanding the long-deferred and quite moderate increases in wages granted the railway employees during and following federal control, part of which increases was taken away again in the July, 1921, wage award of the Railroad Labor Board, the great majority of employees on the railroads today are not receiving a wage sufficient to support themselves and their families in decency and comfort to the extent demanded of them by our democratic form of society with its republican institutions. Not only is this true in the face of intermittent employment and in many cases of complete unemployment, their present wage does not meet even their absolutely necessary fixed charges for food, clothing and shelter."

Increases in Payroll Due to

Other Factors Than Wage Rates

Mr. Warne then proceeded to demonstrate that the railroads have overstated the increase in wages by \$1,250,000,000. He enumerated 11 different items, among which were the inclusion of officers' salaries and employees whose compensation is chargeable to capital account, the increased number of employees on account of increases in business, overtime payments, etc., which he said do not represent increases in wages. He replied in the affirmative, however, when Commissioner Hall asked if the money was not all paid by the railroads and paid to the wage earners. Upon further questioning Mr. Warne gave figures for the amount of most of the 11 items, which, however, footed up some \$300,000,000 short of the billion and a quarter he had given as the total. He said some of the remaining items had been estimated and promised to file the working sheets later.

Mr. Warne was cross-examined briefly by F. H. Wood.

commerce counsel of the Southern Pacific, who said he would rather curtail the cross-examination than the witness' statement if he had anything more to say. Referring to Mr. Warne's attack upon the property investment accounts of the railroads on the ground that they were largely swollen by investments in affiliated companies, Mr. Wood asked M. O. Lorenz, director of the commission's Bureau of Statistics, to give the numbers of the accounts which are included in the commission's report of property investment. He then had Mr. Warne read the description of these accounts from the commission's report form to show that the investments in affiliated companies are not included.

Mr. Warne had also testified that the railroads had overestimated their back wage payments in 1920 and had charged \$146,000,000 to their monthly expenses on this account, whereas the commission's quarterly report of compensation showed only \$102,000,000 of back pay. Mr. Wood showed after numerous questions that the \$102,000,000 applied only to the second quarter of 1920 and that the remaining \$44,000,000 was not shown in the third quarterly report as back pay because it was paid during August and September for service during July and August and was, therefore, not back pay with reference to that quarter.

Mr. Wood asked Mr. Warne if he would agree with the statement he had quoted from the Labor Board that wages were substantially unaltered from August, 1914, to December, 1917. Mr. Warne said it was true so far as "any flat out and out increases" were concerned, although there were some increases "for competitive reasons." Mr. Wood then asked the witness to read from a statement showing the average compensation per employee in 1914, 1915, 1916 and 1917. Mr. Warne declined to do this without giving an explanation of the "absolute inaccuracy" of the average annual compensation and said he had not sufficient time to make the explanation. He did say, however, that the commission's statistics are "worthless" on that point because the total compensation for a year includes payments to many men who were not in service at the time the count of employees was made. For this reason, he said, it is impossible to get any reliable comparison of the earnings in various years. Mr. Wood asked if other classes of employees had not received much larger increases than the percentage quoted from Mr. Walber which he had used. Mr. Warne said he was not able to answer.

Mr. Wood also referred to an exhibit headed "Increase in Mileage Constructed," which the witness had used in reply to statements by railroad officers that new construction has fallen off. This showed an increase of 27,000 miles of line from 1908 to 1919. Mr. Warne said this had been taken from a table in the commission's annual report, but on being handed a copy of the table, he said it had been taken from the figures of operated mileage, which includes trackage rights, instead of from the column of "miles owned," which showed an increase of only 49,000 miles, most of which was in the early part of the period. When Mr. Wood asked why he had not used the miles owned, Mr. Warne said his clerk had probably made the mistake.

Hay Shippers Ask Rate Reduction

Testimony of shippers of hay, grain and seeds was heard on February 9. W. I. Bates, president of the National Hay Association, expressed appreciation of the recent 10 per cent reduction and said it had tended to stimulate the traffic to some extent, but not enough to make it worth while for the farmers to continue to produce hay. It is practically impossible to get the commodity to market, he said, if the grower is to receive a fair price, and the high rates have localized the market so that shipments were reduced from 8,000,000 tons in 1920 to 5,000,000 in 1921. He asked the removal of the entire increase made in Ex Parte 74.

When Commissioner Aitchison asked if the real compe-

tititor of the hay producer is not the Ford company, Mr. Bates replied that the animal population of the country has increased. The commissioners, however, questioned the witness closely as to just how a reduction in rates would benefit the hay producer and as to how much farther hay might be shipped to market. He had no figures on this point. He said that the benefit of the 10 per cent reduction had been given to the consumer and had probably increased the demand for hay 50 per cent, but he was somewhat hazy as to whether a further reduction in rates would go to the farmer, the distributor or the consumer.

Commissioner Hall pointed out that the animals have not stopped eating hay and asked if the effect of the increase had not been to increase the local market for hay while reducing the long haul shipments. Mr. Bates said that the animals have not been so well fed and that the members of his association had indicated their belief that a reduction in rates would help them. On cross-examination it was brought out that as only 35 per cent of the members are producers the vote may have been carried by the jobbers and distributors.

The hearing was resumed on February 15 with shippers of canned goods and wholesale groceries as the principal witnesses. James Moore, president of the National Canners' Association, said the canning industry is in a desperate condition and needs any reduction in rates that can fairly be allowed. He said the relief extended to agricultural products should be extended to canned goods.

Non-Union Mines Could Produce

6,000,000 Tons of Coal a Week

J. D. A. Morrow, vice-president of the National Coal Association, filed a number of supplemental exhibits giving information that had been asked at the time of his testimony, relating mainly to the costs of coal production and wages. One of his exhibits was a table comparing the production capacity of the union and non-union coal districts, which is of especial interest in view of the threats of a coal strike. This showed a capacity for the non-union fields of 5,676,000 tons a week, or 38 per cent of the total capacity. Mr. Morrow estimated that the total capacity of the bituminous coal mines in the United States is 776,000,000 tons, or 14,930,000 a week, of which 481,000,000 tons were assigned to the union fields and 295,000,000 to the non-union fields. According to these figures, in the event of a strike it would be possible to produce about two-thirds as much coal per week as the present average. Discussing the possibilities in the case of a strike, Mr. Morrow said:

"This estimate of capacity is based upon actual productive performance in each district in the United States in 1918, according to the reports to the United States Fuel Administration and the United States Geological Survey. After the first three months of 1918 the bituminous coal mines had a fairly full car supply. In the event of a strike April 1, current business conditions would permit the railroads to give the non-union mines a full car supply, thereby permitting maximum shipments of coal, if railroad operation is not disorganized. The capacity of the bituminous mines of the United States has increased somewhat since 1918. Therefore, the estimate of capacity shown here, based upon 1918 performance, is considered conservative and well within what the bituminous coal mines can do, given full car supply and no interference with production and shipments.

"With a full car supply and no interference with production by the non-union mines in the event of a strike on April 1, the output of the non-union mines will materially increase as additions are made to their working forces and the demand for coal stimulates production.

"From the figures shown above it appears that the present capacity of the non-union bituminous coal mines is nearly 6,000,000 tons per week. Current consumption of bituminous

coal in the United States is apparently somewhat in excess of 7,500,000 tons per week. With a material decrease in the consumption of bituminous coal as domestic fuel and decreased consumption by other users as warm weather approaches, if there is no increase in industrial activity which would necessitate a greater use of bituminous coal, the necessary current consumption after April 1 will approximate 7,000,000 tons a week against the present productive capacity of 6,000,000 tons of the non-union mines. According to the report of the United States Geological Survey, the total stocks of bituminous coal in the hands of consumers January 1, 1922, approximated 47,000,000 tons, an average of 41 days' supply. At the anthracite mines about 2,500,000 tons of steam sizes are in stock awaiting shipment. It appears probable that many important users of bituminous coal are increasing their stocks in anticipation of the suspension of mining in many fields on April 1.

"If consumers further increase their stocks by April 1, and if the potential production of about 6,000,000 tons per week can be obtained from the non-union mines without interference, such shipments, supplementing the stocks referred to, would maintain the United States for several months without serious inconvenience to consumers, even if strikes-stopped production in all union bituminous fields, and if the weekly output of a million tons of steam sizes of anthracite was cut off."

One of the exhibits was a table showing the distribution of the cost of production of bituminous coal of \$2.91 a ton. Of this, \$1.97, or 67 per cent, was assigned to labor.

J. B. Newman testified on behalf of the National Wholesale Grocers' Association to urge a reduction in the rates on the commodities which members of his association handle. He said that if a reduction of rates should reduce the net income of the railroads below a point necessary to pay interest they should pay it out of their surplus which has been accumulated for the purpose of providing for lean years. Commissioner Hall said that the witness spoke as if this surplus were in funds that could be used for that purpose. He replied that he understood the roads had a billion dollars and a half in funds out of a total of three billion.

Senator La Follette on Railway Wages

WASHINGTON, D. C.

SENATOR LA FOLLETTE began in the Senate on February 10 the first instalment of a speech he has been promising for some time on "The Truth About the Wages of Railway Employees." He said he would prove that the nominal increase in wages has been uniformly less than the increase in the cost of living each year during the war and since the war that, therefore, has followed and not preceded the increase in the cost of living. After some general comparisons of union wage rates and cost of living statistics he declared that railway labor "is receiving substantially no more real wages in terms of commodity values for services rendered than it received 20 years ago."

On the same day the Interstate Commerce Commission had declined to receive as evidence in its rate hearings quotations from a previous speech by Senator La Follette offered by Frank J. Warne, a witness for the railroad labor organizations, but Senator La Follette quoted extensively from Mr. Warne's statements before the Senate committee. Whereas Mr. Warne in testifying before the commission had insisted that it is impossible to compare the wages of railroad employees from year to year on the basis of the Interstate Commerce Commission statistics, which he called "worthless," Senator La Follette said he would use the figures as reported by the roads to the commission because, although they are "very unreliable," the advantage is all on the side of the railroads.

"Faulty as they are," he had compiled from these reports tables comparing the average annual earnings of railway employees as a whole and by classes with the cost of living index from 1900 to 1921. He admitted that there were no figures available on living cost prior to 1913 but he had used an index figure for food prices for the years prior to that. His tables showed an increase in the average earnings of railroad employees from \$567 in 1900 to \$1,790 in 1921 based on the average earnings of the first half of the year multiplied by two, and \$1,575 based on the earnings for the last half of the year after the reduction by the Labor Board on July 1, multiplied by two.

His cost of living figure showed an increase from 100 in 1900 to 270 for the first half of 1921 and 264 for the last half, while the index figure for wages of all employees rose to 516 in the first half and 278 in the last half. In the case of the engineers, 246 for the first half and 227 for the last half, and the conductors, 263 and 239, the increase was less than the increase in the cost of living index but for the other classes of employees given the increase was considerably greater than the increase in the cost of living. For firemen, trainmen machinists, trackmen and telegraphers the figures for the first half of 1921 were 318, 336, 315, 345 and 311, respectively, as against 270 for the cost of living. For the second half of 1921 they were 286, 299, 286, 289 and 270 as against 264 for the cost of living.

The Senator made most of his point from these tables by dwelling on the "underpayment" represented by the \$567 average for 1900. Keeping this in mind, he said, the second table "shows us that the railroad workers as a whole, have barely kept pace with the increased cost of living and that the most favored occupations have at the most only made up a small part of the amount by which they were underpaid in pre-war days. The earnings of the engineers and conductors have fallen far behind the increase in the cost of living and they are actually worse off than they were at the beginning of the century."

Senator La Follette then presented another table comparing the buying power of the average earnings per year, using 37 cents as the purchasing power of the dollar during the first half of 1921 and 38 cents during the second half of the year, as compared with 1900. On this basis he gave the purchasing power of all employees as \$662 in the first half of 1921 and \$599 in the second half, as compared with \$567 in 1900. For the engineers and conductors the adjusted figures for 1921 were below those for 1900, but the figures for all other classes showed considerable increases. For the engineers the buying power was \$1,057 in the first half of 1921 and \$999 in the second half, as compared with \$1,161 in 1900. For the firemen it was \$778 and \$719 as compared with \$662. For the conductors it was \$972 and \$909 as compared with \$1,004. For the trainmen it was \$751 and \$687 as compared with \$694. For the machinists it was \$815 and \$758 as compared with \$698. For the trackmen it was \$397 and \$342 as compared with \$311 and for the telegrapher it was \$736 and \$681 as compared with \$644. For all classes except the engineers and conductors the figures for the last half of 1921 also exceeded those for 1913.

This table, the Senator said, presents the actual situation of the railway employees accurately and impressively. "No honest mind can examine these figures without being convinced that the wages of the workers on the railroads cannot be cut, under present conditions, without inflicting a grave injustice upon this splendid body of men."

In another table the buying power of the annual earnings was reduced to percentages. For all employees in the first half of 1921 it was 117 per cent for that 1900 and for the second half it was 105 per cent. For the second half the percentages were: 80 for engineers, 108 for firemen, 90 for conductors, 115 for trainmen, 108 for machinists, 110 for trackmen and 105 for telegraphers.

Operating Results Show Savings by Rebuilt Power

Complete Replacement of Locomotives Furnishes Unusual Opportunity for Comparison of Costs

By H. F. Grewe

Master Mechanic, Akron, Canton & Youngstown

THE OPERATING figures of the Akron, Canton & Youngstown for the period of May to September, inclusive, of 1921, when compared with the corresponding five months of the previous year, give some interesting data in connection with locomotive operating costs. A 100 per cent change in road service motive power presents an unusual opportunity to compare the locomotive operating figures of

comparison of one class of locomotive with the other, operating data for the period from October, 1920, to April, 1921, have been eliminated from the discussion as during that period charges were made against both classes for repairs and fuel.

Before going into the savings effected, a brief description of the two classes of locomotive is pertinent. The Class E locomotive has a tractive effort of 18,553 lb. and a total weight of 108,000 lb. These locomotives, built in 1896, have

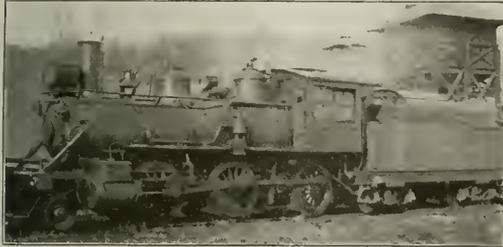


Fig. 1—Old Style Class E Locomotive Used in 1920

an older type locomotive with those of a rebuilt type equipped with superheaters and brick arches.

From March, 1920, until December, 1920, all road tonnage of this carrier was handled with 10 light Mogul locomotives which will hereafter be referred to as the Class E. In December, 1920, a long delayed delivery was made on a

no modern improvements which have to do with fuel economy; that is, they do not have superheaters, brick arches, or other appliances. As will be noted from the illustration, the firebox is of narrow type. Due to the small amount of heating surface and the shape of the firebox it was difficult to maintain the maximum steam pressure at all times.

The Class P locomotives are of a slightly heavier type having a tractive effort of 21,040 lb. and a total weight of 150,000 lb. They were built in 1920 they were rebuilt and fitted with superheaters, brick arches, extra air compressor, Econ-

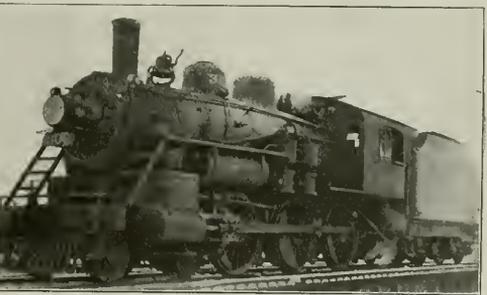


Fig. 2—Rebuilt Class P Locomotive Used in 1921

TABLE 1—LOCOMOTIVE DATA

	1920 Class E	1921 Class P
Tractive effort.....	18,553 lb.	21,040 lb.
Cylinders, diameter and stroke.....	18 in. by 24 in.	19 in. by 24 in.
Valve gear.....	Stephenson	Stephenson
Valve.....	Balanced slide	Economy piston
Weights in working order—		
On drivers.....	94,000 lb.	115,000 lb.
On front truck.....	14,000 lb.	35,000 lb.
Total engine.....	108,000 lb.	150,000 lb.
Tender.....	79,000 lb.	124,200 lb.
Wheel base—		
Driving.....	15 ft. 6 in.	13 ft. 6 in.
Total engine.....	23 ft. 6 1/2 in.	23 ft. 11 in.
Total engine and tender.....	44 ft. 3/4 in.	50 ft. 6 1/2 in.
Driving wheels, diameter over tires.....	57 in.	63 in.
Boiler—		
Steam pressure.....	160 lb.	180 lb.
Diameter, first ring, outside.....	57 in.	58 3/4 in.
Firebox, length and width.....	71 3/8 in. by 31 1/2 in.	102 3/8 in. by 40 1/4 in.
Tubes, number and diameter.....	226 2 in.	131 2 in.
Flues, number and diameter.....	11 ft.	18 5/8 in.
Tubes and flues, length.....	11 ft.	13 ft. 3/8 in.
Grate area.....	15.7 sq. ft.	25.5 sq. ft.
Heating surface—		
Firebox (incl. arch tubes if used).....	138.3 sq. ft.	148 sq. ft.
Tubes and flues.....	1,303 sq. ft.	1,211 sq. ft.
Total evaporation.....	1,441.3 sq. ft.	1,359 sq. ft.
Superheating.....		256 sq. ft.
Tender—		
Water capacity.....	3,500 gal.	5,500 gal.
Fuel capacity.....	9 tons	12 tons

group of Ten-wheel locomotives, referred to in this article as the Class P, which were purchased to displace the Class E for road service. From December, 1920, until April, 1921, the road tonnage was handled with both classes of power. Since April, 1921, the road tonnage has been handled entirely with the Class P locomotives, and the Class E have been stored. Inasmuch as this article deals with the com-

omy steam chests; other betterments were also made which did not affect the fuel economy. These locomotives are free steamers, having fireboxes placed above the frames and a sufficient amount of heating surface.

Comparing the two locomotives, it will be noted that neither is of modern design, although the Class P has some

TABLE 2—COMPARATIVE MILEAGES AND EXPENSES, 1920 AND 1921

Date	Locomotive miles	Train miles	Car miles	Net revenue ton-miles (thousands)	Tons coal	Value coal (\$3.50 ton (dollars))
May, 1920.....	49,029	25,746	270,960	6,295	4,085	14,397
June, 1920.....	40,441	24,352	298,219	4,270	4,832	16,912
July, 1920.....	43,825	24,638	273,139	4,824	3,171	11,099
Aug. 1920.....	45,509	24,094	255,372	3,979	3,369	11,792
Sept., 1920.....	42,113	17,830	239,914	4,259	4,174	14,609
Total.....	220,917	116,660	1,337,604	23,627	19,631	68,709
May, 1921.....	28,998	17,784	233,421	3,213	1,767	6,184
June, 1921.....	38,372	27,196	285,746	4,140	1,896	6,636
July, 1921.....	38,201	26,586	309,935	4,852	2,072	7,252
Aug., 1921.....	44,125	28,232	389,865	6,164	2,456	8,596
Sept., 1921.....	40,755	26,342	350,451	5,147	2,096	7,336
Total.....	191,451	126,146	1,569,118	23,516	10,287	36,005
Percentage.....	86.2	116.2	117.3	99.5	52.4	52.4

advantages in tractive effort and heating surface. The main differences between the two, outside of design, are the superheater and arch applied to the Class P. The leading dimensions and weights are given in Table 1.

Turning now to the savings effected by the change in locomotives, attention is called to Table 2 in which are shown the mileage figures, coal consumption and other data for five months in 1920 when all road traffic was handled by Class E locomotives and for the corresponding period in 1921 when the traffic was handled by Class P locomotives. The figures for the intervening period are omitted, because, as already stated, both types of locomotive were in service at that time. The value of the coal consumed by the locomotives was calculated at a uniform average price of \$3.50 per ton for the

TABLE 3—COMPARISON OF 1926 AND 1921 PERIODS

	1920	1921	Percentage increase or decrease
Cars per train.....	11.47	12.44	+ 8.5
Net revenue tons per train.....	202.60	186.60	- 7.9
Net revenue tons per car.....	17.67	15.00	- 15.1
Pounds of coal per locomotive mile.....	177.70	108.00	- 39.2
Pounds of coal per train mile.....	336.50	163.20	- 51.5
Pounds of coal per car mile.....	29.35	13.11	- 55.3
Pounds of coal per 1,000 net revenue ton miles.....	1,661.00	876.00	- 47.3
Cost of coal per locomotive mile, cents.	31.10	18.90	- 39.2

better comparison of the fuel costs. In Table 3 additional comparative figures are given which have been calculated from the data given in the preceding table.

Unfortunately, the figures covering gross ton-miles have not been kept until recently on the Akron, Canton & Youngstown and are not available for a comparison of the work done by the two types of locomotives in the periods selected for comparison. The net revenue ton-miles was practically the same for the two periods. The average number of cars in a train was somewhat higher in 1921 but the loading was not so satisfactory. The actual total saving in coal for the five-months period of 1921 as compared with 1920 was 9,344 tons, which at the price of \$3.50 per ton amounted to \$32,704, or at the rate of \$78,490 per year.

If a comparison is made on the basis of locomotive miles, which would appear to be the best available basis of comparison, it will be noted that the rate of coal consumption was 177.7 lb. per mile in 1920 against 108 lb. in 1921. At the assumed cost this would amount to 31.1 cents in 1920 and 18.9 cents in 1921, a saving of 39 per cent in the locomotive fuel bills.

The data presented deals only with the savings effected in fuel. No attempt has been made to estimate other savings effected. There is no doubt that an appreciable saving was made in locomotive and train crew time, for the Class P locomotives get the tonnage over the road on schedule whereas the Class E engines did not. The ratio of the engine failures of the Class P engines to the Class E engines were about one to six for the period, and as every engine failure means a tangible money loss to the carrier this also would swell the savings. It is entirely possible that the savings accruing in the transportation department would be no small percentage of the savings of the mechanical department.

THE AMERICAN PEOPLE in framing their tariff policies and navigation laws should always remember that Canada buys more from them than any other country. In other words, Canada is the best customer of the United States. On the other hand, Canada's best customer is Great Britain and the inevitable result of high tariffs and extreme navigation regulations, together with the demands for high premiums in money exchange, will lead to the reduction of Canada's buying in this country. There is no suggestion of ill feeling in this statement; it is merely an ordinary business proposition.—D. C. Coleman, Vice President, Canadian Pacific, in the *New York World*

Plan for Commissioner General of Transportation Not Approved

WASHINGTON, D. C.

ON THE ground that the time is inopportune for the establishment of a new governmental agency in charge of a commissioner general of transportation to represent the public interest in railroad questions, a recommendation by the National chamber's railroad committee that such a proposal be submitted to a referendum of the chamber's membership was disapproved by a resolution which was adopted by the national council of the chamber on February 9.

The council, however, gave its endorsement to the recent action of Secretary of Commerce Hoover in appearing before the Interstate Commerce Commission as the representative of the public, and expressed the hope that the secretary would continue to exercise this authority when circumstances make it appropriate.

The national council also took the position that the time is not propitious to take a referendum on the question of compulsory adoption of the metric system in the United States.

The resolutions adopted were as follows:

"No committee of the chamber has a more distinguished record for service and accomplishment than the railroad committee. From the board of directors the national council has at this meeting received a report in which the railroad committee presented its views respecting subjects of great importance. After opportunity to understand the committee's views, and as a consequence of further considerations brought out in debate, the national council suggests that the board should ask the railroad committee to continue its vigorous examination of the national problems in railroad transportation, and especially the manner in which the Transportation Act of 1920 meets the high purposes for which it was framed, and believes that the committee's suggestion for a new governmental agency in the transportation field is not timely for submission to a referendum vote."

"The secretary of commerce has performed a distinct public service by appearing before the Interstate Commerce Commission and presenting questions which arise from the economic and business situation. As the government's official representative of industry and commerce the secretary of commerce speaks with an authority that commands attention. Believing that the public interest requires such an authoritative presentation when matters of national importance in transportation are under consideration, the national council is gratified to learn that the statutes creating the department of commerce authorize the secretary to perform such a service and that the secretary is disposed to use this authority when circumstances make it appropriate."

Resolutions received by the resolutions committee, with respect to which the declarations recommended by the resolutions committee do not constitute an affirmative report, the committee recommended should be referred to the board of directors for its consideration and such action as it may deem appropriate.

The resolutions as to which this recommendation is made include:

Appointment of a subcommittee in the chamber's transportation department to study problems of highway development.

Opposition to any amendment of the Transportation Act of 1920 before a full test after return of normal traffic conditions.

Relation of freight rates to business operation.

THE CHICAGO UNION MAR TERMINAL has ordered 370 tons of conveyor and structural steel supports from the Pittsburgh Bridge & Iron Company

I. C. C. Orders Increase in New England Divisions

Roads East of Hudson to Receive 15 Per Cent More of Revenue from Joint Class Rates

WASHINGTON, D. C.

THE Interstate Commerce Commission on February 14 made public a modified order in the New England rate division case, dated January 30, following the reargument in November, in which it orders that the divisions accruing to the New England lines of the joint class rates and of the joint commodity rates which divide on a class rate basis other than those in which the Bangor & Aroostook participates, be increased 15 per cent, except in cases where the present divisions of the New England lines are greater than the division accruing to the lines west of the Hudson, in which cases they are to be increased by 15 per cent of the divisions now accruing to the lines outside of New England. It is estimated that this will increase the revenues of the New England lines by approximately \$7,500,000. The order is effective on March 1.

In its former report the commission found that the record afforded no foundation upon which might rest a valid prescription by it of divisions, but it recommended that the roads appoint committees to work out a readjustment themselves. Subsequently, no readjustment having been accomplished, the New England lines filed a petition for reargument, which was held on November 29, and in the light of the commission's further consideration of the law and the evidence it has issued the new decision to give some relief to the New England roads. The report said in part:

Abstract of Commission's Report

It is impossible to avoid the conclusion that Congress intended the relative financial needs of carriers, so far as these needs are legitimate and incident to the transportation service, to be given consideration in fixing divisions; and it is just and right that this should be so. The cost of the service includes not only expenses of operation but taxes and the proper capital charges incident to the continued functioning of the property. The share of overhead costs fairly attributable to interchange traffic may likewise be greater, relatively, where this density is low. Moreover, the group plan of increasing rates which we followed in 1920 under the provisions of the new law necessarily results in inequality of return to the various carriers. Certain of them gain a larger reward than they would receive if it were practicable to fix rates for individual companies, while others have less. Yet all are parts of the national transportation system and must be adequately maintained if they are not to be abandoned. Due regard for the public interest demands that we give these fortuitous inequalities consideration in the fixing of divisions.

Summing up this phase of the matter, we are of the opinion that our power over divisions is founded upon the public interest; that the carriers are mutually dependent parts of the transportation system; that the public interest requires that all essential parts be maintained, so far as possible, in effective working condition; that the relative amount and cost under economical and efficient management of the service rendered is a prime factor in determining the fair and equitable share of joint revenue which each carrier shall receive; and that included in such cost is a due proportion of the burden of maintaining the financial integrity and credit of the carrier.

Complainants perform their part of the interchange service under less favorable conditions than their connections west of the Hudson River. They are terminal lines; their hauls are short; their traffic splits at frequent junction points and is diffused over many secondary and branch lines; their trainloads are necessarily relatively light; the density of their freight traffic is relatively low; and while their investment per mile of road is low, their investment per revenue ton-mile is relatively high. Moreover, no coal mines are located on their rails, and fuel and many other of their supplies must be brought from considerable distance.

These unfavorable conditions are not new; they have long existed. They have been the cause, however, of a disproportionate increase in the burden upon the New England lines during the past three years. This has come about from the extraordinary

increases in wages and rates which have taken place within that period. It is inevitable that when freight rates are increased the carrier that brings its fuel and other supplies from a distance will suffer disproportionately. On coal alone and by the 40 per cent increase in freight rates alone complainants' costs were increased over \$3,400,000 annually. It is also inevitable that when wages are increased the carrier that produces less ton-miles per unit of labor will suffer disproportionately. In this connection the following statistics for the year 1919 are of particular significance. They show percentages for the New England lines as compared with their connections in trunk line and central territories:

Car-miles per car-day	73.5 per cent
Net ton-miles per car-day	60.8 per cent
Net ton-miles per train-mile	57.4 per cent
Net ton-miles per locomotive-day	55.9 per cent
Cost of yard expenses per 1,000 net ton-miles	155.5 per cent
Freight-train costs per 1,000 net ton-miles (wages)	184.1 per cent
Freight-train costs per 1,000 net ton-miles (total)	176.7 per cent

While labor is apparently not so large a factor, relatively, in the operations of the smaller northern New England lines as it is in the operations of the more complex and congested lines of southern New England, the northern lines have likewise suffered a disproportionate burden by reason of the increases in wages during the past three years to a standardized level, since the wages which they paid theretofore were below the average prevailing in the eastern group.

The divisional arrangements exhibited of record are built upon block bases, and in some cases constructive mileage is used or arbitraries are added. As pointed out in our former report, the blocking is often irregular, inconsistent, and illogical. Nevertheless, this system of dividing the joint rates of the New England lines and their western connections has existed for a great many years, and, so far as the record shows, without complaint until the extraordinary changes of the past three years. It is a reasonable assumption that until then it produced on the whole results which were fair.

The divisional arrangements shown apply to class rates, and generally to the commodity rates on articles which are classified. There is no evidence with respect to the divisions on coal and coke, fluid milk and its edible products, high explosives, or certain low-grade commodities moving short distances. Nor were divisions of the Bangor & Aroostook shown. Findings can not be made with respect to any of these divisions, and complainants do not now ask for such findings. On the other hand, defendants made no offer to prove that divisions in such cases are so favorable to complainants as to make up for deficiencies elsewhere, and the absence of evidence in regard to the divisions of certain rates constitutes no reason for failure to act upon the divisions as to which there is evidence.

Before the extraordinary changes of the past three years the New England lines, because of the relatively unfavorable conditions which have already been mentioned, were clearly entitled to divisions materially larger than would be received under a mileage prorate. The evidence shows:

1. That in not a few cases the present New England divisions are less than would be received on a strict mileage basis; that they are generally larger; but that in many cases the excess is slight.
2. That in many cases the New England divisions are larger than would result from a 50-mile block plan, allowing an extra block of 50 miles to both the originating and the terminal carrier, although frequently they are smaller.
3. That in many cases the New England divisions are a smaller percentage of the corresponding local rates than are the divisions west of the Hudson, although by no means in all cases.
4. That in the instances where the New England lines are allowed arbitraries before the division of the rates, these arbitraries have not been increased, notwithstanding the large percentage increases which have been made in the joint rates in recent years.

Having in mind that the 50-mile block plan is designed merely to afford some additional compensation to the originating and terminal carriers and makes no allowance whatever for operating disadvantages of the New England roads, apart from terminal service, there is nothing in this evidence which tends to overthrow the presumption that the divisional arrangements, prior to the recent extraordinary changes, produced fair results or that they were unduly favorable on the whole to the New England carriers. But if this presumption be accepted as a fair and reasonable conclusion from the facts of record, the further evidence with regard to the effect of the recent extraordinary changes leads

inevitably to the conclusion that the scales which formerly hung approximately level as between the participating carriers are now tipped against the New England roads and in favor of their western connections, because of the disproportionate results of these changes.

Financial Needs

These conclusions are further supported by the evidence in regard to financial needs. In 1917 the railway operating income of the complainants amounted to 5.68 per cent upon their recorded railroad property investment, as compared with 5.63 per cent for the carriers in the remainder of the eastern group. In 1919 this had changed to 1.02 per cent for the New England lines and 1.84 per cent for the other carriers. For the first 10 months of 1920 the railway operating deficit of the New England roads amounted to 3.10 per cent upon investment, while the similar deficit of the other eastern carriers was but 0.92 per cent. Finally, in the 12 months ended September 30, 1921, it appears that the deficit of the New England roads was 0.87 per cent upon investment, while the income of the other carriers amounted to 2.85 per cent. Thus the relative situation of the New England carriers has grown progressively worse, and it is a fact generally conceded that as a group they are in greater financial need than any similar group of important carriers in the country.

Nor does the evidence indicate that the financial needs of the New England lines are ascribable to the low level of their local freight rates or passenger fares. Both the class and commodity rates within New England were revised and increased in 1914.

The class rates were again sharply increased following our decision in *Proposed Increases in New England*, and upon this special increase were superimposed the subsequent 25 per cent and 40 per cent increases. The evidence also shows that passenger traffic in New England is generally more profitable than freight traffic.

If this were a case involving a proposed general increase or reduction in rates, evidence of the character which has thus been summarized, indicating a general need for relief, would be deemed persuasive and as justifying a horizontal increase or reduction. It has been our practice in such cases to disregard the immediate effect upon particular rates and to afford relief without delay, leaving a door open for any necessary subsequent readjustments.

In all such general rate cases we have realized and have held that if we were required to consider the justness and reasonableness of each individual rate, the law would in effect be nullified and the commission reduced to a state of administrative paralysis.

Is there good reason why a similar policy should not be pursued when parts of rates, i. e., divisions, are in issue? Manifestly there is need, in the case now before us, for a thorough revision of divisional arrangements upon a more logical and systematic basis. Manifestly, also, if a horizontal increase is made before this revision takes place, the result may be to leave certain divisions too high and others too low. But in this respect the results flowing from the general increases or reductions in rates which we have frequently authorized have been parallel. Moreover, any comprehensive revision upon a logical and systematic basis can be consummated only after many months of labor and, very probably, only after further prolonged recourse to us. In the meantime the New England lines will be denied even a portion of the relief to which the record indicates that they are entitled and which the public interest clearly requires.

Upon further consideration we are of the opinion that in a case involving divisions we may, when the public interest so requires, grant immediate relief subject to later readjustments, as we have done in cases involving general increases or reductions in rates. Otherwise, we shall fail to do substantial justice. The act requires a practical administration, and prompt action where that is necessary in the public interest. In our former report we recognized the need for a revision of the divisions. The course of action suggested in that report having failed to produce prompt relief, we must adopt another, justified by the record, which will accomplish what Congress intended should be accomplished.

Complainants Entitled to Immediate Relief

We are of the opinion, therefore, that some immediate relief may properly be granted to complainants, pending revisions of the existing divisions upon a more logical and systematic basis; but that relief should be held within conservative limits. The New England lines are in part responsible for the difficulties which the case presents because of their failure until recently to give the attention and study to their divisional arrangements of which there have plainly been in need. It remains to determine what form this immediate relief should take.

As already stated, evidence is lacking in regard to the divisional arrangements of certain specified classes of traffic. Our action will be restricted to the divisions of class rates and of the commodity rates which divide on the class-rate basis.

In one of their exhibits complainants showed, for a constructive year October 31, 1919, the revenues accruing to them on so-

called merchandise traffic interchanged with connecting lines and the revenue accruing to the other carriers participating in the same traffic. This covers traffic other than coal and coke. Eliminating interchange with Canadian lines, the total revenue on this merchandise traffic was \$117,118,424, and of this amount \$37,974,231, approximately one-third, accrued to complainants, and the remainder, \$79,144,193, approximately two-thirds, to connections. In the presentation of their case in *Increased Rates, 1920, supra*, the carriers showed that prior to the increase of wages in 1920 the New England lines required an increase of about 47.5 per cent in their freight revenues to meet their needs, while the other carriers in the eastern group required but 28 per cent. It was testified that the increases which we subsequently authorized averaged about 37 per cent throughout the eastern group. If it had been possible to provide at that time that one-half instead of one-third, of this increase on the merchandise interchange traffic should accrue to the New England lines because of their greater needs, they would have benefited to the extent of about \$7,500,000 additional per year, and no one, we think, would have regarded such a distribution of the increase as unfair under the circumstances. This amount, moreover, falls well below any estimate of the disproportionate burden which the New England lines have suffered in the past three years by reason of the extraordinary changes in rates and wages.

An increase of this amount in the divisions received by complainants would manifestly be of benefit to them far greater than the detriment to their western connections. To illustrate this: If the railway operating income of complainants had been increased by \$7,500,000 in the 12 months ended September 30, 1921, their deficit of 0.87 per cent on investment would have been converted to an income of 0.04 per cent; while if the railway operating income of the other lines in the eastern group had been decreased by a like amount, the result would have been only a reduction in the amount earned on investment from 2.85 per cent to 2.76 per cent. It further develops that if the divisions now received by complainants on this merchandise traffic were increased by 15 per cent, subject to the limitation set forth, the result, as nearly as can be estimated, would be an increase in revenue of not exceeding \$7,500,000.

We find, therefore, that the divisions of the joint class rates here under consideration and of the similar joint commodity rates which divide on the class-rate basis, other than those in which complainant, the Bangor & Aroostook Railroad Company, participates, will for the future be unjust, unreasonable, and inequitable to the extent that complainants' divisions thereof shall be less than 115 per cent of their present divisions, except in cases where their present divisions are greater than the divisions accruing to defendants, in which cases the aforesaid divisions will for the future be unjust, unreasonable, and inequitable to the extent that complainants' divisions shall be less than their present divisions plus 15 per cent of the divisions now accruing to defendants. We further find that the just, reasonable, and equitable divisions to be received by the several other carriers participating in the aforesaid joint rates will for the future be the amounts remaining of the joint rates over and above the divisions so to be received by complainants, to be divided among them as they may agree, or, failing such agreement, as may be determined by us upon application therefor.

We enjoin upon complainants and defendants the necessity for proceeding as expeditiously as possible with the revision of divisions upon a logical and systematic basis which we recommended in our former report; and in order that delay in this process may be reduced to a minimum, we make the following additional recommendation:

Instead of attempting to cover the entire field at once, certain important traffic of comparatively simple characteristics should be selected and attention concentrated in the first instance upon the divisions of the rates upon such traffic in order that a suitable guide for the revision of other divisions may as soon as possible be provided. In making a study of such specific rates, every effort should be made to ascertain with such approximate accuracy as may prove possible the respective costs of the service performed by the various participating carriers, including in such costs a fair share of the charges attributable to taxes and a reasonable return upon the property. The other elements mentioned in the statute, in addition to mileage, should likewise be considered. In case of inability to agree upon the divisions of such rates, the question may be presented to us in advance of the consideration of other specific divisions.

Commissioner Potter wrote a concurring opinion while Commissioners Daniels and Hall wrote dissenting opinions. Commissioner Esch also dissented.

Dissenting Opinion

Commissioner Hall said in part:

"In administering and enforcing the interstate commerce act we can change what the carriers do or have done only as

we find violation of that act, and in doing so must mete out an evenhanded justice to all parties before us, whatever their weakness or strength. It has not been committed to us to equalize the fortunes of carriers, of localities, or of men.

"In the present proceeding we find some, not all, of the rail carriers in New England arrayed against practically all other rail carriers in the United States. Joint rates, class and commodity, from and to the South and the West, clear to the Gulf and the Pacific, are maintained by these New England carriers in connection with the defendants there, as well as with their nearer neighbors just across the Hudson. The Potomac, the Ohio, and the Mississippi are crossed as well as the Hudson. The defendants are in varying stages of prosperity and adversity. Some are in the hands of receivers. Some, like those in the South, have suffered far greater enhancement of their labor costs by federal wage increases than have the complainants. Yet all of these defendants, without exception, are here required to yield up to some New England roads shares greater by 15 per cent than those which they have agreed upon among themselves. No attempt is made to ascertain the effect upon defendants of this requirement, or to ascertain whether the shares remaining to them of the joint earnings will be just, reasonable, and equitable. There is not even a perfunctory compliance with the mandates of the statute in that regard. The record affords no basis for it. The one outstanding fact in the report is that in the opinion of the majority the complainants need the money. Perhaps the defendants need the money as much, and have a better right to it. On that we get little light and no facts on which to exercise a judgment. What are the rates to be divided, what is the important tonnage which moves at those rates and on which the important earnings are made, what are the respective services performed by the participants in effecting the movement, what are the cost and value of those services, and what the present divisions here condemned? The report gives no answer.

"These divisions were determined by the parties themselves many years ago. Complainants make no attempt to show that they were cozened or coerced into agreeing upon them. On the contrary, they urge that until recent years their divisions, as a whole, were reasonable. They now claim that because conditions which have developed during the last few years have affected them seriously, their divisions, as a whole, are no longer reasonable. They show how these conditions have affected them but do not attempt to show how defendants have been affected by like or other conditions, or will be affected by decreased divisions. The burden is upon complainants. There is thus a failure of proof in essentials necessary to entitle complainants to such reformation of their contracts as is here required.

"I can give no adherence to the view that we may increase or decrease divisions of joint rates simply to meet the varying financial needs of particular carriers or groups of carriers without regard to the amount, cost, or value of the services performed by the participating carriers, or the share of joint earnings which will remain to each after the change is made."

CANADIAN RAILWAY PROBLEM.—The Montreal Herald, demanding that the Government "Stop Some of the Railway Waste," says that at the Union Station, in Quebec "a strange thing is to be seen every night. On one track there is a C. P. R. train loaded with passengers for Montreal. On the next track is another splendid train, also bound for Montreal, with not a soul in it—a train belonging to the Canadian National. For months past the National Railways have been running a train each way every day between Montreal and Quebec. It may be that traffic somewhere along the line justifies this, but the impression is that here is where some of that heavy railway deficit is incurred. It is said that these daily National trains between Montreal and Quebec cause a loss of from \$700 to \$800 a day.

Progress of Railroad

Administration Liquidation

WASHINGTON, D. C.

DIRECTOR GENERAL Davis of the Railroad Administration has submitted a report to the President covering the 22 months from the termination of federal control of the railroads on March 1, 1920, to December 31, 1921, which has been transmitted to Congress. Mr. Davis estimates that by the end of this year at least 80 or 90 per cent of the claims of the railroads against the government should be adjusted and that the balance of the carriers' claims and all other demands of third persons should be so nearly disposed of during 1923 that at the end of that time consideration should be given to the abandonment of the existing Railroad Administration and transferring the limited amount of undisposed of matters remaining to some permanent organization of the government.

If future adjustments with the carriers are concluded upon the same general lines as those which have been consummated in the past, Director General Davis says, the administration, with its available assets, including cash on hand, assets in field, and the sale and collection of obligations of the carriers now owned by the government and taken from the carriers, in matters connected with and growing out of federal control, should be able to wind up all matters, questions and disputes arising out of or incident to federal control without any further direct appropriation by Congress.

The director general reviews the contention of the Railroad Administration and the carriers in regard to the interpretation of the standard contract which was executed by roads operating 206,401 miles of road, while roads operating 34,793 miles refused or failed to enter into a contract. The serious differences of opinion, he said, grow out of controversies in the matter of maintenance, repairs, renewal, retirement and depreciation, and in addition, with non-contract companies, the question of reasonable compensation for the use of the property. Another fruitful source of controversy arises over the question of the liability for materials and supplies taken over by the government, the book value of which on December 31, 1917, was \$532,528,864.

Although the differences in the construction of the maintenance provisions of the contract were estimated to amount to \$600,000,000 to \$700,000,000, all settlements that have been made to date have been based on the construction of the contract claimed by the government. Up to December 31, claims in final settlement had been filed aggregating \$931,721,488, representing a total main line mileage of 208,731 miles. On this basis it is estimated that the total amount of claims will aggregate about \$1,100,000. Up to the end of the year claims amounting to \$447,518,009 had been adjusted for \$133,694,353. The claims settled represented 116,099 miles or 48.135 per cent of all the main line mileage under federal control. These adjustments were completed with practically no litigation. The short line railroads have filed claims aggregating \$1,732,272.

Discussing the claims of third persons against the Railroad Administration, the director general says that upon the termination of federal control the then acting director general issued an order providing for the opening by each carrier whose property was taken of what is designed as a trustee account, in order that the general assets of the Railroad Administration arising out of federal control might be collected and the general operating liabilities paid through these accounts. For the 22 months covered by the report, the roads collected assets due the Railroad Administration in the field aggregating approximately \$530,000,000 and there was paid out on federal liabilities through these accounts approximately \$970,000,000.

The various regional organizations created by the Railroad Administration to supervise this work authorized payment of \$32,118,139 in settlement of 37,260 claims for loss and damage, personal injury and fire, aggregating \$74,906,763. The amount recommended by the carriers in settlement of these claims was \$36,862,024 so the authorizations made by the regional organizations represented a saving to the government of \$4,743,884. In addition, claims aggregating \$7,686,345 were declined, although the representatives of the carriers had recommended payment of \$1,771,998 in settlement of these declining claims. The greater portion of the claims of this character having been disposed of, all of the regional offices, except that at New York, have been abandoned and the expense connected with them terminated. The central office in Washington maintains an organization which has supervision over the disposition of the remaining claims.

On reparation claims the administration has paid out on formal awards \$522,789 and on informal claims \$543,996, a total of \$1,066,786. In addition, there will be from 50,000 to 75,000 overcharge claims that will require adjustment. Payments of reparation claims are made out of the \$300,000,000 revolving fund under the control of the Interstate Commerce Commission. The Railroad Administration has paid out on account of liabilities resulting from unfinished contracts with inland waterways \$4,636,028. There is still a small amount of these liabilities which the Railroad Administration must finally pay, but its relations with the inland waterways are practically concluded.

In discussing the additions and betterments made during the period of federal control the director general says there is a controversy of some magnitude arising out of the question as to whether certain claims for additions and betterments should be borne by the carriers or by the administration. These disputes arise largely in the matter of improved facilities which the railroads claim were made for war purposes. Up to December 31, 23,797 of these claims, aggregating \$91,318,381, had been presented; 14,704 of these claims have been disposed of; claims amounting to \$6,313,408 have not been allowed, while claims amounting to \$13,993,511 were declined and claims amounting to \$3,610,895 were withdrawn.

The aggregate receipts of the Railroad Administration from March 1, 1920, to December 31, 1921, were \$1,093,757,504 and the disbursements were \$912,496,869, leaving a balance available for the general purposes of liquidation of \$181,260,634. The estimated amount due the carriers with which final settlements have not been made is \$241,062,934.

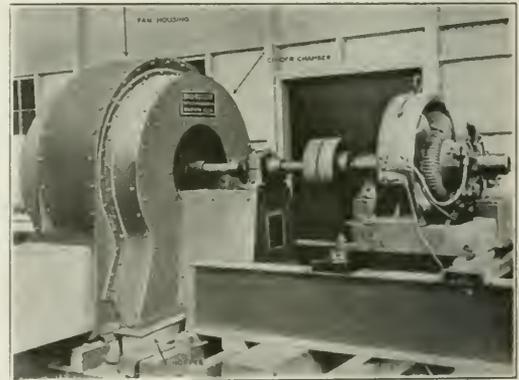
The estimate is based on the administration collecting practically the full amount and that future adjustments will be made along the same general lines as those already collected. On these estimates the Railroad Administration will require some \$59,000,000 in addition to present available funds to complete the final adjustments with the carriers, but it has some other sources from which it may receive some cash and it is, therefore, the judgment of the administration that no additional appropriation will be required. On December 31 the Railroad Administration held \$130,054,053 of definitive obligations of carriers in addition to \$183,255,400 of equipment trust notes. The report says there would seem to be no good reason why the government should not realize and collect a substantial proportion of these obligations. The Railroad Administration had sold \$140,197,700 of the equipment notes and the proceeds were transferred to its account with the Treasury.

During 1921 an average of 1,250 people were in the employ of the Railroad Administration and their total compensation aggregated \$3,084,020. This overhead for the central office in Washington, the report says, is much less than half in number and amount as compared with similar expenses during the period of federal control.

Cinder-Separating Induced Draft Fan

WITH THE IDEA of separating cinders and dust from exhaust gases and thus greatly reducing the smoke nuisance, the B. F. Sturtevant Company, Boston, Mass., has developed a cinder-separating, induced draft fan, shown in the illustration.

The fan housing is indicated by an arrow, also the cinder chamber and the hopper in which dust and cinders collect by gravity. Buckets are provided at the inlet edges of the blades of the paddle wheel. These buckets catch and separate the dust and cinders which are conducted by means of inclined channels leading out into the special dust chambers in the fan. Several small guiding vanes serve to direct the air and cinders into the inclined channels. Since it is impossible to blow dust with air as this would involve again a separation problem, arrangement is made for the dust to settle and fall by gravity into the dust chambers. These dust chambers lead to the closed hopper at the bottom in which the dust accumulates and from which it can be removed periodically or continuously by means of screw or other conveyors. The cinder-separating induced draft fan requires no more attention than an ordinary induced draft fan. It is said to be unusually efficient as a fan and to remove 75 per cent of the solid matter in the gases. The



Sturtevant Fan Designed to Separate Dust and Cinders from Flue Gases

fan removes a still larger proportion of the heavy coarse material which drops over the city in the neighborhood of power plants causing complaints from the residents. Two of these fans have been installed in a large power plant in New York City and are reported to operate successfully. They are used in connection with six 500-hp. boilers and when these boilers are operating at 200 per cent rating, it is found that each fan removes 250 lb. of cinders per hour. At higher ratings this would be much greater. The material resembles a fine coke breeze and on an analysis shows about 9,700 B.t.u. per pound.

The cinder-separating induced draft fan is particularly desirable for use with underfeed stokers. These do not cause a serious smoke nuisance when boilers are operating at normal ratings. They do, however, when the boilers are being forced above normal ratings. Extremely fine particles in the smoke are not particularly objectionable because they are carried away by the air currents and not deposited over the surrounding neighborhood, but the dust and cinders in the gases are fairly heavy and fall within a comparatively short distance of the stack, hence the need of an efficient cinder-separating fan.

Improved Hanna Locomotive Stoker, Type H-2

Changes in Design Increase Simplicity and Durability—Performance
on Norfolk & Western

THE HANNA STOKER, made by the Hanna Locomotive Stoker Company, Cincinnati, Ohio, belongs to the class in which the fuel is delivered in front of a jet of steam by which it is blown into the firebox and distributed over the surface of the grate.

In general, the stoker consists of a steam cylinder which, by means of a rack and pinion rotates a screw conveyor by which the coal is brought from the tender to the locomotive. The coal is then delivered to two screw elevators enclosed in a housing embracing the firing door and elevating on each side of it. These elevators deliver to two oscillating chutes from which the coal drops upon a distributor plate over which it is blown into the firebox and by means of

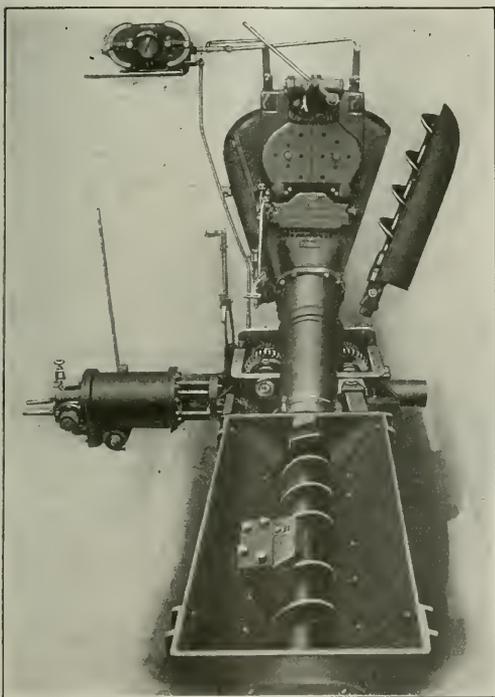
11 in. air brake compressors. Should the conveyor become jammed either by large lumps of coal or by foreign substances such as bolts or stone, it may be necessary to reverse the motion of the piston before it has completed its full stroke. To accomplish this there has been introduced a reversing valve of the piston type operated by a lever in the cab through a system of bell-cranks and rods. The two steam passages from the main slide valve, instead of leading directly to the opposite ends of the cylinder, are carried to the reversing valve chamber, the arrangement of ports being such that by the movement of the reversing valve the steam is caused to flow to the opposite end of the cylinder from that to which it flows when the valve is in the other position.

The end of the extended piston rod is coupled to the rack by means of a key. In addition to the usual stuffing box on the cylinder head, the piston rod passes through a second stuffing box on the rack housing, which is an oil tight case. The rack housing is bored out to take the rack guide which is fitted with two side keys. A bearing and wearing strip is inserted between the rack and the rack guide to take the downward thrust of the rack as it works back and forth to drive the gears. The outer end of the housing is closed by a cap, the removal of which furnishes access to the rack.

Mounted on top of the rack housing is the gear box in which is located the nest of gears which drive the screw conveyor and the two elevators. There are two pinions in mesh with the rack which are so connected by gears and clutches to the conveyors that one of the pinions acts as a driver on the out stroke of the piston while the other pinion becomes the driver on the opposite stroke, thus imparting a continuous motion in one direction to the conveying mechanism.

A telescoping transmission shaft of square section and equipped with universal joints is located on the right hand side and transmits the driving power from the gear case on the locomotive to the gears at the back end of the main conveyor shaft on the tender. This arrangement provides the necessary compensation for the motion between the locomotive and the tender.

The casing of the conveyor on the tender terminates in a ball joint at the front end where it is joined to an inclined circular section which connects the tender to the locomotive. The short conveyor screw in the connecting section is attached to and is driven by the conveyor screw on the tender, a universal joint being used for the connection of the two portions. The elevating screws are independent of the conveyor and are driven direct from the gear case by two universal connections located on the front portion of the gear case.



General View of Hanna Locomotive Stoker

which it is given the proper distribution. The details of the mechanism have been in process of development for a number of years. The speed of the conveyor screws can be varied at will to deliver any desired quantity of fuel; or, in case of clogging or jamming, the conveyor screws can be reversed. Coal may be scattered evenly over the surface of the grate or the delivery concentrated in one place.

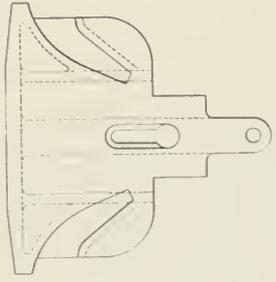
Engine and Conveyor of Simple Construction

The motive power is derived from a single cylinder steam engine having a diameter of 11 in. and a stroke of 16 in. The valve mechanism is similar to that used in 9½ in. and

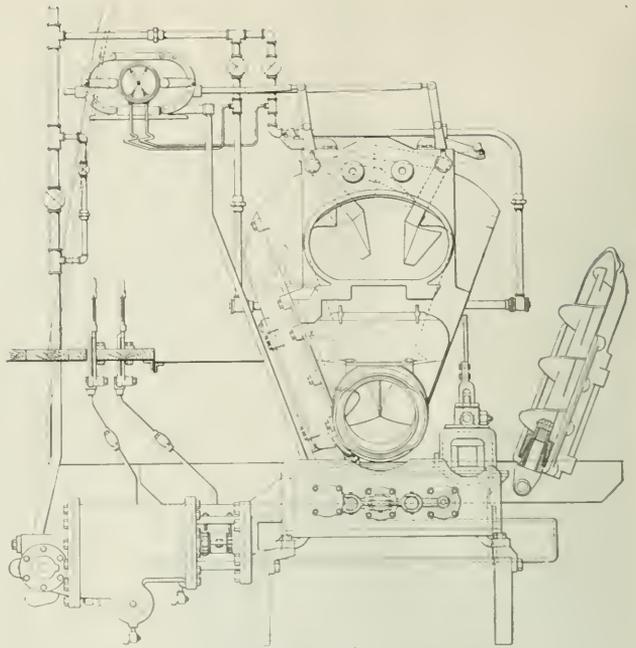
Coal Distributing Mechanism

The pinions driven by the rack are provided with clutches which can be reversed by means of a lever at the left of the fire door. Should it be desired to run the conveyor screws backward, the pressure on the rack is first relieved by reversing the engine as previously explained, and the gear clutches then shifted to bring an extra gear into action which reverses the motion. In addition to these devices a coupling has been provided at the top of the gear case whereby the transmission shaft may be cut off and the conveyor stopped without shutting down the engine. This clutch is operated by a lever on the deck at the right of the fire door.

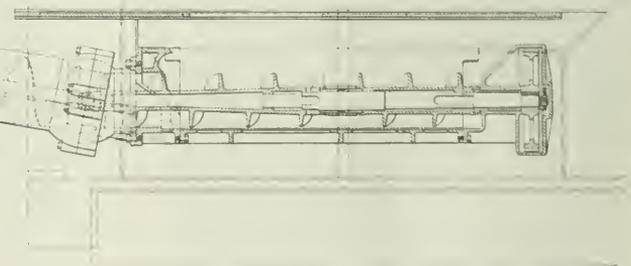
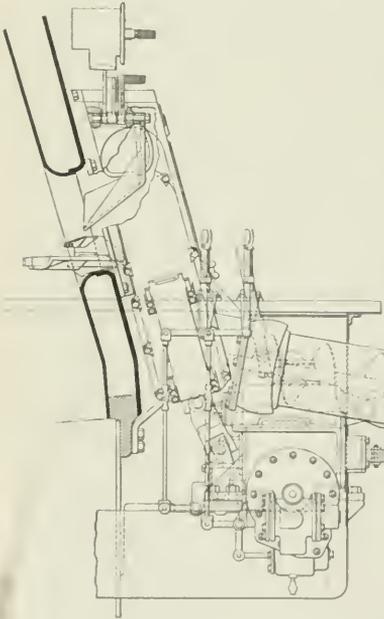
The coal after being conveyed from the tender to the loco-



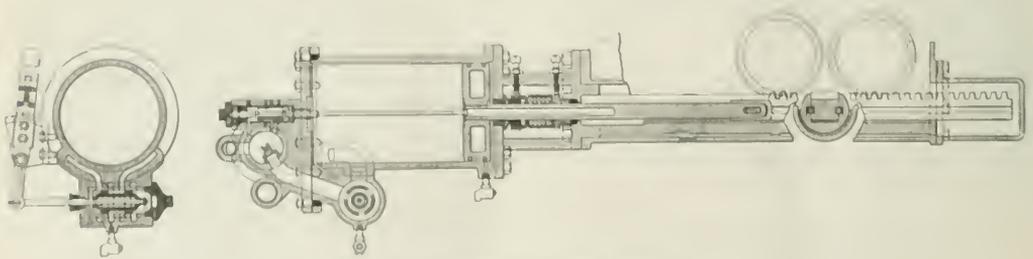
Distributor Plate



Rear Elevation



Longitudinal Section



Section of Engine and Rack Housing

motive and raised by the elevators falls upon two oscillating chutes which swing to and fro as they drop the coal onto the distributor plate. This plate, which is an important element in the operation of the stoker is of cast iron and sets in a casting at the bottom of the fire door from which it can be easily removed even while the fire is burning brightly. As will be noted from the illustration it consists of a broad flat plate with two curved diverging channels cut into the upper surface. These channels catch a portion of the coal as it is blown over the top of the plate and divert it into the back corners of the firebox along the back sheet.

The cast steel blast chamber is located above and slightly back of the distributor plate. It is provided with two trunnions tapped out for $\frac{3}{4}$ in. steam pipes, a different pressure

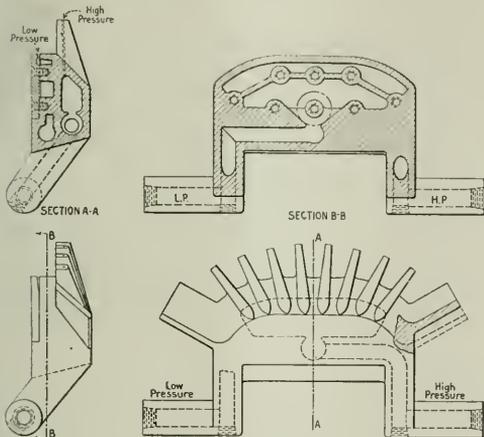
high and low pressure connections of the blast chamber.

By referring to the illustration showing the general rear elevation of the stoker it will be noticed that the main steam pipe leading to the engine is provided with a globe valve and with a $\frac{1}{2}$ -in. by-pass pipe having a second globe valve. In ordinary practice the main valve is kept closed, the by-pass pipe furnishing all the steam necessary to operate the engine at the speed required.

Performance on Norfolk & Western

As an example of the performance of the improved Hanna stoker, some notes relative to a recent run on the Norfolk & Western of a locomotive equipped with a stoker of this type will be of interest. The locomotive was of the Mountain type with 29 in. by 28 in. cylinders, 70 in. drivers, 80.3 sq. ft. grate area and a rated tractive effort of 57,200 lb. The run was from Roanoke, Va., to Bristol, a distance of 151 miles and return. On going west from Roanoke the start is over generally rising undulating grades ranging from 0.73 to 0.9 per cent extending for 20 miles to the eastern slope of the Allegheny mountains. Then there is a direct unbroken rise for about 10 miles on a 1.32 per cent grade to the summit, followed by a drop for about $6\frac{1}{2}$ miles on a 1.0 per cent grade to the valley of the New River. Then there are four sharp rises on grades running from 1.19 to 1.31 per cent with intermediate drops until the summit is reached at 94 miles from Roanoke, the elevation being 2,591 ft. above sea level. On the western slope there is at first a 10 mile descending grade of 1.125 per cent followed by a series of up and down grades of over one per cent into Bristol, the elevation of which is 1,675 ft., making a net rise of 775 ft. from Roanoke, and a total rise on up grades of 3,540 ft.

On the westbound run, known as the "Memphis Special," the train consisted of a mail car, a combination car, two coaches, three Pullman cars and a dining car, the total weight including the locomotive and the eight cars being about 834 tons. There are no regular station stops but two stops are necessary for water and one for coal. On this particular run there were ten stops including those at flag stations together with those for coal and water; in addition there was one slow-down for track work. The actual elapsed time for the run was 4 hr. 50 min., from which 16.5 min. is to be deducted for stops, leaving an actual running time

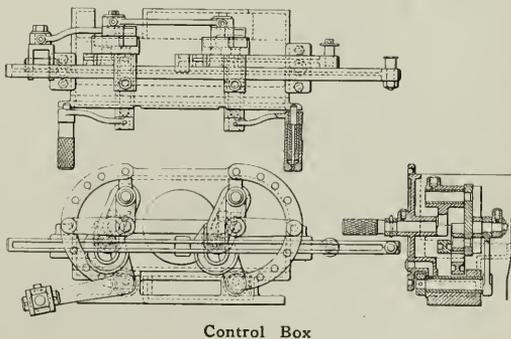


High and Low Pressure Blast Chambers

being supplied to the two connections. High pressure steam at from 25 lb. to 50 lb. pressure enters through the right hand trunnion, passes to the upper passage of the chamber from which it is discharged to the firebox through the eight diverging nozzles which are drilled with $\frac{5}{32}$ in. holes peened down to $\frac{1}{8}$ in. at the orifice. Low pressure steam at from 10 lb. to 25 lb. pressure enters through the left hand trunnion, passes to the lower part of the chamber and is discharged through three nozzles in the plate attached to the bottom of the blast chamber. The combination of the nozzles serves to distribute the coal evenly over the surface of the grates.

The oscillating chutes which deliver the coal to the distributor plate receive their motion from two connecting rods leading to the control box which contains a series of bell-cranks and links. This mechanism receives its reciprocating motion from a crank driven by a worm gear in the main gear case, a rod with universal joints being employed for the connection. On the front of the control box are two levers and handles which are used to adjust the link mechanism and thus regulate the swing of the oscillating chutes. The adjustments for the two chutes are entirely independent and thus provide the maximum flexibility in coal distribution. Should the stoker become inoperative from any cause, the chutes can be disconnected, turned up out of the way and latched; hand firing can then be started immediately. In such a case the coal is simply scattered by shovel on the distributor plate, the stoker being used to take the coal from this point and properly distribute it over the surface of the grate.

A duplex gage is also mounted on the front of the control box, the hands showing the steam pressure of the



Control Box

of 4 hr. 33.5 min., giving an average running speed of 33.1 m.p.h.

On leaving Roanoke there was a brightly burning fire, evenly distributed over the grates, with a depth of about four inches, and a steam pressure of 170 lb. Four minutes after leaving the pressure had risen to 190 lb. and from that time on it swung up and down between 175 lb. and 200 lb. Throughout the run the stoker was controlled by the fireman without having to leave his seat. The rate of feed was gov-

erned according to the steam gage and the appearance of the stack. Only immediately after starting was there any appearance of smoke. The fire door was opened by an observer a number of times when the steam was shut off and in every instance the bed of fire was thin and level.

Occasional adjustments of the steam pressure at the blast nozzles was required but these were slight. Pressures varied from 15 lb. to 20 lb. throughout the run with occasional rises to 25 lb. for the high pressure blast. The oscillating chutes for distributing the coal were untouched except for one adjustment to the right wing. The stoker was stopped 17 times, the total time when it was not in operation being 96.5 min. or about a third of the time. The hook was not taken from its supports, the grates were not shaken and not a shovel full of coal was put into the firebox by hand.

The return run was a local. There were six cars in the train at the start and one picked up later, the train then being 94 tons lighter than on the trip west. The elapsed time was 5 hr. 43 min., of which 1 hr. 10 min. were occupied at station stops, of which there were 33. The actual running time was 4 hr. 33 min., requiring an average running speed of 33.1 m.p.h.

Owing to the frequent stops the stoker required more attention than on the westbound trip. It was stopped 32 times and was idle for a total of 2 hr. 19.5 min., or 41 per cent of the elapsed time. The distributing chutes were adjusted nine times. The pressure at the high pressure nozzles varied from 15 lb. to 30 lb. and at the low pressure from 10 lb. to 30 lb. The steam pressure was maintained between 175 lb. and 200 lb., the average being 192 lb. and the safety valves did not open.

On leaving Bristol the fire bed was rough and lumpy as

left from burning down over night after being banked, but within 10 min. after the start it was in a smooth, even condition. The fire hook was not used, no coal was fired by hand and the grates were not shaken. On arrival at Roanoke the fire was thin, level and burning evenly.

The coal used was prepared for stoker operation in accordance with the practice on the Norfolk & Western and was of the usual grade which contains about six per cent ash and 36 per cent volatile matter. The run was not unusual as the records of the locomotive show that for 28 consecutive runs no coal had been fired by hand, the hook had not been used and the grates had not been shaken.

I. C. C. Has Served Valuations on 184 Railroads

TENTATIVE VALUATIONS have been served by the Interstate Commerce Commission on a total of 184 properties up to December 31, 1921. Owing to the fact that most of them are small roads, few being over 1,000 miles long, the total mileage involved is only 26,191—less than 10 per cent of the total miles of railroad in the United States. The appended table shows the figures for final value in comparison with investment in road and equipment and capitalization as taken from statements published by the President's Conference Committee, dated September 21, 1921, and January 20, 1922. This table contains the figures for the valuations which have been served between July 20 and December 31, 1921, those served prior to July 20 having been abstracted in a previous table in the *Railway Age* of August 31, 1921, page 288.

TENTATIVE VALUATIONS
STATEMENT SHOWING ORIGINAL COST TO DATE; COST OF REPRODUCTION; ORIGINAL COST, PRESENT VALUE AND EXCESS COST OF LANDS, ETC.; "FINAL VALUE"; INVESTMENT IN ROAD AND EQUIPMENT AND CAPITALIZATION AS STATED IN THE VALUATIONS BY THE INTERSTATE COMMERCE COMMISSION

Date of valuation	Owned, used and not used	Miles of road tracks	Miles of all rail	Carrier	"Final Value"				Investment in road and equipment (general balance sheet account 701 as of date of valuation)		Capitalization (general balance sheet accounts 751 to 753, 755 to 757, as of date of valuation)		
					Wholly owned and used	Owned but not used	Used but not owned	Total	Total	Carriers' books	Accounting section's statement	Stock (common and pre-received certificates)	Debt (bonds, trust and receivers')
1916	10	28	10	Peoria Ry. Terminal Co.	\$1,122,306		\$4,049	\$1,122,306	\$1,126,355	\$2,686,110	\$2,676,160	\$1,000,000	\$3,244,000
1916	21	26	26	Mount Hood R. R. Co.	507,032		431	507,32	502,463	402,236	398,104	250,000	500,000
1917	15	20	20	Gilbert & North Island R. R. Co.	108,600		22,306	18,600	130,906	97,659	97,659	120,000	
1915	1	2	2	Gulf Terminal Co.	565,148			565,148	565,148	641,975	575,576	46,000	600,000
1916	24	29	29	Hosac Tunnel & Wilmington R. Co.	641,864			641,864	641,864	582,928		250,000	216,000
1916	13	16	16	Kentwood, Greensburg & South Western R. R. Co.	134,423		4,411	134,423	138,834	149,237		100,000	
1915	3	5	5	Muncie Belt Ry. Co.	62,654		318	1,373	62,972	64,077		50,000	6,791
1916	23	96	96	Portland Terminal Co.	7,022,530		1,074,174	7,022,530	8,096,704	5,138,223		1,000,000	4,752,000
1914	6	7	7	Conway Electric Street Ry. Co.	15,000		1,163	15,000	151,163	214,205	223,512	100,000	100,000
1916	17	20	20	Feridock & Princeton R. R. Co.	174,071			174,071	174,071	159,313		178,000	15,333
1916	14	15	15	The Garden City Western Ry. Co.	192,057		42	192,057	192,000	133,770		1,000	6,998
1916	18	23	23	Grafton & Upton R. R. Co.	496,780		5	496,780	496,785	564,491		250,000	
1915	60	78	78	Manistique & Lake Superior R. R. Co.	686,444			686,444	686,444	1,451,895		280,000	1,100,000
1914	42	54	54	Montpelier & Wells River R. R.	1,750,000		175,000	1,740,000	1,922,000	1,163,611	1,183,947	800,000	25,000
1916	2	5	5	Manassas Valley R. R. Co.	160,404			160,404	160,404	97,741		250,000	
1916	28	36	36	New Orleans, Natalbany & Natchez Ry. Co.	368,769		12,850	368,769	381,619	431,911	430,092	155,600	95,783
1916	7	41	41	Onondaga & Northwestern R. R. Co.	354,944			354,944	354,944	546,528	558,864	303,000	73,863
1915	26	28	28	The Pine Bluff Arkansas River Ry. Co.	23,516		16,242	23,516	39,758	Not reported		Not reported	
1916	40	55	55	Riverside, Snyder & Pacific Ry. Co.	153,840			153,840	153,840	353,074		200,000	155,174
1916	18	147	147	The St. Louis, Bay & Lake Champlain R. R. Co.	558,394			558,394	558,394	751,761	745,445	150,000	157,511
1916	31	41	41	Sumner Land Ry. Co.	2,851,623	518,000	72,447	3,699,673	2,974,130	4,719,604	4,524,089	3,606,849	3,440,435
1916	24	29	29	Sumner Land Ry. Co.	484,983		5,714	484,983	484,983	562,551		109,400	400,400
1916	24	29	29	Terrington & Alexandria Ry. Co.	241,411		2,131	241,411	241,411	742,351	229,119	50,000	154,628
1915				The Shreveport, Bogalusa & Terminal Ry. Co.	434,067			434,067	434,067	450,148	438,163	50,000	450,000
1916	14	21	21	Kentwood & Eastern Ry. Co.	340,000		382,538	319,000	622,538	435,988	412,346	100,000	
1915	9	7	7	Lincoln Freight R. R. Co.	429,831			429,831	429,831	436,529		287,000	60,000
1915	69	89	89	The Louisiana & Northwestern Ry. Co.	23,831,831		2,150,000	21,681,831	23,831,840	26,059,910	26,820,100	2,750,000	24,840,936
1916	106	112	112	St. Louis, North & South Terminal Ry. Co.		2,150,000	1,301	2,150,000		2,684,890		138,300	2,612,956
1915	4	76	76	Washington & Choctawhatchee Ry. Co.	14,068			14,068	14,068	210,118		200,000	
1916	13	14	14	Wabash & Potosi R. R. Co.	116,000			116,000	116,000	113,088		100,000	
1915	4	11	11	Dallas Terminal Ry. & Union Terminal Co.	1,187,810	72,000		1,259,810	1,187,810	46,980		10,000	936,745
1916	15	13	13	Memphis R. R. Co.	119,000		928	119,000	119,928	203,044	127,466	100,000	137,207
1916	7	7	7	Madison & Blue Ridge Ry. Co.	70,551			70,551	70,551	79,802		30,000	95,882
1916	1	9	9	The Wabash Union Terminal R.R. Co.	10,000			10,000	10,000	1,000,828	1,001,797	100,000	2,300,100

Date of valuation	Owned, used and not used	Miles of all road tracks	Carrier	"Final value"				Investment in road and equipment (general balance sheet account 701 as of date of valuation)		Capitalization (general balance sheet accounts 751 to 753, 755 to 757, as of date of valuation)		
				Wholly owned and used	Owned but not used	Used but not owned	Total owned	Total used	Accounting section's statement	Stock (common and preferred certificates)	Debt (bonds, equipment trust and receivers')	
1915	622 841	43 53	St. Louis Southwestern Ry. Co.	26,716,924	75,500	2,355,555	26,792,424	29,072,479	67,430,328	.....	36,249,750	56,189,250
			Central Arkansas & Eastern R. Co.	.....	600,000	.....	600,000	.....	1,070,140	995,140	150,000	1,085,000
	37 43		Parsons Ry. Co.	424,000	.....	.....	424,000	.....	518,145	479,824	100,000	512,758
	13 59		Gray's Point Terminal Ry. Co.	.....	1,321,000	.....	1,321,000	.....	1,841,633	1,818,058	500,000	1,344,633
1915	421 49		Kankakee & Seneca R. R. Co.	800,000	.....	25,645	800,000	825,645	703,368	704,968	10,400	842,400
	231 271		Green Bay & Western R. Co.	5,298,582	.....	14	5,298,582	5,298,596	10,729,344	.....	10,100,000	.....
	35 49		The Keokuk, Green Bay & Western R. R. Co.	1,289,193	.....	.....	1,289,193	1,289,193	1,279,512	.....	664,950	408,000
1916	33 39		The Alnapee & Western Ry. Co.	676,408	.....	.....	676,408	978,437	.....	.....	439,500	425,000
	96 119		Jonesboro, Lake City & Eastern R. Co.	1,117,320	.....	36,657	1,117,328	1,153,985	1,682,600	1,228,612	600,000	694,935
1916	36 29		Chicago & Wabash Valley Ry. Co.	455,500	.....	.....	455,500	455,500	592,308	.....	350,000	662,853
1917	19 15		Clarendon & Lutsford R. R. Co.	490,000	.....	212	490,000	490,212	427,657	.....	270,000	.....
1915	923 278		Moulie & Ohio R. R. Co.	43,279,997	49,818	1,182,443	43,329,815	44,462,340	45,897,678	39,165,878	6,016,800	31,790,000
	54 15		Warrior Southern Ry. Co.	770,000	.....	.....	770,000	.....	1,081,172	776,406	300,000	781,172
1916	880 747		Bancroft & Aroostouk R. R. Co.	21,500,000	.....	3,850,084	21,500,000	25,356,084	23,363,164	.....	3,448,600	20,800,000
	58 126		Northern Maine Seaport R. R. Co.	.....	3,850,000	.....	3,850,000	.....	5,151,623	.....	430,000	4,720,000
	739 923		Van Buren Bridge Co.	77,500	.....	.....	77,500	77,500	127,634	.....	125,000	125,000
	..... 2		Florida East Coast Ry. Co.	46,931,947	.....	714,196	46,931,947	47,646,143	48,207,859	45,185,502	10,000,000	37,300,000
1916	.....		Atlantic & East Coast Terminal Co.	1,200,000	.....	.....	1,200,000	.....	603,503	.....	25,000	578,503
5.355 7.338			The Chicago, Rock Island & Pacific Ry. Co.	231,809,863	252,937	70,467,613	252,062,920	322,277,596	235,867,019	.....	74,482,533	232,804,900
162 186			Knoxak & Des Moines Ry. Co.	3,644,958	.....	.....	3,644,958	.....	6,720,253	.....	4,125,000	2,750,000
1917	1,348		Chicago, Oklahoma & Gulf R. R. Co.	35,500,000	328,585	35,500,000	.....	.....	32,357,599	.....	15,827,500	15,865,482
385 465			Rock Island, Arkansas & Louisiana R. R. Co.	10,750,000	.....	.....	10,750,000	.....	14,864,781	.....	1,768,000	13,446,322
193 234			St. Paul & Kansas City Shurt Line R. R. Co.	8,400,000	.....	.....	8,400,000	.....	12,781,153	.....	50,000	12,629,045
1915	14 15		Rock Island & Dardanelle Ry. Co.	215,000	.....	.....	215,000	.....	.....	.....	100,000	100,000
	21 23		Rock Island, Stuttgart & Southern Ry. Co.	213,000	.....	.....	213,000	.....	178,917	.....	300,000	190,266
	..... 4		Rock Island, Memphis Terminal Ry. Co.	700,000	.....	.....	700,000	.....	1,144,960	.....	1,000	1,437,460
47 69			The Peoria & Bureau Valley R. R. Co.	1,650,000	.....	.....	1,650,000	.....	1,566,600	.....	1,500,000	None
62 70			White & Black River Valley Ry. Co.	700,000	.....	.....	700,000	.....	1,000,000	912,000	400,000	600,000
466 561			The Chicago, Rock Island & Gulf Ry. Co.	13,212,305	621,101	362	13,833,406	13,212,667	17,374,564	.....	469,000	17,317,742
	..... 4		Morris Terminal Ry. Co.	48,750	.....	.....	48,750	48,750	52,320	.....	50,000	2,207
1916	18 22		Chicago, Rock Island & Pacific R. R. Co.	23,250	.....	.....	23,250	.....	190,535	.....	.....	.....
1917	.....		Marion & Rye Valley Ry. Co.	317,177	30,290	317,177	347,467	351,241	359,519	100,000	174,500	.....
1916	.....		Angula Transfer Co.	160,000	.....	.....	160,000	.....	182,498	.....	75,000	None
1915	.....		Augusta Union Station Co.	193,649	51,682	193,649	245,331	237,554	222,513	.....	75,000	225,000
1916	10 11		The Chesapeake & Western Ry. Co.	143,412	425,000	425,000	143,412	129,350	131,000	.....	131,000	None
1915	14 16		Chesapeake Western Ry. Co.	343,837	.....	.....	343,837	768,837	1,027,493	.....	1,419,600	1,419,000
1916	27 30		Chesapeake & Western R. R. Co.	425,000	.....	.....	425,000	.....	1,226,367	.....	562,253	666,000
1916	1 4		Muncie & Western R. R. Co.	41,900	600	41,900	42,500	42,500	87,688	85,883	50,000	None
1915	111 274		New York, Philadelphia & Norfolk R. R. Co.	10,976,927	.....	.....	10,976,927	10,976,927	10,533,162	10,926,581	2,500,000	4,300,000
1915	3 4		Roslyn Connecting R. R. Co.	230,000	34,245	230,000	.....	64,245	96,672	.....	100,000	49,118
1916	104 116		Sandy River & Rangeley Lakes R. R. Co.	1,359,427	.....	.....	1,359,427	1,359,427	1,180,408	.....	340,000	837,000
1916	12 12		Union Print & White Plains R. R. Co.	100,500	.....	.....	100,500	100,500	92,284	.....	32,500	96,650
1916	.....		Massillon Belt Ry. Co.	19,123	.....	.....	19,123	19,123	52,632	.....	50,000	None
1915	341 432		Charleston & Western Carolina Ry. Co.	10,402,096	4,300	106,931	10,406,396	10,509,027	8,279,563	8,447,986	1,200,000	5,700,000
1915	4 10		The Baltimore & Sparrow's Point R. R. Co.	349,237	80,000	349,237	429,237	183,563	236,753	.....	150,000	None
1915	1 13		The Boston Terminal Co.	19,910,500	.....	.....	19,910,500	15,458,562	15,318,520	.....	500,000	14,500,000
1916	.....		The East Jersey R. R. & Terminal Co.	359,390	116,500	359,390	475,890	388,150	.....	.....	257,000	None
509 749			Chicago, Indianapolis & Louisville Ry. Co.	27,270,223	2,484	4,225,135	27,272,707	31,495,358	37,225,990	36,424,870	15,489,000	18,221,930
1915	65 88		Indianapolis & Louisville Ry. Co.	1,900,000	.....	.....	1,900,000	.....	1,938,060	1,920,973	100,000	1,839,903
1916	9 16		Indiana Stone R. R. Co.	555,000	.....	.....	555,000	.....	431,909	.....	15,000	416,909
1918	51 59		Paris and Mt. Pleasant R. R. Co.	813,771	.....	.....	813,771	746,726	746,405	.....	75,000	600,000
1916	9 16		Pickens R. R. Co.	126,426	.....	.....	126,426	114,334	110,494	.....	63,000	63,000
1916	11 12		Virginia Southern R. R. Co.	143,412	.....	.....	143,412	129,350	135,327	.....	25,000	18,000
1916	.....		Rock Island-Frisco Terminal Ry. Co.	2,006,781	29,207	82,893	2,035,988	2,089,674	3,876,681	.....	500,000	3,390,000
1916	1 5		The Elwood, Anderson & Lapelle R. R. Co.	108,910	.....	179	108,910	109,089	136,411	119,928	50,000	.....
1916	1 3		The Lake Erie & Fort Wayne R. R. Co.	37,626	4,133	37,626	41,759	110,859	97,179	73,750	.....	.....
1918	1 3		L'Anguille River Ry. Co.	12,500	.....	4,038	12,500	16,338	18,592	13,250	10,000	22,582
1916	24 27		Leighton Terminal R. R. Co.	28,500	.....	.....	28,500	10,399	.....	.....	6,000	8,993
1916	.....		Little Rock, Maumelle & Western R. R. Co.	300,530	24,632	300,530	325,162	578,308	388,204	160,000	160,000	231,494
1916	4 22		Louisville & Jeffersonville Bridge Co.	2,977,210	.....	.....	2,977,210	5,797,953	5,425,242	1,425,000	4,500,000	.....
1916	10 11		North Albemarle Ry. Co.	141,825	118,135	141,825	259,960	388,156	.....	.....	250,000	135,000
1916	12 38		The Norfolk & Portsmouth Belt Line R. R. Co.	971,881	39,000	971,881	1,010,881	949,277	982,928	63,309	433,000	.....
1917	18 22		Norwood & St. Lawrence R. R. Co.	533,078	895	533,078	533,973	632,780	642,215	250,000	190,000	.....
1917	40 44		The Norfolk Valley Southern Ry. Co.	373,409	263	373,409	373,672	476,651	475,796	45,000	400,000	.....
1916	.....		The Rhode Island Co.	310,000	.....	.....	310,000	.....	.....	.....	.....	.....
1916	8 11		*The Narragansett Pier R. R. Co.	310,000	.....	.....	310,000	.....	203,800	305,092	133,800	70,000
1916	1 1		*Sault Ste. Marie Bridge Co.	500,750	.....	.....	500,750	12,166,699	.....	11,000,000	185,696	.....
1915	5 12		Scottish Illinois & Missouri Bridge Co.	3,182,660	.....	.....	3,182,660	3,250,496	.....	.....	50,000	3,200,246
1916	29 32		The Tuckertan R. R. Co.	503,946	.....	.....	503,946	698,559	648,550	552,242	100,000	.....
1916	10 12		Waupaca-Green Bay Ry. Co.	114,201	.....	.....	114,201	136,000	.....	.....	61,400	69,000

*Road lies partly in Canada. Only property in U. S. inventoried.
 †Figures for entire property both in Canada and United States.
 NOTE 1.—Unit prices used in estimating cost of reproduction new and cost of reproduction depreciation are those termed normal prices as of June 30, 1914.
 NOTE 2.—Items in "Capitalization" column should not be totaled, as some duplications are present.
 NOTE 3.—Where a number of carriers are included in one valuation docket the details of the property "Used but not Owned" are not in all cases set up in the name of the owner, but the total amount is included in the totals for this classification.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading continues to increase, according to the weekly report of the Car Service Division of the American Railway Association. For the week ended February 4 the number of cars loaded with revenue freight was 753,886, an increase of 10,158 as compared with the preceding week and of 54,168 as compared with the corresponding week of 1921.

This was 8,974 less than for the corresponding week of 1920. Coal and merchandise loading showed the large increases.

There was a marked decrease in the car surplus for the week ending January 31, 1922, the total standing at 330,681 cars, or 65,511 cars less than the figure of the previous week.

Of this surplus, 132,174 are box cars, a decrease of 26,925 cars, and 104,386 gondolas, a decrease of 79,613 cars, from the week ending January 23.

Loading of merchandise and miscellaneous freight amounted to 429,705 cars, an increase of 9,295 over the preceding week and 26,944 more than were loaded during the same week last year. It was, however, 9,212 less than were loaded during the corresponding week in 1920.

Coal shipments totaled 185,151 cars, a gain of 4,185 over the week before. This was 27,597 more than were loaded

during the corresponding week in 1921 and 8,640 more than the corresponding week in 1920.

Forest products also showed a gain over the week before of a total of 2,831 cars, the total for the week being 50,204 cars. It was, however, approximately 2,500 under the same week last year and about 10,000 below the corresponding week in the year 1920.

Coke shipments totaled 7,844 cars, an increase of 342 cars over the week before, but 1,678 below one year ago. Ore, with a total of 4,015, was eight in excess of the previous week. During the same week last year, the total was 8,480 cars.

Shipments of grain and grain products amounted to 48,969 cars, a decrease of 1,911 compared with the previous week, but an increase of 11,948 over the same week last year, and 14,376 greater than the same week in 1920. Live stock shipments also decreased 4,592 cars compared with the week before, bringing the total to 27,998, which was 3,608 below the same week in 1921, and 2,263 below the same week in 1920.

Compared by districts, all showed increases over the week before in the loading of all commodities except the North Western, Central Western and South Eastern Districts, while the North Western and South Western were the only ones to show reductions compared with the corresponding week in 1921.

REVENUE FREIGHT LOADED, WEEK ENDED SATURDAY, JANUARY 28, 1922

District	Year	Grain and grain products	Live stock	Forest				Miscellaneous			Total revenue freight loaded	This year, 1922	Corresponding year, 1921	Corresponding year, 1920
				Coal	Coke	Forest products	Ore	L. C. L.	Miscellaneous					
Eastern	1922	8,376	3,046	41,775	1,684	5,361	633	58,639	59,323	178,857	161,127	188,189		
	1921	5,801	3,671	45,395	1,265	5,083	1,019	44,695	51,198	147,595	147,970	167,970		
	1920	2,656	3,219	48,390	3,702	2,793	682	43,389	42,764	107,595	107,970	167,970		
Allegheny	1922	2,301	3,532	48,088	5,618	3,342	2,226	35,752	46,833	107,595	107,970	167,970		
	1921	2,101	3,532	48,088	5,618	3,342	2,226	35,752	46,833	107,595	107,970	167,970		
	1920	2,40	109	23,060	185	1,050	63	5,252	2,862	32,787	26,358	31,962		
Peachontas	1922	4,614	2,307	26,20	465	13,581	476	35,854	28,030	111,774	107,709	125,372		
	1921	3,655	2,034	23,019	534	13,009	1,142	32,510	31,806	107,709	107,709	125,372		
	1920	14,525	9,797	10,980	1,013	13,850	457	23,905	25,461	100,048	94,790	108,424		
Southern	1922	11,064	9,353	5,814	1,284	16,592	1,044	23,302	26,337	94,790	94,790	108,424		
	1921	15,374	11,822	25,023	2,88	4,412	830	29,223	30,771	117,693	105,942	120,341		
	1920	11,747	11,809	18,790	3,21	3,871	2,178	28,532	29,214	105,942	105,942	120,341		
Central Western	1922	5,095	5,234	5,298	155	6,326	866	15,404	19,733	55,001	58,087	61,074		
	1921	5,185	1,869	4,848	97	6,446	430	15,815	23,407	58,087	58,087	61,074		
	1920	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332		
Southwestern	1922	39,964	32,377	163,430	9,513	52,486	8,138	184,389	211,318	701,605	701,605	803,332		
	1921	36,504	34,159	188,913	9,760	58,081	11,701	142,627	321,587	701,605	701,605	803,332		
	1920	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332		
Week Ended	1922	52,181	31,961	164,991	7,267	50,338	4,261	214,364	210,255	720,877	708,658	804,866		
	1921	50,187	36,165	159,245	7,258	48,490	4,451	205,945	209,536	720,877	715,855	840,524		
	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,962	697,641	680,673	830,673		
	1921	30,075	24,567	105,662	6,424	31,406	4,833	170,061	157,956	531,034	602,368	745,446		
	1920	30,075	24,567	105,662	6,424	31,406	4,833	170,061	157,956	531,034	602,368	745,446		

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR LAST YEAR TO YEARS AGO WEEK ENDED SATURDAY, FEBRUARY 4, 1922

District	Year	Grain and grain products	Live stock	Forest				Miscellaneous			Received from connections		This year, 1922	Corresponding year, 1921	Corresponding year, 1920
				Coal	Coke	Forest products	Merchandise	Miscellaneous	This year, 1922	Corresponding year, 1921	Corresponding year, 1920				
Eastern	1922	9,367	2,706	46,770	1,817	5,983	610	62,448	62,406	191,808	192,211	223,311	186,561	216,139	
	1921	5,765	3,37	44,835	1,297	8,461	676	46,208	53,655	163,955	170,556	106,453	101,179	108,214	
	1920	2,615	2,763	51,819	3,813	2,658	556	44,44	44,619	153,305	145,093	147,875	114,448	13,265	18,119
Allegheny	1922	2,615	2,763	51,819	3,813	2,658	556	44,44	44,619	153,305	145,093	147,875	114,448	13,265	18,119
	1921	1,980	3,188	46,911	5,651	2,973	2,753	17,058	14,589	112,795	4,222	31,410	60,203	62,224	78,517
	1920	241	65	23,028	201	1,064	55	5,324	2,861	33,705	109,151	123,340	46,464	43,544	60,139
Peachontas	1922	4,576	2,216	35,431	492	14,480	638	36,388	30,178	112,795	104,171	114,632	41,418	42,908	67,028
	1921	3,400	2,027	32,508	584	13,863	1,315	34,653	31,477	109,151	104,171	114,632	41,418	42,908	67,028
	1920	11,747	8,017	9,919	1,072	14,533	482	17,263	24,406	93,531	95,807	111,563	44,904	42,908	67,028
Central Western	1922	5,234	5,298	5,298	155	6,326	866	15,404	19,733	55,001	58,087	61,074	43,148	43,092	55,998
	1921	5,185	1,869	4,848	97	6,446	430	15,815	23,407	58,087	58,087	61,074	43,148	43,092	55,998
	1920	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332	701,605	803,332	
Southwestern	1922	39,964	32,377	163,430	9,513	52,486	8,138	184,389	211,318	701,605	701,605	803,332	701,605	803,332	
	1921	36,504	34,159	188,913	9,760	58,081	11,701	142,627	321,587	701,605	701,605	803,332	701,605	803,332	
	1920	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332	701,605	803,332	
Total all roads	1922	52,181	31,961	164,991	7,267	50,338	4,261	214,364	210,255	720,877	708,658	804,866	708,658	804,866	
	1921	50,187	36,165	159,245	7,258	48,490	4,451	205,945	209,536	720,877	715,855	840,524	715,855	840,524	
	1922	40,673	25,658	136,982	7,008	41,071	4,321	171,786	178,962	697,641	680,673	830,673	680,673	830,673	
	1921	30,075	24,567	105,662	6,424	31,406	4,833	170,061	157,956	531,034	602,368	745,446	602,368	745,446	
	1920	30,075	24,567	105,662	6,424	31,406	4,833	170,061	157,956	531,034	602,368	745,446	602,368	745,446	

Division Accounting—An Operating Viewpoint

The Centralized and Decentralized Plans Contrasted—Methods Worked Out on the New Haven

By J. E. Slater

Special Assistant to General Manager, N. Y., N. H. & H.

PART II

THE VALUE of any plan depends upon the results which it produces. What then are the results of the plan chosen by the New Haven—the decentralized plan under the jurisdiction of the accounting department? Does it fulfill the requirements which have been previously mentioned? Does it provide accurate, current data on division costs, does it provide detailed information on the various phases of division performance, does it give information not called for as well as regular statements required? A brief summary of the statements issued by division accountants will answer most of these questions.

The Statements Issued

On the New Haven most of the employees are paid weekly, only the officers and subordinate officials being paid semi-

Analysis of Transportation Man Hours

The analysis of transportation man hours is a statement of man hours in transportation service on each division, subdivided into the various classes as prescribed by the Interstate Commerce Commission. This statement is issued six or seven days after the end of the payroll week. It has proven of great value during the last year in the reduction of expenses. During the last week in each month, the general manager, general superintendents and superintendents meet to discuss ways and means of effecting economies and improving performance. With the transportation man hour statement for the first two or three weeks of the month as a basis, a standard of man hours for the succeeding month is established. This standard is then compared with the actual performance each week in the succeeding month. The

NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY									
STATEMENT OF TRAIN LOAD, SPEED AND COSTS FOR SLOW FREIGHT SERVICE, DISTRICTS:									
NEW HAVEN-WORCESTER; NEW HAVEN-PROVIDENCE; MIDWAY-WORCESTER									
WEEK ENDING JAN. 5th, 1922.									
<u>NEW HAVEN-WORCESTER</u>									
	No. of Trains	Train Miles	Gross Ton Miles	Gross Ton Miles Per Train Mile	Rate of orig. Terminal	Average Speed	Gross Ton Miles Per Train Hour	Cost of Wages Per Train Mile	Cost of Wages Per 1000 Gross Ton Miles
East	10	1211	2170446	1799	1608	11.64	20,947	43.3	24.1
West	12	1488	2190911	1803	1705	11.76	17,669	40.1	26.7
TOTAL	22	2669	4369359	1637	1807	11.71	19,164	41.6	25.4
<u>NEW HAVEN-PROVIDENCE</u>									
East	12	1372	3902873	2945	2819	11.72	33,358	50.6	17.9
West	16	1808	2789398	1543	2631	12.47	19,237	51.6	33.4
TOTAL	28	3180	6692261	2108	2712	12.14	25,543	51.2	24.8
<u>MIDWAY-WORCESTER</u>									
East	8	592	771343	1303	1765	9.40	12,244	62.7	40.5
West	7	518	693609	1339	1667	12.05	16,130	40.5	30.2
TOTAL	15	1110	1464952	1320	1719	10.47	13,820	47.0	36.6

Statement of Train Load, Speed and Costs for Slow Freight Service

monthly. On that account, most of the statements are issued weekly. The following are the most important:

- (1) Analysis of payrolls and performance.
- (2) Analysis of transportation man hours.
- (3) Analysis of non-productive time and constructive allowances.
- (4) Analysis of train tonnage, speed and cost of through freight service by districts.

The weekly payroll analysis is a brief summary of payrolls and performance on the division. It contains no innovations, but is designed to give operating officers, (1) a summary of labor expenses, subdivided between departments and classes of service; (2) a comparison of the station, yard and train performances with the costs of these services as a whole; (3) a brief explanation of increases and decreases in payrolls as compared with previous periods. This analysis is issued from seven to ten days after the end of the payroll week

necessity for this close check has resulted in the discovery of means to effect further reductions. The same plan followed by the general manager with reference to transportation service is also followed in the maintenance and mechanical departments. This budget system in both maintenance and transportation departments has been used successfully on other railroads, the important difference on the New Haven being the use of man hours instead of expense.

Non-Productive Time and Constructive Allowances

The statement of non-productive time and constructive allowances is issued within ten days after the end of the payroll week. It is divided into two parts. The first section covers items which are primarily matters of schedule and policy and not subject to the control of local operating officers. Among the important items are payments for vacations and holidays, safety meetings, bonus hour paid to me-

chanical forces in shops, engine and train crews learning road, and relief days for supervisory forces. This part of the statement is valuable chiefly in showing the actual cost of certain schedule rules which provide payment where there is no work.

The second section covers items which are partly or wholly under the control of supervisory officials. Among the important classes are payments for arbitrary allowances for switching by road crews, deadheading, terminal delay, hosting by road crews and guarantee paid passenger crews. These items are closely watched from week to week by division and general officers and material reductions have been made as a result of practices which the statement disclosed.

Analysis of Through Freight Service

By Districts or Runs

The three statements mentioned above are based on division payrolls and the charges made against each division are those carried on that division's payroll. It will be recalled that the division payroll, as far as train and engine service is concerned, may extend beyond the confines of that

Gross ton miles per train hour,
Cost of wages per train mile,
Cost of wages per 1,000 gross ton miles.

This statement is also of particular value in that it furnishes an index of the relative effect of trainload and speed on cost. The importance of properly balancing tonnage and speed is especially great on the New Haven, where the frequency of passenger service makes necessary adequate speed in freight service.

In addition to this analysis of through freight service, the division accountants furnish superintendents with statements of local freight service, by runs. An important consideration in connection with local freight service is overtime and the statement provides an analysis of this factor.

The weekly statements are limited to analysis of labor charges. The question will be asked as to how charges for the important elements of material and fuel are analyzed. These appear in the monthly statement, though fuel is analyzed in greater detail by a method later described.

Monthly Statement in Three Sections

The monthly statement is divided into three sections: (1) maintenance of way expenses; (2) maintenance of equip-

STATEMENT OF NON-PRODUCTIVE TIME AND CONSTRUCTIVE ALLOWANCES OF TRANSPORTATION DEPARTMENT														
WEEK ENDING — JANUARY 8, 1928														
Classification of Causes	New York	New Haven	Hartford	Meriden	Waterbury	Hartford	New London	Total Line West	Providence	Boston	Old Colony	Total Line East	Total New Haven	U.S.S. Ry.
Shedding Fuel Hoisting		35.86				11.77		63.05						48.00
Shedding Crew														17.13
Qualifying	87.62	11.60				9.90	27.14	64.64	8.11	12.13		6.66	127.65	179.84
Transmission		4.94						4.94						4.94
80 Minute Switch Period	491.58	458.79	99.65	87.54	384.09	99.60	982.55	348.35	206.92	228.77	214.71	985.43	2,327.41	118.37
Field Holiday	1,474.42	859.59	55.65	120.71	75.75	47.78	627.15	319.15	201.87	191.26	1,648.33	3,172.08	6,474.37	67.87
Hoisting		6.94						6.94						6.94
Blank Leaves	4.07	38.56	9.04					41.09	43.89	80.64	1,048.19	1,214.71	45.68	9.58
Trains	61.17	146.10	27.12			45.68	47.08	286.90	43.89	80.64	1,048.19	1,214.71	274.00	
Chief Eng for Supt. Force	6.97	35.00	62.10	16.86				35.71		158.98	78.19	167.13	253.41	89.40
Miscellaneous	8.07							8.07						89.40
Sub-total	2,507.54	1,628.31	388.61	107.15	1,059.81	364.04	3,775.72	1,629.70	860.86	335.47	1,119.80	5,643.33	11,246.41	238.43
Hold away from some terminal								3.88						151.76
New Called and Not Done							8.61	10.00		15.20	6.60	8.80	37.76	
Irregular Calling & Assignment								5.94					16.80	
Force used to handle Eng men late								8.80					40.64	
Working at terminals where Tr, Green W.	117.77	12.85					55.60	177.83	59.13	147.24	67.10	415.60	618.17	18.78
Force Working Allowance							10.41	136.15	119.08	84.78	151.20	296.21	316.68	
Train Crews working on road	9.25	53.84	14.21	73.68				8.90			37.37	1.49	107.64	308.07
Engine Working Allowance	80.48							80.48					67.68	
Working by Road Crews	46.06	19.43	12.88					6.03			68.64	9.72	92.19	284.84
Working by Road Crews	80.48							80.48			68.64	9.72	92.19	284.84
Terminal Delay	80.48	90.79	1.64			8.00		16.37	14.07	8.23	154.78	167.39	147.39	879.79
Shedding	397.17	615.90	43.43			556.64		855.47	260.58	237.14	171.72	685.37	1,111.64	2,043.84
Shedding	60.00	148.64	91.84			116.84		64.78	649.89	125.60	6.33	1,028.09	1,263.84	148.80
New Called back at end of Day's work	8.00		10.58					8.21	11.13	60.41	88.69	68.70	107.68	133.50
Miscellaneous	714.28	898.43	320.07	350.77	877.47	395.81	3,826.76	1,629.25	824.70	358.60	378.72	1,235.97	1,485.37	248.75
GRAND TOTAL	8,183.04	5,950.46	778.61	878.07	1,666.25	995.66	6,629.70	3,478.25	1,838.66	1,671.67	2,492.63	6,779.20	17,001.80	618.67
Total Payrolls (incl. & Road Crews)	48,944.00	28,646.45	8,940.19	8,909.90	10,971.77	11,660.54	71,187.74	35,444.60	16,979.39	13,200.49	98,433.41	208,900.88	19,796.20	
Percent to Payrolls	1.68	2.12	1.64	0.87	0.03	0.82	0.84	1.64	1.99	0.19	0.18	0.84	0.84	0.14

Note: Percent of Payrolls represents percentage of the second group of items less "Dearsity" to total payrolls of yard and road crews.

Statement of Non-Productive Time and Constructive Allowances of Transportation Department

division. This situation was the only important operating factor arguing for the centralized plan of division accounting. In order to avoid this difficulty and to provide accurate data for checking the performance of specific trains, a statement is issued weekly, analyzing the performance and cost of through freight train service by districts or runs. This statement ignores division lines, but covers well defined districts within which engine and train crews operate. Each division accountant issues a statement covering designated runs and his statement is forwarded to each superintendent interested in those runs. Where it is desired, the information is further subdivided as between the divisions over which the run is made. The eventual plan will provide for complete separation in this manner in order that train wages on a division may be applied to the ton miles and train miles of that division. For the present, however, this statement furnishes adequate information to interested officers.

The statement shows for each run, separately by direct

- (1) Number of trips,
- (2) Train miles,
- (3) Gross ton miles,
- (4) Average trainloads,
- (5) Average speed,

ment expenses; (3) transportation expenses. The first section shows for the division the total charges to each primary account, subdivided into labor, material and other charges. This permits a close check against the maintenance of way budget, both as to labor and material. The statement also shows a summary of total labor charges, subdivided into roadway forces, bridge and building forces, signal and other forces. Data are also given as to work performed, including ties and rail laid, signals maintained, etc.

The mechanical group of expenses covers charges to primary accounts and, in addition, includes information as to locomotives repaired, running and classified, freight and passenger cars repaired, etc. In addition to this data, division accountants subdivide charges among types of engines and as between running and classified repairs. This information, however, cannot be available on this statement since charges must be consolidated and a system statement issued comparing all the repairs to each type of engine with the mileage made.

The section of the statement covering transportation expenses shows by services, rather than by accounts, the charges made. Station, yard and train services are each divided between passenger and freight service. The miscellaneous items such as charges to signal and interlocker

operation, crossing protection, etc., are shown separately. In addition to the detail of expenses, there is shown general data as to performance. This includes the gross ton miles, train miles (passenger and freight) made on the divisions, the number of tons of L. C. L. freight handled at the larger stations, the tons per man hour and the cost per ton at the same points, the cars handled per engine hour and the cost per car in the more important yards; the ton miles per train hour in freight train service; the cost per 1,000 gross ton miles for freight train expense and for all freight transportation expenses.

Monthly Statement a General Summary

This monthly statement is designed to provide a general summary of the performance for the month. The detailed analyses each week have furnished proper bases for the checking of performance and cost. The monthly statement pretends to do nothing more than show the net result of the efforts made during the month. It is issued on the fifteenth of the following month and is thus reasonably close to the

the division accountant sends daily a report of poor performances to interested officers who check the engine in order to determine the cause of the bad record.

This completes the current information regularly reported to operating offices. This in no way includes all statistical data compiled, but includes only the regular statements issued by division accountants. Moreover, most of the data has been developed with division accounting.

As stated before, however, the greatest value should come from information not specifically called for. In discussing this aspect of the situation, it is difficult to be specific. The amount of information furnished depends largely upon the point of view and experience of the division accountant. Consequently, the extent of the detail furnished varies with division accountants. Cases have been discovered of excessive amounts of overtime paid, and excessive amounts paid for various allowances provided by the schedule. A detailed analysis of the non-productive time statement, showing the specific moves which necessitated the payments, has resulted in corrective measures being taken. Much has been

STATEMENT OF NON-PRODUCTIVE TIME AND CONSTRUCTIVE ALLOWANCES OF MAINTENANCE OF WAY & MECHANICAL DEPARTMENTS
WEEK ENDING - JANUARY 6th, 1922.

Classification of Causes	New York		Total Lines West		Total Lines East		Shops MECHANICAL	Total New Haven		C. N. D. Ry.	
	M. of W.	Mech.	M. of W.	Mech.	M. of W.	Mech.		M. of W.	Mech.	M. of W.	Mech.
Safety & Fuel Meetings	-	-	-	4.32	-	2.25	-	-	6.58	-	-
Attending Court	-	-	-	-	-	-	-	-	-	-	-
Qualifying	-	-	-	-	-	-	-	-	-	-	-
Examinations	-	-	-	-	-	-	-	-	-	-	-
20 Minute Lunch Period	-	105.65	-	75.14	-	41.65	26.33	-	248.97	-	69.80
Bombs Hour	-	110.25	-	475.69	-	638.04	109.02	-	1328.01	-	85.88
Half Holiday	24.08	-	40.68	24.93	44.24	15.51	57.75	108.94	98.19	19.55	3.75
Holiday	65.32	-	604.08	118.49	222.11	109.77	536.28	891.61	763.52	74.78	101.38
Sick Leave	-	-	2.34	112.89	-	-	-	2.34	112.89	-	28.97
Vacations	-	-	-	-	-	-	10.45	-	10.45	-	-
Relief days for Supr. Forces	-	183.47	-	105.48	-	141.79	85.65	-	466.29	-	40.87
Miscellaneous	-	-	25.55	7.44	29.76	11.80	9.02	56.31	28.26	-	19.07
Total	89.34	399.58	673.65	924.38	296.11	966.82	803.38	1059.10	3083.16	94.33	349.15

Statement of Non-Productive Time and Constructive Allowances of Maintenance of Way and Mechanical Departments

period covered. It includes all charges properly made against each division's performance, and subject to the authority of the division staff. It does not include overhead items in which the local organization has no concern. It is a monthly summary of the division's activities and cost of its performance.

Check on Fuel Performance of Individual Locomotives

Mention has been made above of the specific question of fuel. In order to provide a close check of fuel performance, arrangements were made by which each division accountant keeps a check on the performance of individual engines. The car accountant reports to each division accountant the train miles, gross ton miles, time on road and terminal delays of individual freight trains terminating on his division. The division accountant shows against this performance the fuel consumed on the run, this being measured by the fuel necessary to fill the tender at the end of the run. When fuel is taken enroute, report is made to the division accountant of the amount taken. In the office of each division accountant, is a record card for each engine, showing by days the services performed, the fuel consumed and the pounds consumed per 1,000 gross ton miles. These cards are used by road foremen of engines, fuel supervisors and others checking the performance of individual locomotives. The information on the card is available from three to five days after the run is made. In addition to the card record,

done in this direction, but on all railroads this field, almost unexplored, awaits the skill and initiative of division accountants.

Special Studies and Investigation

There is still another field in which the local division accountants can be of the greatest value. This is in the field of special studies and investigation. Experience has repeatedly shown that studies of this kind are much more reliable and satisfactory as to results when they are made under the direction of local representatives who are familiar with the various details of operation in their respective territories, than when conducted by representatives sent out from the central office. Moreover, it has also been shown that these studies are more satisfactory when they are conducted by those whose principal business it is to perform work of this kind than to have it done by various local operating men who are not accustomed to this character of work.

As an example of this sort of work, the New Haven had investigations made of the cost of cleaning fires at some of the more important engine houses. This study was made covering a period of four weeks, involving a time study of the work of all fire cleaning gangs. It required no additional expense, and produced results which quickly justified the trouble in making the study. The work was done through co-operation of the mechanical department and

division accountants and was very satisfactorily worked out.

This field of special studies and analyses is a very broad one and can be more satisfactorily developed by division accountants working on the decentralized plan than by any other method known to the writer.

The net result of the New Haven experiences with the decentralized plan under accounting department jurisdiction has been a success. Much remains to be done to perfect the methods. A large amount of information remains to be

compiled along new lines. Nevertheless, the results have shown that with close co-operation between operating and accounting departments, much can be done otherwise impossible of accomplishment. Moreover, these results can be obtained with relatively slight additional expense. Division accounting opens a great field of study, not only to accountants, but to operating officers. The railroads will do well to push as far and rapidly as possible the further analysis and checking of expenses and costs which division accounting provides.

Labor Board Issues New Rules for Signalmen

Overtime Provisions Materially Changed—Large Part of National Agreement Perpetuated

PUNITIVE OVERTIME for signal department employees will, after February 16, be paid after the tenth hour of consecutive service instead of after the eighth hour, as is now the practice under the existing signalmen's national agreement, according to a new code of rules handed down by the Railroad Labor Board on February 13. The changes which have been made in the rules governing the working conditions of these employees are very similar to those recently made in the working conditions of maintenance-of-way employees and contain relief not so much from the national agreements against which the carriers have directed their fight but from a few of the more restricted rules which necessitate the payment of large sums of money for which no service is received.

The national agreement with the signalmen, formed during the closing days of federal control, contained 78 sections or rules. Of these, 43 are perpetuated in the new code announced by the Labor Board, 16 are remanded to the individual carriers and their own signal employees for settlement, one is eliminated, six are automatically changed by the revision of other rules or by new conditions which did not exist at the time the national agreement was made, and only 12, mostly rules covering the payment of punitive over-time, are changed.

The punitive overtime clause of the signalmen's national agreement stated that "overtime hours, continuous with regular working hours, shall be computed on the actual minute basis and paid for at the overtime rate." The new ruling approved by the Labor Board reads briefly, "overtime will be paid on the actual minute basis at pro-rata rate for the ninth and tenth hours of continuous service, exclusive of meal periods, and thereafter at rate of time and one-half."

Pro Rata Rates for Sunday and Holiday Work

Signal department employees regularly assigned to work on Sundays and holidays, will be compensated on the same basis as on week days, according to another clause of the new code. The signalmen's national agreement provided that "time and one-half time will be paid for all overtime including Sundays and the following holidays: New Year's Day, Washington's Birthday, Decoration Day, Fourth of July, Labor Day, Thanksgiving, and Christmas." The new rule provides that "work performed on Sundays and the following legal holidays—namely, New Year's Day, Washington's Birthday, Decoration Day, Fourth of July, Labor Day, Thanksgiving, and Christmas (provided when any of the above holidays fall on Sunday, the day observed by the state, nation or by proclamation, shall be considered the holiday), shall be paid at the rate of time and one-half, except that employees who are regularly assigned to work

on Sundays and holidays, or employees who work in place of those so regularly assigned, will be compensated on the same basis as on week-days when the entire number of hours constituting the regular week-day assignment of work, or when released on their own request before the completion of such hours." The following clauses are also appended to this new rule:

"If released by the carrier before the expiration of the regular week-day assignment, time and one-half will be allowed for the actual time worked. Sunday and holiday work will be required only when absolutely essential to the continuous operation of the railroad."

A slight change which may or may not, according to the Board's later interpretations, be important, was made in the provisions pertaining to part time work on Sundays and specified holidays. Part of the rule covering this point in the national agreement states that: "regular assignment of more than four and less than eight hours on these days (Sundays and specified holidays) may be established if agreeable to the employees concerned, the hours worked to be paid for at the overtime rate." The comparable clause in the new code reads "regular assignments of more than four hours and less than eight hours on these days may be established if agreeable to the employees concerned, the hours to be paid for at the pro-rata rates."

As in the case of maintenance-of-way employees, the rule covering the payment of employees performing service which requires them to leave and return to their home station daily, has been revised to eliminate the necessity in some cases of paying overtime rates for the time spent in traveling or waiting. The national agreement provision provided that employees performing such service should be paid continuous time from the time they are required to report to the time they return, *whether working, waiting or traveling*. The new rule substitutes for this underlined phrase the following: "straight time for all straight-time work, over time for all overtime work; straight time for all time traveling or waiting."

Another clause of the signalmen's national agreement provided for the payment of half time to employees traveling in boarding cars between 10 p. m. and 6 a. m. This clause has been eliminated in the new code and after February 16, these employees will receive no time for traveling in boarding cars after the regular working period hours.

The rules of the signalmen's national agreement fixing a starting time for shifts and the time and lengths of meal periods have been changed in the new code so that these points may be "arranged by mutual understanding between the local offices and the employees' committee based on actual service requirements."

When employees work through the regular lunch period, they were paid overtime rates for their regular lunch period and 20 minutes in addition to procure their lunch under another rule of the national agreement. Under the new rule covering this point employees required to work through their lunch period will be paid straight time and will be allowed the necessary time to procure their lunch later (not to exceed 30 minutes), without loss of time.

The definition of a helper in the signalmen's national agreement has been expanded and made more specific in the new code. The national agreement characterized a helper as "a man assigned to perform work generally recognized as helpers' work and to assist signalmen, assistant signalmen, signal maintainers, assistant signal maintainers." The new rule characterizes a helper as: "A man assigned to assist other employees specified herein."

Pay for Employees Assigned to Road Work

Section 4 of Article 5 of the signalmen's national agreement relating to the payment on a monthly basis of employees assigned to the maintenance of a section, and who do not return to their home station daily, and employees regularly assigned to perform road-work, is materially changed in the new code. The old and the new rules covering these points are set out side by side below:

National Agreement

An employee assigned to the maintenance of a section who does not return to home station daily and employees regularly assigned to perform road work may be paid on a monthly basis. Such employees shall be paid not less than the minimum hourly rate established for the corresponding class of employees coming under the provisions of this agreement, on the basis of 365 eight-hour days per calendar year, with pay at the rate of time and one-half time for Sundays and holidays designated herein; otherwise, overtime will not be paid. Where meals and lodging are not furnished by the railroad or where the service requirements make the purchase of meals and lodging necessary while away from home point, employees will be paid actual expenses. This service is distinct and separate from that performed by any other class of employees coming under the provisions of this agreement and is not to be confused therewith; the employees assigned to it shall not be assigned to or used to perform work assigned to the other employees under the provisions of this agreement.

NOTE—The following is an example to be followed in arriving at the monthly rate:

	12 hours
365 days multiplied by 8	2920
59 Sundays and holidays at one-half time will be 59	
multiplied by 4, equaling	236
Total hours to be paid for	3156

The monthly salary is arrived at by dividing the total earnings of 3156 hours by 12; no overtime is allowed for time worked in excess of 8 hours per day; on the other hand, no time is to be deducted unless the employee lays off of his own accord.

New Rule

An employee assigned to the maintenance of a section who does not return to home station daily and employees regularly assigned to perform road work may be paid on a monthly basis. Such employees shall be paid not less than the minimum hourly rate established for the corresponding class of employees coming under the provisions of this schedule on the basis of 365 eight-hour days per calendar year. The monthly salary is arrived at by dividing the total earnings 2920 hours by 12; no overtime is allowed for time worked in excess of 8 hours per day; on the other hand, no time is to be deducted unless the employee lays off of his own accord.

The regularly assigned road men under the provisions of this rule may be used, when at home point, to perform shop work in connection with the work of their regular assignments.

Where meals and lodging are not furnished by the carrier or when the service requirements make the purchase of meals and lodging necessary while away from home point, employees will be paid necessary expenses.

If it is found that this rule does not produce adequate compensation for certain of these positions by reason of the occupants thereof being required to work excessive hours, the salary for these positions may be taken up for adjustment.

The new rule, in addition, adds the following:

"A signal helper, when working alone, or two or more signal helpers working together, may perform such work as filling and cleaning lamps, cleaning and oiling interlocking plants, bonding track, renewing primary batteries, excavating, and handling material, but shall not be permitted to do work recognized as distinctively maintainers' or signalmen's work."

Changes in the Discipline Rules

Two sections of the national agreement relating to investigations into the dismissal of employees and appeals thereon provide for the holding of hearings within seven days of the date when charged with the offense, and for the rendering of a decision within seven days after the completion of the investigation, have been revised in the new agreement to provide for a time limit in these cases of ten days instead of seven days.

Another rule of the signalmen's national agreement, which has been slightly revised in the new set of working rules, is that relating to the reinstatement of employees after charges against them have been unsustainable. The rule covering this point in the national agreement said in part:

"If by reason of such unsustainable charge the employee has been removed from position held, reinstatement will be made and payment allowed for the assigned working hours actually lost, while out of service of the railroad, at not less than the rate of pay of position formerly held or for the difference of rate of pay earned, if in service."

The new rule says:

"If by reason of such unsustainable charge the employee has been removed from position held, reinstatement will be made and payment allowed for the assigned working hours actually lost, while out of the service of the carrier, at not less than the rate of pay of position formerly held, or for the difference in rate of pay earned in or out of the service."

Because a very large majority of the carriers and their employees have agreed upon the major part of Article III, comprising the seniority rules, this article is omitted in its entirety. In further negotiations attention is again directed to principle 11, Exhibit "B" of Decision No. 119, which provides that: "The principle of seniority long applied to the railroad service is sound and should be adhered to. It should be so applied as not to cause undue impairment of the service."

The Labor Board believes that certain other subject matters now regulated by the rules of the national agreement may not be covered in all localities by rules of general application, and require further consideration by the parties directly concerned.

The omission of the rules governing the above matters is indicated herein by not including the number of the article or the section thereof, as the case may be, as used in the national agreement, and all such rules which involve a dispute between a particular carrier and its employees are hereby remanded to said carrier and its employees for the purpose of adjustment under the provisions of Section 301 of the Transportation Act.

With the exception noted above, the clauses of the signalmen's national agreement have either been continued by the Labor Board in this new code or remanded to the individual carriers and their own employees for settlement. It will be noted in this connection that the classification rules of the old national agreement remain unchanged with the exception of that one pertaining to helpers and that all of the provisions relating to promotions have been perpetuated *in toto* as have the provisions of the national agreement grouped in Article 7 and termed "miscellaneous."

The new rules are to apply to each of the carriers party to the dispute except in such cases as any particular carrier may have agreed with its employees upon any one or more of the rules in which cases the rule or rules agreed upon by the carrier and its employees are to apply.

Seniority Rules Remanded for Settlement

Regarding the rules which were part of the old national agreement, and which are not specifically mentioned in the new code, the Labor Board's decision says:

As in the case with the previous announcements of this character made by the Board, the interpretations made by the United States Railroad Administration, by adjustment boards or other agencies acting under the Railroad Administration of those rules which are similar to rules in the national agreement do not apply.

Labor Leaders of Railroad and Coal

Miners' Unions to Confer

A joint meeting of representatives of the United Mine Workers of America, and the "sixteen standard" railroad labor organizations, is to be held in Chicago on February 21, to consider the formation of an alliance of the members of these organizations "in resistance to proposed attacks on the wage scale." The call to the meeting was sent out by John L. Lewis, president of the mine workers' organization, who is obviously trying to enlist the aid of railway employees in the threatened strike of coal miners on April 1. Reports emanating from Indianapolis, where the coal miners' organization has its headquarters indicate that every effort will be made to induce members of the railroad organization to either refuse to handle coal produced by non-union workers in the event of a strike in the mines or walk out in a sympathetic strike.

When leaders of the railroad organizations accepted Mr. Lewis' invitation, he said that "it indicates that the organized railroad workers and mine workers have a profound appreciation of the necessity for closer co-operation and it reflects a determination to utilize every proper means of protecting the interest of the men employed in these basic industries."

More Carriers Apply to Labor Board

for Wage Reductions

The list of carriers, parties to the dispute over the proposed wage reductions, hearings in which will begin on March 6, include, in addition to those enumerated in the *Railway Age* of February 11 (page 777), the Alabama & Vicksburg, the Vicksburg, Shreveport & Pacific, the Charleston & Western Carolina, the Chicago & Eastern Illinois, the Louisville, Henderson & St. Louis, the Nashville, Chattanooga & St. Louis, the Chicago, Rock Island & Pacific, the Chicago, Rock Island & Gulf, the Central New England, the Northwestern railroad, the Atlantic Coast Lines, the Boston & Albany, the Boston & Maine, the Buffalo, Rochester & Pittsburgh, the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern, the Louisville & Jeffersonville Bridge, the Muncie Belt, the Denver Union Terminal, the Evansville, Indianapolis & Terre Haute, the Hocking Valley, the Long Island, the Manistique & Lake Superior, the New York, Ontario & Western, and the Pittsburgh & Lake Erie. In addition submissions have been received by the Board on several disputes between certain labor organizations and carriers as a result of the employees' request for wage increases. The disputes of this character submitted to the Board during the past week include cases involving the Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees, and the Cleveland, Cincinnati, Chicago & St. Louis, the Oregon-Washington Railway & Navigation Company, and the Los Angeles & Salt Lake, the Federated Shop Crafts and the Virginian and the Bessemer & Lake Erie; and the Order of Railroad Telegraphers and the Southern Pacific and the Lake Erie & Western.

M & N. A. Seeks Wage Reduction

The Missouri & North Arkansas came before the Labor Board on February 15 and through J. C. Murray, receiver, asked the Board for permission to cut wages 25 per cent in order that the operation of the carrier, suspended since July 31, 1921, could be resumed. Mr. Murray outlined the proposition which was submitted to the employees of the railroad on

October 10. This proposal involves the cutting of wages 25 per cent and the division of any surplus earned by the carriers, after paying operating expenses and interest on government loans, among the men to an extent to bring their wage scale up to the wages paid on other carriers. The owners of the property would receive nothing under the receiver's proposal until after the government loan has been paid off and wages have been restored to the standard scale period.

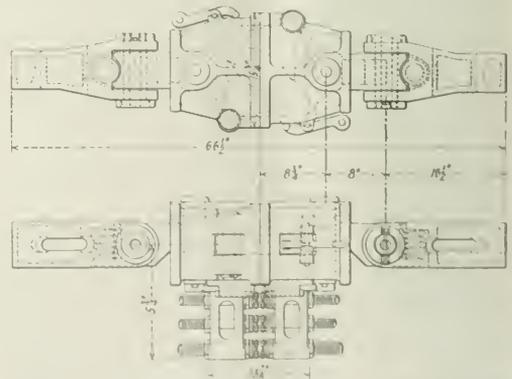
In testifying before the Board Mr. Murray stated that the resumption of operation of the property is dependent upon three propositions: First, the outcome of an application to the Interstate Commerce Commission for a loan of \$3,000,000; second, the outcome of an application to the commission for an increased division of 25 per cent on traffic interchanged with connections; and, third, the outcome of the present application to the Labor Board for a 25 per cent decrease in wages. He also testified that the carrier has been operated at a loss since the receivership began in 1912; that no dividends have been paid since that time, and that the accumulative loss totaled \$17,000,000.

F. J. Wade, president of the Mercantile Trust Company, St. Louis, Mo., representing the holders of all of the stocks, bonds, receiver's certificates, etc., of the carrier, also testified as to the financial history of the property and of his efforts to bring about a resumption of operation.

Representatives of the employees involved based their arguments largely upon the question of jurisdiction and procedure under the terms of the Transportation Act.

The Universal Car and Hose Coupler

A COMBINED CAR COUPLER and automatic steam and air hose connector in the design of which a complete departure has been made from the operating principle of the present standard vertical plane coupler, has recently been placed in service on a number of steam railway passenger cars. The device, which has been developed by the Universal Car and Hose Coupler Company, St. Louis, Mo.,



General Arrangement of the Universal Car and Hose Coupler

provides for no vertical adjustment between the coupler heads and the hose connector blocks are directly connected to the car coupler head.

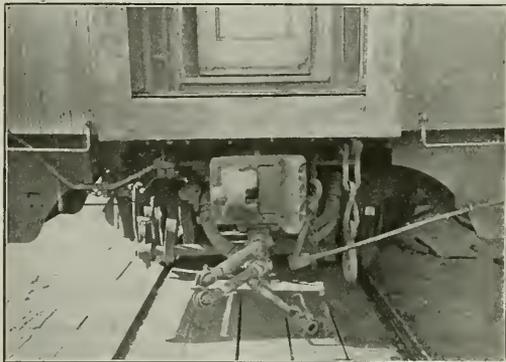
The operating principle of the coupler is clearly shown in the illustrations. From the drawing, which shows two of the devices coupled together, it will be seen that vertical and lateral adjustments are provided for by an intermediate section of the draw bar, hinged to the main draw bar by a large horizontal pin. To the end of this the coupler head in turn

is attached by a vertical pin connection. When uncoupled the coupler head is supported approximately in a horizontal position by means of a vertical coil spring acting on an extension from the lower side of the intermediate draw bar.

The coupler head presents a rectangular bearing face measuring approximately 11 in. vertically by 16 in. wide over all, the width of the bearing surface being about 13½ in. From the left half of the rectangle enclosed by this bearing projects a tongue which is tapered both horizontally and vertically to provide for automatically bringing the coupler heads into alinement as they approach each other. Within the right half of this rectangle is a pocket to receive the tongue of the opposing coupler. The inside vertical face of this tongue is recessed to form a standard M. C. B. knuckle contour for use in interchange with standard equipment. A horizontal opening through the tongue is also provided for the so-called locking lug or latch which is attached to the coupler head by a 1⅝-in. knuckle pin. A cylindrical pocket 8 in. long by 1⅞ in. in diameter is drilled into the locking lug and in this recess is placed a 1-in. coil spring 5½ ins. long acting on a 1-in. pin projecting beyond the back side of the lug. This pin acting against an interior surface of the coupler head automatically maintains the lug in its locking position in which the locking or latch portion of the lug projects outward through the side wall of the adjoining coupler head when the two heads are locked. In coupling, as the bearing faces of the adjoining couplers are gathered into alinement, each automatically opens the latch of the adjoining head against the spring compression until the bearing faces come in contact. Each latch then closes into an opening through the side wall of the adjoining coupler head, thus locking the two heads together. In uncoupling, lateral pressure is brought against the face of one of the latches where it projects through the wall of the adjoining coupler head, by means of a suitable lever arrangement, thus pushing it back

tances below its horizontal center line. These connections project beyond the face of the coupler, in which position they are maintained by coil springs housed within a connector bracket which is attached to the lower face of the coupler head.

When coupled, the compression on these springs maintains a tight joint between the adjoining gaskets. To the rear ends of the connector, pipes are secured short hose connections lacing from the various train line pipes. The gasket ends of the connector pipes are arranged to receive adapter couplings, by which adapter hose can be readily attached for use in interchange with standard equipment.

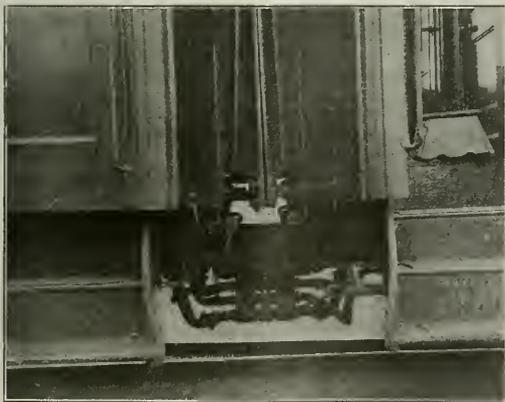


Universal Coupler with Guard Arm Applied for Interchange with the Standard Car and Hose Couplers

To provide for interchange with standard vertical plane couplers a casting, corresponding in contour with the guard arm of the standard coupler, has been designed to fit into the receiving pocket of the Universal coupler, to which it is secured by a lug on its lower face. This lug fits in a corresponding opening through the bottom of the coupler head. One of the illustrations shows this casting in place.

The principle purposes in the design of this coupler are to eliminate the necessity for going between cars to line up coupler heads or to couple air and steam; to interlock the two coupler heads in such a way that the draft stresses will be uniformly distributed over the head; to eliminate slack between the coupler heads and to keep them in correct alinement on curves as well as on straight track.

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Universal Couplers in Passenger Service

to clear the locking face of the coupler head with which it is engaged. The interior surface of the latch end of the locking lug engages a tail projection on the adjoining lug in such a manner that the one operation moves both lugs to the release position.

Owing to the fact that the adjoining coupler heads are permitted no freedom of movement relative to each other when coupled the opposed connector blocks are attached directly to the coupler heads, which, thus perform the function of alinement for the hose connections. All that is required, therefore in the hose connector feature are end gasket connections located on the vertical center line of the coupler at fixed dis-

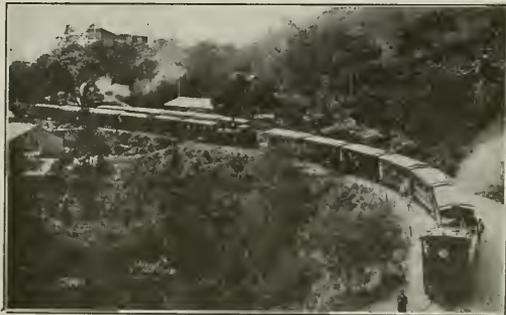


Photo by Keystone

A Narrow Gauge Line in Venezuela

General News Department

The American Association of Engineers will hold its fourth annual railroad conference in Chicago on Monday, March 13, the day preceding the opening of the annual convention of the American Railway Engineering Association.

Hearings before Judge K. M. Landis in the controversy between the Pennsylvania and the Railroad Labor Board, briefly described in previous issues of the *Railway Age*, has again been postponed from February 17 to February 20.

Charges of manslaughter against the engineman and fireman of the Michigan Central train which collided with a New York Central train at the crossing at Porter, Ind., last February, causing the death of 37 passengers, were dismissed in the Circuit Court at Valparaiso, Ind., on February 13.

The Railway Club of Pittsburgh will hold its next meeting at Fort Pitt Hotel, Pittsburgh, on Thursday evening, February 23. Col. H. C. Nutt, president and general manager of the Monongahela Railway will present a paper on "Railway Transportation in the A. E. F." There will be a luncheon following the meeting.

The American Railway Express Company has bought 104 electric trucks for street use, and now has in service more than twelve hundred electric wagons. The new equipment is for service in New York, Philadelphia and Buffalo. It is planned to run the New York trucks on a 24-hour basis, using interchangeable batteries. It is estimated that the exchange of batteries will require less time than to fill the tanks of five-ton gasoline trucks.

The Associated Railroads of New Jersey, comprising nine of the larger systems, represented by A. D. Oliphant and acting with the co-operation of business men and farmers' organizations, have appealed to the Legislature of New Jersey to pass Senator Allen's bill repealing the full crew law of that State. The railroad brotherhoods appeared in force, at the hearing before the Judiciary Committee, to oppose the bill.

Mr. Oliphant showed that since 1913 the added cost of railroad operation due to the full crew law aggregated \$5,000,000 in New Jersey, while last year it amounted to \$627,000. Pennsylvania repealed the full crew law last year, and it is hoped that New York will do the same this year. Mr. Oliphant emphasized the anomalous situation resulting from different laws in the neighboring States. The Allen bill proposes to empower the Public Utility Commission to order larger crews where trains are shown to be undermanned.

Siberian Veterans to Meet

The Siberian Veterans, an organization of those who saw service with the railway expedition to Siberia, will hold its second "Bolshoi Praznik" at the Hotel Commodore, New York, on Saturday, February 25.

Western Railway Club Meeting

The February meeting of the Western Railway Club will be held in the Great Northern hotel, Chicago, on Monday evening, February 20. A paper on "Some Factors in the Business of Owning Locomotives" will be presented by C. B. Peck, mechanical editor of the *Railway Age*.

American Society for Steel Treating

The sectional meeting of the American Society for Steel Treating, scheduled for March 5, will be held at the Hotel McAlpin, New York City, instead of at the Engineering Society's building as previously announced.

C., M. & St. P.'s Appeal Dismissed

The appeal of the Chicago, Milwaukee & St. Paul from the ruling fining H. E. Byram, president of the road, and three other officers \$100 on each of 25 charges for withholding a Chicago employee's wages for time spent in voting on election day was dismissed on February 8 by the State Supreme Court at Springfield, Ill. The court ruled that as the prosecution was under the criminal code, an appeal as in a civil case was not in order.

A. S. T. M. Annual Meeting

The American Society for Testing Materials will hold its twenty-fifth annual meeting at Chalonté-Haddon Hall, Atlantic City, N. J., during the week beginning June 26, 1922. The first day will be devoted to committee meetings and the convention will open on Tuesday morning, June 27, closing on Friday evening, June 30, or Saturday morning, July 1.

Wage Statistics For October

The Interstate Commerce Commission's summary of wage statistics for October indicates an increase of 35,806 in the number of employees as of the middle of the month compared with September. The total compensation increased \$12,630,137, making a total of \$237,02,959 for a total of 1,754,736 employees. The report for the Detroit, Toledo & Ironton is not included.

I.C.C. Reports on Accident to P.R.R. Locomotive

A report has recently been issued by the chief inspector of the Bureau of Locomotive Inspection, Interstate Commerce Commission, giving the results of an investigation of an accident to Pennsylvania Railroad locomotive 2599, which occurred at Gould Mine, Pa., December 6, 1921. The report states that the accident, which resulted in the death of the locomotive engineer, was caused by grooving of the outer firebox sheet directly above the mud ring in conjunction with fractures of the staybolts in the adjacent area.

Demonstration of Regan Train Control

An operating demonstration of the Regan Automatic Train Control system of the intermittent electrical contact type as installed on the main line of the Chicago, Rock Island & Pacific between Blue Island and Joliet was made on February 13 for the benefit of railroad officers representing all departments which will be affected by train control installations. Speed control was demonstrated in connection with caution signal indications and the train was stopped automatically at locations where the signals indicated stop. On the return trip another locomotive equipped with the indication type of apparatus demonstrated the action of this type at four locations between Blue Island and Chicago.

Committee to Study Train Control

Representatives of all but three or four of the 49 railroads cited in the Interstate Commerce Commission's proposed train control order met in Chicago on Tuesday, February 14, to consider the action to be taken in response to the Commission's order. At this time it was decided to create a committee of nine members to represent the roads with the understanding that any carrier may supplement such presentation in any manner and to such an extent as it considers necessary. This committee includes C. E. Denney, vice-president and general manager of the New York, Chicago & St. Louis, chairman; T. H. Beacom, vice-president and general manager, Chicago, Rock Island & Pacific; W. M. Jeffers, general manager, Union Pacific; A. M. Burt, assistant to operating vice-president, Northern Pacific; E. B. Katte,

chief engineer electric traction, New York Central; C. H. Morrison, signal engineer, New York, New Haven & Hartford; W. J. Eck, signal and electrical superintendent, Southern Railway; R. W. Bell, general superintendent motive power, Illinois Central, and C. F. Giles, superintendent machinery, Louisville & Nashville.

It was also concluded that those roads which desire to show cause why this train control order should not be entered will appear individually before the Commission on or before March 15 and that R. H. Aishton, president of the American Railway Association, should request the Commission to name a date on which this newly created committee may present its testimony in connection with the provisions of the order which affect all carriers.

No Particular Type of Train Control

Endorsed by I.C.C.

The Interstate Commerce Commission has issued a memorandum to the press, referring to its automatic train control order, saying: "It has come to the commission's notice that parties interested in particular devices, by advertisements and other representations in stock-selling activities, are giving the impression to the public that the commission approved, and ordered carriers to install, their particular devices.

"The commission desires it to be understood that its order does not prescribe, prefer, or indorse any particular device or type to be used by any carrier.

"The only requirement is that installation shall pass certain technical specifications and requirements which have been found to be necessary for the successful operation of devices of this character. These are so broad as to afford the desired freest field of opportunity for inventors and for trying out all automatic train control and train stop devices."

Tentative Valuations

The Interstate Commerce Commission has issued its tentative valuation of the property of the Chicago & Eastern Illinois as of June 30, 1915, which gives a final value for the carrier property owned of \$66,082,109 and for the property used of \$69,206,753. This is less than the outstanding capitalization on the valuation date, \$87,181,902, but since that time additions and betterments have been made and the company has been reorganized. The difference between the property owned and that used is mainly represented by the leased property, including \$4,000,000 for that leased from the Chicago & Western Indiana. The total mileage owned was 1,012. The cost of reproduction new of the carrier property owned, exclusive of land, was given as \$72,331,913 and the cost less depreciation as \$54,771,471.

The commission has also announced other tentative valuations as follows:

	Used	Owned
Newburgh & South Shore	1917 \$3,754,546	\$3,272,897
Lake Superior & Ishpeming	1916 4,903,378	4,902,156
Minneapolis Western	1916 794,088	712,592
Salt Lake & Los Angeles	1916 353,903	315,391

Both the Senate Committee on interstate commerce and the House Committee on interstate and foreign commerce have voted to report favorably the bills striking out of the valuation act the provision which requires the Interstate Commerce Commission to ascertain and report the so-called "excess cost of acquisition" of land.

The Government's Use of Jersey Central Locomotives

W. G. McAdoe, former director general of railroads, when making his recent statement before the Senate Committee at Washington (*Railway Age*, February 11, page 371) quoted, with inferences unfavorable to the road, from a letter written by President W. G. Besler of the Central of New Jersey to the superintendent of motive power, directing the latter to have certain locomotives repaired as quickly as possible, so that a bill for the repairs could be presented to the government. Writing to the Newark Morning Ledger Mr. Besler replies to Mr. McAdoe in part, as follows:

"One side of the story is good until the other is told. Mr.

McAdoe glibly states that the railroads, on return to private operation, endeavored to put through bills and charge them to the government, and he cites the Jersey Central as a particularly horrible example.

"Of course the railroads did so, for the reason that, under the contract, the government was obligated to return the properties in as good condition as when taken over, and when, as in the case of the Jersey Central, there were upwards of 100 engines disabled, worn out, and out of service, which should have been repaired by the director general, but which had been set aside and were not so repaired, why should not the railroads send such engines to engine builders for rebuilding, and to be placed in working condition? They had been worn out in 26 months of government operation, and had not been repaired. Is there anything improper in the thought that the government should repair them, or at least pay for the bills on account of such repairs? These bills have not yet been paid! It is one of the claims against the government for failure in the matter of maintenance and upkeep which we hope and intend, if possible, to make the government pay, as required by its obligation in the contract."

Hoover, Daugherty and Trade Associations

Secretary of Commerce Hoover in a memorandum to the attorney general has expressed his views on trade associations and has asked the attorney general for an informal expression of his opinion regarding the legality of certain activities of such associations.

Secretary Hoover's view in the main seems to be that the trade association has a legitimate field but that care is needed to prevent abuses. He emphasizes particularly that information regarding production, capacity, wages, consumption and the like should be given for publication to the daily and business press before it is given to members and that any information obtained be made public and not kept for the exclusive information of members of the association. Some of the points upon which the attorney general was asked to express an opinion are, in brief:

1. May a trade association provide for its members a uniform system of cost accounting, provided that costs so arrived at are not furnished to the members of the association?
2. May a trade association work for uniformity in the use of trade phrases and trade names?
3. May it arrange for uniform grading of product, standard contracts, standard processes and co-operate with its members in eliminating wasteful processes?
4. May it collect credit information about customers, provided a blacklist is not established?
5. May it handle insurance for its members?
6. May it, with its members, engage in co-operative advertising?
7. May it engage in welfare work among the employees of its members?
8. May it handle legislative matters in behalf of its members?
9. May it undertake to bring about closer co-operation between its members and federal and state government?
10. May the association collect statistics from members about volume of production, capacity to produce, wages, consumption of product at home and abroad, distribution of product? May a summary by districts be prepared from these statistics and given to the secretary of commerce?
11. May price statistics be compiled and given only to the secretary of commerce?

Attorney General Daugherty has replied that cost accounting uniformity would be objectionable only if uniform costs were assumed by the members of the association for factors entering into the selling price. Certain phases of Mr. Hoover's proposal about co-operative advertising, too, the attorney general said, would well be modified slightly. Regarding the other proposals he could see no objection provided there was no tendency to curtail production, enhance price or suppress competition. He emphasized, however, that this view was tentative.

Hearing on Authority to Permit Acquisition of Control

The Interstate Commerce Commission has ordered a hearing at Washington on February 28 at which interested parties may express their views on the question that has arisen in the Pittsburgh & West Virginia case as to the authority of the commission to grant the application for permission to acquire the control of the West Side Belt under paragraph 2 section 5 of the interstate commerce act. The questions to be considered at the hearing are:

- (1) May one carrier engaged in the transportation of passengers or property subject to the act acquire control of another such carrier or carriers by any of the methods specified in paragraph 2, section 5 of said act without obtaining the approval of the commission, as provided in said paragraph?

Operating Statistics of Large Steam Roads—Selected Items for the Month of November, 1921.

Freight service

Table with columns: Region, road and year; Average miles of road operated; Trains-miles; Locomotive-miles (Principal and helper, Light); Car-miles (Loaded, Per cent loaded); Ton-miles (thousands) (Excluding locomotives and tender, Revenue and non-revenue); Average number of locomotives on line daily (Service, Unserviceable, Percent un-serviceable, Stored).

1 Includes Chicago, Terre Haute & Southern from July 1, 1921, only. 2 Includes Gaston, Harrisburg & San Antonio, Houston & Shreveport, (C) Data not available.

Compared with November, 1921, for Roads with Annual Operating Revenues above \$25,000,000.

Region, road and year	Average number of freight cars on line daily			Per cent unserviceable	Stored	Gross tons per train, excluding locomotives and tender	Net tons per train loaded	Net tons per car-day	Cars per car-day	Net tons per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotive and tender	Passenger service		
	Home	Foreign	Total										Passenger train-miles	
New England Region:														
Boston & Albany.....1921	3,154	5,133	8,287	7.2	700	978	389	20.9	594	28.6	8,284	217	297,481	
1920	3,124	5,128	8,252	6.4	...	923	404	24.5	316	32.2	9,852	225	312,554	
Boston & Maine.....1921	16,732	17,299	34,031	18.6	...	1,129	457	21.3	256	17.8	3,526	158	789,055	
1920	8,961	23,334	32,295	11.0	129	1,081	489	25.9	340	19.4	4,449	...	854,538	
N. Y., N. H. & H.....1921	22,002	19,196	41,198	21.6	152	1,287	546	21.4	196	16.3	4,421	201	1,104,934	
1920	12,499	27,246	39,745	11.4	...	1,110	499	24.4	208	12.5	4,227	201	921,944	
Great Lakes Region:														
Delaware & Hudson.....1921	9,043	6,787	15,830	9.6	262	1,703	846	33.0	619	30.4	11,130	195	185,409	
1920	4,950	11,645	16,595	8.1	...	1,699	879	36.0	708	31.6	7,087	107	180,506	
Del., Lack. & Western.....1921	15,019	16,639	31,658	13.3	...	1,638	731	25.3	535	32.5	13,166	187	480,303	
1920	7,213	16,907	24,120	5.5	...	1,692	825	29.0	665	34.5	16,093	...	482,431	
Erie, (inc. Chi. & E.).....1921	36,174	21,057	57,231	19.1	2,604	1,867	785	26.4	478	30.3	12,101	156	657,195	
1920	12,620	11,722	24,342	6.3	...	1,849	873	30.0	638	33.7	15,183	172	678,289	
Lehigh Valley.....1921	27,660	10,033	37,693	11.2	1,281	1,667	767	28.9	414	23.6	10,974	185	374,786	
1920	11,338	19,472	30,810	10.1	96	1,470	882	32.8	588	28.0	12,754	185	370,012	
Michigan Central.....1921	17,377	17,201	34,578	9.1	...	1,557	602	21.3	277	20.7	5,241	145	565,818	
1920	5,750	21,088	26,838	7.2	...	1,624	700	23.9	432	27.8	6,947	132	2,355,415	
New York Central.....1921	76,793	52,390	129,183	22.8	7,450	1,949	838	35.2	487	29.2	16,285	...	2,242,862	
1920	34,912	107,382	142,294	8.4	...	2,024	965	29.2	792	26.4	12,385	...	1,801,303	
N. Y., Chic. & St. L.....1921	3,518	5,058	8,576	7.5	767	1,564	602	20.7	464	57.4	11,458	115	86,084	
1920	1,865	7,647	9,512	8.0	...	1,503	619	22.4	775	55.3	12,876	...	86,221	
Pere Marquette.....1921	9,935	15,837	25,772	16.2	750	1,271	595	25.0	300	30.0	13,876	161	285,180	
1920	4,497	15,103	19,600	8.5	...	1,432	590	25.9	439	19.6	3,098	182	299,968	
Pitts. & Lake Erie.....1921	18,042	8,906	26,948	43.3	1,370	2,337	1,308	40.9	149	6.0	17,634	93	136,447	
1920	4,864	22,522	27,386	11.6	...	2,695	1,629	42.7	313	10.6	38,192	77	112,471	
Wabash.....1921	11,485	12,621	24,106	11.4	645	1,429	630	25.1	521	11.9	15,922	172	315,998	
1920	5,916	19,151	25,067	9.6	181	1,352	664	26.2	573	29.8	5,944	188	367,146	
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio.....1921	62,407	36,065	98,472	12.7	10,663	1,551	744	31.2	437	23.5	8,291	200	1,368,316	
1920	33,086	79,208	112,294	6.4	...	1,691	875	36.1	237	11.9	8,599	179	1,337,628	
Central of N. J.....1921	17,818	9,033	26,851	15.5	5,029	1,368	656	21.4	423	11.9	8,810	179	314,610	
1920	7,636	17,274	24,910	15.7	...	1,369	706	35.2	316	14.8	11,580	...	313,047	
Chicago & Eastern Ill.....1921	13,529	3,391	16,920	15.7	2,500	1,441	682	29.8	321	18.7	4,800	184	230,812	
1920	6,175	8,056	14,231	13.9	...	1,470	765	34.5	556	26.2	6,945	...	1,457,159	
C., C. & St. L.....1921	19,416	15,263	34,679	11.2	8,302	1,693	832	37.3	489	26.3	9,978	142	606,967	
1920	3,036	28,764	33,800	8.7	...	1,774	845	31.1	605	16.6	8,536	...	666,869	
Elgin, Joliet & East'n.....1921	9,572	4,259	13,831	8.3	534	2,197	1,155	40.9	262	10.2	3,337	137	(*)	
1920	8,839	7,062	15,901	7.1	...	2,221	1,251	42.3	384	13.3	7,377	...	(*)	
Long Island.....1921	1,934	4,584	6,518	5.7	...	1,662	656	25.2	60	17.7	995	346	181,531	
1920	876	5,151	5,727	3.4	...	1,480	563	22.6	18.8	6.2	5.3	901	...	187,794
Pennsylvania System.....1921	206,215	78,864	285,079	12.7	26,733	1,704	829	33.7	426	21.1	11,157	155	4,942,073	
1920	121,377	170,818	292,195	3.6	1,198	1,686	903	36.5	518	22.1	13,953	...	3,496,992	
Phila. & Reading.....1921	24,425	14,735	39,160	6.5	1,800	1,639	837	35.8	387	13.9	13,921	183	477,101	
1920	10,387	28,966	39,353	5.6	...	1,556	926	39.3	557	22.5	19,599	...	524,311	
Poconchos Region:														
Chesapeake & Ohio.....1921	38,297	13,874	52,171	10.9	...	2,170	1,125	40.6	501	22.8	10,254	144	432,333	
1920	17,593	26,632	44,225	8.9	...	2,156	1,187	42.5	750	29.9	3,170	...	2,494,295	
Norfolk & Western.....1921	29,578	7,749	37,327	7.2	645	1,058	1,078	40.7	310	11.0	11,827	190	397,711	
1920	19,337	20,638	39,975	7.2	...	1,991	1,098	43.8	828	31.6	15,035	...	398,497	
Southern Region:														
Atlantic Coast Line.....1921	21,936	9,597	31,533	15.5	...	1,144	435	19.7	272	21.7	13,745	139	750,886	
1920	11,990	17,834	29,824	9.9	...	1,481	481	22.4	366	25.2	2,186	...	777,684	
Central of Georgia.....1921	4,192	3,318	7,510	14.9	...	1,064	458	21.7	419	27.4	1,647	153	301,775	
1920	1,651	5,259	7,180	7.6	...	1,078	506	27.3	535	30.2	2,007	...	310,877	
I.C. (inc. Y. & M.V.).....1921	39,022	24,945	63,967	6.5	6,225	1,615	711	28.0	503	24.6	6,201	...	1,603,308	
1920	18,200	44,627	60,827	4.5	...	1,633	824	34.6	621	17.1	11,201	...	1,839,275	
Louisville & Nashville.....1921	36,920	15,437	52,357	21.5	91	1,113	515	30.3	483	41.8	5,040	181	928,849	
1920	18,139	28,793	46,932	17.0	69	1,074	522	31.6	567	29.3	5,293	...	894,656	
Seaboard Air Line.....1921	12,088	8,952	21,040	28.0	...	1,091	444	21.0	287	20.1	3,292	...	1,045,050	
1920	5,726	12,121	17,847	11.5	...	1,138	527	23.7	404	23.7	4,046	191	525,428	
Southern Ry.....1921	37,090	25,071	62,161	11.1	4,935	1,118	462	23.1	324	22.1	9,901	215	1,259,757	
1920	17,733	41,043	58,776	38.6	...	1,117	489	25.7	397	24.8	3,365	...	1,427,206	
Northwestern Region:														
C. & N. W.....1921	42,644	26,501	69,145	7.0	9,000	1,144	470	23.5	321	22.2	2,653	192	1,576,872	
1920	33,847	47,272	79,119	7.3	2,900	1,145	536	25.9	399	23.0	3,797	...	1,666,439	
C., M. & St. P.....1921	45,963	26,948	72,911	16.4	...	1,280	548	24.0	361	24.2	2,396	184	1,471,743	
1920	23,861	45,041	68,902	7.7	...	1,312	586	26.4	489	30.4	3,174	...	846,889	
C., St. P., M. & O.....1921	3,532	11,547	15,079	16.3	1,267	968	397	21.7	74	17.9	1,820	188	301,776	
1920	2,091	10,757	12,848	14.0	729	994	426	24.3	389	24.6	2,893	...	311,546	
Central Northern.....1921	41,039	13,487	54,526	8.9	...	1,491	610	24.9	394	26.6	2,635	186	973,310	
1920	27,135	22,814	49,949	7.9	...	1,485	707	28.6	557	28.5	3,994	...	5,731,610	
M., St. P. & S. Ste. M.....1921	19,458	5,512	24,970	11.7	1,759	1,053	466	22.5	299	19.4	1,698	171	417,312	
1920	10,484	15,199	25,681	6.4	938	1,332	500	23.1	417	28.7	2,553	151	423,277	
Northern Pacific.....1921	34,076	11,972	46,048	10.4	1,295	1,325	618	25.2	397	25.5	2,848	147	821,488	
1920	22,971	19,101	42,072	9.7	...	1,514	668	27.6	567	35.1	3,727	...	1,337,320	
Ore.-Wash. R. R. & N.....1921	5,869	4,409	10,278	6.4	...	1,258	620	26.9	447	27.7	1,847	258	236,985	
1920	3,165	5,870	9,035	6.0	713	1,300	616	28.1	550	29.3	2,317	...	240,653	
Central Western Region:														
Atch., Top. & S. Fe.....1921	47,194	14,365	61,559	8.0	9,682	1,475	514	21.2	466	38.1	2,925	157	1,653,937	
1920	28,923	35,595	64,518	8.0	...	1,412	546	21.3	379	37.9	3,520	166	1,819,790	
Chicago & Alton.....1921	9,403	3,587	12,990	15.5	1,987	2,884	520	31.1	386	25.5	5,997	197	283,198	
1920	3,210	12,283	15,493	3.4	...	1,249	581	28.9	424	23.				

(2) Do said paragraph authorize the acquisition by one such carrier of title to the physical property of another such carrier either by deed or by lease in perpetuity, the transaction amounting to "consolidation into a single system for ownership and operation," but not involving the creation of a new corporation or change in the corporate identity of either?

(3) May one such carrier controlling 51 per cent. of the voting power in another such carrier acquire additional voting power by the purchase of an additional percentage of such other carrier's securities without securing the approval of the Commission under said paragraph?

(4) May one such carrier purchase less than a controlling interest in the securities of another such carrier where such purchase will not in and of itself give the purchaser control without securing such approval under said paragraph?

(5) May the Commission in connection with an application for authority to acquire control by lease prescribe as a condition of its approval of said lease that the applicant shall not during the life of said lease part with its control over the lessor previously acquired by the acquisition of capital stock?

(6) May the Commission in authorizing acquisition of control in one manner prescribe conditions with respect to the exercise of control in another manner?

(7) What conditions, generally, may the Commission impose under paragraph 2, section 5, in authorizing the acquisition of control in the manner therein prescribed?

Employees Invited to Think

Charles G. O'Neal, receiver of the Fort Smith & Western, a 200-mile railroad in Oklahoma, has issued a circular announcing to employees that cash prizes are to be offered to employees for ideas and suggestions which can be used to enhance the efficiency of the operation of the road. The circular says, in part:

... Your automobile can run for a while without gasoline, going down hill, but to go up-grade you must step on the gas. Any old-fashioned plant can continue to make money when business is flourishing, but in these times, the most expensive, modern equipment will not save any enterprise which ignores the importance of the human element, and the elimination of unnecessary costs.

To encourage every member of the railroad's organization, to suggest, think and work and become a full member of the organization from which he derives a livelihood, the Management is going to offer cash prizes and other suitable recognition to employees suggesting methods that will produce savings to the railroad. . . . Let us remember that one man is only better than another when he behaves himself better.

Let us give every well-behaved man and woman their equality of opportunity. Live and let live is not enough—we must live and help live, in America.

Your employer must be able to make ends meet in order to pay your wages and meet other obligations. Conditions make it necessary that *economy be practiced in its utmost detail*. Therefore, we want to conduct a "business prayer meeting" if you please, where all members of the team, from the highest official down to the office boy, may be encouraged to relate for the common good whatever useful ideas he may have, "either inspiring or chastening." . . . A lot of men are crammed full of knowledge but can't or don't put it in the proper channels for use. Skill is, of course, essential, but it must be wide awake skill that knows the "why" as well as the "how" of a thing.

True worth of any individual can only come through the possession of his full powers and knowledge of the truth. The management is not afraid of the truth. Here are some things that contribute most to men's success: First, ability to get along with other people, second, ability to think, and to go straight when you think. Look about you, study your work, observe the other fellow, can he assist you? or can you assist him in any mutual way that will produce more economy or eliminate waste? You are not limited to any department in your observations. Make memorandums of your observations and be ready to enter this campaign, full of ideas of which will be out in a short time. Are you going to coast? Let's step on the gas.

Traffic News

C. L. Strunk has been appointed traffic manager for the Benjamin Electric Manufacturing Company, Chicago, succeeding F. H. Thyer, who is now in the sales department of the company.

Robert I. Pierce, formerly with the Firestone Tire & Rubber Company, Akron, Ohio, has been appointed manager of the Traffic Bureau of the Terre Haute (Ind.) Chamber of Commerce.

Reductions in round-trip summer tourist rates to the Pacific coast approximating a cut of \$20 were announced by Western roads at Chicago on February 15. Roads east of Chicago have also agreed on new reduced summer tourist fares, which will soon be announced.

The Ohio State Public Utilities Commission has set February 18, as the date for beginning an investigation of coal freight rates within the state. The action follows a request of Governor Davis, who asked for the hearing to ascertain whether the rates are excessive and are contributing to the inactivity of the Ohio coal mines.

Western roads have announced reduced summer tourist rates to mid-western points for 1922 which are approximately the same as those in effect before the increase of 1920. The rates from Chicago will be on the basis of one and one-tenth of the present one-way fares, and of one and one-fourth for the round trip from Missouri river points.

The Transportation Club of Detroit, Mich., has elected the following officers for 1922: President, O. S. Dustin, general traffic manager, Ashley & Dustin Line; vice-presidents, W. S. Rodgers (Detroit United Line); George R. Dawson (Mulkey Salt Company); secretary, T. R. Cochrane, (Wabash); treasurer, J. A. Ferguson (G. P.). Members of executive committee, R. O. Bromley (M. C.); W. S. Crowl (Michigan Alkali Company).

The Transportation Club of St. Paul, Minn., on February 7, elected the following officers: President, P. R. Flanagan, assistant general freight agent, Chicago Great Western; vice-president, Foster Hannaford (Noyes Brothers & Cutler); secretary, Charles A. Liggett (St. Paul Association); treasurer, F. H. Parker, (G. N.); directors, C. S. Beach (Finch, Van Slyck & McConville); H. G. Costello (Young-Gray Lumber Company); M. P. Graven (C. M. & St. P.); H. Lufkin (St. Paul Foundry Company); H. Mueller (St. Paul Association).

The Chicago Great Western has served notice on competing lines that it will place in effect between Chicago and St. Paul, and between Chicago and Omaha, passenger fares \$1.50 less than those over other lines. The C. G. W. sought a year ago to place such a differential in effect but its application to the Western passenger association has been opposed by its competitors. The present notice follows hearings before the association during the past year. The C. G. W. operates fewer trains to these points than its competitors and does not run through and beyond as do the Chicago & North Western and the Chicago, Milwaukee & St. Paul. This disadvantage is recognized by its competitors but they do not admit that it is sufficient to warrant a differential; they would agree, however, to certain excursion and immigrant privileges. Whether the present action is to cause further passenger fare cuts in the west is problematical.

Valuation of Baggage Compulsory

Passengers on the Southern Pacific, beginning on March 1, will be required to place a valuation on all baggage and a charge of 10 cents will be made for each \$100 of value or fraction thereof, over the established limit of \$100. The change is, in effect, the same as that inaugurated some time since by the Chicago, Burlington & Quincy, and the practice of using adhesive stamps for the excess value charge will be followed. The new plan is not compulsory with intrastate movements in the states of California and Arizona.

Atlantic City as a Winter Resort

The Pennsylvania Railroad reports that travel from New York to Atlantic City on Lincoln's Birthday this year assumed huge proportions. On Friday, February 10, the Atlantic City Limited, an all-Pullman extra-fare train, was run in eight sections, carrying a total of 2,065 passengers, and on Saturday, February 11, the same train was run as an extra in eight sections and carried 2,043 passengers, a total of 4,108 for the two days.

Returning on Monday, the 13th, the New York Limited, an extra-fare all-Pullman train, was run in seven sections, carrying 1,564 passengers. Other regular trains on the 13th carried 2,173 additional passengers from Atlantic City to New York.

Anthracite Shipments in January

Cold waves during January, left their impress in the shape of increased shipments of anthracite during that month, there being a gain of 212,131 tons over December, 1921, although the total January shipments were 892,485 tons less than in the corresponding month last year, due in part to the continued industrial depression. The January record of the Anthracite Bureau of Information shows 4,848,053 gross tons is a decrease from the 1921 average of about 14 per cent.

Shipments by originating carriers were as follows:

	January 1922	January 1921	December 1921
P. & R.	1,052,872	1,172,873	985,262
L. V.	766,602	1,058,127	801,796
C. of N. J.	342,558	470,704	532,597
D. L. & W.	748,768	910,260	626,377
D. & H.	619,762	814,491	654,989
Penna.	331,871	451,879	307,520
Erie	466,495	606,602	450,465
N. Y. O. & W.	101,779	156,364	107,107
L. & N. E.	221,346	99,038	169,811
	4,848,053	5,740,538	4,635,922

Coal Production

Production of coal continues to increase, according to the weekly bulletin of the Geological Survey. The total output during the week ended February 4 is estimated at 9,708,000 net tons, an increase of 88,000 tons as compared with the preceding week. In comparison with the corresponding period a year ago, the increase was 1,576,000 tons.

Central of Georgia Calls on the Public to Confer

The general superintendent and other officers of the Central of Georgia have been traveling over the road holding conferences with patrons concerning train service and other problems of mutual interest. Civic organizations, city councils and the public generally were invited to meet them; and W. A. Winburn, president of the road, issued a brief statement showing the imperative necessity of drastic reduction in expenditures. The road failed by a million dollars to be self-sustaining last year and the officers have gone as far as they possibly can in practicable economies. "We have reduced forces, deferred maintenance and postponed repairs so far as is safely possible. Our employes have done their part by saving \$400,000 in the fuel bill, by reducing the claims for loss and damage to freight and by decreasing the personal injuries."

Continuing, Mr. Winburn says: "It appears, therefore, that the only road open to us is the revision of train schedules so as to free us from the burden of paying overtime; and perhaps in certain instances the temporary removal of certain passenger trains that do not appear to be necessary for the business welfare of the communities that we serve. . . . The very fact that the trains are running nearly empty shows that the service is not essential. But we are anxious to avoid injury to the commercial interests of any community and we ask their help in solving this problem."

The party travels by motor car, and Dover, Dublin, Millen, Statesboro, Milledgeville, Covington, Carrolton and Bremen were among the first places visited.

Federal Traffic Bureau Seeks Economies

Plans for the standardization of shipping and travel regulations for all government departments, which are expected to save the government thousands of dollars annually, are being formu-

lated by the advisory committee of the Federal Traffic Board, under the direction of Budget Officer Charles G. Dawes. As a part of his program to secure "more business in government" General Dawes called a meeting of the advisory committee on February 9 and spoke on the various phases of traffic problems faced by the government at this time.

The committee is composed of some of the most prominent railroad traffic executives, consisting of Ralph C. Caples, chairman; Lewis J. Spence, director of traffic, Southern Pacific; George H. Ingalls, vice-president, New York Central lines; Lincoln Green, vice-president, Southern; H. M. Adams, vice-president, Union Pacific, and Archibald Fries, vice-president of the Baltimore & Ohio. At the meeting there was discussed a plan for simplification in rate-making and the subsequent rendition of accounts and their payment. Six committees have been appointed to take up the traffic problems of the government.

Bills of Lading

The Interstate Commerce Commission has issued an announcement regarding its orders in the bill of lading cases which says:

On October 21, 1921, the commission made two reports in this investigation. In the first of these, *Export Bill of Lading*, 64 I. C. C., 347, it prescribed the form of through export bill of lading to be issued for the transportation of property in connection with vessels registered under the laws of the United States. In the second, *Domestic Bill of Lading and Live Stock Contract*, 64 I. C. C., 357, it prescribed the forms of the domestic bill of lading and of the live stock contract, which later were, on petition, modified in two minor particulars.

The export bill was ordered to be made effective on or before February 15, 1922. Upon representations by the roads that they desired to make the export bill, the domestic bill and the live stock contract effective at the same time, the effective date of the order was changed to March 15, 1922. No order was made in connection with the domestic bill of lading and the live stock contract.

These bill-of-lading rules affect "the value of the service rendered to the shipper, or consignee" and must be filed with the commission in accordance with the provisions of section 6 of the law. The commission has no jurisdiction over loss or damage claims, and the interpretation of the applicable provisions of bills of lading is a matter of law, to be determined by the courts. . .

It is customary for carriers to furnish bills of lading, but large shippers frequently provide their own. With regard to the transportation covered by paragraph 11 of section 20 of the law, it is specifically provided that any carrier receiving property for such transportation "shall issue a receipt or bill of lading therefor; and . . . it would seem that a carrier could refuse to use a bill of lading tendered by a shipper which was of an unusual size or style. While this is a question to be determined by the courts, it would appear that the terms and conditions of the appropriate bill lawfully published and filed would govern shipments subject to the interstate commerce act, regardless of what bill was actually issued, or of a possible failure to issue a bill. . . . A number of requests have been received for permission to use old bills of lading, or forms with no conditions printed thereon, but the utmost the commission could do would be to indicate that it approved or did not approve of such a practice. The need for it has greatly diminished now that there will be uniform bills of lading for use throughout the country, and there is still an appreciable time during which current forms can be used; and . . . the commission is unwilling to lend its approval to the practice.

In due course an order will be promulgated by the commission designating points at which information relative to the handling of export shipments shall be maintained, and at which through ocean bills of lading shall be issued. . . .

PASSENGER TRAINS moved over the Pacific system of the Southern Pacific during 1921, averaged 93.4 per cent. on time at destination. This is an increase of 3.4 per cent. over 1920.

AN ATTEMPT TO WRECK the southbound Shore Line limited of the Southern Pacific at Glendale, Cal., on the night of January 27, failed when a man was shot in the act of nailing down an obstruction which might have thrown the train off the track. The culprit, a former switchman of the road, died later from the effect of the wound. It was reported that the train carried from \$70,000 to \$150,000 in money but the actual amount is stated to have been about \$8,000.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from February 15, until June 15, the operation of schedules published by the Carolina, Clinchfield & Ohio which propose to increase the rates from 356½ cents to 388 cents per net ton on coal from mines on the Carolina, Clinchfield & Ohio, the Interstate, the Norfolk & Western and the Norton & Northern in Virginia to destination stations, Stokes to Ehrhardts, S. C., on the Atlantic Coast Line Railroad and Lemon Spur to Ehrhardts, S. C., on the Bamberg, Ehrhardts & Waterboro.

The Commission has issued a decision in the case of the American Wholesale Lumber Association versus the director general and the railroads, in which it holds that the charge of \$10 a day on cars of lumber held for reconsignment beyond 48 hours after 7 a. m. of the day following the notice of arrival, which was established by the director general in 1919, was not unreasonable or otherwise unlawful. However, under present conditions, with the great number of idle freight cars and entire absence of congestion throughout the country, the commission finds that the charge is and while present conditions continue, will be, unreasonable. It is, therefore, ordered that the railroads cease from collecting this charge after March 13 until further orders of the commission.

Personnel of Commissions

E. I. Lewis, a member of the Interstate Commerce Commission, has been designated by the commission to assume administrative charge of the work of the Bureau of Valuation, in place of Commissioner Aitchison, who is to devote more of his time to specialization on car service work. Mr. Lewis has been a member of Division I of the commission, which has general supervision over valuation matters. Charles F. Staples is acting director of the bureau.

Court News

Snowsheds and Boarding Car Cooking Utensils Not Assessable by Counties

The Montana Supreme Court holds that snowsheds are part of the roadbed and therefore assessable by the State Board of Equalization and not by the county assessor; and that boarding car cooking utensils are a part of the rolling stock and subject to no assessment save that by the State Board.—*Great Northern v. Flathead County (Mont.)*, 202 Pac. 198.

Gondola Car With End Unfastened

The Circuit Court of Appeals, First Circuit, holds that a railroad company was negligent in placing a gondola car in a train with its drop end standing up, but unfastened, and that this was not one of the risks of employment assumed by a trainman who, in attempting to pass from that car to a box car next to it, stepped upon the unfastened upright end of the car, which gave way, and he fell through a bridge to the street below.—*Boston & Maine v. Sullivan*, 275 Fed. 890.

Couplers Required Under Federal Law

The Circuit Court of Appeals, Seventh Circuit, holds that, under section 2 of the Federal Safety Appliance Act, couplers must be such that the act of coupling, as well as of uncoupling, can be accomplished "without the necessity of men going between the ends of the cars." (*Johnson v. So. Pac.*, 196 U. S. 1, 25 Sup. Ct. 158), and that the act did not permit the use of a coupler which must require a brakeman to get on the track at the end of the car to open the knuckles, though the other train was some distance away. Other evidence that it is impracticable to build couplers

whose knuckles can always be opened by the lever extending to the side of the car, that no such couplers have yet been made, and that the defendant uses a generally approved type, was held irrelevant, the offer not professing to show that compliance with the statute is a mechanical impossibility. The court said: "If the statute is harsh and is difficult to comply with, relief must come from the law-making, not the judicial, branch of the government."—*Payne v. Colvin*, 276 Fed. 15.

Strike No Defense to Action for Demurrage Charges

The Circuit Court of Appeals, Eighth Circuit, holds that under the Interstate Commerce Acts demurrage charges for detention of cars by a shipper or consignee must be enforced, and it is no defense to an action to collect them that the detention was caused by a strike, or was by orders of a sheriff, prohibiting the moving of the cars to prevent inciting mob violence. Neither the Interstate Commerce Commission nor the courts can release parties from such charges because of a strike. Congress alone has the power to write such an exception into the statute.—*Sinclair Refining Co. v. Schaff*, 275 Fed. 769.

Propriety of Extra Charge for Refrigerator

Car is for I. C. C., Not for Courts

The published freight tariff for potatoes from Page, N. D., to Chicago was \$181.69. Another published tariff authorized an extra charge of \$5 when the shipper uses a refrigerator or other insulated car. The Minnesota Supreme Court holds that the question of the propriety of this extra charge is for the Interstate Commerce Commission to pass upon and the state courts cannot, in an action by the shipper to recover the charge, interfere with the rates fixed.—*J. C. Famechon Co. v. Hines (Minn.)* 185 N. W. 941.

Storage Rule for Explosives Does Not Apply to C. L.

The Circuit Court of Appeals, Third Circuit, holds, affirming judgments for the defendant in actions by thirteen plaintiffs against the Lehigh Valley arising out of the Black Tom Terminal fire, that section 1643 of the regulations of the Interstate Commerce Commission, providing that: "Suitable provision must be made, outside the station when practicable, for the safe storage of explosives, and every effort possible must be made to reduce the time of the storage," does not extend to explosives in carload lots which have arrived at their destination and are awaiting unloading for trans-shipment.—*Fidelity & Deposit Co. v. Lehigh Valley*, 275 Fed. 922.

Derailment—Condition of Cars After Accident

In an action for injuries to a passenger in a derailment the Circuit Court of Appeals, Seventh Circuit, held it error to refuse permission to the railroad company to show what was disclosed by an inspection of the cars of the train. The plaintiff having charged, among other acts, defects in the cars, and having relied upon the rule of *res ipsa loquitur*, so far as the rule may apply, it was incumbent on the company to meet and disprove each of the alleged acts of negligence which would give application to the rule. The lapse of time between the accident and a part of the inspection affected the weight, but not the admissibility of this evidence.—*Payne v. Cohlmeier*, 275 Fed. 803.

Physical Connection of Rival Roads Held Unnecessary

In an action to require the Northern Pacific to make a physical connection at Centralia, Wash., between its tracks and those of the Puget Sound & Willapa Harbor, owned and operated by the Chicago, Milwaukee & St. Paul, the Supreme Court of the State of Washington holds that the rival road should not be required to make the physical connection in order that a lumber company might purchase timber and ship it over the Milwaukee road. Evidence did not show with sufficient definiteness the volume of business to be affected, and the saving of time and expense to the shipper as against the cost and loss to the carrier. Judgment reversing an order of the state Public Service Commission was therefore affirmed.—*Northern Pacific v. Commission (Wash.)*, 202 Pac. 4.

Labor Board Decisions

Labor Board Declines to Restore

Previous Differentials

A request for an increase in the rates of pay for men in signal towers—train directors and levermen—to restore differentials previously existing between those positions and the positions of dispatchers and signal maintainers, respectively, was raised by the Order of Railroad Telegraphers in a protest against the Terminal Railroad Association of St. Louis. Previous to Federal control, train directors received a higher rate than train dispatchers. The application of the various orders issued by the United States Railroad Administration affecting the classes of employees involved in this dispute has resulted in train dispatchers now receiving a higher rate of pay than the train directors, while levermen, who previously received a higher rate than signal maintainers, are now receiving less. The Labor Board denied the request of the employees.—*Decision No. 611.*

Overtime for Sunday Work by Section Foreman

The question of overtime payment to the foremen for the supervising of maintenance of way gangs was submitted to the Labor Board which cited the following clause from the National Agreement as applying:

"(h) Employees whose responsibilities and or supervisory duties require service in excess of the working hours or days assigned for the general force will be compensated on a monthly rate to cover all services rendered, except that when such employees are required to perform work which is not a part of their responsibilities or supervisory duties, on Sundays or in excess of the established working hours, such work will be paid for on the basis provided in these rules in addition to the monthly rate. For such employees, now paid on an hourly rate, apply the monthly rate, determined by multiplying the hourly rate by 208. Section foremen required to walk or patrol track on Sundays shall be paid therefor, on the bases provided in these rules, in addition to the monthly rate."

The decision of the board is as follows: In the event that no agreement has been reached, effective December 16, 1921, section (h) of Article V of Decision No. 501 shall apply in the manner provided therein. For all service considered as overtime, for which extra compensation is provided, the hourly rate of pay for such service shall be predicated upon 204 hours per month, in accordance with section (e), Article V of Decision No. 501, regardless of the hours or days that may be considered as the regular assignment of monthly-rated supervisory forces.—*Decision No. 593.*

Method of Paying Roustabout Carpenters

A roustabout carpenter on the Louisville & Nashville, with headquarters at Knoxville, Tenn., was engaged in miscellaneous repair work over a portion of the line. He was assigned to a certain carpenter gang but worked entirely without supervision except that he made material and work reports to the gang foreman at the end of each week. The railroad paid him on the basis of 10 hours a day at pro rata rates in accordance with Section i of Article V of the National Agreement. The employees contended that Section m of the same article was the one which applied in his case. Sections i and m are quoted below:

(i) Employees temporarily or permanently assigned to duties requiring variable hours, working on or traveling over an assigned territory and away from and out of reach of their regular boarding and lodging places or outfit cars, will provide board and lodging at their own expense and will be allowed time at the rate of 10 hours per day at pro rata rates and in addition pay for actual time worked in excess of 8 hours on the basis provided, in these rules, excluding time traveling or waiting. When working at points accessible to regular boarding and lodging places or outfit cars, the provisions of this rule will not apply.

(m) Employees not in outfit cars will be allowed straight time for actual time traveling by train, by direction of the management, during or outside of regular work period or during overtime hours either on or off assigned territory, except as otherwise provided for in these rules. Employees will not be allowed time while traveling, in the exercise of seniority rights or between their homes and designated assembling points or for other personal reasons.

The Labor Board sustained the position of the carrier.—*Decision No. 649.*

Foreign Railway News

Extending the Benguela Railway

LONDON.

An extensive program of construction and improvement of railways and port works is proposed for Angola, Portuguese West Africa. The most important project is the extension of the Benguela railway to the Belgian Congo frontier, which will involve the construction of about 466 miles of new line. Track material and rolling stock have already been imported.

French Railway Rates to Be Reduced

LONDON.

The French railways are considering the question of lowering their rates, especially in the case of heavy raw materials. M. Le Trocquer, the minister of public works, has provisionally approved a list of rates for metals, providing a fairly large reduction of those actually obtaining. Rates for consignments of metallurgical products to French seaports are reduced by 25 to 40 per cent, and in the case of ores for export, rates are reduced from 10 to 15 per cent.

French Training for English Students

LONDON.

The Société des Ingenieurs Civils de France states that French engineering firms manufacturing rolling stock and other railway material in the Lorrain district have offered to accept for periods of two or three months a few British engineering students through their summer holidays. The students will not receive any salary and are to make their own arrangements for the journey, board and lodging and will be expected to submit to the same discipline and working hours as their French colleagues on the works' staff.

Brighton Railway Electrification

LONDON.

The London, Brighton & South Coast railway, England, has deposited a bill in Parliament to raise additional money for the purpose of electrifying certain portions of its line. It is estimated that the work will require an expenditure of upwards of £1,000,000 (or about \$4,866,000 at the normal rate of exchange). The bill proposes to empower the company to borrow £500,000 (\$2,433,000) authorized in the year 1911, and also further powers to borrow £1,000,000 (\$4,866,000) which "may be raised without reference to the issue of any additional capital."

Electrification of Italian Railways

LONDON.

The Italian ministry of public works has approved the electrification of the Bologna-Venice-Montefalcone line and the work is to be given to private industry. The Italian State Railway Administration is at present considering the question of using thermo-electric centers instead of hydro-electric centers, since the latter presents the difficulty of high cost of labor and materials and owing to the shortage of water supply with which Italy is at present confronted. It is reported that the electrification of the Chiasso-Bellinzona and Arth-Goldan-Luconca lines will be completed by the end of January, 1922.

"Luggage-in-Advance" Rates Reduced in England

LONDON.

The railway companies of Great Britain have announced reduction in the charge for the conveyance of passengers' "luggage-in-advance" from 3 shillings (approximately 73 cents at the normal rate of exchange) to 2 shillings 6 pence (60 cents) per package. Before the war the charge was 1 shilling (25 cents) per package. During the war the

"luggage-in-advance" system was suspended but was one of the first pre-war services to be restored. Its popularity is very great and in addition to its proving a source of income it assists the railway companies to avoid delays which the handling of large quantities of luggage on passenger trains involves.

Strange Railway Accident in England

LONDON.

An accident occurred on January 27, on the London & North Western between Roade and Blisworth, Northampton, England, as the result of which one person was killed and 18 injured.

The accident occurred between two express trains, one travelling from London to Birmingham and the other from Glasgow, Scotland to London. As the trains were passing each other they were struck by a flying piece of metal. What actually happened is still to a very great extent a matter of conjecture, but it is thought that the accident occurred through the steel foot-step of one of the engines becoming detached. The tender foot-step was apparently broken off the train travelling to Birmingham, which fell on the permanent way, and it is thought that when it hit the ground it rebounded and struck the first coach of its own train. The Glasgow to London express happened to be passing at the moment in the opposite direction, and the foot-step appears to have been caught between the two trains smashing in the glass and some panels in the first coach of each train. The roadway was not damaged.

Irish Railway Strike

LONDON.

The general strike ordered to begin on the Irish railways at midnight on January 14, owing to a dispute over an arbitration award lengthening the standard day, has been postponed. This is the outcome of a conference arranged between the railway managers, the men's representatives and Joseph McGrath, the minister of labor in the new Irish cabinet. The following notice was published by the ministry of publicity on Saturday:

The provisional government, mindful of its obligations to protect the economic life of the country and do all in its power to avert the calamitous consequence of a stoppage of railway services, hereby orders that the terms of the Carrigan award, dated December 17, 1921, dealing with wages and salaries, be put into operation as from January 15, 1922, but that, with a view to affording the provisional government time and opportunity to institute investigations, and to endeavor to bring about a settlement, the operation of the award, dated November 19, 1921, dealing with the hours and conditions of service be suspended for one month from January 14, 1922. The provisional government will recompense the companies for any proved loss incurred by them in consequence of the non-application of the award dated November 19, 1921.

The railwaymen's representatives undertook that work on the railways should continue for one month from January 14, 1922, without prejudice to further action.

British-Canadian Concession in Peru

Details of an important concession to British and Canadian interests by the government of Peru are given in the Pan-American Magazine. Some of these are:

1. The construction of about 1,300 miles of railway by the concessionaire.

2. The grant of 50 million acres of agricultural and mining lands to the corporation for development by it. The surface rights are granted in perpetuity and the sub-surface rights for 33 years. Freedom from "import and export taxes, as well as all other imposts, such as income tax, internal revenue dues, stamp and registration fees, is also granted for the period during which the mineral (i. e., sub-surface) rights exist."

3. The concessionaire receives for 33 years a monopoly of the tobacco industry in the country, subject to government supervision.

4. The concessionaire takes over 62 miles of government railways now in operation and 106 miles under construction and pays £1,325,000 to the government, undertaking at the same time to complete the construction of the lines.

5. The government guarantees that for 33 years no railways will be built to parallel those of the concessionaire.

6. The railway construction program is to be completed within 12 years.

7. The concessionaire has deposited £10,000,000 with the government as a guarantee of good faith.

Standardization of Railway Gage in Australia

LONDON.

It is reported that the conference of state premiers with the federal minister has dropped for the time being the standardization of the railway gages. The first installment would involve an outlay of £21,000,000 (approximately \$102,186,000 at the normal rate of exchange). Mr. Hughes, the commonwealth prime minister is not favorable to the acceptance of any outside offer to undertake the transformation on a percentage basis, as he states the government can obtain all the money it needs for the purpose. The question of the standardization of the railway gage is therefore to stand postponed until May next, when a further conference will be held.

Australian State Railways' Deficits

LONDON.

The Australian railways like all other railways in various parts of the world have been unable to do much to reduce the deficits on the last year's working, owing principally to the high cost of labor and materials. From the annual reports published by the treasurer for the year ended June 30, 1921, the Queensland Railways, it is noted, have had the heaviest loss. The deficit in this railway's operations amounted to £1,581,000 (approximately \$7,693,146 at the normal rate of exchange) for the year ended June 30, 1921.

The deficit on the Victoria Railways amounted to £651,635 (or \$2,170,856) for the year ended June 30, 1921, while the deficit for the previous fiscal year amounted to £212,893 (\$1,035,937).

The New South Wales Government Railways had a deficit amounting to £577,032 (\$2,707,838) or a total deficit for railways and tramways of £470,360 (\$2,283,772). From this it will be seen that the tramways really made a profit on the year's operation. The deficit for the previous fiscal year amounted to £137,574 (\$669,435).

The Western Australia Government Railways' deficit amounted to £418,370 (\$2,045,808).

The New Zealand Railways had a deficit of £115,570 (\$562,363) after operating expenses and interest charges had been paid, although the previous years' working had resulted in a surplus.

Favors Leasing of French State Railway

LONDON.

A report of the sub-commission appointed to inquire into the question of leasing the French State Railway, proposes the creation of a company to operate the line. The scheme would always give a majority of votes to private persons owning capital shares, but would also admit to the board of directors and to the general meetings representatives of the state. The new company would have a capital of 210,000,000 francs (approximately \$40,518,000 at the normal rate of exchange). One-third of the shares would be subscribed by the departments and communes served by the State Railway, as well as by the respective chambers of commerce, administrations of free ports and industrial and agricultural groups. Two-thirds of the shares would be subscribed for by the public. A further 60,000 shares, termed labor shares, would be owned by the employees.

The company would be managed by a council of 27 members, three being representatives of the state and three representing holders of labor shares. The 21 other members would represent capital shares and would be elected at a shareholders' meeting, but seven of these are to be chosen from those representing public communities. This would mean that the subscribing public investing two-thirds of the company's capital would always have a majority of 14 directors out of 27.

British Report on Light Signals

The Ministry of Transport of the British Government has issued a report, dated October 28, in which a committee, appointed in July, reports on its investigation of light signals (for use both day and night) for signaling on British railroads.

The committee consisted of Major C. H. W. Edmonds, of the Ministry of Transport, chairman; J. C. Allen, of the National Union of Railwaymen; Major G. L. Hall, government inspecting

officer; H. J. Oxlade, Associated Society of Locomotive Engineers and Firemen; Captain B. H. Peter, Westinghouse Brake & Saxby Signal Company; W. J. Thorrowgood, telegraph and signal superintendent, London & Southwestern and M. R. Gardner, Ministry of Transport.

The committee examined the color light signals in use on the Liverpool Overhead Railway, where such signals have been in use for a considerable time; and it was found that the signals were distinctly visible at a distance of 1,000 yards, when seen during brilliant sunshine. A position light signal on the London & Southwestern was also examined; and in both cases the lights were found sufficient and satisfactory. The conclusion of the committee is that the color light signal, with separate lenses for each color indication, is superior to all other signals. The committee holds that the use of color light signals will afford most, if not all, of the advantages obtained from power worked semaphores, and at considerably lower cost; particularly in congested districts where power is available; and even for sparsely signaled areas there is little difference in cost as compared with mechanical semaphores.

The committee believes that not more than three types of color light signals would be necessary, namely, for long range, for short range and for shunting. It is believed that artificial backgrounds are not necessary; also that lenses alone are preferable to reflectors or to combinations of reflector and lenses. Extensive hoods are believed undesirable.

English Shippers' Questionnaire

on Effect of Rates on Traffic

LONDON.

In view of the situation created by the refusal of the English railway companies to accede to the request of the shippers' organizations for a general reduction of freight rates, the Federation of British Industries has addressed a letter to its affiliated associations with a request for a reply to certain questions to enable the transport committee to draw up a considered case for reduction.

The letter states that the transport committee unanimously decided to adhere to their demand for a percentage decrease which should be general and include all goods affected by the uniform advances. The questions to which the affiliated associations are asked to reply, are:

1. To what extent have you diverted traffic from railway to road or water transport?
2. What amount of such traffic diverted would you hand back to railways if rates were reduced to, say, 75 per cent above 1913 prices?
3. Can you give any idea of what increased tonnage, if any, would result from a reduction in railway rates to say 75 per cent above 1913 prices, apart from question 2?
4. To what extent are the prices of your commodities today in excess of an average pre-war price.
5. What percentage reduction from the existing rates is necessary to assist your business?
6. To what extent have the increased rates caused a limitation of distribution so far as your firm is concerned. Have you had to cease sending long distances. If so, please give a few instances.



A Stop for Fuel and Water, in Mexico

Equipment and Supplies

Locomotives

THE DETROIT & MACKINAC is inquiring for one or more locomotives.

THE SAVANNAH & ATLANTA is asking for prices on 5 Mikado type locomotives.

THE DENVER & RIO GRANDE is asking for prices on 20 Pacific type locomotives.

THE BUFFALO, ROCHESTER & PITTSBURGH is asking for prices on 20 locomotives.

THE LOUISVILLE, HENDERSON & ST. LOUIS is asking for prices on 6 Consolidation type locomotives.

THE ARGENTINE STATE RAILWAYS are asking for bids for 50 narrow-gauge locomotives, the gauge being 750 mm. (30.3 in.). Communications regarding these locomotives should be addressed to the Direction General, Ferrocarriles del Estado, Buenos Ayres, Argentina.

Freight Cars

THE BOSTON & MAINE is having 1,000 box cars repaired at the shops of the Laconia Car Company.

THE NORFOLK & WESTERN is having 400 coal cars repaired at the shops of the Ralston Steel Car Company.

THE DELAWARE, LACKAWANNA & WESTERN is asking for prices on the repair of about 900 steel hopper cars, of 40 tons capacity.

THE PHILLIPS PETROLEUM COMPANY, Bartlesville, Okla., has ordered 60 insulated tank cars of 8,000 gal. capacity from the Standard Tank Car Company.

THE PHILADELPHIA & READING, reported in the *Railway Age* of December 31 as inquiring for from 500 to 2,000, 70-ton hopper cars, has divided an order for 2,000 cars equally between the American Car & Foundry, the Cambria Steel Company, the Pressed Steel Car Company and the Standard Steel Car Company.

Passenger Cars

THE PHILADELPHIA & READING has ordered 50 suburban coaches from the Bethlehem Shipbuilding Corporation, Harlan Plant.

Machinery and Tools

THE ERIE RAILROAD has recently purchased from Metch & Merryweather, Cleveland, Ohio, a considerable number of machine tools, including engine lathes, axle lathes, vertical turret lathes, shapers, a cylinder boring machine, four power hack saws, three hydraulic presses, two motor driven grinders, two pipe turning machines and a cutter grinder.

Iron and Steel

THE SOUTHERN RAILWAY has ordered 9,000 tons of rail from the Tennessee Coal, Iron & Railroad Co.

Miscellaneous

THE BUFFALO, ROCHESTER & PITTSBURGH will receive bids until 12 o'clock noon, February 24, at Rochester, N. Y., for 5,000 tons open-hearth steel rail, 100-lb. sections; 11,500 pairs 100-lb. angle bars 28-in.; 500 kegs track bolts; 1,000 kegs Goldie track spikes and 231,000 Goldie tie plates.

Supply Trade News

George W. Bender, formerly associated with Mudge & Co., has been appointed vice-president of the **Argyle Railway Supply Company**, Chicago. This company has opened offices in the Webster building, 327 S. LaSalle street, Chicago.

Stewart J. Dewey, assistant signal engineer of the Cleveland, Cincinnati, Chicago & St. Louis, has resigned to enter the service of the **Electric Storage Battery Company**, Philadelphia, Pa., in the railway signal department of its Chicago branch, effective March 1.

J. T. McGarry, vice-president of the American Valve and Meter Company, Cincinnati, Ohio, has been elected president and general manager, succeeding **Wallace H. Gray**, who has been elected chairman of the board of directors. **C. F. Bastian** has been elected secretary and treasurer of the same company, succeeding **Dwight Marfield** resigned.

Baldwin Locomotive Works

The annual report of the Baldwin Locomotive Works for the year ended December 31, 1921, shows a net profit of \$5,044,096, after federal taxes and other charges, equivalent, after preferred dividends, to \$18.22 a share on the \$20,000,000 common stock, against a net profit of \$4,428,518, or \$15.14 a share on the same amount of stock in 1920. The gross sales for the year were \$49,945,506 as compared with \$73,542,666 in 1920.

President S. M. Vauclain in his remarks to the stockholders says:

"The period of readjustment to which the president referred in his last annual report still continues and uncertain business conditions prevail. Your property has been maintained in a high degree of efficiency and is fully prepared to meet the renewal of activities which the president hopes will shortly be realized."

The consolidated balance sheet of the Baldwin Locomotive Works and Standard Steel Works Company as of December 31, 1921, follows:

Assets—		
Baldwin Locomotive, 1921, real estate, etc.		\$27,079,542
Std. Stl., real estate, etc.		9,458,571
Investments		387,725
Inventories		7,000,736
Accounts receivable		10,100,486
Bills receivable		10,293,918
Securities		657,484
Bonds, notes, etc.		23,833,715
Cash		2,172,142
Advances, engineers etc.		320,223
Sinking fund		1,678,725
		\$92,983,338
Liabilities—		
Baldwin Locomotive: capital stock		\$40,000,000
B. I. 1st mortgage bonds		10,000,000
Std. Stl. 1st mortgage bonds		2,200,000
Accounts payable		5,590,718
Bills payable		5,000,000
Depositors' saving fund		1,676,993
Advances		1,041,150
Interest		959,741
Reserves		5,854,138
Sinking fund		2,800,000
Surplus		17,860,598
		\$92,983,338

The annual dinner of the **Chicago Railway Equipment Company** was held at the Union League club, Chicago, the evening of February 7 and was attended by a large number of officers of railways and of railway supply companies. One of the principal features of the evening was the showing of moving pictures illustrating the various plants of the company and the detailed process of making its various products. **James A. Emery** of Washington discussed the subject showing the tendency of government regulation to restrict freedom and initiative in the carrying out of business concerns and the effect of the country in the

C. W. Holt, secretary and general manager of the **Curtain Supply Company**, Chicago, has been elected a vice-president in charge of all operations of the company; **Ross F. Hayes**, eastern sales manager, with headquarters at New York City, has been appointed general sales manager, with headquarters at Chicago; **T. P. O'Brien** has been appointed district sales manager, in charge of the eastern office at New York City, and **Ralph Brown** has been appointed district sales manager of the western district with headquarters at Chicago; **G. B. Allison** has been appointed assistant to Mr. O'Brien and **Edward E. Whitmore** assistant to Mr. Brown.

Obituary

William A. Barstow, president of the Union Tank Car Company, New York, died of pneumonia at his home, Hutton Park, West Orange, N. J., on February 10. Mr. Barstow was born on September 27, 1877, at Cleveland, Ohio, and was educated at the Dearborn Morgan School, Orange, N. J., and at Yale University, graduating from the latter in 1899. The same year he entered the employ of the Atlantic Refining Company at Franklin, Pa. He subsequently served in many branches of the oil industry and in October, 1914, resigned as vice-president of the Imperial Oil Company at New York to become assistant to president of the Union Tank Car Company. Later he was promoted to senior vice-president and since 1919 served as president of the same company.

Frank S. Dinsmore

Frank Solyman Dinsmore, for the last 24 years a member of the business department staff of the *Railway Age*, died at the Long Island College Hospital, Brooklyn, N. Y., at 1:30 on the morning of February 14, of chronic interstitial nephritis.



Frank S. Dinsmore

The end came sooner than was expected. On January 4, following advice of his doctor, Mr. Dinsmore sailed for the British West Indies in the hope that the warm climate would help nature, and that his life might thus be prolonged. But it was too late. By the time the steamer reached Barbados Mr. Dinsmore was too weak to disembark; so he came back, was taken to the hospital and there the spark of life gradually dimmed and then went out. With characteristic optimism, he scarcely realized the seriousness of his condition; and he passed away unconscious of the end and without pain.

Funeral services were held in Brooklyn, where he had lived, on the morning of February 16, after which the body was taken to Chicago. A second service will be held at Rosehill Cemetery, Chicago, today (February 18), after which the body will be cremated.

Mr. Dinsmore is survived by a brother, a sister, a half brother and a half sister.

"F. S. D." as he liked to be called and which he frequently applied to himself when reminiscing, was born at Berlin, Wis., May 13, 1859. His father, a pioneer, trekked by wagon from his birthplace in New Hampshire to northern New York, where he married before going West. At the age of 12, Frank, disgusted by his inability to convince his teacher that he was right in an argument when he was sure of the position he had taken, threw aside his books and went to work for his father, a maker of farm implements. In 1881 he made up his mind to study medicine; and for the next 16 years he so applied himself when not selling medical books to get money with which to pay his tuition fees. Thinking that his

ambition to become a surgeon would be advanced thereby, he joined the staff of the Railway Surgeon in 1894, that paper being then published by the owner of the *Railway Age*. Three years later he transferred his affections to the latter publication and came to New York as its eastern representative. From that time to his death he was almost literally wedded to the *Railway Age*; because for it he lived and, in a sense, died—for he might have been spared longer had his devotion to his work not caused him to regard with contempt, until too late, the warnings he heard on every hand and of which he himself must have been convinced.

In trying to visualize another's character, it is not always easy to know just where to start. With Frank Dinsmore, he was, first of all, a philosopher, with characteristic calmness of temper and judgment and practical wisdom; to which should be added a natural love for his fellow man, gentleness, uprightness and loyalty.

Looking back over the last 24 years and applying to him those splendid attributes which were his, it is not hard to understand how, in the early days of the *Railway Age*, Frank Dinsmore, with his philosophical mind, an abiding faith in his mission and tireless devotion to duty, saved the day over and over again when the till was empty and the liabilities far exceeded the assets. At that time he might have advanced further along the road to material prosperity had he so willed; but instead he elected to stay in the niche he himself had selected, that his conscience might not be charged with lack of devotion to the man who had given him his job (the late Hugh M. Wilson) and to whom he had pledged his all.

Mr. Dinsmore's principal work was that of an advertising salesman; and therein lay the tangible measure of his pecuniary worth to this institution. But his employer values most what he did, by living example and fatherly advice, to help and encourage the younger men of the entire staff—business and editorial. When discouraged, he lifted them out of their depths; if he saw their jobs in jeopardy, he diplomatically and unobtrusively tried to awaken the sort of interest and ambition which would overcome the failing; and when they required a guiding hand, it was his that was always outstretched.

And with his tribute to Mr. Dinsmore's immeasurable worth his employer of the last 14 years unstintingly links his own sense of obligation for the unswerving loyalty and devotion that was reflected in so many varied and delightful ways. With employer and co-workers alike, Mr. Dinsmore's death has created a vacancy that is real. Everyone who was intimately acquainted with him will have as his most lasting impression the beautiful example his living afforded.

E. A. S.

Albert C. Ashton, treasurer of the Ashton Valve Company, East Cambridge, Mass., died on January 31, at St. Petersburg, Fla., where he had been for several weeks on account of

ill health. He was born in England, 52 years ago and was a son of the late Henry G. Ashton, founder of the Ashton Valve Company. Albert C. Ashton graduated from Chauncey Hall School, Boston, and the Massachusetts Institute of Technology where he pursued a course in engineering. For over 20 years he had served as treasurer of the Ashton Valve Company and part of this time served also as general manager. Mr. Ashton took a constant and active interest in the local affairs of Somerville,

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will construct an extension to its lines from Owen, Okla., to Pawhuska, a distance of approximately 40 miles.

CHICAGO, BURLINGTON & QUINCY.—This company will soon receive bids for the construction of a new passenger station at Aurora, Ill. A temporary frame station will be constructed at that point by company forces.

CHICAGO GREAT WESTERN.—This company is receiving bids for the construction of a two-story frame office building at St. Paul, Minn.

CHICAGO UNION STATION.—This company has awarded a contract to R. C. Wieboldt, Chicago, for the construction of a temporary frame passenger station at Canal and Jackson streets, in that city, estimated to cost approximately \$12,000. This structure will be used for the suburban service of the Chicago, Burlington & Quincy during the construction of the main passenger building.

CHICAGO UNION STATION.—This company will soon request bids for the construction of a power plant at Harrison and Canal streets, Chicago.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company will construct a second main track from Farmland, Ind., to a point about two miles east of Muncie, a distance of approximately 12 miles.

GREAT NORTHERN.—This company contemplates the construction of a second main track between Surrey, N. D., and Minot, a distance of 7.3 miles, estimated to cost \$140,000; between Dean, Wash., and Hillyard, a distance of 9 miles, estimated to cost \$180,000; and between Spokane, Wash., and Fort Wright, a distance of 2.7 miles, estimated to cost \$54,000.

ILLINOIS CENTRAL.—This company will construct a freight and passenger depot at Baton Rouge, La. It is expected that bids will be called for within a month.

MINERETS & WESTERN.—This company which was noted in the *Railway Age* of January 14 (page 207), as receiving bids for the construction of a 35.5 miles standard gage railroad extending from Fresno, Cal., into timber lands, has awarded the contract for this work to the Warren Construction Company, San Francisco, Cal. The estimated cost of the construction is \$800,000 exclusive of bridges.

MISSOURI PACIFIC.—This company will receive bids until February 20, for the construction of a one-story building at Winnsboro, La., estimated to cost \$10,000.

MISSOURI PACIFIC.—This company, which was noted in the *Railway Age* of February 11 (page 402), as receiving bids for the construction of a service building at Little Rock, Ark., estimated to cost \$12,000, has awarded the contract for this work to J. D. Fitzgibbon, St. Louis, Mo.

NEW HOLLAND, HIGGINSPORT & MT. VERNON.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a line extending from a connection with the Norfolk Southern and Wenona, to New Holland, N. C., a distance of 35 miles.

NEW YORK CENTRAL.—This company will receive bids until noon, February 24, covering the manufacture and delivery (and, if desired, erection) of the structural steel for the proposed bridge of the Hudson River Connecting Railroad over the Hudson river, south of Castleton, New York.

TENNESSEE EASTMAN CORPORATION.—This corporation contemplates the construction of a line from Kingsport, Tenn., into Hawkins County, a distance of about 20 miles. Surveys have been made but no final decision has been made as to the undertaking of the work.



A. C. Ashton

Mass., where he had resided since his schoolboy days, and he was a member of many social and business organizations.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—Application for Loan Denied.—The Interstate Commerce Commission has denied the application of the receiver for a loan of \$615,592, on the ground that no showing has been made that the loan is necessary to enable the road to meet the transportation needs of the public or that its prospective earning power is sufficient to afford adequate security for the loan.

BALTIMORE & OHIO.—Equipment Trusts Offered.—An issue of \$10,284,300 equipment trust 6 per cent. gold notes is being offered at prices to yield from 5.50 to 5.75 per cent, by a syndicate composed of the Bankers Trust Company, Dominick & Dominick, Hornblower & Weeks, Marshall Field, Gloré, Ward & Co., the Union Trust Company of Pittsburgh, Harrison, Smith & Co. and the Northern Trust Company of Chicago. These notes mature serially, approximately \$791,000 annually, on January 15, 1923 to 1935, inclusive.

CHESAPEAKE & OHIO.—Asks Authority to Abandon Ferry.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of its passenger and freight ferry across the Ohio river between Russell, Ky., and Ironton, Ohio.

CHICAGO, MILWAUKEE & ST. PAUL.—Authorized to Acquire Control.—The Interstate Commerce Commission has authorized the acquisition of control by this company of the Chicago, Milwaukee & Gary by purchase of the capital stock. Authority was also granted to assume obligation or liability as guarantor in respect of not exceeding \$3,000,000 of first mortgage, 40-year, 5 per cent bonds of the Chicago, Milwaukee & Gary by endorsing thereon the guarantee of the C. M. & St. P. of the payment of the principal and the interest after January 1, 1924. The bonds when so endorsed are to be redelivered to the St. Louis Union Trust Company. The commission says there appears to be no necessity at this time for the guarantee of the \$2,700,000 of bonds to be retained by the St. Paul and consideration of that part of the application was, therefore, deferred.

DENVER & RIO GRANDE.—Sutro Committee Opposes Reorganization Plan.—The Sutro committee, representing the 7 per cent cumulative adjustment mortgage bonds of the Denver & Rio Grande, has issued a letter to holders of those securities, setting forth its objections to the Western Pacific's proposed reorganization of the old Denver company. The principal points raised are:

First, failure to provide for the acquisition by the reorganized company of the equity in the Utah Fuel Company stock, thus depriving the reorganized company of the control of a part of its fuel supply; secondly, it is pointed out, the plan requires holders of adjustment and refunding bonds to permit an unlimited unifying mortgage to be placed on the property ahead of all other securities to be issued under the plan.

The committee's letter says:

Although the proposed sinking fund bonds, which the holders of adjustment and refunding bonds are asked to take, in respect of the other 50 per cent of their present holdings, are to be subordinated by the proposed plan to this unlimited issue of new unifying bonds, the plan fails to accord any representation whatever in the board of directors of the reorganized company to the holders of these sinking fund bonds or adjustment bonds—thus denying to the holders of these bonds any effective check upon (a) the issue of unifying bonds for purposes not in the interests of the holders of the proposed sinking fund bonds; (b) the diversion of traffic earnings by inequitable divisions of rates, traffic and truck lease contracts, and otherwise; (c) the impairment of the assets of the reorganized company by unwarranted dividend payments in its common stock.

From exhibit 3 attached to the proposed plan it appears that for the year period ending December 31, 1920, the average strike of the railroad union, exclusive of dividends, interest on securities and interest on the balance and excepting only dividends on the stock of the Rio Grande Northern Railway Company applicable to its creation fund debt, averaged over 16,000,000 per year—or almost \$1,000,000 per year in excess of the total interest payments of the adjustment and refunding bonds, and all underlying issues. It is difficult therefore to conceive of the basis for the traffic plan of the reorganization that has been proposed.

FANSAR & OKLAHOMA.—Asks Authority to Issue Stock.—The company has applied to the Interstate Commerce Commission for authority to issue \$1,000,000 of capital stock to complete the

construction of its new line from Forgan, Okla., to Richfield, Kans.

KNOXVILLE & CAROLINA.—Asks Authority to Issue Securities.—An application has been filed with the Interstate Commerce Commission for authority to issue \$400,000 of capital stock and \$300,000 of first mortgage bonds. The stock and \$82,000 of the bonds is to be delivered at par for the acquisition of the Knoxville, Sevierville & Eastern and \$100,000 of the bonds to be sold to pay for improvements.

MEMPHIS, DALLAS & GULF.—Asks Authority to Abandon Lines.—The receiver has applied to the commission for a certificate authorizing the abandonment of the lines from Glenwood and Hot Springs, Ark., 53.3 miles; Graysonia to Leard, 5.49 miles; Daleville to Clark Mill, 10.64, and Nashville to Shawmut, 33.97 miles.

MISSOURI, KANSAS & TEXAS.—Authorized to Extend Receiver's Certificates.—The Interstate Commerce Commission has authorized a further extension of the maturity of \$3,000,000 of receiver's certificates from February 15 to May 15 by endorsement.

NEW YORK, NEW HAVEN & HARTFORD.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$31,324,000 from the revolving fund for 10 years, of which it is proposed to use \$26,258,000 to pay debentures of the European loan maturing April 1, \$2,066,000 to meet equipment trust and other maturities, and \$3,000,000 for additions and betterments.

Following a meeting of the directors on Tuesday President E. J. Pearson stated that the application for a loan of \$31,324,000 was submitted for the purpose of presenting the entire situation of the New Haven to the representatives of the government.

TENNESSEE CENTRAL.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$2,250,000 from the revolving fund for 10 years, of which \$1,250,000 is to be used for additions and betterments and \$1,000,000 to meet short term obligations.

Dividends Declared

Southern Pacific—1½ per cent, quarterly, payable April 1 to holders of record February 28.
 Union Pacific—Common, 2½ per cent, quarterly; preferred, 2 per cent, both payable April 1 to holders of record March 1.
 Cincinnati Northern, 3 per cent, payable March 1 to holders of record February 24.
 Pittsburgh, Youngstown and Ashtabula, Preferred, \$1.75, quarterly, payable March 1 to holders of record February 20.

Trend of Railway Stock and Bond Prices

	Feb. 14	Last week	Last year
Average price of 20 representative railway stocks close of business.....	59.07	57.98	56.57
Average price of 20 representative railway bonds close of business.....	82.23	82.05	74.72



Unloading Coal from Container-Car to Motor Truck in Poland

Railway Officers

Executive

G. R. Loyall, president of the Norfolk Southern, has been elected president of the Norfolk Terminal, succeeding **C. W. Huntington**, president of the Virginian. **N. D. Maher**, president of the Norfolk & Western, has been elected vice-president of the Norfolk Terminal, succeeding Mr. Loyall.

Claude K. Boettcher, whose election as vice-president of the Tennessee Central, with headquarters at Nashville, Tenn., was announced in the *Railway Age* of January 28 (page 304), was born at Boulder, Colo., on June 10, 1875. Mr. Boettcher is the senior partner of the firm Boettcher, Porter & Co., investment bankers at Denver, Colo. He has been associated with various railroads at different times, largely through financial matters. From 1900 to 1906, he was vice-president of the Great Western, with headquarters at Denver, and from 1913 until 1919, he was chairman of the board of directors of both the Denver City Tramways and the Denver Inter-mountain, which latter positions were his last railroad connections prior to the time of his recent appointment.

Andrew P. Titus, general manager of the Chicago & Alton, with headquarters at Chicago, has been elected vice-president in charge of operation, with the same headquarters. Mr.

Titus was born on a farm near Princeton, N. J., on April 11, 1873, and was educated at Princeton Preparatory School and at Princeton College. He entered railroad service on July 1, 1890, in the car department of the Lake Shore & Michigan Southern (New York Central), at Cleveland, Ohio. From 1893 to 1895 he was employed by a mining company in Mexico, and, in June of the latter year, he re-entered the service of the Lake Shore & Michigan Southern at Cleveland. He left in May, 1900, to become



A. P. Titus

car distributor and chief clerk to the superintendent of the car service department of the Wheeling & Lake Erie. He was promoted to superintendent of car service, with headquarters at Pittsburgh, Pa., in November, 1905, and to assistant superintendent of transportation, with headquarters at Canton, Ohio, in May, 1907, which latter position he held until July 1, 1912, when he was promoted to superintendent of the Toledo division. He left in August, 1912, to become general superintendent of the Chicago & Alton, with headquarters at Chicago. He was promoted to general manager, with the same headquarters, on November 1, 1915, which position he was holding at the time of his recent promotion.

Financial, Legal and Accounting

W. M. Mooney, whose election as comptroller of the Tennessee Central, with headquarters at Nashville, Tenn., was announced in the *Railway Age* of February 4 (page 355), was born at Three Rivers, Que., on March 13, 1867. He entered railroad service on August 15, 1888, as a clerk in the car accountant's office of the St. Joseph & Grand Island at St. Joseph, Mo. From January 1, 1890, to September 15, 1892, he was a car clerk on the Chicago, St. Paul & Kansas City (Chicago Great Western) at St. Joseph. He returned to the

St. Joseph & Grand Island on the latter date and was successively station accountant, revising clerk, interline freight clerk and chief clerk of freight accounts. On November 1, 1902, he was made chief clerk to the auditor which position he held until August 15, 1907, when he was promoted to auditor and cashier of that road, and of the St. Joseph Terminal R. R., with headquarters at St. Joseph. He left on November 15, 1909, to become auditor of the Tennessee Central, with headquarters at Nashville, which position he was holding at the time of his recent promotion.

Operating

J. M. Shea has been appointed superintendent of the Northern division of the Norfolk Southern with headquarters at New Bern, N. C., and **J. S. Cox** has been appointed to a similar position on the Southern division with headquarters at Raleigh, N. C. The territory covered by these divisions was formerly distributed among three divisions. The Northern division, as it now is, includes: the main line from Norfolk to New Bern and Beaufort to Goldsboro; the Currituck, Kempsville, Suffolk, Elizabeth City, Columbia, Belhaven, Pinetown and Oriental branches; and Marsden Yard. The new Western division includes the main line from Marsden to Charlotte and the Fayetteville, Aberdeen & Asheboro, Ellerbe and Jackson Springs branches.

Traffic

H. W. Gillis has been appointed assistant general freight agent of the Canadian Pacific, Eastern Lines.

Clement S. Ucker has been appointed director of development of the Seaboard Air Line with headquarters at Savannah, Ga.

H. G. Sullivan, commercial agent of the Central of Georgia, with headquarters at Athens, Ga., has been transferred to Montgomery, Ala.; he will be succeeded by **J. Y. Bruce**.

A. P. Smirl, assistant general freight agent of the Texas & Pacific, with headquarters at Dallas, Tex., has been promoted to assistant freight traffic manager with headquarters at New Orleans, La., succeeding **J. S. Houston**, resigned.

R. D. Johnsen, city passenger agent of the Atchison, Topeka & Santa Fe, Coast Lines, with headquarters at San Francisco, Cal., has been promoted to division passenger agent, with the same headquarters, succeeding **J. F. Moses**, promoted.

B. S. Merritt, general agent of the Great Northern, with headquarters at Spokane, Wash., has been promoted to assistant general freight agent, with headquarters at Seattle, Wash. He will be succeeded at Spokane by **J. F. Pewters**, general agent with headquarters at Great Falls, Mont. **A. J. Grummett** has also been appointed assistant general freight agent, with headquarters at Seattle.

Mechanical

J. A. Conley, master mechanic of the Atchison, Topeka & Santa Fe, with headquarters at Calwa, Cal., has had his jurisdiction extended over the shops at Richmond, Cal., succeeding **E. H. Harlow**, formerly superintendent of shops, with headquarters at that point, who died on January 26, after which time his position was abolished.

M. W. Boucher, locomotive foreman of the Canadian Pacific, with headquarters at Field, B. C., has been appointed general locomotive foreman of the Edmonton, Dunvegan & British Columbia, with headquarters at McLennan, Alta. He will have direct supervision over both the mechanical and car departments, the positions of master mechanic and locomotive foreman having been abolished.

Engineering, Maintenance of Way and Signaling

Stewart J. Dewey, assistant signal engineer of the Cleveland, Cincinnati, Chicago & St. Louis, has resigned to enter

the service of the Electric Storage Battery Company (see item under Supply Trade News).

De Witt C. Fenstermaker, whose appointment as principal assistant engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* of February 11 (page 406), was born on December 27, 1873, at Basil, Ohio. He entered railroad service in 1893 as a rodmn on the Toledo & Ohio Central, and was later successively promoted to instrumentman, draftsman, and assistant engineer, which latter position he held until 1898, when he entered the army for service in the Spanish-American war. From 1899 to 1902 he was assistant engineer in the engineering department of the government of Cuba. Upon returning to this country he entered the service of the Lake Erie, Alliance & Wheeling as resident engineer. He left in 1903, to become resident engineer of the Louisiana Railway & Navigation Company and was soon thereafter promoted to division engineer, and later to chief engineer, with headquarters at Shreveport, La. From 1908 until 1910 he was city engineer of Tulsa, Okla., and from the latter date until 1912, he was designing engineer of the Lehigh & New England. He left in 1912 to become assistant engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago. He was promoted to district engineer, with the same headquarters in March, 1919, and, in April, 1921, he was granted a leave of absence in order that he might act as chief engineer for Peterson, Shirley & Gunther, Omaha contractors, in charge of constructing 50 miles of railroad in Eastern Cuba for the Atlantic Fruit Company which work he was engaged in up to the time of his recent appointment.

F. J. Nevins, whose appointment as valuation engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of February 11 (page 406), was born near Baxter Springs, Kan., in 1872. He entered railroad service in 1892, as a clerk in the local freight office of the Missouri, Kansas & Texas at Denison, Tex., leaving that road in 1893, to enter the service of the Missouri Pacific as a freight brakeman at Osawatomie, Kan., where he was successively conductor, yardmaster and chief clerk to the general foreman of bridges and buildings until 1904, when he was promoted to chief maintenance of way accountant for the entire system, with headquarters at St. Louis, Mo. One year later he was made chief clerk to the chief engineer of maintenance of way, which position he held until 1910, when he left railroad service to become sales and traffic manager of the Portland Cement Company, with jurisdiction over the Southwestern states, and with headquarters at Dallas, Tex. He re-entered railroad service in 1911 as assistant to the vice-president and general manager of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., which position he held until 1914, when he entered the service of the Chicago, Rock Island & Pacific as chief clerk to the engineer in charge of track elevation work at Chicago. He was promoted to chief accountant in the valuation department in 1916, with the same headquarters, which position he held up to the time of his recent promotion.

F. J. Nevins

Purchasing and Stores

E. H. Gaines, Jr., has been appointed purchasing agent of the Tennessee Central with headquarters at Nashville, Tenn.

Obituary

W. G. Bayley, superintendent of the Cleveland, Cincinnati, Chicago & St. Louis with headquarters at Springfield, Ohio, died at Urbana, Ohio, on February 13 at the age of 57, after a lingering illness. Mr. Bayley was born at Hollidaysburg, Pa., and entered railroad service with the Pennsylvania in the engineering department. He later was transferred to the Cleveland, Cincinnati, Chicago & St. Louis and was promoted to engineer, maintenance of way and later to superintendent. Mr. Bayley had been superintendent at Springfield since 1897.

Herbert De Forest Howe, vice-president and general counsel of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, whose death was noted in the *Railway Age* of February 4 (page 356), was born on November 24, 1876, at Morris, Ill. He entered railroad service on November 1, 1898, in the law department of New York Central, Lines West, and served in various legal capacities for that road. In 1909, he organized its general land and tax department and was made general land and tax agent for the western lines. He entered the service of the New York, Chicago & St. Louis on May 15, 1917, as general counsel, with headquarters at Cleveland, and in June, 1917, he was promoted to vice-president and general counsel, with the same headquarters which position he was holding at the time of his recent death.

George K. Warner, treasurer and assistant secretary of the St. Louis Southwestern, with headquarters at St. Louis, Mo., died at his home in that city on February 11, after an illness of two weeks. Mr. Warner was born on September 2, 1860, at Mobile, Ala., and entered railroad service in 1883, as a storekeeper on the New Orleans and Mobile divisions of the Louisville & Nashville. He left in the latter part of that year to become chief clerk to the master mechanic of the Texas & St. Louis, at Jonesboro, Ark., and later at Pine Bluff. From July 10, 1884, to December 5, 1888, he was promoted successively to clerk, bookkeeper, and chief clerk in the accounting department, during which period the name of the company was changed by reorganization to St. Louis, Arkansas & Texas. He was appointed acting treasurer of that company on December 5, 1888, and was elected treasurer on January 14, 1889. On January 16, 1891, upon the reorganization of the company again, he was elected treasurer and assistant secretary which position he was holding at the time of his recent death. He was also secretary and treasurer of the Shreveport Bridge & Terminal Company, vice-president and treasurer of the Grays Point Terminal, the Valley Terminal, the Paraxould Southeastern, the Pine Bluff Arkansas River and the Central Arkansas & Eastern; was also assistant secretary and assistant treasurer of the Southwestern of Texas, Stephenville North & South Texas, Dallas Terminal & Union Depot Company, and the Eastern Texas.



Just Over the Italian-Swiss Frontier in Italy—Simplon Line

EDITORIAL

Railway Age

EDITORIAL

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One Big Thing That Is the Matter with the Railroads

LET RAILWAY officers consider the following statements of fact and the following questions:

The railways of the United States are at least as efficiently operated as any others in the world. They are as efficiently managed as any other class of business concerns in this country.

Why, then, does the public lend a willing ear to charges that they are inefficiently managed and to canards such as that Henry Ford, by his operation of the Detroit, Toledo & Ironton, has "shown up" the managements of other railways?

The railways of the United States are the most conservatively capitalized railways in the world. They are at least as conservatively capitalized in proportion to investment as any other class of business concerns in this country.

Why, then, do so many of the people of the country believe they are grossly overcapitalized?

Railway rates on most commodities are today lower compared with ten years ago than the prices of most commodities.

Why, then, does the public loudly and almost universally complain about railway rates rather than about the prices of most commodities?

It is more economical, safer and pleasanter in almost every part of this country to make pleasure trips of any considerable length by railroad than by automobile.

Why, then, does almost everybody who thinks of taking pleasure trips, from say 50 to 200 miles in length, think of taking them in automobiles?

The railways always have been, and are now, as honestly managed as any other class of business concerns in this country.

Why, then, do many persons believe that there is more crooked financing and grafting in their management than in the management of most other lines of business?

Railway officers receive incomes relatively smaller in proportion to the importance of their duties and responsibilities than men in almost any other line of business in this country.

Why, then, do a large part of the people believe that the public is being mulcted to pay railway officers excessive salaries?

It is at least as essential to the welfare of this country that the railways should prosper as that any other industry should prosper.

Why, then, do most people rejoice when reports from the

farms and factories show an increase in the prosperity of farmers and manufacturers, and at the same time think the railways are practicing extortion and regard it as a public calamity when their net earnings show that the railways are beginning to prosper?

When men make large fortunes in the manufacture of automobiles, kodaks, chewing gum, iron and steel, and publishing farm papers almost everybody rejoices. Nobody finds fault because Henry Ford has become enormously rich in the automobile business, because Eastman has become rich by making kodaks, because Wm. Wrigley has become rich by making chewing gum, because Charles M. Schwab has become rich in the steel business, because Senator Arthur Capper has become rich by publishing farm papers. Such men are among our national heroes.

Why, then, if any man should now become rich in the railroad business would he be generally denounced as a "malefactor," as most of those who did make fortunes in the railroad business in the past were denounced?

No railway officer would question that the statements of fact above made are correct. They show that in most important respects the railways have been and are well managed. They show that the railways are one of the country's very greatest assets.

Why, then, do so many people act on the assumption that the railways are the country's greatest liability?

The railway business is the business of manufacturing transportation. No manufacturing business can be successful unless its organization is highly efficient not only in production but in salesmanship. If a concern year by year is making a larger and better product, is making it with relatively greater and greater efficiency and economy, and is selling it at less and less profit to itself can there be more than one explanation of what is the matter with it? The true and only explanation must be that it is failing to "sell" itself to its customers adequately, wisely and effectively.

What is wrong with the salesmanship of the railways? We do not pretend to be able completely to diagnose the case, but we can mention some pertinent facts. In a period when concerns of other kinds have spoken extremely well of themselves in loud tones, the railways for the most part have kept modestly silent. In a period when many have exploited the great advantages of passenger and freight transportation

by motor and by water, the railways have hardly exploited the advantages of transportation by rail. In a period when many other industries have directly and indirectly attacked the railways, the railways have made no counter-attacks. They have stayed on the defensive, or turned the other cheek.

In a period and in a country when and where advertising as a means of selling institutions and goods to the public has been used more extensively and in more original and varied ways than in any other time or country in history, the railways have done relatively only a negligible amount of advertising, and have done this almost solely to exploit the least profitable part of their business. Apparently the largest expenditure that the railways ever made for advertising was in 1916 when it was \$7,500,000. This was *two-tenths of one per cent* of their total earnings. The following are the percentages of their gross earnings spent for advertising in normal years before the war by certain concerns in widely varying industries. A large mail order house, 10 per cent; two tobacco manufacturers, 5 per cent and 6 per cent; a maker of phonographs, 5 per cent; a maker of paint, $3\frac{1}{2}$ per cent; a maker of cement, 2 per cent; a maker of kodaks, 3 per cent; a maker of soap, 3 per cent; a manufacturer of men's collars, $3\frac{1}{2}$ per cent; a manufacturer of men's clothes, 2 per cent; four makers of automobiles, three-fourths of one per cent to 2.6 per cent.

These are typical examples. If the railways should spend in advertising a percentage of their total earnings equal to the *smallest* percentage mentioned in this list their expenditures for advertising on the basis of their present earnings would be \$42,000,000 a year. Their actual expenditures for advertising in 1920 were \$4,140,000. Under normal conditions the amount spent for advertising to sell passenger automobiles alone is six times as great as was spent in 1920 to sell all the railroads and all their service to the public, and more than three times as great as the largest amount that the railroads ever spent for advertising in any year.

The railways have many difficult and important problems to solve to which they are giving consideration. The most important problem they must solve if they are ever to be allowed to earn reasonable profits, and if private ownership and management are to be perpetuated, is the problem of selling themselves to the public. The amount of constructive and effective study, effort and expenditure being devoted to the solution of this problem on most railroads by the officers who must solve it, if it is ever to be solved, is so small as to be almost negligible.

The railroads are not being "sold" to the public, unless by their friends. They never will be "sold" to the public unless there is a great awakening among the managements to a realization of the fact that here is a great problem about which they have been in doing practically nothing at all, and which they really should solve but they do not even know

The master painter of a certain railroad not long ago made a requisition for varnish for passenger cars. He specified a brand that always gave satisfactory service, but when the material was delivered found that a cheap grade made by a less reliable manufacturer had been furnished. A few days later when

the master painter met the purchasing agent he asked why the cheap varnish had been bought and pointed out that the cost of applying it was more than the cost of the varnish itself so that there was little difference in the total expense, although the low grade material would not last nearly as long. The purchasing agent replied, "If a man does not have money enough to buy a straw hat, he has to make his felt hat do, and this railroad is in the same fix; it simply does not have money enough to buy high priced materials and we have to make cheap material do." This seems to be typical of the viewpoint of some purchasing agents who take the position that the road is too poor to buy material that is higher in price but more economical in the long run. Is such a practice justifiable? As an expedient to avoid a receivership it might be justified temporarily, but as a permanent policy, never. The analogy cited by the purchasing agent does not correspond to the actual situation. The railroad that buys the cheap varnish will find it fails to give the necessary protection to the equipment and the road will soon have to spend money that it might have saved by using first-class material. There is one principle in railroad purchasing which in the interest of economy no road can afford to ignore; that is to follow the recommendations of the specialists in the various departments regarding the purchase of materials.

Less than a month has yet to elapse before the railway civil engineers throughout the country will meet in Chicago in

To Go
or
Not to Go

their twenty-third annual convention; to renew old friendships, to establish new ones, to view the developments in equipment of immediate concern and, more important than these, to participate in the deliberations of a three-day session. Taking cognizance of this many engineers who have never entertained other than the thought of attending, have in all probability already done some planning preparatory to their departure to avoid as nearly as possible the development at the last moment of conditions unfavorable to their plans, as well as to insure the proper functioning of their departments while they are gone. On the other hand many others, if cognizant at all of the association's custom and the proximity of the convention, have yet confronting them "To Go or Not To Go" as an undecided question. Comment need not be made concerning those who have definitely laid their plans, but, in the interest of better railroading, it may well be made concerning those who have not. Men who devote their time and thought largely to engineering problems of the many kinds involved in railway construction, operation or management, should by all means know of the association and should attend its convention, whether members or not, going as to an event from which each cannot afford to be absent. For such is the case. The American Railway Engineering Association is an institution with a constituency which for intellectual ability, sobriety of thinking and industry in its deliberations, is a fit object of pride on the part of its members. The reports presented and discussed are the work of groups of men especially qualified in their particular lines, but far more important to the engineers, they treat of subjects which are his stock in trade; not incidental to his status but fundamental. He may very easily avoid the anticipated inconvenience incident to his attendance at the convention and not having attended feel himself no-wiser than ever for not having gone, but under ordinary circumstances

in doing this he will have made a mistake. The convention is his opportunity, in realization of which the prudent engineer will go if he can.

To many men in train service on double track lines the standard code is a mysterious thing. On it they are examined at more or less frequent intervals, but most of its provisions have no relation to their daily activities. They work under block signal protection and with few train orders. Instructions

Double Track and the Standard Code

which, under the standard code, must be given by train order in specific language they often receive as messages for which no standard form is provided in the rules. All this is confusing and tends to make these men unfit for service on single track branch lines when, upon occasion, they are needed there. There is, of course, no reason why unwarranted restrictions should be placed upon double track operation, but men in train service should be able to tell why certain standard practices are omitted on double track. When they are examined on the subject of train orders they should be required to tell what additional safeguards provided by double-track and automatic signals sometimes make the rules concerning specific train order forms unnecessary and, conversely, why these rules are necessary on single track. The failure to appreciate that additional safeguards have been provided by the double track and automatic signals tends to give the employee the impression that his company is not insisting upon obedience to rules and this impression may be harmful to discipline. Certainly an employee holding such a view cannot be trusted on single track where strict adherence to rule is absolutely essential.

The railroads have suffered from the business depression less than have the grocers, according to the declaration of a prominent speaker at a convention of

Troubled Railroads versus

wholesale grocers in New York City last week; and therefore a reduction of

Troubled Grocers

freight rates should be the first thing to be done to restore prosperity in that

branch of the mercantile world. Not being very well informed concerning the profits made by the wholesale grocers during the past few years, we will for the moment, and for the sake of argument, admit that they are, really, worse off than the railroads. But, from the standpoint of the public, why should it follow that the railroads ought to carry freight at less than cost? The public needs railroad transportation and it needs wholesale grocery establishments. We will assume that it has difficulty in keeping up both institutions, and may be obliged to impose hardships on one or the other of them. Now, which shall it be? Or, to go a step farther, assume that both have already been neglected; which of the two ought first to be aided to recover? Setting aside all notions concerning what we should like to do, or what is ideally just and equitable, in the premises it would seem clear that the railroads ought to be succored first. Not because the railroads' owners are a better class of people; neither because they deserve the better treatment; but because *that course is forced by the nature of the case*. A railroad, if it serves important communities, must be kept going even if to do so should require an assessment on the inhabitants to furnish fuel for the locomotives and food for the trainmen. Nothing can take its place. In place of the merchant, on the other hand, some halfway makeshift can be made to serve temporarily. The people—the communities—have established the typical railroad in such a monopolistic situation that they cannot allow it to suffer, any more than the city of Chicago could afford to close up its most important bridge across Chicago river. The grocer is not thus treated; he is

not classed as a vital part of the civic machinery. The community makes him take his chances. Whether or not that is fair is not the question; it is the fact. Even if he has failed and shut up shop, the railroad must be kept going.

The upkeep of railway crossings is usually imposed on the junior road, not only for the renewals of the rail structure, the timbers and the ballast but also the maintenance of line and surface. The expense incurred by the maintaining road is affected to no small extent by the degree of co-operation offered by the

A Chance for Reciprocity

maintenance forces of the other road using the crossing. While the senior road should not be expected to relieve the junior company of any of its established responsibilities, it should maintain its own tracks adjacent to the crossing in a condition that will tend to relieve rather than increase the burden of keeping up the crossing. For instance, the life of the crossing will be influenced to no small degree by the condition of the rails immediately adjoining it. Badly worn rails connected to a new crossing will produce such poor joints that the crossing rails themselves will soon become battered. Also the alinement of a crossing is seriously affected by the creeping of the rails of the intersecting tracks. If the non-maintaining road does not provide adequate anchorage to hold its track, it will cause the maintaining road no end of trouble in keeping the crossing in place. So severe has been the burden on the maintaining road from this cause that it has even been proposed to place rail anchors on the rails on the other property with the idea that the money so spent would be more than offset by the decreased cost of work on the crossing itself. However, such a course ought not to be necessary. The railroads ought to practice reciprocity at least to such an extent that crossings will be maintained at the least possible cost, regardless of the apportionment of the expense. It is only by so doing that true economy for all will be obtained.

In a recent issue of Industrial Management, V. M. Palmer, engineer of industrial economy for the Eastman-Kodak Company, says, "Foremen are frequently referred to as the non-commissioned officers of industry, which position they do in fact occupy between the management and the employee. There is no

Able Shop Fore- men Must Be Developed

question that the need for greater shop and individual efficiency could be realized more completely if foremen measured up closer to the requirements of their position." This statement applies with equal force to industrial foremen and those employed in railroad shops. Owing to the importance of foremen and their direct influence for good or bad on the cost of shop operation, it is important (1) that they be paid a sufficient remuneration to attract men of the necessary calibre; (2) that shopmen of ability be trained and wherever possible given actual experience as acting foremen while regular foremen are sick or on leave of absence; (3) that present foremen be helped and encouraged in every possible way in the performance of their duties. This does not mean that discipline should be relaxed and no mention made of mistakes. With few exceptions foremen take constructive criticism in the spirit in which it is given, realizing that unless weaknesses are pointed out they cannot be corrected and personal improvement and ultimate advancement will be correspondingly delayed. Moreover, when weaknesses are not explained, they tend to grow worse rather than better and may in the end entirely disqualify a foreman for his position. He is then reduced to the ranks and, not knowing wherein his failure lies, can hardly be blamed for feeling that somehow he has not had a square deal. If errors should

be pointed out, it is fully as important to bestow praise where due. Unfortunately, many railroad men get the impression that good work is taken for granted while trivial mistakes receive undue censure. No matter how busy the higher mechanical department officers, they miss a fine opportunity to develop foremen if for any reason the word of helpful criticism or of appreciation for a job well done is withheld.

The Ability of the Carrier to Pay

SINCE THERE is but one source from which the money to meet a railroad payroll can come, namely earnings, it follows that where the earnings of a railroad are less than its operating expenses, the ability of the carrier to continue to pay certain wage scales to its employees must become eventually the governing factor in determining what constitutes "just and reasonable" wages. An inexorable economic law applies to compel either the downward revision of all its operating expenses, and particularly the preponderating labor expense, or the abandonment of the property. Here, public interest in, and necessity for, transportation service tips the balance in favor of the readjustment of operating expenses. The problem presented in such cases is cold fact and not theory. The Railroad Labor Board has faced it many times and on three occasions has recognized that the "ability of the carriers to pay" is a relevant and vital factor in fixing wage levels in some cases.

In deciding a dispute between the Electric Short Line Railway Company and the train service brotherhoods last October, the Board ordered a wage cut of 20 per cent, adding that the lower wages were just and reasonable, taking into consideration all the conditions and circumstances as contemplated by the Transportation Act, including the financial condition of this carrier, i. e., its earnings, cost of operation, etc. Again, in deciding a dispute between the New Orleans Great Northern and several classes of its employees, the Board recognized and specifically stated that the "ability of the carrier to pay is entitled to secondary consideration with a certain type of carrier dependent almost entirely on local business or whose principal function in the final analysis is the development and upbuilding of a new or comparatively new country." Now a third instance of the recognition of this principle is contained in the Board's decision in the Missouri & North Arkansas case (described elsewhere in this issue) in which the employees have been ordered to accept wages 25 per cent below those paid on other Class I carriers. In all these cases proof was submitted of the failure of earnings to meet operating expenses. In each case the choice was between reduction of wages, bankruptcy or abandonment. Whatever interpretation the Board might wish to put on the seven "relevant factors" stated in the Transportation Act as controlling considerations in fixing wage scales, the issue in each of these cases was clear cut; either the "ability of the carrier to pay" governed or it did not. If it did, the public's right to continuous operation of the railroad was recognized by a body created to protect that right. If it did not, that unfortunate expression "the public be damned" became a truism. The Board should be commended for its decisions in these cases, not because they represent a "victory" for the railroads involved, but because they represent a "victory" for the public.

But having acted wisely in these cases, will the Board continue to face this issue squarely? It is just as possible for a road of 10,000 miles to face an inability to pay the wages fixed by the board, as it is for a road 100 miles in length. The principles in each case are exactly the same. Would the board then apply the same reasoning as applied in these three cases and permit the larger carriers to present evidence of their inability to pay?

During the hearings on national agreements in January, 1921 the railroads in the country were facing just such a

situation. They tried to present evidence to the board showing their inability to continue to bear excessive labor costs. In that case, however, the board ruled that: "all questions involving the expense of operation or necessities of railroads and the amount of money necessary to secure successful operation thereof, are under the jurisdiction not of this board, but of the Interstate Commerce Commission." The testimony which the carriers desired to present was ruled out of court as irrelevant.

The inconsistency in the board's rulings on this factor would indicate that the interest of the public in the operation of a large carrier or a group of carriers is less than its interest in the operation of a smaller road. Obviously such a theory is untenable. It is hard to believe that, having ruled as it has in the Electric Short Line, the New Orleans Great Northern and the Missouri & North Arkansas cases, this body, created largely to insure continuous operation of the railroads, will hold to its ruling in the national agreements case and prohibit testimony on the "ability to pay" in future cases involving either small or large carriers.

The Increase in Freight Movement

THE INCREASES in the number of carloads of freight shipped have been so substantial and persistent since the opening of the year 1922 as to constitute a very persuasive indication that general business is reviving.

Not only did the number of carloads of freight shipped increase in every week from that ended January 7 to that ended February 11, but in each of these weeks the total shipments were larger than in the corresponding weeks of 1921. The total freight car loadings in the four weeks ended February 4, 1922, were 2,956,766 as compared with 2,812,637 in the same weeks of 1921, an increase of 144,129. While the total number of cars loaded with freight in these weeks was somewhat less than in 1920, it was larger than in 1919 and, in fact, seems to have been larger than in other previous years.

The most significant feature of this increase in shipments was that it was due to an increase in the number of cars loaded with most kinds of commodities. In the four weeks ended February 4 there was an increase, as compared with the same weeks of last year, of 33,810 cars in shipments of grain, 2,460 cars in shipments of livestock, 17,666 in shipments of coal, 129,476 in shipments of merchandise, and 1,062 in shipments of miscellaneous commodities. Shipments of coke showed a decline of 11,000 carloads, shipments of forest products a decline of 4,456 carloads, and shipments of ore a decline of 16,000 carloads.

When carloadings began to show an increase in the second week in January it was thought that this might be due to temporary causes. The taxes on transportation were removed on January 1, and it was believed the decline in freight shipments in December was partly due to the fact that some shippers were holding back commodities to avoid paying the tax and would forward them in January. If, however, the increase in shipments had been due to the release of goods held back to avoid the tax, it would hardly have continued at an accelerated rate clear into February.

It might also be thought that the increase in shipments was due to a larger movement of coal in anticipation of a coal mine strike on April 1, but while there has been an increase in shipments of coal it has been smaller relatively than the increases in shipments of other kinds.

After experience with the fluctuations in the railroad and other lines of business during the last year and a half most people are somewhat slow to acclaim any apparent improvement as permanent, or as the harbinger of still further improvements. Certainly, however, if the recent increases in carloadings indicate anything at all they indicate a distinct tendency toward improvement in general business.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Trainmen and the Eight-Hour Day

SAN ANTONIO, TEX.

TO THE EDITOR:

"All men know the truth, but what of that? It is rare to find one who knows how to speak it."—Emerson.

I was pleased to note in a recent editorial in the *Railway Age* that the railroad executives had decided to meet with the executive officers of the railroad brotherhoods in an effort to readjust differences on the basis of a "square deal." Later I read in one of President W. S. Carter's (Brotherhood of Locomotive Firemen and Enginemen) publicity bulletins that "It has been the success of the railroads in 'educating the public' through unfair propaganda that has made it absolutely necessary for railroad employees to adopt some method of telling the truth to the public."

To get at the truth as essential to establishing the square deal it is necessary to go back to the inception of the Adamson law, which has been the cause of a world of misrepresentations and recriminations. In answer to the claim that the railroads were able to show that "under our present practice (1915) enginemen demand the right to do two men's work in order to earn two men's pay," President W. S. Carter admitted the truth of the charge, bitterly assailing those members who, as shown by the railroad representatives, ignored "the rights of their fellowmen" and through the power of seniority, say to unemployed brothers: "You shall not work at all; I am going to do my work and your work too, so that I can draw my pay and your pay too. Citing individual instances of men making double wages through this system, Mr. Carter said: "At the same time we had evidence that on that same railroad they had cut the fireman's list; there were hundreds and hundreds of men hungry and their families hungry—and yet they call this a brotherhood."

This deplorable condition was made the strongest argument for the limitation of the workday to eight hours; and, in the protection of the public interest, to prevent a strike to secure this limitation of hours, the Adamson bill became law.

To refresh the memory as to the facts in the case, it is recalled that on August 13, 1916, the President sent for the brotherhood representatives and the managers to confer with him at the White House, and suggested arbitration by way of settling the controversy. The labor leaders, conscious of their strength, stating that the question of the shorter work day was not arbitrable, refused to arbitrate. Later the president referred to the situation then existing in the following words:

"I was not able to make the slightest impression upon those men. They feel so strongly the justice of their cause that they are blind to all the consequences of their action in declaring and prosecuting a strike.

"I was shocked to find a peculiar stiffness and hardness about these men. When I pictured to them the distress of our people in case this strike became a reality, they sat unmoved and apparently indifferent to the seriousness of the whole bad business. I am at the end of my tether, and I do not know what further to do."

When the sincerity of the brotherhood chiefs was questioned by the railroad executives, who asserted that a raise in pay was the real object of the move, the four executives,

acting for the brotherhoods, issued a statement, saying in effect: "If you doubt the sincerity of the brotherhoods in asking for relief from the long hours of labor, arrange that the employees will not be able to make one minute's overtime."

Since the adoption of the Adamson law both sides to this controversy have dodged the responsibility for inaugurating a real eight-hour law by alleging the impossibility of enforcement. Since then, however, Mr. Ford has shown how a real eight-hour day may be put into effect on the railroad, with wages acceptable to the employees. The Pullman employees and express messengers have also enjoyed the benefits of a real limitation of hours of labor.

How different, though, has been the course of the brotherhoods. They even in the so-called Chicago agreement, governing only the engineers and firemen, provided a work month of 38 eight-hour days, with no provision for holding their members even to that limit. In fact, it is common knowledge that this limitation is constantly ignored, with the result that the railroad managers are still able to show these "high peaks" in earnings. And this, too, when thousands of the 75,000 members of the brotherhoods who bared their breasts to the enemy in the late war are unable to support themselves and their families. As to the conductors and brakemen, so far as any action of their organizations is concerned the eight-hour day has been a sham and a fraud. In fact, by official action train crews have been taken out of the service while other crews were making far beyond the mileage contemplated by the law.

Representatives of labor organizations generally complain of the provisions of the Transportation Act that the earnings of capital are carefully protected by the instructions given to the I. C. C. to establish rates that will provide standard returns as dividends, while the chief argument being advanced for reduction of earnings of employees is that the high rates necessitated by this provision are paralyzing business and the rates cannot be lowered except through reduced wages. While agreeing that these requirements of the law are not conducive to the "square deal" to labor, I am constrained to call attention to the fact that there appears to be no disposition on the part of the brotherhood executives to conserve the welfare of the thousands of loyal members who have been separated from their means of living through cutting down the working force, by enforcing the limitation of hours on the members protected in the "high peaks" of earnings by seniority rights.

That the power to limit hours of service exists in the brotherhoods is shown by the fact that it is rigidly enforced among the employees in yard service. At least there has been no evidence of demands made on behalf of the yard men that they be permitted to increase their earnings by working overtime at the expense of the out-of-work brother.

While the influence of the organization executives has been invoked to continue passenger conductors in their long hours of service, the effect of this policy is shown in the fact that, notwithstanding the law requires that wages shall be fixed, among other things, on the basis of "the training and skill required," and "the degree of responsibility," executives have accepted for them a lower rate of pay than is accorded firemen and through freight brakemen. In fact, brakemen deadheading on a train not infrequently receive a larger rate of pay than is accorded the man in charge of the train.

May it not be due to this condition, and the difficulty experienced by many passenger conductors to preserve the standard of living required of them on the wages they receive, that many of the most experienced and valuable employees, who have acquired their value to the company through their years of loyal service, have been removed from the service because of irregularities?

Let us have the truth and a square deal. Think it over.

F. J. BAILEY.

What Is Ahead of the Chief Clerk?

BOSTON, MASS.

TO THE EDITOR:

I have followed with much interest the various communications relating to the chief clerk which you have published during recent months. Two or three of these letters took issue directly with the one and only communication (August 6, 1921, page 236) that I ever wrote to any paper. I should particularly, however, like to comment on the reply which was made by Grant Gibson in your issue of October 8. His letter takes up the case from three entirely different angles. He assumes a point of view on my part that is entirely absent; this is evidently due to faulty expression or my desire to condense to the minimum number of words.

I have never had in mind, or seen, any antagonism between an official and his own chief clerk. I have grown up in the operating department, as he assumes, and have held positions from trainmaster to general manager. I have had several chief clerks and but one that was unsatisfactory; in the others I have had the utmost confidence and have received from them the fullest support. My article was intended rather as a criticism of the official than of chief clerk.

To take up the case from its first angle; namely, the future for a man who takes a clerical position and who works up to the position of chief clerk. It may seem hard to say so, but it is very difficult for any man whose experience has been entirely in an office to successfully assume an official position of the rank of superintendent, superintendent of motive power, or higher. Of course, there are exceptions but they are very few. The greater part of a railroad's business is done outside under conditions entirely different from any other form of industry. A certain amount of experience out on the road is, in my opinion, essential to make a successful operating official.

Three of the chief clerks that I have had in the past are at present successful operating officers but I credit this to the fact that upon advice each gave up his position as chief clerk and went on the road, or in the shops, in a minor official capacity, from which, as a result of their early and long inside experience, they were promoted rapidly. There are three or four more just as efficient men, who are still chief clerks, who refused to take this advice and are in the blind alley referred to. I think the above answers the question as to what is ahead of the chief clerk.

Taking the case up from the second angle, the one that I have had mostly in mind, is the modern tendency to overload the chief clerk. This is due to two causes; one the natural tendency of many men to allow their chief clerks to relieve them of much responsibility, having sufficient work coming to them anyhow, due to the over-centralization which has been creeping into our railroads for many years. This tends to take responsibility away from the minor official, starting with the supervisor of track, division engineer, master mechanic, and up, bringing cases into the higher offices where the recommendations of these men and instructions to these men are largely handled by the chief clerk of their superior. Regardless of the ability, loyalty and industry of the chief clerk, if the divisional or district officer is competent, his judgment should be reversed by, and instructions to him on matters other than of the merest routine should only be from his superior officer. Unfortunately, on many railroads this is not so. It does not stop with the division superintendent's office but goes all the way up. It often results in improper, although honestly given, decisions, and restricts the individuality and the responsibility of the lower official and brings about the very condition complained of—overcrowding of the work in the higher offices. That is what I mean by having officers do more work and chief clerks do less.

If, for example, a communication from a superintendent or person of not of sufficient importance to warrant the personal attention of his superior it means either his authority

is not sufficient or he is not big enough for the job.

The most important element in railroading, as in any other business, is the personal one. No man likes to be criticised or likes to receive vital instructions from other than his "boss." For that reason letters of criticism should never be dictated or signed by other than the responsible official. Many of us will oftentimes sign a letter we would not have written ourselves on the theory that perhaps a little criticism will do no harm, at the same time feeling that it is probably too strong. Such cases do incalculable harm to the morale of subordinate officers.

Quite the reverse of Mr. Gibson's assumption, my experience with my own chief clerks has been pleasant and satisfactory. Also I have had very little trouble with other people's chief clerks. I have in mind the good of the business as a whole; and, to be perfectly frank, the railroads cannot be run by chief clerks, although there is a decided tendency in that direction. "OPERATING OFFICIAL."

Yardmasters Disclaim

Connection With C. G. Poirier

CHICAGO.

TO THE EDITOR:

In your issue of February 11, page 393, considerable space is devoted to the testimony and opinions of C. G. Poirier before the Senate committee on Interstate Commerce. If the writer's memory serves him correctly this is the same gentleman who appeared before the Interstate Commerce Commission during the hearings before that body in October, 1920, claiming to represent all classes of supervisory officers, but, when questioned by an officer of one of the subordinate official organizations, acknowledged that he represented between 200 and 300 individuals. The facts will be found in the record of hearings Ex Parte 72.

Mr. Poirier is reported by your Washington correspondent as saying that "in my opinion or perhaps my imagination the purpose is to hand those organizations over to the federations later, etc." We have very little respect for Mr. Poirier's opinion in this matter, but we have the most unbounded admiration for his imagination, for to imagine the train dispatchers, the yardmasters, the agents, or the mechanical foremen handing their organizations over to the "federations" is some mental feat. And we are prone to wonder what has so stimulated Mr. Poirier's imaginings since October, 1920, when, according to the record referred to above, he addressed the Interstate Commerce Commission as follows:

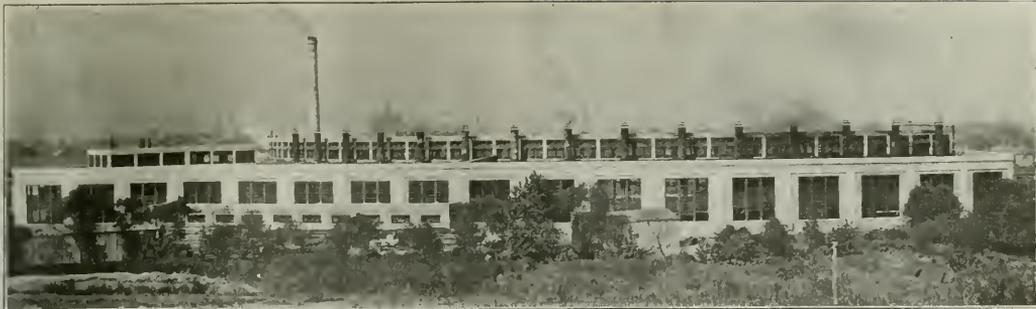
"I just want to say this: It stands to reason that the organizations of subordinate officials were organized for the purpose of withholding themselves from labor organizations. That is true or they would not be here today. They would be affiliated with the American Federation of Labor."

As we have maintained before, the organizations enumerated above came into existence because there was a real need for them in the conditions that existed at the time and that had existed for years past, and one of the impelling motives was to escape the very thing that Mr. Poirier imagines is about to happen.

We have the greatest respect for the fairness and justice of the *Railway Age*, but we cannot help but feel that it has to a certain extent erred in giving so much space to this statement. We do not profess to know what motives have actuated Mr. Poirier in his various appearances in Washington, but we are quite sure that he does not speak for any more men, or any different interests, than he did when he appeared before the Interstate Commerce Commission in October, 1920.

J. L. ELDRIDGE,

First Grand Vice President, Railroad Yardmasters of America



The Simplicity and Harmony of the Design Is Admirably Shown Here

An Engine Terminal for Economical Operation

Central of Georgia Constructs Combined Roundhouse and Shops
of Advanced Design at Columbus, Ga.

By G. W. Tutan

Assistant Engineer, Central of Georgia

THE CENTRAL of Georgia has completed and put into operation at Columbus, Ga., an engine terminal, fully equipped to handle 2-6-6-2 Mallet locomotives and to make heavy as well as running repairs. To secure maximum economies in locomotive terminal operation, the enginehouse has been designed to include a combination of a roundhouse with 15 radial stalls, 120 ft. long, and a power plant and machine, blacksmith and boiler shops. The structure is semi-

the main lines of this division leading from the Birmingham coal and iron fields to points south and east. It is now possible with the new facilities to handle heavy and running repairs quickly and economically on this division.

In considering a location for the proposed engine terminal, two sites were available. One site was three miles east of the city and the other was the existing engine terminal, located in the city limits within a few blocks of the business district.



The Effectiveness of the Lighting and Ventilation Produces a Clear Interior

radial or semi-rectangular in shape, being a combination of the two general types of buildings and is built of reinforced concrete throughout. The roof has a raised section or monitor and is built up from monolithically poured roof slabs, beams and girders. The center bay is served by a 10-ton electric overhead crane which travels the full length of the building, covering both the enginehouse and the machine shop. Stall tracks are served by a 100-ft. turntable driven by a 30 hp. electric tractor. Provision has been made for a future extension of nine stalls.

Columbus, Ga., is the eastern terminus of the Columbus division of the Central of Georgia, and is 100 miles west of the company's main locomotive repair shops. Mallet engines of the 2-6-6-2 type, weighing 308 tons each, are operated over

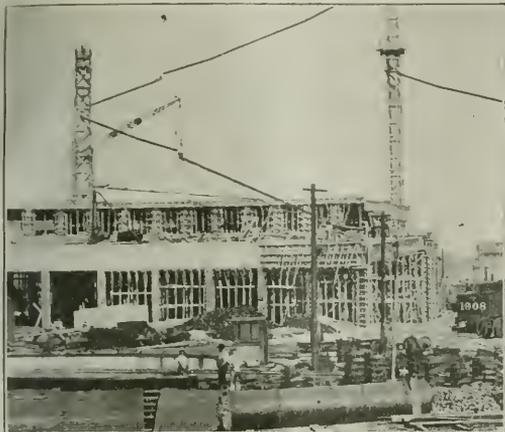
The site of the existing engine terminal within the city was selected because it was more desirable from the point of view of a reliable supply of labor and because a duplication of certain existing facilities would have been necessary at the site east of the city. There were two other important influencing factors, namely, the site east of the city would have added three miles to a district already 57 miles longer than the adjacent eastern one, and the possibility of carrying out the new development without disturbing existing facilities or interrupting operation.

The Design of the Enginehouse Structure

The enginehouse was designed primarily for housing and repairing the 2-6-6-2 Mallet engines and although the three-

proofed with cotton seed gum applied in one coat. The roofs over the power plant, offices and locker rooms are water-proofed with a three-ply built-up felt roofing cemented with cotton seed gum. Sheet steel work has been reduced to a minimum by the use of felt flashing, cast iron and wrought iron rain conductors and copper ventilators.

Ample provision has been made for light and ventilation. Triple sash windows with narrow brick jambs fill the openings between the concrete columns in the outer wall. The



The Concrete Was Chuted From Towers Located at Various Points

sash windows are glazed with clear glass and the top and bottom sash windows are counter-balanced. The upper portions of the hinged doors between the columns on the inner circle are glazed. Pivoted sash windows fill the openings between the columns of the craneway monitor and fixed sash and wood louvres fill alternate openings between columns of the blacksmith monitor. Cast iron smoke jacks with hood openings 4 ft. 7 in. by 12 ft., located over each engine pit and suspended from the roof beams, carry the locomotive

gases from the building. Wrought iron jacks 22 in. in diameter over the forges in the blacksmith shop dispose of these gases.

With regard to artificial lighting provision has been made for outlet plugs for portable lights and power on the columns between all stalls. In conjunction with this a very efficient arrangement of lamps has been obtained and the absence of shadows is particularly noted. All light and power wiring is in metal conduit embedded in the concrete structure and is thus protected from locomotive gases.

There are 15 engine pits of plain concrete with bottoms reinforced with steel rods and old rails. Each pit is 95 ft. 3 in. long on the inside. The bottom is crowned 3 in. and sloped so that the drainage is toward each end into sumps and thence into the sewers. Rail bearing timbers and blocks of creosoted yellow pine are bolted on the walls of each pit for its full length. Cast-iron wheel stops are anchored to the rails at the forward end of each pit. A driving wheel drop pit with air jack lift connects three of the engine pits and, with the traveling crane, permits wheels to be taken from three locomotives at one time. A tender wheel drop pit is built under one of the storage tracks outside of the building.

The floor of the enginehouse and shop is built on a 4-in. concrete base reinforced with wire mesh, a 1/8-in. pitch cushion, and 4-in. creosoted yellow pine blocks. The floors in the offices, locker rooms and power plant are trowel-finished concrete, treated with a metallic floor hardener. The floor between the engine pits has a one-inch crown and drains into the pits. Floor drains connected to sewers take care of the drainage in the power plant and locker rooms.

The turntable is a 100-ft. balanced deck girder steel turntable driven by a 30 hp. electric tractor. The pit walls, bottom and center pedestal are of concrete. Manganese steel heel blocks joining adjacent rails bear on a timber rim on the concrete pit wall. For handling ashes, two double bucket conveyors have been installed and are now in operation.

Shop Equipment Is Complete and Well Laid Out

The shopmen's locker and lavatory rooms in the rear of the blacksmith shop are provided with individual wash basins and shower baths with hot and cold water, sanitary water closets and steel lockers. The engineers' and firemen's locker rooms are similarly equipped with the exception of shower baths, but with the addition of writing tables, benches



The Layout of the Machine Shop Shows Careful Planning

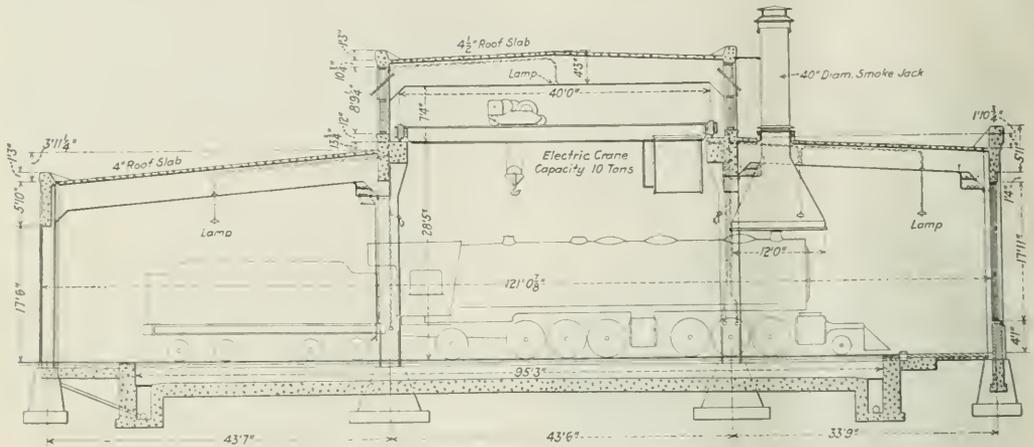
and bulletin boards. Separate rooms are provided for the white and colored employees.

A 10-ton capacity overhead traveling electric crane operates the entire length of the center bay, passing over the 15 engine pits, the drop pit and the machine shop. Jib and bracket cranes are provided in the machine and blacksmith shops. All air, water and steam piping is suspended over-

each group being motor driven and consisting of the following:

GROUP No. 1.

- | | |
|--------------------------------|---------------------------|
| One 26-in. double head shaper. | One twist drill grinder. |
| One 20-in. single head shaper. | One 20-in. emery grinder. |
| Two 36-in. planers. | One 51-in. boring mill. |
| | One 16-in. shaper. |



Section Through Typical Roundhouse Stall

head on wrought iron hangers bolted to the concrete beams and roof slab, where any leakage may be detected and repairs made readily. Drops and valves are provided on columns between all engine pits and in the machine and blacksmith shops.

A heavy duty 90-in. driving wheel lathe and a 42-in. wheel lathe, both motor driven, have been located in positions convenient to the drop pits and wheel tracks. These, with the

GROUP No. 2

- | | |
|--------------------|------------------------------------|
| One 27-in. lathe. | One 2-in. double head bolt cutter. |
| One 24-inch lathe. | One 36-in. vertical turret. |
| Two 18-in. lathes. | One 20-in. double head grinder. |
| One 4-ft. drill. | |

GROUP No. 3

- | | |
|-------------------|---------------------------|
| One 36-in. lathe. | One 4-ft. radial drill. |
| One 24-in. lathe. | One 12-in. brass lathe. |
| One 14-in. lathe. | One 3 by 36 turret lathe. |



The Beginning of the Radial Section—A Business-Like Round House

following tools have been located directly under and are served by the overhead electric crane

- One 100 ton hydraulic press.
- One 6-ft. radial drill—motor driven.
- One 18-in. rapid production slotter—motor driven
- One 25-in. heavy duty lathe—motor driven
- One 24-in. crank plater—motor driven.

The remaining machine tools are arranged in three groups.

- | | |
|--------------------------|----------------------------|
| One 18-in. turret lathe. | One sensitive drill |
| One 3-in. turret lathe. | One horizontal boring mill |

The pipe shop is equipped with a 4 in. motor-driven pipe machine, tilting brass furnace using crude oil for fuel, two coke metal fires and a portable fuel oil burner used for heating and metalizing crosshead shoes, etc. The blacksmith shop is equipped with double forges and also an open or heavy fire served by a two-ton mast crane which also serves a 1,500-lb

steam hammer. A 350-lb. steam hammer takes care of the small work. Other tools and facilities have been installed in quantity and quality necessary to round out the facilities for making economical repairs.

The shop, locker room and office portions of the building are heated by a direct radiation, vacuum return, low pressure steam heating system. Cast-iron wall radiators are attached to the concrete columns and brick walls under the windows. Steam is furnished by the power plant boiler. Climatic conditions make it unnecessary to have radiation in the engine pits.

An efficient boiler washing system, consisting of pumps and washing, filling and sludge tanks, is installed in the

boiler room with pipe lines and drops running to every engine stall. Electric current for light and power is obtained from a local hydro-electric company at 11,000 volts and is stepped down to 440 volts for use in the shop.

Further terminal development in Columbus includes a modern coaling station, an inspection pit and a rearrangement of the freight yard.

The facilities just completed were designed by and erected under the supervision of the engineering department of the Central of Georgia, C. K. Lawrence, chief engineer and W. H. Fetner, superintendent of motive power, with the writer as resident engineer. The general contractor on the work was the George B. Swift Company, Chicago.

Excessive Cost of the National Shop Agreement

Mr. Cuyler Answers Critics Who Doubt Statements Concerning This Inheritance from Government

REPLYING to questions from W. H. Chandler, president of the National Industrial Traffic League, Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, has issued a statement explaining the effect of the "national agreements" with employes, during federal control, on the revenues of the railroads, and disputing some statements made by Walker D. Hines, former director general of railroads. Referring to Mr. Hines's testimony before the Interstate Commerce Commission on January 31, where he said that practically every feature of the shop crafts agreement . . . had been in effect throughout 1919 and had been put in effect in the summer of 1918, Mr. Cuyler says that "some of the most burdensome and injurious interpretations of the provisions of this agreement were never experienced by the director general. These interpretations were largely handed down by Railway Board of Adjustment No. 2, and numerous decisions were rendered in May, June, July, August, and even up to November, 1920."

As to the claim that the classification of labor complained of in the national agreement with the shop crafts had been put in effect in the summer of 1918 and was in effect all during 1919 and could therefore have had no effect upon the operating expenses of 1920, Mr. Cuyler says that one of the most notorious examples of the national agreement, the application of the division of labor to renewing stay-bolts, was not even raised until the case of Engine 1610 of the Baltimore & Ohio on December 6, 1919, less than three months before the termination of Federal control.

The rest of Mr. Cuyler's statement, slightly abridged, is as follows:

Formerly a machinist stripped the locomotive and the boiler makers renewed the stay-bolts. On the occasion in question the shop committee insisted that under the national agreement the following forms of skilled labor must be used:

(1) Pipe fitter and helper to remove injector and other pipes; (2) Machinist and helper to remove injector. (3) Sheet iron worker and helper to remove jacket. (4) Carpenter to remove lagging and running boards. (5) Boiler makers to remove and renew stay-bolts. (6) Engine restored to operating condition by reverse of first four processes.

Yet during 1920 I am informed this became the *standard practice* for the renewal of stay-bolts on all railroads subject to the National Agreement! That the director general did not experience anything like the full force and effect of the rules of the national agreements, will appear from the following decisions of Railway Board of Adjustment No. 2:

Docket 1516, June 18, 1920, prohibiting section men from removing damaged or broken parts of motor cars. Docket 1500,

June 15, 1920, prohibiting machinists taking off electric headlights. Docket 1778, September 2, 1920, requiring that as long as employes are required to perform any work in a carpenter locomotive gang, they must be paid continuously at the highest rate of pay. Docket 1678, August 19, 1920, providing that a freight car repairer who occasionally works on passenger cars must be paid the highest rate of pay continuously. Docket 1477, May 24, 1920, providing that a machinist must be paid overtime when transferring from a night to a day shift, even if to meet his own convenience.

On page 3745 Mr. Hines says, concerning features of the agreement which were established for the first time in 1919, "there were numerous railroads which had practically all those features in their agreement prior to federal control." It is true that under threat of a strike in 1917 a certain group of Southeastern railroads entered into a so-called Southeastern agreement; and this agreement may be considered as the logical predecessor of the national agreement covering the shop crafts. It is equally true that the constructions placed upon those rules by the U. S. R. A. and its boards of adjustment had in large degree never been placed upon them prior to federal control. . . . Even the Southeastern agreement did not abolish piece-work.

When the railroads were returned, on March 1, 1920, they had approximately 261,000 more employes than they had in December, 1917. Of this increase 221,576 is accounted for in shop crafts, clerks, section hands and unskilled laborers. The railroads moved the abnormal traffic of 1920 with no increase in train service employes; but they inherited a 47 per cent increase in the shop crafts, a 29 per cent increase in clerks, and about a 7½ per cent increase in maintenance employes.

It is true that the railroads cannot make an exact computation on each and every railroad of the effect of every rule in each of the national agreements, and of every interpretation; but it is our belief that between excessive increases in employes covered by these rules and decreases in the productivity per man, the estimate of their having added \$300,000,000 to the operating expenses of 1920 is conservative.

It is also undoubtedly true that during 1921, with widespread unemployment and diminished railway forces, the psychological effect made for an increase in productivity and for a curbing of the effort to put further strained constructions upon these rules.

I have no doubt that during 1921 the railroads recovered some considerable portion of the \$300,000,000 excessive burden of 1920, and that the effect of this recovery is included in the approximately \$600,000,000 of net earnings which the roads will probably show for the year 1921.

At the same time I call to your attention that when the Railroad Labor Board announced its revision of the shop crafts agreement, it informally estimated that this revision would probably enable the railroads to save \$300,000,000. . . . We do not believe this to be true, because while the Labor Board made a number of changes which will undoubtedly make for further economy, it left so substantial a portion of the national agreement with the shop crafts that a saving of \$500,000,000 would be impossible unless our original estimate of the cost of the national agreements was far too conservative.

Freight Transportation in New England

AT THE JOINT MEETING of the Boston sections of the American Society of Mechanical Engineers, the American Society of Civil Engineers and the American Institute of Electrical Engineers, held on February 15, the subject of freight transportation in New England and its relation to motor transport was discussed by Gerrit Fort, vice-president in charge of traffic, Boston & Maine, and B. F. Fitch of the Motor Terminals Company. Mr. Fort applied himself to the consideration of existing road motor truck competition, whereas Mr. Fitch spoke on the advantages to be anticipated from the use of unit containers in connection with railways, motor trucks or interurban electric lines, considering all means of transport as a whole.

Motor Trucks and the Railways

Mr. Fort directed attention to the fact that with the exception of the Bangor & Aroostook all railroads in New England showed a deficit for the past year. This was brought about by the high operating expenses, for which the high cost of labor was very largely responsible, coupled with the great decrease in business. With the determination of wages, working conditions, etc., in the hands of the Railway Labor Board and the fixing of rates under the jurisdiction of the Interstate Commerce Commission, it has not been possible for the railways to adjust, of themselves, their revenues and expenses to make ends meet. These restrictions have prevented the railways from adjusting themselves readily to new conditions and have made it impossible for them to meet adequately the motor truck competition. They are not able to "merchandise" their product—transportation—as other industries or merchants do in times of depression and thus increase their revenues. There are no opportunities for bargain sales.

Motor transport by road has its greatest field in the densely populated industrial territories. Thus New England has been a fertile field for the development of this mode of freight transportation and it has hit the railways hard. It received a great impetus during the war when the abnormal demands for transportation were such as to exceed the capacity of the railways for prompt handling.

The motor truck manufacturers were not slow to seize this opportunity. What the actual cost of this mode of transportation amounts to, it has not been possible to determine but it is known that the motor transport companies are charging in the way of rates whatever the traffic will bear and that they are free to adjust their rates either up or down without the interference of any regulatory bodies. In this way they have a great advantage over the railways. In fact there is no regulation between the motor companies themselves.

The question has been asked whether or not it is profitable for the railways to handle L. C. L. freight and if it is not, why not turn it over to the motor trucks. In times of heavy business when a large amount of car load freight is offered, it would undoubtedly be better for the railways to let the motor trucks handle such business, but on the other hand in dull times the railways need the revenue from the L. C. L. shipments

to help meet the overhead expenses. Another distinct advantage enjoyed by the motor truck is that it does not begin to pay for its share of highway maintenance or improvements, while the railway is called upon not only to maintain its own roadway at its own expense but to contribute, by means of taxes, to the maintenance of the highways which the motor trucks use.

Mr. Fort believes that highway motor traffic has come to stay and that for short hauls it has a distinct place in the transportation system of the country, but it should not be allowed to compete unfairly with the railways. The motor truck companies acting as common carriers should be made to pay their fair share of highway maintenance and be subjected to the control of either state commissions or the Interstate Commerce Commission the same as the railways. He believes that the present short haul rail railroad rates should be reduced as soon as business improves or expenses can be reduced. He believes that the motor truck is an economic factor in transportation that should be used to supplement the service of the railways and be developed to co-ordinate with them.

Unit Container Meets New England Conditions

Mr. Fitch explained at some length the service rendered by the unit container for L. C. L. freight at Cincinnati where it has been used with success in linking up the 28 scattered freight houses of all the railways and believed that what had been done there in a small way could be done in a larger way in New England.

He proposed the establishment of transfer stations at the frontiers of the New England territory, such as Albany, Poughkeepsie, Harlem, etc., where all inbound L. C. L. freight should be loaded into containers for individual New England line station destinations or the principal volume consignees. Such containers would then be available for movement by motor truck, interurban car, float or railway car, whichever would offer the most economic operation.

If at such suggested frontier transfers all L. C. L. eastbound shipments destined into New England could be trans-handled to containers and flexibly delivered by any of the existing mediums of transportation throughout this territory, maximum economies could be effected. The cars unloaded at transfers would be immediately available for westbound re-loading, and thus the New England territory, which has been termed a graveyard for box cars, would receive and forward in box cars without transfer only carload shipments, all less than car lots being handled in containers between transfers and industries.

"This program in my estimation," said Mr. Fitch, "will save the per diem charges of foreign cars now paid by New England roads, will decrease labor rehandling costs, increase the ton-mile efficiency of such roads and expedite the movement of freight. As I see the entire New England situation, the problem is first one of co-operation for development of a program permitting maximum use of existing plant of all interests.

Now you all suffer and are paying for the cost of interrupted movements, which causes congestion with its accruing evils and expense, whereas if a co-ordinated system permitting a free and steady flow over existing rails and through existing terminals is developed, your traffic capabilities are unlimited and your cost assessment for additional facilities will be nil."

NEW YORK CENTRAL.—*Stockholders Approve Lease.*—At a special meeting on February 3 the stockholders approved the proposals of the directors to lease the Toledo & Ohio Central and other railroads. The company filed application with the Interstate Commerce Commission last December for authority to make the leases.

Modern Methods of Handling Package Freight*

Remarkable Savings Have Been Made on the New Haven by the
Use of Tractors and Trailers in Freight Houses

By G. Marks

Assistant to General Manager, New York, New Haven & Hartford

MODERN HANDLING of package freight is a real problem. It is a vital factor in prompt dispatch and low transportation cost. Two marked and important innovations have been the deciding factors in securing greater efficiency and economy in the handling of package freight through freight houses:

First: The installation of mechanical equipment through the substitution of electric tractors and trailer trucks for hand-operated two-wheel trucks.

Second: The introduction of cost or performance sheets showing concisely and accurately, the three fundamental features of freight house operation; *total cost* (man-hours and money), *total tonnage*, and *cost per ton*.

Electric Tractors and Trailer Trucks

In order to show the value of the tractor with trailer trucks, it is desirable to call attention first to the so-called "gang system" of handling freight, which is the plan, with but few exceptions, almost universally followed in the East even now, and also the "drop truck system."

The "gang system" involves at least two distinct operations, and often three, as well as much lost motion through the necessity of pushing the freight back to clear the doorways. It increases the possibilities of damage to freight, also splitting of shipments. There is also a decided disadvantage through delay to outward billing, as shipping orders cannot be sent to the billing department until after the final check by the tallyman. Under this system a trucker must make a round trip from the checker to the car and return to the checker. The return movement is unprofitable in that the trucker is not moving any freight, merely pushing an empty truck.

By the introduction of the so-called "drop-truck system," with 4-wheel trucks, manually operated, the first economies were made possible through the elimination of one or two of the three operations previously mentioned. Under this plan, a supply of trucks is placed adjacent to the receiving doorways, enabling teamsters to unload their outbound freight direct to the truck, thus keeping the freight, excepting large and heavy packages, entirely off the freight house floor and almost entirely eliminating the need for the so-called doormen or push-backs. The use of 4-wheel trucks, manually operated, under the "drop-truck" system, effected a partial improvement toward speedier operation as compared with the gang system, but it was still impossible during the peak hours to move the freight as rapidly as offered.

By replacing the 4-wheel trucks, manually operated, with trailer trucks, hauled by electric tractors, it has been definitely shown that rush hours can be protected and the actual loading kept abreast of the receipts, so that at the close of the day, the quantity of freight remaining unloaded is reduced to a minimum. Aside from the loading of practically all freight on the same day offered, it has had the effect of expediting the unloading of freight from the dray and obviating the necessity of the drivers and helpers carrying the freight to any available vacant space on the freight house floor, thereby releasing teams in much less time than was possible under the gang system.

We have operated under the 2-wheel hand truck by gangs; then the 4-wheel truck, manually operated under the "drop-truck" system, and finally under the tractor and trailer system and thus have an intimate knowledge of the results obtainable under all three systems.

Original advocates of tractor operation were firmly of the opinion that a certain hauling distance was essential—I believe 300 ft.—if any decided economy was to be effected, yet this theory has been disproved by practical experience with tractor operation at the New Haven outbound houses in Boston. With designated doorways for the receipt of the freight, practically opposite assigned cars, affording a hauling distance rarely exceeding 150 ft. and averaging but 85 ft., it has been proved that tractors can be most successfully operated regardless of distance.

A most decided advantage in favor of the tractor-trailer is the saving in the number of men, thereby reducing the incidental congestion and confusion with its consequent delay to the hand trucker, also the savings resulting from reduced labor costs. Let me give you some actual figures. At Westchester Transfer, prior to July, 1920 (the date on which it was closed and the new transfer at Cedar Hill opened), the maximum capacity was 25 gangs or approximately 150 men. To exceed this number was unprofitable, as a congestion was created without any resultant increase in performance. Westchester had three platforms, all 1,200 ft. long; two 14 ft. wide, and one, the center, 16 ft. wide. Its peak day averaged between 100 and 125 cars. Yet at Cedar Hill with the same number of platforms, also 1,200 ft. long, two being 20 ft. wide and one 30 ft. wide, using from 12 to 16 tractors with 600 trailing units, and approximately 200 men, three times the number of cars can be worked, as an average of from 300 to 350 cars daily can be handled. With the tractor and trailer, the man movement is restricted to the loading of the trailers at the car being worked and to the unloading of the trailer at its designated block or car by stevedores, the intermediate move being handled by the tractor. Of these 200 men at Cedar Hill, only 32 are required to operate the tractors or ride the trailers, the others being held to a working radius of the car being unloaded or stowed. Due consideration should also be given to the fact that Westchester Transfer operated on a ten-hour basis while Cedar Hill is a straight eight-hour plant.

Our experience is that the trailer equipment should include 15 in. diameter 4-wheel trailers for ordinary compact package freight, with 11 in., or dolly, 4-wheel trailers for hauling machinery, pianos, and similar freight. Fifty 3-wheel trailing trucks, specially adapted to handling heavy package and barrel freight, have just been installed at Cedar Hill, and with these three styles of trailers, the use of the hand truck is practically eliminated, thus giving approximately a 100 per cent tractor-trailer operation.

The tractor crew usually consists of two men—the driver and a helper. The former operates the machine while his helper makes the hitches and lines up the trailers in series according to car location; rides on the rear trailer and upon arrival at the designated cars uncouples the trailers and leaves them for subsequent handling by the stevedores.

The use of tractors requires a charging plant. The neces-

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sary maintenance and minor repairs are handled by an electrician working during the night period who thus gives the trucks daily inspection and attention.

It has been found that the best results from tractor-trailer operation are obtainable only through as close as possible to 100 per cent use of both. The trial of a single unit, when the tonnage handled warrants several such units, does not show up advantageously as the slower work of the hand truck, still retained, interferes with the operation of the tractor.

Whether trailers are hauled directly into cars, pushed in, or left opposite car doors (dependent upon local physical conditions), the actual unloading of the trailer and the stowage of the freight is performed by stevedores assigned to permanent locations who are familiar with the existing loading instructions. In no case is the tractor and its crew detained or held, while trailers are being either loaded or unloaded. The hauling tractor functions usually in both directions, but when no loads are available, empties are moved back to places where they are needed. The distribution of empty trailers is handled by one man who acts in the capacity of car distributor.

Cost or Performance Sheets

To maintain a proper check upon the entire operation of any freight station it is necessary that two distinct divisions of cost be maintained:

First: The freight house force, including all who are actually engaged in the handling of freight through the freight house (watchmen, foremen's clerks, sealers, coopers, sweepers, etc., who, while they may not actually handle freight, yet are essential parts of the freight house organization).

Second: The office force, including those who confine their duties to the freight office and routine work incidental thereto.

Each report should contain a classification of employees by occupations, sub-divided departmentally and the sum total of the expense shown on the two reports should equal the actual payroll total, thus affording an excellent check of performance against the payroll.

The freight house sheet should show the actual hours worked by, and the money paid to each employee, or employees, by classes; the total tonnage handled, subdivided between "forwarded," "received," and "transfer," with but one credit for the same tonnage, regardless of the number of times local conditions require the handling of such tonnage, and without allowance for that tonnage, which, for any reason, is left in the same car and not transferred.

Certain deductions from the payroll total are permissible, as not being chargeable to the actual handling of house freight; such as the use of the house forces for transferring the contents of defect cars; unloading coal for the engine house; or feeding a car of livestock. These deductions should be totaled and shown in a space specially provided with full details of each deduction.

The daily performance record is of first value to the agent, who can thereby gage his forces, day by day, keeping them in proportion with the business offered. Supplementing the daily record, a weekly summary, showing comparative costs for the preceding week, month and year, sent to divisional supervisors, keeps the latter in close touch with each station.

A monthly summary establishes an average daily cost comparison between all stations handling an appreciable amount of tonnage while the grand summary for a division, district or the entire system affords a true basis for comparison and possible improved operation as well as showing the average cost and performance for all stations combined.

The combination of mechanical operation, tractors and trailers, with up-to-date cost and performance sheets, indicating tons handled per man per eight hours, enables an agent to maintain efficient and economical operation, for

by keeping in touch with the cost figures, he can regulate his force as the business increases or decreases day by day.

The results obtainable by present methods versus the old are best shown by a brief statement of the actual experience at the four stations on the New Haven (New York Piers 37 to 42, East River; Cedar Hill Transfer, Providence and Boston), where the tractor-trailer system is now operative.

Pier 39.—In April, 1918, prior to the installation of tractors and trailers, the tonnage handled per man per eight-hour day was 4.4 tons, to be exact 4.408, while in April, 1921, with tractors and trailers, the performance increased to over 9 tons, the exact figures being 9.023, an increase of 4.615 tons or 104 per cent. In other words, the performance doubled itself, creating a saving in handling cost of approximately \$100,000 per year.

Incidentally, during the war period, tractor and trailer operation permitted the New Haven to keep its piers open for outward, and free from embargo on inward, business.

Providence.—The tonnage handled per man per eight-hour day increased from 4.138 in May, 1918, to 7.163 in May, 1921, a net increase of 3.025 tons or 73 per cent. Providence handles both its transfer and outward tonnage with tractors and trailers. The cost per ton was first reduced 10 cents under the "drop truck" system (4-wheel trucks, manually operated) as compared with 2-wheel trucks under the gang system. This saving was equivalent to approximately \$25,000 per year. The cost per ton was further reduced 15 cents through the installation of tractors and trailers, with an additional saving of approximately \$37,500, or a combined saving in excess of \$60,000 per year over the 2-wheel truck operation.

Boston.—At Boston, with its shorter haul to the cars, no transfer freight to be handled, and both "drop-truck" and tractor-trailer operation confined to the handling of outward tonnage only, six cents per ton were saved through the original installation of 4-wheel manually operated trucks, while an additional saving of eight cents per ton has resulted through the installation of the tractor and trailer. Comparing July, 1919, prior to the use of drop-truck, with December, 1921, under tractor and trailer operation, the annual saving attributable to the latter approximates \$75,000.

Considering the cost at these three stations mentioned above prior to the introduction of any form of drop truck, and the present cost with both tractor and trailer, the handling cost has been reduced between 14 and 25 cents per ton. This is due directly to the mechanical equipment. Furthermore, it has been possible to save, within a period of from eight to ten months, an amount equivalent to the entire cost of the installation.

Cedar Hill.—The money saved in the actual handling of the freight is not the only thing to be considered. At the present time business conditions require the purchase of goods in less-than-carload lots. Speedier service from manufacturer to consumer is demanded. Competition with the motor truck must be met; hence, it is imperative that freight move to the greatest practicable extent in "direct-to-destination" cars, thus eliminating all possible delay incident to intermediate and smaller transfer stations. Economical train operation, reduction in per diem, reduction in freight loss and damage costs, require the use of as few cars as possible and all features crystallize in the need of a centralized transfer point, where the greatest number of classifications, or direct cars, can be made.

With this thought in mind, Cedar Hill Transfer on the New Haven was opened in July, 1920. It was initially supplied with 9 tractors and 350 trailers, but this equipment has been increased to 16 tractors and 600 trailers. A record of 2,836 tons has been handled in one day, while 350 cars can be regularly worked and freight transferred into approximately 280 cars in the outbound classifications.

Factors in the Business of Owning Locomotives*

Motive Power and Operating Departments Must Work Together in Design and Operation to Secure Economy

By C. B. Peck

Western Mechanical Editor, *Railway Age*

IN SETTING BEFORE YOU tonight what I conceive to be a few of the important business angles of locomotive policy, my purpose is not that of an exhaustive treatment but merely to suggest something of the relationships which matters within widely different jurisdictions bear to each other in their final effect on the well being of the railroad.

In discussing the ownership and operation of locomotives as a business proposition rather than from the technical viewpoint, it may be pertinent to consider for a moment who owns the locomotives. "The railroad, of course," you say. But the railroad is sharply restricted in its enjoyment of its property by public regulation and if we consider the locomotive as a producer of gross ton miles rather than as an end in itself, a part of the responsibility for expensive service should be placed squarely on the shoulders of the public. Indeed the burden is there now, but there is not a realization of its cause.

Purchasing Policy

The first business relating to the ownership of locomotives is their purchase. The question of what policy should be adopted by railway managements with respect to the acquisition of motive power is an exceedingly difficult one to discuss. Simple as the fundamental principles may appear to be, their application is affected by many variables the relative weight of which must at best be determined on the basis of very meager knowledge. For instance, if a heavy investment in equipment is to be made during a period of heavy traffic in order that the public demand for transportation may be met, just what assurance has the management that the crest of the wave of heavy business may not have passed before the equipment is delivered? If such be the case, what effect is the burden of the added fixed charges likely to have on the financial safety of the corporation until the next period in which the new investment has an opportunity to develop its full earning capacity? Again, with public regulation limiting the maximum return on railway capital to 6 per cent, and then taking care to see that on the average the maximum shall not be reached, what likelihood is there that the credit of the roads will more than meet the need for the additional facilities constantly demanded by the steady industrial and commercial expansion of the country?

With these reservations, then, it may not be out of place to suggest that the ideal purchasing policy is one in which, not locomotives, but locomotive service is the objective. In other words not the lowest price but the least cost per 1,000 gross ton miles or per passenger car mile during the life of the locomotive should be the aim of the management.

The five items of direct cost of freight train operation per 1,000 gross ton miles for the Class I roads during the first 11 months of 1921 averaged \$1,254. Interest on investment and depreciation charges for the same unit of service approximated a total of $7\frac{1}{2}$ cents. The relative importance of locomotive price and operating costs is clearly indicated by these figures. The direct items of unit cost of train operation are given in detail in the table.

Economics and Design

In preparing for the purchase of new motive power the mechanical department has one of the best opportunities that

could possibly be offered to go into the whole vast field of the economics of railway operation. Even the detail mechanical design cannot be settled on the basis of sound judgment until the designer has at his command a thorough knowledge of the limitations of operating and maintenance facilities and a sound appreciation of the relation of the cost of maintaining each group of the details to the total cost of locomotive maintenance. How many roads know the relative cost of maintenance per locomotive mile of locomotives of different

ELEMENTS OF THE UNIT COST OF FREIGHT TRAIN OPERATION

	Cost per 1,000 gross ton-miles
Fuel	\$0.405
Crew wages .....	.378
Locomotive repairs .....	.512
Train and engine supplies .....	.083
Engine house expense .....	.076
Total	\$1.254
Investment charges (estimated)—	
Interest on investment	\$0.050
Depreciation and retirements .....	.025
	\$0.075

classes now in service, and can tell whether the differences are due to the boiler, the rods, cylinder conditions, valve motion, frames or driving boxes? Also whether the differences develop in the back shop or in running repairs? The results of a study of this nature would be tremendously valuable to the designer in his selection of details. One year's saving in maintenance on an order of 50 locomotives, after they had begun to come through for classified repairs would probably defray the entire cost of the study and a sound basis would be established for the rapid elimination from the standards of the road of the undesirable designs. Serious defects of design, tending to cause failures or leading to marked inconvenience in the roundhouse or shop are readily caught. But there are still big possibilities for the exercise of judgment within the range of safe and apparently satisfactory designs. Judgment is nothing but guess work unless founded on fact.

But at the outset the designer has even a broader survey to make—one involving almost every item of direct train operating cost, as well as the investment charges. The limits of weight and tractive effort are generally fixed by conditions outside of the locomotive itself, such as strength of bridges, standards of track maintenance, etc. Within these limits, of course, increasing the capacity of the locomotive decreases the unit cost of crew wages and to a less extent the fuel bill. The cost of maintenance is almost as large as crew wages and increasing the size of the locomotive may materially increase this item of expense if the working loads on the running gear become excessive, or if the size of the locomotive outgrows the facilities for its maintenance. Unit investment charges may also be adversely affected if outgrown shop and terminal facilities lead to a marked reduction in the yearly mileage of the motive power.

The big problem, however, is to determine how much shall be added to the pound price of the bare locomotive for those items of equipment that will increase its capacity without materially increased weight, or will decrease one or more of the important items of unit operating cost.

It is not the purpose of this paper to enter into a detail

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discussion of the possibilities of this growing group of devices; they are known to be large by executives as well as by mechanical department officers. Suffice it is to say that no road need be without reasonably accurate knowledge of the relative importance of each of the factors in its direct train operating costs, and that the final decision as to the selection of such devices should be based on their probable effect on the sum of the cost of fuel, crew wages, locomotive repairs and the investment charges. Of this sum the latter form a very small part, but I fear that they are too frequently the sole factor considered.

Utilization and Maintenance

An analysis of the operating statistics compiled by the Interstate Commerce Commission for the period from 1903 to 1913 inclusive, has developed the fact although there was a marked improvement during that period in the extent to which the potential hauling capacity of freight locomotives was utilized, there was actually a steady decline in the total yearly traffic movement obtained from each unit of hauling capacity. The average train load had increased more than the tractive effort of the average freight locomotive, but the average number of train miles made by each locomotive in a year showed a marked decline. Continuing the comparison, the tremendous increase in traffic which reached its maximum in 1918, led to a big increase in the actual volume of traffic moved by each unit of tractive effort. But this was obtained entirely by increasing the train load, the average train mileage per locomotive per year remaining practically the same as in 1913. In 1920, the record year for volume of traffic, the same conditions continued.

What does this mean? In the first place it shows that the extent of utilization of the capacity of the locomotive when it actually moved, has been greatly increased, with large decreases in the crew time, fuel consumption, cost of train and engine supplies and the enginehouse expense per unit of traffic moved. But the average number of train miles per locomotive has declined from about 22,000 in 1903 to about 18,000 in the high years 1917 and 1920. This decline is equivalent to a loss of two months a year of the kind of service rendered in 1903. To restore the former conditions would mean that $\frac{1}{2}$ of the present investment in locomotives could be released for productive use in providing other much needed facilities.

There are several causes for this marked decline in locomotive mileage, not all of which are under the control of the managements. One of the latter, for instance, is the effect of the locomotive inspection law. But it is pertinent to note that the number of locomotives has increased more than 50 per cent during the 17 years under consideration, and the average hauling capacity has increased between 65 to 70 per cent. In other words, there is at least $2\frac{1}{2}$ times as much locomotive hauling capacity to be maintained as there was in 1903, and some of this capacity probably requires more attention per tractive effort unit than did the average unit of the earlier period. The meager expansion of shop and engine terminal facilities which has taken place during the same period certainly has been far from adequate to care for this great increase in motive power and it seems probable that this is one of the largest, if not the largest single cause of the decrease in train miles per locomotive.

Longer Runs

The distribution of locomotive hours published by the Railroad Administration indicates that the average serviceable locomotive spends not more than 40 per cent of its time on the road, and a little over 50 per cent at the roundhouse. These figures reflect the effect of the short operating district, averaging approximately 100 miles in length, which is so strongly entrenched in American railroad practice.

There are instances where it has long been the practice to

operate passenger locomotives over two freight engine districts, with or without a change of crews, and in several cases increased passenger engine runs have recently been established. On the Missouri, Kansas and Texas, after several months' experience with passenger locomotives operated continuously a distance of 400 miles, the distance was increased on one run to 672 miles, with the result that three locomotives were doing the work which five were formerly required to do. In this case the locomotives are operating in oil burning territory, which, of course, eliminates one of the greatest difficulties in the way of long engine runs, i. e., the maintenance of a good fire without detaching the locomotive and running it over a cinder pit to clean the fire en route. Some experimenting has also been done in increasing the length of freight locomotive runs with very promising results, but this work has not yet reached the point where any general conclusions can safely be drawn from it.

What are the possibilities of long runs? Taking the country as a whole about 10.5 hours are spent on the road and 13.5 hours either in the terminal or at the roundhouse out of each 24 serviceable locomotive hours. Doubling the length of the run would probably have little effect on the average number of terminal hours per trip, but would double the hours on the road. Then instead of 10.5 hours out of each 24 serviceable hours an average of 14.6 hours of actual service would be obtained. This is an increase of about 40 per cent. Putting it differently, for each 10.5 locomotive hours actually required in moving trains there would be 6.75 hours in terminals instead of 13.5 hours, a reduction from a total of 24 to 17.25, or 28 per cent. Eventually, but not immediately, this would mean a 28 per cent reduction in investment charges per unit of service. If the fires do not require cleaning enroute it would reduce the engine house expense per unit of service by 50 per cent. The cost of repairs would not necessarily increase; indeed the closer attention to running repairs required to insure against engine failures would tend to prolong the mileage of the locomotive between classified repairs.

Where locomotives are now operating in assigned service, increasing the length of runs may lead to much less satisfactory maintenance conditions, since it will tend to create pooling conditions with a loss of interest in the upkeep of the locomotives by the crews. This will have to be paid for at the terminals in increased inspection or the plan is likely to prove a failure at the outset.

Wherever a general extension of locomotive runs proves to be practicable an opportunity is offered for the concentration of work at the better equipped terminals. On the development of these terminals future appropriations may be concentrated, with much more effective results than would follow the wider distribution of the same amount of capital over the additional number of intermediate terminals.

Dispatching

The locomotive, like any other machine, has its limitations. Failure to respect these limitations inevitably leads to increased operating costs. Any machine gives the best results when subjected to steady and constant use, following as nearly as possible a fixed routine. In the case of the locomotive this would require dispatching after a fixed minimum period in the hands of the mechanical department with a full tonnage train movement over the division without delay on a regular schedule of running time, followed by the delivery of the train and the return to the mechanical department without terminal delay at the terminal. It is, of course, unnecessary to call attention to the effect of delays, either road or terminal, in increasing crew overtime, and fuel consumption. Nor does it need much argument to convince any mechanical department officer that excessive delays greatly increase the amount of boiler work. Here, the business of locomotive operation comes in vital contact with transportation yard

facilities and passing tracks, on the adequacy or inadequacy of which depends the possibility of obtaining ideal locomotive operating conditions.

But there is another possibility for stabilizing locomotive operation, that does not involve the question of capital expenditure for other facilities. That is the possibility for organizing freight train movement on the basis of regularly scheduled dispatchings, so fixed as to smooth out the load on tracks, yards and engine terminals. The common practice of fleeting trains over the road overloads the passing track facilities on single track lines, thus causing excessive road delays. It chokes terminal yards, which are excessively busy for comparatively short periods followed by longer periods of idleness, and throws a load on the engine terminal that results in long delays to locomotives under steam, short time for repairs, delay in dispatching and engine failures. These overloads increase the unit cost of yard operation, train crew wages, engine house expense and, through neglect of defects in the early stages of their development, inevitably lead to increased maintenance expenditures. Of course certain classes of traffic demand a service that leaves no choice as to how or when the trains shall be moved. But the great bulk of traffic on American railroads can be started on its way at 10, 12 or 2 o'clock as well as at 6 o'clock.

Maintenance

For the first 11 months of 1921 the combined cost of locomotive repairs and engine house expense per 1,000 gross ton miles on the Class I railways slightly exceeded the cost of train and engine crew time, and was only a little less than the cost of fuel. These two accounts, the sum of which is tremendously influenced by the character of shop and engine terminal facilities, are therefore among the three principal items of direct cost of train operation.

Two railroads operating in the same region, through country of much the same nature, handle practically the same character of traffic in about the same average train loads, both passenger and freight. With the exception of enginehouse expense and locomotive maintenance, the unit costs of train operation on the two roads differ but slightly. Over a period of four years' enginehouse expense on Road A averaged 5.5 cents a train mile, and on Road B, 7.3 cents a train mile. Locomotive repairs cost Road A 17 cents a train mile and Road B 26.9 cents a train mile. Road A gets about 40 per cent more train miles a year from each locomotive owned than does Road B. Shop and engine terminal facilities on Road A are considerably above the average; those on Road B, particularly its back shop facilities, are much below the average.

On the business handled during the four years the above difference in the rate of expenditure on these two accounts cost Road B an average of about \$2,300,000 a year. Assuming that half of this difference is brought about by causes which increased and improved facilities could not remove, the saving of the remainder would justify a capital expenditure of over \$9,000,000 on the basis of a 12½ per cent return—certainly liberal enough to be attractive even in these days of high interest rates. The book value of this road is approximately \$400,000,000, and it is doubtful whether the value of all shops, engine terminals and shop facilities for the care of both the cars and the locomotives exceeds \$16,000,000.

Capital Expenditure

But before passing final judgment on the managements of these two roads one other comparison should be made. Road A has a history of extremely conservative financing which places its present management in a position of security; the sheriff has his eye on Road B. Road A is considerably above the average in its ability to accumulate a surplus; Road B's situation is fairly typical of the situation with which the

greater part of the railroads in the United States are confronted today.

With these facts in mind let us try to answer the question, "Where would Road B get \$9,000,000, or half of that amount, to provide additional shop and terminal facilities?" "But," you say, "the prospect of a saving in operating expenses equal to a return of 12½ per cent, possibly even larger, ought to be attractive enough?" Undoubtedly it is attractive enough to the management of Road B, but put yourself in the place of the investor a moment and remember that your bonds will not alone enjoy the security of the high earning capacity of the capital you furnish, but that they will have to share it with most of the securities already outstanding. Furthermore, how confident would you feel that the public would not relieve the railroad of its 3 or 4 per cent of the return, with which it hopes to build up its surplus, long before the maturity of your bonds, leaving you with a depreciated security on your hands? Would you take the risk?

It is not difficult to understand why the credit of the railroads narrowly restricts the amount of new capital they are able to raise. And generally speaking, the managements have little choice as to how they shall spend it. Daniel Willard, president of the Baltimore & Ohio, in his testimony before the Interstate Commerce Committee of the United States Senate during the railroad inquiry last May, clearly defined this problem as follows:

"Is it desirable to spend at this time for new shops \$2,000,000, which sum is available and which sum would enable it to repair its locomotives at a lesser cost, or should the money be used for the purchase of new steel coaches which will mean no economy in operation, but on the contrary mean an increased cost of transportation because of the greater weight of the steel equipment?"

"It was decided," said Mr. Willard, "that the public in this instance would be better served by spending the money available for steel coaches rather than for new shops, inasmuch as it was possible to maintain the motive power in the existing shops."

The demands of the public for increased service require a constant expansion of certain facilities such as industrial tracks, cars and locomotives. Unless funds are still available after these demands have been met how can the management make the much needed investments in facilities such as new shops and enginehouses, which offer opportunities for tremendous economies in operating costs, but which will not take the place of cars and locomotive in actually moving the business?

The public is in control of the railroads' revenues. It controls over half of their expenses. The greatest field for economy beyond the scope of public regulation requires capital expenditure. But the ability of the roads to raise capital depends on their credit, and their credit is largely determined by the relation between their revenues and expenses. Who, then, is responsible for the waste resulting from the use of obsolete and outgrown facilities? The railroads or the public? In my opinion, in the long run the public will pay dearly for its covetous attitude toward its railroads.

The question of back shop expansion is somewhat different from that of engine terminal expansion. In the latter case the necessities of location and service leave little question as to who shall provide the capital. The need for additional back shop space may, however, be met outside of the railroad. While the opportunities for contracting locomotive repairs are not as numerous as in the case of cars the possibilities of utilizing shop space in certain industries during slack times, for locomotive repairs might be developed to very great advantage, thus postponing the time when back shop extensions would become compulsory. If sufficient capacity were available in outside shops, the railroads might be money ahead by depending on them for future growth, thus conserving their credit and at the same time getting the bene-

fit of real business management in the cost of part of their work. Competition of this kind between the railroad and the contract shop might have a wholesome influence in the development of more businesslike methods of control in the management of the railroad shops.

This statement is not a reflection on the ability of railroad shop managements. The methods of accounting for maintenance expenditures leave them little opportunity for the exercise of good business judgment, and any real improvement in this situation will have to originate with, or have the active support of, the chief operating officer or the executive.

Locomotive Rehabilitation

At the present time we are in an era of intensive locomotive development which has progressed so rapidly that the original construction of probably more than half of the locomotives in service is obsolete. Many of these locomotives already have been through one or more rehabilitation processes to restore them to a status of usefulness comparable with that of the new locomotive of modern construction. What should be done with the remainder?

In answering this question, consideration should be given to the question of capital turnover. The maintenance of equipment accounts include a depreciation and a retirement account for each class of equipment, which I am inclined to believe are not taken seriously enough.

There is no doubt but that a locomotive could be maintained forever in a physical condition averaging say about 60 per cent of its condition when received from the builders. But improvements in the efficiency and effectiveness of locomotives, as well as in the other parts of the railroad machine with which it must function have in the past and probably always will in the future, limit its usefulness to a comparatively short period. In considering the advisability of rehabilitating the old locomotive, which has accumulated a large part of the fund necessary to replace its original value, through the depreciation account, this fact should be kept clearly in mind. Furthermore, the cost of the process of rehabilitation cannot all be capitalized but may involve an abnormally heavy charge to the repair account at the time the work is done and the locomotive, being old, and of small capacity will probably continue to run up heavier unit repair charges than would a new locomotive, modern in design and capacity. It becomes a question, then, whether it would not be cheaper to save the heavy charge to repairs, make the necessary retirement charge and raise new capital for the difference between the book value of the old locomotive and a new one, thereby getting at least a year's service with only nominal repair costs, as well as all the advantages of a modern locomotive in reducing the other train operating costs. With these facts in mind it becomes a matter for serious consideration just how large the depreciation rate should be. Too small it tends to perpetuate obsolete and inefficient power. Too large it may increase the average of the sum of all operating costs. Its correct establishment to best fit the probable future development of each road, is not a matter of mere bookkeeping but a question directly affecting future operating costs.

Conclusion

The few business factors which have been here touched on are, I believe, sufficient to establish the fact that a railroad is an entirety which cannot function as a group of walled-in departments, each sufficient unto itself. Probably each one of the points suggested is better understood by some of you than by me, but if in attempting to bring them together some phase of the subject not in his immediate view may have become a little more concrete to any one present, I shall have accomplished my purpose. Let no one forget that railroading is a business and that the yard stick of business principles should be applied to every problem, no matter how technical it apparently may be.

Motor Cars on the New Haven

IN THE discussion of F. M. Whyte's paper on "Australia and Its Railways" at the meeting of the New York Railroad Club, February 17, W. L. Bean (N. Y. N. H. & H.), referred to the use of small self-propelled units in place of steam trains where runs are short and traffic light and unremunerative. He pointed out that there are two fields for these cars; short line runs and branch lines of larger roads. The requirements of these two classes of service are different and care should be taken to make sure the equipment is suitable. It is also necessary for railroad officers to understand definitely the limitations of power available in a gasoline engine, which differs from a steam engine and must not be overloaded. For this reason, grade, speed and weight per horsepower must be carefully considered. At this time it is best to keep on the safe side and not overdo the application of internal combustion engines as this might cause a serious setback in the development.

Mr. Bean discussed the operation of the cars which are now in use on the New Haven. The equipment has only been in service since January 3 and it is impossible to state definitely what the results will be in maintenance, depreciation or reliability, but it is felt that it will be satisfactory in these respects. One of the cars is now making two round trips a day on a 15-mile branch, making a schedule speed of 25 miles an hour with three stops. The car has made 1,437 train miles, carrying from 3 to 38 passengers, the average being 21.2 passengers per trip. The average delay has been 1.3 min. per trip. A second car is making 137 miles a day, the schedule varying from 19 to 23 miles an hour, with five to eight stops. It is carrying from 10 to 66 passengers, the average being 27.2 passengers per trip. The average delay has been 1/5 min. per trip. The third car is making 146 miles a day, the schedule varying from 20 to 26 miles an hour, with three to twelve stops. The car covers six separate trips in a day on lines with grades varying from level to 100 feet per mile. It has carried from 10 to 73 passengers. The average delay has been 1.2 min. per trip.

As a result of the experience up to this time, Mr. Bean is confident that very large economies are available by the use of motor cars. The development will no doubt be rapid and should be directed along sound engineering lines to avoid the building of unsatisfactory equipment. He pointed out that standby losses and the cost of coal and ash handling and attendance at terminals must be considered in comparing steam operation with motor trucks as the gasoline-driven equipment will save large amounts in these items of expense.



Illustration by Kadel & Herbert

German Locomotives for Export Passing Through Kiel Canal on What Was Once a Battleship



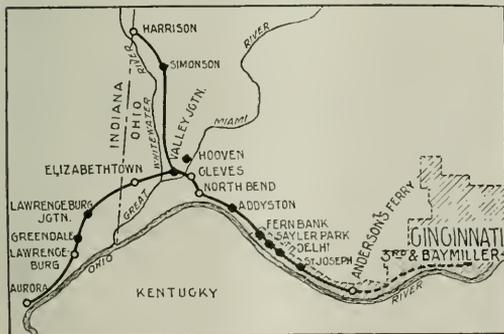
The Three Unit Container Train

Container System Creates Freight Service

Interurban Line Installation at Cincinnati Interesting
Because of Relation to Railroad Practices

IN VIEW of the prominence which the subjects of container cars, motor truck haulage, steam line short-haul, etc., have been receiving of late, the experience of the Cincinnati, Lawrenceburg & Aurora, an electric line, should be of interest. By establishing a small, inexpensive off-track station

outlying point in the city of Cincinnati, known as Anderson's Ferry, to Aurora and Harrison, Ind., a distance of about 30 miles. Anderson's Ferry has been the transfer point for passengers and is now the transfer point for the freight service. The off-track station is located at Third and Baymiller streets in Cincinnati and is equipped for handling demountable containers. Freight is received from and delivered to shippers at this station. The incoming freight is run into containers of 5-ton capacity by hand trucks through end doors and is stowed away in line station order to facilitate quick unloading of individual consignments through the side



Black Characters Denote Prepay Stations

in the downtown part of Cincinnati and inaugurating a demountable body or unit container system in conjunction with motor trucks and flat cars, the road has furnished a freight service that is proving profitable where none at all was furnished previously. The motor truck equipment and service is supplied by the Cincinnati Motors Terminals Company utilizing the same system employed by that company in the interchange of l.c.l steam railroad freight; this system was described on page 219 of the August 6, 1920, issue of the *Railway Age*.

The Cincinnati, Lawrenceburg & Aurora extends from an



Container Ready to Be Removed from Motor Truck Chassis
on to Electric Car

doors at the various destinations. Lading and way bills are made out at the off-track station for each consignment and an abstract of the shipments in each container is made from the way bills. Outbound shipments are made daily, leaving the station at 12:00 noon, and being delivered at the end of the

line at 3:00 p. m. The rates charged are practically the same as steam railroad rates.

Containers Are Handled by Electric Hoists

This off-track station is equipped with a simple steel superstructure carrying an electric hoist for loading and unloading the containers from the wooden horses used to support them at the freight house to the truck chassis. The container when loaded on a truck is moved to the transfer station at Anderson's Ferry on a scheduled run of 40 minutes, partly through city traffic and over a total distance of 6.1 miles. The off-track unit is arranged at present to handle two container units at one setting.

A similar superstructure with hoist has been installed at Anderson's Ferry, extending over the standard gage tracks of the electric line, a driveway for the trucks and storage space with wooden horses. The mobile equipment consists of a 5-ton truck chassis, six container units, an electrically driven flat car and trailer. The containers are the same as those employed in the steam line I. C. I. interchange service except that they have been provided with sliding doors. For this purpose angles were extended back from the doors at the top and bottom of the unit and the door is divided at the center with door stop arrangements similar to those of the ordinary box car. The bodies are 17 ft. 6 in. long, 8 ft. wide and 7 ft. 3½ in. high, inside dimensions.

The electrically driven container flat car has controls and trolley at each end. An old passenger car, that otherwise would have been scrapped, was remodeled at a total cost of about \$500 by removing the body and lengthening the frame about three feet so that two containers could be carried. Steel 3-in. angles anchored to the floor, laterally and longitudinally, hold the units securely. The trailer car consists of a simple steel frame 20 ft. long mounted on two single axle



Motor Truck and Container Ready to Leave

spring trucks and carries one container. This container train is operated by a crew of two men, the motorman and the conductor.

Actual Moving of the Freight

After the containers are loaded on the truck at the off-track station the driver receipts for the load, as represented by the abstract, taking two copies together with the corresponding way bills to the rail transfer. The driver retains one receipted copy of the abstract when his load is received by the train crew. All freight carried in the containers is under the railroad's seal. Before the truck has arrived at the transfer, the two-man crew has already unloaded the container from the flat car and placed it upon the wooden horses.

Upon arrival of the truck, the same crew loads the out-

bound container from truck to flat car or trailer and then loads the return unit from the wooden horse to the truck. Five minutes per unit are allowed for these mechanical interchange movements. The truck then delivers the return container to the downtown off-track station, after which it is released. Space is provided at this point for two bodies so that one is always available for outbound loading by hand truck from shipper's trucks or drays.

The two-man crew unloads the freight from the containers at line destinations; it also makes store door deliveries and collections of light consignments to and from shippers adjacent to the railroad. At Valley Junction the trailer is dropped off for transmission over the branch to Harrison by passenger car, while the self-driven container car proceeds to Aurora. On the return trip the crew loads freight from way station platforms through the side doors without consideration to station order since all shipments are segregated upon receipt at the off-track station.

Since the inauguration of this service both outbound and



Interior View of Off-Track Station Showing Containers Being Loaded

inbound business has increased rapidly, reaching by January 10, 1922, a sustained daily average of 9,000 lb. outbound and a fluctuating inbound agricultural commodity movement of from 1,000 to 12,000 lb. daily. Thus, at times, it has been necessary to use an additional truck chassis providing for simultaneous two-truck movements under a five-minute headway. The outside platform area at the downtown station is 382.5 sq. ft. and the inside, 748.5 sq. ft. This inside area is extended to 1,028.5 sq. ft. by the addition of 280 sq. ft. of floor area provided by the two bodies. It is estimated that this fixed plant is capable of passing 160 tons of freight per 8-hour shift.

FOUR EMPLOYEES of the Denver & Salt Lake were killed when a snow-slide swept a locomotive and six men off the track into a canyon near Loop, Colo., February 19. The four men killed were on the ground shoveling snow to fill the tank, when the slide swept all from the tracks into the canyon. The two men on the tender were saved from death by the protection of the walls of the tank.

THE GULFPORT & MISSISSIPPI COAST TRACTION COMPANY, operating 20 miles of line between Biloxi, Miss., and Pass Christian, making connection with the Gulf & Ship Island at Gulfport, has been adjudged a common carrier of freight in both intrastate and interstate traffic. The officers of the company are, President, W. T. Stewart; general manager, W. A. Sullivan, and traffic manager, T. F. Harris.

The Consolidation of Freight Terminals

This Is Not Desirable for Many Reasons—Railroads
Must Improve Terminal Efficiency

By F. J. Lisman

TO THE PUBLIC the consolidation of terminals means that any shipper will be enabled to deliver his freight at the nearest freight station, no matter what its final destination might be, the same as he would drop a letter into the nearest letter box. Just what this would mean in the handling and rehandling of freight and switching, needs no comment. Even in big cities which have but three railroad systems, like Boston, Philadelphia and Baltimore, this letter box system of freight delivery would not be workable, on account of the cost of rehandling. In the countries of Europe, where the railroads are either owned outright by the government, or are divided into regional groups, freight for any particular point of destination can generally be delivered at only one freight house in each city, except in the case of very large cities where three different freight stations may be available. No doubt if we had similar conditions here, a similar system would prevail and thus the railroads would get more benefit from consolidation and the public would get less service. If unification of terminals would mean less service to the public, the public would not want it.

To those who theorize about possible savings in railroad operation, consolidation of terminals undoubtedly does not mean quite the same thing as it does to the man in the street above referred to. These people no doubt are thinking about consolidation of all terminal facilities owned by all the railroads within certain limits, either within city limits or within limits to the outer yards, etc. Consolidation of this kind would mean that all the companies owning terminals of any kind—tracks, yards, warehouses, freight buildings, team tracks, etc.—would turn them over under a long lease to a new terminal company. The fee naturally could not be turned over to this new terminal company, because terminals in nearly all cases are covered by a variety of long time mortgages. The terminal company would then be expected to act as agent for all the railroads entering a given city, giving each one equal facilities and treatment.

High Cost of Operating Joint Terminals

Presumably each railroad would have a representative on the board of directors of the terminal company, which would select a manager to operate the property for their joint account, each tenant paying according to usage his proportion of operating expenses, rentals, interest charges and taxes. Assuming there are ten railroads interested in such a terminal company, no one of these ten would be particularly interested in its most economical management. It is but human, for instance, to advance the salary of a general manager, even though he may not be entitled to it, just because he is a good fellow, as long as nine-tenths of such an advance is paid by the other man. Likewise, what almost might be called disinterestedness, will permeate the whole management, and such a terminal company would not be operated as economically as at least eight of the ten railroads would operate their own specific properties. Quite true, many switching movements might be eliminated by such joint management or by the joint use of tracks, but it is very doubtful whether the savings at the end of the year through the elimination of unnecessary switching engines will overcome the indifference due to a management which has no keen desire to save and which is not supervised by a real boss who watches every expenditure. Most railroad men express themselves strongly

on the subject of high cost of operating joint properties.

There is an approach to a unification of terminals in the case of the Terminal R. R. Association of St. Louis. The writer does not happen to be familiar with the management of this property, but since its creation quite a number of the lines have established separate freight stations, like the Rock Island, the St. Louis-San Francisco, the Missouri, Kansas & Texas, etc. The extravagant cost of handling passenger business through the big union stations, like Washington, St. Louis, Kansas City, etc., is quite notorious.

Underlying the movement for consolidation of terminals is the idea that expenditures for additional terminals in the future could thereby be saved; but as a matter of fact the development of terminals during the last ten years has been comparatively small and has nowhere been carried on with the idea of anticipating the future, because the railroads have not had the necessary money to do this, nor has there been any encouragement for them to do so. While some railroads may own some undeveloped land available for terminal development, here and there, taking the country as a whole terminal facilities are nowhere excessive. During the period of heavy traffic during the war and up to the fall of 1920, there was a great lack of terminal facilities in the way of yards, sidings, freight houses, etc. Consolidation may in exceptional cases induce the additional use of certain tracks or gauntlets, but probably not of freight houses, docks or even team tracks.

The present Transportation Act may be unconstitutional in so far as it provides for a division of the surplus earnings over 6 per cent with the government. Quite likely the Supreme Court will finally hold that a company is entitled to a fair rate of interest on the capital invested and that a fair rate is 6 per cent, but it is not likely the court will hold that if the companies earn only 3 per cent in one year they will be compelled to divide the surplus above 6 per cent which they may earn the following year. In other words, an average of $4\frac{1}{2}$ per cent would not be a fair return on the money invested and a company therefore should not be compelled to give up any of the surplus earnings unless it has a fair average or cumulative return on the invested capital.

Penalizing the Far-Sighted

Suppose the management of a company has been far-sighted in the acquisition of terminals in a given city and that a large amount of tonnage originates on these terminals. If such terminals were put into a consolidated terminal company on a basis of physical valuation, the company which owns them would lose the benefit accruing therefrom; that is, it might be deprived of a large amount of this traffic and its earnings might fall considerably below the maximum allowed under the present law. Our most successful railroad corporations have generally succeeded because the management over a long period of years has been far-sighted in acquiring ample terminals at all points along their lines on which in course of time all kinds of industries have located. Should these valuable traffic producing facilities now be taken away from them, so that those who have never sown may reap? If a scheme of consolidation of terminals should indemnify these companies for loss of business, the situation might be different.

Theoretically since all railroad companies must switch

from each other, the shipper is supposed to have the choice of routing his freight, but as a matter of fact it is doubtful whether 1 per cent of freight shipped, say, out of the terminals of the Chicago, Burlington & Quincy from Chicago and destined to a local point on the C. B. & Q., is ever routed over any other road. Switching to other railroads, as a rule, is confined to that from manufacturers' sidings to off-line points.

If the terminals in all cities are to be merged, a very large proportion of competition must necessarily be done away with because a large proportion of this competition consists of offering better terminal facilities and prompter handling through the terminals. If a shipper can send his freight to and from a joint terminal over any route between Chicago and Omaha, then the actual competition in service will consist only in more rapid handling of the business over the line or in prompter or more liberal settlement of claims or a more liberal distribution of cigars by the traffic men. Surely competition should not be reduced to these elements only.

While the present system of philosophy is based on the theory of "the greatest good to the greatest number" the carrying out of this philosophy, like that of all socialistic theories is based on the exploitation of those who have been wise and thrifty in the past; but this does not encourage others to build for the future. Under such conditions there will be no further development by forward-looking people. To sum up:

1. It remains to be proved that joint terminals will in the long run be economical of operation.

2. Development of terminal facilities which may be needed by communities in the future will hereafter not be anticipated.

3. As the properties of these joint terminal companies which are to be created will consist mostly of leaseholds, with a variety of mortgages, it will be quite difficult to finance such terminal companies to the best possible advantage unless all the tenant railroads join in a several and joint guaranty of the securities which are to be issued. Should and can the strong corporations be compelled to use their credit for the benefit of their weak competitors?

If the cities themselves, through their officials, become interested in these joint terminal companies, can politics be kept out? Is it not better after all to leave the development of the country and its cities to enlightened self-interest? This has been more successful than any other system devised in the history of the world. Are we not attempting to fly from conditions which can hardly be called evil to evils which we know in part and the extent of which we certainly do not know fully?

Terminal Handling Methods Inefficient

With the readjustment of the cost of living now under way, every effort must be made to reduce expenses in all directions. Railroad companies are expected to do their full share in this and certainly none will claim that the cost of passing the various commodities through the various terminals has reached perfection.

Motor trucks are taking a large amount of the short-haul business. In many cases this seems beneficial to the railroads, but just where the line is to be drawn seems an unknown factor at this time. The railroad companies need all the business out of which they can possibly extract a profit. One of the great advantages of the motor truck is the door to door delivery. There would appear to be every reason to believe that the railroad companies can arrange for deliveries as cheaply, if not cheaper, than motor trucks, because the motor truck mostly assembles and discharges its freight in small amounts while the railroad company brings in or takes out goods by the carload; therefore, a railroad motor truck, at least, either begins or finishes its trip with a full load.

After all the present manner of conducting a freight house

is the outgrowth of primitive conditions. In a country town when the local freight train comes along, it will discharge a few packages, whether they be boxes, sacks or barrels, etc., which are dumped on the platform or hauled into a freight house and then the local agent will call to the country merchant across the way from the station or send a message to him by some passing boy or driver to get his stuff which has just arrived. In the larger communities business is done in not quite as haphazard a way, but nevertheless freight cars are discharged practically by hand and the freight is handled and rehandled. If the L. C. L. freight in a community of say 2,000 were loaded on to a motor truck directly out of the car and delivered within a mile radius, it would probably cost very little more than it does to handle the business into the freight house, send out postal cards and in the meanwhile run the risk of loss and damage. In many cases goods are handled by the old fashioned hand truck by laborers who work as slowly as possible; who are likely to go on strike and who are otherwise not dependable. In many cases it might be possible at a very small cost to provide for increased mechanical handling by endless belts or escalators, etc. If escalators could be standardized so that they could be manufactured on a large scale, their cost would undoubtedly be greatly reduced, probably by over 50 per cent.

Interstate Commerce Commissioner Hall has given this particular phase of terminal work a very large amount of study and is probably more familiar with it than anyone else. He is decidedly of the opinion that this phase of the science of transportation has been grossly neglected.

Suggestions for Improvement

The writer had the pleasure of spending two days in the year 1914 with Henry W. Thornton (who was afterwards made brigadier general and knighted), general manager of the Great Eastern Railway of England. In answer to a question as to the relative merits of American and English railroad management Sir Henry Thornton replied that as far as terminal work was concerned English methods were much more satisfactory than American methods. He went on to explain that conditions were quite different owing to lighter cars which could be switched by horse power, etc. Nevertheless, there appears to be an unnecessary amount of lost motion in terminal work in this country, not only in the handling of freight but also in the handling of cars. Switching engines capable of hauling 30 to 40 loaded cars, are employed a large proportion of the time in switching from 1 to 5 cars. Possibly a light locomotive tractor could be employed to do light switching to very much better advantage. The Pennsylvania Railroad in Jersey City and the Baltimore & Ohio in Baltimore employ fairly heavy tractor locomotives for switching cars on paved streets. The progress made during the war in the development of tractor machines, which could be used over the worst kind of ground, might point the way to considerable savings in many kinds of switching.

Special Charge for Terminal Service

We are now tending in the direction of store-door or direct delivery for which a commensurate additional charge will have to be made; naturally this will mean that we shall drift towards the British system of fixing rates on a basis of a rolling charge and a terminal charge. Nothing is ever settled until it is settled right and the present system of charging rates irrespective of the cost of terminals is unsound and grossly unfair to the smaller communities. In the *Railway Age* of December 13, 1912, an article appeared by the writer, embodying the following:

For nearly a century there has been a tendency on part of the population to drift to the cities. The age of steam which has been followed by the age of electricity, has accentuated this movement, as is evidenced by the census of 1910, in practically all the countries of the world. Manufacturers move to the cities because they are attracted by the labor market; by the fact that the free competition in transportation

facilities, and in many cases the certainty of home markets for their products, etc. In consequence thereof, the railroads in order to meet this condition, have acquired expensive terminals as nearly adjacent as possible to the manufacturing district of these cities. They have in many cases gone to a great expense to build sidings to various factories erected in the centers of these communities.

Unless something is done to check this movement towards the large cities, the railroads will have to increase these heavy expenditures. I do not presume you question the necessity of doubling the terminals every ten to twenty years in the various cities, like not only New York, Chicago, Philadelphia, etc., but also in the smaller size manufacturing towns, like Newark, Paterson, Elizabeth, Trenton, N. J.; Wilmington, Del.; Chester, Pa.; South Bend, Ind.; Kalamazoo, Mich.; Rockford and Joliet, Ill.

What compensation will the railroads get for this increased capital expenditure for the increased cost of switching these cars over the multiplicity of sidings in order to reach their particular destination?

If the establishment of manufacturing plants were encouraged in the smaller communities, the local freight train in many cases could drop off one to five cars at some factory siding, located opposite the freight house or within one or two blocks of it, and the train could move on.

Compare cases of this kind of delivery with the delivery of cars on any of the local freight stations of important lines, or the site of a factory in the manufacturing district of Jersey City or Chicago. The difference in the cost of switching engines, as well as cost of real estate over which trains are run, etc., is, taking everything into consideration, from \$3 per car upwards.

Supposing the little community was to get the benefit of this \$3 per car. It would go a long way towards overcoming the disadvantages of the smaller community compared with the larger one and its broad labor market, which now largely brings the factories to the big communities.

If a difference in rates can be established which is based both on cost of service and value of service, as previously stated, it would go a very long way not only towards avoiding car shortage, the congestion of terminals, but also the congestion of people in the large cities and thus help towards solving one of the biggest problems of our times. The consequences of such a change in the rate making fabric are so broad that space does not permit going into details.

There would be a great deal of opposition from the various chambers of commerce in the various cities, which are interested in building up their towns, the value of real estate and the business of their merchants. On the other hand, the small towns have no such organization. Should not a broad patriotic and philanthropic point of view prevail over a selfish one?

I do not wish to suggest that the rates to the smaller communities should be reduced; on the contrary, the shipper in the larger city should pay a terminal charge above the existing rate in order to compensate the companies for the more expensive service.

Factories in Country Districts

Commissioner, now Chairman, C. C. McChord of the Interstate Commerce Commission, wrote an article entitled "Diffusion of Factories to Country Points," which appeared in the Washington Post of July 28, 1918, and which became part of the record of the Senate Committee on Interstate Commerce.

The following extract is quoted from this article:

The most important matter just now, however, is the part that the railroads should play in the readjustment that must be made in our industrial and economic conditions. As before noted, it has come about that the larger part of our manufacturing is done in our cities. The greatest manufacturing cities of the nation, considering the variety and quantity of production, are Chicago and Philadelphia. Southern New England has developed into a succession of manufacturing cities. Pittsburgh dominates the iron and steel industry and controls prices wherever sales may be made in this country, as Chicago dominates and controls the prices of meats and their products. New York City produces immense quantities of readymade clothing, employing thousands in sweatshops of unsavory surroundings. The result is that workmen and women in largest numbers live under conditions that are not sanitary, wholesome, nor conducive to good morals. This has happened in a country that is less densely populated than any of the great nations of earth and where there is room enough for every citizen and resident to enjoy his full share of pure air and sunlight and to live under conditions conducive to health, morality, and happiness. It would also enable him to secure a home at moderate cost or at reasonable rental, with an area of ground sufficient to permit him to cultivate a garden, where fresh vegetables may be grown for his own use.

Many good people have organized societies and have expended large sums of money in philanthropic efforts to induce immigrants and others to shun the haunts of their fellows in crowded cities and seek homes in the South and West, where conditions are wholesome. In this they meet with a live in a city than in the country. A lower wage payment in the country than in the city would enable the workman to secure more comforts of life, to clothe his family better, and educate them more adequately. If the factory is located near the raw product, there is saving in transportation costs which will be reflected in net earnings.

There are many considerations that dictate a relocation of our manufacturing industries. In the first place, it costs more to do business in a city than in the country. Land values and costs of construction of plants, taxes, etc., constitute charges that must be met from earnings. It costs more to live in a city than in the country. A lower wage payment in the country than in the city would enable the workman to secure more comforts of life, to clothe his family better, and educate them more adequately. If the factory is located near the raw product, there is saving in transportation costs which will be reflected in net earnings.

Municipal Interference Undesirable

Interstate Commerce Commissioner Hall called the writer's attention to the very interesting and most modern development in terminal and port facilities in Astoria, Oregon, constructed by the city authorities at that point. In his opinion much is likely to be done in that direction by other municipal authorities, the same as has been done in some of the large European cities like London, Liverpool, N. Antwerp, Hamburg, Havre, Genoa, etc.

If this should be the tendency in the development of tide-water terminals, we may find that some cities will be willing to handle their terminal work at less than actual cost in order to attract traffic. It is very undesirable that cities should compete with each other in any way but on a sound business basis; if one given city were to handle business over its terminals at less than cost other cities will be compelled to follow the same course, and in the end the deficit will be laid on the taxpayers in general instead of making each class of traffic bear its due proportion. Indirect taxation for any purpose whatsoever is subtle and leads to extravagance.

From the moment municipalities undertake to do business for their own account the game of log rolling, incorrect book-keeping and insufficient depreciation commences and only the sky seems to be the limit. Each administration tries to pass the buck to the next one, etc.

Railroads Must Get Busy

With the increased complexity of our modern civilization, a large part of the public demands (the rest of the public does not object) that municipalities take on new responsibilities and duties under which is included the great problem of reducing the cost of food products to the ultimate consumer. Unless the railroads impress the public with the fact that they are doing their full share in this direction by cutting down every possible expense, many cities are likely to take over a substantial portion of this phase of the transportation business. Railway officials, therefore, must make a thorough study of co-ordination of economic terminals for food products in connection with wholesale and retail food markets.

Fuel and Locomotive Performance on the Central of Georgia

THE statement has been made that whatever tends to conserve locomotive fuel tends also to improve the general operating performance of a railroad. This seems to be borne out by the statistics of the Central of Georgia for the year 1921. During the year the railroad conducted a fuel economy campaign that developed a fine spirit of co-operation among the employees. The results in fuel saving were excellent. As shown in Table 1 the railroad saved more than half a million dollars during the year by improved locomotive fuel performance, this saving resulting in part from direct reductions in the fuel bill and to a lesser degree from incidental economies in operation as shown in the summary.

The spirit developed by the campaign on fuel saving has materially affected the operation in other ways and it is felt that it was an important factor in the excellent passenger train performance. Throughout the 12 months, 98.7 per cent of all passenger trains were on time. The operation of manifest freight trains was also improved, the percentage on time increasing from 76.5 in 1920 to 93.1 in 1921. Engine failures were materially reduced and the average mileage per failure rose to 57,572. Overtime was reduced to a remarkable degree, the overtime for enginemen and trainmen in 1921 being 23 per cent less than 1920. In yard service, overtime was 45 per cent less and in shops, 67 per cent less.

In announcing the results of the fuel saving campaign,

the Central of Georgia Employees' Magazine makes the following comments:

"It is not necessary to state that this amount of money saved in coal has enabled the maintenance of equipment and maintenance of way departments to work more men and to use more material in the past year than would have been possible if this saving had not been effected.

"The credit for this fine performance is due to every one on the railroad who had anything to do directly or indirectly with the consumption of coal. By this time, as a result of the very intensive campaign on fuel economy, all of us are thoroughly familiar with the fact that practically every one on the railroad has something to do directly or indirectly with the question of fuel economy.

"At the various meetings which have been held by division committees on fuel and employees generally on the various divisions, the latter part of December, 1921, and the first part of January, 1922, resolutions have been made to the effect that every effort will be made to make a still greater saving in the year 1922. Fuel economy is a vital element in the operation of our railroad at this time; not only in respect to the direct saving as result of decrease in amount of coal used, but it has a direct influence on the prompt handling of business. The employees of the Central of Georgia are to be congratulated on the fine showing in the year 1921 as reflected by the figures given herewith."

TABLE 1—ANALYSIS OF FUEL SAVING

Actual cost of coal 12 months ending December 31, 1921-1920, as charged to operating expenses

	12 Months 1921	12 Months 1920	Decrease
Tons of coal.....	511,520	637,412	125,892
Cost.....	\$2,092,647	\$2,741,153	\$648,436
Average cost per ton.....	\$4.091	\$4.300	\$0.209
Saved by better performance.....			91,254 tons
At an average of 50 tons per car, the detention of 1,825 cars was saved.			
Figuring an average of 10 days per car, from mine back to mine, there were saved 18,250 car days.			
Figuring an average of 28 cars per train at an average haul of 250 miles, there were saved the operation of 261 trains, also operating 32,625 locomotive miles.			
Saving in car miles and ton miles based on average haul of 250 miles			
Traded cars and 250 miles empty back to the mine.....	912,500		
Car miles.....	912,500		
Ton miles.....	36,503,750		

Summary Saving in Money

91,254 Tons of coal valued at.....	\$350,999.47
18,250 Car days at \$1.00 per day.....	18,250.00
32,625,750 Ton miles at actual transportation cost, or .0034 per ton mile.....	124,112.75
Locomotive repairs 32,625 miles at .30 per mile.....	9,878.50
Freight car repairs 912,500 miles at .02 per mile.....	18,250.00
Total saving.....	\$521,399.72

TABLE 2—PASSENGER TRAIN PERFORMANCE, 1921

Month	Number passenger trains run	Number passenger trains on time	Percentage on time
January.....	2,937	2,867	98
February.....	2,656	2,592	98
March.....	2,941	2,888	98
April.....	2,850	2,816	99
May.....	2,814	2,779	99
June.....	2,792	2,763	99
July.....	2,814	2,802	98.8
August.....	2,820	2,796	99.4
September.....	2,722	2,706	99.4
October.....	2,811	2,765	99.4
November.....	2,903	2,779	99.1
December.....	2,915	2,880	98.4
Totals for 1921.....	33,895	33,456	98.7

TABLE 3—COMPARISON OF ENGINE FAILURES, 1920 AND 1921

Month	Number failures		Miles per engine failure	
	1921	1920	1921	1920
January.....	16	46	43,788	18,015
February.....	17	49	16,731	25,452
March.....	18	44	39,108	15,467
April.....	6	34	112,174	19,231
May.....	11	17	63,371	41,716
June.....	6	19	118,942	39,317
July.....	6	11	94,406	72,497
August.....	12	33	58,747	22,231
September.....	16	44	46,611	17,132
October.....	6	19	118,811	38,457
November.....	15	24	43,110	18,966
December.....	13	26	48,819	29,014
	144	370	Average 1921	Average 1920
			57,572	23,708
			57,572	23,708

Increase in average miles per engine failure, 1921 over 1920, 33,774 miles, or 58.66 per cent

"After Highways Are Pounded to Pieces—What?"

THE California Electric Railway Association has recently issued a booklet which it has given wide distribution among the chambers of commerce and the traveling and shipping public in general throughout that state. It contains abstracts from the editorials of 78 Californian newspapers, all of which strongly advocate a change from the present day policy of permitting the unrestricted use of boulevards and other paved roadbeds by private parties, companies, and corporations for transacting freight and passenger business by means of heavy and overlaid trucks which, at the same time, establish unfair competition with the railroads.

As the San Luis Obispo Telegram sees it, "there is absolutely no justice in allowing bus and truck lines to operate on roads paid for by the public and, by so doing, cripple or kill the railroad systems which have developed the country and are absolutely essential to the welfare of any community." The Hanford Journal further substantiates this viewpoint by stating "Who is wearing out our highways? Not the business and pleasure cars operated by the people who paid for the roads and are paying for their maintenance. No, they are being hammered to pieces by the heavy passenger busses and the overloaded trucks that are being operated by individuals for profit at the expense of the people. If the business of a railroad is depleted by the competition with trucks and stages, the railroad has a right to apply for higher rates on freight and passenger service, in order that it may yield the return to which it is entitled upon its investment. So, while the people of the country are patronizing trucks and stages, and burdening themselves with the enormous expense of maintaining the highways for the trucks and stages, they are also forcing the railroads to demand and receive greater rates for their service."

"Trucking and passenger motor routes," says the Wheatland Four Corners, "should adequately compensate the state for using the highways, of which much of the building and maintenance costs are derived from the railroads through taxation," and the Tulare Register feels it is unjust that "railroad companies must lay their own rails, maintain their own rights-of-way and general equipment of rails, switches and many other items, while the motor truck is provided by the state with a free right-of-way and a fine roadbed."

Representing one of the richest farming districts in California, the Imperial Valley Press states, "We try to make the railroads pay all the taxes that the traffic can bear, but their competitors on the highways have roads built for them at the public expense, and they get off with a normal license fee. While the San Francisco Chronicle says, "No form of automotive traffic on the highways can of itself develop new territory on any important scale. It cannot create traffic. It can only compete for traffic developed by others."

From every dollar that is collected by the railroads 5½ cents under the old law, and 7 cents under the King bill, goes into the state treasury. "This," says the Indio Palm, "is where the state gets its money with which to build public highways. Every dollar collected from the public by a motor transit company is a dollar taken away from the railroads, 7 cents taken away from the state treasury, and a proportionate amount taken away from the cause of good roads, while every dollar's worth of business that is diverted from the railroads leaves a deficit of one dollar on the company's balance sheet and calls for a corresponding increase in freight and passenger rates somewhere else."

The San Bruno Herald believes that "it is through the railroads alone that we can expect adequate service and that which will develop with our growth and needs. The motor truck can never cover efficiently the field of commercial activities that the railroad does."

The I. C. C. General Rate Investigation

Pooling of Freight Cars Proposed by National Association of Owners of Railroad Securities

WASHINGTON, D. C.

APPROVAL by the Interstate Commerce Commission of a plan for the pooling of freight cars and their purchase, inspection, repair, rebuilding and direction by the National Railway Service Corporation, organized by the National Association of Owners of Railroad Securities, was urged by S. Davies Warfield, president, and other representatives of that association at the rate hearing before the commission on February 15 and 16. Immediate consideration of the plan was asked and it was stated that the association is ready to obtain the introduction in Congress at once of the necessary bills, including one to make the \$300,000,000 loan fund available after March 1. The service corporation under this plan, which was worked out by the association's Board of Economics and Engineering, and described in detail before the commission by W. W. Colpitts, a member of the board, would act in collaboration with the American Railway Association.

The savings to be effected by the plan were estimated by Mr. Colpitts at \$300,000,000 a year, including the following items: Reduction of empty car mileage, \$9,000,000 per annum; reduction in first cost of new equipment, \$33,000,000; saving in financing cost of new equipment, \$23,000,000; reductions in cost of freight car repairs, \$30,000,000; saving through retirement of weak cars, \$96,000,000; saving through improved distribution, \$66,000,000.

"Of all railroad facilities there is none that presents a greater opportunity for joint use or co-ordinated relation than the railroad freight car," said Mr. Warfield. "It is the hybrid of hybrids. It has its birth on the owner railroad and spends 60 per cent of its life on foreign lines; it is responsible to no one and no one is responsible for it. No one seems to care whether its life be long or short, because of its migratory habits and abuse.

"The faults of the system have ranged from inefficiency and carelessness to the extent of conviction for causing bills to be rendered for repairs not made. Such a system cannot produce economical results." He stated that, to secure full results, the present state charter of the service corporation should be superseded by a federal charter. The board of trustees of the service corporation would be evenly divided between executives of the railroads and representatives of investment and business interests, such as compose the present board of the service corporation; the trustees representing the railroads to be selected by each of the four railroad groups now established by the commission.

"The service corporation, through loans made by the commission from the \$300,000,000 revolving fund," he said, "has financed equipment for carriers under the plans of the corporation on more advantageous terms than obtained outside by roads of stronger credit."

Immediate Consideration Urged

Walter L. Fisher, of counsel for the association, urged the immediate consideration of the proposals. "We are in a really serious situation with respect to the transportation system of the United States," Mr. Fisher said. "We have only two sources from which to make effective the necessities—either increase the efficiency and economy of the railroad system or impose an additional burden upon the shippers in order to maintain transportation. I say that not with reference to the return upon the investment but as regards the new funds that are needed.

"We have to find some way in which this railroad system

can be kept functioning. There are two great factors that upon the very first inquiry into the matter reveal themselves as promising relief; they are not small measures of relief, but perfectly enormous. They are the rolling stock and terminals. The report of the board with respect to terminals is not yet available, but the report with reference to the rolling stock has been completed. The reason we came here before you at this time is the exigency of the situation. If you are to utilize this service corporation to which Mr. Warfield has referred, Congressional action must be taken, because the use of the revolving fund expires on March 1. You have to take other action which possibly does not require that authority. You are requiring reports now with respect to the excess over 6 per cent which 15a of the Transportation Act requires. That fund is available.

"If the government should be driven to guaranteeing the equipment certificates, that, as we see it, will necessarily be regarded as an incident for the subsequent guarantee by the government of other things. The equipment certificates are those the railroads can finance better than other securities. You have a concrete demonstration of the ability of the National Railway Service Corporation to finance equipment trust certificates at better rates for the weaker roads than the strongest roads of the United States have been able to finance their certificates.

"Why was it able to place car trust certificates? Representing as it does, constituted as it is of these large investing institutions—they are not bankers, they are not brokers, they are not buying securities to sell them—but they are life insurance companies and savings banks that form the backbone of this association. The savings banks, together with those insurance companies, are ready to buy these certificates direct; they cut out the commissions, the brokerage, and the intermediate profits that would otherwise accrue. If you can stabilize those securities so they can buy them, they are a legitimate form of investment for these institutions.

"This agency is available. As I understand it, it asks no participation except service. There shall be no profit whatever. Here we are representing the rail fundamental securities of these railroads. You have an agency which is sympathetic with the operating end, sympathetic with the public end, and acting under the control and supervision of this commission it can be a tremendous effective agency in bringing about those efficiencies in railroad rolling stock and terminal facilities which are so absolutely essential to any adequate relief of this situation.

"We know the difficulty the commission has in performing the matters of routine work that come before you. We merely wish to offer real opportunities to reduce your labors and present you with material which you can take and put up to be shot at and if it stands analysis you can adopt it. Constructive measures should be the chief work of the commission. In fact, it is almost impossible not to confine yourselves to details and yet the constructive measures are the things that will put the commission in the absolute confidence of the people of the country, make it that great agency for the regulation of our transportation system that it is intended to be, but now must be the time."

Commissioner Hall remarked: "I don't challenge your statement, Mr. Fisher, but it will hardly satisfy 1800 litigants a year filing that number of complaints with the commission if their complaints are pushed to one side while we consider constructive measures. There are 700,000 cars at

the present time in the United States that are not in condition. There has been a certain amount of deferred maintenance, and that has had its effect upon the cars, upon the lessening of expenditure which has brought about the showing the carriers have been able to make for the year 1921. Of course, whoever does it, however it is done, the putting of the bad order cars into good order is going to cost money. This plan you figure on here, does not that involve money, the outlay of money by the carriers?"

"It does," replied Mr. Fisher, "and it proposes, if the chairman please, that this service corporation will undertake to do that work for less money than the carriers will otherwise have to pay to do it."

Proposed Plan of Operation

Mr. Colpitts stated that the pressure for reduced rates is so insistent in the present depressed state of business that means must be sought for meeting this demand, and the board has reached the conclusion that centralized control of interchange freight cars furnishes the most practicable method for effecting an immediate reduction of operating expenses sufficient to aid the carriers in a material degree toward accomplishing this end.

The plan generalized provides for placing all cars normally used in general interchange subject to the control of the central agency with the concurrence of the owners, each railroad retaining its local or special equipment. The ownership of existing equipment would not be disturbed, Mr. Colpitts said. Where unequal ownership of freight cars exists carriers would be required to bring up their quota of cars to meet the country's needs.

Mr. Colpitts summarized the benefits as follows:

"The central agency would immediately arrange for the repair or rebuilding, either in railroad shops or those of car builders of the 300,000 bad order cars, and for the retirement of the much larger number of small capacity weak cars and their replacement with modern cars of larger capacity so as to provide ample equipment against the return of normal traffic. The employment of the men and the purchase of the materials and supplies which this plan involves will aid appreciably in restoring business activity and in putting to work 550,000 idle cars.

"Under unified operation of freight cars, shortages will be less frequent and of shorter duration, and shippers will have greater assurance of receiving cars when and where needed. The program for new construction and replacements will permit of more adequate provision of cars designed and adapted to meet special needs such as the movement of the grain of the West, the citrus fruits and vegetables of California, Florida and the South, and products of the East and Central West.

"Through central control of the equipment, it is quite possible to establish a program of replacements which, within a definite period, say five years, would eliminate all wooden cars from interchange service. In January, 1921, the total number of wooden cars in service approximated 890,000, with a capacity ranging from 30 to 35 tons. It is proposed to replace these 890,000 cars within a period of five years with 540,000 steel underframe cars of 50-ton capacity."

He said that in collaboration with the American Railway Association it is estimated that the service corporation could establish a standard design for cars of different capacities; that the agency could best distribute such surplus cars from a railroad where cars are now owned and only used for that railroad's seasonal requirements, so that such cars could be used many times over to meet the conditions of seasonal requirements of other roads and localities. Cars would be interchanged at interchange points and where repairs or rebuilding is found necessary they would be assigned to either the shops of car manufacturers or railroad shops nearest the point of repair, which however would prove the more econom-

ical. Local group committees could be appointed throughout the country whose function it shall be to know in advance the needs of each section and distribute cars in accordance with local requirements, the chairman of each group committee to be the chief routing officer of the district.

Carriers would no longer bill each other for per diem, repairs, etc. All such items would be charged to and by the agency and cleared by the agency. Each carrier would be concerned only with the balance between interchange cars on its own rails and its contribution of cars to agency control, subject to such exceptions as may be made in case of waiver of per diem. The agency would undertake to supply participating carriers with their normal needs at all times and with their appropriate share of the surplus over normal needs. The cost of operating the agency, not specifically allocated, would be assessed according to car use.

F. H. Wood, commerce counsel of the Southern Pacific, asked whether the probable results of the plan were such that the commission would be justified in making an immediate reduction in rates or whether it would not take considerable time to make the results felt.

"Any savings are required by the railroads to help their credit," replied Mr. Colpitts. "This is not in any sense an argument for reducing rates at this time. Some of these savings would grow from year to year and reach their maximum in five or ten years."

Mr. Wood asked if the fact, as testified by Mr. Aishton, that the average percentage of empty car mileage during federal control was about the same as it had been for 15 years before, would not shake the witness' confidence in his prediction of saving in empty car mileage. Mr. Colpitts said it would not.

Testimony of Shippers

The hearing on February 16 and 17, following the testimony of Mr. Colpitts, was devoted to shippers of fruits and vegetables. In general they asked the removal of the balance of the increases made in Ex Parte 74.

R. G. Phillips, appearing for the International Apple Shippers' Association, the National League of Commission Merchants and the Western Fruit Jobbers' Association, presented numerous voluminous exhibits to show that the freight rates are absorbing a large percentage and in many cases all of the wholesale price. His statement devoted considerable space to answering editorials in the *Railway Age* which had called attention to the wide margin remaining between the retail sales prices of vegetables and the amounts paid to the growers and the railroads, but his statement attempted to defend the wholesaler and the commission merchant against charges of profiteering rather than to explain the prices charged to the public.

Commissioner Hall remarked that the "profiteering" charges were not in evidence before the commission. Mr. Phillips and other witnesses, representing various associations of growers and distributors of fruits and vegetables, who testified, had many statements analyzing the expenses involved in the shipments of thousands of cars to show that the producers and the wholesalers received little or no profit after the freight and other expenses had been paid, but they were generally unable to give satisfactory answers to questions asked by the commissioners to show whether or not the examples given were representative and what became of the balance of the price paid by the consumer. Some of the witnesses asked that the pre-war rates be restored.

Samuel Fraser, a fruit dealer and grower of Rochester, N. Y., objected to an advertisement used by the Louisville & Nashville, which showed that on watermelons shipped from Albany, Ga., to Baltimore, the grower received 7.52 cents, the carrier 12.7 cents and the "middlemen" 80 cents. He had an exhibit covering 1,233 cars of watermelons shipped from the Southern states to Northern cities which showed

the freight rate per melon to be 12.4 cents, but his figures stopped at the wholesale prices.

February 18 was devoted to testimony on behalf of shippers of milk, cream and dairy products, February 20 to beverages and beverage containers and waste material, and February 21 and 22 to livestock and packing house products. The commission's schedule provided also for testimony on petroleum and petroleum products on February 23 and 24 and other commodities on February 25. March 2, 3 and 4 have been set aside by the commission for rebuttal evidence on behalf of the carriers and March 8 to 11 for oral argument. In a notice regarding these dates the commission said that cumulative argument should be avoided and argument should be confined to the outstanding aspects of the case. By co-operation the parties should endeavor to reduce the number of persons to be heard. Brief printed abstracts of the main facts relied upon and of the argument may be presented at the time of oral argument. Voluminous and exhaustive abstracts or arguments are not desired. Parties not participating in the oral argument who have presented evidence may present such abstracts on or before March 8.

W. E. Rosenbaum, traffic manager of the Anheuser-Busch Company of St. Louis, asked for a reduction in the rates on

cereal beverages, saying the present rates are mostly "paper" rates and that a reduction would increase the revenues of the railroads because it would increase the tonnage of cereal beverages which are now in competition with the moonshiner, the bootlegger and the home brewer, whose products do not move extensively by rail. "The cereal beverage industry," he said, "realizes the serious predicament of the carriers, they having been hit almost as hard a blow as our industry, but if we are to survive lower freight rates are absolutely necessary."

The representatives of the livestock shippers who asked further reductions in rates were met by cross-examination which brought out the considerable increases in the prices of livestock since the first of the year. Kenneth F. Burgess, of the Chicago, Burlington & Quincy, asked Henry R. Park, traffic manager of the Chicago Livestock Exchange, how he accounted for the increase in the price of hogs on the Chicago market since January 1 of \$2.20, or five times the amount of the freight rate from the Missouri river to Chicago, 42½ cents, which represents an increase of 19 cents as compared with the rate before federal control. The witness said it was due to increased demand but that it represented only an "unimportant" increase as compared with 1913.

Dispatchers Given New "National Agreement"

Punitive Overtime Clause Included in Labor Board's Rules—Other Developments in Labor Field

A COMPLETE new set of rules to govern the working conditions of train dispatchers was announced by the Railroad Labor Board on February 20, to become effective on March 1. The new rules, constituting what will eventually be another national agreement, are featured by provisions for the payment of punitive overtime after the ninth hour, for one rest day per week, which must be taken by the employees involved, and for the payment of train dispatchers on a monthly basis. The new code contains specific rulings on the scope, hours of service, overtime and expenses, rest days and relief service, rates and application of pay, and miscellaneous conditions usually covered in agreements of this character. Rules on the subjects of seniority, promotions, vacations and sick leave with pay, are not specifically included in the new code, the Board stating that these and "certain other subject matters may not be covered in all localities by rules of general application and require further consideration by the parties directly concerned."

The new rules promulgated by the Board follow:

ARTICLE I—SCOPE

The term "train dispatcher" as herein used shall be understood to include chief, assistant chief, trick, relief, and extra dispatchers, except chief dispatchers vested substantially with the authority of superintendent or assistant superintendent.

ARTICLE II—HOURS OF SERVICE, OVERTIME AND EXPENSES

(a) Eight consecutive hours shall constitute a day's work for train dispatchers.

(b) All time worked in excess of eight hours shall be paid for on the actual minute basis at pro-rata rate for the ninth hour at the rate of time and one-half thereafter. Time consumed in making transfer shall not be counted as overtime.

(c) Each train dispatcher will be assigned to established headquarters in accordance with seniority provisions and when required to leave such headquarters shall be paid necessary actual expenses in addition to regular salary while away. This section does not apply to relief or extra dispatchers.

ARTICLE III—REST DAYS AND RELIEF SERVICE

(a) Each regularly assigned train dispatcher (and extra dispatchers who perform six days' dispatching service in one week)

will be allowed and required to take one day off per week as a relief day, except when unavoidable emergency prevents furnishing relief. If required to work such relief day, extra compensation will be allowed at pro-rata rate.

(b) The carrier shall designate an established rest day for each position in accordance with the foregoing section. Reasonable notice shall be given of change in assignment of rest day.

(c) Where relief requirements regularly necessitate four or more days of relief service per week, relief dispatchers shall be employed and paid the daily rate of each dispatcher relieved, and when not engaged in dispatching service will be assigned to other service and paid therefor a daily rate commensurate with the service rendered.

(d) Relief requirements of less than four days per week will be performed by extra dispatchers who will be paid the daily rate of each train dispatcher relieved.

ARTICLE IV—RATES AND APPLICATION OF PAY

(a) Train dispatchers shall be monthly employees, but the monthly compensation shall be computed on a daily basis.

(b) When necessary to fix a daily rate of pay it shall be determined by multiplying the regular monthly rate by 12 and dividing the result by 313.

(c) Loss of time on account of the hours-of-service law or in changing positions by the direction of proper authority shall be paid for at the rate of the position for which service was performed immediately prior to such change. This does not apply in case of transfers account employees exercising seniority.

(d) Rates of pay for new positions shall be the same as for existing positions of equal scope and responsibility.

ARTICLE V—MISCELLANEOUS

(a) Dispatching offices will be maintained as private as possible.

(b) When assignment by the carrier requires train dispatchers to change their place of residence they will be furnished free transportation for their families and household goods to their new place of residence at time of transfer.

(c) Train dispatchers and their dependents will be granted as liberal transportation privileges as are accorded other subordinate officials and employees.

(d) Reasonable notice will be given of reduction in force or change in hours of assigned positions.

Scope of New Rules Conforms to I. C. C. Regulation

In the general instructions accompanying this decision, the Board, in speaking of the scope of the new rules, cites

the ruling of the Interstate Commerce Commission issued on November 24, 1920, in which it ordered that employees of carriers performing the duties of chief dispatchers, day or night, be classed as officials when vested substantially with the authority of a superintendent or assistant superintendent, and then adds the following explanation:

In its consideration of Article I, defining the scope of the rules for train dispatchers, the Labor Board has recognized the above regulation, which has been in effect incorporated in this article. Under the rule as decided by the Board, each carrier and its employees in disagreement on this article will consider each position involving the work of chief dispatcher in the light of the Interstate Commerce Commission's regulation and of the Board's decision on Article I, and where a chief dispatcher is vested substantially with the authority of a superintendent or assistant superintendent, he will be considered in the official class and will not, therefore, come under the jurisdiction of these rules; where not so vested, he will be considered as coming under the rules.

The new rules will apply to each of the carriers parties to the dispute except in such instances as any particular carrier may have agreed with its employees upon any one or more of such rules in which case the rule or rules agreed upon by the carrier and its employees will apply on the carrier.

Referring to certain other rules which have been proposed by the train dispatchers, the decision says:

The Board has eliminated proposed rules relative to payroll classification, specification of duties, and preference in employment of experienced train dispatchers. These rules shall cease and terminate, except in such instances as any particular carrier may have agreed or may hereafter agree with its employees upon any one or more of such rules, in which case the rule or rules agreed upon by the carrier and its employees shall apply on said road.

In connection with this decision it will be recalled that the American Train Dispatchers' Association first presented its demands for a definite code of rules governing the working conditions of train dispatchers on June 4, 1920. These demands were later changed and during the progress of the hearings on national agreements, in the early part of 1921, an amended proposition was submitted to the Labor Board. Several of the rules requested by the organization in the amended proposition have been sanctioned by the Board in this decision, although the new code is much shorter and less specific than the agreement proposed by the train dispatchers association.

M. & N. A. Employees Ordered to Accept Unique Proposition

The employees of the Missouri & North Arkansas have been ordered by the Labor Board to return to work under the proposition made by Festus J. Wade, and described in last week's issue of *Railway Age*. The Board's decision was handed down on February 18, and after reciting the history of this case—which has been covered in previous issues of the *Railway Age*—described the hearings before the Board on February 15 and includes an opinion and decision in part as follows:

The carrier's request contemplates a reduction in the wages of the employees from the rates established by Decision No. 2 of the Board, an amount equivalent to the decreases authorized by Decision No. 147 for the classes of employees referred to therein in the service of the carriers, parties to said decision, and an additional 25 per cent reduction. There has been submitted to the Board in support of this request considerable data and information in reference to the cost of living, rates paid in outside industries and other relevant conditions referred to in the Transportation Act, 1920.

The representatives of the employees who were present at the hearing held by the Labor Board contended that in view of the conditions hereinbefore set forth the Labor Board had no jurisdiction of this dispute, and, furthermore, contended that there had not been held in compliance with Section 301 of the Transportation Act, the conferences contemplated by said section for the consideration of the justness and reasonableness of the proposed scale of wages.

In its presentation to this Board the carrier has set forth that it has appealed to the Interstate Commerce Commission for assistance to resume operation and has appealed to the executives of carriers in the territory which it serves for a sufficient division of rates to provide adequate income to pay operating expenses, taxes and interest on a proposed loan from the government, if granted. Before the applications with respect to division of rates and government assistance can be finally passed upon a decision from the Labor Board on the question of wages is necessary. The carrier has shown that in order to resume operation of the property a reduction in wages equivalent to an annual saving of \$310,000 must be made, and this would require the application of the decreases authorized by the Board in Decision No. 147, for the classes of employees referred to therein and a further reduction of 25 per cent in the wages established by the application of Decision No. 147.

If this request is not granted the carrier contends that it is inevitable that the road must be scrapped, with the result that thousands of people along the line will be out of employment, with great loss and inconvenience to all those who have made investments in farms, homes, manufacturing establishments, financial institutions, schools, and churches along the line of the railroad on the theory that it was to be an operating railroad. The carrier's proposition further contemplates that the owners of the property shall not receive any return upon their investment until the government loan which is contemplated is paid off and wages of the employees are restored to the standard scale.

The employees request that the Board give consideration at this time only to the question of jurisdiction, and if it is decided that the Board has jurisdiction to set a further hearing for the discussion of the merit of the carrier's proposals as to reduction in wages.

Opinion.—The Labor Board has given consideration to the question of jurisdiction referred to by the employees and is of the opinion that it has jurisdiction in this dispute. It further appears that the contention of the employees that this dispute is not properly before the Board in view of the failure of the carrier to hold conferences as contemplated by Section 301 of the Transportation Act, is not well sustained. The evidence shows that the representative of the receiver circulated among the employees a notice of its desire to resume operation and establish certain wages which would permit of saving an amount required to operate the property. This notice was not only distributed among the employees' representatives on the property to which the carrier had direct access, but the carrier's representative appeared at a conference in Chicago conducted by the organizations whose membership was involved in the controversy and made known to those present at said conferences the details of its proposals and sought their acceptance of the reduced scale of wages. The committee representing the Federated Shop Crafts claim that they were not a party to the conferences conducted by the carrier in either St. Louis or Chicago, but the evidence shows that at the conference in Chicago the president of the Federated Shop Crafts was in attendance and participated therein.

Decision.—That the proposition contained in the submission made by the representatives of the carrier, dated October 10, 1921, shall be accepted by the employees, based upon a continuation of the agreement as to working conditions that were in effect as of January 1, 1921, or, in lieu thereof, the decisions the Labor Board has rendered in connection with rules which superseded the several agreements in effect as of January 1, 1921.

While this matter is not in issue at this time before the Labor Board, it is recommended by the Board that all the former employees party to this dispute be reinstated with the continuity of their seniority unimpaired.

Conferences to be held between the representatives of the employees, parties to this dispute and the representative of the carrier, at the earliest possible date, not later than March 1, 1922, to properly and fairly apply this decision.

Pennsylvania Outlines Its Plan for Settling Disputes

The manner in which controversial questions and matters of mutual interest to the employees and the management of the Pennsylvania are settled under the agreements that carriers has made with several classes of its employees is described in a summary recently issued by that carrier. Steps are provided through which the employees or management may carry a dispute culminating in the reference of the dispute to a last court of appeal, "the United States Railroad Labor Board or other public arbitrator to be decided upon by the reviewing committee." These steps may be summarized as follows:

1. The individual employee first takes up his dispute with his immediate superiors.

2. The local chairman or local committee then takes up the dispute with the division superintendent.

3. The general or regional chairman next takes up the dispute with the general superintendent.

4. The general chairman takes up the dispute with the general manager.

5. The dispute is then referred to a joint reviewing committee composed of equal representation of employees and management with equal voting power, a decision to be arrived at by two-thirds majority, and,

6. The dispute may be referred to the United States Railroad Labor Board or other public arbitrator to be decided upon by the joint reviewing committee.

Labor Leaders Attempt Formation

of Political Coalition

Representatives of a large number of labor organizations and state federations of labor met at Chicago on February 20, in an endeavor to form a coalition to back candidates for public offices who will be favorable to labor legislation and to the demands of organized employees. The call to the meeting was sent out on February 8 and was signed by a committee composed of officers of various railroad labor unions. Included among the signers of the call were W. H. Johnston, International Association of Machinists; Timothy Healy, International Brotherhood of Stationary Firemen and Oilers; L. E. Shepherd, Order of Railway Conductors; Martin F. Ryan, Brotherhood of Railway Carmen; E. J. Manion, Order of Railway Telegraphers; and Warren Stone, Brotherhood of Locomotive Engineers. All except Mr. Stone were present at the meeting on February 20.

Mr. Johnston, who acted as chairman of the meeting, declared in his opening remarks that this movement "will result in retiring from public life the servants of plutocracy and privilege." According to Mr. Johnston, the coalition which has been proposed will "work through existing organizations" to place "more genuine farmers and workers as representatives * * * in our legislative halls."

Among the other railroad labor leaders who attended the meeting were T. C. Cashen, Switchmen's Union of North America; E. F. Fitzgerald, Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees, and E. F. Grable, United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers.

Pennsylvania Labor Controversy Delayed Again

The suspension of Colonel J. V. Clinnin, assistant United States district attorney at Chicago, who was assigned to the case of the Labor Board in its legal controversy with the Pennsylvania has resulted in the postponement of hearings before the United States District Court at Chicago until March 8. The developments in this case have been fully described in previous issues of the *Railway Age*.

Board Holds Hearings on Telegraphers' Rules

Hearings on proposed rules to govern the working conditions of telegraphers were held before the Board on February 21. Approximately 70 carriers have failed to agree with the telegraphers as to their working rules and all of these disputes were consolidated by the Board into one hearing. The principal points in dispute include "split tricks," overtime, basic days, scope, and punitive payment for calls, Sunday and holiday work and meals. The carriers' testimony at the opening session was largely confined to statements opposing the rules which have been proposed by representatives of the telegraphers on these subjects on the grounds that they will result in uneconomical, unjust and unreasonable conditions. Among those who testified on behalf of the carriers at the opening session were J. W. Higgins, representing 10 western carriers; M. C. McClaury, representing a group of eastern carriers; E. B. Perry, New York, New

Haven & Hartford; T. A. Gregg, Atchison, Topeka & Santa Fe; W. G. Bied, Peoria Terminal Railway; G. H. Synes and R. McIntyre, Union Pacific; H. D. Earl, Texas & Pacific; A. L. Robinson, Wabash; R. S. Henry, Nashville, Chattanooga & St. Louis and a group of southwestern roads; I. C. Clark, Chesapeake & Ohio; J. H. Owen, Florida East Coast; T. B. Turner, Louisville & Nashville; and W. R. Hensley, Louisville, Henderson & St. Louis.

E. J. Manion, president of the Order of Railroad Telegraphers, appeared on behalf of the employees, contending that procedure outlined in the Transportation Act has not been followed in these disputes and urging further conferences on working rules. He dwelt at length on the basic eight hour day, presenting several compilations to show that an eight hour day without provisions for punitive overtime after the eighth hour resulted in the extension of the working day. The subjects of "split tricks" and the scope of the proposed rules were also taken up by Mr. Manion, who argued that the former should not be permitted and that the latter should take in non-telegrapher agents and other similar employees.

Working Conditions for Firemen and Oilers

A new agreement covering the working conditions of firemen and oilers was announced by the Board on February 23 to become effective March 1. This new code extends the scope of the old national agreement, provides for the payment of pro rata rates for the ninth and tenth hours of continuous service and time and one-half thereafter, and for the working of these employees on split tricks, providing their service comes within a spread of 12 hours.

The firemen and oilers' national agreement specifically excluded employees who perform stationary engineers' work, but the new rule on this point extends the application of the new code to stationary engineers, hoisting engineers, grease cup fillers, flue blowers and borers, fire knockers, cinder pit men, fire builders and coal passers. This extension is in keeping with the demands of the firemen and oilers made during the progress of the national agreements case.

The new ruling covering intermittent service and giving the carriers the right to employ men on split tricks without punitive payments is exactly the same as the rule recently given to the clerks and reproduced in the *Railway Age* of January 28, page 277. Several additional changes are included in the new national agreement but these are of minor consequence.

The old national agreement with the firemen and oilers contained 18 rules. Of these five have been reproduced in the new code. One has been automatically changed. Ten rules relating to discipline and grievances have been remanded to the carriers and their employes for further negotiation and two have been materially changed.

Dual Flow Steam-Driven

Air Compressor

THE STEAM END of the Dual Flow steam-driven air compressor recently developed by the Chicago Pneumatic Tool Company, New York City, is said to be entirely new and distinctive, yet based upon principles which have already proven their soundness and superiority in steam engine practice. The foremost feature of this machine, illustrated in Fig. 1, is the steam cylinder which is so designed and constructed that initial condensation is almost entirely eliminated, resulting in a great saving in steam power.

Initial condensation is one of the greatest preventable losses in steam engines of the old counterflow or compound type; it is caused by the cooling of the cylinder walls and head by the comparatively cool exhaust steam as it washes

over them in leaving the cylinder through the same port by which it entered. In the Dual Flow cylinder, the exhaust steam does not wash back over the cylinder walls and head, but leaves through a port in the center of the cylinder. Thus the interior surfaces of the cylinder walls and head remain at very nearly the same temperature as that of the entering steam and initial condensation is reduced to the absolute minimum.

The exhaust port is uncovered by the piston when the latter has traveled about half its stroke. The exhaust is controlled, however, by a patented, steam-tight poppet valve, which opens when the piston is near the end of its stroke and closes again (if the machine is running non-condensing) when the piston covers the port on the return stroke. When running condensing, the valve closes early in the return stroke.

The Dual Flow cylinder was designed to have several advantages over uniflow types. In the first place, a material saving in steam consumption when running non-condensing is claimed. Since the piston of a uniflow engine covers the exhaust port at the start of the return stroke, some provision must be made for preventing excessive compression. This usually takes the form of large clearance spaces. If there is any back pressure, there must be still greater clearance. Compression in the Dual Flow cylinder on the other hand does not begin until the piston has traveled half the return stroke.

A section of the cylinder, showing its construction, is given in Fig. 2. Valve leakage probably causes a greater steam loss than any other single factor. Especially is this true of installations where superheated, high-pressure steam is used; in fact, the faults common in most of the valves now used, such as leakage, excessive clearance, necessity of valve lubrication, etc., have partly offset the advantage to be derived from the use of superheated steam. Too much attention, therefore, cannot be given to the type of valve used.

A solution of the valve problem has been sought in the

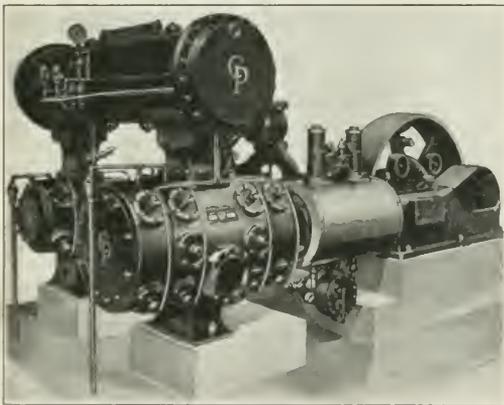


Fig. 1. General View of Dual Flow Air Compressor

case of the Dual Flow steam-driven air compressor by the adoption of the Skinner steam-tight, double-seat poppet valve for both admission and exhaust. This valve is said to remain steam tight indefinitely and seat perfectly, regardless of the pressure or temperature under which the cylinder is operated. It has been known to keep steam tight, with one grinding, with 159 lb. pressure and 150 deg. F. superheat and also with saturated steam at 100 lb. pressure. No lubrication is required.

Inequalities of expansion of the metals forming the valve and seat due to different coefficients of expansion, are com-

pensated for and no side thrust is imposed upon the stem by the lifting mechanism.

The governor is mounted in the flywheel and operated by centrifugal force and inertia. The governor arm is connected to the steam valve eccentric and by changing the throw of the latter it changes the point of the cut-off of the steam entering the cylinder. This method is obviously superior to the old scheme of merely throttling the steam. It is apparent that variations in speed may be made by adding or removing weights.

Unlike the old counterflow engines, which were regulated economically by slowing down during the unloaded periods of the compressor, the Dual Flow is a constant speed machine

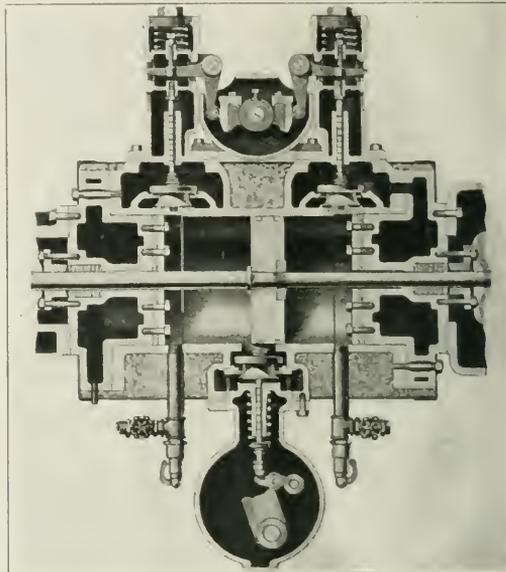


Fig. 2. Cross Section of Dual Flow Steam Cylinder

and shows the best steam economy when operating at its greatest speed. Regulation is therefore effected by two-step capacity control. Two differential unloaders connect with the inlet valves and reduce the capacity of the compressor in two steps. One unloader holds open the inlet valves on the crank end of one cylinder and the head end of the other. The second unloader holds open the inlet valves at the opposite ends. This is one of the simplest, most positive and most efficient methods of regulation known. The air valves are of the Simplate, independent disc type.

DURING THE PERIOD of 24 hours preceding 1 p. m., February 9, 264 passenger trains in-bound and out-bound were handled 100 per cent on time at the Union Station, Chicago. Fifty of these trains were operated in the hour from 7 to 8 a. m.

THE BILL to AMEND the valuation law by omitting the requirement that the Interstate Commerce Commission shall report the cost of acquisition of land, which has been favorably reported by both the House and Senate committees, was debated in the Senate on February 21. It was brought forward on February 17 by Senator Cummins, who asked its immediate consideration. This was opposed by Senator Underwood, who asked for more time to consider it, but Senator Cummins later succeeded in having it made the unfinished business of the Senate.

Present Lubrication Methods Faulty

Positive Mechanical Oil Feed Would Reduce Friction and Wear and Minimize Equipment Delays

By J. J. Hennessy



Delayed by a Hot Box

ONE MEANS of improving net earnings always open to the railroads is to increase the efficiency of train operation, reducing the cost per unit of tonnage moved. Efforts along this line in the past

have been confined largely to increasing the size and hauling capacity of locomotives and cars and the mileage made in a given period by adopting improvements such as superheaters, outside valve gears, mechanical stokers, six-wheel trucks, larger journals, etc. The method of lubricating the journals of railway equipment, especially cars, however, has not been changed, or any serious attempt made to improve it since the first railroad cars were built. It is true that the grease cellar at the time of its adoption for the lubrication of locomotive journals worked a great improvement in the performance of heavy locomotives, but an analysis of the situation at that time showed that while the use of hard grease prevented delays on the road, this was accomplished at the expense of increased wear of equipment, particularly driving journals, boxes and rods.

Oil Versus Hard Grease Lubrication

Grease of the best quality has never been considered by experienced engineers to be nearly as good a lubricant as oil. The best grease that can be manufactured for use on driving journals (this grease must necessarily be quite hard) cannot contain more than 50 per cent of oil, or pure lubricant, the rest being of questionable value except to stiffen the lubricant. Tests made on railroads in Europe and England have proved conclusively that grease is not only a poor lubricant for railway equipment journals of light cars, being injurious to journals and bearings and producing high friction, but that it is impossible to lubricate with grease a journal carrying a load greater than about 80 lb. per sq. in. of projected area where the movement in the journal box due to reversed pressure such as that experienced in a driving box from the piston thrust, is absent. Very few figures reflecting actual costs due to grease lubrication are available, but most mechanical superintendents agree that considerable expense in maintaining driving journals, boxes and rods is incurred because of the poor lubrication afforded by grease.

There is no comparison between the condition of journals and bearings lubricated with grease and those lubricated with oil from the standpoint of wear, and the life of the latter is at least three times as great as the former. In other words, a journal will run without truing three times as long when properly lubricated with oil. In the case of driving journals, greater wear is experienced in the bearings (brass) which wear so rapidly at the front and back as almost to control the length of time a large engine can be kept out of the shop. Other defects of locomotive design, formerly controlling the time an engine could be kept in service, have been overcome to such an extent that at present the excessive wear of driving box brasses with resultant pounding and rod play practically limits the mileage between repairs.

Proof that grease is not as good a lubricant as oil is had from the fact that grease will not lubricate locomotive journals other than driving journals (all of which carry less load) because of the absence of the back and forth movement of the journal in the bearing; also, an engine lubricated with grease will not run cool when not pulling a load, as when being hauled in a train.

In the light of the few experiments in improved methods of lubricating railway equipment that have been made, the increased car-carrying capacity and more economical train operation seem to warrant the most careful attention to proper lubrication. Oil of a nature most suitable for each service should be supplied in such a manner as to provide practically perfect or bath lubrication.

Bath Lubrication More Effective Than Wick Feed

Laboratory tests* made with a standard lubricant testing machine by Beauchamp Tower, and others, have shown that journal friction is reduced materially by increasing the supply of lubricant. Where oil is fed to a journal in sufficient quantity to provide an oil bath, as compared to the amount fed by capillary attraction or wick feed, the coefficient of friction is reduced from .011 to .002 using the same oil under the same laboratory conditions. Bath lubrication would produce a much greater reduction of friction under actual conditions where oil is subject to temperature variations, waste becomes glazed, and both oil and waste are filled with dirt.

In a laboratory, a journal carrying a load equal to that carried by heavy railway journals can be lubricated to produce a coefficient of friction of decidedly less than .003 and the attempt should be made to approach more nearly what can be accomplished under the most favorable conditions.

Railway journals are lubricated by the present method a small portion of the time in a manner that only approximately approaches that of the laboratory with wick feed. This is due to atmospheric conditions and the glazed condition of waste next to the journal which begins as soon after oil is applied, as the journal begins to warm up. About one-half of the period between applications of oil to the waste in the journal box of a normally loaded journal, the journal operates on a scanty supply of lubricant and this condition can be overcome only by bath lubrication or some method giving practically bath lubrication.

Advantages of Better Lubrication

Any reduction of resistance to train movement by better lubrication would have a direct bearing on coal consumption per unit moved, with an indirect bearing on train operation in general and maintenance expense. Delays because of hot boxes, and the labor and material costs involved in bearing and journal renewals, would be correspondingly reduced.

Some tests to determine resistance to car movement have been made by the Pennsylvania Railroad and reported in Bulletin No. 26. Among the resistances considered are rolling resistance of wheel on rail (influenced by type and condition of track), flange pressure on rail, wind resistance due to speed, curve resistance and grade resistance, none of which resistances can be reduced by better lubrication of journals. It is safe to assume that track and equipment conditions,

*Reported in a book entitled "Lubricants and Lubrication," by Archbutt and Dealey.

as well as the condition of packing in boxes were ideal, or in other words that the journals were lubricated in a manner superior to that obtained in ordinary railway practice. Tests with ball bearing journals on railway equipment, the improvement effected being confined entirely to eliminating resistance due to journal friction, have shown such a decrease in effort required to pull cars as to prove that about one-third of the resistance to car movement on good, ballasted level track is due to journal frictional resistance. It would seem from the figures reported in the test that six pounds per ton is required to move what might be considered an average loaded car on level track, or that six pounds per ton would be a fair figure to consider as necessary to pull an average car, considering the number of empties moved and the average loadings of box cars.

The test figures show resistance to movement of light loads and empties to be much greater per ton than with heavily loaded equipment, which further proves that resistance other than journal resistance is of small consequence. Taking two pounds per ton as the resistance due to journal friction as a basis, the coefficient of friction is easily twice as high as under the most unfavorable (wick fed) method in the laboratory. If a method more nearly approximating what should be expected of bath lubrication as shown by laboratory tests is used the journal resistance will be reduced still further. More cars can be hauled and as small a number as three cars added to each freight train of normal size means a considerable increase in revenue per train to say nothing of the decrease in maintenance cost on all cars.

As an additional advantage the carrying capacity of journals would not only be increased by more adequate and reliable lubrication, but where journal load limits with present methods are not so nearly reached, savings due to improvement in their lubrication would be reflected in reduced attention necessary and less hot box trouble when these journals are placed under heavy load. The load limits of journals are increased by proper lubrication and any increase in the carrying capacity of present journals would remove, to a great extent, the need of larger sized journals and six-wheel trucks.

Expense attributable directly to hot boxes on all classes of equipment is enormous and an investigation of the expenditure due to, or resulting from, hot boxes on any of the larger systems would show great possibilities of saving by reducing this trouble alone.

A comparison of the lubrication of railway equipment bearings with the bearings of other heavy machinery is almost impossible due to the crude method of lubricating railway journals and the conditions under which these journals operate. In spite of this fact, when the number of journals that are in service, their loads, operating conditions and the uncertainty of lubrication are considered, the comparatively small amount of trouble experienced is amazing. The success attained with the present methods is made possible by the constant attention of highly trained specialists and the unremitting perseverance of a large number of railway employees. The cost, however, is proportionately large and journals demand a much greater proportion of attention in relation to other matters pertaining to train operation than they should. It would pay to make a serious effort to bring railway journal lubrication up to a status requiring no more attention and expense than the lubrication of ordinary machinery bearings.

Oil of the Right Consistency Needed

Oil of a certain consistency is required by the present method of supplying lubricant to journals by waste feed, to insure its feeding in sufficient quantity under all atmospheric conditions. This requirement limits the lubricants to oils not always most satisfactory from a strictly lubricating standpoint. The constant disturbing of the waste by a large

number of operatives, which is absolutely necessary in severe service, also increases the liability of failure and the application of oil directly to a journal does not seem to reduce this liability. With the best attention possible and the use of all the oil permissible with the present method of application, it is absolutely impossible to avoid a great deal of hot box trouble on the heavier equipment in severe service.

The inadequacy and the unreliable nature of the present method is most noticeable on equipment moving the greater portion of the time under heavy loads. Lubrication failures or hot box troubles develop on this equipment with the greatest frequency, although the inadequacy of the lubrication afforded is proportionately as great on journals carrying less loads a greater portion of the time. The tendency of these journals is to heat when placed under full load, and journal resistance is increased.

An improvement in the method of applying lubricant to such a point that oil of any desired body could be furnished to journals under all conditions, entirely independent of the capillary action of the waste in the box, would reduce the running temperature of journals under heavy load. Little tendency to heat would be noticeable, or if there was heating, it could be detected by a casual inspection and remedied before the box became hot enough to damage the bearing.

A great deal of expense is incurred by giving unnecessary attention to bearings in severe service as a result of the inability of the inspectors to determine exactly which journals are lubricated properly or which are in need of attention. The expense necessary to lubricate railway journals successfully has become accepted as unavoidable, and about the only remedy applied where trouble is experienced seems to be to increase the number of operatives giving journals inspection and attention, without any definite plan of procedure to remedy the trouble. Some positive mechanical means of supplying the lubricant to the journal should be provided and arrangements made for ready inspection. In this way the exact condition of journals can be determined and the efforts of the inspectors will not be nullified because of the impossibility of carefully inspecting all journals.

Locomotive Journal Lubrication

Locomotive driving journals are not more difficult to operate from a lubrication standpoint than the journals of cars, and their construction is such as to lend itself to the development of some more satisfactory method than that used at present. The ease and frequency with which these journals can be inspected and given attention also makes this desired improvement more easily available than in the case of other equipment.

The large diameter of a driving journal and the construction of the waste receptacle or cellar, however, makes the continuous application of sufficient oil to the entire surface of the journal difficult, and the metal of the driving bearing being harder than that of the car bearing makes it necessary that this supply of lubricant to the journal be absolutely continuous, greater damage being done by a failure of the supply of lubricant to journal for a short period.

Modern Heavy Equipment Must Be Well Lubricated

The general adoption of the hard grease method of lubricating locomotive driving journals was largely the result of a determination to eliminate road delays on account of lubrication failures and entirely regardless of the expense incurred by excessive journal wear, frictional resistance and resultant deterioration of other locomotive parts. None of these effects were as noticeable, or of as great consequence, on the locomotives in general use at that time, as with the larger locomotives of the present day. Increases in the size of locomotives, with improvement in their design and construction, permits capacity operation a greater portion of the time and emphasizes the inadequacy of journal lubrication, focusing

attention on repairs directly necessitated by poor lubrication.

Repairs to driving boxes and parts directly affected by the condition of driving boxes are the principal causes of locomotives being kept out of service between general overhauls. While the increase in carrying area of driving journals has about kept pace with the increase in locomotive size, no provision has been made to take care of the greater thrust of piston, and wear at the front and back of driving brasses has become more noticeable. This excessive wear of brasses aids, to a certain extent, the lubrication of the journals provided with grease cellars by permitting a greater movement of the journals back and forth in the boxes, without which satisfactory lubrication with grease is impossible. This movement is much more detrimental to the larger equipment and it becomes more desirable to reduce it to a minimum, which in turn reduces the lubrication afforded by the grease. Moreover, the larger cylinders and heavier wheels bring the centers of the driving boxes further from the centers of the crank pins and closer together, still further adding to the necessity for reducing this movement as well as increasing the need of lubricating the journals properly.

It would seem that a driving box would eventually be developed to provide a greater area to take piston and rod thrust by having the bearing extend down below the center line of the journal. This construction would necessitate oil lubrication with some positive means of application, as restriction of this movement to only that required for proper operation of the journal with oil lubrication would make it impossible to lubricate satisfactorily with grease. Any improvement along this line would show beneficial results, especially on the heavy equipment, and hasten the adoption of some positive mechanical means of supplying oil of any desired consistency to journals of all classes of railway equipment in an absolutely reliable manner.

American Railway Association. The total was 788,412 cars, as compared with 687,867 in the corresponding week of last year and 786,663 in 1920. This is the first week for a long time in which the loading exceeded the corresponding week of 1920. The increase as compared with the previous week was 34,000 cars. Increases as compared with the corresponding week of 1921 were shown in the loading of all classes of commodities except coke, forest products, and ore.

The freight car surplus showed another large drop during the week ending February 8 to 296,659, a decrease of 34,022. There were 121,528 surplus box cars and 123,119 surplus coal cars.

The number of bad order cars on February 1 was 331,050, or 14.5 per cent, an increase of 11,538 as compared with the number on January 15.

Freight Car Loading

THE LOADING of revenue freight continued through the week of February 11 the increase which has been shown each week since the first of the year, according to the weekly report of the Car Service Division of the



Photo by Underwood & Underwood

A Typical Scene at the Station at Wellesley, Mass., Upon the Occasion of a School Holiday

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO—WEEK ENDED SATURDAY, FEBRUARY 11, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L. C. F.	Miscellaneous	Total revenue freight loaded		
										This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	10,939	2,785	47,135	1,698	5,935	633	63,540	62,415	195,080	162,482	171,546
	1921	6,127	2,902	43,120	1,131	8,517	838	47,928	51,919	162,482	171,546	
Allegheny	1922	2,827	2,573	55,744	3,887	2,881	554	45,928	46,822	161,216	142,734	161,164
	1921	1,681	2,872	45,575	5,270	2,575	2,569	37,897	44,289	142,734	161,164	
Pocahontas	1922	251	68	25,250	235	961	20	5,530	3,194	35,509	23,366	32,983
	1921	167	94	13,753	343	1,258	51	4,267	2,433	23,366	32,983	
Southern	1922	5,441	2,389	26,607	576	15,242	589	36,913	34,428	121,585	108,114	125,950
	1921	3,098	1,796	21,757	649	12,629	937	34,112	33,136	108,114	125,950	
Northwestern	1922	13,739	9,231	9,699	1,033	15,471	397	25,429	26,845	101,844	95,458	114,748
	1921	9,730	8,123	6,006	1,617	18,002	982	23,831	27,167	95,458	114,748	
Central Western	1922	17,034	10,929	22,825	252	4,544	900	29,819	28,794	115,097	99,684	118,018
	1921	9,299	10,886	16,570	292	3,684	2,316	28,975	28,462	99,684	118,018	
Southwestern	1922	5,683	3,299	5,507	142	7,604	922	15,749	20,175	58,081	57,029	62,224
	1921	4,549	1,770	4,596	96	6,470	401	16,155	22,992	57,029	62,224	
Total, all roads	1922	55,914	30,274	192,167	7,823	52,638	4,015	222,908	222,673	788,412	687,867	786,633
	1921	34,657	27,643	151,377	9,398	53,135	5,094	193,165	210,398	687,867	786,633	
	1920	35,579	28,782	188,371	9,977	61,712	12,183	137,577	312,452	786,633		
Increase compared	1921	21,257	2,631	40,790	.....	.....	.....	29,743	12,275	100,545	.....	.....
Decrease compared	1921	.....	.....	.....	1,575	497	4,079	.....	.....	.....	.....	.....
Increase compared	1920	20,335	1,492	3,796	.....	.....	.....	85,331	.....	1,779	.....	.....
Decrease compared	1920	.....	.....	.....	2,154	9,074	8,168	.....	89,779	.....	.....	.....
February 11	1922	55,914	30,274	192,167	7,823	52,638	4,015	222,908	222,673	788,412	687,867	786,633
February 4	1922	48,969	27,998	185,151	7,844	50,204	4,015	218,571	211,134	753,886	699,718	762,680
January 28	1922	50,890	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332
January 21	1922	52,181	31,961	164,091	7,267	50,328	4,269	213,642	214,536	738,275	708,658	804,866
January 14	1922	50,187	36,165	159,245	7,258	48,490	4,451	205,546	209,536	720,877	715,855	840,524

General News Department

The Boston & Maine has decided to sell advertising space in passenger cars and in station buildings and has made a contract with George W. Roebing, advertising agent, of New York.

L. M. Parker, secretary to Mr. Hooper of the United States Railroad Labor Board and at one time adjutant of the Soldiers' Home at Hampton, Va., has been appointed secretary of the Board, succeeding C. P. Carrithers. W. M. Hart, assistant statistician of the Board, has been appointed chief statistician, succeeding V. J. Banzer.

Two hold-up men boarded a Denver & Rio Grande train at Alamosa, Colo., on the night of February 18, and after shooting down the messenger in the express car, ransacked that car and then proceeded to go through the passenger coaches, robbing the passengers. The men then stopped the train and made their escape. The express messenger was seriously injured and is not expected to recover.

A. W. Mellon, secretary of the treasury, has issued a statement saying that newspaper reports to the effect that he approves of a plan to give a government guaranty to issues of railroad equipment obligations are without foundation. No such plan has ever been presented to the treasury for consideration. This statement was called forth by the publication of newspaper articles which stated that the Cabinet was considering the suggestion, made by Secretary Hoover in his statement before the Interstate Commerce Commission, that the government might guarantee railroad equipment trust obligations.

Historic Iron Box Car Wrecked in Blast

Box Car No. 90190, of the Nashville, Chattanooga & St. Louis was destroyed by the explosion of a case of dynamite at Hollow Rock Junction, Tenn., last week. This car was the first metal box car ever used in the Southern States. It was commandeered by General Sherman as an ammunition carrier in his advance on Atlanta, in 1864.

The Pere Marquette's Budget for 1922

The proposed new shops of the Pere Marquette at Wyoming (Grand Rapids), Mich., constitute the largest item in the budget of that road for 1922, which amounts to \$4,035,000. For the construction and equipment of the shops the allotment is \$1,400,000. Other improvements include the completion of the Flint Belt line; the installation of a telephone dispatching system between Grand Rapids and Petoskey, and between Holland and Pentwater; \$100,000 for two bridges which will ultimately represent an outlay of \$700,000, and \$1,300,000 for ballasting and rail requirements.

Music at Sacramento Shops

Employees of the Southern Pacific shops at Sacramento, Cal., are having great success with their musical organizations, consisting of a 38-piece band and a glee club of 48 voices. These have been developed at the shops and have attracted favorable attention in many sections of the state during the last few years. Although organized as recently as 1917, during the Liberty Loan drive the organizations have made great strides. In a little over four years these two organizations, which are under the direction of J. L. Weida, foreman of locomotive machine shop No. 1 at Sacramento, have raised over \$14,000 for charitable purposes, have built up a music library valued at over \$3,000, and have equipped themselves with uniforms valued at several thousand dollars.

One of the members of the glee club which has brought the

members much favorable notice is their Christmas carol singing. On Christmas morning at five o'clock the club makes the rounds of all the hospitals, city and county jails, homes of shop employees who have been sick, and to any place where it is felt that music would bring cheer.

Frisco Votes \$7,776,000 Improvements

The St. Louis-San Francisco has authorized an expenditure of \$7,776,000 in 1922, for repairing and modernizing cars and locomotives, purchasing new equipment, and in improving the road and its facilities. The appropriation for new equipment is \$1,260,000, and that for the repair and improvement of existing equipment approximately \$3,072,500. An appropriation of \$1,691,000 has been set aside for laying 186 miles of track, including new second main track out of St. Louis and Kansas City. Other improvements to roadway will take approximately \$1,500,000.

Reading Conductor and Engineman Convicted

Conductor Evans and Engineman Yeakel, the men immediately responsible for the fatal collision on the Philadelphia & Reading at Woodmont, Pa., on December 5, when 27 persons were killed, were tried in court at Norristown, Pa., last week, and were convicted of criminal negligence; the maximum penalty for which is five years' imprisonment or \$5,000 fine, or both. The men were released on bail of \$5,000 each, pending application for a new trial. The verdict of the jury included a recommendation for mercy. According to press reports, the jury, in which were two women, balloted for twenty hours before reaching a decision, 200 ballots being cast.

Ticket Clerks

H. L. Hungerford, superintendent of the Charlotte division of the Southern Railway, in a letter headed as above and circulated among "whom it may concern" gives some condensed advice as follows:

"About nine-tenths of any traveler's opinion of a railroad is made at the ticket window. The reception they get there, the way they are handled, the way they are taken care of, go far towards establishing what travelers will think of that railroad.

"The ticket clerk's job is not an easy one. He has to be a diplomat and a gentleman, he has to have tact and patience and an easy working smile.

"You have to remember that you are never doing a person a favor to sell him a ticket. If people find it difficult or unpleasant to do business at the ticket window that is a sure sign of a poor ticket clerk. Think of the men and women who come to you as being your guests in your house. They are invited to come, and they have every right to expect courteous and cordial interest in their wants.

"If you can't meet and care for people in this spirit; if you can't or won't be courteous, and helpful and gracious and pleasant at every step of your work; and with your fellow employees as well as with the public—*Don't try to be a ticket clerk.*"

Mine and Rail Unions Meet

The joint conference of representatives of the larger railroad labor organizations and the United Mine Workers of America, scheduled for February 21, was held on February 22 and resulted in the adoption of a "toothless" protective agreement for "closer co-operation of forces which will operate to protect more effectively the interests of workers in mining and transportation." While the meeting was held behind closed doors, reliable reports of the developments were circulated. One of these reports quoted Quilliam Green, secretary-treasurer of the miners' or-

ganization, as saying, "It is not what we do in this meeting but what the public believes we can do that is important. If the public believes we can form a working co-operating alliance, the public will force operators to grant our demands."

The substance of the resolution adopted at the conference is contained in the following:

"After mature deliberation and with a full sense of our responsibility we declare that the mutuality of interests of the employees in these basic industries must be recognized and we assert our purpose to apply every honorable method to secure adequate compensation for service rendered and to maintain proper American standards of living. When it becomes apparent that any one or group of the associated organizations is made the victim of unwarranted attacks or its integrity is jeopardized, it will become the duty of the representatives of each of the associated organizations to assemble to consider the situation. Ways and means may then be considered and applied to best meet the emergency. Action taken under this section is subject to approval by each organization represented. This plan shall become operative when ratified by the constitutional authorities of each associated organization."

A. R. E. A. Program

The program for the twenty-third annual convention of the American Railway Engineering Association, which will be held in the Congress Hotel, Chicago, on March 14-16, is as follows:

Tuesday, March 14

President's address.
Reports of secretary and treasurer.
Reports of standing and special committees.
Yards and Terminals.
Electricity.
Ballast.
Iron and Steel Structures.
Standardization.
Signals and Interlocking.
Ties.
Track.

Wednesday, March 15

Shops and Locomotive Terminals.
Roadway.
Economics of Railway Location.
Stresses in Railroad Track.
Records and Accounts.
Signs, Fences and Crossings.
Water Service.
Uniform General Contract Forms.
Annual dinner at 6:30 P. M.

Thursday, March 16.

Masonry
Rail.
Economics of Railway Labor.
Wooden Bridges and Trestles.
Economics of Railway Operation.
Buildings.
Wood Preservation.
Rules and Organization.
Memorial Meeting—John Findley Wallace.
New business.
Election and installation of officers.
Adjournment.

Friday, March 17.

Excursion to Gary Industrial District.

March Meeting of Signal Section

F. B. Wiegant, chairman, and H. S. Balliet, secretary, announce that the ninth meeting of the Signal Section of the American Railway Association will be held at the Drake Hotel, Chicago, on Monday and Tuesday, March 13 and 14. The committee reports to be considered at this meeting are as follows:

Committee I—General provisions for major specifications. Committee II—Specifications for concrete trunking, capping and supports; for universal compensation of pipe line and for mechanical interlocking; also three drawings. Committee III—Specifications for electric wiring for interlocking plants. Committee IV—(Direct current automatic block signaling); requisites

for circuits; approach lighting of signals. Committee V—Rules for signal maintenance and examination papers on signal maintenance. Committee VI—Seven revised standard drawings.

Committee VII—Tables of standard resistances of direct current relays, with their operative characteristics. Committee X—Report on colors for signals. Committee XI—Specifications for storage battery jar and for cement concrete battery box. Committee XII—(Contracts.) Table of interlocking units and values.

Committee XIII—(Electrical Testing.) Instructions for inspecting and testing direct current relays and indicators. Method of testing first range d. c. bottom of mast, upper quadrant, motor signals, push clear type, in service. Method of testing first range, upper quadrant, d. c. motor signals, top mast or bottom of mast type, having pull clear connections. Committee XV—(Valuation.) Table of average service life of the important units of the different types of signal installations. Forms for reporting distribution of signal labor and material charges and credits. Committee XVI—Specification for illuminating Oil No. 5003.

Committee XVIII—Discussion of factors involved in the standards of safety for track circuits. Methods of making d. c. track circuit tests for rail and ballast resistance with forms for recording same. Committee XX—(Highway crossing protection.) Twelve recommendations.

Proposed Legislation to Regulate Aeronautic Industry

The Board of Directors of the Chamber of Commerce of the United States has authorized its Department of Transportation and Communication to interest itself actively in urging broad enabling legislation in commercial aeronautics. The department committee recommends in principle the immediate support of basic national legislation on aeronautics providing for a proper regulatory procedure in the nature of an enabling act providing for the continuation, administration and improvement from time to time of an aeronautical code under proper government authorization, adequate facilities within the Department of Commerce for promoting the regulation and development of commercial air transport operations, intrastate state legislation to conform as nearly as possible to the basic federal legislation, and encouragement of widespread public support of essential aeronautical legislation.

The department's statement says that through lack of legal and economic status aviation is not receiving the practical encouragement it deserves, as a most powerful arm of national defense and as a new transportation agency of great potentiality. The aeronautic industry is the only important case on record of a new industry asking to be regulated from the inception of its operations, whereas the regulation of rail transportation and public utilities have been developed under public pressure.

"During 1920, the Army air service flew 6,250,000 miles; Navy air service, 1,500,000 miles; Air mail, 1,500,000 miles; total, 9,250,000 miles, excluding private and commercial flying. The Manufacturers' Aircraft Association reports 15 commercial companies with over 130 planes in service carrying 86,000 passengers with a gross revenue of over \$800,000. The post office department reports that including the calendar year 1920, the Air mail carried 41,000,000 letters, with an operating cost of \$1,340,000, equal to about \$1 per plane-mile, or slightly exceeding three cents per letter. In the fiscal year 1920-21, the Air mail flew 1,771,000 miles, reducing the cost to 85 cents per plane-mile, carrying an average of 400 pounds per plane. Since the last change in government administration, all air-mail routes have been discontinued, except the New York-Chicago-San Francisco route, due to limited appropriations.

"Yet we find that Europe now has scheduled air service (passenger, mail and freight) between 30 or 40 principal commercial centers. Service runs by time-table, with efficiencies reported on some routes as high as 90 to 98 per cent of scheduled flights run. Europe has largely developed commercial aviation, while America has concentrated on the Air mail. The United States Air mail mileage last year exceeds the commercial mileage of both Britain and France, but our commercial mileage is hardly comparable. * * * Air subsidies in Europe have been important accelerators of commercial air transport. England has granted about \$1,000,000 per year for a three-year period. Government aircraft are operated privately under rental contract. France has given large subsidies. Canada is operating under approximately the International Code and had nearly 500 licenses in force last fall."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1924

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total revenues, Maintenance of way and structures, Equipment, Traffic, Trans-Operating expenses, General, Total, Operating ratio, Net from railway, Operating income (or loss), Net after rentals, Net after rentals 1919.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage carried during period, Freight, Passenger, Operating revenues, Total operating revenues, Way and equipment structures, Maintenance of equipment, Traffic, Transportation, General, Total, Operating ratio, Net from way operations, Operating income (or loss), Net after rentals, Net after rentals.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—Continued

Table with columns: Name of road, Average mileage operated, Freight, Passenger, etc. (Operating revenues), Maintenance of way and equipment, Traffic, Transportation, Total, Operating expenses, Net operating income, Net after rentals, Net after interest.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Total structures, Maintenance of way and equipment, Traffic, Total, Operating expenses, Net from operations, Operating (or loss), Net after rentals, Net after rentals 1920.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated per year, Freight, Passenger, Total revenue, Operating expenses, Net from operations, Operating income, Net after rentals, Net after taxes. Rows include various railroads like Great Northern, Great Western, Great Northern & Pacific, etc.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues.			Operating expenses.			Total.	Operating ratio.	Net from operating (or loss).	Net after rentals.
		Freight.	Passenger.	(inc. misc.)	Traffic.	Trans- portation.	General.				
Houston, East & West Texan.....	191	\$188,094	\$249,356	\$78,591	\$46,688	\$17,075	\$18,200	\$794,000	109.90	\$24,615	\$81,941
12 mos.	191	213,660	287,500	89,690	51,608	19,273	20,612	850,000	85.50	33,971	148,707
*Louisiana Western.....	207	213,660	332,750	110,331	245,704	14,916	2,422,302	4,830,824	127.10	40,932	114,015
12 mos.	207	2,993,533	1,129,911	4,387,857	1,072,642	136,251	3,496,354	8,496,285	79.70	891,663	525,564
*Morgan's L. & T. R. R. & S. S. Co. Dec.	400	459,701	127,955	685,831	95,979	24,624	221,538	344,530	123.00	-157,572	-289,925
12 mos.	400	6,232,200	1,901,760	8,759,560	1,888,531	216,610	3,668,456	8,561,561	97.40	228,059	633,356
Texas & New Orleans.....	507	670,309	1,600,773	878,254	3,704,447	18,450	4,519,666	1,070,132	121.80	-191,878	-576,526
12 mos.	479	6,462,066	1,846,943	8,804,744	2,081,383	2,373,530	3,421,625	8,723,565	89.60	79,183	-639,666
Spokane & International.....	165	1,057,714	184,275	1,300,660	288,579	113,841	36,856	441,197	74.00	338,115	245,728
12 mos.	549	4,573,330	1,143,927	6,663,319	1,040,947	422,660	70,407	390,760	59.80	866,559	1,346,508
Spokane, Portland & Seattle.....	519	5,426,615	1,831,501	7,959,290	896,899	1,071,655	168,221	2,681,328	64.30	2,638,811	4,383,682
Tennessee Central.....	292	1,060,036	467,399	1,668,878	423,239	43,547	4,939	10,016	118.10	-30,547	-45,662
12 mos.	292	1,585,770	605,339	2,388,348	591,082	503,699	58,722	1,239,548	105.80	-135,615	-179,538
Term. R. Assn. of St. Louis.....	37	.....	.....	4,352,866	1,028,144	491,852	1,189	1,618,941	71.40	1,294,440	1,888,824
12 mos.	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East St. Louis Connecting.....	3	.....	.....	116,734	13,020	6,406	367	59,397	71.60	34,368	5,304
12 mos.	3	.....	.....	1,598,645	219,770	76,116	4,188	748,411	60.78	59,484	34,631
St. Louis Mchs. Bridge Term. Dec.	9	.....	.....	3,658,660	56,760	285,465	11,799	1,647,747	79.00	767,461	44,828
12 mos.	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis Transfer.....	6	.....	.....	81,005	10,194	3,533	216	29,738	56.70	35,059	17,189
12 mos.	1,955	2,090,982	6,691,587	3,078,348	4,455,278	47,777	1,069,567	9,343,379	127.80	855,001	900,379
Texas & Pacific.....	12 mos.	1,951	24,346,031	8,696,559	35,600,474	5,748,559	8,404,106	1,263,504	84.70	5,462,008	2,832,148
Toledo, Peoria & Western.....	247	103,899	58,270	163,434	24,329	42,777	5,743	7,849	64.30	57,589	36,738
12 mos.	454	721,519	300,131	785,990	147,948	204,504	19,196	322,759	90.50	74,330	129,869
Toledo, St. Louis & Western.....	12 mos.	454	8,737,449	3,653,358	9,503,970	1,531,323	1,966,428	243,932	3,383,736	194,300	1,355,565
Trinity & Brazos Valley.....	368	1,142,166	245,829	3,501,011	653,700	615,888	35,996	1,349,260	121.40	2,149,622	2,944,668
12 mos.	128	36,993	20,308	105,513	17,361	29,489	1,820	64,522	115.40	-16,260	-28,362
Ulster & Delaware.....	12 mos.	128	846,016	537,396	1,135,501	237,226	277,805	917,667	92.00	137,885	12,430
Union Pacific.....	3,665	5,829,178	1,294,353	3,369,448	1,031,187	1,664,495	102,228	2,669,044	84.20	52,975	70,281
12 mos.	3,622	84,377,064	19,438,055	114,733,971	33,633,971	47,877,418	4,777	6,933,319	79.80	706,398	624,926
Union Short Line.....	2,366	2,125,123	2,821,855	2,868,188	409,092	520,852	52,346	975,145	73.90	745,395	688,991
12 mos.	2,360	27,901,720	6,068,743	36,834,262	5,909,264	6,894,833	526,899	11,923,696	74.40	9,481,063	6,020,095
Oregon-Wash. Ry. & Nav. Dec.	2,218	1,685,513	465,545	2,486,000	509,673	376,854	55,032	1,189,458	92.40	187,890	36,241
12 mos.	2,222	20,849,206	6,240,256	29,818,740	6,242,811	5,009,591	710,389	12,620,757	81.50	3,241,162	1,041,422
St. Joseph & Grand Island.....	258	2,798,753	35,270	2,590,391	37,957	28,363	2,407	110,194	97.00	436,286	223,940
12 mos.	258	2,798,753	35,270	2,590,391	37,957	28,363	2,407	110,194	97.00	436,286	223,940
Union of Pennsylvania.....	45	.....	.....	702,817	44,720	211,132	98	318,499	82.50	122,681	-161,946
12 mos.	45	.....	.....	9,435,212	741,476	2,884,977	2,368	4,934,726	81.70	7,246,807	2,115,352
Utah.....	104	.....	.....	1,233,534	7,617	1,233,534	4,705	403,351	83.26	203,199	86,654
12 mos.	104	1,922,088	7,617	1,233,534	7,617	1,233,534	4,705	403,351	83.26	203,199	86,654
Virginian.....	326	932,359	76,555	1,165,946	264,294	333,020	9,360	439,045	89.50	122,599	66,050
12 mos.	326	15,631,951	956,830	18,047,337	3,968,022	5,136,848	112,769	7,701,928	82.50	3,152,407	1,155,720
Wabash.....	2,472	45,688,528	9,931,246	61,927,692	9,210,291	11,843,320	1,341,728	25,726,606	75.30	8,211,523	6,846,802
12 mos.	2,472	45,688,528	9,931,246	61,927,692	9,210,291	11,843,320	1,341,728	25,726,606	75.30	8,211,523	6,846,802
Western Maryland.....	804	1,235,576	1,406,716	2,228,988	362,241	20,531	465,085	57,467	74.60	157,450	300,752
12 mos.	804	1,235,576	1,406,716	2,228,988	362,241	20,531	465,085	57,467	74.60	157,450	300,752
Western Pacific.....	1,041	586,129	1,114,612	1,775,210	313,903	165,565	6,390,521	296,478	129.80	3,231,279	4,377,538
12 mos.	1,016	8,972,847	2,333,282	12,100,162	2,169,348	2,339,158	378,927	4,581,962	86.10	1,674,942	851,959
Wheeling & Lake Erie.....	511	1,708,570	79,295	938,199	109,122	218,327	18,996	451,519	89.90	474,769	32,028
12 mos.	511	12,708,910	952,334	14,770,247	1,910,291	3,401,301	183,697	5,670,632	79.00	3,104,227	2,035,748
*Yazoo & Mississippi Valley.....	381	1,125,604	447,888	1,771,044	281,610	703,355	25,055	457,102	90.30	1,071,883	97,852
12 mos.	1,351	15,385,060	4,284,094	20,759,409	4,845,961	6,000,996	303,953	8,485,636	89.20	2,232,568	876,000

* Tentative report.
 ** Estimated report.
 † Corrected report.
 ‡ Preliminary tentative statement.

Traffic News

The Norfolk & Western has reopened its commercial office in Little Rock, Ark., with F. W. Hampson in charge as commercial agent.

The Akron Traffic Association, Akron, Ohio, has elected the following officers for 1922: president, E. W. Swartz; vice-president, E. L. Morgan; treasurer, C. M. Groninger; secretary, H. L. Sovacool; directors, C. W. Meacham, F. M. Evans, Jr., E. J. Stubbs and H. X. Knox.

Coal Production Increasing

The total output of bituminous coal during the week ended February 11 is estimated by the Geological Survey at 10,326,000 tons, an increase of 620,000 tons over the preceding week. Except for the latter part of October when consumers were stocking up in anticipation of a possible railroad strike, this was the largest output attained in any week in the coal year 1921-22.

Time for Filing Overcharge Claims Extended

The House on February 20 passed the bill to extend the time for filing straight overcharge claims against the Railroad Administration from March 1, 1921, as provided in the transportation act, to September 1, 1922, and to extend the time for filing suits on awards of reparation by the Interstate Commerce Commission until one year from the date of the commission's decision. The bill had been passed by the Senate but an amendment was added in the House to allow a longer time and the Senate on February 21 passed the bill as amended in the House.

Freight Traffic in 1921

Traffic statistics filed with the Interstate Commerce Commission show that during 1921 there was a falling off in the freight traffic of the country of approximately 23.3 per cent compared with the volume the previous year. The decline was the greatest both relatively and absolutely that the railroads of the United States have ever suffered in the course of a single year. The net ton miles, totaled 344,167,000,000 or 104,390,000,000 less than in 1920.

The greatest decrease was in the Eastern district where the net ton miles for the year amounted to 172,394,000,000, a reduction of 55,906,000,000 or 24½ per cent. The Western district showed a reduction of 22½ per cent, or 36,910,000,000 below 1920; and the Southern district 20.6 per cent or 44,729,000,000 in 1921 compared with 56,303,000,000 in 1920.

Reports for December from all but one road, the Detroit, Toledo & Ironton, showed a reduction in traffic on the railroads of the nation of 25.9 per cent compared with the same month the year before total 25,707,000,000, or 8,963,000,000 less than December, 1920.

The compilations are based on reports from carriers representing a total length of road of 233,459 miles.

THE SAFETY REPORT of the Chicago Great Western for 1921 shows that no passenger was killed on the entire system; and not an employee was killed on the Western division. There was no reportable injury of an employee on the Western division in 120 days, and none on the Northern division in 118 days.

APPOINTMENT OF A RECEIVER for the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers was asked in a petition filed by the Bacon Brothers Company of Toledo, Ohio, in the federal court at that city on February 16, the receiver to take possession of all property of the brotherhood, including funds in the Brotherhood of Locomotive Engineers' Co-operative Bank. This application is supplementary to the original complaint filed several months ago, in which the union was sued for breach of contract to the amount of several hundred thousand dollars in damages.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until June 10, the operation of proposed reductions varying from 1½ to 4 cents per 100 lbs. in the rates on grain from points on the Illinois Central in Illinois to New Orleans, for export to Europe.

A hearing on advances in cotton rates has been scheduled for March 13, before Examiner Cassidy, of the Interstate Commerce Commission, at Memphis, Tenn. It involves increases in cotton rates affecting all points in the Mississippi Valley. The carriers proposed a rate of \$1.37 per 100 lb. from Memphis, to Boston, Mass., and other eastern points, and of 90 cents from Memphis to New Orleans, La. The present rate is \$1.12 from Memphis to Boston and 69 cents from Memphis to New Orleans.

Investigation of Rates on Bunker Coal

The commission on its own motion has instituted an investigation into rates on bunker coal, from all points of origin to all ports of the United States. Many of the carriers serving Atlantic ports make lower rates on coal to such ports for use in bunkering vessels than they make on coal to the same ports for local use. The investigation will deal primarily with the lawfulness and propriety of the practice of discriminating in such rates. A hearing has been scheduled for March 20, at Washington, before Examiner W. P. Bartel.

Investigation of Freight Rates in Southern Territory

At the request of carriers operating within southern territory and of many interested shippers, the commission on its own motion has instituted an investigation of the class rates applicable in interstate commerce to, from and within southern territory.

The rates in question, in many instances, differ materially for substantially similar hauls on like classes of traffic and the relationship to first class of the rates on the lower classes varies greatly in many cases. The investigation is favored by most of the commissions of the southern states. The carriers have been working upon a revision of the rates for many months. Intrastate rates have not been included within the scope of the investigation, but the commission in reaching conclusions with respect to the interstate rates will consult with the state commissions and is confident of their co-operation.

State Commissions

The Minnesota Railroad and Warehouse Commission is preparing to file a petition of intervention with the Interstate Commerce Commission in the case of the Sioux City Live Stock Exchange vs. the Chicago, St. Paul, Minneapolis & Omaha, and the Great Northern. It is claimed that there is discrimination against the state of Iowa resulting from the Minnesota commission's order allowing live stock shippers to be carried back to their homes free. This is not permitted in Iowa and shippers in that state are taking advantage of Minnesota's free fare inducement to take their stock to the South St. Paul market.

Personnel of Commissions

George R. Edwards, member of the state railroad commission of Mississippi, has resigned.

Court News

Provisions for Handholds and Sill Steps

The New York Appellate Division holds that the requirements of the Safety Appliance Act of 1893 as to handholds, and of the act of 1910 as to sill steps, were not suspended by the Interstate Commerce Commission's orders of March 13, 1911, and November 2, 1915—Green v. L. V., 191 N. Y. Supp., 489.

Foreign Railway News

Dutch Secure Chinese Bridge Contracts

LONDON.

The Netherland Syndicate, Ltd., has been authorized by the Chinese government to place orders in Holland for the construction of 150 railway bridges of various spans. These bridges are for the eastern part of the Lunghai Railway which is now under construction.

West Australian to Build Locomotives

LONDON.

The West Australian government will shortly be in the market for the supply of drills, milling machines, plate rolls, grinders and other equipment to the value of £20,000 (or \$97,200 at the normal rate of exchange), to enable the railway workshops to undertake the construction of locomotives.

Electrification in Czecho-Slovakia

LONDON.

A Reuter cable states that plans for railway electrification in Czecho-Slovakia extend over a period of 20 years. A great saving in coal is expected. The first lines to be electrified are those converging on Prague with a radius of 30 miles in order to avoid the transport of coal to the capital.

Deplorable Condition of Russian Railroads

LONDON.

The Russian railways are in a deplorable condition owing to the lack of supplies. On January 1, 1917, the serviceable mileage was approximately 44,000. On January 1, 1921, it was only about 29,000 miles. The number of locomotives in good condition on January 1, 1917, was 17,012, of which 36 were new. On January 1, 1921, the number was 2,921, of which 35 were new. The percentage of unserviceable locomotives on January 1, 1917, was 16.8 per cent. On January 1, 1921, it was 64.2 per cent.

Danish Railway Rate Reduction Proposed

LONDON.

Although the Danish State Railways show a deficit for the half year ending October, 1921, the Danish Traffic Minister has introduced a bill reducing freight rates from between 12½ per cent to 33½ per cent. Passenger rates will be reduced by about 10 to 12 per cent for the third class and the new second class fares will be approximately 80 per cent higher than in 1914. Zone rates will be maintained, but reduced for longer distances. The extra charge for express train tickets will be reduced to less than half of the present charge.

Unbusinesslike Accounting on Belgian State

The Belgian State Railway Administration has decided to change its accounting methods, according to the Wall Street Journal. Heretofore it has been the custom to begin each year with a clean slate. Deficits or surpluses were not carried over. Consequently the State Railway could suffer a loss one year and make a slight profit the next, and when the statement for the second year was given out it would appear that the railways were in good financial shape. Hereafter the railways will be expected to justify themselves over a period of years.

Mexican Government Wants Southern

Pacific to Build Line

Amado Aguirre, secretary of the Department of Communications and Public Works of Mexico, says that the government is anxious to have the Southern Pacific of Mexico complete its branch line between Tepic and La Quemada, as by establishing a junction at Orendain it would connect with the National Railways of Mexico and form a direct line from Mexico City to

Nogales, Sonora. This branch may be extended later via Plan de Barrancas or the Pajarito range, but it is probable that the first point will be chosen. Notwithstanding the fact that the canyons at Plan de Barrancas are deeper, it is probable that this route will be selected as the line will thereby be shortened a number of miles and several curves avoided, it is stated.

It is announced that the Southern Pacific is willing to extend this branch in view of the benefit to be derived from the greater volume of freight and passenger business, which would connect with the National Railways of Mexico, but that this is impossible at present, due to extensive repairs on the line now in operation, made necessary by the deterioration suffered during the revolutionary period.

Mexico Defends Holding of Interoceanic

In response to the recent formal and emphatic demand of the British shareholders of the Interoceanic Railroad that that property be returned to them by the Mexican government, the official explanation is made in Mexico City that under the original concession granted for the construction and operation of this road it was expressly provided that the government could take it over in time of military necessity. This was done during the revolutionary period and it is asserted that the "military necessity" still exists, not only as to the operation by the government of the Interoceanic but of the other former individual properties that now comprise the National Railways of Mexico. The authoritative statement also is made here that "the government is excused from paying damages and indemnity, accrued during the revolutionary period until a final liquidation and return of the railroad is effected."

According to a statement issued by Manuel Padres, chairman of the board of directors of the National Railways of Mexico, the Interoceanic is not operated under lease by that company. He said that the Mexican government owns 55 per cent of the stock of the Interoceanic Railway and that the action of the minority stockholders at their meeting in London is of no legal effect.

New Working Rules in Germany

LONDON.

The new regulations regarding working hours on the German railways have been agreed to, according to Modern Transport (London). In principle they maintain the eight-hour day, but at the same time aim at a more rational and economic use of all the employees. The scheme deals with the actual working hours, the daily rest time and the number of rest days. It points out that the conditions and degrees of employment within the railway service are widely different from those generally prevailing in industry and other fields of employment and it differentiates between hours of actual work and hours when men are required only to be present or available, but are not doing any work. As the nature of the latter class of hours varies materially, rules have been drawn up as to whether and to what extent this time of being in readiness can be counted as part of the 8 working hours.

This should make it possible in some cases to have only two shifts for 24-hours instead of three. In other words the eight-hour day should be transformed into eight working hours. The "service shift," or the aggregate of the actual hours of work including the time the men are to be in readiness, the pauses and the service trips, is not to exceed 15 hours, but the duration is subject to various circumstances and regulations, and the maximum will only come into operation when a minimum of service or work is required from the men. The minimum hours of rest if spent at home are to be eight consecutive hours and 10 hours for the train service men. The number of rest days will not be less than 52 during a year, each of at least 32 consecutive hours. Under circumstances of extra heavy traffic or other emergencies the railways are at liberty to exceed the regular working time of any of their employees.

A BILL has been introduced in the legislature of Kentucky seeking to give to the Railroad Commission of that state the same power over intrastate transportation that the Interstate Commerce Commission has over interstate affairs.

Equipment and Supplies

Equipment Program of the St. Louis-San Francisco

The St. Louis-San Francisco has authorized the expenditure of \$7,766,000 in 1922 for new equipment, the repair and improvement of old equipment and other improvements included in the amount is \$1,260,000 for 8 steel coaches, 6 steel chair cars and a 150-ton steam derrick; \$360,000 for rebuilding 250 steel coal cars; \$300,000 for rebuilding 9 locomotives; \$1,431,000 for bettering existing equipment; \$205,000 for new power plants; \$328,000 for rock blasting; \$280,000 for permanent concrete bridges; \$46,000 for new fences; \$35,000 for new water-treating plants; and \$87,500 for improvement of coaches in branch line service. All mail and mail apartment cars are to be entirely rebuilt; baggage cars are to be improved; 7,000 freight cars rebuilt; 1,150 furniture and vehicle cars to be improved; and electric lights to be installed in coaches on branch lines, and steel underframes to be placed in all wooden coaches.

Locomotives

MITSUI & Co., New York City, are inquiring for 11 tank locomotives, 2-4-2 type; also for 2 internal combustion locomotives adapted for kerosene, of 30 in. gage. All these locomotives are for service in Japan.

THE SOUTHERN RAILWAY is rebuilding 25 consolidation type and 20 Pacific type locomotives in its own shops. These locomotives will be equipped with superheaters and Chambers throttle valves. Outside valve gear will be added to the locomotives not yet equipped with this device.

Passenger Cars

THE DELAWARE & HUDSON is asking for prices on 15 coaches and 2 buffet cars.

THE GREAT NORTHERN, noted in the *Railway Age* of November 26 (page 1068), as inquiring for 35 passenger cars has withdrawn this inquiry.

CENTRAL OF NEW JERSEY.—This company, which was reported in the *Railway Age* of February 11 as inquiring for 25 passenger cars, 10 combination passenger and baggage and 10 baggage cars, has ordered 25 coaches from the American Car & Foundry Company; also 10 cars from the Bethlehem Shipbuilding Corporation, Harlan Plant, and 10 from the Standard Steel Car Company.

Freight Cars

THE ATLANTIC COAST LINE is inquiring for 100 Steel phosphate cars.

THE PEORIA & PERIN UNION is inquiring for from 25 to 35 gondola cars.

THE CENTRAL OF BRAZIL, is inquiring through the car builders for 10 freight cars.

THE ATLANTIC PETROLEUM COMPANY, 233 Broadway, New York City is inquiring for 100 tank cars, of 4,000 gal. capacity, for service in Italy.

THE SOROCABA RAILWAY (Brazil) is inquiring through the car builders for 300 tank cars, of 12 tons capacity and for 200 gondola cars, of 28 tons capacity.

THE CERRO DE PASCO COPPER CORP., 15 Broad Street, New York City, is inquiring for from 20 to 40 steel concrete cars, also for 4 all-metal hopper cars, of 60 tons capacity.

THE PACIFIC FRUIT EXPRESS, reported in the *Railway Age* of January 21, as inquiring for 3,300 refrigerator cars, has ordered 200 of these cars from the Standard Steel Car Company.

THE UNITED SALT COMPANY, New York City, reported in the *Railway Age* of January 28, as inquiring for 50 freight cars, has ordered 50 tank cars, of 20 tons capacity, from the Magor Car

Company. These cars are for use on the Tela Railway, Honduras.

THE GREAT NORTHERN, reported in the *Railway Age* of November 19, 1921, as inquiring for 500 refrigerator cars, has ordered this equipment from the General American Car Company; also 500 all steel gondola cars from the Pressed Steel Car Company, and 500 stock cars from the Pullman Company.

Iron and Steel

THE CHESAPEAKE & OHIO is inquiring for 21,000 tons of rail, including 3,000 tons for the Hocking Valley Railway.

THE CHICAGO UNION MAIL TERMINAL has ordered 370 tons of conveyor and structural steel supports from the Pittsburgh Bridge & Iron Company.

THE BANGOR & AROOSTOOK recently placed an order with the Bethlehem Steel Company for 2,000 tons of 80-lb., open hearth steel rails, with angle bars to fit.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, March 3, for 23,000 tons of fabricated steel, for the proposed bridge over the Hudson river at Castleton, N. Y.

Track Specialties

THE HARBOR DEPARTMENT OF LOS ANGELES, CAL., will open bids on March 3, for miscellaneous supplies including 30 frogs, 30 switches, 30 stands and other track material.

THE CINCINNATI NORTHERN is inquiring for 300 kegs of track bolts and 10,000 tie plates, for which bids are to be submitted to W. J. Hiner, Cincinnati, Ohio, on or before 12 o'clock noon of February 27.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 2,975 kegs of track bolts, 81,200 tie plates, 300,000 galvanized tie dating nails, bids for which are to be submitted to W. J. Hiner, Cincinnati, Ohio, on or before 12 o'clock noon February 27.

Machinery and Tools

THE RICHMOND, FREDERICKSBURG & POTOMAC has placed orders for some tools for the repair of elliptical springs.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, March 6, on its requirements of track bonds; the furnishing, delivery and erection of one 2,000 k.w. synchronous motor generator set, appurtenances, switchboards, wiring and work of such character.



Grand Central Terminal, New York

Supply Trade News

The **Eymon Crossing Company**, Marion, Ohio, has opened an eastern office in Boston, Mass., in charge of **G. T. Wiswell**, formerly with the New York, New Haven & Hartford.

The **Ryan Car Company** has increased its capital stock from \$2,500,000 to \$6,000,000, by the issuance of 35,000 shares of additional common stock with a par value of \$100 per share.

The **Barnes Railway Rail Brace Company** has been organized at Willis, Tex., by **M. E. Barnes** of that city; **Mack Hannah**, of Port Arthur, Tex., and **C. H. Long**, San Antonio, Tex.

T. J. O'Meara, office and construction engineer and formerly assistant signal engineer of the New York Central at Albany, N. Y., has entered the service of the **Hall Switch & Signal Co.**, Garwood, N. J., as electrical engineer, effective February 15.

Pendleton E. Lehde has been appointed a special representative in the state of Louisiana and the southern part of Mississippi of the **Roller-Smith Company**, New York City. Mr. Lehde's headquarters are at 609 Whitney central building, New Orleans, La.

C. L. Dewey, formerly associated with the Dewey Cement-Gun Company, and the Traylor-Dewey Contracting Company, Allentown, Pa., is now with the **Cement-Gun Construction Company**, Chicago, and will devote his time to the development of cement-gun contract work.

General Railway Signal Company

For the year ended December 31, 1921, the General Railway Signal Company reports earnings of \$146,575, as compared with \$748,358 for 1920. The surplus December 31, 1921 was \$554,629, as against \$975,684 at the close of 1920.

Referring to the recent automatic train control order of the Interstate Commerce Commission, the annual report says:

"For more than ten years your company has been engaged in the development of both automatic train stop and automatic train control devices and has made and patented many valuable inventions, and has by purchase and license acquired rights under many other patented inventions in these fields. We are, therefore, in an excellent situation to furnish high grade, dependable devices of the required character as well as the block signaling systems in conjunction with which they should be employed."

Pressed Steel Car Company

The earnings of the Pressed Steel Car Company for the year ended December 31, 1921, after deducting for depreciation, obsolescence, etc., were \$681,906. In 1920 the company reported net profits of \$2,531,805. Dividends on the common stock were reduced from \$1,000,000 in 1920 to \$250,000 in 1921. On the preferred stock \$875,000 was paid in both years, making the total amount paid in dividends \$1,125,000 in 1921, as compared with \$1,875,000 in 1920. The working capital—surplus and undivided profits—on December 31, 1921, was \$14,677,900.

The general balance sheet shows inventory valued at \$2,939,771, against \$11,237,622 at the close of 1920. Cash on hand was \$1,497,192, against \$2,954,137, and notes and accounts receivable \$7,525,167, against \$9,052,208. Accounts and notes payable were reduced from \$14,080,724 to \$3,663,915.

The annual report signed by President F. N. Hoffstot says in part:

Your company's business is so indissolubly linked with the business of the railroads that anything that affects them affects us. Before the war the railroads were about adjusted to new conditions resulting from the supervision of their business by the Interstate Commerce Commission and would have replaced their depleted equipment had it not been necessary to bend their energies first to help meet the extraordinary demands from abroad and then

after the United States entered the war, to support our war program. Then quickly followed government control of the railroads, resulting ultimately, by the granting of increased wages, in the entire overturning of the rules for employment, established as a result of many years of experience. Since the armistice, one by one the pegs supporting this government protection have been removed, but unfortunately this action was not uniform or intelligent.

We are often asked the question, "When will the railroads begin buying?" When they have difficulty in taking care of their overhead charges, let alone setting aside anything for surplus, and must contend with high costs and a reduced volume of traffic, they cannot be expected to incur liabilities for the purchase of rolling stock, particularly at a time when a large part of the equipment they own is not in service, nor will they have a volume of traffic to produce increased revenues unless the manufacturers along their lines are operating successfully.

When car business does revive there will be, in addition to the work we have had in former years, considerable "heavy repairs," as large cars built 20 years ago are only now beginning to need substantial repairs, and few railroads are fitted to do this work as economically as car shops.

Indications point to a large demand for passenger cars, as for years few have been bought, and while this is not an important factor with us, it will help. During the year we took a substantial order for China, which we hope to complete early this year.

Obituary

William C. Sargent for 22 years secretary and also a director of the Chain Belt Company, Milwaukee, Wis., died on February 5. Mr. Sargent was born at Troy, N. Y., on February 2, 1849. In 1871 he went to St. Paul, Minn., and in 1900 became secretary and later a director of the Chain Belt Company, Milwaukee. He was also a director of the Federal Malleable Company, West Allis, Wis.

Joseph E. Schwab, formerly (from 1902 to 1904), president of the American Steel Foundries Company, at New York, died at his home in New York City on February 17, at the age of 57. He was born at Loretto, Pa., and joined the Carnegie Company two years after his brother, Charles M., became identified with it and since that time they were closely associated in various business enterprises. Joseph Schwab served as an engineer in the Carnegie Company until 1894, when he became manager of its Duquesne works. When the United States Steel Corporation was formed, he left the Carnegie Company to become assistant to his brother, the president of the corporation. Two years later he became president of the American Steel Foundries Company and, after a few years, he retired from active participation in industrial properties.

Trade Publications

GASOLINE POWER UNITS.—The Buda Company, Chicago, has issued bulletin No. 388, describing a four-cylinder gasoline power plant, which it has recently developed for use in driving electric generators, arc welding sets, triplex or other types of pumps, hoists, concrete mixers, air compressors and for similar uses in machine shops, etc.

ELECTRIC ENGINE COALERS.—The Robert & Schaefer Company, Chicago, has just issued a four-page folder illustrating locomotive coaling equipment involving the use of an inclined elevator. The descriptions cover plants without elevated storage where the cars and the track hopper afford the storage, the coal being dumped directly from the elevating bucket into the locomotive tender.

GENERATOR COOLING APPARATUS.—The B. F. Sturtevant Company, Boston, Mass., has issued Bulletin No. 246 describing and illustrating in detail its generator cooling apparatus. A psychrometric diagram showing the percentage of relative humidity has also been included in the bulletin which contains 27 neatly arranged pages.

COALING STATION EQUIPMENT.—The Howlett Construction Company, Moline, Ill., has issued a 25-page, loose-leaf booklet, describing the types of coaling stations it erects, together with its line of coaling station equipment. This equipment consists principally of coal gates and aprons, electric hoists, hoisting buckets, car pullers, etc., all of which are illustrated by half-tones and line drawings.

Railway Construction

AMERICAN RAILWAY EXPRESS.—This company is constructing a new brick and concrete station and office building at Sweetwater, Tex.

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of February 11 (page 401) as having closed bids for the construction of a branch line from Santanta, Kan., to a point 55 miles westward, the cost of which was estimated at \$1,400,000, has awarded the contract for this work to Scott & White, St. Louis, and construction will be started at an early date. The same company will construct four small store department buildings at Topeka, Kan., estimated to cost \$15,000. A new bridge will be constructed over Stranger Creek, a short distance northwest of Potter, Kan. One-story brick section houses will also be constructed at Strong City, Kan., Cherryvale and Ottawa Junction, estimated to cost approximately \$7,500 each.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a steel coal chute at Bridgeport, Tex., estimated to cost about \$30,000. The same company contemplates the construction of a two-story brick freight house at Omaha, Neb., estimated to cost \$70,000, and a one-story brick passenger station at Graham, Tex., estimated to cost \$25,000.

ELGIN, JOLIET & EASTERN.—This company, in conjunction with Chicago & Joliet Electric, and the state highway department of Illinois contemplates the construction of a viaduct over the tracks at East Cass street, Joliet, Ill.

ILLINOIS CENTRAL.—This company closed bids on February 23, for the installation of a pipe line at Centralia, Ill., to extend from the city water main in that city to the company's yards, a distance of about 3 miles.

ILLINOIS CENTRAL.—This company contemplates the construction of a freight and passenger station at Clarksdale, Miss., estimated to cost \$250,000, of which the city and commercial organizations at that point will bear a proportion of the expense.

INTERNATIONAL & GREAT NORTHERN.—This company has been requested by the state railroad commission of Texas to rebuild its bridge over Greens Bayou, near Aldine, Tex.

KANSAS & OKLAHOMA SOUTHERN.—This company has been authorized by the Interstate Commerce Commission to construct a line from Caney, Kan., to Vinita, Okla., a distance of 61 miles, and a further extension from Vinita, Okla., northwest for a distance of about 10 miles into the coal mining district of that state.

LOS ANGELES & SALT LAKE.—This company will construct a new freight station at Long Beach, Cal., and has applied to the railroad commission of that state for permission to construct standard gage tracks on certain streets in that city for the purpose of serving the proposed station.

LOUISIANA RAILWAY & NAVIGATION.—This company, which was noted in the *Railway Age* of January 28 (page 303) as having preliminary plans prepared for the construction of a passenger station at New Orleans, La., has petitioned the railroad commission of that state and the city council of New Orleans for permission to extend its tracks in that city and to construct the station at Gerod and South Romfort streets. The city has demanded that the cost of the station must not be under \$125,000, and also that the municipal government shall not be held liable for injury to private property in that neighborhood.

MINARET & WESTERN. This company has awarded a contract to the Meritt Frazer Company,ureka, Cal., for the construction of a bridge over the San Joaquin river at Friant, Cal., the cost of which is estimated at \$60,000. The structure will be 1,300 ft. in length of which 400 ft. will be of steel construction.

MONTECALM, ST. PAUL & SALT SPRING.—This company contemplates the construction of new terminal facilities at Park Falls, Wis. A four-house repair and machine shops, car sheds

and other necessary buildings will be constructed at that point at an estimated cost of \$500,000.

NEW YORK CENTRAL.—This company is contemplating the construction of a steel highway bridge, 125 ft. in length, near Syracuse, N. Y., to carry the Newark-Lyons highway over its tracks, eliminating a grade crossing.

NEW YORK, NEW HAVEN & HARTFORD.—This company in applying to the Interstate Commerce Commission for a government loan, including \$3,000,000 for additions and betterments, lists the following among other proposed expenditures for the coming year: Rail and other track material, \$700,000; additional main tracks, \$100,000; additional yard tracks and sidings, \$500,000; signals and interlocking, \$300,000; shop buildings, engine houses, etc., \$150,000; electric power plants, etc., \$600,000; improvements to freight cars, \$150,000; and improvements to locomotives, \$100,000.

PERE MARQUETTE.—This company is preparing plans for the construction of new shops at Wyoming (Grand Rapids), Mich., estimated to cost \$1,400,000. This company will also construct a swing bridge over the Saginaw river at Saginaw, Mich., and a bascule bridge over the Black river at Port Huron, Mich., estimated to cost \$700,000. The Flint Belt line which was started last year will be completed at once at a total cost of \$650,000.

PHILADELPHIA & READING.—This company has awarded a contract to the Bader Construction Company, Atlantic City, N. J., for the construction of a third track between Haddon Heights, N. J., and Magnolia, a distance of 2.7 miles. Creosoted ties, stone ballast and 100-lb. rail will be used. At each end of the third track section an interlocking plant will be installed.

RAILWAYS ICE COMPANY.—This company is constructing a one-story brick icing station, 275 ft. by 100 ft., at Clearing, Ill., at an estimated cost of \$350,000. It will be completed by April 15, and operated by the above company for the Belt Railway of Chicago.

SALT LAKE & UTAH.—This company has been authorized by the Public Utilities Commission of Utah to construct an extension to its line from Springville, Utah, into the Uintah basin, the work to be completed within two years.

SAN ANTONIO & ARANSAS PASS.—This company has under consideration improvements and betterments to its property at Waco, Tex., estimated to cost between \$30,000 and \$40,000. No definite decision has been made as to when the work will be undertaken.

ST. LOUIS-SAN FRANCISCO.—This company will spend \$1,691,000 during the current year for track extensions and the replacement of rails. A second main track will be constructed between Spring Hill, Kan., and Paola, a distance of about 13 miles, and between Windsor Springs, Mo., and Valley Park, a distance of approximately 5 miles; \$673,000 will be spent for grade revision work between Crocker, Mo., Garnsey, and St. John; \$280,000 for new power plants; and \$25,000 for water treating plants. This same company will receive bids until March 1, for the remodeling of its Harvey eatinghouse at Sapulpa, Okla., which is estimated to cost approximately \$65,000.

TRINITY & BRAZOS VALLEY.—This company will reconstruct a station at Donie, Tex., and one at Coolidge, both of which were recently destroyed by fire.

APPOINTMENT of a receiver for the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers was asked in a petition filed by the Bacon Brothers Company of Toledo, Ohio, in the federal court of that city on February 16, the receiver to take possession of all property of the brotherhood, including funds in the Brotherhood of Locomotive Engineers' Co-operative Bank. This application is supplementary to the original complaint filed several months ago, in which the union was sued for breach of contract to the amount of several hundred thousand dollars in damages.

THE BOSTON & MAINE has decided to sell advertising space on passenger cars and in station buildings and has made a contract with George W. Roebing, advertising agent, of New York

Railway Financial News

BIRMINGHAM & NORTHWESTERN.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of first mortgage 6 per cent refunding bonds to refund an issue due March 1.

CHICAGO, PEORIA & ST. LOUIS.—Asks Authority to Issue Certificates.—The receivers have applied to the Interstate Commerce Commission for authority to issue \$335,000 of one-year certificates of indebtedness at 7 per cent.

DELAWARE, LACKAWANNA & WESTERN.—New Directors.—Samuel Sloan, P. R. Pyne, H. B. Spencer, R. C. Gasser and Frank Rysavy have been elected directors to succeed William Rockefeller, George F. Baker and H. S. Vanderbilt, who resigned recently, in accordance with the Interstate Commerce Commission's ruling on interlocking directorates, and H. A. C. Taylor and M. Taylor Pyne, deceased.

DENVER & RIO GRANDE.—Perkins Committee Criticizes Reorganization Plan.—The committee headed by James H. Perkins, president of the Farmers' Loan and Trust Company, representing the first and refunding 5 per cent bonds, has issued a statement to holders of these securities, setting forth the committee's reasons for opposing the Western Pacific's reorganization plan of the Denver & Rio Grande. The Perkins committee opposes forcing through any plan without proper opportunity for investigating its fairness or for determining whether better terms are available from others than the Western Pacific. The committee has extended to April 1 the time limit for deposit of bonds with the committee.

The statement of the Perkins committee says:

There is a large equity in the Denver & Rio Grande property which the Western Pacific plan does not recognize and it is believed that other proposals for reorganization can be obtained which are decidedly more favorable. For this reason bondholders who have deposited with the so-called Hammond committee should withdraw before February 27 to prevent the Western Pacific plan from going through by default. The Hammond committee has been in existence five years and during that time has been acting with the Western Pacific. On February 1 last the Western Pacific permitted default in the interest on the refunding bonds. They have chosen the moment to make the default (and the time of default is entirely a matter of their own choosing) when the Denver property has not as yet fully recovered from the serious Colorado flood damage of 1921 and when general railroad earnings are at the lowest point, in their endeavor to force the bondholders into accepting this plan by which the bondholders turn one-half of their holdings into preferred stock and permit a new mortgage ahead of the bonds.

ILLINOIS CENTRAL.—\$50,000,000 Preferred Stock Issue Planned.—The stockholders, at the annual meeting on April 19, will be asked to authorize an issue of \$50,000,000 preferred stock, to be sold at various times, for the purpose of electrifying the road's lines in Chicago, reconstructing its Chicago freight and passenger terminals and improving other property in that city. As the work which the issue will finance is expected to spread over a period of 18 years, according to the letter which President C. H. Markham sent to all stockholders describing the plan, the stock will be offered ratably to common stockholders. Those who do not care to subscribe will be given opportunity to dispose of their subscription rights.

President Markham's statement outlining the plans is in part as follows:

New capital will be required by the company principally for electrification of its lines within the City of Chicago, reconstruction of its principal passenger station and freight terminals there and improvement of lands acquired under the contract ordinance with that city passed July 21, 1919. The work is to be done within the next 18 years and is divided into various stages running over that period. The ordinance was accepted after much consideration and it is believed that the improvements contemplated will be productive and remunerative and will permit the use for railroad purposes of much valuable real estate of the company which otherwise would be practically useless.

The board of directors has decided that the financing necessary to carry out these improvements can best be done by issue of preferred stock. Increasing the amount of capital stock relative to bonded indebtedness increases safety, since thereby no addition is made to fixed charges which must be met. The effect should be to improve the credit of the company and enable it to borrow upon more favorable terms in the future if and when necessary for other purposes.

The preferred stock, if authorized by the stockholders, would be a high grade investment security, and should be readily salable as and when funds are needed. The directors do not think it practicable under present market conditions to issue more common stock.

The present amount of stock authorized is \$123,552,000, of which \$109,296,000 is outstanding and the present proposed aggregate increase is \$50,000,000 par value. It is not contemplated to issue this entire amount at this time, but that separate series will be issued over a period of years as the needs of the company shall require. The authority to issue the new

stock will be so framed as to enable the directors to take advantage of market conditions. Approval of the Interstate Commerce Commission is required by law to be given to each issue as it is made. As the preferred stock is issued it will be offered to the common stockholders ratably, and such stockholders as do not care to subscribe will be given the opportunity to sell their subscription rights. In this way the common stockholders will have an opportunity to benefit from whatever advantages may be given the preferred stock.

Principal features of the proposed plan are the following, subject, however, to such changes, additions or subtractions as the stockholders at the meeting may determine:

Far amount of preferred stock at any time shall not exceed one-half of the par amount of common stock at the time outstanding.

Preferred stock shall be preferred both as to dividends and assets; and in case of dissolution of the company preferred stock shall be entitled to receive the redemption price thereof before any distribution shall be made to the common stock.

The preferred stock may be issued from time to time as the board of directors shall determine in one or more series, all series being of equal rank, but differing as to terms in the respects hereinafter stated, as the board of directors shall determine.

The preferred stock shall be entitled to receive from the surplus or net profits of the company, in each fiscal year, dividends at such rate or rates, not exceeding 7 per cent per annum, as shall be determined by the board of directors in connection with issue of the series, respectively, and expressed in the preferred stock certificates, before any dividend shall be paid upon the common stock, but such dividends shall be non-cumulative.

For the election of directors and in all other matters, the holders of the preferred stock shall be entitled to full voting rights as stockholders of the company. The preferred stock or any series thereof may, if the board of directors so determines at the time of the issue thereof, be convertible into common stock within such period and at such rate, taking the preferred stock at par and the common stock at not less than par, as the board of directors shall determine at the time of the issue.

Board of directors may at the time of issuing preferred stock determine that it shall be subject to redemption as a whole at a premium which shall not exceed 15 per cent of par.

Ask Authority to Issue Bonds.—The Illinois Central and the Chicago, St. Louis & New Orleans have filed a joint application with the Interstate Commerce Commission for authority to issue \$1,924,000 of Illinois Central and Chicago, St. Louis & New Orleans joint first refunding mortgage 5 per cent bonds to reimburse the treasury of the Illinois Central for advances made from time to time for additions and betterments for the C., St. L. & N. E. The bonds are to be pledged from time to time, but are not to be sold.

LIVE OAK, PERRY & GULF.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a branch line from Murat Junction to Murat, Fla., 3.74 miles.

NEW ORLEANS, TEXAS & MEXICO.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$991,100 of first mortgage 6 per cent gold bonds to reimburse the treasury for expenditures for additions and betterments. The company had already secured authority for \$533,700 of these bonds which have not been issued, and it asks a new order authorizing the issue of \$457,400 additional.

NEW YORK, NEW HAVEN & HARTFORD.—Asks Authority to Extend Loan.—This company has applied to the Interstate Commerce Commission for authority to extend all or part of its outstanding European loan debentures, amounting to \$27,582,691, for three years from April 1, 1922, with interest at 7 per cent instead of 4 per cent as at present. The European loan was floated in 1907, and the amount now to be extended represents part of a total original issue of 145,000,000 francs, or the equivalent then of \$27,985,000. The issue was payable at the option of the holders in francs, pounds sterling or marks. In view of the present depreciated rate of exchange, as an inducement to holders to agree to the extension, it is proposed to extend the franc debentures, of which 69,762,500 are now outstanding, with a guarantee to the holders that at maturity on April 1, 1925, principal and interest will be collectible in dollars in New York at the rate of \$96.50 for each 500 francs face value.

Dividends Declared

Canadian Pacific.—Common, 2½ per cent, quarterly, payable April 1 to holders of record March 1.

Delaware & Bound Brook.—2 per cent, quarterly, payable February 20 to holders of record February 11.

Eric & Pittsburgh.—1½ per cent, quarterly, payable March 10 to holders of record February 28.

Green Bay & Western.—5 per cent, payable February 27 to holders of record February 25.

Trend of Railway Stock and Bond Prices

	Feb. 21	Last week	Last year
Average price of 20 representative railway stocks close of business.....	59.51	59.07	56.83
Average price of 20 representative railway bonds close of business.....	82.18	82.23	74.06

Railway Officers

Executive

E. H. Cox has been elected president of the recently organized Minarets & Western, with headquarters at San Francisco, Cal.

E. C. Lindley, vice-president and general counsel of the Great Northern, with headquarters at St. Paul, Minn., has resigned.

Financial, Legal and Accounting

Walker D. Hines, formerly director general of railroads, has been appointed eastern general counsel of the Great Northern.

Operating

F. M. Rutter has been appointed superintendent of the London division of the Canadian Pacific and R. McKillop to a similar position on the Bruce division, effective February 15.

Traffic

Charlton Messick has been elected treasurer and assistant secretary of the St. Louis-Southwestern, succeeding G. K. Warner, deceased.

J. W. McClymonds has been appointed manager of perishable freight service of the Western Pacific and Tidewater Southern, effective February 15, with headquarters at San Francisco.

William Haywood, general freight agent of the Illinois Central, with headquarters at Chicago, has had his jurisdiction extended over all matters relating to solicitation, except in Memphis, Tenn., and New Orleans, La.

W. B. Wheeler has been appointed general eastern agent of the Belt Railway of Chicago with headquarters at Pittsburgh, Pa. A. C. Burgess has been appointed commercial agent with headquarters at Minneapolis, Minn.

I. N. Randall has been appointed general agent, refrigerator service of the Union Pacific System, with headquarters at Omaha, Neb., succeeding J. W. McClymonds, who has resigned to accept service with another company.

F. W. Hampson, soliciting freight agent of the Norfolk & Western, with headquarters at Memphis, Tenn., has been promoted to commercial agent, in charge of the newly re-opened freight traffic office at Little Rock, Ark.

A. P. Smirl, whose appointment as assistant traffic manager of the Texas & Pacific, with headquarters at New Orleans, La., was announced in the *Railway Age* of February 18 (page 455), has been in the service of the Texas & Pacific for many years. Prior to Federal control, he was commercial agent, with headquarters at St. Louis, Mo. In 1917, he was promoted to division freight and passenger agent, with headquarters at Shreveport, La., and on March 1, 1920, to assistant general freight agent, with headquarters at Dallas, Tex., which latter position he was holding at the time of his recent promotion.

W. M. Penick, commercial agent of the Illinois Central, with headquarters at Pittsburgh, Pa., has been promoted to assistant general freight agent, with headquarters at Chicago. Mr. Penick was born at Union City, Tenn., on October 27, 1886. He entered railroad service in 1905 as a clerk in the local freight office of the Mobile & Ohio at Union City. He was promoted successively to clerk in the inbound freight

department of the general offices at St. Louis, Mo., bill of lading clerk and chief clerk in the same offices, soliciting freight agent at Chicago, and traveling freight agent at that point, until 1917, when he left to enter the air service of the American army. He was appointed commercial agent of the Illinois Central, with headquarters at Pittsburgh, Pa., on March 1, 1920, which position he was holding at the time of his recent promotion.

Engineering, Maintenance of Way and Signaling

T. O. Russell has been appointed chief engineer of the Minarets & Western, with headquarters at Fresno, Cal.

F. M. Hawthorne, assistant division engineer of the Pennsylvania, with headquarters at Logansport, Ind., has been promoted to division engineer, with headquarters at Terre Haute, Ind., succeeding T. C. Herbert, promoted.

Purchasing and Stores

D. V. Fraser has been appointed assistant to the purchasing agent of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., succeeding H. H. Kahrs, resigned to enter other business.

Obituary

W. R. Beauprie, who was vice-president of the Gainesville Midland in 1918 when he retired, died in Atlanta, Ga., on January 13, 1922, as a result of a stroke of paralysis.

A. T. Hardin, vice-president in charge of operation of the New York Central Lines, died on February 21 at New York. Mr. Hardin was born in 1868. He was graduated in engineering from the University of South Carolina in 1894. Previous to that time, 1882, he had entered railway service as a telegraph operator on the Southern. He served that company, except during the period 1890-94, when he attended college, until 1898. He filled the positions of agent and stenographer and, after his graduation from college, was employed in the maintenance of way department. In 1898 he went with the New York Central as supervisor and division engineer.



A. T. Hardin

The following year he was promoted to engineer of track and, in 1903, to engineer maintenance of way. In 1905-06 he was assistant to the general manager and, thereafter, assistant general manager. In 1912 he became assistant vice-president and, in 1913, vice-president. Two years later he was appointed vice-president in charge of operation and, in 1916, he assumed a similar position for all the New York Central Lines. In this position he was serving at the time of his death.

CROSSING A RAILWAY TRACK against the warning of a signal or a watchman has been declared an offense, punishable by fine of not more than \$200, by an ordinance adopted by the Board of Commissioners of Dallas, Tex.

THE NETHERLAND SYNDICATE, LTD., has been authorized by the Chinese government to place orders in Holland for the construction of 150 railway bridges of various spans. These bridges are for the eastern part of the Langhai Railway which is now under construction.

EDITORIAL

Railway Age

EDITORIAL

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Why Not Sell Necessary Service at a Profit?

THE NECESSITY of the service of railroads and other public utilities constitutes today one of the greatest menaces to their prosperity and development.

To say the fact that people have to buy a service whether they want to or not is a source of great danger to the concerns that render it, may sound like a paradox, but it is not one. First, the public necessity for their service is the real foundation upon which all special regulation of railroads and public utilities is based. Secondly, *the fact that their service is necessary unquestionably is the main reason why adequate and effective means of "selling" these concerns to the public are not adopted by the managements of most of them.* Now, this peculiar form of regulation, and this conspicuous failure of the managements of most railroads and public utilities to "sell" them right, are the main causes of their most serious troubles.

The man who makes kodaks, chewing gum, automobiles, or millinery knows that if his business is to be successful he must give relatively as much attention to salesmanship as to production, because his commodity is not one which the public absolutely must buy. Therefore, he carries on his sales campaigns with the object of so popularizing his product, in spite of the fact that it is a non-essential, as both to create a large demand for it and to enable him to secure prices for it which will yield him a large profit.

Why make similar efforts and expenditures to sell to the public services such as railway transportation, which the public will have to buy anyway? Because, unless these necessary services are sold to the public in the right way they cannot and will not be sold at a satisfactory profit, no matter how much of them may be sold. The public itself, through commissions, fixes the prices that it pays for railroad service. It will never so fix the prices it pays that they will yield a reasonable profit to the railroads as a whole, unless, first, it is "sold" the belief that the service is economically and efficiently rendered, and, secondly, that it is to the public's interest to pay rates that will yield the railroads as a whole reasonable profits.

We have said that the public fixes the prices it will pay. Here is a fact of vital importance which is constantly overlooked by many managements. The railways, collectively and individually, are well organized and equipped to present

their cases to lawmakers, commissions and courts. In other words, they are well organized and equipped to "sell" the lawmakers, commissions and courts. It is a well-known fact, however, that over and over again they convince lawmakers, commissions and courts that certain policies should be adopted, and that in spite of this directly contrary policies are adopted. Why? Because the lawmakers, commissions and courts have been "sold" the policies in question, but the public has not been, and it is public sentiment that finally determines the policies actually adopted.

It is essential to have the case of the railroads fully and ably presented to lawmakers, commissions and courts. But this has been done for many years, and in spite of this railroad net return and railroad development have steadily declined. Why? Because with respect to railroad regulation it is practically useless to convince lawmakers, commissions, and even courts of anything of which the public also is not convinced.

If there is anything regarding the railroad business which should now, after the experience of the last 15 years, be perfectly plain, it is that "selling" the railroads to the public is just as essential a part of successful railroad management as the running of trains, the maintenance of equipment and tracks, the keeping of the books, or the presenting of testimony to commissions and courts. It is equally plain that the public relations work of the railways as a whole and of most individual railways has not been adequately done. If it had been, the railroad history of recent years and the present railroad situation would be very different. It ought to be equally plain that public relations work cannot be successfully done without adequate organizations for that purpose, composed of competent men devoting their thought, time and energies to it, any more than the railroads could be successfully operated and maintained without adequate organizations and competent men devoting themselves exclusively to operation and maintenance. Furthermore, public relations work cannot be successfully done without expenditures proportionate to the purposes sought to be accomplished any more than any other branch of railroad operation can be successfully carried on without expenditures proportionate to the importance of the ends to be attained.

A number of railways have established what are virtually

public relations departments, although not always so called, and by adopting various means to present all the facts about their achievements, their operations, and the necessities of their business to the public have accomplished a great deal in the way of selling to the public not merely their service but the railways themselves as useful and beneficent institutions. Every important railway system of the country ought to be doing the same thing, not merely in its own selfish interest, but in the interest of the public as well. It is as much to the interest of the public as to the railways that the public should be made to see the railroads and their managements as they are instead of as they are painted by their enemies.

The very fact that railroad service is a necessity to the public will always be a liability instead of an asset to the railroads themselves, until the railroads learn to sell their service in such a way as to convince the public that their service is a great benefit to the public for which the public should be glad to pay reasonable rates, instead of letting a large part of the public continue to feel that railroad service is an incubus which they must bear, but for which they should insist upon paying the very least that they can legally force the railways to accept.

Reports from the industries show that business is picking up all along the line and the indications are for a continued improvement, although not in the nature of a spectacular increase. The revenue freight car loadings for the week ending February 18 are again most favorable, as will be noted from the article and diagram on another page. For the weeks ending February 11 and 18 the revenue freight car loadings have surpassed those for the corresponding weeks in previous years. The most significant fact about these increased loadings is that the increases, as compared with the last year, are shown in all districts and in all but a very few classes of materials.

The extended use of long distance telephone circuits for other than train dispatching service is resulting in extensive economies on a number of railroads. The primary function of the telephone is to facilitate the transaction of business between different departments or with the general public. The justification for the extension of this service to long distance telephone communication between general and divisional headquarters depends on the amount of money now spent for toll on commercial lines. An article published elsewhere in this issue describes how one large railroad system is saving over \$52,000 a year by owning and operating its own long distance telephone circuit between New York and Chicago. No doubt many other roads are losing money by delaying similar installations of telephone facilities. It would therefore seem advisable wherever telephone toll payments are at all important for railroad officers to check their expenditures for communication service as compared with the cost of providing their own telephone systems.

During the first two months of this year more freight cars were ordered for domestic use than during the entire year 1921. True, only 23,346 cars were ordered last year, while the number ordered during January and February this year—24,031—is at a rate which might reasonably be expected under normal conditions—a rate, however, which makes no allowance for the shortage of equipment which was so marked when business was at its height. General business is growing slowly but steadily. The public seems to be gaining renewed confidence in the administration of the railways. With the increase in business, this ought to be reflected in greater confidence in railroad securities which will put the roads in a position to order more and more in the way of equipment and facilities. Secretary of Commerce Hoover's statement that the cost to the public of a marked transportation shortage can be calculated in the neighborhood of a billion dollars, should also influence the ordering of equipment wherever possible. It is quite likely, therefore, that the remaining ten months of the year will develop equipment orders in even greater proportion than during the past two months. It is significant also to note that 70 per cent more passenger cars were ordered during January and February than during the entire year 1921, 420 cars being ordered for domestic use for the two months this year as against 246 for the twelve months last year. Welcome as these orders have been, the roads will undoubtedly order at a faster rate if improved business conditions warrant so doing.

A suitable award of cash will be made to any employee offering a suggestion which results in economies or increased efficiency and any saving so effected the company will use in giving employment to more men—this is the gist of the proposal recently made by the management of the Buffalo, Rochester & Pittsburgh to its employees. The fairness of such a plan is manifest. Economies effected at the instance of employees will benefit everyone concerned—the man making the suggestion, the company and the additional men thus given employment. The company has organized a "suggestion bureau" to consider the proposals made by the employees. To make sure that prejudice or discrimination do not enter into this bureau's decisions, all suggestions will be submitted to it by serial number only, with no hint concerning the identity of the author. This move by the Buffalo, Rochester & Pittsburgh sounds promising. Almost every intelligent railroad employee has ideas concerning the operation of his road. The great difficulty has always been to get him to make these ideas known to someone in authority. The offer of a cash prize together with the assurance that savings effected will be used in giving employment to his idle fellow-workmen should provide sufficient incentive to overcome this reticence. If the plan proves a success its adoption will doubtless be widespread. Naturally a report on the results accomplished after the bureau's work is well under way will be of great interest.

It is difficult, if not impossible, to say anything new about the need for better organized railway shops and more efficient utilization of shop equipment and manpower. The need is so great, however, that the presentation of new evidence and the restatement of old facts is justified on the ground that eventually a general realization of mechanical department needs will be followed by active steps to improve conditions. Manufacturers throughout the country are examining costs with a critical eye and bending every effort to economize in

Keep the Pace Up

A Fair Bid for Employees' Assistance

Railway Shop Production

labor and material so far as may be consistent with standard, reliable products. Are railroad shops also prepared to turn out cars and locomotives in a minimum time and at the least cost consistent with good quality work? Unfortunately the answer is no. A railroad expert on shop conditions recently said "At the present time I am afraid that the railway shops do not turn out work as quickly as would be done by up-to-date manufacturing concerns." If this statement is true, and it can hardly be denied, two questions immediately arise. What is the reason? What is the remedy? Without going into an involved discussion of the case, shop output per man is dependent upon the attitude of shomen towards their work, the machinery provided for doing that work, and the methods of scheduling and performing detailed operations. These three all-important factors must receive prompt consideration and action by officers in charge if mechanical departments are to play their part in increasing the spread between railway operating revenues and expenses.

One of the old established machine tool manufacturers in New England recently published a list of men who had completed the apprentice training course in the company's shops. The primary object of the course is to develop skilled mechanics, but few of the men are now working at their trades. Their present occupations show that a large proportion have risen to positions of responsibility. Many have become foremen, others are superintendents or general managers, and the list, although short, contains the names of a number of presidents and vice-presidents of important companies. Why have so many of these men made successes in life? There seems but one valid conclusion; the training they received fitted them for managerial positions. Certainly there is a lesson in this for the railroads. There is hardly a road that can find among its employees enough of the right kind of men to fill the vacancies that occur among the officers. Despite this fact, little is done to train the younger employees. Apprentice training that is more than mere time serving has almost disappeared from the railroad shops. How many roads have taken advantage of the new rules that provide for special apprentices? A large railroad system is probably the most complex business institution on earth. It requires many highly skilled leaders to make it operate efficiently. Some good men may develop by chance, but this is not enough. There should be always available in every department men who have a thorough understanding of railroad work that will fit them to assume supervisory positions. The type of man formerly so common, who had a broad knowledge gained by working in various positions is almost unknown at present. The railroads need such men. They can be had only if the railroads will set out deliberately to train them.

Training Men for Promotion

Occupations show that a large proportion have risen to positions of responsibility. Many have become foremen, others are superintendents or general managers, and the list, although short, contains the names of a number of presidents and vice-presidents of important companies. Why have so many of these men made successes in life? There seems but one valid conclusion; the training they received fitted them for managerial positions. Certainly there is a lesson in this for the railroads. There is hardly a road that can find among its employees enough of the right kind of men to fill the vacancies that occur among the officers. Despite this fact, little is done to train the younger employees. Apprentice training that is more than mere time serving has almost disappeared from the railroad shops. How many roads have taken advantage of the new rules that provide for special apprentices? A large railroad system is probably the most complex business institution on earth. It requires many highly skilled leaders to make it operate efficiently. Some good men may develop by chance, but this is not enough. There should be always available in every department men who have a thorough understanding of railroad work that will fit them to assume supervisory positions. The type of man formerly so common, who had a broad knowledge gained by working in various positions is almost unknown at present. The railroads need such men. They can be had only if the railroads will set out deliberately to train them.

Construction to Meet Competition

TO WHAT EXTENT is a railway justified in reducing grades and otherwise improving its facilities to lower its costs of operation in order to compete for and secure traffic from another line already equipped to handle this business with equal or greater economy? This may seem like an academic question, but it is one which is being raised on more than one road today.

Prior to the passage of the Transportation Act of 1920 it was the duty of a railway management to improve and operate its property so as to earn for the stockholders the largest net return consistent with the rendering of adequate service to the public without regard to the effect of this competition on other lines. In general this responsibility is still the same, but the provisions of the Transportation Act rela-

tive to authorizations for new expenditures, grouping the roads into systems, etc., indicate the trend of public regulation toward less active competition and increased unity of operation. Theoretically traffic should be concentrated upon those lines which can handle it most economically and the facilities of these lines should be increased as necessary to enable them to keep pace with the growth of business. Also, the public has an interest in the expenditures which the railways make because of the provision in the Act that the roads shall be permitted to earn a return upon these expenditures. It is therefore interested in the elimination of unnecessary or competitive construction.

On the other hand, the railway system of America has been developed under the stress of active competition, and it has been the hope of increased earnings that has led railway managements to venture large sums for improvement work. Such improvements will be made only if there is a chance to secure the business necessary to earn a return on the investment. Since rates between common points are the same, the roads can compete for traffic only upon the basis of the service which they render and this service reacts to the benefit of the shipper. That the shippers desire competition was demonstrated by their clamor for the return of the railways to private control, following their unified operation by the government.

The expenditure for the enforcement of a competitive line to enable it to handle economically, traffic which it must develop, involves a waste in investment in whole or in part until such time as the traffic taxes the capacity of both lines. However, competition necessarily leads to waste in numerous forms of which this is but one. It is, however, the stimulus to improvements in service and economy in operation which has made the American transportation system the leader of the world. Therefore, while the Transportation Act throws new restrictions around improvement work, it modifies the responsibility of the managements with respect to expenditures for improvements only to the extent that it acts as a curb against reckless investment.

Increase in Total Tractive Power and Car Capacity

IT REPEATEDLY has been shown that the number of locomotives, freight cars and passenger cars acquired by the railways has been declining for some years and that the increase in their number has not kept pace with the growth of traffic. Attempts have been made, however, to show that there has been no ominous decline in the growth of the capacity of the equipment, because, as has been pointed out, year by year there has been an increase in the average tractive power of locomotives and in the average capacity of freight cars. For example, the following statements were made in the weekly news letter of the American Farm Bureau Federation for February 16 in a report of the rate hearings now being conducted by the Interstate Commerce Commission:

Much has been said about the railroads failing to keep up their facilities of recent years. We have been told about the increase in the number of engines and cars not being sufficient. While it is true that in 1920 (the latest year available) there were approximately only 18 per cent more engines in number than in 1908, Clifford Thorne finds that the tractive power had increased 661 per cent. (This figure evidently is a typographical error.) While the total number of (freight) cars in 1920 exceeded those in 1908 by only 13 per cent, the capacity of the cars in 1920 was 37 per cent greater than in 1908. In other words, these statements about increased facilities totally ignore the larger size of the cars and engines.

It is not true that the statements made by witnesses for the railways to the Interstate Commerce Commission have ignored the larger size of the engines and cars. The increases in the average tractive power of locomotives and the average capacity of freight cars have been specifically mentioned, but it has been pointed out that these increases in average power and capacity have been going on steadily for many

years, and that therefore the reduction in recent years in the amount of equipment acquired represents also a reduction of the increase in the total capacity of the equipment.

Shippers should be fully and correctly informed regarding the facts, for they are even more vitally concerned than the railways. What, then, are the facts regarding the increases which have occurred within recent years and in former years in the aggregate tractive power of locomotives and the aggregate capacity of freight cars?

The statistics of the Interstate Commerce Commission make possible comparisons for the years from 1902 to 1920, inclusive. When these years are divided into two periods of nine years each, and the statistics for the two periods are compared, the facts disclosed are striking and even startling. In both these periods there were very large increases in freight and passenger traffic. In both of them there were years when there were acute congestions of traffic and large shortages of cars. Only in the middle of the first period, however, did drastic regulation of the railways become effective, and it was a period when relatively large net returns were earned. On the other hand, in the second period the railways were either subject to extremely effective regulation, or under government operation, and the net returns earned by them were sharply reduced.

The increase in freight business in the first period was 61 per cent and in passenger business 69 per cent. The increase in freight business in the second period was 62 per cent—almost exactly the same relatively as in the earlier period—and the increase in passenger business 41 per cent.

Bearing in mind that the increases in freight business in the two periods were relatively almost exactly the same, what were the comparative increases in the total tractive power of locomotives and the total capacity of freight cars?

In 1902 the total tractive power of locomotives was 770,000,000 pounds. In 1911 it was 1,714,000,000 pounds, an increase of 122 per cent. This seems like a very large increase, but it should be remembered that developments in 1905, 1906 and 1907 showed that the tractive power of the railways was very inadequate, and this large increase in it was made to remedy the inadequacy. In the nine years ending with 1920, the total tractive power increased to 2,337,000,000 pounds, or 36 per cent. In other words, although the increase in freight business was relatively as great in the second period as in the first, the increase in total tractive power was relatively only one-third as great.

In 1902 the total capacity of the freight cars in service was 42,168,000 tons, and in 1911 it was 81,227,000 tons, an increase of 92½ per cent. This large increase in the total capacity of cars was due to the same experience that caused the large increase in the total tractive power of locomotives. In 1920 the total capacity of freight cars was 98,020,000 tons, an increase over 1911 of only 21 per cent. In other words, the increase in it was relatively less than one-fourth as great as in the preceding nine years, although the increase in the freight business handled was relatively as great.

Certainly these figures show a significant decline of the increase in total tractive power and car capacity. It is necessary, however, to present and study the facts in more detail in order to grasp their full significance. The accompanying table gives the statistics regarding the total tractive power of locomotives and the total capacity of freight cars by three-year periods.

It will be noted that the increase in the tractive power of locomotives was the greatest in 1902-1905 and that it steadily declined from that time until the three-year period ended with 1917. It then advanced, but never again became as great as in the three years ending with 1905.

The increase in the total capacity of freight cars was very large in the three years ending with 1905, and even larger in the three years ending with 1908. Since then it

has steadily and rapidly declined. In the three years ending with 1920 the increase in total freight car capacity was less than one-fourth as great as in the three years ending with 1908.

The railways were able to cope with the 62 per cent increase in freight business that occurred between 1911 and 1920 largely because of the great increases in the total tractive power of locomotives and the total capacity of freight

Year	Total tractive power locomotives, pounds	Total capacity freight cars, tons
1902.....	770,000,000	42,168,000
1905.....	1,128,000,000	53,556,000
Increase 3 years.....	358,000,000	11,388,000
1906.....	1,128,000,000	53,556,000
1908.....	1,458,000,000	72,980,000
Increase 3 years.....	330,000,000	19,424,000
1908.....	1,458,000,000	72,980,000
1911.....	1,714,000,000	81,227,000
Increase 3 years.....	256,000,000	8,247,000
1911.....	1,714,000,000	81,227,000
1914.....	1,887,000,000	90,700,000
Increase 3 years.....	173,000,000	9,473,000
1914.....	1,887,000,000	90,700,000
1917.....	2,088,000,000	95,467,000
Increase 3 years.....	201,000,000	4,767,000
1917.....	2,088,000,000	95,467,000
1920.....	2,337,000,000	98,020,000
Increase 3 years.....	249,000,000	2,553,000

cars and other facilities which occurred prior to 1911. Unless the experience of the future is to be entirely different from all our experience in the past they will be offered within a few years a freight business exceeding that of the years 1911 to 1920 as much as the freight business of 1911 to 1920 exceeded that of 1902 to 1911. For over ten years they have been increasing the amount of business handled by them far more relatively than they have been increasing their capacity. The experience of the years 1917, 1918 and 1920 shows that considering the railways as a single system, they had in those years very little surplus capacity left. How, then, is the future increase in the business of the country to be handled unless there is an increase in railway facilities as large in proportion as the increase in traffic? How is this increase in facilities to be made unless the railways are allowed to earn a much larger average net return than they earned in the years during which, as the statistics herewith presented show, their expansion was steadily declining?

The very persons who are now trying to show that there has been no serious decline in the development of the railways will be the first to denounce their managements for inefficiency if, when business revives, the railways are unable to move all the freight offered to them.

The Latest Scheme for Pooling Cars

WHEN AN ORGANIZATION with a standing before the public such as that of the National Association of Owners of Railroad Securities proposes to save the railroads \$500,000,000 a year, the railroads cannot afford to let the proposal pass without subjecting it to critical analysis. If the result of such an analysis indicates that the plan actually offers large possibilities for effecting savings which the railroads cannot themselves effect, certainly they cannot afford to lose the opportunity it offers. If on the other hand the plan possesses inherent weaknesses likely to result in its failure, or if the same difficulties stand in the way of obtaining the economies claimed that prevent the railroads from obtaining these economies themselves, then these facts should be clearly set forth before the public to offset as far as possible the presumption against the railroads always created in the public mind by each reformer with a new million dollar

a day program for saving the railroads from themselves.

Large reductions can no doubt be made in the expenditures of the railroads for car service by improvements in maintenance conditions, by the retirement of obsolete and outworn equipment and by increased car utilization. Some of these savings the railroads have already demonstrated their ability to realize under existing conditions; a high degree of effectiveness in car utilization was attained in 1920. Others could be realized if the necessary capital were available and the financial condition of the roads were such that they could safely undertake the outlay for shop improvements and equipment replacements. Still other savings will be possible when there is a wider appreciation of the fact that 20 empty car miles costs as much as a day's rental.

But these savings would probably fall far short of \$300,000,000 a year. Would the National Railway Service Corporation be able to make good its estimate? Consideration of the various items of the estimate in the report of the Board of Economics and Engineering indicates that some of the conclusions are based on data too general to be conclusive and others are matters of opinion apparently unsupported by tangible evidence.

The saving of \$33,000,000 a year in the first cost of equipment is contingent on complete standardization and uniform buying irrespective of business conditions. The matter of standardization, however, is surrounded by many difficulties and many of the questions to be settled are likely to prove highly controversial. For instance, shall future construction be of the all-steel or composite type; and at just what point shall a compromise be arrived at between the adherents to cars of great strength and those who believe in minimum weight? If the benefit of steady production is to be obtained, what will be the source of the fund from which purchases can be made during periods of business depression when the available surplus of the roads may be too small to stand the strain?

The estimate of the Board indicating a saving of 20 per cent in the cost of heavy repairs, amounting to \$30,000,000 a year, is not entirely consistent. Quantity production methods are to be introduced through a reduction in the number of points at which general repairs are made, but the equipment is to be sent to these plants irrespective of ownership. Many railroads have already availed themselves of the opportunity for saving through the employment of quantity production methods by contracting out their heavy repairs. These benefits have been obtained by aggregating large numbers of cars of a single series in order that each car may be subjected to identical operations, and even though wrong repairs were permitted, much of the benefit of production methods would be lost unless such a segregation were made. Furthermore, the plan contemplates the establishment of shops at large traffic centers, involving considerable capital outlay before it could become effective.

The largest single item in the estimate is the annual saving over a ten-year period of approximately \$96,000,000 a year to be effected by retiring 890,000 small capacity cars of all-wood construction and replacing them within a period of five years with 540,000 steel underframe cars of 50-ton capacity. During the year ending December 31, 1918, there were 524,000 wood box cars and 182,000 coal cars of all wood construction in service on Class I roads. Many of the box cars have undoubtedly already received reinforcement or are suitable for reinforcements which convert them into satisfactory service units. Of the wood coal cars a large number are undoubtedly employed in company service and do not enter into interchange. It is doubtful whether more than half of the 890,000 cars referred to in the report would prove to be subjects for replacement by the corporation. But assuming that the entire number were to be replaced with cars of the increased capacity, would 540,000 of the larger cars be capable of rendering the same service? Dur-

ing 1920 the average carload was 29.4 tons, but considering the fact that open top cars on the average are loaded close to capacity, the average box car load probably did not exceed 22 tons, with an average capacity of approximately 37 tons. Is it probable that an increase in unit capacity is likely to be followed by a proportional increase in the average box car load? The answer to this question has an important bearing on the saving through the retirement of weak cars, since \$65,000,000 per year of the total is claimed for the lesser amount of car mileage in handling an equal volume of traffic in a small number of larger capacity modern cars.

A saving of \$66,000,000 per annum is claimed for the increase in ton-miles per car per day, assuming an increase from 506 obtained in September and October, 1916, to 528. But the railroads, with the assistance of existing agencies, have already demonstrated their ability to exceed this figure for a period of four months in 1920.

Altogether the detailed estimate presented by the Board totals \$257,000,000. Just how the additional \$43,000,000 to make the round sum of \$300,000,000 a year is arrived at the report does not say.

The present accumulation of more than 300,000 bad order cars is the result of one of the most drastic retrenchments in the railroad history. The plan of the National Association of Owners of Railroad Securities proposes that its National Railway Service Corporation immediately arrange for the repair or rebuilding of these cars, a project involving an outlay of at least \$45,000,000 to \$60,000,000. This work will be done for the account of the owners. But if the owners have found themselves unable to undertake it under present business conditions, how will the \$45,000,000 to \$60,000,000 bills be paid?

There are many attractive features in the Association's proposal and the *Railway Age* has no desire to discredit it. To say the least, however, there is a reasonable doubt that the plan, if adopted, will effect a saving approaching \$300,000,000 a year, certainly not immediately. In promising such enormous savings some of which are based on nothing more tangible than opinion evidence, the Association is doing the railroads and their security owners a poor service. In the present state of public opinion if the plan should be dropped, no matter how good the reason, the railroads will stand charged with mismanagement for not adopting it, even though there are good reasons for not adopting it. Should the plan ultimately be adopted, nothing less than \$300,000,000 a year will be accepted by the public. In either case it is not clear just how the inevitable disappointment will serve the best interests of the owners of railway securities. The plan is not one to be placed before the public in terms of glittering generalities but must be subjected to the most careful and detailed analysis by competent railroad officers.

THE SOUTHERN RAILWAY announces round-trip tourist rates to mountain and seashore resorts for the coming summer season at 80 per cent of the double one-way fares. For example, where the one-way fare is \$10, the round-trip rates this summer will be \$16. Last year it would have been \$18 plus \$1.44 war tax.

IN THE NEW ENGLAND FREIGHT-RATE decision the Interstate Commerce Commission holds that our railroads constitute a national transportation system, whose parts must be maintained if they are not to be abandoned. In the undirected, free processes of trade are developed slowly a solidarity and integration that socialize local or temporary advantages which bear disadvantageously on individuals or localities without compensating advantages to society as a whole. As business becomes more of a regular operation in the performance of service and less of a private speculation the integration that goes on reappraises local advantages and disabilities in the interest of the whole process.—*J. Shirley Eaton.*

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

The Lowest Bidder

SHREVEPORT, LA.

TO THE EDITOR:

I have read, with interest, your editorial of December 10, entitled "Should the Low Bidder Get the Work?" and I agree with you in all that you say.

As an engineer with some years of experience, I have advocated the rejection of "the lowest bid" in cases where it was apparent that the work could not be successfully carried out at the price bid, even though the certified check and surety bond were satisfactory.

I can cite you to more than one case where the "lowest bid" was accepted, and where the final cost to the owner was greater than if the "highest bid" had been taken, to say nothing of poor workmanship that sometimes goes with a job that costs the contractor more than he is receiving, although the efforts of the supervising engineer and his assistants have been all that they could be.

LINTON W. STUBBS.

Give the Facts to the Public

LOUISIANA.

TO THE EDITOR:

I meet many intelligent people whose ideas on most matters are sound, but on account of the camouflage indulged in by the labor agitator and Ford, now believe that all roads are over-capitalized, and all except the D., T. & I. are mis-managed.

It is not uncommon to see in our daily press statements about the roads that are absolutely at variance with the facts. Should not concerted action by our railroad executives be taken to counteract the evil effect already produced by the publicity that has been given to many statements absolutely untrue, and which has greatly affected the attitude of the public toward the railroads? At this time, when the railroad situation is a very live topic, should not every reasonable effort be made to show to the public plainly what the conditions are?

ANOTHER RAILROAD STUDENT.

Religion Required in Railroading

READING, Pa.

TO THE EDITOR:

In your issue of February 18 "Train Dispatcher" asks, "Will religion and railroading mix?"

To my mind, even an expression of doubt on this subject is a sad reflection upon the code of morals of railroad men as a body. In answer I quote from a Pennsylvania Railroad man in The Mutual Magazine of January, 1922,—a publication issued by employees of that road: "The real nature of all the serious problems of the day is spiritual, and their social or material aspects are the result of ignoring divine law in human relationships."

The writer believes religion and railroading will mix—eventually; or there never will be peace and harmony. For, not only the Christian religion, but all others, enjoin strict

justice and fair dealing, and condemn selfishness, greed and so-called sharp practice in all transactions between man and man, either as individuals or in brotherhoods, associations or groups of men.

Only when the rules and conduct of brotherhoods and corporations conform to the precepts of religion will a secure basis be found for a permanent peace on the railroads, or between nations, or in any other human relationship. Make no mistake—not the will of labor, nor the will of capital, nor yet the will of labor boards, commissions or congress, but the will of God must finally and eternally govern the world, including the railroads. Wouldn't it be wise to get on the right side now and begin early to practice the principles that must finally prevail? Every railroader, officer or employee who is doing otherwise is violating the divine book of rules and running without orders. CLERK.

Meetings With Trainmen; Compulsory Attendance

DETROIT, Mich.

TO THE EDITOR:

To the railroader who has been watching things from the inside for 35 years the various letters and other articles concerning safety of train movement which have recently been published call to mind the fact that there are many old lessons which have still to be learned.

The general superintendent ought to get down off his throne, leave his fishing rod or gun to one side, and have a personal meeting with all of the conductors and engineers at least once each month. Every conductor and engineer should be able to show that he has attended such meetings with reasonable regularity. These men sometimes have to attend meetings on two or more divisions so they cannot perhaps be held to the strictest account; but they ought to be required to attend at least four meetings a year.

At these meetings the hand of fellowship should be extended, and the men should be drilled into habits of safety; more than this, into habits of safety and of making time, both at the same time.

At one time we try to inculcate safety; at another time we emphasize the importance of making time; of economizing in the time of men and with the quantity of fuel used, etc. Why not try to teach the men along both of these lines?

J. T. HUFFMANN

Bringing the Best Out of Men

CHICAGO, Ill.

TO THE EDITOR:

Just a few lines to emphasize what has been stated by others, especially the authors of "Big Stick vs. Golden Rule," in the *Railway Age* of November 26, 1921, and "The Golden Rule in Railway Work" in the issue of December 5.

Having taken treatment from several specialists during the last thirty years, I am still of the opinion that the mistake nowadays is in acting toward men very much as if they were animals. Most animals of the domestic type, in fact, receive pretty good treatment if they are in the best skilled. But even a dog tucks his tail between his legs and sneaks away when scolded, or else shows his teeth; a vicious animal, however, will easily respond to kindness. We have but to remember the old saying that soft words turn away wrath, but grievous words stir up anger.

In general, officers above the rank of division superintendent are of the fair sort, but subordinate officers seem to think they must make a big noise and nag and nag and scold, the good with the bad being subjects of their ever-

ready pens and tongues. The whole division is threatened because of the alleged failure of one or two.

If higher officers stand for this (and it rarely comes to the surface except through grievances of the men), then they are applying absent treatment—a thing that will never work to the good of the service. The sooner employers get back to the old way (if they ever knew it), the sooner we will get back to that thing we hear so much of nowadays—normalcy. If men are not trusted they will not respond to the full extent, but the pride most men have will, with proper treatment, call forth the very best.

ANOTHER OLD RAILROADER.

A Word of Suggestion to the Dictator

NEW YORK.

TO THE EDITOR:

The business of writing, like that of railroads, is to get there with the goods.

The writer is the transportation man, the reader is the consignee. It is important to discover the maximum economic load for a train of thought. This varies according to the character of the freight carried, the nature of the region served and the draw-bar pull of the idea that is to move the train of thought.

Too many heavy cars in the train of thought leads to a break-in-two. The best remedy for a break-in-two of this kind is to send out a flagman with a period and to couple up the rest of the train with a new engine.

It is important in passing switches to make sure that the rear end of the train of thought isn't left on a siding. This makes it difficult for the consignee to locate his goods.

It is bad practice to make up a train of thought exclusively of L.C.L.

A critter on the track that has been the cause of many derailments is "and which."

"As" is a very poor coupling and so is "—ing"; they have been the cause of many break-in-twos.

For a heavy train of thought "however" is a poor head engine; cut it in two or couple in three cars back for 100 per cent efficiency.

It is important that the train of thought should be supplied with side-cards indicating destination of its several members.

Transportation men should take care in handling infinitives not to split them. Some consignees object to receiving them in this condition.

F.

Say Good-bye to Old Mr. 31

DALLAS, TEXAS.

TO THE EDITOR:

I have read the several interesting articles in the *Railway Age* on Form 31 train order. I am sure that unless something is done soon to eliminate Form 31 it will eliminate itself. The present rules and attempted practices surrounding Form 31 have become obsolete; everybody knows that these rules and regulations are not in keeping with present day demands.

The saving in operating expense by avoiding unnecessary stopping of long freight trains would in itself amount to a large amount within a twelve-month period. The only reason we do not eliminate Form 31 at once is that we lack the nerve to take the forward step and accept the responsibility. It has ever been thus, with each advance movement in train dispatching.

I cannot believe that with Form 19 there will be more collisions resulting from misinterpretations, mishandling, or overlooked train orders than we are having now. If anything, the odds are in favor of the 19 Form on account of

the manner in which it is handled. It should keep fireman and brakemen better informed concerning orders affecting movements of their train. Wireless telephony, in the near future, will afford means of communication between the train dispatcher and the train crew; then good-bye to old Mr. 31!

When trains are run by signal indications only, no signature is secured for passing either a "stop" or a "proceed" indication. I think any fair minded person will agree that there are more cases of disregarded signal indication (including false indications) than there are of misinterpreted train orders.

How would it do to revise the rules along the following lines?

Leave Rules 201, 202, 203 and 204 as they are;

To Rule 205 add a clause requiring dispatcher to record the time that the order is released for delivery;

Rule 206, no change;

Rule 207, eliminate reference to Form 31;

Rules 208 and 209, no change;

Rule 210, eliminate;

Rule 211, no change.

There will be certain other rules and regulations governing the issuance of clearance cards and their delivery. The train dispatcher should authorize clearances, giving them numbers over his initials and keeping a record in his order book. The operator should repeat and sign his name.

It is my suggestion that this subject be referred to the rules committee of the American Railway Association and let it be given some thought and study. If this is done the only logical outcome will be the abolition of Form 31 and the adoption of a present-day standard method of handling train orders.

W. M. WHITENTON,

Assistant Chief Operating Officer, Missouri, Kansas & Texas.

How a College Training Helps

TEXAS.

TO THE EDITOR:

The various letters and editorials regarding the college man in railroad work which have appeared in the *Railway Age* have been interesting to me because of my being a college man in railroad work. Perhaps some of my experiences, conclusions, and mistakes will be of interest.

I now know that I made two important mistakes during my apprenticeship. First, I was so deeply interested in the new experiences I was meeting that I didn't take time to make friends. Second, I argued technical matters with non-technical men and many times was made to appear ridiculous by having someone pass along my statements badly garbled.

I frankly confess that my advancement has been as rapid as my ability would permit. I wasn't the best student in my class and I am not the best man on the railroad. I have done better than the average man in my class and probably better than I would have done in any other industry, for I was born with the call of the rail in my blood. I have seen some good men fall down because of having advanced too rapidly.

My college training could not possibly have taught me the facts one must know or have given me the experience one must have in order to be a successful mechanical department officer but it has been especially valuable to me in the following ways: It taught me to read with understanding; to think straight and rapidly and to a definite conclusion; to make and appreciate clear and concise reports; to investigate fully before making a decision; to respect the feeling of other men; to know the other fellow's way may be just as good as mine; to take criticism without "blowing up" and to work in harmony with others.

Aside from vicious personal habits nearly every failure of a railroad officer to succeed may be traced to his lack

of training in one or more of the above points. These are the things a man has a chance to learn at college regardless of the studies he pursues and they are the things a man must learn to succeed in any industry. It is granted that they may be learned in the shop or office by experience, but the method is slow and very discouraging.

Prejudice against the college man is not confined to the railroad business. It exists in all branches of industry. However, it appears to be perhaps more pronounced in railroading than in other industries because of the fact that the knowledge which must be acquired by actual experience in the shop or on the road is more essential to success in railroading than is the knowledge acquired at college and this is not the case in most other industries. F. E. M.

Educating Railway Employees

TO THE EDITOR:

I read with a great deal of interest the article of C. G. Juneau, master car builder of the C. M. & St. P., in your issue of January 21, page 223. The thoughts expressed by him are of value to anyone interested in the education of railroad employees. However, he made one statement that I can hardly agree with. The same idea seems to be prevalent in the minds of many railroad men, especially those of the older school.

Mr. Juneau stated: "Unable to turn to educational institutions to provide a trained personnel to grapple with their problems, the railroads' one chance of resurrection seems to lie in their own education of their employees."

It is not quite clear what Mr. Juneau means by "education" in this sense. Obviously he does not refer to general education, but rather to specialized training. But in this sense it must be remembered that practically all of the personnel of the legal and engineering departments of a railroad is college trained. More than one-half of the official personnel of the mechanical department is college trained, while on some roads practically all the mechanical officers are graduates of technical schools.

Perhaps he does not know of the attempt made in the past on the part of the railroads to educate their own employees. There have been some very ambitious beginnings—that of the Harriman lines a few years ago being the most auspicious—but they all failed, except in the work of training apprentices in the mechanical department. The broader the plans, the greater the failure, and they failed for the reason that the function of a railroad company is to produce transportation. It is not to educate. A railroad is primarily a money-making plant and every moment of company time spent by an employee in learning the principles and details of his work represents a loss to the stockholders and a greater charge to the public. The only economic excuse that a railroad company has to engage in educational work is to prevent a greater loss because of the lack of knowledge and inefficiency of its employees. If it can find an outside agency to perform this function, it would be a financial waste for a railroad to attempt it.

Another reason for the failure of educational campaigns undertaken by the railroads themselves is the violation of a fundamental principle of education, i. e., that education must not be forced. There are no exceptions to this rule in the case of grown men and women. The pupils of a railroad educational campaign are men and women and while at first the educational opportunities may be accepted with a great deal of enthusiasm, especially by the ambitious, in the course of time the requiring of knowledge of their duties will be accepted as a part of the job itself. What this means—what effect it will have on the enthusiasm of the students—Mr. Juneau will know.

This does not agree with some authorities who believe that the education of the employee should be required rather than invited. True, such a procedure will produce some results, for it is well known that even a little education is better than none at all, but it will not produce the best results, which can only be obtained through voluntary action on the part of the student.

This has been the course of most railway educational campaigns. They were inaugurated with a burst of enthusiasm that burns itself out within a year or two. The attempt dies so slowly that no one notes its passing. No one seems to miss it. Then when an ambitious official grasps the need of an educational program, it is again resurrected as something original.

Mr. Juneau makes the same mistake that is made by a large number of railroad officers in regard to education. He believes education consists of a course of training in the specialized details of the work. Owing to the complexity and fluctuating character of railroad work, a course of education based on details would be of no value to the student soon after it was completed. If such a course was based on the practices of one road, it would be worse than useless on another road.

Technical education consists in acquiring skill in a certain trade or profession, or specialized work. It does not consist primarily in knowing how to do skillfully certain detailed jobs, but it means the possession of certain fundamental truths or principles which will enable the student to meet practical situations and contingencies as they arise. For instance, if a tariff clerk is familiar with the tariff files, he will understand how to locate the rates without making a study of every tariff file he comes in contact with. If a yardmaster knows the layout of a yard, the purpose of the different tracks and the uses to which they can be put, he can handle any yard after only a slight study of the local layout. If an agent at a small station understands the fundamentals of station work, he will have no difficulty in breaking in at a large station. A civil engineer is not taught how to solve individual engineering problems except as a means of understanding more thoroughly engineering principles. Thus education is fundamentally based on principles, and it is left to the student to apply these principles.

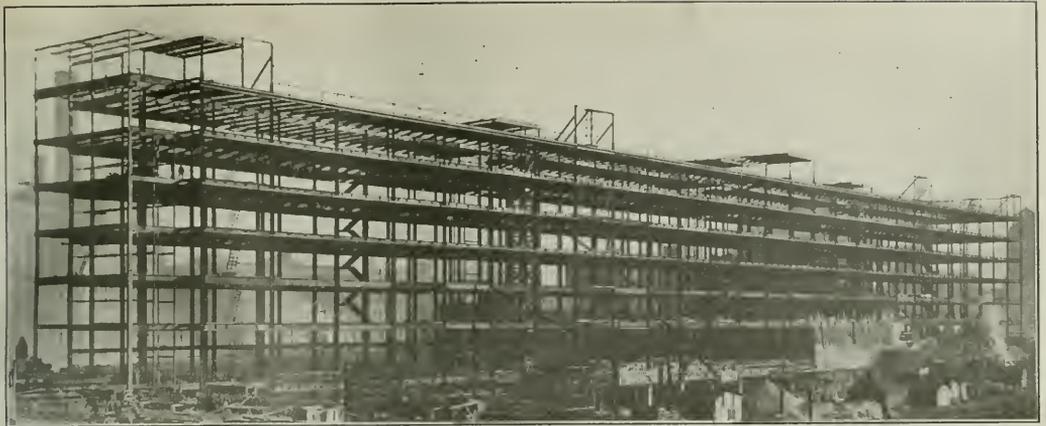
I agree with Mr. Juneau when he states that no educational institution can produce a railroad man. No one who knows anything at all about the business will even suggest that a man can learn the rules or principles of any department of the railroad, and then step out and compete successfully with an employee of a long and varied experience. But it is equally true that a man who learns the rules before the game begins is a much more valuable player than the man who has to be taught as the game proceeds.

CHARLES E. PARKES.

THE DELAWARE & HUDSON reports the number of employees killed (while on duty) in 1921, as 10, as compared with 19 in the preceding year; and of injured 744 as compared with 1,115. The safety department of that road was organized in 1918 and since then the diminution in the number of casualties among employees has shown a marked decrease. The number of employees killed, in all departments, was, for the four years, 40; 18, 19; 10 of injured, 1,615; 920, 1,115, 744. The casualties per million locomotive miles were as follows:

	1918	1919	1920	1921
Killed	2.0	1.3	1.4	0.9
Injured	116.1	78.4	80.9	67.1

In the transportation department the number of killed in 1921, per million locomotive miles, was 0.5 as compared with 2.1 in 1918, and of injured, 30.0 in 1921 as compared with 43.9 in 1918.



The Building Required 7,000 Tons of Structural Steel

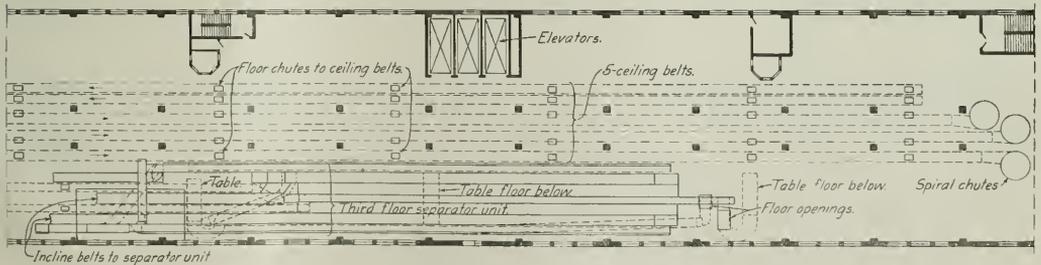
Railway Mail Terminal Will Handle Large Tonnage

Mechanical Transportation an Important Feature of New Union Station Structure at Chicago

THE LARGE railway mail terminal now being erected as a part of the Chicago Union station project* at a cost of \$4,000,000 clearly demonstrates the tendency towards closer co-ordination of the postal service and railway transportation in the handling of mail. For many years, and particularly since the introduction of parcel post, the railway mail service has been operating under adverse conditions in Chicago in the form of facilities that are inadequate

railway mail service and the Union Station Company culminated in an agreement whereby the station company should erect a new mail terminal building and lease the six stories above the track level story to the federal government, the station company retaining the track level story and basement for its own operations.

The new mail terminal will be used for a variety of postal operations, but all of them are closely related to the receipt



A Part Plan of the Third Floor Showing the Separator Unit and the Floor Chutes and Ceiling Belts

for the rapidly increasing volume of business. In 1919 a committee of the railway mail service with William I. Denning, then superintendent of the railway mail service, as chairman, made a thorough study of the operations and the necessary facilities; as a result of its labors a comprehensive scheme of terminal operation was adopted. The fundamental features of this plan were a site conveniently located for both railway mail cars and auto trucks, a building of adequate dimensions and design in which to handle the mails economically and an extensive application of mechanical apparatus. In December, 1920, negotiations between the

and dispatch of mail, either at the Union station or at the other railway stations in Chicago. The operation of this terminal will require the co-ordination of the activities of four independent groups of men; the mail terminal employees, the employees of the postal station, the Union station mail handlers and the employees of the mail street vehicles, but the duties of these several groups and the portion of the building assigned to them will be so clearly defined that little, if any, opportunity will be afforded for any confusion or interference.

An idea of the magnitude of the operations to be carried on in this terminal will be gained from the fact that it will be capable of handling 3,000 tons of mail each 24 hours, and will employ over 1,000 clerks and porters in the railway

*A brief reference to this terminal in connection with its relation to the Chicago Union station was made in an article on the station project published in the *Railway Age* of February 4, page 323.

mail terminal department alone. To meet these needs an enormous building has been provided. It occupies a length of 796 ft. along the east side of the Union station property between Van Buren street and Harrison street. It has a width of 76 ft. and a height of seven stories and basement. Besides the frontage on Van Buren street and on Harrison street which is relatively narrow, a private driveway is being provided along the full length of one side. Like the large freight terminals of the Pennsylvania, the Chicago & Alton and the Chicago, Burlington & Quincy recently completed or under construction in the same vicinity, the mail terminal will be of the two-level type to be served by platform tracks on the lower level and a teamway on the street level, the driveway mentioned above affording 580 ft. of clear tail-board space, or enough for 60 street vehicles at one time. The track level will have platform lengths adequate to serve 61 cars, while the basement will afford communication by means of tunnels with cars at Union station platforms remote from the mail terminal.

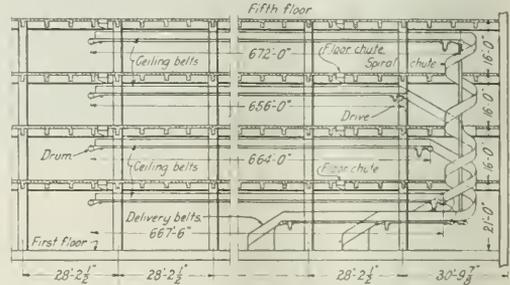
It is to be expected that the expeditious and economical movement of the vast amount of material which must be handled daily in this new terminal in units no larger than the ordinary mail sacks will require the application of suitable material handling equipment to the greatest extent feasible. Accordingly, arrangements have been made for the use of 15 freight elevators, 65 belt conveyors requiring the use of seven miles of belting and nearly 2,000 industrial trucks of various patterns and capacities, together with a sufficient number of tractors to handle them effectively throughout the building.

A Variety of Functions

The terminal will have a variety of functions. From the standpoint of railroad officers, the feature of first interest is the handling of mail received from and delivered to trains at the Union station. This portion of the work will be handled by Union station employees and will consist primarily of the transfer of mail sacks from street vehicles to mail cars and vice versa. However, the great bulk of the operations of the terminal will consist in the receipt, classifying and dispatch of all papers, catalogs and parcel post mail originating in Chicago, as well as mail of these three classes passing through the city. Much of the material will

floor and trucked to the driveway space near the south end of the building for transfer to the street vehicles.

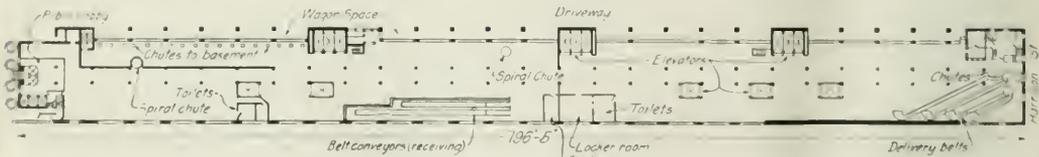
By far the greater portion of the building will be devoted to the railway mail terminal service, the purpose of which is the receipt, classification and dispatch of all mail coming from the street or from the trains which is not received in sacks properly classified for delivery to trains or street vehicles. Such mail will be received from the street along the middle portion of the driveway space and from trains on the basement or track level. From these points of receipt it will be delivered to the upper floors of the building for the necessary work which consists of one or more classifications,



A Part Longitudinal Section of the Terminal. Showing How the Ceiling Belts Deliver Mail to the Spiral Chutes

resulting in the sacking of the mail properly segregated according to the various railway mail routes or street delivery. Another separation introduced is to provide that second-class matter, catalogs and small parcels, are not placed in the same mail bags with large, bulky packages. The first named are classified on the fourth and fifth floors and the other two on the second and third. Separation into these two classifications is to be made on the first floor or, insofar as possible, by persons or companies delivering mail to the terminal.

Second-class, catalogs, and small parcelpost packages delivered in sacks will be placed on 3-ft. by 8-ft. platform



Plan of the Building on the Street Level

be received in the terminal already weighed and with the postage canceled, but on a considerable portion of it these operations will not have been completed. Consequently, it has been necessary to provide for a postoffice in the building for the receipt and handling of so-called postoffice mail.

All classes of mail made up in bags for mail cars on lines served by the Union station will be received on the street level at the north end of the building where 18 chutes will be available for transmitting the mail sacks directly to the track or basement level to be sorted and loaded on platform trucks to be hauled direct to the mail cars of the various trains. Incoming mail on trains entering the Union station will be sorted on the track or basement level, loaded on trucks and delivered to upper floors of the building by elevators. Sacks of mail properly sorted for other railway stations or for Chicago City Delivery will be delivered to the street level

trucks and will be taken to the elevators and delivered to the fourth or fifth floors, according to a general classification. Sacks containing bulky packages, if classified according to states, will be placed on 8 ft. trucks and delivered to the third floor. In general, mail delivered to the upper floors on the 3 ft. by 8 ft. trucks will be transferred according to classification onto smaller trucks of a capacity of about 20 sacks each and delivered on these to the various state sections on the floors for classification.

The classification of bulky parcelpost mail received at the station in unclassified form will be handled through the aid of special classifying equipment, for which purpose the work will be greatly facilitated by having the mailer deliver it to the terminal in tilting box trucks which may be rolled off of the street vehicle with the minimum of effort. These tilting box trucks will be taken to two belt conveyors as indi-

cated in the plan of the street floor where they will be dumped onto the conveyors for delivery up an incline to the third floor. Here the packages will pass through what is known as a separation unit. As shown in the drawing this consists of a series of belts arranged in such a fashion that postal clerks standing on platforms between these belts may pick up packages from the feed belts and throw them onto other belts to separate them for certain general classifications. In addition two belts are to be provided to receive mail for another primary classification. These two belts will deliver this material up an incline to the fourth floor, where the second separation unit will be provided for the separation of the mail into other general classifications. The mail sep-

question are provided with delivery spouts on the street floor, as indicated on the floor plan.

Large Amount of Conveying Equipment Required

The conveyors consist of belting made of four thicknesses of canvas weighing two pounds to the square yard, traveling on rollers consisting of cold drawn seamless steel tubes, 3 1/2 in. to 5 in. in diameter, made of No. 10 gage material. This tubing is spot-welded to pressed steel heads that support turned steel shafts 3/4 in. in diameter. These shafts are to be fitted with renewable steel races and Hyatt roller bearings. The belt conveyors are equipped with either canvas or metal side guards, except where their use in separation units would result in interference. The belts are operated by motor-driven, double-drive pulleys, the main pulley being 30 in. in diameter and provided with an automatic gravity takeup. There will be 65 separate conveyor belts to be driven by 65 motors, all of which are to be of the multi-polar semi-enclosed type designed for 220-volt direct-current service. Provision will be made for a very complete system of control so that any continuous train of the conveying system may be shut off instantly by push buttons located at convenient intervals along its course. This will be provided to insure against the piling up of mail as a consequence of the continued operation of any portion of the train of conveying equipment when a section in advance has been shut off.

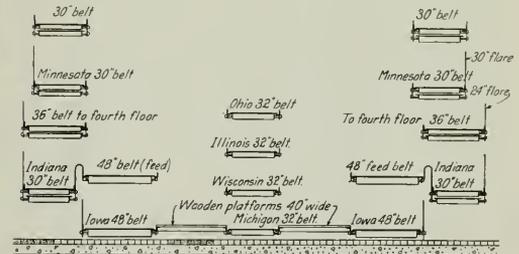
The spiral chutes are to be made of No. 12 gage steel plates with double blades. The mail chutes on the street floor are arranged to close flush with the floor when not in use so as not to interfere with trucking. Mail chutes leading to the ceiling belts are given a quarter turn so that the mail sacks can slide to within three feet of the belts instead of dropping the full vertical distance of 7 ft. from the floor level



Drawing of the Building, Showing the View from Van Buren Street

arated on the classification belts in the separation units on the third and fourth floors will be transmitted through openings in the floors and over other belts to working tables on the second floor and third floors, respectively.

The final separation and classification of all mail handled by the terminal forces is to be made at tables on the second, third, fourth and fifth floors where the mail is placed in sacks and properly marked, ready for delivery to the Union station forces on the track floor or the basement, or to the street vehicles on the street floor for delivery to various parts of the city or to other railway stations. This movement of the mail sacks from the second, third, fourth and fifth floors, to the street floor, the track floor or the basement, is to be accomplished with a minimum of manual labor and without the use of the elevators. Close to the ceilings directly below the second, third, fourth and fifth floors, five longitudinal conveyor belts (20 in all) are being provided, extending practically the entire length of the building and with which communication is afforded by means of 60 openings through each of these floors at approximately uniform intervals; these openings are to be of sufficient size so that mail sacks may be dropped onto the belts readily. Each of these 20 conveyor belts is to be connected with one of five double spiral chutes. One of these is located at the north end of the building, one near the middle and three at the south end. All of these chutes except two extend to the basement and the two in



Typical Section Through One of the Separator Units

to the belt. The elevators are to be equipped with automatic leveling devices to insure that the platforms of the elevators are locked on perfect level with the floor whenever the elevator doors are open.

The new mail terminal building was designed and is being constructed under the direction of J. D'Esposito, chief engineer, and A. J. Hammond, assistant chief engineer of the Chicago Union Station Company, in co-operation with the late Colonel E. H. Shaughnessy, second assistant postmaster general, and W. H. Riddell, general superintendent of the Railway Mail Service. The mail handling equipment is being installed in the building by The Lamson Company, Boston, Mass. Graham, Anderson, Probst & White, Chicago, are the architects.

THE CHICAGO SAFETY COUNCIL, in its co-operation with the railroads to reduce automobile accidents, finds that in the year ending December 31, 1921, out of 210 cases reported by the roads, 63 were instances where crossing gates were damaged by motor vehicles running into them.

House Committee Begins Hearings on Transportation Act

WASHINGTON, D. C.

THE HOUSE COMMITTEE on interstate and foreign commerce on February 23 began a series of hearings, at the request of the state railroad commissioners on proposed amendments to the Transportation Act. Chairman Winslow announced that the hearings would be confined to bills relating to Section 15-a of the act and the provisions relating to intrastate rates and as many bills relating to these subjects have been introduced during the past year the Sweet bill, H. R. 6861, was called up as the basis for the hearing. This proposes to terminate all control by the Interstate Commerce Commission over intrastate rates and to nullify all orders of the Interstate Commerce Commission relating to intrastate rates. It provides for dealing with questions of discrimination against interstate commerce by co-operative proceedings to which both the Interstate Commerce Commission and the state commissions would be parties. It also would repeal Section 15-a.

J. E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, made an opening statement outlining the history of the Shreveport case, the decision in which, he said, "attributed a meaning to the interstate commerce law which had been undiscovered for 25 years." He told the committee that the Interstate Commerce Commission, in spite of the fact that its "Shreveport powers" had been very clearly defined during the six years preceding the Transportation Act, has construed that act as giving it a power totally new which in effect results in centralizing the power of regulation over all rates.

Reading the resolutions adopted by the state commissioners at their convention in Atlanta as outlining their position as to amendments to the law, Mr. Benton said they do not contend that the so-called Shreveport power of the Interstate Commerce Commission ought to be wholly terminated, but the association asks a definition of the commission's jurisdiction that will hold it to the application of that power as it was exercised before the passage of the Transportation Act.

W. D. B. Ainey, chairman of the Pennsylvania Public Service Commission, said that he desired to approach the subject from a somewhat different angle. The Pennsylvania commission is not confronted with any serious situation arising from the Transportation Act, and its relations with the Interstate Commerce Commission are perfectly harmonious, but it is opposing the centralization of regulating authority in Washington on the ground that it is tending to deprive the carriers of initiative and responsibility. He believed that the correct policy of railway regulation is that represented by the Pennsylvania law, which makes the state commission a purely corrective body that does not substitute its judgment for the initiative of the carriers.

"So far as the Pennsylvania commission is concerned," Mr. Ainey said, "we would be perfectly willing to have all our authority taken away as far as railroads are concerned. We would still have plenty to do, but we are concerned with the overcentralization of authority over our rates in Washington. We believe it is depriving the railroads of responsibility and initiative and we don't believe it will lead to the best development of the railroad system or enable the roads to function properly and render adequate service. We believe the removal of all authority from the states such as has been accomplished will lead to a tendency against which we wish to protest because it will narrow the scope of the authority of the railroad through..."

He said he had recently taken up with a member of the commission a question of vital importance to the city of Philadelphia but was told the commission would not deal with a question of the first in Philadelphia but must consider San Francisco, Seattle, Chicago and St. Louis.

Representative Merritt said he agreed that the railroads ought to be allowed more initiative and asked if the proposed legislation provided for it, but Mr. Ainey said he was not discussing any of the bills and had not examined them.

Chairmen or members of a dozen or more state commissions were present prepared to testify on following days and Mr. Benton indicated that he hoped to have an opportunity to present a comprehensive statement later.

Operating Results with Gasoline Motor Cars

THE LINE of the Pittsburgh & Shawmut passes through the coal mining section of Western Pennsylvania and does not reach any large centers of population. Freight forms by far the most important traffic; in fact the road found that passenger trains were unremunerative but were necessary to keep up the production of the mining towns along the line because a supply of men could not be maintained at these points unless transportation facilities were provided to enable them to reach the larger towns. In order to reduce the cost of maintaining passenger service three Bowen motor cars were purchased and were placed in operation during the month of October, 1921. The results obtained up to this time are of special interest as indicating what may be expected with this type of equipment.

The motor cars have already been described (*Railway Age*, October 29, 1921, page 841) and for that reason further details will not be given here. The cars operate on severe grades and are not designed for high speed, the maximum speed on level track being about 30 miles an hour. The schedule on the Pittsburgh & Shawmut, including stops, averages 22 miles an hour. The cars are operated under the standard form of train rules adopted by the American Railway Association. The crew consists of two men—an engineer and a conductor. One car operates out of Brookville, Pa., making 98 miles daily, the wages, including overtime, amounting to \$7.83 for the engineer and \$9.38 for the conductor. Another car operates out of Kittanning, Pa., on an 83-mile daily run, the wages being \$8.63 for the engineer and \$9.10 for the conductor. The wages of the crew on these runs are respectively 17.5 cents and 22.5 cents per train mile.

The mileage per gallon of gasoline with these cars is about 6.8. The total cost of operation, including wages, material and supplies, fuel, and depreciation at the annual rate of four per cent, amounts to approximately 35 cents per train mile. The cost of operation of steam passenger trains based on the same method of ascertaining costs is approximately 71 cents per mile. Thus the motor cars reduce the cost by about one-half, at the same time giving more frequent service and developing business which could not have been obtained with steam train operation.

The cars handle 45 passengers seated, but have frequently been loaded with as many as 65 passengers leaving the initial terminal. There have been no derailments since the cars were put in operation. Some difficulty has been experienced by reason of sleet and ice making it impossible to operate on schedule time. The transmission gears originally applied gave some trouble and it has been necessary to replace them with heavier gears. As a whole, the railroad officers are well satisfied with the operation of the cars as it is felt that very little difficulty will be experienced since minor mechanical defects have been corrected, and the substitution of motor cars for steam train operation will enable the road to conduct its passenger business on a paying basis. The *Railway Age* is indebted to Dwight C. Morgan, vice-president of the Pittsburg & Shawmut for this information regarding the performance of the cars.

The Federal Signal Company's Audible Signal

Interesting Experiments on the Boston & Albany in
Massachusetts and New York



one at East Brookfield, Massachusetts, and one at Chatham, New York.

This apparatus was first put on the market by the Federal company several years ago, and one of them has been in use at Salmon Bay drawbridge, on the Northern Pacific, in the state of Washington, since 1914; but numerous changes of detail have been made in the design since that year. The cutting-out arrangement (by which an approaching engine-

THE BOSTON & ALBANY has in use two audible roadside signals, installed by the Federal Signal Company, of Albany, N. Y., last September, which have given very satisfactory service, functioning as distant signals; an audible warning (a torpedo) sounded in conjunction with the visual indication given by the three-position automatic semaphore. The torpedo is in position to be exploded by the passage of a train, at all times when the semaphore is in the 45-degree position. When the semaphore goes to the clear (90-degree) position the audible apparatus is cut out. The signals are on the westbound track of the main line,

an interlocked stop signal and has never been exploded by a train. It is tested once a month.)

The Boston & Albany signals have operated without failure since they were installed, six months ago. They have been subjected to severe winter weather, and a heavy train service. The signal may be called a repeater of the caution indication, but it operates independently of the visual signal.

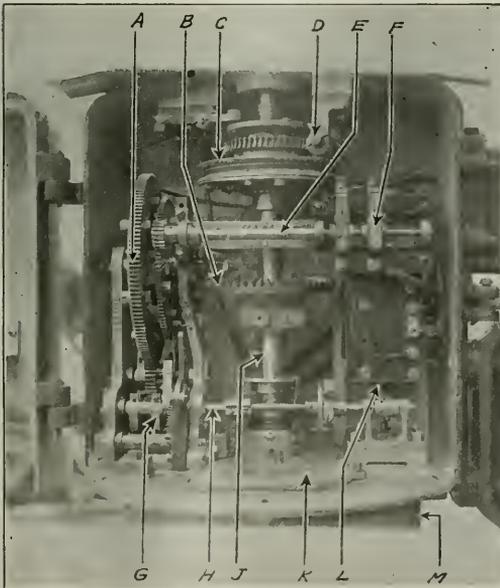
The shell magazine in the audible signal is designed to hold 72 shells, and is so interconnected with the semaphore that when the magazine approaches exhaustion the semaphore blade is set in the horizontal position against approaching trains. On the Boston & Albany reloading once in about two weeks is sufficient, explosions taking place on an average of 25 a week at each signal.

The mechanism is shown in the illustration, the torpedo drum being at the bottom of the case. This drum is rotated by means of a large weight which tends at all times to bring a new cartridge into firing position. This is accomplished by de-energizing a holding winding on the operating solenoid. When a cartridge has been fired, the operating weight indexes a fresh cartridge to the firing position so that the succeeding pick-up of the track relay (when the train has passed out of the block) will again put the mechanism in condition to repeat the firing operation. Check contacts are provided to insure that the audible signal is in a firing position before the signal control circuit is completed, so that the audible signal must be in firing condition before the visual signal can indicate either "proceed" or "proceed with caution."

The mechanism case is mounted on a short post (iron pipe). This is set about 60 ft. in advance of the semaphore so that the explosion, which occurs about one second after the leading wheels of the train pass the signal post (and open the track relay) will sound at the moment when the engineman in the cab is nearest to it.

Within the post is suspended the operating weight, which is attached, by means of a cable, running over a grooved pulley to the main operating sheave C. The weight tends to rotate a main shaft J, at the lower extremity of which is mounted the drum carrying the cartridges (inside of M). Rotation of shaft J drives, through the medium of the bevel gears B, the spur gear A, which in turn cocks the firing hammers as each cartridge is indexed to the firing position. The hammers are held cocked by the triggers G. These triggers are carried on a trigger shaft H connected to the plunger of the solenoid core L. Thus, as the core L drops, the trigger G is disconnected from the firing hammer and one cartridge is exploded. The apparatus can be adjusted to provide for any number of explosions at each operation.

After the explosion, the drum is indexed by the weight to the new firing position. As soon as the solenoid core L is picked up the circuit controller F will close, to permit the semaphore to again clear. The controller contacts are in timed relation to the firing position of the magazine, through the medium of the gears and pinions on the left hand extremity of the shaft E. The shaft D is provided for disconnecting the operating weight when it is necessary to replenish



Federal Audible Signal

man, after seeing the visual signal, can prevent the explosion) which has been a feature of the descriptions heretofore published, is not included in the Boston & Albany installation. (On the Northern Pacific the torpedo apparatus is at

and reload the magazine. Access to the firing chambers is provided through a hand hole plate *K*.

The control of the explosion of the cartridge so that it will occur only on the passage of a train, and at the moment that the locomotive passes nearest to it, is accomplished by means of a contact on the track relay. Assuming that the leading train—the train to be protected—is in section *B-C*, The semaphore at *A* is at caution; and as the following train reaches *A* its leading wheels, by opening the track relay at that point, cause the semaphore arm to move to



the stop position and also cause the opening of a circuit to the solenoid which controls the release of the trigger that causes the explosion of the cartridge.

THE SPACE INTERVAL.—It is getting harder to railroad legislation through Congress now that they have installed the bloc system.—*Southern Lumberman*.

Freight Car Loading

WASHINGTON, D. C.

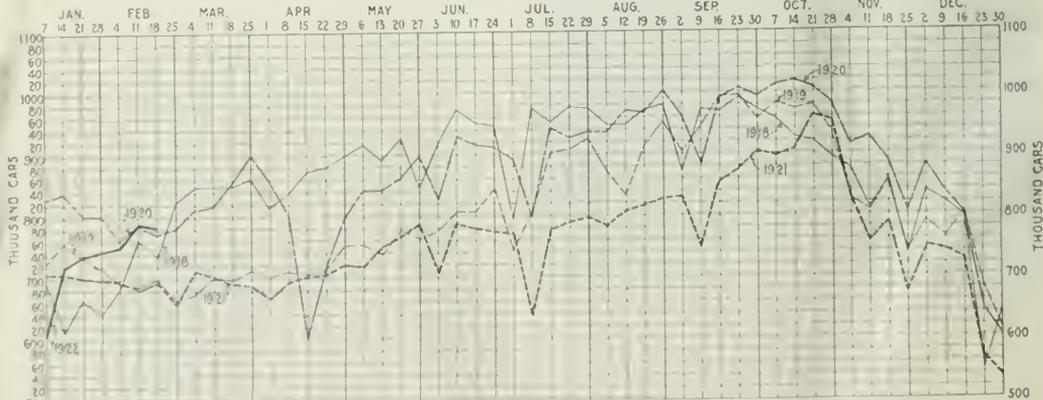
FREIGHT CAR LOADING for the week ending February 18 showed a slight decrease as compared with the preceding week, according to the weekly report of the Car Service Division of the American Railway Association, which is doubtless attributable to the observance of Lincoln's Birthday as a holiday in many parts of the country, but there was a large increase as compared with the corresponding week of 1921 and an increase over 1920. The total was 780,924 cars as compared with 692,007 in 1921 and 772,102 in 1920. The previous week the loading was 788,412. Increases as compared with last year were shown in all districts and in all classes of commodities except coke, forest products and ore. The principal increase was in coal but large increases also were shown in grain and grain products and merchandise and miscellaneous freight. The summary is given in the table below.

The number of surplus freight cars showed another reduction during the week ended February 15 to 278,481, which was 18,178 less than for the previous week. Of these 104,513 were box cars and 112,050 were coal cars.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEAR AGO. WEEK ENDED SATURDAY, FEBRUARY 18, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscel. income	Total revenue freight loaded			
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920	
Eastern	1922	9,833	2,719	46,880	1,654	5,363	569	60,688	60,948	188,654	.....	.....
	1921	5,359	2,889	43,630	1,056	8,621	654	48,511	53,634	34,651	164,354	164,405	
	1920	3,274	2,658	54,319	3,754	2,652	781	44,977	46,093	158,518	.....	.....
Allegheny	1922	1,871	2,976	44,239	5,051	2,687	2,880	38,840	46,711	145,255	145,255	161,446	
	1921	264	83	24,617	188	928	22	5,642	2,907	34,651	.....	.....
	1920	155	77	12,912	279	1,349	35	4,283	2,493	.....	21,585	30,763
Peachontas	1922	4,844	2,219	26,719	508	15,032	432	36,781	36,428	1,296,63	.....	.....
	1921	4,129	2,083	21,003	561	13,345	923	33,892	33,622	.....	109,558	121,862
	1920	13,951	9,214	9,984	1,090	14,915	444	25,310	25,256	100,264	91,764	112,644	
Northwestern	1922	8,768	8,128	5,640	1,381	16,789	1,000	24,125	25,893	.....	.....	.....
	1921	16,392	11,169	22,857	302	4,573	877	29,985	31,244	117,399	102,053	119,917	
	1920	11,372	10,345	16,154	258	3,783	2,099	38,086	29,956	.....	.....	.....
Central Western	1922	5,651	2,265	5,324	170	7,333	909	15,667	21,166	38,485	.....	.....
	1921	5,075	1,833	3,826	139	6,424	529	16,326	23,326	.....	57,478	61,065
	1920	54,209	30,327	190,700	7,666	50,796	4,034	219,050	224,142	780,924	.....	.....
Southwestern	1922	36,729	28,331	147,404	8,725	52,998	8,120	194,063	215,637	.....	692,007	.....
	1921	36,274	29,168	171,408	9,818	57,931	11,614	140,874	314,575	.....	.....	772,102
Total all roads	1922	17,480	1,996	43,296	1,059	2,202	4,086	24,987	8,505	88,917
	1921	17,495	1,159	19,292	.....	2,152	.....	7,115	7,580	78,176	8,821	.....
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Feb. 18	1922	54,209	30,327	190,700	7,666	50,796	4,034	219,050	224,142	780,924	692,007	772,102	
Feb. 11	1922	55,914	30,274	192,167	7,823	52,638	4,015	222,908	222,673	788,412	687,867	786,633	
Feb. 4	1922	48,969	27,998	185,151	7,844	50,204	4,015	218,571	211,134	753,886	699,718	762,680	
Jan. 28	1922	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332	
Jan. 18	1922	52,181	31,961	164,091	7,267	50,328	4,269	213,642	214,536	738,275	708,658	804,866	



Revenue Freight Car Loadings to February 18, 1922

I. C. C. Orders Increasing Intrastate Rates Upheld

Supreme Court Says Effective Control of Interstate Commerce Must Embrace Incidental Control Over Intrastate Rates

WASHINGTON, D. C.

THE VALIDITY of orders of the Interstate Commerce Commission increasing intrastate rates by the percentages applied to interstate rates in Ex Parte 74 was completely upheld in a unanimous decision of the United States Supreme Court handed down on Monday, February 27, in the Wisconsin passenger fare case, followed by a similar decision in the New York passenger fare case. In these cases the state authorities had contested the commission's orders advancing the intrastate passenger fares to 3.6 cents a mile, in spite of state fare laws providing for a lower rate, on the ground that they were beyond the powers of the commission as provided in the Transportation Act. A committee representing the state railway commissioners had also attacked the constitutionality of the provisions of the act, Section 13 and Section 15-a, under which the commission's orders were issued.

The decision was based on the broad ground that Congress in the Transportation Act had undertaken to insure an adequate system of interstate commerce by providing that the revenues should be adequate and that Congress, as the dominant controller of interstate commerce, may, therefore, restrain any undue limitation by a state authority of the earning power of the interstate commerce system in doing state work. The disparity between state and interstate rates which the commission sought to remove was declared to be plainly an undue, unreasonable and unjust discrimination against interstate commerce "within the ordinary meaning of those words" and the court pointed out that the power to remove such discrimination in pursuit of the effort to provide adequate transportation service for the country does not constitute a centralization of authority over both state and interstate commerce but represents merely an incidental regulation of state commerce upon occasion as part of the regulation of the agencies of interstate commerce.

An interesting feature of the decision is that it finds that a "new power" was conferred upon the commission in the new law to deal directly with discriminatory intrastate rates, whereas many members of Congress who were prominent in the drafting of the law have repeatedly said that they were merely writing into the law the doctrine of the Supreme Court's decisions construing the original act in the Shreveport and other cases.

In both of the cases the state commissions had permitted the increase of state freight rates by the percentages applied by the Interstate Commerce Commission on August 26, 1920, to interstate traffic but had declined to permit increases in intrastate passenger fares because of state statutes fixing the rates, and in the New York case, in addition, because the charter of the New York Central fixed a rate of 2 cents per mile on its main line.

In both cases the higher fares ordered by the federal commission have been in effect under injunctions issued by federal district courts whose decisions are now affirmed. In the Wisconsin case it was estimated that the difference in revenues resulting from the difference between the state rate and that ordered by the commission amounts to \$6,000,000 annually and in the New York case the difference was estimated at \$12,000,000.

The opinions were rendered by Chief Justice Taft. After outlining the history and the contentions of the opposing parties, in which he referred to the enormous increase in expenses of railroad operation during federal control and the purpose of the Transportation Act to provide by Section 15-a for an adequate basis of revenues after the return of

the roads, he said that there are two questions for the court to decide: First, do the intrastate passenger fares work undue prejudice against persons in interstate commerce such as to justify horizontal increases of all of them; and, second, are these intrastate fares an undue discrimination against interstate commerce as a whole which it is the duty of the commission to remove? He pointed out that the orders in these cases are much wider than the orders in the Shreveport and Illinois Central cases. It is also stated that Section 13 "for the first time authorized the commission to deal directly with intrastate rates" when they are unduly discriminatory against interstate commerce—"a power already indirectly exercised as to persons and localities with the approval of this court in the Shreveport and other cases."

Transportation Act a New Departure

"It is manifest," the chief justice said, "that the act made a new departure. The new measure imposed an affirmative duty on the Interstate Commerce Commission to fix rates and to take other important steps to maintain an adequate railway service for the people of the United States. This is expressly declared in Section 15-a to be one of the purposes of the bill. Intrastate rates and the income from them must play a most important part in maintaining an adequate national railway system. Twenty per cent of the gross freight receipts of the railroads of the country are from intrastate traffic and 50 per cent of the passenger receipts. The ratio of the gross intrastate revenue to the interstate revenue is a little less than 1 to 3. If the rates on which such receipts are based are to be fixed at a substantially lower level than in interstate traffic, the share which the intrastate traffic will contribute will be proportionately less. If the railways are to earn a fixed net percentage of income, the lower the intrastate rates the higher the interstate rates may have to be. The effective operation of the act will reasonably and justly require that interstate traffic should pay a fair proportionate share of the cost of maintaining an adequate railway system.

Direct Power to Remove Discrimination Conferred

"Section 15-a confers no power on the commission to deal with intrastate rates. What is done under that section is to be done by the commission in the exercise of its power to prescribe just and reasonable rates, that is, the powers derived from previous amendments to the interstate commerce act, which have never been construed or used to embrace the prescription of intrastate rates. When we turn to Paragraph 4 of Section 13, however, and find the commission for the first time vested with the direct power to remove any undue, unreasonable or unjust discrimination against interstate or foreign commerce, it is impossible to escape the dovetail relation between that provision and the purpose of Section 15-a.

"If that purpose is interfered with by a disparity of intrastate rates the commission is authorized to end the disparity by directly removing it because it is plainly an undue, unreasonable and unjust discrimination against interstate or foreign commerce within the ordinary meaning of those words."

Commerce Does Not Regard State Lines

In reply to the objection that the order violated the specific proviso of the interstate commerce act that the commission is not to regulate traffic wholly intrastate, the court said: "Such orders as to intrastate traffic are merely incidental to

the regulation of interstate traffic and necessary to its efficiency. The effective control of the one must embrace some control over the other in view of the blending of both in actual operation. The same rails and the same cars carry both. The same men conduct them. Commerce is a unit and does not regard state lines, and while under the constitution interstate and intrastate commerce are ordinarily subject to regulation by different sovereignties, yet when they are so mingled together that the supreme authority, the nation, cannot exercise complete effective control over interstate commerce without incidental regulation of intrastate commerce such incidental regulation is not an invasion of state authority or a violation of the proviso."

No Doubt as to Constitutionality

It was stated that counsel for the appellant in the Wisconsin case had not contested the constitutionality of the statute, but that counsel for the state commissioners who had been permitted to file a brief *amicus curiae* had done so. On this point the court said that the principles laid down by this court in the Minnesota, Shreveport, Illinois Central and analogous cases "we think leave no room for discussion on this point. Congress in its control of interstate commerce is seeking in the Transportation Act to make the system adequate to the needs of the country by securing for it a reasonable compensatory return for all the work it does. The states are seeking to use that same system for intrastate traffic. That entails large duties and expenditures on an interstate commerce system which may burden it unless compensation is received for the intrastate business reasonably proportionate to that for the interstate business.

"Congress as the dominant controller of interstate commerce may, therefore, restrict undue limitation of the earning power of the interstate commerce system in doing state work. The affirmative power of Congress in developing interstate commerce agencies is clear. In such development it can impose any reasonable conditions on a state's use of an interstate carrier for intrastate commerce it deems necessary or desirable. This is because of the supremacy of the national power in the field.

"It is said our conclusion gives the commission unified control of interstate and intrastate commerce. It is only unified to the extent of maintaining efficient regulation of interstate commerce under the paramount power of Congress. It does not involve general regulation of intrastate commerce.

"The action of the Interstate Commerce Commission in this regard should be directed to substantial disparity which operates as a real discrimination against and obstruction to interstate commerce and must leave appropriate discretion to the state authorities to deal with intrastate rates as between themselves on the general level which the Interstate Commerce Commission has found to be fair to interstate commerce." Discussing the possible effect of blanket increases in rates in particular localities, where, by discouraging patronage, earnings may be decreased, Chief Justice Taft asserted that should such results follow, the Interstate Commerce Commission would be available for appropriate action.

In this case the order of the district court for the eastern district of Wisconsin was affirmed. In affirming a similar decision of the district court in the New York case the court said that similar questions were involved, the only difference being that in New York the state had a charter contract with one of the roads providing for a two cent fare.

State Commissioners to Ask Modification of Law

This decision means a renewal of the campaign to induce Congress to amend the law to deprive the commission of what the court referred to as the new powers conferred by the act. A large number of state commissioners who had been testifying before the House committee on interstate and foreign commerce on bills to restore the powers of the state

commissions were present in court when the decision was read. The Senate committee on interstate commerce has called a meeting for Saturday, March 4, to consider its action on the Capper and other bills in the light of the Supreme Court's decision.

Valuation Bill Passed by Senate

WASHINGTON, D. C.

THE SENATE on February 23 passed the bill introduced by Senator Cummins, at the request of the Interstate Commerce Commission and the state commissioners, to eliminate from the valuation act the requirement that the commission ascertain and report "separately the original and present cost of condemnation and damages or of purchase in excess of such original cost or present value" of railroad lands. There was practically no debate on the bill, but Senator Cummins had devoted an hour or so to an explanation of it. He explained that the commission had held that it is practically impossible to ascertain the cost of reproducing the land holdings of the railroads but that the Supreme Court had held in the Kansas City Southern case that the road must comply with the law, although in the Minnesota rate case the court held that to estimate what would be the actual cost of acquiring the right-of-way if the railroad were not there "is to indulge in mere speculation."

Senator Cummins said that it is estimated that land constitutes about 12½ per cent of the railway property, or approximately \$2,000,000,000 and that if this were doubled by the application of a multiple, the additional 6 per cent return the public would be expected to pay would amount to \$120,000,000 a year. He showed, however, that since the Kansas City Southern decision the commission has been reporting a figure for the cost of acquisition of land made up by using multiples ranging from 0.55 to 2.

"The commission has practically compromised with the railroad claim by adopting about one-third of the railroad demand," Senator Cummins said, "but even with the additions which are proposed, and which the Interstate Commerce Commission is now pursuing as well as it is able, and if no part of the further railroad claim is conceded anywhere, we will add more than \$2,000,000,000 to the value of the railway lands of the United States, and that means an annual imposition upon the people in the way of railway rates of not less than \$120,000,000; and if under the testimony which is being taken all the while by the Interstate Commerce Commission the railway claim should hereafter be given further consideration, it might add \$4,000,000,000 or more to the value of these lands.

"My position is that when the railway companies receive the benefit of the unearned increment of all the lands in the United States, of which they have been in possession in many instances for more than 50 years, when rights-of-way which were insignificant in their cost at the time of acquisition have quadrupled and multiplied in many instances a hundred times, I think they ought to be content, and should not insist that we should not only give them the benefit of the increased value of their property as a whole, but that we should attempt to ascertain what it could cost to acquire by condemnation or purchase their particular rights-of-way at the present moment. That is the whole purpose of this amendment. It is to strike out the requirement that the commission shall find the excess of cost of present condemnation over present value. They are entitled to present value, and I think the commission ought to be permitted to go its way unhampered by a statute of this sort, to ascertain, according to the rules of the law, what the present value of the lands is."

Senator Kellogg remarked that the fact that the commission is required to ascertain this element of value does not necessarily mean that it would be included in the final value.

G. R. S. Company's Auto-Manual Train Control

A System Which Retains All the Advantages of Visual Signals and of the Enginemen's Brain

THE DRAWINGS and photographic illustrations shown in Figs. 1 to 6, inclusive, illustrate the automatic train control system of the General Railway Signal Company, of Rochester, N. Y., which was described in the *Railway Age* of October 29 last; but which since that time has been improved in various details. An essential element of this system is the arrangement for permitting the engineman,

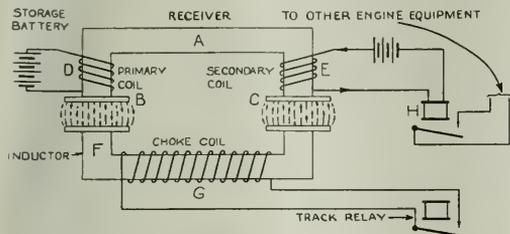


Fig. 1—Inductive Train Control

when alert and watching for and obeying the visual signals, to cut out the automatic brake-setting machinery and thus keep in his own hands full control of his train; and this is the reason for the name adopted, "auto-manual train control." The cutting out device is so arranged that the engineman must have the co-operation of the fireman, thus insuring that it shall not be used unless there are two men alive and active on the locomotive; and the circuit breakers are so combined in a small box that no cut-out can be con-

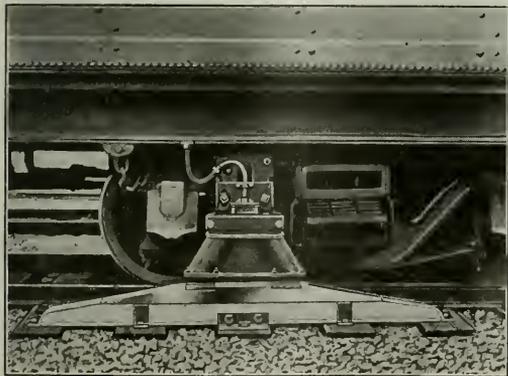


Fig. 2—Receiver on Tender; Inductor on Ties

tinued for a longer time than ten seconds; this to thwart the lazy engineman who might wish to cut out the stop apparatus for a whole run. If an engineman does allow his train to be automatically controlled, it must come to a stop before the control can be released.

From a detailed account furnished by the manufacturer, we condense the following description:

The means by which control is transmitted from the roadway to the moving train is induction, employing the inductor-alternator principle, as illustrated in Fig. 1. The inductor *G* is fixed on the ends of the ties with the pole faces $2\frac{1}{2}$ in.

above the top of the running rails. The receiver or locomotive element *A* is carried on the tender truck so that its pole faces pass about 2 in. above the pole faces of the inductor. On one leg of the receiver is placed a primary coil *D* fed from a storage battery. A secondary coil *E* on the other leg of the receiver includes in its circuit a storage battery and a relay *H*. The magnetic flux in the secondary coil, remaining constant in amount, keeps the flow of current through the relay likewise constant and holds the relay contacts closed. This is the normal condition on the locomotive. When, however, it passes a control point, if the circuit of the choke coil *G* is open, the inductor, partially completing the magnetic circuit of the receiver, will cause a large change of magnetic flux within coil *E*, which in turn will result in a sufficient variation of current to open the relay. The relay, when open, causes a brake application.

If, as the locomotive passes, the circuit of coil *G* is closed

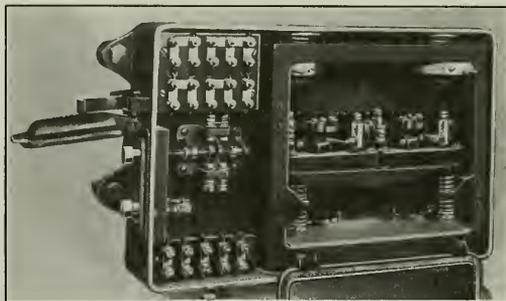


Fig. 3—Reset Key, Battery Switch and Relays

(by the track relay of the track section to which this control applies) this coil will then act as a choke, preventing the magnetic flux from varying materially in the secondary coil of the receiver; the engine relay will not be opened and the train will not be stopped.

It is to be noted that the coil on the inductor is never supplied with energy; the only thing necessary to make the inductor effective to stop a train is the opening of this no-battery circuit. Thus is avoided all trouble or expense to provide a roadside current-supply for train-control purposes. The inductor is of course uninfluenced by sleet, snow, water, etc., and is not affected by stray magnetic fields from passing electric locomotives or current in the propulsion rails. It is on an oak foundation with a manganese steel cap on the top. The manganese steel, being fairly non-magnetic, does not interfere with the proper function of the inductor.

Fig. 2 shows the inductor and the receiver. The receiver is fitted in between the projecting springs and journal box of the truck frame of the tender. It is adjustable vertically to compensate for wheel wear. It is resiliently supported by a cast steel structure fastened directly to the truck frame, in such manner that no car springs intervene between it and the axles.

The engine relay, Fig. 3, is so housed and supported as to be immune to the effects of locomotive vibration. It has a very light, short armature mounted on jeweled bearings. Two relays are employed, a primary and a secondary. The primary relay, designed to be especially rapid in action, takes a

very small amount of energy. The secondary relay need not be rapid in action and is provided with heavy carbon to metal contacts, giving a wide break and is capable of continuous and satisfactory handling of the current taken by the electro-pneumatic valve.

These two relays are resiliently supported in an inner housing, said housing being purposely made heavy, about 70 lb. This inner housing being in turn resiliently supported in the relay box proper, engine vibration is prevented from reaching the relays. The inner enclosure in addition prevents frost troubles and the accumulation of dust on the relays.

The Brake Setting Apparatus

The brake setting apparatus consists of an electro-pneumatic valve, controlling a cylinder which is directly connected to the engineer's brake valve handle (Fig. 6) with a mechanism so designed that the valve will automatically move to the service application position without danger of jumping to the emergency position. The engineer may at any time put on the emergency if he so desires; or, by exerting heavy pressure against the brake handle, he can modify an automatic brake application. Absence of air permits a heavy coil spring within the cylinder to move the brake handle to the service position. The spring is so designed and protected that even if it should break, it would continue to operate reliably.

As before stated, the engineer who permits automatic application of the brakes can release them only after the train has stopped. The reset key, with front and back contacts, is fixed on the side of the tender midway between the front and the back end, and is so connected in the circuit that if operated following an automatic application of the brakes, it will restore the automatic control equipment to normal. If an attempt should be made to lock the key in its release position it would cause an application of the brakes, it being

To make the system "auto-manual" there is provided an "acknowledging contactor" for the engineer and also one for the fireman. A contactor (Figs. 4 and 5) has a normally closed and a normally open contact. The normally open contact is closed when the lever is depressed, and when closed it prevents a brake application. The normally closed contact is controlled by a time mechanism so that it will open after the lapse of ten seconds, thus making it useless for engineer or fireman to attempt to tie or lock the lever down. Ten seconds represents about 900 ft. of train travel at 60 miles an hour.

The two acknowledging contactors are connected in series, so that the engineer and the fireman must operate them

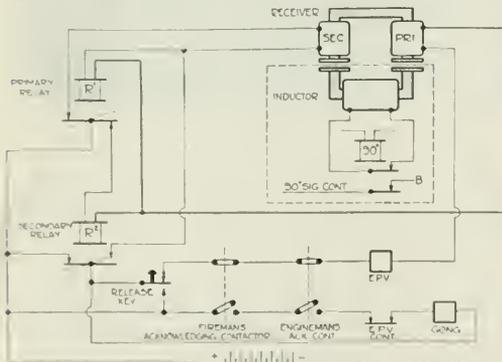


Fig. 4—Circuits of Auto-Manual Train Control

necessary in the process of restoring the automatic control equipment to normal, to first push the plunger in and then allow it to come back to its normal position.

Reversing Switch and Acknowledging Contactors

In order to set up the proper combination so that the engine will not be under control when operating against the current of traffic, a reversing switch is employed, and arranged to be operated by one of the axles of the locomotive or tender. This is so fixed that the direction of rotation of the axle automatically puts into commission the equipment on the right side of the locomotive, with reference to the direction in which it is moving. There is a receiver on each side of the locomotive.



Automatic Cylinder on Brake Valve and Acknowledging Contactors

simultaneously, in order to forestall an application of the brakes. The fireman's lever is under the left window sill and engineer's under the right window sill. To the objection that the fireman's duties would prevent him from operating the contactor it is replied that the direction of the restrictive signals; and on most railroads he is required to call signals, both favorable and adverse.

Current Supply and Speed Control

The current supply for the automatic train control equipment on the locomotive may be taken from the turbo-generator direct or from a storage battery independently charged or from a storage battery of smaller capacity floated across the turbo-generator and provided with the usual reverse current relay to prevent its discharge in case the turbo-generator voltage should fall unduly. There are required about 25 watts continuously while the automatic control is in effect. A cut-out switch is placed in the relay box so that the battery current may be cut off when the locomotive is out of commission.

This system readily provides for permitting a train to move

up to a stop signal without an automatic application of the brakes and without the use of acknowledging contactors, by the use of inductors placed along the road in combination with a time mechanism on the locomotive, the whole so organized that if a train passes from one inductor to the next with speed sufficiently reduced, no brake application will take place. Upon reaching the second inductor, the time

mechanism will again have closed its circuit so that it would not cause a brake application. This speed control arrangement is exceedingly flexible and comparatively simple, involving the same kind of parts as would be used in connection with an automatic stop, except that the time contactors are added. Speed restrictions are instantly removed when, and if the signal ahead shows a more favorable indication.

New Rules for Express Employees Announced

Overtime Provisions Changed—"Split Tricks" Authorized in Revised Code Governing Working Conditions

A NEW CODE OF RULES to govern the working conditions of employees of the American Railway Express Company was announced by the Railroad Labor Board on February 25. Included in the new "national agreement" are provisions for the payment of punitive overtime after the ninth hour of continuous service instead of after the eighth hour, the payment of punitive overtime to employees in train service after 270 hours per month instead of after 240 hours and for the working of "split tricks" where such work can be performed within a spread of 12 hours. The new rules became effective on March 1.

The national agreement with the employees of the American Railway Express Company, formed during federal control, contained 95 rules. The Labor Board's decision contains 17 rules of which eight are reproductions of corresponding rules in the national agreement, one is a new rule governing the effective date, etc., of the decision, seven are revisions of corresponding rules of the national agreement and two are reproductions of old rules with but little modification.

Because the express company and its employees agreed upon practically all of the rules governing seniority, discipline and grievances, and leave of absence, the Board remanded these subjects to the interested parties for settlement. In addition, the decision adds that "the Labor Board believes that certain other subject matters now regulated by the rules of the agreement between the employees and the carrier effective February 15, 1920, may not be covered in all localities by rules of general application, and require further consideration by the parties directly concerned." The rules thus remanded to the parties directly concerned total 76, including the rules of seniority, discipline and grievances and leave of absence.

The changes which have been made by the Board are summarized as follows:

Rules 39 and 90 of the national agreement provide for the granting of transportation to committees of employees handling grievances and to employees and those dependent upon them for support. In the new code, that portion of Rule 39 and all of Rule 90 containing these provisions are eliminated.

The new ruling covering intermittent service and giving the express company the right to employ men on "split tricks" without punitive payments, is exactly the same as the rule recently given to the clerks and to the firemen and oilers and reproduced in the *Railway Age* of January 28 (page 277). Under this new ruling, employees may be used for eight hours of intermittent service within a 12-hour spread.

Under the national agreement "split tricks" could be worked only where five or less employees were assigned at the smaller agencies.

Rule 54 of the expressmen's national agreement provided

for the payment of punitive overtime after the eighth hour. The corresponding rule of the new code provides for the payment of pro-rata rates for the ninth hour and punitive overtime thereafter. In addition, the method of computing overtime for monthly rated employees, which was a part of the old Rule 54, is eliminated in the new ruling.

Under Rule 66 of the national agreement, express employees in train service were paid time and one-half overtime for all work performed above 240 hours per month. The new rule on this point provides for the payment of pro-rata rates for service in excess of 240 hours per month and for time and one-half for service in excess of 270 hours per month.

The same provisions were made for relief, substitute and extra train service employees in Rule 73 of the national agreement and the comparable rule of the new code has been changed to conform with the new Rule 66. In addition, Rule 73 provided that employees in train service performing extra work not in place of any regular messenger and paid no stated salary should be paid 50 cents per hour and helpers 40 cents per hour. These rates of pay are raised in the new code to 60 cents and 50 cents per hour, respectively.

In providing for the payment of employees called to protect a route other than their own, Rule 74 of the national agreement provided that;

"Compensation for time so occupied shall be paid on following basis: For the first eight hours pro-rata, time thereafter at time and one-half time applied to each trip. (There will be a minimum allowance of two hours at time and one-half time for two hours' work or less. If time exceeds two hours but is less than eight hours, the bonus of one hour will continue up to and including the seventh hour)."

The new ruling on this point provides that "compensation for time so occupied shall be paid for on the minute basis at pro-rata rates with a minimum allowance of three hours' pay for two hours' work or less."

The minimum meal period of 30 minutes provided for in Rule 48 of the national agreement is changed in the new code to 20 minutes.

Rule 55 of the national agreement pertaining to punitive payments for calls to perform work not continuous with the regular work period, is changed so that the provisions of this rule apply to such calls either *before* or *after* the regular work period.

The wording of Rule 1 relative to the scope of the rules has also been changed slightly but its effect will be virtually the same.

Included among the rules of the national agreement which have been approved by the Board are those covering payments for reporting and not used, the eight-hour day, fixing and changing starting time, Sunday and holiday work, monthly assignment of employees in train service, overtime for fractional parts of a month of employees in train service and the payment of train service employees in short turn-

around service. In addition portions of several other rules are reproduced unchanged in the new code.

Similar rules relating to overtime payments for calls and monthly assignment and overtime rates for train service employees were also announced by the Board to apply to the Southeastern Express Company.

The questions of working rules and wages for yardmasters will be held in abeyance pending the outcome of conferences now being held between the carriers and their train service employees according to a recent decision of the Labor Board. Accordingly no new rules to govern the working conditions of these employees will be announced at this time nor will the organized yardmasters be a party to the wage reduction hearings which will begin on March 6.

Rules for Supervisors of Mechanics Announced

ANOTHER NEW CODE of rules governing, in this case, the working conditions of employees who are members of the International Association of Railroad Supervisors of Mechanics, was announced by the Railroad Labor Board on February 28. The new rules, which are reproduced in full below, apply to the Baltimore & Ohio (Chicago Terminal); the Boston & Maine; the Colorado & Southern; the El Paso & Southwestern; the Gulf Coast Lines, including the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the New Iberia & Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico; the St. Louis Southwestern, and the Southern Pacific (Pacific System). They are effective March 1.

The new rules are as follows:

Rule 1. The term "supervisor of mechanics" as hereinafter used, shall be understood to include all foremen below the rank of general foreman supervising mechanics in the maintenance of equipment department.

Rule 2. All supervisors of mechanics, herein specified, shall be compensated on a monthly salary basis.

Rule 3. To determine the daily basis for all employees herein specified, multiply by twelve the regular monthly rate (exclusive of compensation for extra service), and divide the result by the number of days in a year that service has been customarily performed.

Rule 4. Monthly salaried supervisors of mechanics shall be required to remain on duty only a sufficient length of time after the shift of mechanics they supervise have completed their tour of duty, to properly turn over the work to their successors, if on a relief position; or if not on a relief position to see that there are no fire hazards and that everything is in proper place and order.

Rule 5. Supervisors of mechanics will not be required to report for work on Sundays, unless they have supervisory duties to perform, or when attending a conference in the interest of the service.

Rule 6. Supervisors of mechanics whose tour of duty consists of seven days per week, will be granted two days off each month. If for any reason the supervisor is not permitted to have two days off each month, he will be compensated for those days on the pro rata basis, in addition to the regular monthly compensation.

Rule 7. There will be no deduction in the compensation of supervisors of mechanics on account of shops working reduced hours.

Rule 8. The entering of employees in the positions occupied in the service, or changing their classification or work, shall not operate to establish a less favorable rate of pay or condition of employment than is herein established.

Rule 9. When a new position is created the rate of pay will be established to conform to positions of similar character and responsibility.

Rule 10. Foremen temporarily assigned to higher-rated positions will receive the higher rate.

Rule 11. When supervisors of mechanics are required to leave their established headquarters (which will be designated by superior officers), in compliance with the directions of superior officers, they will be paid necessary actual expenses while away.

Rule 12. Employees covered by this schedule and those de-

pendent upon them for support will be given same consideration in granting free transportation as is granted other employees in service.

Rule 13. In filling vacancies or new positions, supervisors of mechanics senior in the service employed on a division or terminal making written application for such position, shall be granted preference where ability is conceded; the superintendent or master mechanic to be the judge.

Rule 14. When a position held by a supervisor of mechanics is abolished, advance notice thereof will be given, and so far as the management is concerned, he may resume his seniority in the craft from which he was promoted.

Rule 15. Efforts will be made to provide suitable employment for supervisors of mechanics who have given long and faithful service and have become unable, on account of age or infirmity, to handle their present positions.

Rule 16. In case a supervisor of mechanics accepts an official position with the carrier, or a salaried position as a representative of the employees, he will retain all seniority rights as provided for in Rules 13 and 14.

Rule 17. This agreement shall be effective as of March 1, 1922, and shall continue in effect until it is changed as provided herein or under the provisions of the Transportation Act, 1920.

Rule 18. Should either of the parties to this agreement desire to revise or modify these rules, 30 days' written advance notice, containing the proposed changes, shall be given and conferences shall be held immediately on the expiration of said notice unless another date is mutually agreed upon.

The new rules are to apply to each of the above-named carriers "except in such instances as any particular carrier may have agreed with its employees upon any one or more of such rules, in which case the rule or rules agreed upon * * * shall apply * * *"

Referring to certain rules proposed by the employees, the decision says:

The Board has eliminated proposed rules relative to classification of shops, classification of supervisors of mechanics, and duties required in case of industrial disputes. These rules shall cease and terminate, except in such instances as any particular carrier may have agreed or may hereafter agree with its employees upon any one or more of such rules, in which case the rule or rules agreed upon by the carrier and its employees shall apply on said road.

All rules regarding the subject of discipline and grievances are left to the carriers and their employees for adjustment, the decision stating that a "substantial number of the carriers and their employees have agreed upon the major part of" these rules. The Board also adds:

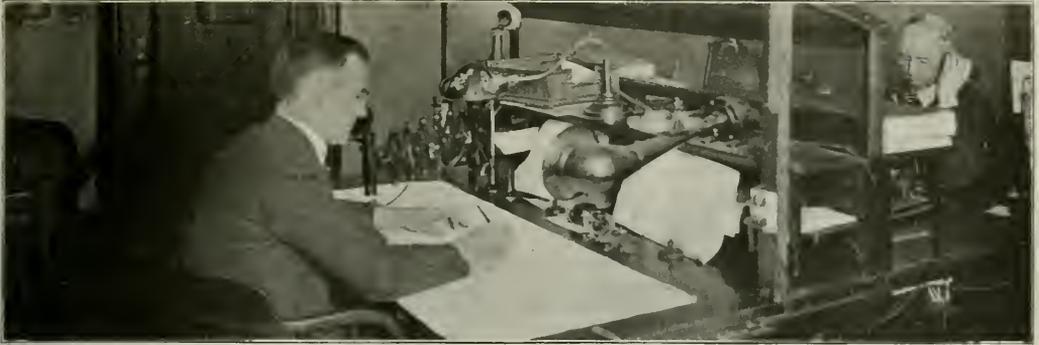
The Labor Board believes that certain other subject matters may not be covered in all localities by rules of general application, and require further consideration by the parties directly concerned.

Similarly the questions of vacations and sick leaves with pay are, according to the terms of this decision, remanded to the carriers and the employees for settlement.

Correction

IN THE correspondence between W. H. Chandler, president of the National Industrial Traffic League and Thomas De Witt Cuyler, chairman of the Association of Railway executives, reproduced in the *Railway Age* of February 25, page 487, Mr. Cuyler is quoted as stating that "when the Railroad Labor Board announced its revision of the shop crafts agreement, it informally estimated that this revision would probably enable the railroads to save \$300,000,000." This should have been \$50,000,000.

THE CHICAGO & NORTH WESTERN has asked for a permanent injunction to restrain the Minnesota Railroad and Warehouse Commission from enforcing what is known as the "car shed law" of that State. The case was taken under advisement by the District Court at Minneapolis, on February 18. The law, which is scheduled to go into effect on September 1, requires railroads to build sheds for the protection of car repairers.



Loud-Speaking Telephone Receiver on Dispatching Circuits

The Telephone in Trunk Line Railroad Service*

A Discussion of the Use of Long Distance and Dispatching Circuits on the New York Central

By Stanley Rhoads

Telegraph and Telephone Engineer, New York Central Lines

THE USE of commercial telephones in railroad service began about 1890, but the privately owned and operated lines, such as dispatching and message lines, were introduced late in 1907. The telephone service on nearly all railroads is supervised by the telegraph department although at present the telephone outweighs the telegraph in importance on many railroads.

The expense of the telephones in railroad service is a quite appreciable item in the cost of operation of a road, as may be judged by the fact that it is estimated that the annual cost of the rented telephone service is between \$7,000,000 and \$10,000,000 for the railroads of the country. This includes the rental of the telephones and switchboards, together with the salaries of the operators, but does not include the cost of maintenance or the annual charges on the railroad-owned long-distance lines, which it is difficult to separate from the costs for other wires. The New York Central Lines costs for telephone rentals, toll calls and operators' wages total over \$800,000 a year in normal times.

There are 9,500 rented telephones on the New York Central Lines, of which 5,500 are connected to 116 private branch switchboards, which require 250 operators; the remaining 4,000 telephones are on direct exchange lines. Each rented telephone costs close to \$100 a year for rent, operator's wages, toll calls and measured service, although the nominal rental on the bill of the commercial telephone company may be but \$3.60 a year. These figures indicate that the railroads probably use more telephones than any other industry in the country.

To give service over private lines of the railroads to the intermediate towns where no railroad exchange is maintained, a semi-local telephone line is provided on some railroads, with rented telephones connected at these towns, so that the division headquarters switchboard can be called directly, or can call these stations for such business as arranging Pullman reservations, obtaining freight or ticket tariffs, etc. It is not as yet economical for all stations to be connected to such railroad semi-local lines because the present rental rate

on the telephones for such use is so high that it is prohibitive.

One switchboard operator can usually handle about 75 local telephones on a railroad private branch exchange, although if the lines are very busy, 25 may be all that can be handled. Two long distance lines may give one operator enough to do if the lines are busy and the conversations are short, for some time is required to make the record of the call. Five long lines are about all that one operator can handle even if their load is light.

Telephone repeaters are an important and indispensable adjunct to railroad long distance telephone service. It would be impossible to give service for distances as great as New York to Chicago with practicable sizes of wire, without them. The repeaters are rented from the American Telephone and Telegraph Co., and it is probably betraying no secret to say that they cost \$1,200 each a year.

Economy of Railroad-Owned Long Distance Lines

Telephone service from New York to Chicago over the commercial telephone lines costs about \$5.80 for the first three minutes and \$1.90 for each additional minute, for particular party calls, such as railroad officers make, and based upon the average length of calls on the New York Central between these points, the cost would be more than \$10 a call. This road has at the present time an average of 32 calls a day over the railroad line between New York and Chicago, averaging 3.75 minutes each. At commercial rates these calls would cost \$231 a day, or \$70,686 in a year of 306 business days. This is equivalent to the interest on \$1,178,100 at six per cent. A line between New York and Chicago at present prices would cost about \$300 a mile, or approximately \$300,000. The interest on this at six per cent would be \$18,000; consequently the railroad line is economical, giving about \$70,000 in service at a cost of \$18,000 a year.

At Cleveland the line is cut through to Chicago only while the connections from New York to Chicago are up. During the remainder of the time the line is used locally east and west from Cleveland. The sum of the through and local service would be equal to that of the through circuit for the

*Abstract of a paper presented before the Western Society of Engineers, Chicago, on February 23.

full eight-hour day. Therefore, the line is worth four times \$70,000 because it is cut through to Chicago only one-fourth of the time for the 32 calls a day, making the total circuit value four times \$70,000 or \$280,000 a year, nearly enough to pay for the line each year.

Another way to state the conclusion is that more calls can be handled for the same money over railroad-owned long distance lines than over commercial lines. Many important matters will be delayed or valuable opportunities lost if railroad officials depend on commercial service because it is well-known that the number of commercial calls will be kept at a minimum by the fear of the large toll bills.

Telephones for Service With the Public

The public makes considerable use of the telephone to obtain information regarding the time of arrivals and departures of passenger trains and rates of fare. This demand has become so large at the big terminals that it has been necessary to provide special equipment to take care of it. A special twelve-position switchboard is provided for this use at the Grand Central Terminal. Telephone requests for Pullman reservations have also increased at the large cities, until special switchboards are required for this service.

Several railroads make use of automatic telephones at locations where operating conditions warrant the separate privately-owned plant. The Illinois Central has an extensive system in Chicago, while the Louisville & Nashville has several installations. The New York Central Lines have two, one on the Michigan Central at Detroit and one at New York City.

Message Telephones

There are at present 48 selector message telephone circuits on the New York Central Lines with 1,464 selectors. These message circuits are like train dispatching circuits in their equipment and are used as dispatching circuits when the latter fail.

Therefore some railroads call them emergency dispatching circuits. It is standard practice to place an operator on them at the division office, who does the ringing for other stations and who is called the monitor.

Messages are handled on these circuits about the same as on telegraph circuits insofar as symbols, form and sequence of filing time, date, address, text, signature and operators' signatures are concerned. It is difficult to eliminate conversational use of such circuits but such use is not encouraged. If the railroad is on the complete telephone basis, all railroad messages to and from way stations are handled on these circuits. Messages are handled just about twice as fast by telephone as by telegraph, according to our experience.

It is only a question of time until the chief trunk line railroads will be on the complete telephone basis on their main lines at least. Even on divisions where the telegraph is still used for message work and the telephone for dispatching, the operators make so little use of the telegraph that they are noticeably out of practice, and object to the use of the telegraph.

Nine-Hour Law Forced Adoption of Telephones

The first cause of the adoption of the telephone for train dispatching was the so-called "nine-hour" law of 1907 which limited the hours of service of telegraph operators to nine hours regardless of the actual work performed. The unlooked for and highly profitable result was that a great deal more work could be done by telephone dispatching than by telegraph and with lessened effort, by the same man on the same circuit.

This was reflected in faster train movements, reduced delays and consequent economies. It has also led to extending the length of dispatching districts in many cases, or to the doubling up of two districts during slack periods. There was some skepticism in the early days regarding the safety

of the telephone for train orders but experience soon caused this to disappear. The results during 15 years of service under all sorts of conditions is the positive and conclusive verdict in favor of the telephone for this use.

There are two telephone train dispatching circuits on the New York Central at New York, on which no one wears a head-receiver, loud speaking telephones being provided at the dispatcher's offices and at all the way stations. Each circuit is about 30 miles long with 12 stations. One extends to Harmon and the other to North White Plains. There is so much traffic in this territory that the operators along the line would have to wear the receivers all the time if the head band type were provided. Trains pass the stations at such close intervals at certain times of the day that it is necessary to report their passing time to the dispatcher by the quarter minute.

The Western Electric Company has furnished a vacuum tube type of loud speaking telephone for the dispatcher on the Harmon circuits. Selectors would be too slow for such circuits, as it is necessary that all stations hear what is said and in this respect loud speaking telephones are the only kind that can compete with Morse telegraph, which of course can be heard at all stations all the time.

An important factor in economical railroad operation is the outlying telephone. One method is to run separate lines from the block stations to the outlying switches, where booths or pole boxes are provided. The train crews use these telephones to tell the block operators when their trains are in the siding, clear of the main track. Other railroads connect these telephones directly to the dispatching circuit and use them at closed stations, or at stations closed part of the day, as well as at switches. Thus the conductors have direct communication with the dispatcher, which permits giving train orders direct to the conductors without the intervention of a third party—the operator—and would seem to lessen the chance for error. It also places the responsibility upon an employee—the conductor—who has had long service, is well versed in the operating rules and is consequently more to be trusted than newly employed operators who may in many cases be young and inexperienced persons.

FIRE, OF UNKNOWN ORIGIN, at the car shops of the Atchison, Topeka & Santa Fe, in Chicago (West 38th street and South Central Park avenue), destroyed two freight cars on February 25. Estimated loss including part of a car repair shed, \$65,000.



Photo by International

Handling Coal in England

Chilean Railways' Electric Passenger Locomotives

Two Types Provided for Express and Passenger Service—
Express Locomotives Will Use Regenerative Braking

ATOTAL of 39 electric locomotives are to be supplied to the Chilean State Railways in the contract which provides for electrifying the section from Santiago to Valparaiso. This includes 6 express passenger locomotives, 11 for local passenger service, 15 for road freight service and 7 switchers.

The contract was awarded to Errazuriz, Simpson & Company, a Chilean firm, and all electrical equipment will be furnished by the Westinghouse Electric International Company. Conditions which must be met and the manner in which electric traction will be used to meet these conditions were described in an article in the January 21, 1922, issue of the *Railway Age*, page 216.

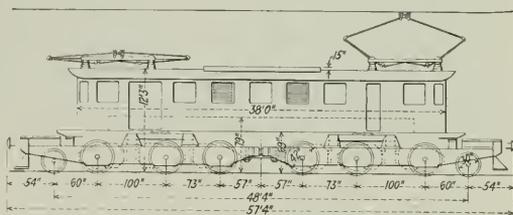
Express Passenger Locomotives

The six electric locomotives which are being built for express passenger service will be capable of hauling 300-ton trains in either direction between Valparaiso and Santiago without the aid of helpers as is now necessary with steam operation on the Tabon grade, between Llai Llai and La Cumbre. This type of locomotive will weigh 127 tons and will have 105 tons on the drivers. It will have a nominal rating of 2,250 hp. corresponding to a speed of 37 miles per hour at a tractive effort of 23,400 lb.

The wheel arrangement will be 2-6-0 + 0-6-2, consisting of two main trucks, each of which has three driving axles and a two-wheel guiding truck. The cab will be of the

Chilean railways will be changed to M.C.B. standard, the Chilean freight cars now use the Continental type drawhooks and for this reason the M.C.B. couplers will be provided with attachments for chain couplers.

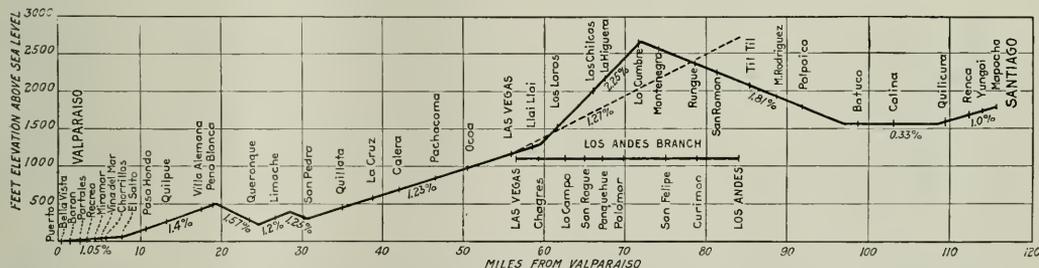
The automatic air brake equipment will be the Westinghouse type 14-EL, a standard similar to that used on the



Side Elevation of Express Passenger Locomotives

present steam locomotives. With this equipment straight air is available for handling the locomotive alone and the automatic feature for both locomotive and train.

The locomotives will be equipped with six 275 hp. driving motors provided with field control and geared direct to the axles by Nuttall flexible spur gears. These motors are de-



Profile of Zone to Be Electrified

single box type and the motors will be geared direct to the driving axles.

DIMENSIONS AND WEIGHTS OF EXPRESS PASSENGER LOCOMOTIVES

Classification	2-6-0 + 0-6-2
Length over buffers	57 ft. 4 in.
Length over cab	38 ft. 0 in.
Total wheelbase	48 ft. 4 in.
Rigid wheelbase	14 ft. 5 in.
Diameter of driving wheel	42 in.
Diameter of guiding wheel	30 in.
Weight of complete locomotive	253,600 lb.
Weight of mechanical parts	160,000 lb.
Weight of electrical parts	93,600 lb.
Weight per driving axle	35,000 lb.
Weight per guiding axle	21,800 lb.

The trucks will be connected at the inner ends by a drawbar held in tension by spring buffers. The frames will be cast steel, bar type, located outside of the wheels, connected by cast steel bumpers and crossies and carried on semi-elliptic springs over the journal driving boxes.

The cab underframe will be of rolled steel longitudinal members connected by cast steel and rolled steel cross members. M.C.B. couplers will be used with Continental spring buffers. Although eventually all drawbar equipment on the

signed for operation two in series on 3,000 volts and will be grouped in three speed combinations, all six in series for low speeds, three in series with two groups in parallel for two-thirds speed and three groups each with two motors in series for full speed. There will be six running positions, the change from one motor combination to another being made by the shunting method of transition.

The control equipment is designed for operation of the locomotive from either end and provision for regenerative electric braking is included. This enables the locomotive to return energy to the overhead system when descending grades. The main motor armatures will be connected in the same combinations when regenerating as when motoring, the excitation for the motor fields during regeneration being supplied by a constant voltage motor-generator set.

There will be two master controllers, one in each end of the cab, and the same controller will be used for both motoring and regulating. This controller will have four levers with a total of 51 notches available in the three combinations. Westinghouse type HLF control establishes the main circuit

connections by the use of individual unit switches operated by compressed air controlled by electro-magnetic valves.

Motor-generator sets will supply low voltage current for the control equipment, blowers and compressors. This is a two-bearing type of machine with a common frame for both motor and generator. The normal rating of the set is 35 kw. at 95 volts with 3,000 volts at the motor terminals.

The current collectors will be spring raised, air lowered and mechanically locked in the lowered position and controlled throughout by compressed air.

On level tangent track these locomotives will have a running speed of 61.5 miles per hour when hauling a 300-ton trailing load. On the Tabon grade, which is 2.25 per cent, the average running speed will be 33.5 miles per hour. The maximum tractive effort based on 25 per cent adhesion will be 32,500 lb. and the maximum speed 62.6 miles per hour. The range of speed in regenerative braking will be 12½ to 50 miles per hour.

Local Passenger Locomotives

In general appearance the 11 electric locomotives for local passenger service will be somewhat similar to the express passenger locomotives. This locomotive will weigh 80 tons and the wheel arrangement will be 0-4-0 + 0-4-0. It will be capable of hauling a trailing load of 350 tons from Puerto to Vina del Mar, 260 tons from Vina del Mar to Llai Llai and return and 300 tons from Las Vegas to Los Andes and return. These locomotives will have a rating of 1,500 h.p. corresponding to a tractive effort of 15,600 lb. at a speed of 31 miles per hour. The maximum tractive effort under standing conditions will be 40,000 lb. and the maximum speed will be 56 miles per hour. The cab will be of the single box type and the motors will be geared direct to the axles. The general dimensions and weights will be as follows:

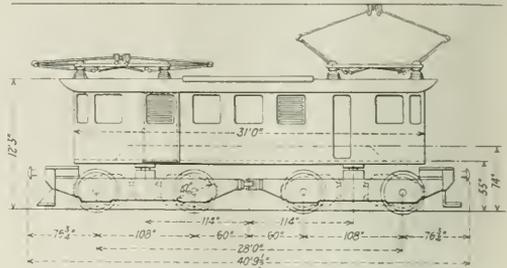
DIMENSIONS AND WEIGHTS OF LOCAL PASSENGER LOCOMOTIVES

Classification	0-4-0 + 0-4-0
Length over buffers	40 ft. 9½ in.
Length over cab	31 ft. 0 in.
Total wheelbase	28 ft. 0 in.
Rigid wheelbase	9 ft. 0 in.
Diameter of driving wheel	42 in.
Weight of complete locomotive	160,000 lb.
Weight of mechanical parts	96,000 lb.
Weight of electrical parts	64,000 lb.
Weight per driving axle	40,000 lb.

The two trucks, each having two driving axles, will be connected at the inner ends by an articulated coupling in the form of a Mallet hinge. The frame and cab construction,

the couplers and the brake equipment will be similar to those of the express passenger locomotives.

The local passenger locomotives will be equipped with four 275 h.p. driving motors provided with field control and geared direct to the axle with flexible spur gears. There will be two combinations by connecting the motors in series and in parallel and additional speed variations will be obtained by varying the fields of the motors.

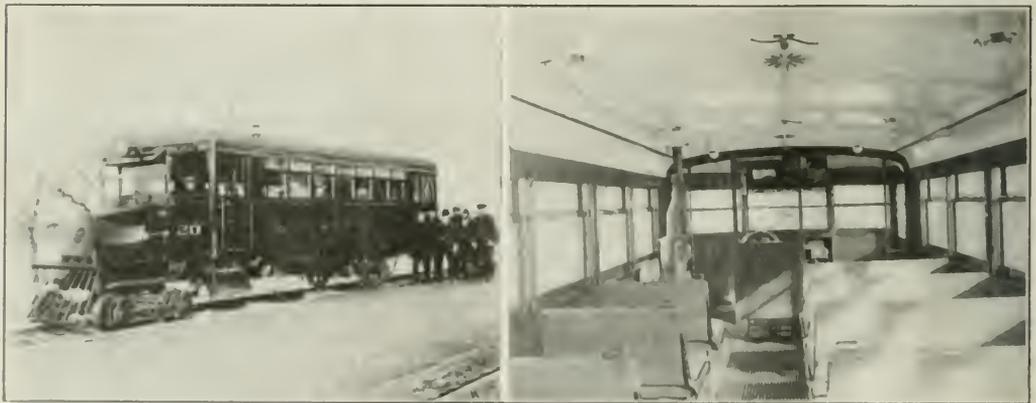


Side Elevation of Local Passenger Locomotives

The control equipment is designed for operation of the locomotive from either end but the grade conditions on the section of line on which these locomotives will operate do not justify the use of the regenerative braking feature. There will be two master controllers, one in each end of the cab, each controller having two levers, namely, speed and reverse, with a total of 23 notches available in the two combinations. The switching equipment duplicates that on the express locomotives.

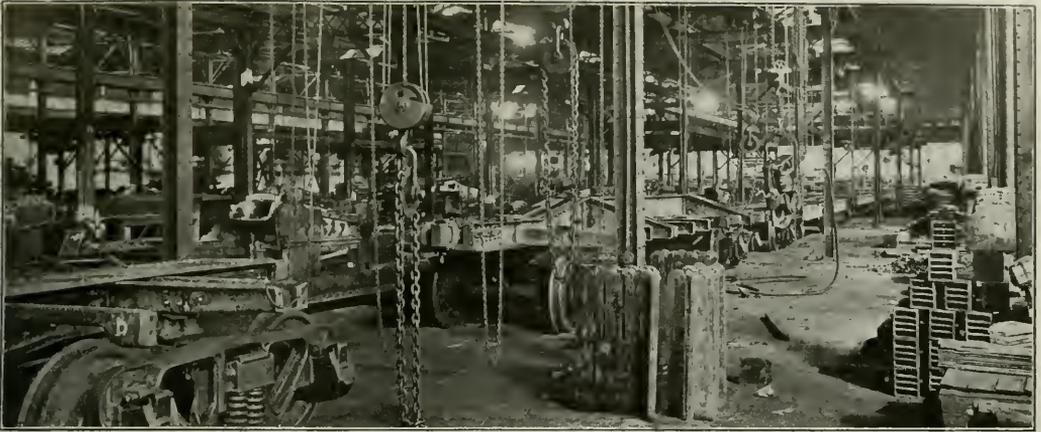
The motor-generator set will be a double armature machine, each armature consisting of a motor and a generator. The normal rating of the set will be 22.5 kw. at 95 volts with 3,000 volts at the motor terminals. The current collectors will be the same as on the express passenger locomotives.

On level tangent track these locomotives will have a speed of 56 miles per hour when hauling a 220-ton trailing load. The maximum tractive effort based on 25 per cent adhesion will be 40,000 lb. A great many of the electrical and mechanical parts are interchangeable between the express and local passenger locomotives.



Gasoline Motor Car on Lewisburg, Milton & Watontown

Exterior and Interior Views of Car Built by J. G. Brill Co., Mack A.C Chassis—Note Seats for Three on One Side of Car—Has Seating Capacity 18. 11' 3 1/2" Long Overall and 9' 8 1/2" in Wide. Passenger Compartment Finished in Cherry-Stained Mahogany



Business Handicaps of the Railway Car Shop

Lack of the Incentive of Competition—Limitations on
Specialization—Absence of Cost Control

By J. W. Roberts

President, The Roberts-Pettijohn-Wood Corporation, Chicago

IN A SERIES of articles which recently appeared in these columns the present writer reviewed the results of a special study of the relative cost of making heavy repairs to freight cars in a railroad shop and in a contract shop. In the case reviewed the cost of the work done in the outside shop was found to be less than that done in the railroad shop, but the question may quite properly be raised as to whether this result is typical, or may not be due to special conditions not generally prevailing.

We know much more of the cost of contract shop work than of railroad shop work. In the former case the volume and the quality of work performed for the money paid out is definitely established by contract and is measurable. In the case of the railroad shop, however, we have, generally speaking, no reliable information either as to the total actual cost, the volume or the quality of the work turned out. Since railroad accountancy does not recognize the cardinal principle of cost accounting—that expense should follow the benefit conferred or the causative responsibility—the ascertainment of dependable railroad shop costs is a difficult undertaking. The question, therefore, cannot be answered by the simple process of demonstration, and we shall be obliged to satisfy ourselves by an analysis of the general situation.

Railroad Manufacturing Ventures

It is often contended that a common carrier strays outside its bailiwick when it engages in manufacturing enterprises. Manifestly a railroad should engage in manufacturing effort, if it be foreign to its nature, only for very good reasons. One good reason would be, for instance, the advantage of definite and enduring economies, if they are thus to be gained. Another would be necessity imposed by isolation from manufacturing centers, or the difficulty attending any other than an internal source of supply. The genuineness of the necessity can be readily tested, but where economy is the

motive it is more difficult to determine whether appearances may be relied on and, if so, for how long a time. How many railroad manufacturing establishments are strictly necessary adjuncts or are definitely known to be paying their way? Most such enterprises live, it is believed, by grace of the management's tolerance.

Railroad management requires special training and a high degree of technical skill because of the peculiar demands of the business. Even so does the manufacturing industry require peculiar skill and ability because it has its own laws and rules of procedure which are as inexorable as those pertaining to the field of transportation. The known advantages possessed by a railroad-fostered manufacturing enterprise, such as transportation at actual cost, an unsolicited patronage, a divided burden as to general expense, and certain other special privileges are, after all, merely incidental benefits. On the other hand it is subjected to handicaps of a fundamental character when compared with private industry. It lacks the spur of vigorous competition, which is the ever-present incentive for the private producer to work efficiently lest his business perish, and we recognize no greater necessity than that of self-preservation.

Now let us briefly examine into the commercial car plant's situation, as compared with the average railroad shop, after which the reader may, it is hoped, be assisted in arriving at his own conclusions.

Relation of Wage Payment Basis to Labor Efficiency

Manufacturers have long since recognized that while the labor wage is an important element of cost, the man-hour output is of even greater importance. Every workman's service costs more than his wage. The additional cost is proportional to the time he expends in the shop. If the wage is based on piece work performance, the individual's pay depends on his output, but the fact remains that the shop time

he consumes further regulates the cost of his production.

For example, a shop operating on a piece-work basis may determine that 100 operations constitute a normal day's work, and may fix a rate of eight cents a piece. An inefficient operator may produce only 80 pieces a day and receive therefor \$6.40; an efficient operator may produce 120 pieces a day for which he receives \$9.60. Adding to these amounts the cost of power, supervision, maintenance of buildings and equipment, depreciation, insurance, taxes and other items of indirect expense, which may total \$5.00 a day for each man employed, it is found that the total cost of 80 pieces produced by the inefficient workman is \$11.40, or 14¼ cents each, while the 120 pieces produced by the expert workman costs \$14.60 or 12½ cents each. The spread represents a difference of 17 per cent. It may be readily perceived that the increased productive costs due to the employment of inefficient workmen may convert the operating results of a shop from profit to loss.

In many instances the piece work idea is carried a step farther in contract shops, and gangs, including their leaders, are paid for piece-work. This not only stimulates the productivity of the individual but promotes co-ordination of effort and produces the maximum results from the group.

The piece-work basis may constitute only a temporary advantage enjoyed by the outside shop, but its unbroken sequence therein has placed the railroad shops under a handicap which they cannot quickly overcome. The contract shops have a corps of skilled workmen who are specialists, a tested method of rewarding special ability and a quick means of determining and disposing of the inefficient. Railroad management is now deterred from taking advantage of these methods of effecting increased output by the restrictions of public control. Furthermore, because of the labyrinth of relationships which must be sustained the problem of securing maximum efficiency from individual workers is a detail which perhaps never can be given the studious attention it merits.

Effectiveness of Supervision

The private manufacturer stresses the importance of effective supervision because he is cognizant of the numerous opportunities for creating expense which will devour his profits if individual effort is not properly directed and all operations fully co-ordinated. He therefore holds his supervisors to strict accountability; he requires that they administer strict discipline. In the railroad shops more laxity is observed with respect to these matters. There is more lost motion because individual accountability and discipline is less exacting. The atmosphere which pervades a properly managed private factory is frequently lacking. These conditions would materially lessen the benefits received by the railroads under the identical wage payment plans used in outside shops.

Effect of Volume of Output on Cost

Volume of output in a railroad shop frequently fails to meet the requirements of economical shop operation. The immediate needs of the transportation business must be promptly served. Even if repair cars are concentrated in large numbers, their progress through the shop may necessarily be interrupted by emergency jobs. On the other hand, repair cars may be purposely shopped in small lots because of the traffic conditions, labor scarcity, shortage of funds, or for other reasons. If the shop operating costs are not under strict control it is easy to overlook the effect which lapse of time has on the cost of output and to allow sub-normal output unduly to increase the proportion of indirect expense.

In this respect the outside shop is unhindered except possibly by its inability to procure business. It is stimulated by a different incentive and follows a different procedure. Its sales force is constantly informed of the status of work in

the shop and is charged with the responsibility of procuring business which will always keep work ahead. The heaviest possible load is kept on the shop because the manufacturer well knows the relation between maximum production and low costs. His fixed charges, which do not fluctuate with production, may be 50 per cent of the cost with low output and only 10 per cent with an output approximating capacity.

The outside shop draws its business from many sources; the railroad shop usually has but a single patron. The car builder may escape some burden of expense in slack periods by closing down his plant, but the railroad shop must maintain its non-productive organization because its shops are frequently used for ordinary repair as well as rebuilding or construction purposes.

Cost Affected by Shop Routine

There are marked differences in the practices of railroad and contract shops. The contract shop is normally organized and equipped to provide for the movement of cars under repair or construction from station to station until the work is completed. At each station the car is subjected to a definite set of operations, and the workmen are skilled in the performance of these operations. Tools and machinery necessary to expedite their performance are conveniently at hand. The materials required are ready in sufficient quantities to prevent delay, and so placed as to facilitate application. By this and similar methods the contract shop enjoys the effect of a high degree of specialization on the volume, quality and cost of output.

Contract shop undertakings are carefully planned and scheduled before the work is begun. The machinery is rearranged, if necessary, to permit a smooth and uninterrupted flow of work through the shop. Tools are made accessible, the material is stored at the proper place to avoid unnecessary handlings and delays and every operation from beginning to end is carefully co-ordinated to avoid lost motion and retarded movement.

Because of demands made on it by the operating requirements of the road, the railroad shop cannot attain a corresponding degree of perfection in its functioning. The variety of its performances and the relatively lesser volume of each, generally preclude the handling of work in the manner above outlined. Improperly laid out plants, inadequate equipment and the lack of skillful workmen are common handicaps.

Shop Arrangement and Equipment

A contract shop specializing in heavy repairs is usually carefully laid out and arranged for the special task for which it is intended. The machinery will be specially designed to fit the work and to reduce productive costs. The shop will be constructed with a view to expansion with the least possible additional outlay of capital. The whole arrangement and equipment will be attuned to a program of undertakings with certain definite limitations.

The average railroad shop is designed for less highly specialized service and expansion is usually effected by a "patching on" process which does not permit of the orderly conduct of operations throughout the shop. Special machinery which would facilitate production and decrease the cost is often absent because it would be used only periodically. It is evident that a railroad shop designed and equipped to carry a peak load of heavy repairs with the greatest efficiency would represent a heavy investment which would be unproductive for a considerable part of the time.

Ordering and Handling Material

The contract shop, except under unusual market conditions, orders construction materials sufficient to meet known requirements only. Shipments are arranged so as to avoid delay to work, as well as to minimize handling and storage expenses. The builders seem to be able to control deliveries to better advantage than the railroads when the latter supply

certain materials, and but little difficulty is experienced in adjusting receipts so as to keep pace with production. Many of the car plants are situated near established market and production centers, which not only expedites delivery, but generally provides loads for the completed cars when homeward bound.

The railroads' situation is somewhat different. The constant need for many kinds of repair material prompts the accumulation of stocks at central stores, from which distribution is made to outlying points of consumption. Many railroad stocks have a very slow turnover. Much expense attaches to the repeated handlings to and from storage, and sometimes delay to shop work ensues. This disadvantage cannot be easily overcome. An extension of the inventories might save back hauls and shop delays, but the increased investment and risks caused by market fluctuations might offset or exceed the gains.

Differences in Character of the Work

The work let to an outside shop is usually defined by a rigid set of specifications, and regulated by constant inspection of the most critical sort. Outside repair work is generally done with a wholesale thoroughness, which creates a uniform physical condition in all of the cars affected. This thoroughness reduces the frequency of general shoppings, stabilizes the repair program and when cars are in demand it reduces the time out of service.

The work customarily done in the railroad shop is less thorough and passes a less critical inspection. A larger element of discretion is permitted as to the extent and character of repairs, as to the quality of materials used and as to the time the cars may be held out of service.

Supplementary Manufacturing in Outside Shops

One of the most disturbing conditions in the car building industry arises from the periodical fluctuation in the volume of available business. Railway purchases are controlled by the condition of the finances as well as the need for equipment. To provide against operating losses which would otherwise occur during periods of light production, many contract shops catering chiefly to car repair or construction work, are equipped to manufacture other things involving the same general processes. These related manufacturing operations serve to employ portions of the plant which would otherwise be idle at times, and reduce the expense of maintaining the business that under other circumstances would need to be borne by the output of new and rebuilt cars.

The railroad shop generally has no such relief. Its losses must be charged against the railroad's revenues, but they are not conspicuously displayed and they frequently escape notice.

Close Control Exercised by the Management

In the average contract shop the managerial influence is not so far removed as in the case of a railroad shop. It is direct and positive and obtains a quicker response. The delegation of responsibility is definite and unevasive. The system of accounting affords a clear insight into each phase of the business. It serves the manager as effectively as the instruments before him serve the driver of an automobile. The manager is not distracted by duties more or less foreign to his principal interest, which is to keep his production up and his costs down. There is no parent enterprise to make good his shortcomings.

The managing head of the railroad shop is often less fortunately circumstanced, through no fault of his own. His opportunities are less extensive, and his freedom of action is more restricted. These handicaps are inherent in his position.

Are Independent Car Plants Necessary?

Whether existing railroad shops that are used for manufacturing purposes are justified or not, the contract car shop

must remain a necessity unless all railroads provide complete facilities for constructing and rebuilding their own equipment. It has already been suggested in these columns that the outside shops now provide a safety-valve for the railway shop labor situation.

If, then, good reason be found for the existence of the independent plants it behooves the railroads not to withhold their patronage without good reason, because the builders' charges must be regulated by their expenses. When their shops are only partially filled or shut down they are a source of expense that in the long run must be paid by the customers. Instead of investing large sums in additional facilities of doubtful economical value, would it not be well for the carriers to divert at least the overflow of heavy work to the outside plants? This could readily be done under a predetermined program for repairs or construction, which would permit of shop space being contracted for in advance.

Any general discussion of this subject cannot be wholly convincing because of the wide differences of conditions in railroad shops. But let the reader remember that as a condition precedent to passing judgment, he should have not only a knowledge of the cost of the outside work, but a thorough understanding of the true cost of doing business in the railroad shop, because judgment requires comparison and discrimination. Without such knowledge he may only guess, and the matter is much too important to be decided by guess-work.

President Urges Co-Operation Between Railways and Steamships

WASHINGTON, D. C.

AN AMENDMENT to the interstate commerce law which will permit railway systems to own and operate steamship lines engaged in other than coastwise trade was advocated by President Harding in his address to Congress on February 28 urging a plan of ship subsidies. "There is measureless advantage," he said, "in the longer shipments, where rail and water shipments are co-ordinated, not alone in the service but in the solicitation of cargoes which ever attends an expanding commerce."

The President also said that American railways must be brought into co-operation with American steamship lines. "It is not in accord with either security or sound business practice to have our railways furthering the interests of foreign shipping lines when the concord of American activities makes for common American good fortune." He added that we can and will make effective the spirit of Section 28 of the Jones act of 1920, providing for preferential rail and steamship rates on through shipments of American vessels.

These questions are also discussed in a report of a study on government aid to merchant shipping prepared under direction of the United States Shipping Board, on which the President's plan for a ship subsidy is based. This report said:

"It is believed by many that considerable indirect aid will result from the making effective of Section 28 of the merchant marine act. The legislation is mandatory and its real worth can only be determined by actual trial. The Shipping Board is making an exhaustive investigation of the practical application of this section as a preliminary to certification to the Interstate Commerce Commission that adequate shipping facilities are afforded by American ships.

"The railroad systems of the United States feel the need of definite import and export working agreements with steamships engaged in foreign trade. A number of such agreements have been made in the past, and some are still in force. They have usually been with foreign steamship lines; such agreements are prejudicial to American shipping. It would seem expedient and wise to permit reasonable working ar-

rangements to exist between railroads and steamships, with special reference to the interchange of traffic between the roads and vessels of the United States.

"The problem of fully and completely co-ordinating our rail and water transportation is acute and important. The solution of this problem will involve extensive research and study of the facts and principles involved. The work, of course, calls for the supervision of the Interstate Commerce Commission as well as of the United States Shipping Board. The suggestion has been made that a group of experts should be created, to be appointed jointly by these two bodies, whose chief duty would be to make full inquiry, and to formulate appropriate rules and regulations providing for such co-ordination, subject to the approval of the Interstate Commerce Commission and the United States Shipping Board.

"At the same time an added impetus can be given the investment of new capital in American shipping and in the possible purchase of vessels from the United States Shipping Board, if railroad interests are permitted to own and develop steamship lines operated exclusively in foreign trade. To do this effectively it would be necessary to modify Section 11 of the Panama Canal act (approved August 24, 1912) to the extent that vessels may be thus owned when exclusively engaged in foreign commerce. The provisions of that act would remain in full force, so far as they prohibit the use of the canal by vessels owned by railroad interests, if the vessels are engaged in traffic between the Atlantic and Pacific coasts of the United States. This would leave intact the main purpose of the original provision, which was to insure the competitive advantages of water-borne intercoastal traffic against the control of trans-continental railroads."

Following the presentation of the President's plan for extending governmental aid to merchant shipping, a bill to carry it out was introduced in both Houses of Congress. The provisions of the administration bill relating to rail and water transportation declare it to be the policy of Congress to co-ordinate fully and completely rail and water transportation, and the United States Shipping Board and the Interstate Commerce Commission would be authorized, empowered and directed to take such steps as may be deemed proper and necessary to bring about such co-ordination. In pursuance of this policy, those government agencies would be directed to create, from among their own personnel, a joint board to study rail and water traffic and conditions, their interrelations and the principles and policies essential to bring about their more complete co-ordination. The board is to formulate and recommend such rules and regulations, not inconsistent with existing law, relating to traffic between railroads and shipping lines, that it may deem proper and necessary to bring about such co-ordination. It is to be the duty of the United States Shipping Board and the Interstate Commerce Commission to make effective, by joint or individual action as the case may require, such rules and regulations as they may respectively approve. Provided, that this shall not authorize the commission to make any rule or regulation affecting shipping, and that all the provisions of Section 19 of the merchant marine act, 1920, shall continue in full force and effect with respect to the commission.

The ninth paragraph of Section 5 of the interstate commerce act (the Panama Canal Act) would be amended by inserting at the end thereof the following:

"Provided, that the provisions of this paragraph shall not apply in any case where such common carrier by water or such vessel is engaged exclusively in trade between any ports not included in the coastwise trade of the United States and not including trade upon the Great Lakes, but including trade between the United States and the Philippine Islands."

The bill also provides that whenever any common carrier by water engaged in interstate or foreign commerce shall enter into any agreement with any common carrier by land engaged in interstate or foreign commerce, each such carrier shall file

immediately with the Shipping Board a true copy, or if oral a true and complete memorandum, of every such agreement or modification, or cancellation thereof, to which it may be a party or conform in whole or in part, relating to the interchange of freight or passengers or the making of joint or through rates or providing warehousing, docking, or other terminal facilities, or providing that the one carrier shall act in any manner as agent or representative of the other carrier or in any manner providing for a co-operative working arrangement between the two carriers. The term "agreement" in this section includes understandings, conferences and other arrangements.

The Shipping Board would be authorized to disapprove, cancel or modify any agreement, or any modification or cancellation thereof, whether or not previously approved by it, that it finds to be unjustly discriminatory or unfair as between carriers, shippers, exporters, importers or ports, or between exporters from the United States and their foreign competitors, or to operate to the detriment of the commerce of the United States, or to be in violation of law, or to be otherwise detrimental to the interest and welfare of the United States, and shall approve all other agreements, modifications or cancellations. Agreements existing at the time of the enactment of this act could be lawful until disapproved by the board, but would be made unlawful to carry out any agreement or any portion thereof disapproved by the board. All agreements, modifications or cancellations made after the enactment of this act would be lawful only when and as long as approved by the board and before approval or after disapproval it shall be unlawful to carry out, in whole or in part, directly or indirectly, any such agreement, modification, or cancellation. For violation of any provision of this section a penalty of \$1,000 for each day such violation continues is provided.

Following another conference between members of the Shipping Board and officers of the Chicago, Milwaukee & St. Paul and the Great Northern at Washington on March 1, at which the Shipping Board renewed its previous efforts to persuade these railroads to abrogate voluntarily their traffic contracts with Japanese steamship lines, the Shipping Board issued an order stating that it requires a complete cancellation of all such contracts and that failing to realize these cancellations by July 1 next, the board will take such steps as it deems necessary to enforce its views. The railroads were represented by H. E. Byram, president of the Chicago, Milwaukee & St. Paul, and Vice-Presidents W. P. Kenney and L. C. Gilman of the Great Northern. Representatives of the Seattle Chamber of Commerce were also present



A Freight Yard in Berlin

Establishing Icing Facilities on a Large Scale

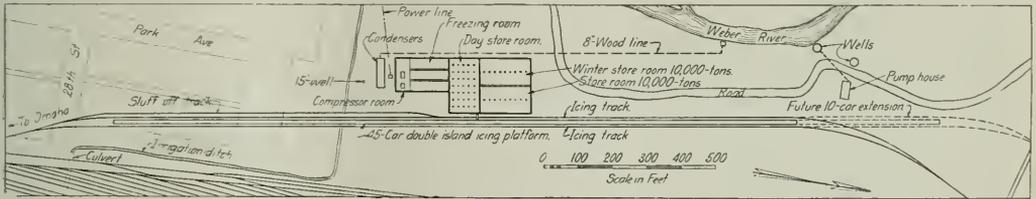
System Recently Inaugurated on Southern Pacific and Union Pacific Gives Highly Satisfactory Results

By W. C. Phillips

General Superintendent Ice Plants, Pacific Fruit Express, San Francisco, Cal.

THE PACIFIC FRUIT EXPRESS COMPANY was organized in 1907 by the Harriman interests for the purpose of providing the necessary refrigerator cars and furnishing refrigeration and ventilation service for the protection of perishable commodities originating on and moving over its lines. This service had formerly been provided by the Armour Car Lines. In 1907 the Pacific Fruit Express Company owned 6,600 refrigerator cars; in 1921 there were 19,200 of its cars in service, with prospects for the immediate construction of 3,000 additional cars. In 1907 this company

plant having a manufacturing capacity of 60 tons daily was owned by the company in 1907 and constituted the nucleus of what is now one of the largest groups of ice manufacturing plants operated by one company. The company now has 12 ice manufacturing plants located on Southern Pacific and Union Pacific lines with a daily manufacturing capacity of 3,500 tons, and a storage capacity for 230,000 tons. The company also owns and operates five natural ice plants with a total storage capacity of 100,000 tons, these plants being located at points where a dependable and economical supply



The General Layout of the Artificial Ice Manufacturing Plant at Ogden, Utah

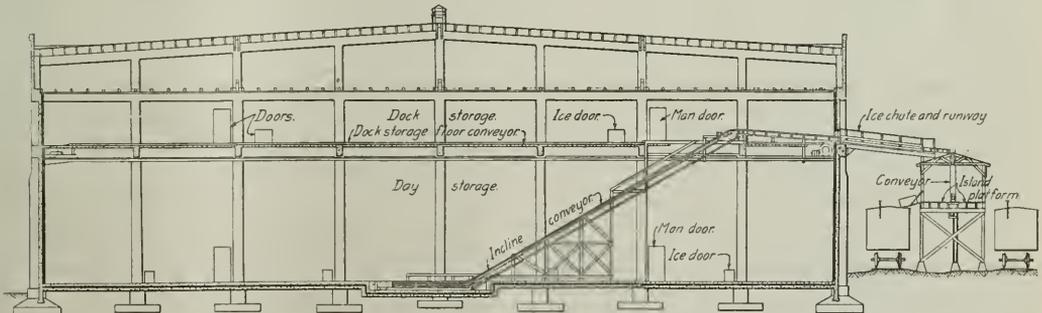
handled 48,900 carloads of perishables, 50 per cent of which were given refrigeration service requiring 250,000 tons of ice. In 1921 the volume of perishables had increased to 170,000 carloads, of which 70 per cent moved with ice in the tanks and required a total of 1,000,000 tons of ice for refrigeration.

Trend Has Been Toward Artificial Ice

In 1907 about 80 per cent of the ice used was purchased from commercial concerns, a very large proportion of this

of natural ice is assured. The remaining ice required is obtained from a number of commercial concerns which operate under contract to furnish a specified tonnage. These plants provide an additional definite supply amounting to 1,300 tons daily, and a storage capacity for 80,000 tons which is held subject to the company's demand.

During the war period the production and distribution of perishable shipments received a considerable impetus. For various reasons, one of which was the impossibility of securing the necessary materials for construction purposes, this



Sectional View of the Day and Dock Storage Rooms of the Ogden Plant

being natural ice. It has been found, however, that natural ice as a general proposition is uneconomical and not dependable, as a result of which the trend has been toward the use of artificial ice. In 1921 fully two-thirds of the ice used for car icing purposes was produced at plants owned and operated by the Pacific Fruit Express Company and only a small percentage of this was natural ice. One artificial ice

increase was not attended by a corresponding increase in icing facilities. This was the condition not only with Pacific Fruit Express Company but with commercial concerns as well. The very heavy increase in perishable shipments from points on the Southern Pacific and Union Pacific systems made it imperative that new and enlarged icing facilities be installed quickly. It was also thought advisable for the

company to own and operate all main line icing facilities to insure more economical and prompt handling.

\$4,000,000 Construction Program Was Authorized

Early in 1920 authority was received to proceed with a construction program which contemplated an expenditure of approximately \$4,000,000 for new and enlarged ice plants and icing facilities. A standard layout plan and design for buildings was adopted and construction started on several plants with company forces as soon as the layout and detail foundation drawings were prepared. This action was taken to prevent delay which would have occurred if work had been held up for complete plans and specifications, and the time necessary to secure bids from contractors. As an example of the dispatch with which work was handled, the ground was broken at Council Bluffs, Iowa, on March 21, 1921, and the plant was placed in operation on August 1. This plant has a daily manufacturing capacity of 250 tons, with a storage capacity of 21,000 tons, also an island car icing platform 2,460 ft. long which will accommodate two trains of 55 cars each. An idea of the general layout of this and other plants may be obtained from the illustrations of the plant at Ogden, Utah.

Reinforced concrete has been used almost exclusively throughout these plants, including the pilaster and curtain wall construction. Pure corkboard only was used for insulating the storage rooms. With the exception of the three steam-driven plants, all ammonia compressors are electrically operated with 150 to 187 r.p.m., 2,300-volt synchronous motors direct-connected to the compressor shafts. Duplicate direct-connected exciter sets were installed, each of sufficient capacity to excite one or both motors. The flooded system was adopted as standard for all freezing tanks. The accumulators, one for each tank, are of the drop leg type, and are placed from 16 ft. to 18 ft. above the tank coils which are 1¼ in. special ammonia pipe, 8 pipes high with extra-heavy return bends. All tank coils are split transversely in the center, thus making two coils placed end to end, each coil provided with a separate feed. All joints are welded with the exception of one flanged fitting on each liquid and suction line to the headers.

Agitators of ample capacity were provided to insure proper circulation of the brine in the freezing tanks, and electric hoist and power-driven cranes were installed. All cans are filled at the dumps, which at most of the plants are of the automatic sprinkler type. Inclined elevators as well as elevating and lowering machines and conveyors are of the company's own design.

The size and capacity of these various plants vary in accordance with the seasonal ice demands at different stations. The largest plant, at Roseville, California, has a daily production capacity of 525 tons, and a total storage capacity for 46,000 tons. In 1921 there was used a total of 165,000 tons of ice at Roseville, the issue for one day running as high as 2,400 tons.

Island Icing Platforms Give the Best Results

All main line icing stations on the Southern Pacific-Union Pacific route are now equipped with island or double car icing platforms accommodating 55 cars on each side, as shown in one of the illustrations. Operations last season have proved conclusively that this type of icing platform makes a decided saving in the economical handling of ice as well as in the time of trains in yards. Shorter icing platforms, causing delays and extra switching of cars, have in the past proved expensive to both the express car line and the railroad. These platforms are frame structures approximately 14 ft. high, with shelter roof and with a platform surface 14 ft. wide on which ice is handled. Along the center of the platform for its entire length there are installed mechanically-operated endless chain conveyors.

This plan permits the railroad to handle trainloads of refrigerator cars direct to the icing platform with a road engine, after which the incoming engine and caboose are cut off and the outgoing engine and caboose coupled on. Train inspection is accomplished while icing is under way, and the entire operation is performed without the necessity of again moving the train until it is ready to leave the station, thus greatly decreasing terminal time, and reducing the cost for switching. The general effect of these long icing platforms is to shorten the schedules of through trains, which, in connection with perishable shipments, is especially beneficial.

Provisions for 6 Per Cent Return and Government Loans Expire

WASHINGTON, D. C.

FEBRUARY 28 marked the close of two years since the return of the railroads by the government and also the expiration of two important periods fixed by the transportation act. The proviso in Section 15-a directing the Interstate Commerce Commission to take as the fair return which it is directed to try to allow the railroads in fixing rates a sum equal to 5½ per cent of the aggregate value of the railroads plus ½ per cent in its discretion for improvements, applies only to the two years beginning March 1, 1920. For the future the commission is directed to try to allow the railways "as nearly as may be to a fair return" upon the aggregate value and to "from time to time determine and make public what percentage of such aggregate property value constitutes a fair return thereon," but until the commission does so what little excuse there may have been for referring to these provisions as constituting a "guaranty" ceases to exist.

The commission apparently felt no need for haste in making public the percentage which it shall consider a fair return for the future since the rates which it prescribed in 1920 in the hope they would produce 6 per cent have, under the circumstances, produced only slightly over 3 per cent, and, as no one is proposing that rates now be increased the only object in determining a percentage now would be to end any uncertainty as to what it would consider a fair return. The question of what the percentage shall be is one of the subjects under consideration in the general rate investigation hearings which are to be concluded on March 9 and there are expectations that a decision may be rendered about April 1, so that it is possible the commission may announce the percentage at that time.

The provision for the recapture of net income in excess of 6 per cent is not affected by the expiration of the two-year period. It is contained in another paragraph of Section 15-a not affected by the proviso in paragraph 3 of the section.

The two-year period provided by the transportation act within which applications might be filed by carriers to the Interstate Commerce Commission for loans from the \$300,000,000 revolving fund created by the act also expired on February 28 and therefore no new loans may be made by the commission except upon applications received by that time. The commission may, however, certify to the Treasury additional loans upon applications filed in time but not yet acted upon, as the funds become available, and a large number of applications were filed during the last two or three weeks, as noted in our financial columns.

Practically all of the available amount of the fund has been loaned but it has recently begun to "revolve," as its title indicates that it should, as repayments are made and as interest payments come in. The total fund was not made available for loans as \$40,000,000 was tentatively reserved by the commission to meet claims, judgments, etc., against the Railroad Administration, arising out of federal control,

but more than \$260,000,000 had been loaned at the date of the latest report because the revolving fund had been increased by repayments and interest. The maximum period of loan provided for in the act was 15 years, but many loans have been for shorter periods. The National Railway Service Corporation recently applied for a loan of \$100,000,000 for the purpose of assisting it in the financing of new equipment and the rebuilding of unserviceable equipment. That amount is not now available but the application asked for loans in instalments, if it should be approved by the commission. In its annual report the commission suggested to Congress that if the period for filing applications should be extended approximately \$103,000,000 might be made available for additional loans.

Rate Hearing Nears Conclusion

WASHINGTON, D. C.

TESTIMONY on behalf of shippers in the rate hearing before the Interstate Commerce Commission was concluded this week and after two days of railway rebuttal testimony oral argument in the case was to begin on Friday, March 4. February 23 and 24 were devoted to testimony on petroleum and its products, by representatives of the National Petroleum Association, American Petroleum Institute and Western Petroleum Refiners' Association, who in general asked for a reduction in their rates of 15 per cent plus the 4½ cents per 100 pounds by which the rates were advanced in 1918. The statements made were mainly devoted to showing the effect of the increases in rates in restricting the markets of certain producers.

Some of the witnesses said they could no longer ship by rail for distances over 400 miles, whereas they had formerly been able to ship up to 800 miles. The effect, they said, was to drive the business to water lines and pipe lines. Commissioner Hall asked one of the oil witnesses why, if the Standard Oil Company derived such advantages from the control of pipe lines, the independents did not build pipe lines, and Commissioner Aitchison said that when he was a boy water used to be transported in wagons, whereas now pipes are used. The witness replied that the reason was lack of capital, and that it is now cheaper to send oil by a railroad already built than by a pipe line that would have to be built.

Four days, February 25 to March 1, were devoted to testimony as to other commodities not previously scheduled. This brought out a large number of witnesses who urged reduction in the class rates and rates on agricultural implements, coffee, ice, paper and pulp, box board and paper board, slate, building stone and tile, office furniture, creosote oil, roofing material, burial goods, peanuts, sewer pipe, nursery stock, tan bark, clam and mussel shells, wool, zinc ore, bullion, paints, glass containers, surgical supplies, shoes, salt, seed, rice, clay and coconut oil.

The oral argument is scheduled to be concluded on March 9. The hearing has been in progress, with some adjournments, since December 14. Approximately 8,000 pages of testimony have been taken and over 400 exhibits have been filed.

Commission Asks for Information

The commission on February 21, served notice upon the carriers that it requires certain information in connection with its consideration of the general rate inquiry, and directed them to have the information ready for submission in the time allotted them for rebuttal testimony, as follows:

1. The carriers are requested to furnish separately for the eastern, southern and western groups, the western group to include the mountain Pacific group, and for the United States as a whole, financial statements for a constructive year based upon the operations of the calendar year 1921, modified in

accordance with the most recent available factors of rate changes, volume of traffic and operating costs, including taxes.

2. The railroads and the Pullman Company are requested to furnish, so far as practicable within the time available, an analysis of the revenues and expenses of carrying passengers in Pullman cars as contrasted with passengers handled in other equipment, on both passenger-mile and car-mile bases. Such analysis should show the revenues derived from passengers handled in Pullman cars, indicating separately (a) the revenue from the regular passenger fare, (b) from the surcharge, and (c) from Pullman contracts or other sources. Expenses should, as far as possible, be analyzed on both car-mile and passenger-mile basis to indicate the difference in the expense of handling passengers in Pullman cars as contrasted with the expenses in other equipment. The year 1921 should be used, if possible. If not, such other period for which the data are available should be used.

3. Such analysis also should show a comparison of the number of passengers per car carried in Pullmans and in coaches by months, 1920 and 1921, and by years, 1915 to 1921, inclusive.

4. To what extent did the increased fares established by the Pullman Company May 1, 1920, increase the revenues of the railroads received from the Pullman Company under contractual arrangements, for the calendar year 1921.

5. Statements should be furnished showing for each commodity class used in the regular quarterly reports of commodities, both the number of tons (including tons from connecting carriers) and the freight revenue for the calendar year 1921, from all carriers that regularly compile such information.

6. The carriers are asked to furnish specific information with respect to the effect of rate reductions upon the movement of traffic. Their testimony has consisted largely of opinions of witnesses to the effect that the reductions heretofore made have not stimulated traffic. Specific figures for representative tonnage before and after important rate reductions should, as far as possible, be furnished. Particular attention is called to the reductions on iron ore in eastern territory effective about October 1, 1921, and upon export rates on iron and steel articles effective in the latter part of that year. The effect, if any, that these reductions may have had on the movement of traffic can be furnished by the American Railway Association from their car loading statistics.

Where shippers assert that a reduction in rates has stimulated the movement of traffic, they should furnish figures on which such assertions are made.

Public Opinion Can Restore Railroad Credit and Public Prosperity*

By William Sproule

President, Southern Pacific Company

I BELIEVE PUBLIC opinion will do more than either railroad men or bankers can do to bring about that improvement in conditions, which is the need of the time. The problem is how to reach the people so that the public may be correctly informed and that public opinion, thus enlightened, may move in the direction of national well being. By the public I mean the average man, the man in the street. He desires to know about our business, but he is accustomed to deal in easy and familiar terms, and unless the facts are presented to him in that form which attracts his attention, and which he can understand without serious mental effort on his part, our efforts to inform him fail.

I have heard doubts expressed about the public being fair, and yet I have an abiding faith that if we can get before the people the basic facts of our business, its principles and practice, they will endeavor to do the wise thing, and they are very apt to do the direct and wholesome thing. If we can but get the public to understand our difficulties they will help us.

First, the public should understand that the railroad funding bill now before Congress should pass. But the force of public opinion behind it is needed to have it passed. The public have the notion that it is some kind of a gift to the railroads, a gift of \$500,000,000; instead of which there is

*An address before the forty-seventh annual convention of the American Bankers' Association at Los Angeles, California, October 5, 1921.

no gift about it. It does not propose to give the railroads a single dollar. The fact is that during the time of war the government had the railroads and ran them. The government made large capital expenditures for improvements and the railroad companies had neither the railroads nor the money with which to make the improvements. The government has since returned the railroads to their owners, and still there is no money to pay for these improvements. The railroads are simply asking that the debts be funded as any other public debt would be, so that the payment of the debts may be extended over a period of time upon an interest basis. When the government made the expenditures the amounts were charged up to the railroads, with the intention that these sums should be deducted from the standard return guaranteed to the railroads for the war period. But not only are the railroads not in position to pay these amounts at this time, but the situation is worse than that. For most of the railroads, including most of the great railroad systems of the country, have not so far been able to collect any of the money due them from the government for the guaranty period.

All the railroad companies got out of the federal period is, first, a load of debt because of capital expenditures incurred by the government; second, the promise of a guaranteed return, which promise in large part remains unfulfilled and the railroads are without the money; and third, they were left with a huge labor bill, so huge as to be to the present day a burden upon transportation that is only partly borne by increases in freights and fares, and although but partly borne, is causing keen criticism from the people who pay those freights and fares.

Very few realize what those burdens are. The war period carried the railroads along into 1920 and the United States Railroad Administration, during the brief period of four years, raised wages \$2,230,000,000. This vast increase in payrolls does not represent increase in the public service. No, indeed, it represents 152 per cent increase in railroad operating expenses for wages, to gain not quite 8 per cent more hours of service.

At the same time the railroads are weighted down with these difficulties the burden of taxation has also grown. While contending with all this, an important part of the money gathered in taxes from the railroads has been turned into channels of competition with the railroads.

The trans-continental roads are in the hopeless fix of competing with United States Shipping Board vessels which do business between the ports of this country at a loss and for those losses the railroads have been taxed. The roads were taxed to help build the ships in the first place and are now being taxed to continue their operation at a loss in the second place. These high costs of shipping enter into the railroad difficulties and are part of the increased freights and fares the people have to bear.

Nor is the competition by ship all the competition the railroads have to face. The cities, counties and states have in the past few years built highways of hard foundation and smooth surface largely paid for by taxation of the railroads. Along these highways ply motor buses often holding as many as 40 people, and motor trucks ply in trains of two and three cars big as railroad freight cars and each designed to carry several tons. The railroads were taxed to build these highways and are being taxed to maintain them. In the meantime the highways are being broken down. Built as highways of easy communication for all the people, they have been perverted into highways of transportation for hire and have become in fact free highways for the carriers of freight and passengers, while the steam railroads must still stick to their own right-of-way and pay heavy taxes for the privilege of being "bumped" over roadbeds of their own construction.

Now that the highways are being smashed to pieces under the pounding of these ponderous vehicles the great body of

people who desire to enjoy these highways are beginning to sit up and inquire where they get off; and the answer is more taxes, both for the people and for the railroads. The new slogan is "Build the road to carry the load," and if these people have their say who do their business over these roads for hire, they will build a road that will cause the people of this country to carry a load of taxes under which they will stagger and fret for many a day. They will first have to build a taxpayer who can carry the load.

Thus there are combined against the railroad wartime wages, wartime taxes and increased competition by ship and highway for which also the railroads are taxed, until in 1920 taxes alone against the railroads amounted to \$279,000,000, whereas the return on the capital invested in the railroads amounted in that year to only \$62,000,000. Think of it—\$279,000,000 in taxes against \$62,000,000 in return on the money in the business; four and one-half times as much for taxes.

I submit to you that with the railroads in this fix it is idle to talk of remedy by reductions in rates. The fact is we are face-to-face with the cumulative effect of the Adamson Act and the acts of the United States Railroad Administration in all their bearings, including the so-called "national agreements" to which the railroads never agreed and in which the railroads had no voice whatever.

We have to address ourselves to these cumulative results, and happily if the public be fully informed public opinion will bring about the remedy that is necessary. The Adamson Act is still on the statute book, but let me tell you that the Adamson Act has been superseded for all practical purposes by the Transportation Act of 1920. The rate adjustments and so-called "national agreements" all are superseded by the authority granted under the Transportation Act of 1920 to the United States Railroad Labor Board.

That board is today the national government to all intents and purposes in dealing with disputes between railroad employers and employees regarding wages and working conditions. Today the Adamson Act is in effect and the acts of the United States Railroad Administration are in effect as to wages and working conditions only to the extent that the United States Railroad Labor Board elects to keep them in effect by its own rulings. So long as the board retains them in effect by its rulings, the burden will be borne by the railroads and by the public, and to whatever extent the board releases the railroads from these burdens to that extent only will relief be forthcoming. The relief so far obtained has only been fractional, and the board still has the subject under consideration.

Meanwhile, discussions are going on in the public prints as if the Labor Board decisions on wages and working conditions were to be respected at the whim of the parties interested, or to be thrown out of the window if unsuited to their purposes. But that is not the status of the United States Railroad Labor Board. When the board speaks in deciding wages or working conditions, it speaks as the voice of the public. It is composed of three parts. Three members represent the carriers, three represent the railroad employees and three are selected to represent the public. The President names all nine but at least one of the public three has to concur in any decision handed down; and the sooner we get to a knowledge of the fact that the Railroad Labor Board is the voice of the government, and represents the public at large, the less misunderstanding will there be as to where we stand.

But it takes the support of the public to let the Labor Board know when it does speak for the public. If the public will but realize that the Labor Board represents them and that its wage decisions affect not only the railroads directly, but indirectly the rates of wages everywhere, the public will take more interest in being properly informed, and in adequately informing the Labor Board upon pending questions.

General News Department

The **Reading Dissolution Case** has been restored to the docket of the Supreme Court for reargument on April 10, by an order of the court issued on February 27. The question is on whether the decree in the district court is in conformity with the opinion of the Supreme Court.

The **Pullman System of Railway Car Lighting** was the subject of a paper by Ernest Lunn, electrical engineer of the Pullman Company, which was presented before the Illuminating Engineering Society, Chicago section, at the rooms of the Western Society of Engineers, on February 23. The paper was followed by a general discussion.

The **United States Supreme Court** in a decision rendered on February 27 sustained a decision of the district court in the case of the Western Union against the Louisville & Nashville, which held that the telegraph company had not a vested right in its easement for the placing of telegraph poles upon the right of way of the railroad. The state statute under which the telegraph company had enjoyed this easement had been repealed, but the company had claimed that it had a vested right.

Investigation of Power Brakes

The Interstate Commerce Commission has ordered an investigation to determine whether, and to what extent, power brakes now in general use are adequate and in accordance with requirements of safety; what improved appliances or devices are available for use, and what improvements may or should be made. Hearing at Washington, April 6.

Plans for June Convention

Details of the annual meeting of the Mechanical Division of the American Railway Association to be held in Atlantic City, N. J., June 14 to 21, 1922, are now being formulated. The association has announced that the reports of committees investigating car matters will be received and discussed on Wednesday, Thursday and Friday, June 14 to 16 inclusive, and the reports of committees investigating locomotive matters on Monday, Tuesday and Wednesday, June 19 to 21 inclusive. A circular has been issued giving a list of hotels in Atlantic City and the rates.

Hearing on Automatic Train Control March 20

The Interstate Commerce Commission, at the request of President Aishton, of the American Railway Association, has postponed the date of its order to 49 railroads to show cause by March 15 why an order should not be issued requiring them to install automatic train control. The date was extended to March 20 and a hearing on the order set for that date in Washington so as to enable railway officers who would be required to attend the hearings, also to attend the meetings of the American Railway Engineering Association and the Signal Section of the American Railway Association at Chicago, March 13 to 16.

Changes in Train Control Committee

Two changes have been made in the personnel of the committee appointed by the roads cited in the proposed train control order to represent them in the hearing before the Interstate Commerce Commission (*Railway Age*, February 18, page 442). T. H. Beacom, vice-president and general manager of the Chicago, Rock Island & Pacific and W. M. Jeffers, general manager of the Union Pacific, representatives of the operating division, asked to be released from this committee because of their participation in wage conferences. These vacancies have been filled by the appointment of B. R. Pollock, vice-president and general manager of the Boston &

Maine, and by the transfer of A. M. Burt, assistant to the operating vice-president of the Northern Pacific, from the engineering to the operating division of the committee. Mr. Burt has been succeeded as a representative of the engineering division by W. P. Wiltsee, assistant engineer of the Norfolk & Western.

Hearing on Authority to Permit

Acquisition of Control

The Interstate Commerce Commission heard arguments on February 28 at Washington on the general questions that have arisen in the Pittsburgh & West Virginia case as to the authority of the commission to grant the application for permission to acquire the control of the West Side Belt under paragraph 2 of Section 5 of the interstate commerce act. The arguments presented varying views as to the proper construction, principally as to whether it is mandatory or permissive, pending the commission's consideration and adoption of a plan of consolidation.

P. R. R. Fire Losses Only \$26,000

Pennsylvania Railroad employees (in 1921) extinguishing fires on railroad property with the company's apparatus before the arrival of municipal fire fighters, kept the losses down to less than one-tenth of one per cent of the value of the property imperilled. In 1921 there were more fires but the loss was less in amount than in the previous year. The number of fires extinguished by employees was 288. The loss caused by these fires amounted to only \$26,112.30, while the work of the employee firemen saved railroad property with an insurance valuation of \$30,612,653.

A number of these fires were in buildings worth millions of dollars, but the average loss was about \$90. This record is regarded by the railroad as very creditable to the employees in carrying out the company's fire-prevention regulations.

Mr. Jones and the Dining-Car Business

John J. Jones, a dining car waiter on the Congressional Limited Express of the Pennsylvania Railroad, between New York and Washington, has held that job 25 years, and the brass buttons which, day by day, he takes out of the coat that he takes off and puts into a clean one, have become so worn from thousands of polishings that he has had to ask for a new set. His record is so unusual that the railroad company's advertising department has issued a leaflet containing a little sketch of Mr. Jones' career, with a portrait. He is so continually amiable that passengers remark on the fact; and, to a woman who asked him to explain how he was able to keep smiling he said: "Madam, that is how I make my living. If I am courteous to passengers, they are good to me." Jones has been in the dining car service of the Pennsylvania altogether 35 years, and calculates that he has served 300,000 meals.

The same leaflet containing this little sketch says that the overhead charge in the operating expenses of a dining car amounts to 57 cents a meal; in other words, that average amount has been spent for each passenger whether he orders a slice of toast or a larger meal.

The Pennsylvania has authorized the construction of 20 new dining cars, and when these are completed, in the Spring, there will be in service on the company's lines 128 dining cars, all of steel.

The Pennsylvania now has in its dining car and restaurant department 2,230 employees, two-thirds of whom are waiters, cooks, etc., who are required to undergo a monthly physical examination. In November, and again in December, every one of these examinations proved satisfactory, each person being given an absolutely clean bill of health.

Operating Statistics of Large Steam Roads—Selected Items for the Month of December, 1921,

Region, road and year	Average miles of road operated	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line daily				
		Trains-miles	Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored
New England Region												
Boston & Albany.....1921	381	124,479	274,171	31,539	4,453,314	9.3	233,548	90,000	117	27	18.4	...
Boston & Albany.....1920	394	297,111	343,931	44,533	6,111	64.4	269,435	115,574	126	28	23.8	...
Boston & Maine.....1921	2,469	548,875	608,503	49,429	10,813	66.4	568,035	222,275	327	127	28.0	43
Boston & Maine.....1920	2,460	634,551	701,688	60,819	11,465	67.4	662,635	300,724	345	117	25.3	7
N. Y., N. H. & H.....1921	1,960	436,253	479,690	26,418	10,292	67.0	521,137	210,831	298	83	26.7	35
N. Y., N. H. & H.....1920	1,959	473,838	498,652	39,642	9,634	64.8	543,424	241,807	293	107	21.7	10
Great Lakes Region												
Delaware & Hudson.....1921	887	362,862	473,145	36,023	8,522	59.7	576,598	280,162	266	42	13.6	99
Delaware & Hudson.....1920	881	418,180	585,653	40,092	9,836	63.8	678,216	356,279	268	45	15.5	38
Del., Lack. & Western.....1921	946	365,616	421,194	31,574	14,333	66.4	521,194	244,424	229	63	27.4	24
Del., Lack. & Western.....1920	929	597,588,391	725,310	14,546	15,655	64.3	945,535	453,294	322	70	17.9	...
Eric (inc. Chic. & Erie).....1921	2,259	885,984	1,003,448	57,321	26,046	63.3	1,508,818	695,175	383	182	23.8	94
Eric (inc. Chic. & Erie).....1920	2,259	1,104,951	1,255,276	48,577	31,481	65.1	2,023,208	1,011,924	582	105	15.3	50
Lehigh Valley.....1921	1,430	364,222	617,569	63,241	6,014	61.4	890,016	404,520	424	121	28.1	123
Lehigh Valley.....1920	1,431	645,947	723,871	67,749	16,239	61.8	1,075,057	534,500	391	190	32.3	33
Michigan Central.....1921	1,827	471,645	478,763	18,871	12,798	61.3	700,503	261,959	314	96	23.4	102
Michigan Central.....1920	1,829	485,635	510,083	19,613	13,295	60.8	777,377	339,579	322	97	23.2	68
New York Central.....1921	5,655	1,719,485	1,917,229	139,435	56,034	62.7	3,264,582	1,375,924	1,076	527	32.9	294
New York Central.....1920	5,666	2,206,566	2,534,763	207,413	66,035	58.7	4,445,532	2,023,837	613	313	24.8	...
N. Y., Chic. & St. L.....1921	572	343,662	345,618	1,294	10,046	63.7	528,438	198,579	123	36	22.5	47
N. Y., Chic. & St. L.....1920	572	389,970	392,481	1,751	9,927	64.0	548,551	221,814	105	51	32.7	18
Pere Marquette.....1921	2,151	316,605	333,374	6,390	6,927	60.8	411,470	184,933	154	55	26.1	10
Pere Marquette.....1920	2,202	343,514	363,934	7,749	6,938	63.4	415,423	160,337	160	63	23.8	6
Pitts. & Lake Erie.....1921	238	84,110	88,558	1,278	2,931	64.4	188,295	100,152	62	16	20.9	15
Pitts. & Lake Erie.....1920	235	158,337	173,579	1,699	5,240	64.8	374,636	222,597	67	9	11.6	1
Wabash.....1921	2,418	569,159	596,887	5,977	14,399	65.5	795,361	330,768	279	63	18.5	33
Wabash.....1920	2,418	663,492	678,240	8,171	15,108	68.1	868,143	404,302	271	66	19.6	...
Ohio-Indiana-Allegheny Region												
Baltimore & Ohio.....1921	5,185	1,595,638	1,679,742	127,242	36,933	60.8	2,344,405	1,112,369	1,016	367	26.5	269
Baltimore & Ohio.....1920	5,184	2,104,154	2,358,514	125,863	46,679	57.1	3,387,910	1,687,853	1,111	212	16.0	4
Central of N. J.....1921	679	276,838	307,914	38,607	5,532	58.6	369,752	179,013	213	43	17.3	9
Central of N. J.....1920	679	337,289	366,019	67,749	9,719	63.2	458,835	232,666	202	63	23.2	6
Chicago & Eastern Ill.....1921	1,129	214,180	215,288	3,251	4,783	61.8	291,245	143,427	120	52	30.2	41
Chicago & Eastern Ill.....1920	1,131	345,306	355,362	5,183	7,265	55.7	508,507	254,673	145	43	23.1	...
C., C. & St. L.....1921	2,387	605,479	634,558	2,165	15,721	56.4	1,002,159	433,594	323	123	28.0	66
C., C. & St. L.....1920	2,366	730,566	760,463	10,463	17,790	57.4	1,277,927	573,574	311	103	27.1	...
Elcin, Joliet & Eastern.....1921	839	97,854	109,078	7,906	2,721	62.9	213,522	113,717	99	9	8.0	29
Elcin, Joliet & Eastern.....1920	838	149,939	169,729	12,396	4,115	66.6	321,429	180,921	94	11	10.6	...
Long Island.....1921	395	41,451	45,837	8,304	467	58.9	26,503	9,938	46	8	17.5	1
Long Island.....1920	395	54,514	59,934	9,749	498	59.2	37,429	13,357	35	7	16.0	...
Pennsylvania System.....1921	10,876	4,044,305	4,390,669	325,321	95,770	61.4	6,479,645	3,076,759	2,547	948	28.0	616
Pennsylvania System.....1920	10,836	5,214,116	5,840,489	474,806	116,127	58.1	8,841,221	4,356,052	2,246	832	27.0	23
Phila. & Reading.....1921	1,119	542,251	603,259	71,888	11,916	58.5	820,261	418,766	375	68	15.4	157
Phila. & Reading.....1920	1,119	734,209	852,430	116,867	16,599	60.3	1,212,654	656,515	302	79	20.6	3
Pocahontas Region												
Chesapeake & Ohio.....1921	2,548	622,469	685,709	18,801	16,135	55.1	1,248,387	653,743	465	95	16.9	133
Chesapeake & Ohio.....1920	2,527	831,078	906,114	32,552	22,720	55.5	1,843,469	995,266	411	128	23.8	...
Norfolk & Western.....1921	2,352	641,109	779,966	31,452	16,050	59.1	1,164,969	611,263	593	108	15.4	210
Norfolk & Western.....1920	2,189	867,472	1,082,957	37,360	20,383	55.1	1,691,834	905,940	494	182	26.9	58
Southern Region												
Atlantic Coast Line.....1921	4,918	635,531	640,805	11,354	14,050	60.0	739,231	361,953	303	109	26.4	32
Atlantic Coast Line.....1920	4,888	703,757	705,116	12,338	14,196	59.1	805,140	314,392	284	134	32.1	...
Central of Georgia.....1921	1,908	189,068	190,562	5,422	7,292	57.7	195,883	83,536	110	22	17.0	16
Central of Georgia.....1920	1,913	230,286	232,988	3,018	4,079	60.9	249,466	134,205	110	22	16.6	...
I. C. (inc. Y. & M. V.).....1921	6,151	1,560,294	1,567,357	32,984	38,837	60.8	2,491,578	1,119,413	741	103	12.2	12
I. C. (inc. Y. & M. V.).....1920	6,151	2,088,518	2,099,596	42,385	43,880	57.6	3,001,576	1,430,688	709	99	13.3	3
Louisville & Nashville.....1921	5,021	1,272,893	1,336,566	44,607	20,513	59.7	1,330,365	609,098	568	94	14.1	74
Louisville & Nashville.....1920	5,026	1,617,893	1,680,039	57,039	25,433	59.9	1,727,111	853,537	581	135	23.7	...
Seaboard Air Line.....1921	3,547	389,139	395,778	6,503	8,451	68.2	432,698	168,736	175	81	31.8	...
Seaboard Air Line.....1920	3,537	444,562	453,942	7,356	8,886	63.2	507,204	210,819	169	81	32.3	...
Southern Ry.....1921	6,942	1,152,759	1,175,434	29,531	34,692	63.3	1,289,842	511,503	371	243	21.8	33
Southern Ry.....1920	6,942	1,412,503	1,451,557	38,825	25,745	63.8	1,520,557	684,552	934	184	16.5	4
Northwestern Region												
C. & N. W.....1921	8,378	1,333,729	1,361,832	18,518	26,268	62.3	1,513,174	677,804	809	228	28.8	110
C. & N. W.....1920	8,319	1,726,404	1,755,848	27,073	39,735	58.2	1,841,370	916,800	889	252	26.8	...
C., M. & St. P.....1921	11,827	1,779,119	1,815,455	59,455	3,993	60.0	1,685,850	766,237	850	227	21.0	151
C., M. & St. P.....1920	11,830	2,436,118	2,479,958	74,777	29,866	62.7	2,220,832	1,072,929	658	357	31.3	...
C., St. P., M. & O.....1921	1,76	271,962	282,203	12,193	4,592	68.2	243,538	100,684	147	67	31.4	38
C., St. P., M. & O.....1920	1,726	308,504	325,202	15,408	4,995	66.5	283,752	174,668	158	47	22.9	26
Great Northern.....1921	8,162	727,758	751,083	26,582	1,700	69.0	966,985	451,802	615	181	27.7	195
Great Northern.....1920	8,162	912,641	938,698	38,366	20,674	61.4	1,208,471	576,376	527	237	31.0	77
M., St. P. & S. Ste. M.....1921	4,359	400,264	426,519	7,267	8,147	70.3	460,749	182,427	142	62	15.3	28
M., St. P. & S. Ste. M.....1920	4,27	511,113	561,342	7,607	10,066	62.4	576,749	233,054	332	80	19.4	59
Northern Pacific.....1921	6,419	696,744	714,103	43,559	17,516	68.4	993,059	454,834	556	157	22.0	87
Northern Pacific.....1920	6,435	913,700	931,411	63,511	19,871	60.9	1,211,567	569,411	444	210	20.0	34
Oriz. Wash. R. R. & Nav.....1921	2,150	207,001	211,957	27,988	4,588	68.5	267,815	125,818	128	34	21.0	4
Oriz. Wash. R. R. & Nav.....1920	2,146	209,306	238,251	25,654	4,482	75.4	253,362	129,928	109	41	28.9	...
Central Western Region												
Atch. Top. & Santa Fe.....1921	9,805	1,338,060	1,400,145	60,166	32,317	61.8	1,847,455	674,497	766	177	18.8	143
Atch. Top. & Santa Fe.....1920	9,708	1,742,650	1,813,688	89,423	37,818	56.7	2,360,809	933,881	673	248	26.1	15
Chicago & Alton.....1921	1,010	317,245</										

Compared with December, 1920, for Roads with Annual Operating Revenues above \$25,000,000.

Region, road and year	Average number of freight cars on line daily			Per cent un-serviced	Gross tons, excluding locomotive	Net tons per loaded car	Net tons per car-day	Pounds of coal per ton-mile		Passenger service					
	Home	Foreign	Total					Net-ton-miles 1,000 gross tons including locomotive	Per ton-mile		Passenger-train miles				
New England Region:															
Boston & Albany.....1921	3,574	4,485	8,063	6.8	1,208	919	355	20.3	7,391	24	31,074	2,094,721			
1920	1,526	5,862	7,388	7.2	426	908	389	20.5	5,044	32.2	359,087	2,102,001			
Houston & Maine.....1921	16,856	15,216	32,072	10.8	455	1,035	405	20.6	17.5	2,904	172	822,864	4,496,145		
1920	14,066	23,001	37,067	7.2	455	1,044	474	26.2	29.3	16.6	3,929	87	876,925	4,578,925	
N. Y., N. H. & H.....1921	24,144	15,011	39,155	22.0	3,031	1,195	483	20.5	17.4	12.7	3,471	1,048,754	6,584,684		
1920	14,836	23,860	38,696	11.0	316	1,147	510	25.1	20.2	12.4	3,982	206	118,228	7,026,114	
Great Lakes Region:															
Delaware & Hudson.....1921	10,075	6,132	16,207	8.7	607	1,590	772	32.9	558	28.4	10,189	207	193,600	949,942	
1920	5,971	11,379	17,350	7.3	...	1,622	853	36.3	663	28.7	13,068	216	196,783	1,316,688	
Del., Lack. & Western.....1921	18,391	7,639	26,030	11.3	...	1,552	684	23.9	433	37.1	10,110	210	56,428	3,741,610	
1920	10,977	12,601	23,578	6.2	...	1,607	770	29.0	620	33.3	14,670	...	501,085	3,630,533	
Erie (inc. Chic. & Erie).....1921	16,364	16,069	32,433	6.2	...	8,888	1,767	785	26.7	398	23.5	9,928	169	685,851	4,866,944
1920	10,469	34,804	51,268	7.8	...	1,831	915	32.1	636	30.4	14,339	176	704,104	4,877,610	
Lehigh Valley.....1921	31,046	8,534	39,580	13.1	3,827	1,577	717	28.1	330	19.1	5,122	171	317,773	2,884,580	
1920	14,709	18,017	32,726	11.3	1,332	1,664	827	32.9	527	25.9	12,053	196	385,265	2,851,937	
Michigan Central.....1921	21,148	18,883	40,031	...	1,601	699	25.5	401	25.8	5,988	...	631,779	5,443,519		
1920	17,400	19,609	37,009	...	1,538	699	25.5	401	25.8	5,988	...	138	2,427,411	19,182,846	
New York Central.....1921	86,499	45,414	131,913	21.1	23,052	1,888	860	24.6	337	21.9	7,849	138	2,461,578	18,907,949	
1920	44,006	99,717	143,723	8.1	3,756	1,948	910	30.8	456	25.3	11,601	...	88,284	501,424	
N. Y., Chic. & St. L.....1921	5,518	4,613	10,131	3.1	173	407	569	23.1	725	52.0	12,511	...	89,839	527,783	
1920	4,819	7,097	9,916	4.1	173	407	569	23.1	725	52.0	12,511	...	197	79,953	1,485,741
Pere Marquette.....1921	11,578	9,121	20,699	17.2	2,000	1,299	584	26.7	288	17.8	2,722	149	23,773	1,984,792	
1920	6,389	12,510	18,899	8.3	...	1,209	564	27.3	331	11.8	5.3	14,175	92	109,812	571,268
Pitts. & Lake Erie.....1921	19,614	7,823	27,437	45.6	1,139	2,239	1,119	22.9	119	18.8	2,832	197	61,563	608,805	
1920	13,347	9,761	23,108	12.5	801	1,397	580	22.9	461	30.7	4,407	175	530,294	2,880,165	
Wabash.....1921	7,993	17,907	25,900	9.5	234	1,308	609	26.8	504	27.6	5,394	207	581,558	3,071,913	
1920	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ohio-Indiana-Allegheny Region:															
Baltimore & Ohio.....1921	76,671	26,937	97,608	12.3	23,081	1,469	697	30.1	368	20.1	6,921	192	1,434,318	9,004,607	
1920	41,419	68,209	109,628	5.5	4,193	1,610	802	36.2	497	24.0	10,565	...	1,397,897	9,079,701	
Central of N. J.....1921	20,078	7,205	27,283	8.3	6,828	1,336	647	32.4	212	11.2	8,360	...	332,528	2,388,580	
1920	9,586	16,427	25,913	17.3	...	1,360	691	30.0	290	11,022	189	227,976	4,572,762		
Chicago & Eastern Ill.....1921	17,525	2,964	20,489	11.4	4,579	1,460	691	30.0	290	11,022	189	227,976	4,572,762		
1920	10,066	10,066	20,132	11.4	...	1,473	738	35.1	436	22.3	7,264	...	240,912	1,550,156	
C., C. & St. L.....1921	19,455	17,135	36,590	10.3	12,206	1,655	716	27.6	362	24.6	8,611	148	700,274	4,437,366	
1920	10,019	27,810	37,829	10.3	2,792	1,632	729	31.6	479	28.3	7,572	...	818,811	4,798,910	
Elgin, Joliet & Eastern.....1921	9,635	4,296	13,931	8.1	860	1,244	1,201	44.7	382	13.1	6,933	...	(5)	(5)	
1920	9,091	7,097	16,188	9.1	209	1,244	1,201	44.7	382	13.1	6,933	...	(5)	(5)	
Long Island.....1921	2,300	3,447	5,747	4.9	279	639	240	21.3	57	4.5	813	387	192,853	1,083,120	
1920	926	4,042	4,968	3.7	...	621	247	23.1	68	5	860	...	1,027	1,027	
Pennsylvania System.....1921	217,643	62,439	280,082	11.8	62,536	1,889	767	32.0	351	18.0	9,125	135	5,181,281	34,719,856	
1920	136,923	134,776	271,699	10.9	12,507	627	835	37.5	517	23.7	12,968	...	5,487,578	36,755,745	
Phila. & Reading.....1921	26,963	11,167	38,130	4.3	3,498	1,531	772	35.1	554	17.2	12,071	205	494,969	2,309,636	
1920	13,673	25,569	39,242	6.8	...	1,638	894	39.6	540	22.6	18,930	...	532,345	2,434,437	
Peachonts Region:															
Chesapeake & Ohio.....1921	43,427	10,026	53,453	9.8	5,336	2,006	1,049	40.5	394	17.7	8,270	151	449,676	2,562,531	
1920	25,912	25,192	51,104	7.8	...	2,069	1,117	43.8	718	29.5	12,705	...	451,547	2,494,295	
Norfolk & Western.....1921	35,504	6,045	41,549	4.6	5,383	1,817	953	38.1	475	21.1	8,874	204	419,477	2,691,470	
1920	21,463	17,279	38,742	6.6	...	1,950	1,044	44.4	754	30.8	13,532	...	430,194	2,943,556	
Southern Region:															
Atlantic Coast Line.....1921	23,050	8,158	31,208	14.2	1,163	412	18.6	271	24.2	1,718	137	830,233	5,549,576		
1920	14,569	18,307	32,876	9.7	...	1,145	447	22.1	308	23.6	2,075	...	863,623	6,047,923	
Central of Georgia.....1921	4,582	2,392	6,974	16.8	250	1,036	446	28.0	382	26.1	3,935	183	219,719	1,724,710	
1920	2,246	4,597	6,843	11.5	...	1,081	446	28.0	382	26.1	3,935	...	338,220	1,758,573	
I. C. (inc. Y. & M. V.).....1921	4,459	19,551	24,000	6.6	11,773	1,596	717	28.8	539	30.7	5,876	159	1,452,893	8,572,532	
1920	2,434	32,409	43,049	6.5	1,287	2,083	1,480	690	32.8	713	37.7	7,555	...	1,438,350	8,521,696
Louisville & Nashville.....1921	41,744	10,828	52,572	16.5	94	1,046	479	29.1	374	21.5	3,913	191	1,042,556	6,049,289	
1920	21,833	28,825	50,658	16.9	81	1,069	519	32.0	270	27.5	5,364	...	1,438,350	8,521,696	
Seaboard Air Line.....1921	12,485	7,642	20,127	29.0	...	1,110	434	20.0	270	19.9	1,539	190	598,998	3,669,004	
1920	7,189	10,112	17,301	12.0	...	1,141	444	20.8	360	24.0	1,923	196	579,845	3,445,741	
Southern Ry.....1921	40,182	10,214	50,396	10.5	8,769	1,118	444	20.8	374	20.2	2,377	217	1,330,741	7,941,775	
1920	21,370	36,460	57,830	3.9	...	1,076	486	26.6	382	22.5	3,181	...	1,495,400	9,479,834	
Northwestern Region:															
C. & N. W.....1921	47,645	21,650	69,295	6.5	6,000	1,135	588	25.8	316	19.6	2,610	100	1,638,785	10,054,538	
1920	36,361	36,545	72,906	8.6	3,000	1,067	631	30.8	440	22.6	3,355	...	1,761,020	11,038,969	
C., M. & St. P.....1921	47,703	21,312	69,015	16.9	...	1,263	547	25.3	349	22.3	2,375	196	9,015,098	57,411,114	
1920	29,456	34,009	63,465	8.0	...	1,198	540	26.0	349	24.2	3,600	...	1,471,180	9,422,770	
C., St. P., M. & O.....1921	3,493	10,178	13,671	11.9	...	1,110	434	20.0	270	19.9	1,539	202	311,315	1,812,703	
1920	2,604	10,078	12,682	12.1	1,389	920	494	25.9	317	19.1	2,330	...	325,798	1,975,014	
Great Northern.....1921	45,449	8,277	53,726	8.5	...	1,330	621	26.5	271	14.8	1,786	196	997,303	5,959,940	
1920	32,218	24,910	57,128	8.7	...	1,329	630	28.7	326	17.6	2,277	...	1,008,323	6,293,410	
M., St. P. & S. M.....1921	19,969	4,334	24,303	11.3	2,053	1,016	456	2.4	242	15.4	1,350	127	440,206	2,529,464	
1920	12,602	13,714	26,316	6.5	2,917	924	439	23.3	286	19.7	1,779	160	430,078	2,799,120	
Northern Pacific.....1921															

Snow and Ice Paralyze Traffic in North Central States

One train wreck causing the death of five people, property damage aggregating millions of dollars, telegraph, rail communication paralyzed and severe floods have resulted from a snow, sleet and rain storm which passed over the north central states on February 21. Train service in northeastern Wisconsin and northern Michigan was at a standstill for two and one-half days. The storm began with a heavy rain, followed by sleet and blizzards, only to turn to sleet again, and many passenger trains on the Chicago, Milwaukee & St. Paul, the Chicago & North Western and other roads in the storm-bound area had to be annulled. Both passenger and freight trains on these roads were stalled and service was demoralized. Snow plows had difficulty in clearing the tracks. On the Great Northern, a rotary snow plow near Montrose, Minn., about 40 miles west of Minneapolis, collided with passenger train No. 10 eastbound, drawn by two engines, causing the death of five trainmen and the injury of eleven passengers. Traffic over most of the roads except in northeastern Wisconsin, was resumed by February 27.

Railway Returns for December and for Twelve Months

The Class I railroads of the United States in 1921, had a net operating income of \$615,625,619, which was at the annual rate of return of 3.31 per cent on their tentative valuation, according to a statement issued by the Association of Railway Executives. The net operating income hardly more than covered their interest charges and rentals alone, these items amounting to \$603,000,000 in 1920 and somewhat greater than that in 1921. Fifty-four railroads, operating 26,022 miles, had operating deficits in 1921, totaling \$29,114,000.

Operating revenues in 1921 totaled \$5,569,888,000, a decrease of 10.6 per cent as compared with 1920. Operating expenses were \$4,602,425,000, a decrease of 21.1 per cent. Of this \$2,019,985,000 was spent for maintenance, 23.1 per cent less than in 1920.

For December, the net operating income was \$51,510,478, which would be at the annual rate of return of 3.44 per cent. Operating revenues were \$425,044,000, a reduction of 22.8 per cent from 1920, and operating expenses \$348,973,000, a decrease of 31.7 per cent. The Detroit, Toledo & Ironton was again late in filing its report.

The December net lacked \$38,412,522 of being a 6 per cent return. Expenditures for maintenance, \$142,159,256, were 34.8 per cent less than in December, 1920.

Net operating income for 1921 of the railroads in the Eastern district aggregated \$271,820,000 compared with a deficit of \$82,659,000 in 1920. This would be at the annual rate of return of 3.31 per cent on their tentative valuation, but \$220,240,000 below a 6 per cent return. In the Southern district net operating income was \$56,995,000 compared with \$18,443,720, the year before. This was equivalent to an annual return of 2.60 per cent. The Western district had a net operating income of \$286,811,000 (compared with \$123,584,000 in 1920), which would be at the annual rate of return of 3 1/2 per cent.

National Railway Service Corporation

Asks \$100,000,000 Loan

An application to the Interstate Commerce Commission for a loan of \$100,000,000 from the \$300,000,000 revolving fund was filed on February 23 by S. Davies Warfield as president of the National Railway Service Corporation. "To aid the service corporation in financing equipment trust certificates for the purchase of all or any part of the 300,000 bad order freight cars of the country, and for the further purchase of new equipment for the railroads."

The National Railway Service Corporation was organized by the National Association of Owners of Railroad Securities and has acted in financing equipment purchases for several railroads in connection with government loans. Recently the association asked the commission to approve a plan for pooling railroad equipment under its direction. Most of the \$300,000,000 fund has already been loaned but the balance is increased from time to time by repayment and interest. The loan is requested to be made in installments, presumably to find income available. Under the law no new loans from the fund may be made on applications filed later than February 28.

"Through the financial plans of the service corporation, as laid before the commission," a press notice says, "large sums of money will be liberated to the carriers, through the purchase of cars standing unit for use on their tracks; in addition, the money will be provided for rebuilding these cars to meet transportation requirements upon the return of normal conditions. This will give employment to thousands in opening up railroad and car manufacturing and supply shops. The application states that it is submitted that the loan proposed is indispensable to a comprehensive and adequate program for the prompt rehabilitation and rebuilding of railway equipment on terms which the carriers can adopt; that it is made for the acquisition and rebuilding of bad order equipment which, when rebuilt, will be made available, by lease or sale, to any railroad. The National Railway Service Corporation operates without profit in the public interest. The service corporation will issue its deferred and prior lien certificates in the manner heretofore adopted in financing the carriers. The prior lien certificates will be sold; the deferred lien certificates to be taken by the government."

The application states that \$50,000,000 is desired for the acquisition and rebuilding of unserviceable equipment for lease or sale to the railroads when rebuilt, and \$50,000,000 for new equipment. The funds derived from the loan are to be used to cover 25 to 50 per cent of the appraised value of the equipment as rebuilt and as part payment of 40 per cent on the cost of new equipment.

B. R. & P. Proposes a New Economy

The Buffalo, Rochester & Pittsburgh, in its last efficiency circular calls on employees to suggest new ways of economizing, and promises to make suitable recompense. The circular says, in part:

"In the belief that the employees as well as the railroads are vitally interested in every possible economy, the Buffalo, Rochester & Pittsburgh has authorized all departments to place in effect a suggestion bureau to receive and consider suggestions of economies made by the employees. The company has no heart in laying off men, but realizes the demand of an economic force far greater than its desires. We feel that much good will result from an exchange of ideas on economic practices. It may be that the suggestion bureau will be the means of avoiding conditions which have been forced on some other railroads. As it must be a matter of some satisfaction for an employee to realize that he is not only a potent factor in economic production, but personally responsible for creating employment for his fellow men, the company will make suitable cash award for every suggestion which has an economic value and in addition to such award will use the entire amount saved by such suggestion to hire additional employees.

"All suggestions will be handled by a departmental secretary, who will submit the suggestions, with author's name eliminated and nothing to identify it except a serial number, to the bureau for consideration. A suggestion having economic merit will be paid for in accordance with its value and the actual monthly saving converted into additional employment. In addition to cash and increased labor award the name of the suggestor will be displayed on the departmental bulletin board, together with the suggestion made."

Meetings and Conventions

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

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 12, 1922, Hotel Washington, Washington, D. C. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.—J. F. Gettrist, The Ashton Valve Company, 348 W. Washington St., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—E. A. Pontius, Superintendent of Demurrage and Storage, C & N W Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Simms, C. & E. Ry., Chicago.
- AMERICAN ASSOCIATION OF ENGINEERS.—C. I. Drayce, 63 F Adams St., Chicago. Next railroad conference, March 13, Chicago.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AGENTS.—F. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. & E. Ry. of N. I., 111 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, Kansas City, Mo.

- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchardt, 202 North Hamlin Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.
- Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
- Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.
- Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.
- Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Next meeting, March 21-23, Richmond, Va. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.
- Safety Section. J. C. Caviston, 75 Church St., New York.
- Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III—Traffic. J. Gotschalk, 143 Liberty St., New York.
- Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next convention, March 16, Chicago. Exhibit of National Railway Appliances Association, March 13-16.
- Construction and Maintenance Section. E. H. Fritch.
- Electrical Section. E. H. Fritch.
- Signal Section (including former activities of the Railway Signal Association). J. T. Murphy, General Store Keeper, New York Central, Collinwood, Ohio. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.
- Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
- Equipment Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI—Purchases and Stores (including former activities of the Railway Stores Association). J. T. Murphy, General Store Keeper, New York Central, Collinwood, Ohio. Annual meeting, June 19-21, 1922, Hotel Traymore, Atlantic, N. J.
- Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Filcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichy, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 14-16, Chicago. Exhibit by National Railway Appliances Association, March 13-16.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittlesey, Union Trust Bldg., Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseeman, 4600 Prospect Ave., Cleveland, Ohio. Annual convention, September 25-30, 1922, Detroit, Mich.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26-30, 1922, Chalfonte-Haddon Hall, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- Railroad Division, A. F. Stuebing, Managing Editor, Railway Mechanical Engineer, Woolworth Bldg., New York. Next meeting, May 16, 1922, 39 W. 39th St., New York.
- AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill. Next convention, June 18, 1923, Chicago.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis. Next meeting, January 23, 1923, New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Pipe Company, 332 C. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Russhrooke St., Montreal, Que. CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Iroquois, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesan Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.
- CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.
- EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.
- FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)
- GENERAL SUPERINTENDENTS' ASSOCIATION.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 22-25, 1922, Auditorium Hotel, Chicago. Exhibit by International Railway Supply Men's Association.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.
- INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.
- MAINTENANCE AND MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1922, Hotel Sherman, Chicago.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)
- MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)
- NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James H. Walker, 21 W. Waller St., New York. Next convention, September 26, 1922, Detroit, Mich.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.
- NATIONAL RAILROADS ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition, March 13-16, Coliseum, Chicago, at Convention of American Railway Engineering Association.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 14, 1922, Cleveland, Ohio.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noonan, 600 Liberty Bldg., Broad and Resnet Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.
- RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)
- RAILWAY SUPPLY ASSOCIATION.—(See A. R. A., Division VI.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Cortlandt St., New York.
- RAILWAY TREASURY OFFICERS ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.
- ROADMASTERS AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, & N. W. Ry., Setting, Ill. Annual convention, September 12-14, 1922, Cleveland, Ohio. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Suburban Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.
- WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

President Harding has signed the bill, S. 621, extending the time in which shippers may file overcharge claims against the director general of railroads.

A. M. Groscclose, assistant traffic manager of the Northwestern Fruit Exchange, Seattle, Wash., has been promoted to traffic manager, succeeding J. Curtis Robinson, who has resigned.

Edward T. Sicardi, vice-president of the Union Tank Car Company, has been elected president of the company, succeeding William A. Barstow, who died at West Orange, N. J., on February 10.

The executives of the Eastern trunk lines, at a meeting in New York, on February 27, took action under which the legal departments of the roads will seek a review by the courts of the recent decision of the Interstate Commerce Commission, changing, in favor of the New England roads, the division of through rates on freight between New England and points west of the Hudson river.

Coal Production

The production of soft coal dropped back slightly during the week ended February 18, according to the weekly bulletin of the Geological Survey, but the output is estimated at 10,167,000 net tons, a decrease of 150,000 tons when compared with the week preceding. The bulletin says probably not less than 1,000,000 tons of the week's output went into storage.

New England Shippers Ask Removal of Baltimore and Philadelphia Port Difficulties

The Interstate Commerce Commission in a formal complaint filed on February 28 by the principal commercial organizations of New England is asked to issue an order requiring the railroads to establish and apply in the future rates for the transportation of export and import freight between the New England ports and Buffalo and points in differential territory which shall not exceed the corresponding rates contemporaneously maintained between the same territory and Philadelphia or Baltimore, or such other rates as the commission may deem reasonable and just. The complaint was filed by Clark & La Roe, the firm of which Edgar E. Clark, former chairman of the Interstate Commerce Commission, is a member, on behalf of the Maritime Association of the Boston Chamber of Commerce, the Associated Industries of Massachusetts, the New Bedford Board of Commerce and the chambers of commerce of New London, Portland and Providence.

The export and import rates between the New England ports and the large territory west of the Buffalo-Pittsburgh line are higher than the corresponding rates between Philadelphia and Baltimore and the same territory, which are constructed by deducting from the New York rates certain port differentials. The complaint says that by reason of these port differentials import and export freight has been diverted from the New England ports to Philadelphia and Baltimore and that during the months of September, October and November, 1921, Boston handled only 2 per cent of the grain exported from the Atlantic ports. It is stated that during the last 10 years the commission has made no formal review of this rate structure that the limitations on the commission's power which existed when the situation was previously reviewed have been displaced by grants of power deliberately made by Congress to insure complete justice and preservation of the public interest, that the port differentials are entirely arbitrary, not reflecting differences in transportation conditions, but had their origin in rate wars between individual railroads, and that Congress has declared its policy to encourage and develop water transportation and to foster both rail and water transportation not through the ports of Baltimore and Philadelphia, but through all ports of the United States.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from March 25, until July 23, the operation of schedules published by the Missouri, Kansas & Texas which propose to increase rates on horses and mules from points in Missouri and Kansas to Memphis, New Orleans, and points taking same rates.

The commission has suspended from March 2, until June 30, the operation of schedules published by the Hocking Valley, which propose to increase the rates on brick and articles taking brick rates from points on the Hocking Valley Railway Company located in the so-called Hocking group in Ohio to points in Ohio and West Virginia.

Export Bill of Lading

The commission is in receipt of a communication from the United States Shipping Board, recommending certain amendments in part II of the uniform through export bill of lading prescribed by the commission, and has reopened the case for further hearing, such hearing to be limited to the reasonableness and propriety of the suggested provisions for inclusion in part II. The proceeding is assigned for hearing on March 4, at Washington. The commission is advised that considerable work has been done and expense incurred in the matter of printing supplies of the bills prescribed by it, and to avoid delay and confusion, it is provided in the order reopening the case that pending a hearing and decision the order entered on October 21, as modified by order of January 30, shall remain in full force and effect.

An early decision will be rendered. In the event that the further hearing shows that amendments such as are recommended are appropriate, the effective date of any order of the commission prescribing amendments will be such as to allow a reasonable time for making changes, due consideration being given to the supplies of unused printed forms on hand. The reopening of the proceeding does not affect the domestic bill of lading or the live stock contract.

State Commissions

The railroad commission of California, on February 17, instituted an investigation of the surcharge on the fares of passengers riding in sleeping and parlor cars, directing the railroads to show cause why it should not be eliminated in California. The hearing is scheduled for March 22.

The Railroad Commission of Georgia has ordered a general reduction in the freight rates on cotton, hay and grain, including grain products, to be put into effect on April 1. It is said that the new rates are based strictly on mileage and that the reduction amounts to 24 per cent on cotton and about 20 per cent on the other articles. The Commission is engaged in a general investigation of freight rates throughout the state and proposes to make reductions on other important commodities.

Court News

Safety Appliance Act; Steps on Pilot

The Interstate Commerce Commission's order of March 13, 1911, requires locomotive pilots to have one step at each side, but allows railroads to make additional safety rules not inconsistent with the order. A railroad bought an engine equipped with two steps on each side of the pilot, and, after using it for some time, took off the upper step, to comply with the order. In an action for negligent injury, alleging violation of the Safety Appliance Act, the Texas Court of Civil Appeals holds that the use of the two steps was not the adoption of an "additional rule," because it was inconsistent with the commission's order, and that negligence could not be alleged after the removal of one of the steps, because the company was then complying with the order.—Payne v. Albright (Tex. Civ. App.), 235 S. W., 288.

Assessment of Railroads for Street Improvements

The Minnesota Supreme Court holds that, prior to the enactment of Chapter 533, Laws 1919, making railway companies subject to special assessments for local improvements, a city had no power to assess the cost of street paving against a railroad corporation which has paid a gross earnings tax.—*Chicago & N. W. v. City of Marshall* (Minn.), 186 N. W. 137.

Statute Requiring Enginemen to Look Out

The Missouri Supreme Court holds, in an action for the death of an engineman in a crossing collision, where the evidence showed that the death resulted from the man's failure to comply with the state statute requiring him to see that a crossing is clear before entering on it, that the statute could not be abrogated by a custom making it the fireman's duty to look out on his side.—*Frese v. Chicago, B. & Q.* (Mo.), 235 S. W., 97.

Grantor of Right of Way Not Entitled to Damage From Overflow

Where a landowner has conveyed to a railroad a right of way over his farm, the Tennessee Supreme Court holds that he cannot recover damages to his farm by a fill and a culvert therein causing an overflow, no negligence of the railroad company in the construction of the track and culvert being shown.—*Knott v. L. & N.* (Tenn.), 234 S. W., 1003.

Action for Short Delivery Barred by Two-Year Limit

The Circuit Court of Appeals, Fifth Circuit, holds that an action brought January 28, 1921, by the holder of bills of lading for cotton, issued by the Director General in March, 1918, for short delivery, is barred by a provision in the bills requiring such suits to be brought within two years and one day after delivery or within two years and one day after the elapse of a reasonable time for delivery.—*Leigh Ellis & Co. v. Davis*, 276 Fed. 400.

Mere Presence of Johnson Grass Not Unlawful

The Oklahoma Supreme Court holds that the state statute prohibiting the introduction into the state and the sale of Johnson grass does not make the mere presence of such grass on premises unlawful, and mere evidence of the presence of such grass on a right of way, resulting in the death of a cow which strayed on the right of way and ate some, is not sufficient to give a cause of action to the owner of the cow.—*McCormick v. Atchison, T. & S. F.* (Okla.) 202 Pac. 302.

Delay in Calling for Baggage

The decisions are not in harmony as to what is a reasonable time after arrival of passenger's baggage to change the railroad's liability from that of carrier to warehouseman; but, following the decided weight of authority, the Minnesota Supreme Court holds that a delay from the afternoon of arrival until next morning in calling for it is unreasonable, so that, in case of its theft during the night, the railroad's liability is that of warehouseman only.—*White v. Chicago, M. & St. P.* (Minn.), 186 N. W. 145.

Excessive Damages Ground for New Trial

A verdict of \$10,000 for personal injuries to a member of a gravel train crew, 56 years of age, based largely on the testimony of plaintiff that he earned \$130 a month on a basis of 22½ cents an hour, which would oblige him to work 20 hours each day during a month of 30 days, was held by the Montana Supreme Court to be excessive, on the ground that "it would be an imputation on human intelligence to assume that a jury of reasonable men, after due deliberation, could believe that at his age he could constantly endure a strain so severe," combined with the fact that the plaintiff was, at the time of the trial, managing a restaurant business with little, if any, detriment to his activities from his injuries. The award of damages failed to commend itself to the judicial mind, and a new trial was awarded. *Wegge v. Great Northern* (Mont.), 203 Pac. 360.

Decisions Under the Federal Employers' Liability Act

The New York Appellate Division holds that one assisting in enlarging the pit of an old turntable, to install a larger one, was engaged in new construction and not in interstate commerce within the act.—*Seaver v. Payne*, 190 N. Y. Supp. 724.

The Illinois Supreme Court holds that a conductor of a freight train, carrying interstate cars, and engaged in interstate commerce, did not depart therefrom by turning his attention to a package containing dangerous explosives, brought to the car by a railroad policeman.—*Moore v. Wabash* (Ill.), 132 N. E. 814.

Automobile Turning Switch After Collision

A passenger train, at a crossing, in a town, struck an automobile and threw it against a switch stand, turning the switch and turning the train onto a side track, resulting in a collision. In affirming a judgment for the defendant on a directed verdict in an action for the death of a passenger resulting from the collision, the Indiana Appellate Court holds that, though the operators of the train should have anticipated the presence of the automobile on the crossing, they could not have anticipated the unusual result, so that their negligence was not the proximate cause of the passenger's injuries.—*Engle v. Director General* (Ind. App.), 133 N. E., 138.

Bill-of-Lading Time Limit for Suits

The Connecticut Supreme Court of Errors holds that the provision in the uniform bill of lading requiring suits to be brought within two years and one day after delivery or after the expiration of a reasonable time for delivery, is not unreasonable. It holds a finding of the trial court allowing six months as a reasonable time to be extremely liberal. The only change made by the decision of the Interstate Commerce Commission in *Decker & Sons v. Commission*, 55 I. C. C. 453 (1919), is that where the claim has not been settled before the beginning of the last six months of the two years and a day period, suit may be filed within six months from the date when the claim is definitely declined in writing. This ruling is not retrospective and does not affect bills of lading issued prior to December 2, 1919.—*Humphrey-Cornell Co. v. Hines* (Conn.), 115 Atl. 561.

Obtaining Possession Without Surrender of B. L.

If a consignee of goods knew that he was not entitled to their possession without surrender of the bill of lading, and that the railroad could not deliver the goods to him without a breach of its obligation to the shipper, and took possession knowing that the delivery to him was unauthorized, and that it would not have been made except for an innocent mistake of fact on the part of the railroad, the Massachusetts Supreme Court holds that a verdict against him for conversion, in an action by the railroad, was justified. His possession of the goods being unauthorized and wrongful, no demand was necessary before bringing the action. Even if the consignee believed that his receipt of the goods was justified because of the railroad's surrender of the actual possession, that belief was no defense.—*N. Y. C. v. Freedman* (Mass.), 133 N. E., 101.

Decisions Under Federal Employers' Liability Act

Foreign cars, brought into the state ten days before, were being moved within a yard, one for unloading, others for repairs. The Circuit Court of Appeals holds that a conductor of a drill crew, killed while shifting the cars, was not within the act.—*Schauffele v. Director General*, 276 Fed., 115.

A depot truckman assisting in moving a crate containing a planing mill, placed on the platform by another company for transportation out of the state, was held within the act.—*Maher v. St. L.-S. F.* (Mo. App.), 234 S. W., 1034.

The New York Appellate Division holds that a section man, killed about 3,000 ft. from his work by a backing locomotive, while walking toward his home during the noon hour, was not within the act, the accident not being in the course of his employment.—*Pallocco v. L. V.*, 190 N. Y. Supp., 867.

The rule that a trackwalker assumes the risk of injury by trains operated in the usual manner is not changed by the federal Employers' Liability Act.—*Davis v. P. & R.*, 276 Fed. 187.

Labor Board Decisions

Truck Driver Not Allowed to Assume

Position of Bill Clerk

A truck driver of the American Railway Express Company at Nashville, Tenn., was given a trial as a bill clerk when his former position was abolished and on failing to qualify was dismissed. The employees maintained that he was appointed to the position and had not been given a fair opportunity to qualify. The Board held that the man had not been appointed and denied the claim of the employee.—*Decision No. 683.*

Employee, Incompetent, Not

Entitled to Seniority Rights

An employee of the Atlantic Coast Line was assigned to a clerical position for a two-months' trial, during which he failed to perform the duties satisfactory to the carrier and was discharged. The employees contended that when he was released from this position he should have been given a place in the office or the right to exercise his seniority right to a position for which he was qualified. The Labor Board denied this petition.—*Decision No. 684.*

Pay Not Allowed for Vacations Not Granted

Several clerks employed in the Baltimore & Ohio freight station at Cambridge, Ohio, sought 15 days' pay in compensation for vacations which were not granted in 1920. The national agreement under which these employees were working does not contain any specific rule on the question of pay for time lost on account of sickness or for vacations. The Board held that the instructions of the Director of the division of operation of the United States Railroad Administration of January 30, 1920, which stated that "existing practices as to vacations and sick leave would remain in effect," applied in the case. The Board therefore decided that the employees were not entitled to compensation as, under the past practice, they were not granted vacations during 1920.—*Decision No. 682.*

Representation of Mechanical Supervisory

Forces To Be Determined by Ballot

On May 4, 1921, a communication was addressed to A. P. Titus, general manager of the Chicago & Alton, by a committee representing the International Association of Railroad Supervisors of Mechanics requesting a conference for the purpose of negotiating rules and working conditions in accordance with the provisions of Decision No. 119. The carrier maintained that the organization did not represent a majority of the subordinate officials as designated by the Interstate Commerce Commission, and the organization submitted the question to the Labor Board, filing a petition hearing the signature of 90 foremen, authorizing it to represent them in agreement negotiations. The carrier also made a canvass of the foremen and 98 men, or 76 per cent of the supervisors of mechanics in the maintenance of way, locomotive and car department, signed a petition signifying their desire either to deal with the company direct or through a committee named in the petition. The organization took exception to the method followed by the carrier in canvassing the foremen. The board has decided that the method followed by both parties was in accordance with the intent of Decision No. 119 and that a conference shall be held between representatives of the carrier, of the International Association of Railroad Supervisors of Mechanics, of any other organization representing mechanical foremen, and of 100 or more unorganized employees, for the purpose of arriving at a clear understanding as to the details of making a ballot by which the foremen, by a majority vote, may designate their choice of representation. Separate forms of ballot for the foremen in the mechanical and bridge and building departments are required.—*Decision No. 629.*

Foreign Railway News

Complicated Rulings on Eight-Hour Day in Spain

New rulings on the eight-hour day have gone into effect in Spain, according to the Railway Gazette (London). The underlying principle adopted is 8 hours of work per day with waiting time counted at only half of working time. The runs of train and engine men are to be arranged so as to provide an average of 48 hours per week on duty. In the case of station service, employees' time on duty when held but not working counts as only half-time in determining the eight-hour day. Overtime is paid for generally at time and a quarter, although occasionally at straight rates only.

The railways have notified the government that without some assistance in the shape of increased rates they will be unable to meet the burden imposed on them by the eight-hour day measures, and it is understood that the government is considering a provisional advance of funds, repayable by the railway companies in some form when the Transport bill, which is now in committee, becomes a law.

English Locomotive Coaling Plant

An interesting locomotive coaling plant of small capacity is that of the London & Northwestern at Willesden, London. This plant, which was built by the Mitchell Conveyor and Transporter Company, consists of a rotary tippie driven by a 10 h. p. electric motor, fitted with automatic chock for supporting the side of the car, and also two double chains at one end, which come in contact with the side of the car and prevent the wheels leaving the rails.

The coal falls into a reinforced concrete hopper of 12 tons



L. & N. W. Coaling Plant at Willesden

capacity. This hopper is 9 ft. deep and has an outlet 3 ft. by 2 ft. 7 in. at the bottom, which permits the coal to flow on to a circular feeder, 7 ft. 6 in. diameter, which feeds the coal into a skip. This circular feeder is rotated by a 3 h.p. motor fixed on the surface and connected to the feeder by a shaft and gearing.

The skip, when filled with one ton of coal is lifted by a 10 h.p. motor, the wire rope passing over a pulley on a weighted lever at the top of the plant, and so arranged that

when one ton of coal has been fed into the skip, the lever is depressed and the current to the feeder motor is cut off.

The fuelman, by actuating a switch on the stage, can then raise the loaded skip which tips itself automatically into a 5-ton steel hopper, at the bottom of which is a lever operated gate for distributing the coal onto the locomotive tenders.

Experimental Automatic Stop Device on Great Central, England

The automatic stop device illustrated herewith was developed on the Great Central (England). The principle on which it is based is well shown in the illustration, i. e., when the section is not clear the track instrument operates to place an obstruction in the way of the wooden prop on the locomotive mechanism. If the locomotive passes the track device in such a position, the prop, naturally, is knocked down with the result that the lever, held by the prop in a horizontal position, is released. This ac-

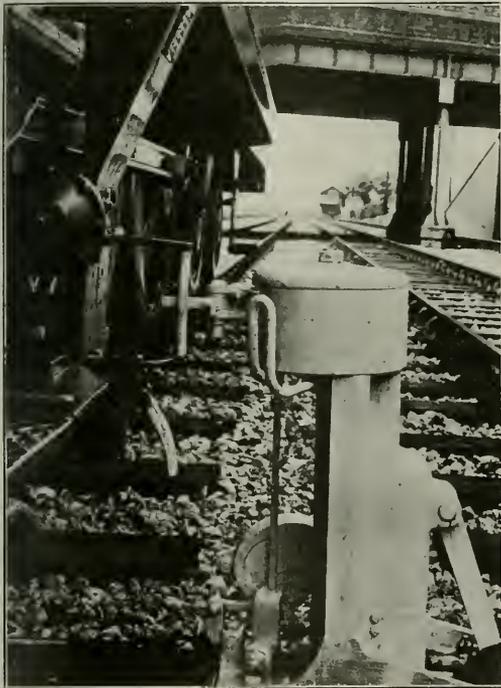


Photo by Kadel & Herbert

tion brings about the application of the brakes. The engineman cannot release the brakes until he has placed another prop under the brake lever.

This device is used in connection with another, placed before it on the track, which gives an audible signal to the engineer when the track is not clear. Only if that signal is disregarded does the device illustrated here come into use.

Further Details on German Railway Strike

LONDON.

The strike of the Imperial Union of German Railway Officials ended on February 8, as a result of negotiations with the government. The German Railway Union and the railway unions in the south and west did not support the strike, but considerable inconvenience was caused in the north of Germany and particularly in Berlin, where on February 4, the municipal employees went out on strike, and the Berlin branch of the German Railway Union went out in sympathy with the strikers. The Imperial

Union of Railway Officials is not a large body but it includes many indispensable employees and is affiliated with the Central Union of German Officials.

The reason for the strike was that the Imperial Union of German Railway Officials demanded a revision of salaries on a greatly increased basis, the previous increases and bonuses granted by the government having left the majority of the minor officials as they were. Objection was also made to two bills now before the Reichstag, namely, the Railway Finance Bill regulating their pay and pensions, and the Hours of Labor Bill, which they thought would endanger the eight-hour day. The Minister of Communications declined to negotiate with the men's leaders on the ground that officials have not the right to strike. The Berlin Municipal Employees went out on strike for the eight-hour day and the right to strike, and it was for this latter reason that the Central Union of German Officials gave its support. The General Federation of Trade Unions and the Railway Workers' Union condemned the strike but issued instructions to its members not to perform strike labor. The government's manifesto prohibiting the strike and imposing severe penalties only aggravated the situation, but a skeleton freight service was put into operation and was gradually extended with the help of the Technical Emergency Corps which was called out. The strike ended on February 8, after an agreement between representatives of the railway officials' union and the chancellor, in which the government agreed that there should be no dismissals en masse, that the Railwaymen's Hours of Labor Bill should be incorporated in a bill affecting all classes of labor, and that there should be an early revision upward of the scales of pay.

Government Railways Ruining Swiss Tourist Business By Julian Grande

GENEVA.

The Swiss Federal Railways have decided to reduce their passenger fares beginning May 1, but only in the case of a minimum distance of 106 tariff kilometers (about 66 miles) third class, 112 tariff kilometers (about 70 miles) second class, and 115 tariff kilometers (about 71½ miles) first class, or in the case of round-trip tickets for twice these distances. In no case will the reductions exceed 20 per cent. According to the Federal Railway statisticians, unless passenger traffic increases the loss entailed by these reductions will be 5,000,000 francs (approximately \$965,000 at the normal rate of exchange).

As regards general season tickets, these are to be reduced by 10 per cent. The following will be the rates for a general season ticket available for one year after May 1, next:

WITHOUT SUPPLEMENT ALLOWING THE HOLDER TO TRAVEL BY EXPRESS TRAINS	
First class.....	1,920 francs (about \$370 at par)
Second class.....	1,440 francs (about \$275 at par)
Third class.....	960 francs (about \$185 at par)
WITH SUPPLEMENT ALLOWING THE HOLDER TO TRAVEL BY EXPRESS TRAINS	
First class.....	2,280 francs (about \$443 at par)
Second class.....	1,720 francs (about \$334 at par)
Third class.....	1,140 francs (about \$220 at par)

How much higher these rates are than those of 1913 may be judged from the following:

COST OF 1913 GENERAL SEASON TICKET FOR ONE YEAR	
First class.....	\$750 francs (about \$145 at normal rate of exchange)
Second class.....	\$25 francs (about \$102 at normal rate of exchange)
Third class.....	\$75 francs (about \$72 at normal rate of exchange)

These 1913 tickets allowed the holder to travel by any train he chose, for it was before the day of express train supplements. In 1913, also, a general season ticket could be and very often was bought in any class for 15 days, 30 days and 45 days, as well as of course three, six or twelve months at proportionate rates.

It is not yet certain whether after May 1 next, general season tickets for 30 days will be reintroduced, but if it should be decided to allow them, they will cost not less than half as much as a three months' general season ticket costs, that is, one will cost about 243 francs whereas in 1913 the cost was only 70 francs.

Apparently the Federal Railways are too nervous to really ever take any initiative. In 1913, the Swiss railways in general, not the federal lines alone, derived 40 per cent of their traffic receipts from passenger traffic, but in 1919, the last

year for which complete figures are available, they derived only 28.6 per cent from this source, and all railways earned far more from their third class passengers than from their first and second put together. The following classifies by percentages, the importance of the various classes for the year 1919:

First class.....	2.5 per cent
Second class.....	16.6 per cent
Third class.....	80.9 per cent

In reality, however, nothing at all is earned from first class passenger traffic, for the rates do not cover the cost of the first class service. The following figures give the percentage of passengers traveling in the different classes for the years 1913 and 1919:

	1913	1919
First class.....	6 per cent	.2 per cent
Second class.....	6.8 per cent	4.1 per cent
Third class.....	92.6 per cent	95.7 per cent

The percentage of first and second class passengers has not increased since the year 1919.

What is astonishing is that the Swiss Federal Railways, which are supposed to be for the Swiss people, do almost everything which the Swiss people do not want. Bureaucracy is not only injuring the finance of the Swiss State Railways, but doing much to ruin the country's tourist traffic on which Switzerland is more dependent than any other country in the world.

The tourist who used to come to Switzerland before the war and buy a 15-, 30- or 45-day general season ticket used to stay in perhaps 25 or 30 different places, and naturally spend money in all of them. Now, however, if any one does come, he usually settles down in one place and stays there until he has to leave, returning by the same route as he came. Anyone with a season ticket who found the weather bad in one part of Switzerland used to leave for another part where weather conditions might very well be quite good, and the visitor did not return home complaining that he had had bad weather all the time. Bureaucracy, however, does not perceive what is to the interest of the nation as a whole, but only thinks of its own musty files and of getting out lists of figures often too late to be of much value. Only gradually can it be realized what a curse state railway management is to a country. On the other hand, the state votes so many million francs for advertising the country as a tourist resort and on the other hand it does all it can to kill the tourist traffic. It is not merely putting barriers in the way of foreign tourists, but actually preventing the Swiss themselves from traveling about their own country. For instance, the supplement now charged in Switzerland for express trains is thoroughly unreasonable in view of the shortness of the distance between the stops, even in the case of the fastest trains. Moreover, the fastest train in Switzerland hardly ever goes more than forty miles an hour. The people grumble and the bureaucrats smile.

S. M. Vauclain on European Conditions

S. M. Vauclain, president of the Baldwin Locomotive Works, in an interview with representatives of the daily press, has given out some impressions of his recent trip through Central Europe.

Aided by a strategic position, between Germany and Russia, Germany's manufactured goods flow in increasing tides across Poland, and nearly Russia is continually buying both from Germany and Poland in enormous quantities, he said. In Germany he visited the Krupp works at Essen and saw their locomotive shops. There, he said, the work is being pursued day and night. There are enough orders ahead to keep the works at full speed for 12 or 14 months.

Russia has ordered 1,000 locomotives from Sweden, Mr. Vauclain said. The Swedish builders are doing all in their power to bring production up to one locomotive each day, and in this effort they are having the aid of Russia. It is very likely that they will be able to meet the demand. He said that in his opinion Poland is destined to arrive at a stage of prosperity earlier than any of the other nations of the New Fast.

It is reported that Mr. Vauclain made arrangements to supply Poland with locomotives in exchange for lumber which he proposes to derive from France.

Equipment and Supplies

Locomotives

THE LEHIGH & NEW ENGLAND is inquiring for 2-8-0 type locomotives.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for 20 locomotives.

THE AKRON, CANTON & YOUNGSTOWN is inquiring for 5 Consolidation type locomotives.

THE TOLEDO, ST. LOUIS & WESTERN has ordered 5 additional Consolidation type locomotives from the Lima Locomotive Works, Inc.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of January 28, as inquiring for 55 locomotives, has ordered 47 Mikado, Sante Fe and Pacific type locomotives from the Baldwin Locomotive Works and 8 Mountain type from the Lima Locomotive Works.

Freight Cars

THE ATLANTIC COAST LINE is inquiring for 100 phosphate cars.

THE FRUIT GROWERS EXPRESS is building 100 refrigerator cars in its shops at Alexandria, Va.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of February 11, (page 399) as inquiring for 500 automobile cars, has ordered this equipment from the Pullman Company.

THE PACIFIC FRUIT EXPRESS has ordered 700 refrigerator cars from the General American Car Company. This is in addition to the cars ordered by the same company last week and reported in our issue of February 25.

Passenger Cars

THE CENTRAL OF NEW JERSEY reported in the *Railway Age* of February 25, as having placed orders for 45 cars for passenger service has placed orders for a total of 70 cars as follows: 20 coaches and 10 combination passenger and baggage cars to the American Car & Foundry Co., 30 coaches to the Standard Steel Car Company and 10 baggage cars to the Bethlehem Shipbuilding Corporation, Harlan Plant.

Iron and Steel

THE CHESAPEAKE & OHIO is asking for 150 tons of steel for a bridge.

THE LEHIGH & NEW ENGLAND is inquiring for 400 tons of fabricated steel for seven bridges on its lines.

THE DELAWARE, LACKAWANNA & WESTERN is asking for prices on 500 tons of fabricated steel for various bridges on its line.

THE BALTIMORE & OHIO has ordered fabricated steel for a bridge from the Mt. Vernon Bridge Company and for another bridge from the Fort Pitt Bridge Company; both structures call for a total of about 550 tons.

Signaling

CHICAGO UNION STATION.—This company will receive bids until March 20, for the construction and installation of two large interlocking plants at the north and south approaches to the union station. Bids have just been received for the installation of a pneumatic tube system and bids for 10,000 duct feet of six-way conduits are being received at the present time.

Supply Trade News

The Wood Shovel & Tool Company, Piqua, Ohio, has appointed the Maintenance Equipment Company, Chicago, its agent to handle the distribution of its shovels to the railroads.

Ross F. Hayes, whose appointment as general sales manager of the Curtain Supply Company, Chicago, was noted in the *Railway Age* of February 18 (page 452), was born at



R. F. Hayes

Lewiston, Me. He entered business with the Boston Woven Hose & Rubber Company in 1888, and was in the service of that company for 16 years, during which time he served as salesman in the rubber goods department in New England and New York state and in 1893 was transferred as city sales manager to St. Louis, Mo. After two years service at that point, he was appointed New England representative of the mechanical rubber goods department and two years later manager of the

Philadelphia office, where he remained until 1904. During the latter year he entered the service of the Curtain Supply Company as western representative and since 1907 has served as eastern sales manager with headquarters at New York.

Geo. W. Bender, whose appointment as vice-president of the Argyle Railway Supply Company, Chicago, was noted in the *Railway Age* of February 18 (page 452), was born at



G. W. Bender

Pittsburgh, Pa., on August 20, 1884. Seventeen years later he entered the engineering department of the Pressed Steel Car Company, at Pittsburgh. In 1906 he entered the service of the American Locomotive Company, where he had charge of the extra work order department. He became associated with Mudge & Co., in 1910, as chief draftsman, and subsequently was placed in charge of the mechanical department. Later he was promoted to assistant to the vice-president and in April, 1918, was appointed

eastern manager in the New England and Atlantic Coast states. In September, 1919, he was appointed manager of sales and service, with headquarters at Chicago, the position he occupied at the time he entered the service of the Argyle Railway Supply Company.

John D. Ristine, manager of sales of the Chicago Crucible Company, has been appointed manager of sales of the railroad division of the Service Motor Truck Company, Wabash, Ind. Mr. Ristine has been with the Chicago Crucible Company for the past two years. Previous to that time he served

as assistant to G. B. Robins, vice-president of Armour & Co., before which he was engaged in railway supply work, having been at one time secretary of the Union Draft Gear Company.

The United States Cast Iron Pipe & Foundry Company, Burlington, N. J., has opened a new office in the Interstate building, Kansas City, Mo., in charge of D. W. Pratt, sales agent.

The United Alloy Steel Corporation, Canton, Ohio, announces that John McConnell, who was formerly in the service of the corporation has again entered its service as vice president, in charge of operation.

The O'Fallon Railroad Supply Company, Arcade building, St. Louis, Mo., has been appointed sales agent for the Standard Railway Equipment Company, the Pressed Steel Manufacturing Company, the Imperial Appliance Company and the Union Metal Products Company for the St. Louis district.

Exum M. Haas, formerly manager of the railroad department of the Austin Company and more recently the H. K. Ferguson Company, both of Cleveland, Ohio, and western editor of the *Electric Railway Journal* from 1911 to 1916, has entered the service of the Simmen Automatic Railway Signal Company, Eden, N. Y., in an executive capacity.

Morris A. Zook, formerly resident engineer, Bureau of Valuation, Interstate Commerce Commission, has recently opened offices as a consulting engineer at Plainfield, N. J. He will specialize in examinations, estimates and reports and all matters in connection with the valuation of common carriers. Mr. Zook was educated at the Polytechnic College of Pennsylvania. Prior to his connection with the Interstate Commerce Commission, Mr. Zook served as resident engineer and division engineer on the Norfolk & Western; assistant engineer and engineer on the Pennsylvania, Lines West; the Chicago, Indianapolis & Louisville as engineer maintenance of way and superintendent; and various other railways and other industries in the capacities of special and consulting engineer.

The Meadville Machinery Company, Incorporated, Meadville, Pa., has been organized. William Schlafe, mechanical manager of the Erie at New York has been elected president of the new company, Charles James, who was mechanical superintendent on the Ohio Region of the Erie at Youngstown, is vice-president and W. A. Cotton, of the office of the mechanical manager, is secretary and treasurer. The general offices will be at 50 Church street, New York City. The company was organized to operate the locomotive and car shops of the Erie at the following points: Stroudsburg, Pa., Dunmore, Pa., Avon, N. Y., Meadville, Pa., Galion, Ohio, and Dayton, Ohio; car shops only at Elmira, N. Y., and Marion, Ohio, and locomotive shops only at Cleveland, Ohio; Huntington, Ind., and Hammond, Ind.

American Locomotive Company

The net earnings of the American Locomotive Company for the year ended December 31, 1921, were \$5,083,785, as compared with \$7,111,126 for 1920. After the payment of dividends on both common and preferred stock and setting aside a reserve of \$1,000,000 for additions and betterments, there remained a surplus of \$833,785, as against a surplus of \$1,861,126 for the previous year. Gross earnings amounted to \$35,711,507, as compared with \$66,884,613 for 1920.

The balance sheet of the company as of December 31, 1921, shows an excess of current assets over current liabilities of \$41,725,992, after including in current liabilities a reserve of \$1,244,940 for income and profit taxes. The company on this date had no bills payable. The inventory account on December 31, 1921, was \$4,751,901, as compared with \$15,119,342 at the close of 1920.

President Andrew Fletcher in the annual report says in part:

The gross earnings for the year in comparison with the year ending December 31, 1920, show a reduction of about 46 per

cent. The volume of domestic business was very materially reduced, due to the general depression of business throughout the country. A larger amount of foreign business could have been obtained during the year 1921, but in a number of cases the requested length of time of the deferred credit payments and the securities offered for the protection of the payments were not considered conservative business risks for the company to assume.

During the calendar year there was expended for additions and betterments to the plants \$1,446,109, which has been charged to the reserves created for such purposes.

No construction work was done during the year on the proposed new plant in the St. Louis district and it is the present intention of the company to withhold active development of the property until the general business requirements of the company warrant it.

The unfilled orders for new locomotives, reconditioning of old locomotives and miscellaneous work on December 31, 1921, amounted to \$3,344,300, of which approximately 96 per cent is domestic business and 4 per cent foreign business.

It is difficult to forecast the volume of business of this company for the year 1922. The federal investigation of railroad transportation matters of the country is still continuing and progress is being made. The recent representations to the Interstate Commerce Commission, made by some of the ablest and most experienced railroad chief executives and by the Honorable Secretary of Commerce of the present conditions of the railroads are most impressive and convincing and prove that there was practically no inflation in the railroad transportation business during the war, and that, therefore, there is a much less margin and opportunity for deflation now; that the effective equipment of cars and locomotives of the railroads has not kept pace the past few years with the natural growth and development of the country.

CONDENSED INCOME ACCOUNT OF THE AMERICAN LOCOMOTIVE COMPANY, MONTREAL LOCOMOTIVE WORKS, LIMITED, AND AMERICAN LOCOMOTIVE SALES CORPORATION—COMBINED		
	12 months ended Dec. 31, 1921	12 months ended Dec. 31, 1920
Gross earnings	\$35,711,507.47	\$66,884,613.18
Manufacturing, maintenance and administrative expenses and depreciation	30,106,478.80	58,043,172.53
Gross profit	\$5,605,028.67	\$8,841,440.65
Interest on bonds of constituent companies, etc.	86,243.10	94,300.77
	\$5,518,785.57	\$8,747,139.88
Deduct for United States and Canadian income and profits taxes	435,000.00	1,636,013.60
Available profit	\$5,083,785.57	\$7,111,126.30
Dividend on preferred stock at 7 per cent	1,750,000.00	1,750,000.00
Dividend on common stock at 6 per cent	1,500,000.00	1,500,000.00
	\$1,833,785.57	\$3,861,126.30
Reserve for additions and betterments	1,040,000.00	2,000,000.00
Net credit to Surplus accounts	\$833,785.57	\$1,861,126.30

Railway Steel-Spring Company

The annual report of the Railway Steel-Spring Company for the year ended December 31, 1921, shows net earnings amounting to \$1,551,636, as compared with \$4,435,350 in 1920. Dividends of 7 per cent on the preferred stock and 8 per cent on the common totaling \$2,025,000, were paid in both years. The surplus on December 31, 1921, was \$12,468,990.

President F. F. Fitzpatrick in his remarks to the stockholders says:

"During the latter part of the year the plants of your Company were operated at only 35 per cent of capacity. The railroads have purchased only very moderate quantities of new equipment and supplies during the past few years, and it is therefore expected that their purchases through 1922 will be considerably increased.

"The operations of the Canadian Steel Tire & Wheel Company, Limited, were satisfactory. By the establishment of this plant at Montreal, we have been able to render very efficient service to our Canadian customers."

Trade Publications

TRADE STANDARDS IN THE PUMP INDUSTRY. The Hydraulic Society, New York, has recently published a 20-page booklet on trade standards in the pump industry. The text explains what is meant by trade pumps, plain fitted or brass fitted pumps, what is considered standard equipment and what are considered as extras. Typical sizes of trade pumps are shown as well as definitions of terms used in the industry. The subject matter is intended as a guide and represents what the society and its members think is good practice.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of January 28 (page 303), as having closed bids on January 25, for the construction of extensions and improvements to its machine shops at San Bernardino, Cal., the work to include a one-story building 65 ft. by 510 ft., equipped with machinery and cranes, of which the entire cost is estimated at \$250,000, has awarded the contract for this work to C. A. Fellows, Los Angeles, Cal. This same company has awarded a contract to the Hayes-Oser Company, San Francisco, for the construction of a reinforced concrete icing plant at Riverbank, Cal., 84 ft. by 134 ft. The plant will have a daily capacity of 150 tons, with 10,000 tons storage space.

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of February 11 (page 401), as contemplating the construction of 75 miles of second track between Yampai, Ariz., and Griffith, including the reduction of a grade, has awarded the contract for this work to the Sharp-Fellows Contracting Company, Los Angeles, Cal. A new refrigerating plant estimated to cost approximately \$40,000, for use in its El Tavor Hotel, Grand Canyon, Ariz., is also contemplated.

CHICAGO & WESTERN INDIANA.—This company closed bids on February 28, for the remodeling of its passenger station at 63rd and Wallace streets, Chicago.

CHICAGO, BURLINGTON & QUINCY.—This company contemplates the construction of a new electric power house at Aurora, Ill., estimated to cost \$100,000.

CHICAGO GREAT WESTERN.—This company, which was noted in the *Railway Age* of February 18 (page 453), as accepting bids for the construction of a two-story frame office building at St. Paul, Minn., has awarded the contract for this work to John Jacobson, Marshalltown, Iowa.

GULF PORTS TERMINAL.—This company will complete the construction of an extension to its line from Muskogee, Fla., to Mobile, Ala., there being a remaining distance of 18 miles, giving the railroad a complete line from Pensacola, Fla., through to Mobile. The sum of \$300,000 from the \$500,000 recently raised by a bond issue will be spent for this work, other construction and additional equipment.

ILLINOIS CENTRAL.—This company which was noted in the *Railway Age* of February 4 (page 353), as preparing plans for the construction of a third track from Matteson, Ill., to North Junction, a distance of about 10 miles, and from Tucker to Kankakee, a distance of approximately 5 miles, including a considerable amount of grade reduction work, will accept bids for the same until March 6. This same company is also accepting bids for the installation of a 2 pipe steam vacuum heating system for its freight house at Baton Rouge, La.

ILLINOIS CENTRAL.—This company which was noted in the *Railway Age* of February 18 (page 453), as planning to construct a freight and passenger station at Baton Rouge, La., will accept bids for the same until March 9.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of February 23, as planning the installation of six miles of 10 and 12-inch pipe lines extending from the city water main in Centralia, Ill., to the company's yards, estimated to cost \$75,000, has awarded a contract for this work to Joseph E. Nelson & Sons, Chicago.

LOUISIANA RAILWAY & NAVIGATION.—This company, which was noted in the *Railway Age* of February 25 (page 502), as having petitioned the commission council of New Orleans, La., for permission to construct a passenger station at South Rampart and Girod streets in that city, estimated to cost \$125,000, has received a franchise for this work. It is expected that bids will be accepted at once.

MINGO VALLEY.—The Interstate Commerce Commission has issued a certificate authorizing the construction of the first 3 1/2

miles of a line from a point on the Monongahela river near the mouth of Mingo Creek, Pa., to a connection with the Montour railroad, 18.2 miles.

MISSOURI, KANSAS & TEXAS.—This company, which was noted in the *Railway Age* of February 4 (page 353), as preparing to construct a brick and stucco passenger station, with a Spanish tile roof, and a 500 ft. platform, at Highland Park (Dallas), Tex., estimated to cost \$17,000, has awarded the contract for this work to Hickey & Montgomery, Dallas.

MISSOURI PACIFIC.—This company which was noted in the *Railway Age* of February 18 (page 453), as receiving bids for the construction of a one-story station building at Winnsboro, La., estimated to cost \$10,000, has awarded the contract for this work to T. S. Leake & Co., Chicago.

MONTREAL WAREHOUSING COMPANY.—This company, which operates grain elevators for the Grand Trunk at Montreal, will shortly ask for bids for the construction of an addition to its storage elevators to take care of 1,000,000 bushels of grain; also for a car dumping plant and an additional conveyor for loading grain into ocean vessels.

PENNSYLVANIA.—This company has under way the demolition of the umbrella terminal-shed which covers all tracks at its Exchange Place Terminal, Jersey City. Platform shelters will be erected. The total cost of the work, for which the Triest Contracting Corporation, New York, has the contract, will be about \$300,000. The company has also awarded a contract to the McLean Contracting Company, Baltimore, for the construction of a ferry slip at Market street, Philadelphia, and to the Arthur McMullen Company, New York, for a similar structure at Camden, N. J. Upon the completion of these slips the company will place two new ferry boats in service between Philadelphia and Camden. The slips and boats will cost in excess of \$500,000.

TENNESSEE CENTRAL.—This company contemplates the construction of three small steel bridges, the entire cost of which is estimated at \$46,000; two coaling stations with cinder pits; and two small station buildings. An application for a loan to cover the above, and a number of additional improvements has been made to the Interstate Commerce Commission.

TEXAS & PACIFIC.—This company is constructing a three-story building at Marshall, Tex., to be used by its apprentices for their instruction and study of car and locomotive work.

TEXAS & PACIFIC.—This company contemplates the enlarging of the terminal facilities of its Trans-Mississippi Terminal at New Orleans, La. No definite decision has been made as to when this work will be undertaken.

WABASH.—This company has been directed by the Missouri Public Service Commission to construct a new freight station at Kirksville, Mo., and also to remodel its present passenger station, and to lay several tracks, all of which has been estimated to cost \$44,000.

LANDSLIDES in Cajon pass, Cal., and heavy snowslips in the vicinity of Dillon, Colo., on February 22, caused a suspension of train operation on both the Atchison, Topeka & Santa Fe and the Colorado & Southern.

CRIMINAL NEGLIGENCE. A jury, of which two women were members, has returned a verdict of criminal negligence against the engineer and conductor involved in the collision at Woodmont, Pa., in December. The government's investigation made it clear that to inflict any punishment on these two men would be grossly unjust. They were mainly responsible for the wreck but the operation of trains under the manual block system was absolutely chaotic. Negligence and laxity existed all along the line and no jury would be competent to fix responsibility in a case of such technical complexity, if, indeed, there was criminal negligence any where. * * * Trials of this kind are usually unsatisfactory, convictions are seldom obtained. The negligence which causes railroad wrecks, even where responsibility can be fixed is not often deliberate or even criminally careless.

Unfortunately the American public is disposed to tolerate all kinds of laxity when things go well but demands a scapegoat when something suddenly goes ill.—*Springfield (Mass.) Republican.*

Railway Financial News

ALABAMA, FLORIDA & GULF.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$100,000 for eight years.

CARROLLTON & WORTHVILLE.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$8,000 for five years.

CHICAGO, MILWAUKEE & ST. PAUL.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$10,000,000 from the revolving fund for 15 years to pay off a note for a like amount to the United States maturing January 1, 1923. The loan of \$10,000,000 was made on June 30, 1920, maturing in 1924. The company has already received a loan of \$25,000,000 payable March 1, 1927.

CHICAGO, PEORIA & ST. LOUIS.—*Asks Government Loan.*—The receivers have applied to the Interstate Commerce Commission for a loan of \$1,000,000 from the revolving fund for 10 years.

CISCO & NORTHEASTERN.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$148,600 for nine years for the purpose of making improvements to its property including new shop buildings and machinery.

DENVER & RIO GRANDE.—*New Bondholders' Committee.*—The formation of a new and independent bondholders' committee will be undertaken on March 3 at the Hotel Savoy, according to a notice sent out by the stockholders' protective committee of the Denver & Rio Grande. The notice was addressed to the holders of first and refunding 5 per cent bonds and to the holders of 7 per cent cumulative adjustment mortgage bonds, or to the holders of certificates of deposit issued against the same. The notice read:

"Among other important matters affecting the value of your securities, the facts bearing upon the methods pursued by the Western Pacific interests in getting possession of \$20,000,000 worth of cash and bonds and \$100,000,000 worth of stock of the Utah Fuel Company belonging to the Denver & Rio Grande will be fully presented for your consideration."

DENVER & SALT LAKE.—*Asks Government Loan.*—The receivers have applied to the Interstate Commerce Commission for a loan of \$6,500,000 from the revolving fund for 15 years to assist the company in building the long projected tunnel through James Peak and to complete the line to its projected terminus at Salt Lake City.

GREEN BAY & WESTERN.—*Dividends.*—This company has declared annual dividends of 5 per cent on its capital stock, 5 per cent on the class "A" debentures and ½ of 1 per cent on the class "B" debentures payable on and after February 27. Dividend on the stock is payable to stockholders of record February 25. Last year an annual distribution of ⅓ of 1 per cent was made on the class "B" debentures.

GULF, MOBILE & NORTHERN.—*Government Loan Approved.*—The Interstate Commerce Commission has approved a loan to this company of \$918,500 for 10 years to assist the company in meeting maturing indebtedness and providing certain additions and betterments.

ILLINOIS CENTRAL.—*Equipment Trusts Authorized.*—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability in respect of \$3,225,000 of equipment trust certificates.

LEAVENWORTH & TOPEKA.—*Asks Government Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$100,000.

LEHIGH VALLEY.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a branch line extending from Ganoga Lake to Ricketts, Pa., 3.83 miles.

MAINE CENTRAL.—Asks Authority to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$331,000 of first and refunding mortgage 6 per cent gold bonds, of which \$300,000 is to be pledged as collateral security for a demand note to be issued to the director general of railroads and any of the balance to be pledged in connection with the funding of indebtedness to the United States for additions and betterments made during federal control.

MANONT, ALMA & SOUTHBOUND.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$84,290 for five years to enable it to purchase rails.

MINNEAPOLIS & ST. LOUIS.—New Directors.—M. A. Taylor and M. L. Bell have been elected directors to succeed H. E. Huntington and E. V. R. Thayer.

MISSOURI, KANSAS & TEXAS.—Chairman.—Henry Ruhlender has been elected chairman of the board.

NEW YORK CENTRAL.—Acquisition.—The Interstate Commerce Commission has issued a revision of the tentative report recommending approval of the acquisition by the New York Central of control of the Chicago River & Indiana and the Chicago Junction, which contains additional conditions, that the companies shall signify their acceptance of the order and of the conditions contained by written agreement and that if any part of the commission's order shall for any reason be adjudged to be invalid, the entire order and the authorizations shall be void, it being the intent of the order and authorization that it shall be effective only in the event that all the conditions and parts of the order and report shall be effective.

PITTSBURGH, SHAWMUT & NORTHERN.—Earnings.—The following figures show this company's operating results in December, 1921, and for the 12 months ending with December, 1921:

	December	12 Months
Average mileage operated during period.....	210	210
Operating revenues.....		
Freight.....	\$78,845	\$1,059,708
Passenger.....	8,800	86,326
Total (inc. misc.).....	110,179	1,195,797
Operating expenses.....		
Maintenance of way and structures.....	\$40,550	\$353,838
Maintenance of equipment.....	228,135	671,692
Traffic.....	1,424	37,782
Transportation.....	41,422	535,554
General.....	5,899	87,554
Total.....	317,433	1,666,485
Operating ratio.....	28.1	13.4
Net from railway operations.....	def. \$207,254	def. \$470,688
Operating income (or loss).....	def. 210,760	def. 498,953
Net after rentals.....	def. 210,214	def. 379,465
Net after rentals 1920.....	def. 36,889	def. 37,202

RICHMOND TERMINAL.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$3,380,000 of first mortgage, 30-year, 5 per cent. gold bonds, to be guaranteed by the Richmond, Fredericksburg & Potomac and the Atlantic Coast Line and to be sold at not less than 92 1/2%. The proceeds are to be used to refund certain promissory notes.

SALINA NORTHERN.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$308,130 for 10 years to enable it to retire indebtedness and purchase equipment and make other improvements.

TENNESSEE CENTRAL.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$3,000,000 of common stock and \$3,000,000 of first mortgage 25-year 6 per cent bonds. The proceeds are to be used to pay for the property of the railroad taken over following the reorganization, \$1,500,000, and the balance for additions and betterments and purchase of equipment. The application states that it is proposed to sell the securities at 33 1/2 cents on the dollar, that is, each purchaser of bonds is to receive in addition stock to the amount of twice the amount of the bonds in par value to the extent of \$1,500,000 of bonds. The balance of the bonds is to be deposited with the government as security for a loan of like amount which has been applied for or to be held in the treasury in case the loan is not allowed.

UNION PACIFIC.—Asks Authority for Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to issue equipment trust certificates.

mission for authority to assume obligation and liability with respect to \$6,800,000 of 5 per cent. equipment trust certificates, which have been sold to Kuhn, Loeb & Co., at 95, for the acquisition of 4,545 cars at a total cost of \$9,122,800.

VICKSBURG, SHREVEPORT & PACIFIC.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$408,900 for 15 years to assist the company in rebuilding freight cars and making certain other improvements.

WABASH, CHESTER & WESTERN.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$500,000.

WHEELING & LAKE ERIE.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$600,000 for 10 years to enable it to meet maturing indebtedness.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Wheeling & Lake Erie.....	\$440,000
San Antonio, Uvalde & Gulf.....	210,000
Western Heater Dispatch.....	50,000
Hamilton Belt.....	20,000
Camas Prairie.....	230,000
Norfolk Terminal.....	4,575
Salt Lake City Union Depot & Railroad Co.....	1,360
Lorain & West Virginia paid Director-General.....	25,000
Sainte Marie Union Dept. Co. paid Director-General.....	2,852
SHORT LINES	
White Sulphur & Huntersville.....	3,500
Tavares & Gulf.....	8,500

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Dividends Declared

Beech Creek—\$6.50, quarterly, payable April 1 to holders of record March 15.
 Boston & Albany—\$2.00, quarterly, payable March 31 to holders of record February 28.
 Buffalo & Susquehanna—Common, 1 1/4 per cent, quarterly, payable March 31 to holders of record March 15.
 Fond du Lac, Johnston & Gloversville—Preferred, 1 1/2 per cent, quarterly, payable March 15, to holders of record March 10.
 Pittsburgh, Ft. Wayne & Chicago—Common, 1 1/4 per cent, quarterly, payable April 1 to holders of record March 10; preferred 1 1/4 per cent, quarterly, payable April 4 to holders of record March 10.
 St. Louis, Rocky Mt. & Pacific—Common, 1 per cent quarterly; preferred, 1 1/2 per cent, quarterly; both payable March 31 to holders of record March 19.

Trend of Railway Stock and Bond Prices

	Feb. 28	Last week	Last year
Average price of 20 representative railway stocks, close of business.....	60.28	59.51	54.34
Average price of 20 representative railway bonds, close of business.....	82.57	82.18	74.55

SCHOLARSHIPS IN TORONTO UNIVERSITY are offered, subject to competitive examination, by the Canadian Pacific Railway Company, to apprentices and other employees enrolled on the permanent staff of the company, under 21 years of age, and to minor children of employees. Scholarships are also granted covering four years' tuition in engineering, etc., in McGill University.

THE UNIFORM BILL OF LADING, new form, is to be put in use on March 15. J. C. Lincoln, manager of the traffic bureau of the Merchants' Association, New York City, reminds shippers that all claims should be presented within six months (or nine months) after the delivery of the property to the carrier. The nine months' period refers to export goods. Another change made in the new bills permits that where loss, damage or injury was due to delay or occurred during loading or in transit by carelessness or negligence, then no notice of claim nor filing of claim will be required as a condition precedent to recovery. The limitation of liability for loss or damage to property transported in open cars, which was formerly provided for, has been eliminated.

Railway Officers

Executive

W. A. Webb has been elected president of the Cambria & Indiana, with headquarters at Philadelphia and Colver, Pa.

S. L. Vaughan, traffic manager of the Grand Rapids, Grand Haven & Muskegon, with headquarters at Grand Rapids, Mich., has been elected vice-president of that road with the same headquarters.

Financial, Legal and Accounting

M. T. Countryman, general solicitor of the Great Northern, with headquarters at St. Paul, Minnesota, has been promoted to general counsel with the same headquarters, succeeding **E. C. Lindley**, resigned.

Mrs. Helen M. Handy has been elected secretary of the Detroit, Bay City & Western, the Port Huron & Detroit, and the Port Huron Southern, with headquarters at Bay City, Mich., succeeding **F. S. Handy**, deceased. **Leo C. Van Laan**, auditor, with headquarters at Bay City, has been elected assistant secretary with the same headquarters.

Charlton Messick, whose election as treasurer and assistant secretary of the St. Louis Southwestern, with headquarters at St. Louis, Mo., was announced

February 25 (page 504), was born on August 22, 1870, at Louisville, Ky. He entered railroad service in November, 1888, as a clerk in the accounting department of the St. Louis Southwestern (at the time the St. Louis, Arkansas & Texas). After holding various clerical positions in that department, he was promoted on August 1, 1893, to chief clerk of passenger accounts, which position he held until July 1, 1900, when he was promoted to chief clerk of freight and ticket accounts. Mr. Messick

was made assistant general auditor on May 1, 1904, and federal treasurer on August 15, 1918. He resumed his duties as assistant general auditor on March 1, 1920, which position he was holding at the time of his recent promotion.

Operating

George Bradshaw, supervisor of safety of the Pere Marquette, with headquarters at Detroit, Mich., has resigned to retire from business.

The position of assistant to the general superintendent of the Grand Trunk, Lines West, with headquarters at Chicago, made vacant by the death of **John Ehrke** on February 21, has been abolished.

W. S. Hall, superintendent of the Cranbrook division of the Canadian Pacific, with headquarters at Cranbrook, B. C., has been transferred to the Portage division, with headquarters at Winnipeg, Man., succeeding **T. R. Flett**, who has been transferred to Cranbrook.

H. H. Brown, assistant general manager of the St. Louis-San Francisco, with headquarters at Springfield, Mo., has

been appointed superintendent of the Northern Division with headquarters at Fort Scott, Kansas, succeeding **C. H. Claiborne** who has been transferred to the Western division, with headquarters at Enid, Oklahoma, who in turn succeeds **W. H. Bevans**, assigned to other duties.

P. T. White, superintendent of the St. Louis division of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Mattoon, Ill., has been transferred to the Cincinnati-Sandusky division, with headquarters at Springfield, Ohio, succeeding **W. G. Bayley**, deceased. He has been succeeded at Mattoon by **E. F. Hayes**, superintendent of the Cairo division, with headquarters at Mt. Carmel, Ill., and he in turn was succeeded by **H. F. Milligan**, superintendent of terminals, with headquarters at Cincinnati, who was succeeded by **E. M. Kelley**, assistant superintendent of the Cincinnati-Sandusky division, with headquarters at Springfield. The position of assistant superintendent of that division has now been abolished.

Traffic

F. W. Hampson has been appointed commercial agent of the Norfolk & Western, with headquarters at Little Rock, Ark.

L. A. Goodrich has been appointed acting traffic manager of the Grand Rapids, Grand Haven & Muskegon, with headquarters at Grand Rapids, Mich.

Bert R. Persels has been appointed general agent of the Great Northern, with headquarters at Kansas City, Mo., succeeding **P. E. Meany**, deceased.

L. A. Sackbauer has been appointed traffic manager of the Wabash, Chester & Western, with headquarters at Chicago, succeeding **A. J. Chouinard**, who has resigned to enter other business.

B. S. Merritt, whose appointment as assistant general freight agent of the Great Northern, with headquarters at Seattle, Wash., was announced in the *Railway Age* of February 18 (page 455), was born at Port Huron, Mich., on January 26, 1876. He entered railroad service on April 15, 1895, as an agent and operator on the Pere Marquette, which position he held at various points on the line until October, 1906, when he left to enter the service of the Great Northern as an agent and yardmaster at Williston, N. D. He was promoted to traveling freight agent at St. Paul, in December, 1908, and in 1910, was made station supervisor at Minot, N. D., and later during that year, traveling freight agent at Billings, Mont. From 1911 to 1913, he was traffic agent at Great Falls, Mont., and from the latter year until 1914, he was in charge of the traffic agency at St. Paul, Minn., for both the Great Northern and the Chicago, Burlington & Quincy. He was promoted to general agent of the Great Northern with headquarters at Great Falls, in 1914, which position he held up to the period of federal control when he was made station inspector. On July 1, 1919, he was made general agent, with headquarters at Spokane, Wash., which position he was holding at the time of his recent promotion.

R. D. Williams, whose appointment as traffic manager of the Sacramento Northern, with headquarters at Sacramento, Cal., was announced in the *Railway Age* of February 11 (page 405), was born at Cleveland, Ohio, on April 12, 1881. He entered railroad service on June 1, 1896, as an office boy in the freight claim department of the Erie Despatch at Cleveland. In 1898, when that office was consolidated with the main office at New York, Mr. Williams was transferred to the latter city where he held various clerical positions in that department until 1906, when he was promoted to take charge of the newly created branch freight claim office at Chicago. In 1908 he was transferred to the traffic department as a representative of the general dairy agent. In 1909, he was transferred to Des Moines, Ia., as a traffic agent, and in 1911, he was promoted to general agent, with headquarters at Los Angeles, Cal., which position he held until August 15, 1916, when his jurisdiction was extended over the entire Pacific coast traffic of that road. He was granted a



C. Messick

leave of absence in 1918 in order that he might organize and manage the traffic department for the housing division of the Emergency Fleet Corporation. In April of the following year he returned to the Erie as general agent, with headquarters at New York, which position he held but a short time when he left to become traffic manager of the California Fruit Exchange at Sacramento, leaving this position to accept his present one.

Mechanical

William Schlafge, mechanical manager of the Erie, and **Charles James**, mechanical superintendent of the Ohio region, have resigned (see item under Supply Trade News elsewhere in this issue).

Engineering, Maintenance of Way and Signaling

F. B. Wiegand, signal engineer of the New York Central, lines West, with headquarters at Cleveland, Ohio, has been appointed to serve in the additional capacity of consulting engineer of the Cleveland Union Terminal Company.

Purchasing and Stores

Edwin H. Gaines, Jr., whose appointment as purchasing agent of the Tennessee Central, with headquarters at Nashville, Tenn., was announced in the *Railway Age* of February 18 (page 456), was born at Nashville, on November 8, 1887. He entered railway service in September, 1905, as a file clerk in the passenger traffic department of the Nashville, Chattanooga & St. Louis at Nashville, and was successively chief file clerk, secretary to the chief clerk and advertising agent in the above named department of that road until February 1, 1909, when he left to become associated with the Charleston Mining & Manufacturing Company. He entered the service of the Tennessee Central at Nashville in July, 1913, since which time he has been invoice clerk in the receivers' office, secretary to the receivers, secretary and chief clerk to the general superintendent, and chief clerk to the receivers, which latter position he was holding at the time of his recent promotion.

Obituary

John Ehrke, assistant to the general superintendent of the Grand Trunk Lines West, with headquarters at Chicago, died on February 21 while on business at Battle Creek, Michigan.

Robert B. Stanton, formerly a division engineer of the Union Pacific, died at a hospital at Stamford, Conn., on February 23. Mr. Stanton was 76 years of age, and well known for his engineering aid in the construction of the "Georgetown loop" and the surveying of a railroad line through the Grand Canyon.

H. C. Blye, general agent of the Trunk Line Association with headquarters at New York, died at Monticello, N. Y., on February 22. Mr. Blye was born in Philadelphia on August 4, 1843. He enlisted in the navy and was retired in 1871 as a lieutenant-commander. He entered railway service as a union ticket agent in the old Astor House, New York. Then successively, until 1877, he was clerk, car accountant, claim agent and contracting agent for various fast freight lines. He entered the service of the Trunk Line Association at its inception and was soon thereafter appointed its general agent, in which position he served 45 years—up to the time of his death.

Walter Galt Barnwell, assistant freight traffic manager of the Atchison, Topeka & Santa Fe, Coast Lines, with headquarters at San Francisco, Cal., died while on business in Chicago on February 28. Mr. Barnwell was born in April, 1865, at Danville, Que. He entered railroad service in 1861 as an agent and clerk in the office of the auditor of freight accounts of the Canada Atlantic (Grand Trunk). He left in 1884 to become an agent in the superintendent's office of the Great Northern, and he was

later promoted to division clerk in the superintendent's office of the Breckenridge division at Breckenridge, Minn., which position he held until 1891, when he left to enter the service of the Southern California (Atchison, Topeka & Santa Fe), as cashier at Redlands, Cal. From the latter date until May, 1898, he was successively agent at Santa Ana, Cal., contracting agent, and commercial agent. He was promoted to general agent of the freight department, with headquarters at Los Angeles, Cal., in May, 1898, and two years later he was made assistant general freight agent of that road, the Santa Fe Pacific, and the San Francisco & San Joaquin Valley, with the same headquarters, those railroads now comprising the Coast Lines of the Atchison, Topeka & Santa Fe. In April, 1905, he was promoted to general freight agent of the Coast Lines, with the same headquarters which position he held until June 1, 1913, when he was made assistant freight traffic manager of the Coast Lines, with headquarters at San Francisco.

John R. Savage, general superintendent of the Long Island, died on February 25 at New York. Mr. Savage was born on April 17, 1869, at Philadelphia. He was graduated from the

University of Pennsylvania in 1889 and entered the service of the Pennsylvania Railroad as a rodman and leveler. He left this position the following year to go with the government engineering corps. In May, 1895, he was appointed engineer of the Seattle & Lake Washington Company. Two years later he returned to the Pennsylvania as an assistant engineer. For several months in 1900 he was employed on surveys for a proposed railway from Cornwall to Highspire, Pa. In 1901 he entered the

service of a steel company, which position he held until 1904 when he became chief engineer of the Long Island. In 1917 he was appointed general manager. In 1920 when the organization of the property was modified he was appointed general superintendent, which position he was holding at the time of his death.



J. R. Savage



Photo by Underwood & Underwood

On Viaduct South of Long Key, Florida

EDITORIAL

Railway Age

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Railway Public Relations Work

THE SUCCESSFUL selling of the railroads and of their service to the public has become mainly a matter of forming and maintaining satisfactory relations between the railways and the public. It goes without saying that unless the best service is rendered and the fairest and lowest rates are made which conditions permit, no amount or kind of public relations work will be of much value. On the other hand, experience has proved only too conclusively that good service and low rates will not win public favor and fair regulation unless the case of the railroads is constantly, adequately and efficiently presented to the public.

Every railway officer agrees that some public relations work should be done. They differ as to the best kind of work to do. As a matter of fact, there are many things that ought to be done, and unless most or all of them are done the relations between the railways and the public will never be made satisfactory and governmental regulation will never become fair or beneficial either to the public or the railways.

The public constantly comes in contact with railway employees. Its attitude toward the railways is influenced by the way it is treated by the employees. There is no form of public relations work more essential than that of training employees to be always helpful and courteous to patrons.

Each year the management of every railway communicates with all its stockholders through its annual report. There are several hundred thousand railway stockholders. They are the real owners of the railways. They are scattered throughout the country. They are usually people of influence in their communities. It would do a great deal of good if the management of each railway, in its annual report, would present to its stockholders not merely the detailed facts regarding the improvements made and the operating and financial results secured during the year, but also the facts regarding the general railroad situation, and urge the stockholders to discuss the railroad problem with those with whom they come in contact, and use their influence to counteract unfair propaganda against the railways and to promote sound regulation.

The late Theodore N. Vail, when he was president of the American Telephone & Telegraph Company, made its annual report the means of giving to the stockholders sound views and arguments regarding government ownership and

government regulation and in this way did some of his most effective public policy work.

The railways serve and have officers or agents in almost every territory and community. These officers and agents have opportunity to participate in all the commercial and civic activities of the various territories and communities. They could so participate in them as to make a large part of the public better realize that the service rendered by the railways is invaluable and that the managements of the railways are anxious, in their own selfish interests, to give service and make rates that will promote the welfare of the country and every part of it. The managements of the railways ought constantly to encourage their officers and agents to thus represent them in every territory and community.

The public is anxious to hear railway facts presented and railway affairs discussed from the railroad point of view. There are innumerable meetings of agricultural and business associations at which this could be done. The large organizations of the railways, ramifying through every part of the country, must contain numerous lawyers, operating men, traffic men and other officers who could effectively participate in the discussions of railway matters which will always occur at these meetings, whether railway officers participate in them or not. Unfortunately, the number of persons in other lines of business who are disposed to criticize the railways is much larger than the number of railway officers who are willing to explain and defend the policies of the managements.

There has never been a time when a large majority of the press of the country has not been willing to give space in its columns to the railway side of every controversy. The advertising columns of the newspapers and magazines are used on a vast scale by almost every class of business concerns in the country to sell themselves and their service to the public. Some railways have in the past carried on and are now carrying on valuable and effective publicity and advertising work.

Unfortunately, however, most of the railways never have employed or developed men who can and do effectively present their cases to the public through publicity and advertising. While most magazines and newspapers are willing to give space in the reading columns to material favorable

to the railways if it has news value, every publication distinguishes sharply between material which it is willing to publish as news and material which it believes should be published, if at all, as advertising. They have a perfect right to do this, and it is only sound business to do it. There is a great deal of information regarding individual railroads and the railroad business as a whole which it is to the interest of the railroads to give to the public, and to the interest of the public to receive, but which ought to be published by the railways as advertising. Some of this advertising would be for the benefit of all the railways and should be done at the cost of all. Some of it is primarily for the benefit of individual railroads and should be done at their cost.

The railways are among the very largest industries in the country, and in their own and the public's interest, should be among the largest advertisers. The attitude of the press and the public toward the railways will never become and remain what it ought to be in the interest of all concerned until the railways advertise on a very much larger scale than they ever have in the past the facts about their service, their capitalization, their rates and all of the other features of their business in which the public is interested.

The return to the use of hard rubber battery jars for car lighting equipment has received considerable attention recently. The majority of the roads discarded the rubber jar years ago because of the large number of jars broken in service. In contrast to this conclusion it is especially interesting to note that

Rubber Jars for Car Lighting Batteries

one large road that operates some 1,250 sets of batteries of 16 cells each on passenger train equipment has continued to use the rubber jar and claims real economy by the practice. Battery jars cannot be grounded if they are made of rubber, nor are the rubber jars subject to leaks caused by chemical or electrolytic action, as in the case of lead tanks. As a result the maintenance costs of batteries using rubber jars are reduced considerably. If lead tanks are used, it is necessary to keep an experienced lead burner at each of several terminals to repair jars that develop leaks. On the other hand, rubber jars may be broken by the growing of the positive plates or by rough handling in crates not properly constructed. The growth of the positive plates can be minimized by so adjusting the charging equipment as not to allow excessive overcharging. However, in spite of the best of precautions the positive plates will often grow and the only alternative is to remove the battery from the car at regular intervals, tear down the cell and trim the plate off to the proper dimensions. Another solution is to adopt a type of positive plate that does not grow appreciably. The successful use of rubber jars on the road in question may be, in a large measure, attributed to the attention given to the design of the crates and care given to secure the proper fit. The records of this road show that for an average covering the last three years the cost for maintenance and replacement of rubber battery jars for a coach is only 30 cents a month and for a sleeping car 34 cents a month. As explained in detail in an article elsewhere in this issue, the road under discussion is evidently securing very good economy from the use of rubber battery jars in car lighting service and it might be well for other roads to check their costs with those given

As outlined briefly on another page some unusually valuable foundation data were developed recently at Chicago as a result of tests made by the engineering staff of the Chicago Union Station. Loading tests were made on full size concrete piers or caissons carried down 65 ft. to a stratum of hardpan, thus

A Public Service

affording information not hitherto available concerning bearing pressures and in particular as to the soil skin friction. The cost of the test to the station company was about \$15,000, an expense more than justified because it may mean a saving of many times that amount in the construction of foundations for the station headhouse. The tests had their inception in a problem confronting the engineers of the station company with regard to foundation piers (caissons) which had been designed and constructed to support a headhouse of the single-story, monumental type. Owing to the fact that it was decided to change the plans to a building of 16 to 20 stories, after the caissons were sunk, the engineers were required to determine if they could safely carry the higher and therefore much heavier structure. The problem of allowable pressures on hardpan is one which has perplexed the structural engineers in the city of Chicago ever since they were required to provide for the loads of tall buildings. In the matter of skin friction, the knowledge of engineers has been based largely on conjecture. But owing to the great cost of comprehensive tests, it was not until money was appropriated for this purpose by the Union Station Company that tangible information has become available. Unlike expenditures for development work carried on by a manufacturer in the perfection of a device in which he is enabled to profit through the granting of a patent, the results of these foundation tests will become public property. The making of these tests, therefore, constitutes a public service for which the officers of the corporation should receive due credit.

With more than 1,200 railway power plants in operation in the United States, consuming many thousand tons of coal annually, the possibilities of economy or waste in converting this coal into power are extremely important and often overlooked. Prominent combustion engineers have frequently stated

Possibilities of Fuel Economy in Power Plants

that the average steam power plant without special attention to economy loses approximately 25 per cent of its fuel due to preventable heat losses alone. There is loss in handling the coal, by incomplete combustion, by air leakage in furnaces, by soot on heating surfaces, by scale in the boiler, by inefficient steam engine units, by power transmission losses and by uneconomical use of power in the shops. Probably few railway power plants are operated so efficiently that attention to these details would not show immediate results in fuel economy, and the man to start things going is the highest mechanical department officer. If the superintendent of motive power and shop superintendent never visit the boiler room or take steps to find out what is going on there, how can the plant engineer or firemen be expected to take much interest in fuel economy? The latter are taught, by inference at least, that it is relatively unimportant. Much of the boiler plant equipment now in service has been used many years and cannot compare in efficiency with modern equipment. The question of installing new equipment, however, becomes the more or less delicate one of balancing possible savings against carrying charges on new equipment, for which capital is not easily obtained in the present state of railroad credit. Flue gas analysers, differential draft gages, pyrometers, steam indicators and other test apparatus cost relatively little. Power plant engineers should be en-

couraged and afforded every assistance in making such tests as will locate fuel wastes in any place where they may occur. Improvements in furnace, boiler, or engine operation can then be made as needed and the railroad fuel bill correspondingly reduced.

That the railroads are endeavoring to aid the country in returning to normalcy, and to the traveling conditions which existed prior to the war, is evidenced

Passenger Rates Are Being Cut

by recent announcements of the western carriers that, beginning March 7, semi-monthly "homeseekers' rates" will be restored to practically all western points. These rates will reduce the present cost of a round trip ticket to that of a one-way fare plus two dollars, and, while made partly for the purpose of assisting in the colonization of the sparsely settled western districts, will be open to general purchase. Less than three weeks ago the same roads announced reduced summer tourist fares to western points, approximately the same as before the advance in rates of 1920. It is apparent that the passenger traffic departments of the railroads recognize the need for stimulating travel and are directing their efforts in that direction. So far, the reductions made have been principally by western lines. The eastern roads may follow a like course and reduce summer fares to seaside resorts, etc. It is likewise probable that the low-priced week end local excursion rates, famed in the years gone by, will again be resumed. Just what effect these reduced rates will have on passenger earnings is problematical.

The International Railway Congress at Rome, Italy, April 18 to 30, presents an unusual opportunity for railway officers

International Congress at Rome

to meet their fellows from all over the world, to discuss their common problems and to benefit from the experience of others. Rome has been well chosen as the meeting place, from the standpoint of the United States and Canada, because England, Belgium, France and Switzerland can be visited on the way with but little deviation from the most direct route. Thus, in addition to the unquestionable value of the discussions of technical problems at Rome and the opportunity afforded to meet railway men from all over the world, the itinerant American railway officer can easily devote some attention to railway practices in several European countries. The experience would broaden any railroad man and might very well suggest to him opportunities for improvement on his own line. Few would challenge the statement that railway development on this continent can, in a general way, be held up to the whole world as one of the greatest achievements in history. Such a statement does not, however, preclude the possibility of our learning many things—to do and to avoid doing as well—from European practice. The officers of railways where electrification is being considered, for instance, could probably find much of interest in Italy and Switzerland, where there is already a considerable mileage of electrified line, and in France where an electrification program of tremendous proportions is in its initial stages. In England our officers could make some observations of the passenger service which is so often held up to us by travelers who claim its superiority over our own. In short, the whole trip could be arranged so that there would be little time spent unprofitably. Moreover, while the excursion would have none of the characteristics of a junket, it would, of course, provide a beneficial relaxation from customary duties which many of our railway officers are ordinarily loath to leave even for a brief vacation.

The law should require, everywhere, that omnibuses filled with passengers be brought to a stop before crossing a railroad at grade. It would seem as though the experiences of the last few years ought to impress the stop-look-and-listen rule on everybody; but the killing of 16 people at Painesville, Ohio,

The Painesville Crossing Disaster

on the night of March 3 calls attention again to the fact that reckless or ignorant drivers are still very numerous on our highways. This case is unusual in two particulars. The reckless driver ran his omnibus on to the crossing in the face of a watchman's warning signal, given with a hand lantern, in what seems to have been ample season to bring the driver to his senses. And the tragedy occurred in a state in which legislation concerning safety at crossings had been discussed and where, indeed, a law had been enacted; but a law which fell just short of covering a case like this. It requires that where school children are the passengers an omnibus shall be brought to a stop; but other classes of people are not accorded any such protection. In a recent court decision, where passengers riding in an automobile with a careless driver were injured at a crossing, the judge held that not alone the driver, but also the passengers themselves, would be chargeable with negligence if they were in position to check his reckless conduct and did not do so. It is regrettable to burden the statute books with laws which can be enforced only at great expense, or which certainly will be flouted by many otherwise respectable citizens; but in this matter society has no alternative; it must legislate to put the duty of protection where it belongs because only in that way can it relieve itself from an unjust responsibility.

Canada's Heavy Railway Losses

ONE OF THE MOST DIFFICULT problems with which the government of the new Premier of Canada, W. L. MacKenzie King, must grapple is presented by the government railways. The Dominion government is in serious danger of having its credit destroyed by its railroad policy. The Dominion is considering trying to float a large loan in the United States. American investors probably will consider Canada's railway policy before deciding on the desirability of buying its government securities.

We publish elsewhere in this issue the first of two articles on "The Problem of the Government Railways in Canada," by W. T. Jackman, Associate Professor of Economics in the University of Toronto. Mr. Jackman's articles should be interesting to students of railway questions throughout the world, and especially to the people of Canada.

The deficit officially admitted by the Canadian government as having been incurred by its railways in 1920 was over \$70,000,000. This, however, did not include interest on the investment in a large part of the railways owned by it. J. L. Payne, formerly controller of statistics of the Department of Railways and Canals, who is probably the best authority on railway statistics in Canada, estimated the total losses, direct and indirect, at about \$136,000,000.

Complete statistics for 1921 are not yet available. Those that are available, however, indicate that the government railways as a whole failed by at least \$20,000,000 to earn their operating expenses. To this should be added about \$100,000,000 for interest on the investment. Therefore, directly and indirectly, government ownership of the railways last year added to the burdens of the Canadian taxpayer around \$120,000,000.

The government now actually owns about 17,000 miles of railway. It is still carrying on negotiations for the acquisition of the Grand Trunk, which would make the total mileage actually owned and operated by it about 22,500 miles. In view of the enormous deficits which always have been in-

curring by every railway owned by the Dominion government since it acquired the Intercolonial over a half century ago it would seem wise for the people of Canada to do some very hard studying and thinking before they finally take over the title to the Grand Trunk.

There are many Canadians who favor adding the Grand Trunk to the government system, first, because they think it will "round out" that system and give it more business, and secondly, because they believe the net earnings of the Grand Trunk will partially offset the deficits of the other government lines. No reasoning could be more fallacious. In the first place, the Grand Trunk now has traffic arrangements with the government lines which cause it to interchange practically as much business with them as it would if they were under a single ownership and management. In the second place, not only the experience of Canada, but the experience of every democratic country in the world indicates that under permanent government ownership the Grand Trunk itself would become and remain a producer of large deficits.

Deficits always have been the result of government operation of railways in democratic countries. This is not always, or perhaps even usually, due to inefficiency in the official personnel. It is almost always due to the fact that the government owned and operated railways are subjected to influences different from those to which private railways are subjected. These influences are chiefly political. They render it impossible for the management adequately to advance rates when they ought to be advanced, or adequately to reduce the number of employees when it ought to be reduced. In many cases they cause expensive service to be rendered which from an economic point of view ought not to be rendered. No future thing could be more certain than that if the government acquires the Grand Trunk Railway it will in a comparatively short time increase the government's railway deficit and not diminish it.

Now, the railway deficit is becoming an extremely serious thing. Canada has only nine million people and the Dominion government has an annual revenue of only about \$450,000,000. It needs about \$109,000,000 a year to pay expenses due to its participation in the war, including interest, pensions, etc. Its national debt is heavy and instead of declining has been increasing since the war ended. This increase in its national debt has been mainly or entirely due to the deficits incurred by its railways. The government will be positively inviting bankruptcy if it engages in any more railway ventures.

If the people of Canada have any doubt that continued government management of railways, and especially an increase in the mileage of government railways, means a continuance of railway deficits let them consider what has been happening in the rest of the world. Railway deficits are not peculiar to Canada. Large deficits were incurred by the railways of the United States in 1918 and 1919 under government operation. They were not due to the official personnel, which was not much changed, but to the system of management, which was radically changed. The organization and policy always are and always must be different under government from what they are under private management, because the controlling influences are different, and these controlling influences always tend to produce deficits. Since the government guarantees to the railroads of the United States were withdrawn they have incurred losses, but the taxpayers have not had to pay them.

Most of the government railways of Australia incurred deficits before the war. These have been increased since then. The deficits in the year ending June 30, 1921, of the Australian railways for which we have statistics were as follows: Queensland, \$7,694,000; Victoria, \$3,171,000; New South Wales, \$2,808,000; Western Australia, \$2,000,000. The total for the railways of these countries was almost

\$16,000,000. The New Zealand state railways had a deficit of almost \$600,000.

Before the war, under a highly centralized monarchical government, the Prussian state railways earned substantial profits, while the railways of most of the German states did not earn interest on the investment in them. Since the war the German state railways as a whole have been incurring enormous deficits. In 1920 their deficit exceeded fifteen billion marks. Of course, this is in a depreciated currency. For 1921 the deficit was estimated some time ago at seven billion marks, but we shall know better what the deficit really was when complete figures for the year's actual operations are available. There are six private railway companies in Germany. It is a significant fact that between 1913 and 1920 the ratio of their total expenses to their total earnings increased from only 60 per cent to 96 per cent, while that of the state railways increased from 70 per cent to 179 per cent. These figures mean that in 1913 the expenses of the German state railways were 70 cents for every dollar that they earned, while in 1920 their operating expenses were \$1.79 for every dollar they earned.

It is not yet too late for the people of Canada to make some arrangement under which the Grand Trunk can be privately owned and operated in future. They will do so unless they choose to disregard the warning plainly given by their own past experience with government operation as well as with the past experience of the entire world. One thing is certain. The Dominion of Canada cannot afford to operate a railway system of 22,500 miles at a chronic loss proportionate to that which has been incurred on all its railway ventures for over a half century. To do so would be to impose upon the business and the taxpayers of the country an unsupportable burden and completely to destroy the government's credit.

Supreme Court Decision a Doubtful Victory

THE RECENT DECISION of the Supreme Court in the case from Wisconsin involving the power of the Interstate Commerce Commission to advance state rates is a rather doubtful victory for sound regulation.

The court upheld the orders of the Interstate Commerce Commission in litigation, requiring state rates to be advanced to the basis of interstate rates, solely upon the ground that the Interstate Commerce Commission was given power to issue such orders by the Transportation Act. Many of those who claimed that the Interstate Commerce Commission had power to advance state rates which discriminated against or imposed an undue burden on interstate commerce contended that it had been held to have this power by the Supreme Court in the Shreveport case, and that the Transportation Act gave new expression to, but did not increase, its power over state rates. The Supreme Court, in its recent decision, rejected this view. It said in effect that there are two ways in which state rates may discriminate against interstate commerce.

First, they may be unfairly discriminatory because they are lower from one point in a state to another point just within the border of that state than interstate rates to a point just across the border in another state. This kind of discrimination in rates, which puts a shipper who is sending goods to a point just without a state at a disadvantage compared with a shipper who is sending goods to an adjacent point just within the state, is held to be prohibited by the doctrine of the Shreveport case.

Secondly, a state may make all the rates within its borders so low compared with the interstate rates that the revenues derived from the state business will be unduly small com-

pared with those derived from the interstate business. The Supreme Court holds that this *revenue* discrimination is not prohibited by the principle of the Shreveport case, but that it is prohibited by the rate making provisions of the Transportation Act. This act requires the Interstate Commerce Commission to fix rates which will enable the railways to earn a fair return upon the aggregate valuation of their property, taking into consideration the need of the country for adequate transportation. The court upholds the power of Congress to impose this duty on the commission and decides that any state which makes rates which will not contribute their fair share toward the revenues held by the Interstate Commerce Commission to be needed, would unduly discriminate against the burden interstate commerce within the meaning of the Transportation Act.

A reading of Chief Justice Taft's opinion makes very plain that if the Transportation Act had not been passed the states would have power to make any rates which were not absolutely confiscatory, provided they did not work unfair discriminations at border points. The rate making provisions of the Transportation Act have, therefore, derived from this decision a new importance from the standpoints both of those who favor and those who oppose so-called "state's rights" in the regulation of rates. Suppose that the Interstate Commerce Commission should continue to hold that the public welfare requires that the railways be allowed to earn an average net operating income of six per cent on their aggregate valuation. As long as the present rate making provisions of the Transportation Act stand the commission can force state rates to be so made that they will contribute their share toward the revenues necessary to yield this return. On the other hand, if the rate making provisions should be repealed, the states thereafter, so long as they did not unfairly discriminate between persons and places at border points, could fix rates which would yield less than six per cent on state business, unless the courts should hold them confiscatory.

It is highly probable that the decision of the Supreme Court will intensify the struggle already going on between those who would repeal and those who would retain the rate making provisions. These provisions practically vest in the Interstate Commerce Commission exclusive authority to determine what return in excess of one that would be confiscatory the railways of the United States may earn. To repeal the Transportation Act would be to divide this power between the Interstate Commerce Commission and all the state commissions. The result might be that the railways in each state would be allowed to earn a different return from that earned in every other state.

The railways render a national service. Eighty per cent of their freight earnings, one-half of their passenger earnings and three-fourths of their total earnings are derived from interstate business. The country tried for years the plan of having rates independently regulated by the Interstate Commerce Commission and the authorities of the various states. The Interstate Commerce Commission represents the people of every state, being a branch of the federal government. If the power to determine what net return the railways may earn should be vested in governmental authority at all the argument for vesting it in the Interstate Commerce Commission alone seems conclusive.

The state commissions are, however, anxious to recover the authority over revenues derived from state business that they formerly exercised. The advocates of so-called "state's rights" are constantly growing more active and clamorous. It is evident that if the rate making provisions of the Transportation Act are to be retained and the more enlightened policy of regulation they were intending to establish is to be secured, no time should be lost by those who are in favor of their retention in voicing their views and making their influence felt.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Possibilities of Promotion for the Secretary

ON LINE.

TO THE EDITOR:

I have read with a great deal of interest the articles appearing in recent issues concerning the chief clerk, especially the one appearing in the issue of February 25, signed "Operating Official."

I note "Operating Official" states that the chief clerk's work consists principally of general office work and that he does not acquire sufficient knowledge of the road work to warrant his promotion to an operating position. I agree with him that few chief clerks acquire a clear knowledge of the road work; but what of the secretary? Does he not acquire a great deal of learning in the operation of the road during his regular routine of duties? He is necessarily on the road two-thirds of every month in the year, and anyone who is intelligent, quick of perception and willing can certainly acquire a clear working knowledge of the operating conditions. What, then, are his chances for the higher position? You may say he stands in line for promotion to chief clerk. I, personally, would decline the promotion, for it seems to me that after a man once takes a chief clerkship his line of promotion is ended.

From the knowledge a secretary gains in his work I feel that he should be able to hold down the job of assistant trainmaster, and, if he is quick and is under the directorship of an efficient trainmaster, will surely be able to learn all the details within a short time. Are the operating officials willing to give their secretaries that chance? I am not saying that the secretaries are imposed upon, and I heartily disagree with my friend of recent weeks who wrote the letter entitled "The Official Goats." If his boss treats him in that manner there must be some justification for it. I have always enjoyed the confidence and good-will of my boss and my relations with him have always been most pleasant. I would like to see a reply from an "Operating Official" giving his views on the question above. "SOUTHERN SECRETARY."

Mixing Railroadng and Religion

NEW YORK.

TO THE EDITOR:

I have read with deep interest and great pleasure the letter from "Train Dispatcher," published in your issue of February 18 under heading "Will Religion and Railroadng Mix?" because he touches a most important point. His question might well be broadened to read "Will Religion and Any Kind of Business Mix?"

Recently, while at a division point, I was quite unexpectedly invited to attend a dinner of a R. R. Y. M. C. A. Bible class. It seemed to be a regular weekly affair and there were, I believe, upward of a hundred men present. After dinner had been served, which had been interspersed with singing of hymns, an old railroader read a lesson from the Bible and followed it with a brief and interesting explanation. There was plenty of enthusiasm during the singing and rapt attention during the reading and subse-

quent remarks, and I could not help but feel that any effort in the direction of acquainting the men with the principles laid down in the Bible—in brief, with God—must tend to elevate their thinking to a higher level and make them better workers, i. e., teach them to work more conscientiously, not because of fear of losing their jobs or merely to earn some money, but as a matter of principle, realizing that it is right to give an honest day's work for an honest day's pay—or, to put it another way, because only right acting can bring and must bring due and just compensation.

And all this applies to executives as well. By taking God into our business, in humble obedience to the injunction "In all thy ways acknowledge Him and He shall direct thy paths" (Prov. 3:6), and by observing the Golden Rule (Luke 6:31), all classes are reaching a common level on which they can meet in full confidence. What is needed in business—especially in railroading—is more religion and less politics.

All this may sound visionary, but the time will surely come when it will be recognized that religion is not merely a thing for Sundays, but an everyday requirement, and we all shall learn how to apply it practically in everyday affairs and especially in business.

RAILROADER.

Can Railways Earn a Fair Return?

LONDON, England.

TO THE EDITOR:

Permit me to thank you for your criticism of my paper with the above title, which was published in the *Railway Age* of January 28 and commented upon in the same issue. My object in sending it was to evoke discussion. But I seem to have failed to make my point clear.

I assume we shall all agree on two propositions:

(1) If railroads can earn a fair return directly, by all means let them do so; there is no balance to be made up, and we need not therefore discuss how it is to be done.

(2) But railroads are as necessary to the community as highways. If therefore they cannot earn a fair return, the public must in some shape or form make up the deficiency.

Now let me give an example to illustrate my meaning. The New Haven is not earning a fair return. It is necessary to the community. It may be said; let the New Haven rates be further increased. The answer is that it is very questionable whether further increases would produce more net revenue. Certainly they would hamper the trade of the Port of Boston and would handicap New England manufacturers in competition with those in other parts of the country. Probably they would divert further traffic to the motor trucks, and therefore not only further diminish New Haven net revenues, but also increase the cost to the New England public of maintaining the highways.

Broadly, then, my point is that the conditions of competition between traffic by railroad, which is expected to pay total cost, and traffic by highway, which only pays conveyance cost, must be more nearly equalized. You may redress the balance to some extent by calling upon the motor trucks to meet some portion of the total cost beyond the mere conveyance costs. In my judgment in some cases it will be necessary also to relieve the rail-borne traffic of some share of total cost. This is in the public interest because there can be no doubt that, except for high class traffic for short distances, total road cost is greater than total rail cost.

Let me add that I never suggested a "government appropriation to make up railway deficits." What I did suggest was that, in certain cases, the government should assume the responsibility for some portion, or the whole, of the cost of providing the railroad. For instance, taking the New Haven case, I can imagine the states through which this railroad runs contributing, say, \$5,000,000 or \$10,000,000 per annum to meet the interest on New Haven bonds; and then leaving

it to the Interstate Commerce Commission precisely as at present, to fix such reasonable rates as will produce a reasonable return on the balance of the New Haven capital.

W. M. ACWORTH.

"East Brookfield on the Map"

HARTFORD, Conn.

TO THE EDITOR:

Your report, printed last week, of the installation of audible signals on the Boston & Albany at Chatham and at East Brookfield, is an event of importance. With audible signals in use in France for 40 years, and in England for about 20 years, it is a trifle odd, to say the least, that up to the present time this country has done nothing at all in that direction.

It is also interesting to see that East Brookfield is on the map. It is a place where, apparently, something is needed to wake up sleepy enginemen. The recent government report, calling on the Reading road to install automatic train control on a short branch, doing a light business, because a collision had occurred on that branch, is sufficient justification for the principle that remedies for disease ought always to be applied where the disease exists. East Brookfield has been the scene of two notable collisions when careless enginemen of passenger trains ran into freights; and the road has, evidently, determined to take effective measures to prevent a repetition of such disturbing incidents at that point.

The first of these collisions occurred on Friday, February 25, 1853. The New York afternoon express, drawn by the locomotive "Addison Gilmore," (which engine at that time was the glory of the railroad world, at least in the eyes of New Englanders) ran over a misplaced facing switch and collided with freight cars standing on the side track. Engineman Isaac Wadleigh and Fireman Charles Dresser were, however, the only persons seriously injured.

The second accident was on March 31, 1880, and it occurred to the same train. In both cases the engineman was at fault, the line being straight and the weather clear; but the discipline in both cases seems to have had to do mainly with the station men. In 1880, as distinguished from 1853, there was a power brake by which the train could have been stopped if the engineman had been alert; and there was a state railroad commission to investigate the case. The report of the commission does not indicate that there were any fatal injuries. The switch tender was dismissed and the station agent was requested to resign. As to the time when the air brakes were applied, or how far away the engineman was when he first saw the switch target, the report of the commission contains the usual array of conflicting evidence, such as railroad officers are familiar with today.

You will understand, Mr. Editor, that I am not proposing any particular commendation for the Boston & Albany in this matter. A need which has existed for 69 years must be classed as some need! And, if the warning had not been repeated 27 years later, there is no telling but what it might have been forgotten entirely. To wait 41 years after the second warning certainly cannot be called particularly commendable. So far as concerns prompt recognition of a defect, and effective application of a remedy, this road is not, in this particular instance, to be taken as a model. However, the remedial action has been instituted, and all concerned should be congratulated.

And, if a thought is to be given to the matter of condemnation for slowness, the Boston & Albany is not alone. That shining list of railroads which you designate as Class I (with a big I) contains a large number of very respectable names of roads whose policy is equally slow—or much slower.

B B A.



View of the Freight House From the North End

Katy Builds Freighthouse of Fireproof Construction

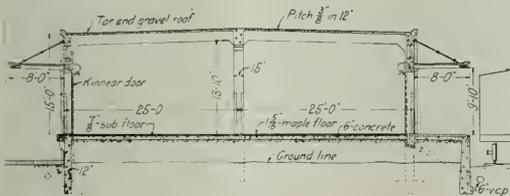
Inbound Terminal, Recently Completed at Dallas, Tex., Is Erected to Modern Standards

A NEW INBOUND freighthouse was recently completed for the Missouri, Kansas & Texas at Dallas, Tex., at a cost, including auxiliary improvements, of \$350,000. The existing outbound house, a frame building, was also moved a sufficient distance to allow space for four tracks between the inbound and outbound houses. Other improve-

ments include the paving of adjacent streets and driveways, with vitrified bricks laid with an asphalt filler on a concrete base, and the extension and rearrangement of the team yard.

The new house is 600 ft. long by 50 ft. wide and one story in height except 100 ft. of the south end, which is two stories high, the second story and the south 20 ft. of the first floor being used for offices, stairways, toilet rooms, etc. An eight-foot platform is provided along the track side of the warehouse, and in addition there is an open platform 100 ft. long by 58 ft. wide at the north end.

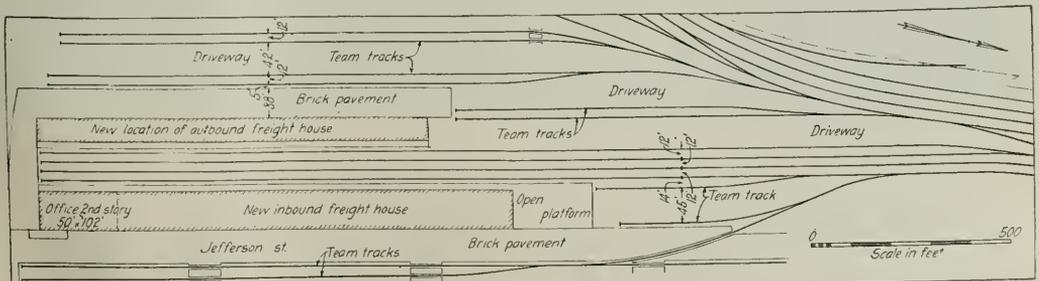
The building is of fireproof construction throughout. The ground floor is supported on a concrete slab, which rests on a fill enclosed by retaining walls, except for a small basement to house a heating plant at the south end of the building. The frame of the structure is of reinforced concrete with a reinforced concrete slab for the roof and for the second floor and a portion of the first floor over the basement. The north end of the warehouse and the south end and second floor of the office building are enclosed with brick walls with wire-glass windows set in standard sheet metal fireproof sash and frames. In the warehouse, owing to the maximum utilization of wall space on the team and track side for doors and windows, the brick work was superfluous, and only the concrete lintels, columns and girders are exposed to view between the wall openings, which are fitted with Kinnear rolling doors with wire glass in Fenestra sash in the transoms. The stairways consist of No. 12 gage pressed steel treads and risers, carried by stringers of 3/16 in. plates. The treads are covered with 1½ in. of concrete and are fitted with Mason safety treads. The office space on the second floor is provided with a plaster ceiling on wire lath and metal



Section Through the Warehouse

ments include the paving of adjacent streets and driveways, with vitrified bricks laid with an asphalt filler on a concrete base, and the extension and rearrangement of the team yard.

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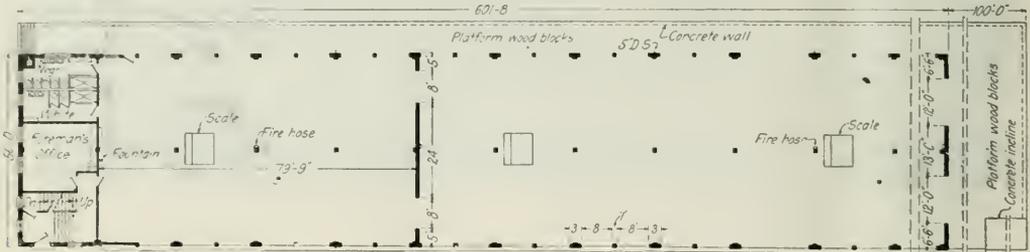


Location of the New Freight House in Relation to Existing Facilities

joists, suspended by metal hangers from the reinforced concrete roof frame.

The building is supported on natural foundations at a depth of a few feet below grade. The warehouse floor and the platforms are at a level of 3 ft. 10 in. above the top of rail. Inside the house the concrete floor is covered with a 1 5/16 in. maple floor with a 7/8 in. sub-floor, carried on 2

The doorways along the roadway side and the platform on the track side are protected from the weather by a continuous canopy projecting eight feet from the wall. This canopy is of frame construction, covered with 7/8 in. tongue and grooved boards and the entire frame is supported from the building by 7/8 in. tie rods anchored into the wall. The roofs of the building are covered with tar and gravel, sloping from the



First Floor Plan of the Freight House

in. by 4 in. sleepers imbedded in the concrete. On the platforms cross-tied wood blocks take the place of planking.

The concrete framing of the superstructures consists of three lines of columns spaced 20 ft. longitudinally and spanned by longitudinal girders. These in turn support transverse beams spaced 6 ft. 8 in. center to center, which carry the roof and floor slabs. For the warehouse doors the 20 ft. panels are cut in two by 12-in. by 12-in. concrete door posts, leaving two openings 8 ft. wide by 9 ft. high for the

longitudinal center line each way to gutters along the two sides of the building, having external downspouts at intervals of 40 ft.

Warehouse scales with platforms 4 ft. 8 in. by 7 ft. 6 in. are installed on the center line of the freight house at intervals of 80 ft. and an automobile scale with a platform 9 ft. by 20 ft. is provided on the platform at the north end where a crane has also been installed to handle heavy shipments. At every fifth column on the center line of the building a fire



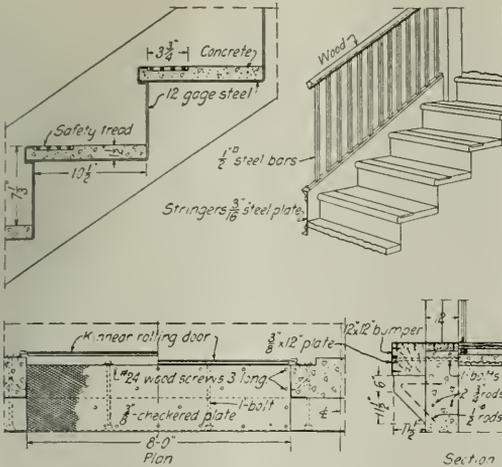
The Freight House Is Well Lighted

rolling doors. All columns and door frames in the warehouse are protected at the corners by 6 in. by 6-in. steel caps extending to a height of 6 ft. above the floor. Along the roadway side of the building a 12 in. by 12-in. bumper under is provided, supported on reinforced concrete brackets. This bumper is covered by a 1/2 in. plate, the top sheet being a hard-wearing safety floor plate.

hose is provided with connection to a Volkhardt valve and base installed in a pit below the floor.

The office portion of the building on both the first and second floors is heated by steam from a plant in the basement, which is of the vacuum return type. Generous natural illumination of the building, both in the offices and the warehouse, is supplemented by a complete system of electric light-

ing. In the freighthouse space this consists of two 200-watt lamps spaced symmetrically on either side of the center line of the building every 20 ft., with a 100-watt lamp under the canopy on either side of the building at the same spacing. Plugs for extension cords are installed in the edge of the



Details of the Metal Stairway and of the Sill Construction of the Driveway Doors

platform on the track side at intervals of 20 ft. for carrying extension cords into cars. The office building is provided with either 60-watt or 100-watt outlets at intervals of 10 ft. in each direction in the ceiling for both the electric lights and electric fans, with floor and wall plugs at sufficient in-



The Office

tervals to take care of dictaphones and other motor-operated office equipment.

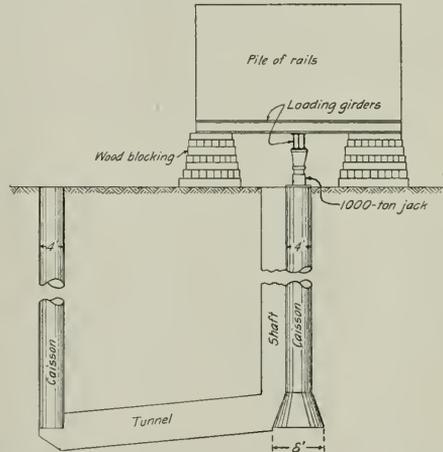
The inbound house was constructed under contract by Hickey & Montgomery, of Dallas, Tex., and the paving by the McKenzie Construction Company, of San Antonio, Tex. The work was in direct charge of J. M. Metcalf, principal assistant engineer, with S. K. Keller, assistant engineer in charge on the ground, and under the general supervision of F. Ringer, chief engineer.

Foundation Tests Develop

Interesting Data

VALUABLE INFORMATION concerning deep foundations was developed by the engineering staff of the Chicago Union Station Company through the aid of some large scale loading tests made at the site of the station on full size concrete caissons. The information developed will be of great value to the constructors of buildings in the business district of Chicago, and certain of the data, especially those concerning the amount of skin friction developed between the sides of the concrete piers and the surrounding earth will be of benefit to engineers the world over. Facts concerning these tests were presented before the Western Society of Engineers on March 6 by J. D'Esposito, chief engineer of the Chicago Union Station Company. Mr. D'Esposito, however, declined to present any general conclusions owing to the limited time at his disposal for studying the test data. However, some facts concerning the information developed are of interest pending the appearance of the formal report of the tests.

These tests had their inception in a problem which arose



Sketch of the Loading Test Showing the Load in Position Over the Larger Caisson

in connection with the foundation for the headhouse of the station. These foundations, consisting of some 200 concrete piers (caissons) carried to a depth of about 60 to 65 ft. below city datum to a stratum of hardpan, were proportioned for a bearing of six tons per square foot under the loads imposed by a structure of the monumental type, that is, a relatively low building like the Pennsylvania station in New York. Subsequent to the construction of these foundations it was decided by the officers of the Union Station Company to erect a building some 16 to 20 stories high, thereby giving rise to loads much greater than those originally provided for. The tests were undertaken to ascertain whether it would be feasible to impose the greater loading on the existing foundations.

The tests consisted in sinking two caissons according to the Chicago method, that is excavating curbed wells to a depth of 60 to 65 ft. and filling them with concrete. Both wells were four feet in diameter, but one of them was belled out at the bottom to a base diameter of eight feet. A pile of 1,200 tons of rails was then supported in turn over these two caissons in such manner that a 1,000-ton jack placed on top of the caisson could be made to transfer any part of the

weight of the rails to the top of the foundation. Under this arrangement sustained loads of gradually increasing amounts were applied to the caissons, while repeated check levels were made to note settlement. These tests showed that the material on which the caissons were supported would carry loads many times in excess of those that were allowed by the building department of the city.

The most interesting part of the test consisted in a further experiment on the smaller of the two caissons, namely the one with the base of four feet diameter. After the bearing test had been completed a shaft was sunk alongside of the larger caisson and a tunnel driven to the other one for the purpose of making an excavation under the bottom of the caisson so as to leave it supported entirely by the friction between the sides of the shaft and the material in which it was imbedded. Upon making loading tests on the caisson in this condition, it was found that it would sustain a maximum load of 250 to 260 tons, solely from the friction on the sides. This superimposed load, together with the weight of the caisson itself, 65 tons, gave a total load of 315 tons, which, divided by the area of the sides of the cylinder, gave an average load of 700 lb. per sq. ft. as the ultimate value for the skin friction. These caissons were dug in the ordinary manner and curbed with wooden lagging, the lagging necessarily remaining in place. More concrete facts concerning this test will be available when the studies now in progress are completed.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING for the week ending February 25 showed another drop, due to the observance of the holiday on February 22, to 735,286 cars, according to the weekly report of the Car Service Division of the American Railway Association. This compares with 780,924 for the preceding week. However, it represented a considerable increase as compared with the corresponding week of 1921, when the loading was 659,642, although it was less than for 1920, when it was 785,295. As compared with last year, increases were shown in the loading of all classes of commodities except forest products and ore, but the principal increase was in coal, merchandise and miscellaneous.

Increases were shown in all districts except the North Western.

The freight car surplus showed another reduction during the week ending February 23 to 264,814, a reduction in a week of 13,667. Of the total, 105,938 were surplus box cars, while the surplus coal cars numbered 105,570. The number of bad order freight cars on February 15 was 332,014, or 14½ per cent. This was the same percentage as was reported on February 1.

A summary of loadings by commodities and districts is given below, as is a diagram comparing 1922 with 1920 and 1921.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS. COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, FEBRUARY 25, 1922

District	Year	Total revenue freight loaded										This year 1922	Corresponding year, 1921	Corresponding year, 1920	
		Grain and grain products	Livestock	Coal	Coke	Forest products	Ore	Misc. L.C.L.	Miscellaneous						
Eastern	1922	8,919	2,634	46,272	1,780	4,970	764	57,583	58,193	181,115					
	1921	5,991	2,284	40,019	876	8,061	568	42,612	49,949	158,288	150,360	173,087			
Allegheny	1922	3,617	2,614	55,950	3,890	2,519	951	40,922	47,825	130,874	166,743				
	1921	2,173	2,800	41,537	4,653	2,471	2,107	34,770	37,159	117,314	112,153	124,903			
Peachontas	1922	273	75	26,924	217	1,116	25	5,373	3,156	21,674	31,116				
	1921	166	86	13,392	277	1,283	37	3,991	2,442	11,716	11,124				
Southern	1922	3,860	2,188	34,760	553	16,505	497	34,146	34,805	105,946	99,993	118,222			
	1921	4,285	1,938	21,659	561	13,561	794	34,642	34,715	79,769	89,767	111,124			
Northwestern	1922	11,002	7,915	6,783	1,158	11,130	481	19,540	21,760	24,983	27,900	27,900			
	1921	10,561	8,345	5,548	1,326	15,296	941	22,767	24,983	27,900	27,900	27,900			
Central Western	1922	11,427	10,181	21,812	298	4,406	886	27,030	27,900	27,900	27,900	27,900			
	1921	13,085	9,997	16,298	219	3,775	2,340	26,088	28,191	27,900	27,900	27,900			
Southwestern	1922	5,631	2,133	4,946	176	7,058	726	14,563	20,462	55,695	54,819	58,110			
	1921	4,871	1,595	4,525	122	6,045	436	14,707	22,518	55,695	54,819	58,110			
Total all roads	1922	46,726	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295			
	1921	41,132	27,045	142,998	8,034	50,492	7,223	179,577	203,141	659,642	783,295	783,295			
Increase compared	1920	34,753	28,776	182,913	9,909	60,106	11,831	136,232	318,773	109,966	78,295	78,295			
	1921	5,597	695	44,449	38	2,788	2,893	6,225	10,966	75,644	75,644	75,644			
Decrease compared	1920	11,976	4,534	1,837	12,402	7,501	6,225	104,668	48,009	104,668	104,668	104,668			
	1921	46,729	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295			
Increase compared	1920	54,209	30,327	190,700	7,666	50,796	4,034	219,050	234,132	80,934	692,007	772,102			
	1921	54,704	30,274	193,377	7,823	52,638	4,015	222,908	232,673	788,412	687,867	786,633			
February 25	1922	48,060	27,098	185,151	7,844	50,364	4,015	218,371	211,134	738,886	699,718	752,680			
	1921	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332			



Revenue Freight Car Loadings to February 18, 1922

Labor Board Begins Hearings on Wage Reductions

J. W. Higgins and J. G. Walber Present Interesting Data on Payrolls in Other Industries

THE MEN DOING WORK comparable to that done by railroad employees and engaged in 5,327 industries in 28 western states, are now receiving wages much lower than those paid to railway workers. This situation was brought to the attention of the Railroad Labor Board on March 7 by J. W. Higgins, executive secretary of the Association of Western Railways, who, on behalf of 101 western carriers, opened the second nation-wide wage reduction controversy before that body. The hearings on proposed wage cuts were scheduled to begin on March 6, but delays due to the necessity for obtaining a large hall in which to hold the sessions and for a roll-call postponed the real opening of the hearings until the following day.

Mr. Higgins' statement was based on information gathered in a long investigation conducted by committees in all the 28 western states whose researches led them into all industries in any degree comparable to the business of railroading. These data, in the form of an exhibit, also include the wages paid in rural communities and on farms in the territory involved.

The survey showed that of the 318,893 employees of all classes studied in other industries, 247,866, or 77.73 per cent, were getting lower wages in December, 1921, than were paid by the railroads for similar service. There are only four states in the west, Montana, Nevada, Oregon and Wyoming, for which the reports show less than 50 per cent of the employees in other industries paid less than railroad wages, and peculiar conditions exist in these four states not found elsewhere in western territory. In 26 principal cities in the west the investigation shows that out of 125,425 employees in outside industries, 98,814, or 79 per cent, are paid less than the railroads pay for similar work.

"Industrial employers declare that the high level of railroad wages is a direct charge upon them," said Mr. Higgins, "that it is paid by them in transportation rates; that the high level of wages on railroads exerts an influence upon, and artificially stimulates wages for men doing like work in their industries which creates friction and dissatisfaction among their forces. I believe this explains to a large extent the business man's attitude toward railroads and railroad rates.

"The railroads are not asking for the low level of pre-war wages. Indeed, the wages I have read into the record show that for most classes the railroads propose scales 50 to 100 per cent higher than those paid in 1915, and from 30 to 70 per cent higher than the level of 1917."

"Standard" Wage Rates Attacked

Mr. Higgins added that while the roads wish the wages paid to be fair and adequate, it was not believed that the Transportation Act intended a flat rate of wages to prevail throughout the country. Outside industries, he said, never have and do not now pay a flat rate. Furthermore, a flat rate of wages never existed, he declared, in the classes of railroad employees under consideration prior to government control.

The situation, Mr. Higgins suggested, might be met by an order permitting the railroads to pay the going rate of wages, or in any event a rate not less than the preponderating rate paid in the zone for similar work.

"There are great differences in the wages paid by outside industries for the same kind of labor in different parts of the western territory," said Mr. Higgins. "Common labor

in Oregon gets from 31 to 45 cents, while in the central agricultural and industrial states, it receives from 26 to 35 cents, and in Mississippi, Louisiana, New Mexico and Texas, the range is from 10 to 25 cents an hour. Wages for metal crafts also vary as to locations. In the state of Washington the range for machinists in outside industries is from 56 to 75 cents; in Nevada, from 61 to 75 cents; in Illinois, from 41 to 65 cents an hour, and in Mississippi, from 30 to 55 cents an hour."

Mr. Higgins declared with respect to the cost of living that the index figures of the National Industrial Conference Board indicate a downward trend. These figures, he declared, show that the family budget, which includes food, shelter, clothing, fuel and light and sundries, as of February 1, 1922, is 22.9 per cent less than the peak reached in July, 1920.

These figures, Mr. Higgins said, show a remarkable decline in the price of food, which is 43 per cent of the family budget. Food prices for January 15, 1922, show a decrease of 35 per cent from the peak in July, 1920.

In Chicago the investigation disclosed that out of a total of 32,350 employees in other industries whose wages were studied, 24,846, or about 75 per cent, are paid less than railroads pay for similar work. This was shown also as to shop employees and laborers in steel plants at South Chicago, Gary and Joliet.

Wage Decreases Requested by Western Carriers

The wage decreases requested by the western railroads, represented by Mr. Higgins, may be summarized as follows:

For employees paid on an hourly basis, decreases ranging from four cents an hour to 27 cents an hour have been asked. The present wage of these employees, the wage proposed by the western carriers and the amount of decrease, all in cents per hour, are shown in the following table:

Class of employee	Present wage	Proposed new rate	Decrease requested
Skilled Shop Employees—			
Machinists, boiler-makers, blocksmen, electricians, copper and tin workers, coach and body builders and repairers (except on running rep.), loc. carpenters (except on running rep.), pattern makers, cabinet makers, silver platers, wood machine operators (regularly assigned in mills), upholsterers, coach and loc. varnishers, letterers and stippers	77	67½	9½
Regular apprentices (trades above)	34—59	29—54	5
Helper apprentices	54—64	40—54	10—14
Other Shop Employees—			
Freight car body and truckmen (steel and wood); tank car body, tank and truckmen (steel and wood); passenger car truck and platform men (steel and wood); air brakemen (freight and passenger); train yard car inspectors (freight and passenger); passenger car running rep. men (outside rep. shops); tender frame rep. men; men on miscellaneous work; freight car painters	72	50	22
Carmen helpers, including car oilers and material carriers	54	35	19
Carmen helpers, apprentices	54—64	35—45	19
Painters, wood iron and steel pipe work	77	50	27
Stationary engineers (electrical)	77	63½	13½
Mechanics, M. of W., Bridge and Building Departments	58	53	5
Helpers	44	36½	7½
Boiler room water tenders and coal passers	35—47	31—42	4—5
Signalmen, leading maintainers, gang foremen, etc.	78	72½	5½
Signalmen and signal maintainers	73	60—67½	5½—13
Signalmen asst., and asst. signal maintainers	54—68	40—54	14

For employees paid on a monthly basis, decreases ranging from \$10.02 to \$14.28 per month have been requested as indicated in the following table showing the present monthly wage of the employees involved, the monthly wage proposed

by the western railroads and the difference between the present and proposed rates.

Class of employee	Present wage	Proposed new rate	Decrease Requested
Janitors, watchmen, etc.	\$70.00	\$55.72	\$14.28
Office, shore boys, etc.	45.00	30.72	14.28
Bridge and building foremen	125.50	115.00	10.50
Assistants	115.20	105.00	10.20
Track and maintenance foremen	110.20	100.00	10.20
Storekeepers, clerks, 2 years or more experience	87.50	77.22	10.28
Clerks, less than 2 years experience	87.50	73.22	14.28
Stationary engineers (steam)	120.20	108.18	12.02
Stationary firemen and engine room oilers	160.20	90.18	10.02
Callers, gatemen, etc.	93.62	79.34	14.28

For track and common laborers, laborers in the maintenance of way department, laborers around shops, station and platform employees, performing work which requires little or no skill or training and common laborers in station forces now receiving the wages in cents per hour indicated in the following table, the western railroads have requested authority to pay the prevailing rates in the territory employed.

Class of employee	Present wage
Track and common labor, M. of W. Department	28-40
Laborers around shops	31-43
Station and platform employees, station forces	37-49
Common labor	28-40

In addition, authority is asked to pay drawbridge tenders and assistants, now receiving \$75 a month, the prevailing rate in the territory in which they are employed.

The proposed new rate for car cleaners is set at two cents above the rate paid to track labor in the territory in which these employees are working. The present rate of car cleaners is 42 cents an hour.

New rates for inexperienced clerks, based upon length of service, are also requested by the western railroads. Under present rates these employees are paid from \$67.50 to \$77.50 a month, and the proposed new rates range from \$50 to \$70 a month. Similarly, new rates for inexperienced gatemen and callers have been proposed, these rates ranging from \$50 to \$60 a month.

J. G. Walber Represents Eastern Roads

In presenting the case of the eastern railroads, John G. Walber, executive secretary of the Bureau of Information for those roads, drew attention to the fact that motive power and rolling stock are being maintained for immediate requirements only. "There is an accumulation of bad order locomotives and cars," he said, "which, when business resumes, will have to be put into serviceable condition. This is simply charging against the future that which under normal conditions would have been taken care of currently.

"Since the time when most of the wage conferences were held, the most recently available data on the subject indicate that the cost of living has receded somewhat. Assuming for the sake of argument that the rates of pay established by the board May 1, 1920, were in proper relation to the cost of living then prevailing, the reduction in the cost of living from May 1, 1920, to July 1, 1921, was approximately 20 per cent, as indicated by the governmental and other statistics, yet the reduction in wages effective July 1, 1921, was approximately 11 per cent." Mr. Walber said that exhibits would be introduced showing clearly that the cost of living today is back where it was in 1918. "So far as the cost of living is a factor in determining wages," he declared, "the wages of today should be based upon what the cost of living was in 1918.

"It will be observed from the data placed in detail before the board that for all classes of employees on the eastern railroads (the payrolls of which are approximately 45 per cent of the entire country for the classes affected) the saving effected as a result of the reduction in rates of pay heretofore ordered by the Railroad Labor Board amounted, in the aggregate, to 11.2 per cent, or \$6,923,015.72 a month, and that the saving effected by the changes in rules and working

conditions heretofore promulgated by the labor board amounted, in the aggregate, to 1.2 per cent, or \$748,333.87 a month. In other words, the total saving effected on the eastern railroads as the result of the wage reduction heretofore ordered by this board, plus the saving effected on those roads as a result of the modification of rules and working conditions ordered by the labor board amounted, in the aggregate, to not more than 12.4 per cent, or \$7,671,349.59 a month."

Mr. Walber also submitted an exhibit showing the result of an investigation on the eastern railroads of comparative wage schedules as paid in outside industries and paid by the railroads for comparable labor in more than 3,700 plants and 988 communities in eastern territory. For ordinary unskilled labor comparable to railroad labor in shops, round-houses, etc., this exhibit shows that of 36,865 such employees in outside industries, only 575 received rates of pay equaling or exceeding the prevailing rate of 41 cents an hour paid by the railroads, but the average rate for these outside industries was 30 cents an hour. For car repairmen comparable with rough painters, scourers, primers, etc., of which there were 11,292 employed in the outside industries above referred to, only 143 received rates of pay equaling or exceeding the railroad rate of 72 cents an hour, but the average for such labor was 48.8 cents an hour. For machinists, of whom there were 42,159 in the outside industries studied, only 650 received rates equaling or exceeding the railroad rate of 77 cents an hour, but the average rate paid in the outside industries was 56 cents an hour.

"We submit," said Mr. Walker, "that it is to the greater interest of the railroad employees and the public in general that the employees be placed upon a basis which will permit of working the maximum forces, so providing employment for the greater numbers, increasing the consuming public and in that way contributing to the general revival of business.

"The extent to which the readjustment in other fields has already progressed is strikingly illustrated by the deflation which has thus far taken place in the wholesale prices of commodities. The data compiled by the United States Department of Labor indicate that the highest level of wholesale prices was in May, 1920, when, as related to the average prices of 1913 as the 100 base, the index number of 272 was reached. Since that time there has been a constant recession in prices so that on January 1, 1922, the index number of 148 had been reached; in other words, a decline of 124 points or a reduction of approximately 45 per cent from the May, 1920, peak. It is interesting to note that the deflated level at the present time corresponds with the level prevailing in December, 1916.

"It was natural that the manufacturers and other representatives of the shipping public should feel that as their industries had been undergoing the process of readjustment, and as the railroad industry was still operating on the basis of war time costs, plus the increase in the cost of their labor resulting from decisions of the labor board, the railroad industry should also contribute toward the readjustment. The rates of pay which the railroad industry is paying are public information, and it was only natural that outside industries should make comparisons between the rates which they pay their employees and those which the railroads are paying. The public generally, including wage earners in other industries, should not be called upon to pay transportation charges based on an inordinately high level of railroad wages."

E. J. Manion Protests Wage Cut Negotiations

Immediately following the roll-call, E. J. Manion, president of the Order of Railroad Telegraphers, injected a protest against the manner in which the disputes over wage scales were handled by the railroads. He charged that rep-

representatives of the carriers had informed the members of his organization during their negotiations that wage reductions were being proposed in order to pass along the savings made therefrom to the public in the form of lower freight rates instead of to establish just and reasonable wage levels. In support of this position he pointed out the rate increases authorized by the Interstate Commerce Commission to take care of the wage increase of July, 1920, the subsequent decreases in both rates and wages and added that "the transportation industry is the only inflated industry in the country today and it should be deflated before more is taken away from the lower paid employees now before the Board." The regional negotiations between the carriers and the train service brotherhoods were characterized by Mr. Manion as "petting parties," the inference being that those classes of employees now before the Board are being discriminated against by the railroads.

Labor Leaders Threaten to Delay Hearings

Before Mr. Higgins began his presentation on behalf of the western carriers, B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, and Martin Ryan, president of the Brotherhood of Railroad Carmen, threatened to delay the hearings by their protests against the conferences which preceded the submission of the wage controversy to the Board. However, Judge R. M. Barton, chairman of the Board, ruled that the hearings should continue, the objections made by these labor leaders to be considered in connection with each dispute as it came before the Board. In addition, Mr. Jewell had previously asked for permission to examine the representatives of several carriers as a preliminary to the actual taking of testimony. After considerable argument as to the procedure to be followed in presenting this case to the Board and the relevancy of his request, Mr. Jewell was allowed to question representatives of the New York Central, the Western Maryland, the Chicago Great Western, the Michigan Central, the Pere Marquette, the Bangor & Aroostook, and the Cleveland, Cincinnati, Chicago & St. Louis as to the extent of their contracts for the operation of shops and the wages and working conditions of employees in contract shops. In each case the representative of the carrier admitted that certain shops were being, or would be, operated under a contract arrangement, but none of the employees in these shops were included in the requests for wage reductions.

The charge of "petting parties" between the carriers and the train service organizations came up again on March 7 when W. L. McMenimen, labor member of the Board, asked Mr. Manion, sponsor of the charges, if he had not sought "a bid" to these "parties." Mr. Manion replied that he had and "got turned down flat." He added, however, that this constituted the best evidence of discrimination.

Industrial Wages in Western

States Below Railroad Wages

The remainder of the session on March 7 was taken up with the presentation of evidence by various railroad officers who had acted as state chairmen in gathering the mass of information filed with the Board by Mr. Higgins. These witnesses outlined the manner in which the information was gathered and presented statistics showing that in certain western states from 60 to 90 per cent of the employees in other industries performing work comparable to railroad work were receiving wages lower than those paid by the carriers.

Representatives of the four train service brotherhoods and a committee representing the western railroads and headed by William Jeffers, general manager of the Union Pacific, are still in session at Chicago considering wages and working conditions. These conferences are in line with the policy of both parties to carry on negotiations on a regional basis as was done prior to federal control.

J. W. Higgins Asks for Graduated

Wage Scale for Shopmen

In summing up the testimony presented to the Board by the various state chairmen, Mr. Higgins asked for a graduated scale of wages for shop employees performing work which does not require the services of skilled mechanics. He said in part:

"I want to point out that our evidence shows conclusively that in every city and state in western territory the great bulk of shop work is performed in outside industry at lower rates than the railroads pay and that much of the rougher shop work for which railroads now pay mechanics' rates is performed in outside shops by specialists, handymen or second-class mechanics at much lower rates than the mechanics receive, and a great deal of it at rates lower even than those we are now offering helper and regular apprentices in the last year of apprenticeship. The consideration that the western roads ask the Board give this situation is this—that in its decision, permit the railroads to adjust, with the men, the rates for such positions, or that it name rates for those positions requiring less skill that are more nearly in accord with the rates paid for similar work in outside industries.

"The western railroads want the 67½ cent rate to supplant the 77 cent rate for skilled shopmen, that is, first class journeymen mechanics; they also want and earnestly request that this Board not impose higher rates for less skilled positions than the rates paid by industries in contiguous territory, nor do they want to be compelled, through classification of work, to use the skilled journeyman mechanic on the rougher and lower grades of work. They ask that this Board fix rates for these lower grades more nearly comparable with the rates paid for like work in other industries in contiguous sections. In other words, they ask that the Board, after fixing the minimum rate for skilled journeymen mechanics, fix rates at a lower level for the lower grades of work, specifying the kind of work and the rate that would be paid for such work and fixing the rates so they will fall within the spread between the minimum rates for skilled journeymen mechanics and the maximum rates for regular and helper apprentices—for example, between the 67½ cent per hour rate we are proposing for skilled journeymen and the maximum 54 cent rate we are proposing for regular and helper apprentices."

The remainder of the Board's session on March 8 were taken up with the presentation of evidence by the chairman of western State and city committees who had supervised the gathering and compilation of the data regarding wages in other industries. In addition, representatives of several western carriers made separate representations outlining conditions peculiar to their properties.



White Creek Bridge, Fraser Canyon, on the C. P. R.

Labor Board Announces

New Rules for Telegraphers

A NEW SET of rules to govern the working conditions of telegraphers, telephone operators (except switchboard operators), agent-telegraphers, agent-telephoners, towermen, levermen, tower and train directors, block operators and other similar employees, was announced by the Railroad Labor Board on March 4. The outstanding features of the new code, which becomes effective March 16, are the provisions for the payment of punitive overtime after the ninth consecutive hour of service, the provision permitting the employment of "split tricks" at one-shift offices provided the actual tour of duty of eight hours comes within a spread of twelve hours, the provisions giving regularly assigned telegraphers a guarantee of one day's pay within each 24 hours, and the provisions prohibiting the employees covered by the new rules from carrying United States mail and parcels post where this work becomes "unduly burdensome" and from attending interlocking or switch lights except to see that they are kept burning.

The rules in this new "national agreement" covering the basic eight-hour day, intermittent service, overtime, punitive payments for calls and free transportation are similar to those which have already been granted by the Board to cover other classes of employees and described in previous issues of the *Railway Age*. The intermittent service rule, giving the carriers the right to employ men on "split tricks" without punitive payments is exactly the same as the rule recently given to the clerks and firemen and oilers and reproduced in the *Railway Age* of January 28, page 277. The overtime rules provide for the payment of punitive overtime after the ninth hour of consecutive service, and the call rule provides for the payment of a minimum of three hours for two hours' work or less when the service performed is not continuous with the regular tour of duty.

Other Rules in the New Code

The remainder of the rules in this new code include the following:

Rule 1. Scope.—This schedule will govern the employment and compensation of telegraphers, telephone operators (except switchboard operators), agent-telegraphers, agent-telephoners, towermen, levermen, tower and train directors, block operators, staffmen, and such agents as may be included by the operation of the second paragraph of this rule, and will supersede all previous schedules, agreements and rulings thereon.

The disputes as to what exclusive agents shall be covered by the rules are remanded to the representatives of the parties on the individual carriers for further negotiation.

Rule 6. Meal Period.—Where but one shift is worked, employees will be allowed 60 consecutive minutes between 11.30 and 1.30 o'clock day or night for meal.

If the meal period is not afforded within the allowed or agreed time limit and is worked, the meal period shall be paid for at the pro-rata rate; and 20 minutes, with pay, in which to eat shall be afforded at the first opportunity.

Rule 7. Starting Time.—Regular assignments shall have a fixed starting time and the regular starting time shall not be changed without at least 30 hours' notice to the employees affected.

Where three consecutive shifts are worked covering the 24-hour period no shift will have a starting time after 12 o'clock midnight and before 6 A. M.

Rule 8. Sunday and Holiday Work.—Employees will be exempt from Sunday and holiday duties as much as the condition of business will permit.

Time worked on Sundays and the following holidays—namely, New Year's day, Washington's birthday, Decoration day, Fourth of July, Labor day, Thanksgiving day, and Christmas (provided after any of the above holidays fall on Sunday the day observed by the community or by proclamation) shall be considered as "holidays" and be paid for at the regular hourly rate when the extra number of hours constituting the regular week-day assignment are worked.

When called or called to work on Sundays and the above specified days a less number of hours than constitute a day's work

within the limits of the regular week-day assignment, employees shall be paid a minimum allowance of two hours at overtime rate for two hours' work or less, and at the regular hourly rate after the second hour of each tour of duty. Time worked before or after the limits of the regular week-day assignment shall be paid for in accordance with overtime and call rules.

Rule 9. Basis of Pay.—All employees herein specified will be paid on hourly basis.

Rule 10. Guarantee.—Regular assigned telegraphers will receive one day's pay within each 24 hours, according to location occupied or to which entitled, if ready for service and not used, or if required on duty less than the required minimum number of hours as per location, except on Sundays and holidays.

This rule shall not apply in cases of reduction of forces nor where traffic is interrupted or suspended by conditions not within the control of the carrier.

Rule 11. Discipline—Pay for Time Lost.—If the final decision decrees that charges against the employee are not sustained the record shall be cleared of the charge; if suspended or dismissed, the employee will be returned to former position and paid for all wages lost less amount earned in any other service.

Rule 12. Suspension of Work During Regular Hours.—Employees will not be required to suspend working during regular hours or to absorb overtime.

Rule 14. Classification of Employees, New Position, etc.—Where existing pay roll classification does not conform to Rule 1, employees performing service in the classes specified therein shall be classified in accordance therewith.

When new positions are created compensation will be fixed in conformity with that of existing positions of similar work and responsibility in the same seniority district.

Rule 15. Attending Court—Witnesses.—Employees taken away from their regular assigned duties, at the request of the management, to attend court or to appear as witnesses for the carrier will be furnished transportation and will be allowed compensation equal to what would have been earned had such interruption not taken place and, in addition, necessary actual expenses while away from headquarters. Any fee or mileage accruing will be assigned to the carrier.

Rule 16. Handling Train Orders.—No employees other than covered by this schedule and train dispatchers will be permitted to handle train orders at telegraph or telephone offices where an operator is employed and is available or can be promptly located, except in an emergency, in which case the telegrapher will be paid for the call.

Rule 17. Handling United States Mail.—When the carrying of the United States mail and parcels post by the employees herein specified becomes unduly burdensome, or interferes with the proper operation of trains, they will be relieved from such work.

Rule 18. Handling Switches, Attending Switch Lights, etc.—At stations where section men reside or porters or helpers are employed, employees as per Rule 1 will not be required to attend interlocking or switch lights, but will see that they are kept burning.

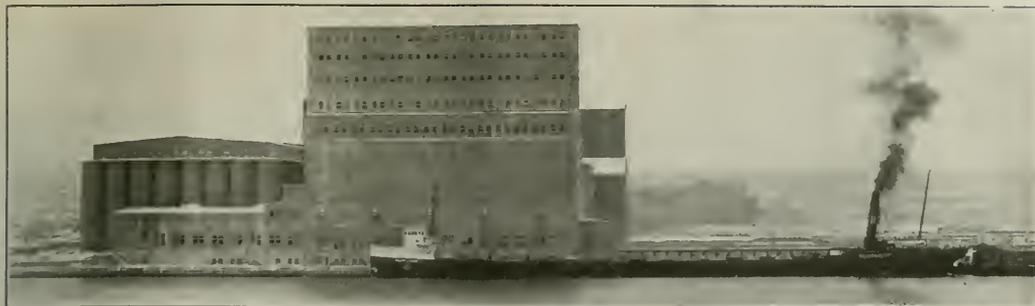
At stations where employees as per Rule 1 are required to care for interlocking or switch lights they will be allowed 75 cents per light per month, with a minimum of \$3 for four lights or less.

Rule 19. Regular Assigned Men Doing Extra Work.—Regularly assigned telegraphers will not be required to perform relief work except in cases of emergency and when required to perform relief work, and in consequence thereof, suffer a reduction in the regular compensation, shall be paid an amount sufficient to reimburse them for such loss, and in all cases they will be allowed actual necessary expenses while away from their regular assigned stations.

Rule 20. Express and Telegraph Commissions.—When express or Western Union commissions are discontinued or created at any office, thereby reducing or increasing the average monthly compensation paid to any position, prompt adjustment of the salary effected will be made conforming to rates paid for similar positions.

Rules governing seniority, promotions, discipline and grievances and vacations and sick leave with pay and "certain other subject matters in dispute" are remanded to the individual carriers and their employees "for the purpose of adjustment under the provisions of Section 301 of the Transportation Act."

THE "I. D. & B. C." (the Edmonton, Dunvegan & British Columbia Railway) has brought to Edmonton, Alberta, during the past six months about 1,500,000 bushels of wheat, oats and barley from Peace River and Grande Prairie districts. 718,624 bushels wheat, 676,983 bushels oats, and 100,699 barley or a total of about 900 cars, or, say, 35 cars a week.



A Government Railway Elevator

Problem of the Government Railways in Canada*

Large Deficit in 1920 Has Led to the Investigation of Expenses, Operation and Management

By W. T. Jackman

Associate Professor of Economics, University of Toronto, Toronto, Can.

AT THE TIME of the acquisition of the Canadian Northern in 1917, through the purchase of the remaining \$60,000,000 of common stock, the government declared its intention of operating this property, for the time being, through the corporate machinery by which it had been operated previously, but under a reorganized board of directors named by the government and free from political influence or interference.

In June, 1919, the Canadian National Railways Act was passed, providing for the administration of all railways that had been or might be acquired subsequently by the government, under a Canadian National Railways Board, to be appointed by the governor-in-council, but although two years have elapsed this board has not yet been formed. Consequently, the management of the former Canadian Northern is still carried on by the old operating staff under a reconstituted directorate. For operating purposes there was added to this railway system the lines of the Intercolonial, the National Transcontinental and the Grand Trunk Pacific, the latter of which has been in the hands of the minister of railways as receiver since March 9, 1919.

Deficit of \$70,000,000 In 1920

The financial results of the management of this system show that for the year 1919 there was a deficit in operating expenses and fixed charges amounting to \$48,242,536, while for the year 1920 the corresponding deficit was almost \$70,000,000. These figures do not take into account any interest on the capital of the National Transcontinental and the Intercolonial. To add \$12,000,000 for the interest on the capital of these lines would bring the deficit up to \$82,000,000 for the government-owned railways; but as the capital for these roads was furnished by the government and interest payments therefore would be made by one branch of the government to another, we may neglect this item entirely. A deficit of \$70,000,000, however, calls for explanation and when we note that the deficit of 1920 was almost 50 per cent greater than that of the previous year we have a condition which demands serious attention.

With these facts placed before the country there was an

insistent demand in Parliament for an investigation of the affairs of these railways. This, together with the fact that the operation of the Canadian government merchant marine was not satisfactory either financially or otherwise, led to the organization of a Committee on Canadian National Railways and Shipping, composed of members from the three parties in the House to inquire into:

1. What information as to the government railways and marines should be given to Parliament, and when and how such information should be given.
2. What system of auditing should be adopted and what details should be given in the annual report.
3. What, if any, improvement could be made in the general plan of management.
4. Whether and for what purposes this committee should be continued.

As will be noted from the terms of reference, there was much contention as to what information should be given to the public. Some were opposed to making public anything more than the main outstanding facts; others considered that, since the people have to finance the railways, complete details should be placed before them as to the methods and results of operation. The chief objections urged by members of Parliament to giving full information to the people were: first, that in this way the railways would become, as the Intercolonial has been, the football of politics, and second, that thereby all the facts would get to the Canadian Pacific and would be used by the latter against its rival, the government-owned system. These difficulties, especially the latter, were given little attention by the management of the government system. To the latter the important reason why certain things should not be made public was because it would make the administration of the national lines much more difficult, when past contracts were made and prices paid, as well as proposed future business, were laid open to the eyes of all.

Reasons For Deficit

It is desirable to note the chief reasons for the increasing railway deficit, as these were brought out in the course of the investigation.

1. *High wages.* For every dollar earned by the Ca-

*This is the first of two articles on this subject. The second will appear in an early issue.

Canadian National Railways, 75 cents were spent for wages, 20 cents for fuel, and 29 cents were required for other materials and miscellaneous expenses in order to earn the dollar. These high wages were due to certain conditions which prevailed in the United States and were made applicable to Canadian railway labor. In 1918, after the government of the United States had taken control of the railways, the "McAdoo award" raised the wages of railway employees, and this was followed by 23 supplements to adjust the wages of the men in the different trades, which added more to the payrolls than the original award. Then in 1920, after further agitation on the part of labor, the "Chicago award," made in September, raised the wages of labor still more and rendered this increase retroactive to May 1. Of course, the railways were allowed to raise their rates after September, but as this was not retroactive the extra wages given from May 1 to that date were equivalent to a hand-out to the men, for which the railways received no return.

To show the extent to which wages have been increased for the various classes of railway labor, the following table of schedule rates of pay is given. It must be emphasized here that these do not include allowances or overtime rates, which have been a source of enormously high wages in many cases without any compensating return to the railways.

Class of employee and rate	Per cent increase									
	1918			1919			1920			
	1917	1918	1919	1917	1918	1919	1917	1918	1919	
Sectionman, hour....	\$0.19	\$0.25	\$0.40	\$0.48	31.6	110.53	155.26	over	over	over
Machinist, hour....	0.37	0.68	0.68	0.85	83.8	83.8	129.7	1917	1917	1917
Agent, Teleg., month.	66.00	85.00	111.00	125.00	28.8	68.2	89.4			
Conductor, passenger, 100 miles	2.90	3.35	4.00	4.67	12.1	37.9	61.0			
Conductor, freight, 100 miles	4.00	4.82	5.40	6.44	20.5	35.0	60.1			
Brakeman, passenger, 100 miles	1.60	2.23	2.66	3.33	39.4	66.2	108.1			
Brakeman, freight, 100 miles	2.67	3.72	4.08	5.12	39.3	52.8	91.8			
Engineer, passenger, 100 miles	4.11	4.57	5.60	6.40	11.2	36.2	55.7			
Engineer, freight, 100 miles	4.53	5.23	6.08	7.12	15.4	34.2	59.4			
Fireman, passenger, 100 miles	2.50	3.15	4.00	4.80	26.0	60.0	92.0			
Fireman, freight, 100 miles	2.85	3.69	4.24	5.28	29.4	48.8	85.3			

From this table it will be observed that the unitary rate of wages increased in 1920 over that of 1919 by very large percentages. For instance, for sectionmen the increase was roughly 45 per cent; for machinists, 46 per cent; for conductors, 25 per cent; for brakemen, 39 to 42 per cent; for engineers, 19 to 25 per cent; and for firemen, 32 to 36 per cent. But these figures fail to tell the whole story. Before the "McAdoo award" the total yearly wages paid on the Canadian National Railways were \$43,265,881.79. The 23 supplements to that award increased this by \$13,013,954.92. The increase due to the "Chicago award" was \$10,390,895.58. Thus the pay-roll per annum was increased from \$43,265,881 as at June 30, 1918, to \$81,347,880 in 1920; in other words an increase of 88 per cent in two years. This does not take into account the increase in labor that was required to handle the increased business, nor a lot of the overtime conditions which, because they changed from time to time, it was impossible to figure. Moreover, under the retroactive features of the "Chicago award" a gift of \$4,881,885 had to be made to the men.

High cost of fuel and other materials. As we have said, 20 per cent of all earnings had to go for fuel. The average price paid for coal during a succession of years may be set down as follows:

1914	\$6.65 per ton for Canadian Northern System
1915	4.41 per ton for Canadian Northern System
1916	6.60 per ton for Canadian Northern System
1917	6.00 per ton for Canadian National Railways
1918	7.40 per ton for Canadian National Railways

The total increase in the fuel cost of 2,800,383 tons at an average price of \$6.20 per ton in 1919 and 3,066,344 tons at an average price of \$7.40 per ton in 1920 would be \$5,

328,571. The cost of ties also increased from an average of \$3.4 cents to 91.6 each, and this, with the greater use of ties, made the expense bill for ties in 1920 \$512,798.90 more than that of 1919. The cost of most other materials increased even more than that of ties.

Leaving out of account, for the time being, everything else than wages, from what we have already shown concerning the vast increase in the amounts paid for labor, it is easy to account for the increased deficit in 1920 over that of 1919. For if we take the increase in the wage bills in the two years, from \$43,000,000 to \$81,000,000, or an average yearly increase of \$19,000,000 and add to this the amount of the retroactive payment under the "Chicago award," namely \$4,800,000 which is a payment for the year 1920, we shall get \$23,800,800; and this amount added to the \$48,000,000 deficit of 1919 will make up that deficit to over \$70,000,000 for 1920. It is evident, then, that the increase of wages alone is sufficient to account for the increased deficit noted.

But it is thought by many that the increased rates granted to the railways were enough to compensate for the higher wages paid to labor. What were these increases? On December 1, 1916, there was allowed a freight increase of 5 per cent on lines east of the Great Lakes, but no increase on the Western lines. In March, 1918, there was an increase of 15 per cent on all lines. In August, 1918, there was an additional increase of 10 per cent. On September 13, 1920, there was an increase of freight rates of 40 per cent on the eastern lines and 35 per cent on the western lines. But there were a great many commodities to which the increased rates did not apply, and the average increase on the Canadian National System was only 27.45 per cent. This increase in rates was not proportional to the increased costs of labor and materials. Then on January 1, 1921, these rates were automatically reduced 35 per cent on the eastern lines and 30 per cent on the western lines, and the new average yield to the National system was 23.22 per cent. It is manifest, therefore, that the net increase of rates was much less than the gross increase would imply.

3. Another reason for the great deficit of 1920 was the large amount of deferred maintenance charges, and all these were charged to operating expenses, not to capital. During the four years of war a great amount of the expenses for maintenance-of-way and structures and for maintenance of equipment was necessarily postponed, and then when the war was over there had to be much greater expenditures to bring the property up to the operating standard, so as to be in a position to compete with other lines operating through the same country. Then, on the prairies, a large proportion of the lines was originally laid with 60-lb. rails, and with the growth of traffic on some of these lines it has been found desirable to use heavier cars and locomotives, which, in turn, has necessitated replacing the light steel rails with rails of 80 lb. or 85 lb. Of course, part of this expense for heavier rails could be charged naturally to capital. The following comparison of expenditures for the years 1919 and 1920 is instructive:

	1919	1920	Total increase	Per cent increase
Maintenance of way and structures	\$48,476,440	\$11,759,133	\$5,982,870	23.06
Maintenance of equipment	19,540,469	27,945,511	8,113,109	40.15

This increase of \$14,000,000 in the maintenance of the properties and facilities of the National lines for one year represents a heavy drain upon earnings, and, taken in connection with the very high wages and costs of materials and fuel, must have been a potent cause leading to the financial deficit. Then, too, at the close of the war there was a general feeling that public expenditures should not cease immediately, but, on the contrary, should be continued for some time, and acting upon this the directors of the National railways recommend to the government a program of betterments which would improve greatly the position of this sys-

tem from a competitive standpoint. The government acquiesced in these expenditures and the management set to work to develop the property to enable it to provide good service for which everybody was clamoring. This policy provided work for many who would be otherwise without it, and possibly the scale of betterments undertaken was altogether too liberal for the revenues of the lines, though not too generous for the building up of the property as a competitor of the Canadian Pacific.

Political Background

Some have thought that one reason why the National Railways have not paid was because political interference had already become evident in the affairs of the system, and it has openly been stated by at least one of the papers friendly to the government that "the pretense that these railways are now free from politics deceives nobody." To this statement the management of the system gives a categorical denial. The vice-president in charge of operation and maintenance was asked concerning the appointment, promotion or transfer of an officer, "Have you ever been influenced by any person or from any quarter other than your own judgment as to what was in the best interests of the service?" His answer was, "No, I have not." The president was asked, "In the employment of your men, are you approached frequently by members of Parliament or members of the government, or are you being given a free hand, or are you being embarrassed?" His answer was: "We are not the slightest embarrassed at all. Of course, I have got letters." He plainly states that the management of the road is not prejudiced by political intervention even to the slightest extent, and that there is no over-manning of the system by red tape and duplication. It is acknowledged that those who are responsible for the administration of these railways receive letters from members of Parliament offering suggestions as to employees, etc., although not to any extent.

Another viewpoint, however, is presented by one of the board of directors who has stated that, "Until the millennium comes I don't see how it is possible for governments to own railways anywhere in the world without political influence creeping in somewhere." He acknowledged that thus far he had seen nothing of this kind in connection with the National Railways, but that the possibility of it is always present and that he could see no way of getting rid of it. So long as the government appoints the board of directors and can dismiss any or all of them at any time and put others in their place—so long as it can remove any of the officials of the system and substitute others—there will be suspicion in the public mind that the management is not given a free hand. Whether there shall be much or little interference on the part of the government will depend largely on the personnel of the directors and to a less degree on the needs of the railways.

Other Rumors of Influence

There is also the impression in the country that the board of directors of the National Railways is too closely related with other interests to be able to see the welfare of the railways in an impartial way. It would be unnatural that a director of the railways, who was at the same time a director of a railway equipment concern, should not want the railways, when in need of rolling stock, to purchase from the manufacturing firm of which he was a director. It is not necessary that he should profit financially by such a transaction in order to want it consummated; directors are honored according to the success they have had in the administration of corporate enterprises and if they can make their connections in a business way contribute to the up-building of the respective concerns of which they are directors who shall say that it should not be done?

On the board of directors as at present organized there are

members who are also presidents, vice-presidents or directors of 48 other companies, and many of the latter are in position to sell to the National Railways large amounts of the materials and equipment which they would require. We must not be understood as giving any credence to the statement that these relations are made effective in this way; in fact, one of the vice-presidents of the National System denied absolutely that there were any preferred relations between the railway management and the companies which had some of the same directors.

In purchasing supplies the almost universal rule was to call for tenders and the lowest tenderer invariably received the order so long as quality, deliveries, etc., were acceptable. The words of the president are amply confirmatory of this. He said: "The railway company buys everything by tender And I am very sorry that it is so because I think we get it in the neck very often, in regard to our prices. . . . Under the old conditions when we were carrying on as a private corporation we rarely appeared in print as to tenders for this, that and the other thing. It is human nature that when we call for tenders for ties materials that a few of them get together and say, 'Now, they are bound to buy these ties. We cannot all get the contract, but we can fix the price so that we will all be in it somewhere before we get through.'"

This acknowledgment that the public railway system, by buying rolling stock, material and supplies by tenders, frequently paid higher prices than were paid when the Canadian Northern was operating as a private concern, accords entirely with the statements of an officer of the Canadian Pacific who said: "No, we do not (advertise for tenders). We do not think it is wise. It has only one advantage, that is of raising the price to the purchaser because the moment the manufacturers find out the railway is in the market for a large quantity of material, they immediately meet and raise the prices." The system of the National Railways in advertising for tenders is evidently not so economical as the Canadian Pacific system of purchasing through private or personal negotiation, but it has the advantage of carrying on the purchasing in the open market without any ostensible favoritism.

But while, perhaps, it cannot be said with truth that other companies profited from the publicly-owned railways through the community of directors, the words of President Hanna in this connection are well worth pondering: "I should say that under a new administration it would be better for everybody who had anything to do with the National Railway to eliminate themselves from anything else but the National System." If this were done there would be some radical changes both in the directorate and the management, for even some of the latter have very close connections with the corporate life of the country. On the other hand, if, as so many assert, the important thing is to secure a "business administration" by "good business men," it will be impossible to dissociate these railways from the country's industrial, commercial and financial interests.

Contrast With Canadian Pacific

The question has been asked, Why should the Canadian National Railways show a large deficit in 1920 when the Canadian Pacific, subject to the same external influences, paying the same rates of wages and charging the same tariffs for freight and passengers, was able to pay all its operating expenses and fixed charges and have a good balance for the payment of dividends to its stockholders? The answer to this question given by the vice-president of the Canadian National Railways in charge of finance is as follows:

The Canadian Pacific runs through a well-developed territory, while the Canadian National lines are in a large measure pioneer roads put through sections which have only recently been opened up. Consequently, the Canadian

Pacific has a much larger volume of business and when its greatly increased working expenses are spread over a larger tonnage the unitary expense of operation is correspondingly reduced and so the net earnings are maintained or increased.

The Canadian Pacific can also concentrate its traffic into heavier train loads and in this way reduce the actual movement expenses. For instance, its average freight train load in 1920 was 529 tons, while that of the National System was only 383 tons. This was possible because of the much larger traffic density on the private line, which was 1,207,269 tons, as compared with 588,359 tons on the government system. Similar advantages for the Canadian Pacific are found in the passenger business. Its passenger density (that is, the number of passengers carried one mile per mile of line) was 132,233 as compared with 54,075 on the National lines, and the average length of journey per passenger was 102.45 miles as compared with 58.66 miles on the National System.

As a result of these conditions of more economical operation on the Canadian Pacific, its passenger train earnings per train mile were \$2.81 as compared with \$1.73 for its competitor, and its total passenger train earnings per mile of road were \$4,844.78 as compared with \$1,857.77 for its competitor; while the freight earnings per train mile were \$5.50 and the freight earnings per mile of road were \$11,072.83 on the Canadian Pacific as against \$3.76 and \$5,763.27 respectively on the National lines. The heavier train loads on the Canadian Pacific, which can be carried at very little more expense than the lighter train loads of the National system, give a financial economy to the former which is impossible at present to the latter, and is a large factor in making the difference between operating profit and operating deficit. In the words of the above-mentioned official, this is "the whole story."

We are inclined to disagree with the latter statement. It takes more than merely physical operating conditions to make the difference between profit and loss. The clientele which has been built up gradually through the rendering of good service to the public; the allegiance of the whole staff to the directing minds; the pride in the success of the organization—these and many related factors must also be taken into consideration in showing why the Canadian Pacific has been able to meet successfully the recent and present emergency and to show its favorable operating results. In partial extenuation of the unfortunate results on the Canadian National System we must keep in mind that this system maintains and operates a transportation network equal in mileage to the Canadian Pacific, with practically one-half of the traffic, and as the overhead costs relatively to the traffic are necessarily greater the cost of maintenance is likewise very much greater.

Attitude of Government and Management

What has been the attitude of the management and of the government towards these annually increasing deficits on the National lines? The fact that the government appointed a committee to inquire into this railway system would seem to indicate that it was very much alarmed at the results, particularly of the last year. But when we look closely at the subjects into which the committee was to inquire there is nothing in the reference to indicate that the government was at all troubled over the financial condition of the system.

The minister of railways, in making his annual report said, "I hope I have made it clear that the result of the operation of the Canadian National Railways was not worse than obtained generally on the other side of the line (United States) and across (England). Notwithstanding the outlook I have shown, I am still a firm believer in the ultimate success of our National Railways. But success depends on how they are managed." Then he declared that the solution of the problem was to have a conference of the

management and employees in order to reduce wages so that freight rates might be reduced, without which the future advancement of the country would be interfered with.

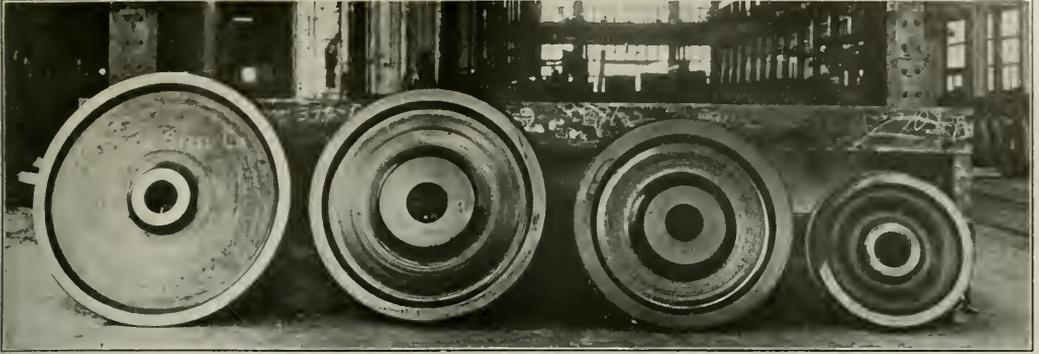
In other words, his policy was to put the whole problem before the management and have them solve it by wage reductions.

Some other members of the government considered that this was a serious matter and that both sides of the house should get together to find a solution of it. But behind all such declarations there seemed to be an attitude of something like indifference, as if they would say: "This is a bad situation, but in a few years when the country grows up this condition will change and everything will come out right in the end." On the part of the management there seemed to be a well-defined conclusion that "the indirect benefit which the country is receiving from the National System will in a large measure offset the temporary loss that the country is suffering in the deficit," but just what the "great many indirect benefits" are was not stated.

Time would be necessary in order to overcome these deficits, for the country would have to grow up to the measure of its transportation facilities before these railways could be put upon a satisfactory basis. The gradual improvement of the system and the progressive development of the country through which these lines run, with the consequent increase of traffic were the ameliorative factors which were emphasized to bring the system out of its condition of chronic deficits and place it upon a firm foundation. But in order to increase the volume of business it was considered necessary that the public should begin to realize that the National System is owned by the people, that it is dependent upon them for traffic and that their co-operation is absolutely necessary for the success of the enterprise.

One of the directors said: "My conviction is there can be no real success for the government railways until the people of Canada thoroughly realize that they are the shareholders and own the road. They do not realize that now." The same viewpoint was expressed by one of the vice-presidents: "I do not think that the people of Canada as a rule appreciate that they own a National System, and if that were thoroughly understood I think that the needs of the National System would largely be taken care of." Even the president had to complain that he "would like to see a better appreciation of the fact that we have a government road" and that the people "fail to give to their own property that consideration that we have every right to expect"; in fact, he "found that in certain sections there is an indifference, and people do not care whether things go well or not." Members of Parliament, the government and its departments, and private citizens made their shipments, sent their telegrams and traveled by the Canadian Pacific when the same facilities and service could be secured by the publicly-owned agencies. If this were at all general, it is not surprising that the management felt "very hot about it." The officials of the National System did not want all the business to go by their lines, they did not want to do anything to injure such a great national institution as the Canadian Pacific. All they wanted was a chance to compete on an even basis with their great rival.

RAILWAY ASSESSMENTS IN NEW JERSEY as affirmed by the Supreme Court on February 21 are reduced materially. About three millions is taken off the valuation of shore-front property on three roads in Hudson County. The local valuations were appealed by the railroads to the County Board, which refused to make any reduction. The reductions by the state board were as follows: Central Railroad, \$16,145,505 to \$14,645,505; Lehigh Valley, \$7,614,545 to \$6,330,487; Pennsylvania, \$6,179,200 to \$6,174,300. The Erie assessment stands at \$1,404,200, the amount fixed by the local assessors.



Four Sizes of Wheels Rolled on the Same Mill; Right to Left, a 33 in. Freight Car Wheel, 44 in. and 50 in. Trailer Wheels and a 53 in. Special Wheel.

Rolled Steel Trailer Wheels for Locomotives

Edgewater Steel Company Produces Large Sizes for This Purpose
—Method of Manufacture

DURING RECENT YEARS rolled steel wheels have come into extensive use where steel tired wheels were formerly employed. The latest example of this tendency is found in the application of special rolled steel wheels on the trailing trucks of locomotives. These wheels have been developed by the Edgewater Steel Company of Pittsburgh, Pa., at the suggestion of an eastern railroad.

This extension of the field of rolled steel wheels is due to advantages in first cost and maintenance coupled with the high degree of reliability demanded for the most exacting service. Formerly steel tired wheels were favored for trailer trucks because the tires could be changed readily. On modern locomotives the trailing axles have outside bearings and the wheels must be dropped to change the tires. It is often cheaper to change the wheels and send the parts to the shop

for turning than to remove the tires and shrink on a new set. Where this is the case, rolled steel wheels are often preferred.

In developing the roller trailer wheels it was found that the requirements for practically all classes of locomotives could be met by two sizes of wheels, 44 in. and 50 in. diameter with $5\frac{1}{2}$ in. by 3 in. rims. The hubs are $8\frac{1}{2}$ in. long and the diameters of the faces, 16 in. and 19 in., the large face being placed inside or outside as desired. The two sizes of wheels mentioned will fit in almost any trailing truck, but other sizes can be made if necessary. One of the illustrations shows four sizes of wheels produced by the Edgewater Steel Company: a 33 in. wheel for freight cars, 44 in. and 50 in. trailer wheels and a 53 in. wheel which was rolled to demonstrate the capacity of the mill.

Although rolled steel wheels are used extensively, few

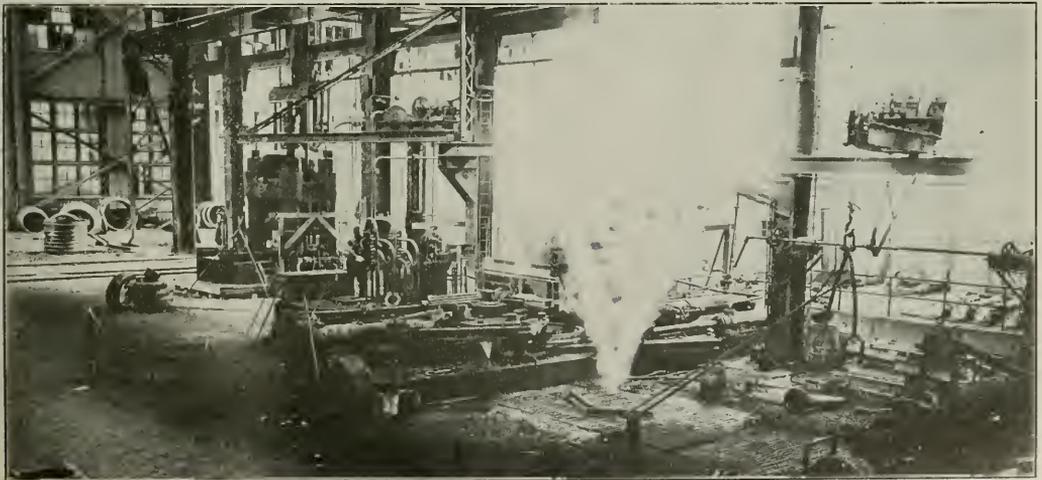


Fig. 1. Special Rolling Mill, Driven by 1,000 Hp. Motor, on Which Wheels and Tires Are Made

railroad men know except in a general way how they are made. The method of manufacture, especially that used by the Edgewater Steel Company, is most interesting.

The first step in producing rolled steel wheels is to make suitable steel. The specifications of the Mechanical Division of the American Railway Association call for the following chemical composition when the steel is made by the basic open-hearth process.

Carbon, 0.65 to 0.85 per cent.
Manganese, 0.55 to 0.80 per cent.
Silicon, 0.10 to 0.30 per cent.
Phosphorus, not over 0.05 per cent.
Sulphur, not over 0.05 per cent.

The Edgewater plant has four open-hearth steel furnaces; two of 75 tons capacity, one of 50 tons capacity, and one of 25 tons capacity. The steel is tapped into ladles and poured into ingot molds which are filled from the bottom in order to reduce the inclusion of gases and insure sound ingots. The composition of the steel is carefully controlled during the making by chemical and physical tests of each heat.

The ingots are allowed to cool and are cut into blocks in slicing lathes, as shown in Fig. 2, the size of the block de-

termined by the diameter of the wheel which can be moved toward or away from the main roll at the will of the operator, thus controlling the diameter of the piece being rolled. In this way the diameter of the piece is maintained until the flange and rim are fully formed by the rolls and then increased to the finished size.

The wheel is next transferred to a 2,500-ton hydraulic press where it is dished, giving the hub the required offset from the rim. During this operation the heat number and any other markings required are stamped on the wheel. After the wheels come from the press, they are allowed to cool, after which the hub is bored and faced and the groove showing the limit of wear is cut in the outside of the rim. The wheels are then measured and marked with the tape size, after which they are ready for mounting.

There are two unique features in this method of manufacturing wheels: the piece is developed from the block to the finished wheel in a single heat and the rim is worked on all sides throughout the rolling process. The thorough working of the metal and the low finishing temperature insure the proper structure of the steel in the finished wheel.

The method of making tires for locomotive or car wheels

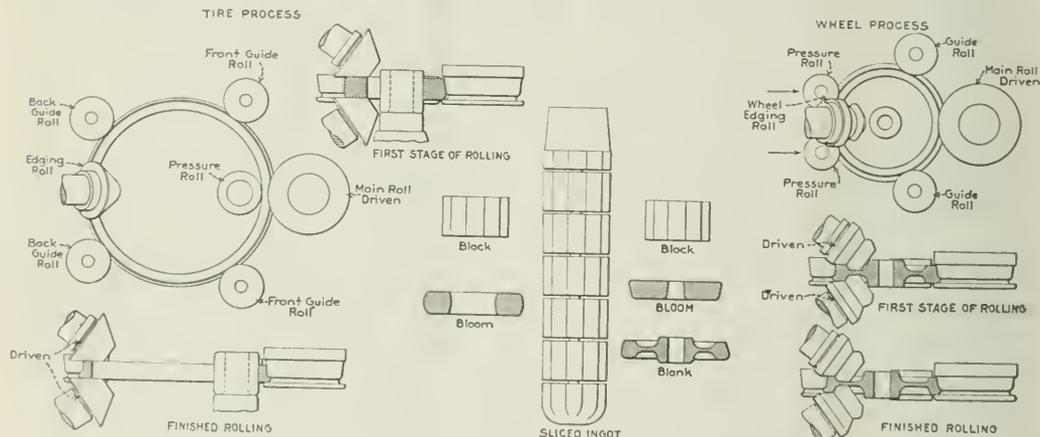


Fig. 2. Successive Steps in Converting an Ingot Into Rolled Steel Wheels or Tires

pending upon the size and type of wheel to be made. The crop end of the ingot is discarded and the blocks are carefully inspected for defects.

The blocks which pass inspection are reheated in a special type continuous furnace which brings the entire block gradually up to a uniform forging heat. From the furnace the block is carried by a semi-automatic conveyor to a 6,000-ton hydraulic press. The first operation on the press is to flatten the block to approximately the width of the wheel rim, this operation serving also to remove the scale. The center is punched out and then the bloom is placed in a set of dies and pressed to the shape of the blank shown in Fig. 2. The blank as it comes from the dies has a hub of the correct dimensions but the diameter over the rim is less than that of the wheel to be made and the rim has no flange.

The finished blank as it comes from the dies is transferred immediately to the rolling mills. One of these mills is illustrated in Fig. 1 the details of the arrangement of the rolls being shown at the right in Fig. 2. By reference to the latter illustration it will be noted that the wheel is held on the rim between seven rolls, the main driven roll shown at the right, two guide rolls, two edging rolls and two pressure rolls mounted between the edging rolls. The actual rolling of the metal is done between the pressure rolls and the edging

rolls. These are mounted on a carriage which can be moved toward or away from the main roll at the will of the operator, thus controlling the diameter of the piece being rolled. In this way the diameter of the piece is maintained until the flange and rim are fully formed by the rolls and then increased to the finished size.

The wheel is next transferred to a 2,500-ton hydraulic press where it is dished, giving the hub the required offset from the rim. During this operation the heat number and any other markings required are stamped on the wheel. After the wheels come from the press, they are allowed to cool, after which the hub is bored and faced and the groove showing the limit of wear is cut in the outside of the rim. The wheels are then measured and marked with the tape size, after which they are ready for mounting.

There are two unique features in this method of manufacturing wheels: the piece is developed from the block to the finished wheel in a single heat and the rim is worked on all sides throughout the rolling process. The thorough working of the metal and the low finishing temperature insure the proper structure of the steel in the finished wheel.

The method of making tires for locomotive or car wheels

VALUABLE RECORDS of the Nashville, Chattanooga & St. Louis were destroyed in a fire which burned a building of that company in Nashville, Tenn., on March 3, estimated total loss \$50,000.

FIFTY PER CENT is the reduction reported by the Philadelphia & Reading in the number of fatal accidents to employees in 1921, as compared with 1920; sixty-eight killed in the last year and 34 in the year before. There was also a material reduction in the number injured.

Arguments Before I. C. C. in General Rate Case

Counsel for Carriers Urge No General Reductions in Rates or Percentage of Return at This Time

WASHINGTON, D. C.

THE RATE HEARING before the Interstate Commerce Commission reached its final stage on Wednesday, March 8, when the oral arguments before the full membership of the commission were begun by the railroads. Eight hours were allotted for argument on behalf of the carriers and 12 on behalf of the shippers and state commissioners, which would bring the hearing to a conclusion on Saturday, March 11. The hearing of testimony was concluded on March 4 after which there was an adjournment for two days. The argument was opened by Henry Wolf Bikle, assistant general counsel of the Pennsylvania, on behalf of the eastern carriers, who said the roads were unanimous in the belief that no general reductions in rates should be made at this time.

H. W. Bikle for Eastern Roads

Mr. Bikle stated that the economic situation now confronting the country has a wider basis than the rates and fares of the railroads. It is a result of the dislocation of industry and the destruction of values produced by the World War, he said and that until this dislocation is corrected and new values created by productive effort, real prosperity cannot return. This return will necessarily be gradual, and any effort to accelerate it artificially by striking at the transportation industry would produce reactions which would defeat the very purpose intended to be accomplished.

He stated that the commission's finding in 1920 as to the aggregate value of the eastern carriers' property indicated that they earned, during 1921, only 3.3 per cent as against the 6 per cent to which they were entitled under the law; that for the last six months of 1921 their earnings were only 4.49 as contrasted with the 6 per cent to which they were entitled under the law; that while expenses of operation have been to some extent diminished, they have not been diminished so as to permit further general reductions in rates, unless preceded by reductions in wages.

The general reductions already made, particularly with reference to farm products, etc., have constituted a substantial inroad on the already depleted revenues of the carriers, and, with the financial condition of the railroads what it is, further experiments of this kind involve the possibility of the most serious consequences to the railroads, as well as ultimately to the public.

Mr. Bikle stated that the evidence showed that a 1 per cent reduction in freight rates would mean something over \$40,000,000 to the carriers of the country; that no one seemed to think that any stimulation of business would result short of at least a 10 per cent reduction, and that it was obvious that such a reduction would be impossible. He further said that the testimony indicated that no stimulation of business would result from reductions of this character since the depression in business had resulted irrespective of the reductions in prices made by producers, and that the small additional reduction which might be possible if the freight rates were reduced would certainly have no more effect than the large reductions in prices already made.

He further contended that, in view of the evidence as to the small profits which the shippers claim to be making, there is little chance of any reduction reaching the pockets of the consumer, and unless it did reach the pockets of the consumer, his buying power would not be increased, and consequently there would be no stimulation in business.

He also stated that the carriers strongly protest against any reduction in passenger fares, since clearly such a reduc-

tion would have no effect on business, referring to the testimony of Secretary Hoover, who had testified that in his judgment, "a decrease in passenger rates is not nearly so vital to the community as freight rates."

When Mr. Bikle said the rule to govern the commission's action in this case is to be found in section 15-a of the law, Commissioner Aitchison asked if he had considered what the commission should do if it should appear that it is impossible to make 6 per cent.

"I understand that is provided for in the law," replied Mr. Bikle. "The requirement is not absolute that the roads should be allowed 6 per cent. The law contains the words 'as nearly as may be.' You are only to try to reach that standard as nearly as possible."

Mr. Bikle said that with rare exceptions the shippers have recognized the serious situation of the carriers and have shown a considerate attitude which the carriers appreciate. He said there would be no justification for the fixing of a lower rate than 6 per cent and that the only evidence against the commission's tentative valuation of \$18,900,000 is that of Mr. Thorne's witness, Fred Pettijohn, who had presented a computation based on the tentative valuation reports already served of 182 roads, representing only about 10 per cent of the mileage. In urging the commission to prescribe 6 per cent he said the courts have recognized 6 per cent as the judicial minimum.

Commissioner Aitchison asked counsel to discuss the suggestion that the commission is not required to state a percentage but merely fix rates from time to time that will produce what it considers a fair return. Mr. Bikle said he thought the law clearly required the commission to state a percentage. Commissioner Hall asked if that meant that there was any dereliction on the part of the commission in failing to name a percentage on March 1. Mr. Bikle said he would not carry the point that far because it was not necessary since the roads were not asking for an advance in rates, but that it would be necessary if rates are to be reduced. The roads are merely asking the commission to continue the rule of Ex Parte 74. He could conceive of no more serious blow at railroad credit than a decision by the commission finding less than 6 per cent to be a fair return.

Commissioner Potter asked how a 6 per cent return for the carriers as a whole gives any assurance to the individual investor, as in the case of the New England roads. Mr. Bikle replied that while there is no guaranty, a 6 per cent aggregate return would at least give the New England investor a greater assurance than a 5 per cent return. Mr. Bikle said we know little about the future except that it is uncertain and he referred to the probable effects of a coal strike in reducing traffic. He said the statements that reductions in rates would be followed by a great stimulation of business are not founded upon evidence but represent rather only a wild guess.

"Does not 15-a require us to speculate?" asked Commissioner Aitchison.

"I think it rather requires you to act in the light of present conditions," replied Mr. Bikle.

Fred H. Woods for Western Roads

Fred H. Wood, commerce counsel of the Southern Pacific, urged the commission not to make any further reductions

in freight rates until there has been a further liquidation of operating expenses owing to the financial condition of the railroads of the country. He spoke for the western roads.

"No greater blow to the credit of the carriers, to the improvement of transportation facilities or to a renewed purchasing power upon the part of the carriers as an impetus to industrial activity, could be imagined than an order by this commission whereby a general reduction in rates is ordered, either as a whole or upon any substantial volume of traffic, whether upon the theory that business would be thereby stimulated, or through the medium of a reduced authorized rate of return," Mr. Wood said. "The maintenance even of present earnings and of the present upward tendency is involved in much doubt and uncertainty.

"Based either upon actual operations or upon the constructive year figures it is manifest that present and prospective earnings fall far below the standard of Section 15-a and cannot be substantially reduced without seriously imperilling the financial condition of the carriers, which has been at such low ebb throughout the entire 16 months since the close of the guaranty period, during which as a whole the average rate of return has been scarcely more than one-half of the standard set by Section 15-a and but little in excess of interest charges, many of which have not in fact been earned by many important carriers.

"The credit and financial position of the carriers has been maintained during this period largely through the hope of better conditions in the future, and it is inconceivable that in the face of the actual results of operation for the past six months and the computations made in the constructive year the commission will, by reason of the slight increase which these figures show over the 16 months' period as a whole, find it either lawful or expedient to neutralize the slight improvement which has already taken place by rate reductions, seriously affecting net earnings. Furthermore, when the figures for the month of January, 1922, the first month which reflects the cumulative effect of rate, wage and price reductions, are taken into account the utter un wisdom, not to say illegality, of orders reducing rates becomes manifest.

"Incomplete reports would indicate that the net operating income of the carriers in the Eastern district in January last were at the annual rate of return of 4.4 per cent on their tentative valuation, those in the Southern district, 2.6 per cent, and the Western district, 1.1 per cent, the average for the country as a whole being approximately 2.2 per cent.

"The cumulative effect of the rate reductions already made is illustrated by the fact that whereas the ton miles in the west show a decrease in January, 1922 of 6.9 per cent the gross revenues show a decrease of 15.8 per cent. Under these circumstances the commission must conclude that even without any allowance whatsoever for deferred maintenance, the past, present and prospective net earnings of the carriers are such that no reduction therein through a reduction in rates of a general character, either as applied to all traffic or any description thereof can safely be made with justice to the carriers or to the interests of the public."

Mr. Wood said that "with due allowance for deferred maintenance the present net earnings as well as prospective earnings indicate that the position of the carriers is substantially as perilous as that which continued through 1921 and little less critical than at the termination of federal control."

The commission will take a great responsibility if it orders a reduction upon the expectation that the traffic will be so stimulated thereby as to offset or more than offset the cumulative effect of such reductions upon the volume of traffic now being moved without the most convincing proof," added Mr. Wood. "If the matter is involved in doubt or left to speculation there can be no warrant for such action."

The usual argument in favor of the reduction in rates

upon the theory of stimulating business is speculative and artificial. The only definite and certain thing present in the situation is that by such reductions the carriers will be driven back to a position as bad or worse than that which faced them at the end of federal control. A business revival can be much more speedily and effectively brought about by a resumption of buying power upon the part of the railroads than by any other single event which can take place in our industrial life, and this buying power instead of being stimulated will be completely destroyed if the theory of those who advocate rate reductions for the purpose of stimulating business are to be governed."

Mr. Wood pointed out that the aggregate amount of money represented by reductions made since 1920 in wholesale prices is 15 times as great as the aggregate advance in freight rates made by the commission in its order effective August 26, 1920, but said that the lower price level had not stimulated demand which remains stagnant.

"To suggest," said Mr. Wood, "that the relatively small further reduction in prices, which might but probably would not follow a reduction in rates, would have this effect is to assume the incredible and to shut the eyes to the fundamental causes of business depression."

Mr. Wood said that exhibits filed with the commission show that there had been a "progressive and continuous drop" since September, 1920, in the prices of metals and metal products, the drop being "manifestly largely in excess of the decrease demanded in freight rates" but added that it has had no "apparent stimulating effect upon demand."

Mr. Wood pointed out that the passage of the transportation act was not an act of favoritism to the railroads but represented a recognition of the fact that production is nothing without distribution and that adequate transportation service is a national necessity.

"If, as believed," Mr. Wood said, "any general reduction would be inconsistent either with the strict letter or with the general purpose of the fundamental statutory provisions, this case comes to an end, and the disposition of rates on individual descriptions of traffic is relegated to the ordinary docket."

As to when reductions in rates may be expected, Mr. Wood said:

"The answer is easy. With a wage bill approximating the pre-war revenues no one has a right to expect pre-war rates. The carriers are now before the Labor Board seeking reductions in wages. The process is necessarily slow and cumbersome. This commission should make it plain to the public that these rates cannot be reduced until operating expenses are reduced through such wage reductions as the Labor Board shall find to be just and reasonable. It would not be right for this commission to anticipate its action. The railroads are on record in giving assurances that rates will be promptly reduced by the amount of any wage reductions."

Some of the commissioners asked Mr. Wood how the rate reductions would be made following a wage cut. He said he assumed the roads would then consider a plan and submit it to the commission for approval. Commissioner Potter remarked that so far as he was concerned, he would object to the railroads bargaining as to what they shall do with any saving they shall make, because the commission has some responsibility as to that.

Frank Gwathmey for Southern Roads

Frank W. Gwathmey, speaking for the Southern roads, said that there was a relatively small amount of testimony by shippers in this case referring to the southern situation. The carriers in the southern territory, he said, have exhibited the most unfavorable returns of any group of roads in the country. Their increases in rates have been less than those of other roads, averaging about 56 per cent, and they received less than they asked in Ex Parte 74. Since September, 1920,

the southern roads in each month have earned a less percentage than the other groups. For 1921 it was only 2.6 per cent. For the last half of 1921 it was 4.04 per cent. In the aggregate they failed to earn interest on their funded debt.

"It would be worse than idle," he said, "to assume that any percentage reduction in rates could have a greater effect on the movement of cotton than the great price fluctuations that have been made. The recent 10 per cent reduction made not even a flutter in the market. The crop is not there to move." There has also been a large shrinkage in the production and consumption of tobacco and fertilizer in spite of reductions in price, he said. Improvement in business in the south must necessarily be gradual, and it would be only slightly influenced by any reasonably possible change in freight rates.

State Commissions Ask Rate Reductions

F. W. Putnam of the Minnesota railroad commission, urged that the railroads "do their share toward the restoration of normal pre-war conditions." He spoke on behalf of a committee representing the western and southern states, asking the commission to find (1) that it is fully authorized to reduce rates on the ground that, under present rates and costs, with normal traffic, the carriers would earn a net railway operating revenue in excess of that contemplated by the act; (2) that the present rates are unreasonable under Section 1 of the act, and (3) that the passenger rates are unreasonable and higher than the traffic will bear and reduced rates will stimulate business and result in maintaining present net return and give a greater public service.

Traffic Officers Say Rate Reductions

Will Not Increase Revenue

The hearing of testimony was concluded on Saturday, March 4, after three days of rebuttal testimony on behalf of the railroads.

T. C. Powell, vice-president of the Erie, said that in the view of traffic officials generally no reduction in rates that could reasonably be made at this time would have any substantial effect in stimulating traffic, because of the world conditions and the lack of demand. He said there was nothing in the testimony offered by shippers to shake that statement, yet, he pointed out, a reduction of 1 per cent in freight rates would reduce revenues by \$50,000,000 a year. He said a maximum increase of 20 per cent in traffic would be required to make up for a 10 per cent reduction in rates but added that he firmly believed such an increase was far beyond anything possible. He introduced a number of exhibits analyzing the traffic in 1921 in various commodities on which rates were reduced by the carriers to show that the reductions had practically no effect. The initial effort of the roads to stimulate business by reducing rates was the reduction in export rates on iron and steel, yet there was practically no change in the traffic after the rates had been reduced 25 per cent.

Mr. Powell had an exhibit comparing the prices of anthracite coal at the mines with the freight rates for the years 1913, 1914, 1915, 1916 and 1921, which showed that in almost every instance the rate was a lower percentage of the mine price in 1921. On domestic sizes the price had increased 100 per cent since 1913 while the rates had been increased about 66 per cent.

Mr. Powell said that the eastern lines desire the Pullman surcharge continued and that their experience has not borne out the statement of the Pullman Company that it has materially decreased traffic. The Pullman Company's statement, he said, failed to take sufficient account of the effect of the business depression on passenger travel, but he thought the surcharge had caused many people to ride in day coaches rather than in Pullman cars.

Certain butter shippers had urged a reduction in their

rates to enable them to compete with butter shipped from Denmark and Australia, yet, he said, Danish butter sells in New York for 4 cents a pound more than American butter, because it is better butter and a freight rate of 4 cents would more than carry it across the country.

Stanley H. Johnson, vice-president of the Chicago, Rock Island & Pacific, produced exhibits to show that some of the principal reductions in rates made during 1921, including livestock, grain, fruits and vegetables, and lumber, were not followed by increases in traffic and the present indications are for a reduction rather than any possible increase in the principal classes of traffic carried by the western railroads in 1922. On the other hand, there have been fluctuations in prices much greater than any changes in rates. He said there is no prospect for anything but a decrease in agricultural tonnage no matter what the freight rate is and that general reductions on any commodity would not stimulate the traffic except as it affected one competitor as against another. Commissioner Aitchison asked if an increase in rates sufficient to produce a 6 per cent return would affect the traffic. Mr. Johnson replied that in his opinion any increase within reason would not, generally speaking, but it would be poor psychology to increase rates.

Mr. Johnson referred to the fact that a large number of shippers have urged reductions in coal rates, but he said that as most manufacturers use coal for fuel this means no more than a general desire on the part of taxpayers for lower taxes or on the part of street car patrons for lower fares. He pointed out that the effect of a general reduction in rates on coal would be felt particularly by the same western railroads which are also the heaviest carriers of agricultural products, on which rates have already been reduced. The reductions in rates on fruits and vegetables, he said, may have prevented some reduction of long haul shipments but had no marked effect on the movement generally. As to grain and livestock, he said, there is not enough traffic in sight in the country to enable the railroads to recoup themselves by increased tonnage for the loss in revenues resulting from the reductions in rates.

"It is my opinion that the granger roads, whose very existence is so bound up by the earnings which they derive from the handling of their relatively large proportion of the total tonnage represented by the movement of the products of the soil, of the field, the forest and the mines, have already contributed their full share in the shape of freight rate reductions," Mr. Johnson said. "Emphasis is laid upon the facts that the comparatively poor showing for November and December last did not include the reductions represented by the commission's grain rate decisions and the 10 per cent reduction voluntarily made by the carriers. If the western carriers are going to continue to properly function, it is earnestly felt that they cannot sustain further rate reductions in the near future."

As to the wheat prospects for 1922, Mr. Johnson said that government estimates made on December 1 last, showed that with the single exception of Illinois, the 1922 prospect is substantially poorer than the 10-year average. "The Department of Agriculture," he said, "has issued no subsequent bulletin but it is a matter of general information that the current condition of winter wheat, due to lack of moisture, has greatly deteriorated since December 1, 1921. This prospect foretells substantial inroads for the last six months of 1922 in the freight earnings of the western carriers, which carriers, including those in the state of Illinois, originate 75.7 per cent of the nation's wheat. A reduction in freight rates obviously cannot stimulate or create the movement of wheat of the crop of 1922, which is not harvested."

Mr. Johnson said most of the 1921 wheat crop had been moved prior to the rate reductions already made, but said the contrary was the case with respect to coarse grain.

"The amount of coarse grain which will be either fed at

home or offered for transportation on or after January, 1922, will approximate the crop of 1921. While there was more or less movement previous to that date, it was probably offset, if not more so, by the large amount of coarse grain carried forward from the crops of 1921 and previous thereto into the crop movement of 1921, so that speaking in approximate terms the carriers are confronted with a shrinkage in their earnings for the year 1922 in the territory described, of 21.7 per cent on an amount of movement of coarse grain approximating the crop year of 1921.

"Grain and grain products represent 11.39 per cent of the total tonnage originating on the western railroads and the prospective curtailed movement of wheat for 1922 and the large percentage of reduction in the rates on coarse grain represent an outlook of distinct discouragement for the western railroads."

The witness pointed out that with cotton as with grain, live stock and other products of the soil, a large quantity has been produced in this country in 1921, and there will be just so much cotton to be transported and its volume cannot well be affected by any freight rate change within reason.

The Warfield Pooling Plan

Daniel Willard, president of the Baltimore & Ohio and chairman of the advisory committee of the Association of Railway Executives, and R. H. Aishton, president of the American Railway Association, told the commission why they did not think much of the Warfield plan for pooling cars under the direction of the National Railway Service Corporation. Mr. Willard said the railroads have not been indifferent to the subject of improving the efficiency of car handling and he described the organization of the advisory committee, the American Railway Association and its Car Service Division and the work they have done. His committee has had one meeting, he said, with the board of economics and engineering of the Warfield organization, had given it assurances of a willingness to co-operate and made arrangements for furnishing it with information requested. The recommendations made by the board, however, he said, were unnecessary, because the objects sought were being accomplished in a more efficient manner by the agencies already in existence which have stood the test of time.

He referred to the Car Service Division, the result of six years of development, and to the accomplishment made in 1920 when the roads handled the heaviest traffic on record, with the co-operation of the Interstate Commerce Commission in the exercise of the emergency powers provided by the Transportation Act. He said the report of the board of the Security Owners' Association suggested collaboration with the American Railway Association but that the new organization could not be superimposed on the existing agencies; it represented a new experimental plan proposed as a substitute. The commission has power in times of emergency to deal with all the freight cars without regard to ownership.

The economics claimed by W. W. Colpitts for the pooling plan, Mr. Willard said, represented merely estimates and some of them could be brought about just as well by existing agencies as by a new one, while others were of doubtful dependability and would require many years to show any results.

Some of the advantages that might result from pooling would be more than offset by other disadvantages. Regarding the claim that it would reduce switching and empty mileage, he said he had not had his attention called to any substantial saving of switching resulting from the pooling of cars during federal control and that the amount of empty mileage is largely governed by the lack of balance in the traffic because a car must move home empty sometime.

In reply to questions by the commissioners as to whether there would not be an advantage in having some agency to

repair cars at the most economical time and have them ready when needed, Mr. Willard said that under ordinary conditions that could be done by the railroads. Now they are deferring repairs in order to be able to meet their payrolls and interest, not merely to make a better earnings showing, but the commission has authorized the railroads to do repair work in dull times and charge it to expenses later when the cars are put into service. When the operating expenses show some improvement that can be done, Mr. Willard said.

As to standardization, Mr. Willard said that the work the railroads had already done in standardizing such things as wheels, axles, couplers, brakes, etc., was monumental as compared with what the Railroad Administration did.

To show the extent to which the railroads are now co-operating by the use of joint facilities, Mr. Willard read a statement summarizing the replies to a questionnaire sent to the Class I roads which showed:

Seventy-six railroads reported 243 engine terminals owned and used jointly;

One hundred twenty-seven roads reported 3,558 points of freight interchange at which inspectors are located;

One hundred twenty roads reported 1,416 interchange points at which joint inspectors are stationed;

One hundred roads reported 1,006 l.c.l. joint freight houses;

One hundred seven roads reported 1,280 joint passenger stations;

Ninety-five roads reported 555 joint yards;

Sixty-four roads reported 554 large bridges jointly used;

One hundred sixty-one roads reported the joint use of 16,251 miles of track under trackage rights;

The report also showed 3,179 separate passenger stations used by two or more railroads.

Mr. Willard said he had been bothered some to understand how the proposed corporation would be sufficiently assured of an adequate income to insure its credit.

Mr. Aishton said that the subject of car pooling had been argued by railroad officers for many years but that the almost unanimous opinion of transportation officers was that car service rules and a per diem system represent the better plan. He took up in some detail the various claims made for the plan and pointed out some practical objections.

The Car Service Division, he said, co-operating with the Interstate Commerce Commission, is now able in times of emergency to create what amounts to a temporary pool of freight cars by directing the movement of cars from parts of the country where there may be a surplus to the districts where shortages exist. He pointed out that the pooling of freight cars during federal control had failed to demonstrate any marked economy. To illustrate the efficiency of freight car use he pointed out that in the fall of 1916, the ton-miles per freight car averaged 506 per day. In the fall of 1918, under federal control, the ton-miles per car per day averaged 556 and in the fall of 1920, under private management, the ton-miles per car per day reached the record figure of 564.

Regarding the proposed retirement of the light cars, Mr. Aishton questioned whether it would be good business to retire them in a few years rather than to retire them gradually in a normal manner, because many of them are fulfilling a useful function and are good for many years of service. He said the empty mileage is largely controlled by traffic tendencies and he thought it better for the necessary empty movements to be made normally by attaching the empty cars to light trains than to have the movement forcibly made by a central agency.

Effect of a 10 Per Cent Reduction in Coal Rates

Replying to various witnesses representing shippers who had contended that a reduction in freight rates on coal is essential to the stimulation of business, H. A. Cochran, assistant coal traffic manager of the Baltimore & Ohio, told

the commission that almost any reasonable reduction that could be made would hardly be reflected in selling prices.

Estimating the average consumption of coal at 5.35 tons per household, Mr. Cochran estimated that a 10 per cent reduction in freight rates would mean an average saving to each householder of only \$1.21 a year.

"Exhibits filed by shippers with the commission show that the freight charges on a ton of coal from Athens, Ohio, to Detroit, Michigan, is \$2.47 per net ton," continued Mr. Cochran. "In constructing an automobile, whose factory price is approximately \$1,000, these exhibits show that about two tons of coal is used. The freight charges on this would be \$4.94. The exhibits show that the freight charges on an automobile from Detroit to Athens would be \$24.83. A reduction of 10 per cent in the freight rate on coal used in constructing the automobile would result in a reduction in the cost of 49½ cents. A 10 per cent reduction in the rate on the automobile would reduce the cost to the consumer by \$2.48.

"In like manner we find that a 10 per cent reduction in the rates on coal from Fairmont, West Virginia, to Allentown, Pennsylvania, would reduce the cost of producing a barrel of cement slightly over three cents while a reduction of 10 per cent in the rate on cement from Allentown to Fairmont would reduce the cost to the consumer by 7½ cents a barrel. A reduction of 10 per cent in the coal rates from Somerset, Pa., to Pinesburg, Md., would result in a saving in the production cost of lime of 7½ cents per ton, while a reduction of 10 per cent in the freight charges on lime from Pinesburg to Somerset would result in a reduction in the cost to the consumer of 26¾ cents per ton of lime."

Mr. Cochran said that a 10 per cent reduction in coal rates would reduce the cost of producing a ton of copper 38¾ cents while a reduction of 10 per cent in the rate on copper would reduce the cost to the consumer by 76 cents.

"Reports of the Bureau of Census for 1914 show the value of manufactured products to have been a little over \$24,000,000,000," the witness said. "In that year the bituminous coal production (422,000,000 tons) was but slightly greater than in 1921. Exhibits already filed show that the coal transported by railroads and used in steel plants, by-products, coke ovens and other industrials amounted to 40.2 per cent of the total production. The bituminous coal produced in 1921 was about 407,000,000 tons; 40.2 per cent of this would be 163,614,000 tons. Freight charges on this at an average rate of \$2.27 per ton would be \$371,403,780. The present index number of the bureau of labor statistics is about 150.

"If the same amount of products was manufactured in 1921, as in 1914, the value would be over \$36,000,000,000. The freight charges on coal used for industrial purposes would therefore be but slightly over one per cent of the total value. A 10 per cent reduction in bituminous coal rates would be equivalent to but one-tenth of one per cent of value of products.

"So far as we can find from the record," the witness said, "not one shipper producing manufactured articles through the use of coal has gone on record as agreeing to translate a rate reduction on coal into a reduction in the selling price of his manufactured articles."

As to the effect of a 10 per cent reduction in coal rates on the manufacture of steel products, Mr. Cochran said that such a reduction would reduce the production cost only 64/100 of one per cent and a 15 per cent reduction would reduce the cost by less than one per cent. "It is not believed," he said, "that so slight a reduction would be reflected in the selling prices to the railroads."

Mr. Cochran also said that even a reduction of 15 per cent on coal rates would mean a saving of only from 23½ cents per ton of pig iron in the Pittsburgh district to 76½ cents per ton in the Chicago district. He also showed that

a 15 per cent reduction in coal freight charges would result in a saving of only from 1½ cents to 4¼ cents per barrel on cement.

Replying to the assertion of J. D. A. Morrow, vice-president of the National Coal Association, that lower rates on coal will reduce the operating expenses of the carriers and that roads which pay freight on their fuel will show an immediate saving, Mr. Cochran said it is self-evident that to the extent the operating costs of some railroads would be reduced the revenues of other railroads would be reduced, and that any reductions in rates on railway fuel coal would have to apply on commercial coal, involving heavy losses in revenue.

Estimating a production of 500,000,000 tons of bituminous per year, railroad consumption at 27.7 per cent would be 138,500,000 tons. At 57 cents per ton, the freight charges on this coal paid by the railroads would amount to \$78,945,000. On the other hand, the tonnage on which freight charges were paid by others than railroads would be 300,500,000. Therefore, a 10 per cent reduction in rates would mean a saving to the railroads which pay freight charges on their coal of \$7,894,500, which would be accompanied by loss in revenue to themselves and other railroads of \$68,213,500 on bituminous coal other than railway fuel. This would be in addition to a loss of \$7,894,500 to the carriers who receive freight charges on railway fuel. The loss would be particularly heavy in the case of such roads as the Baltimore & Ohio; Buffalo, Rochester & Pittsburgh; Chesapeake & Ohio; Chicago & Eastern Illinois; Erie; Pennsylvania; Western Maryland and Wheeling & Lake Erie.

It is impossible, Mr. Cochran said, to forecast with any assurance the f.o.b. mine prices after April 1, but if the operators are to claim profits as indicated by their exhibits for 1921 it is difficult to see how the average selling price after April 1 can be less than from \$2.48 to \$2.60.

"Mr. Morrow estimated prospective reductions in costs of railway fuel coal at from 50 cents per ton to \$1 per ton below the October, 1921, average of \$2.98 per ton. If we take the average of these estimates and assume a reduction of 75 cents from \$2.98, the average mine price for railway fuel after April 1, 1922, would be \$2.23," Mr. Cochran said.

"If we are to accept the proposition that all savings by reason of reduced mine prices of coal are to be translated into reductions in freight rates on coal, then we should also translate all increases in mine prices of coal into increases in freight rates on coal. Applying this theory to the present situation and assuming that the average prices of railway fuel used in October, 1921, and the coal freight rates were at that time properly balanced or related to each other, then the coal freight rates after April 1, 1922, based on Morrow's forecast of the prices that will be available to railroads after that time, would be changed as follows:

"On a 500,000,000 ton annual production approximately 12 per cent or 60,000,000 tons would not be shipped via railroads. Approximately 95,000,000 tons used by railroads would not be subject to freight charges. This leaves 345,000,000 tons, or 69 per cent of the total production as the amount on which freight charges would be paid by railroads and other consumers.

"Coal purchased by railroads (27.7 per cent of the total production) is equivalent to 40 per cent of the coal on which freight charges are paid (69 per cent of the total production). If freight charges should receive the full benefit of all savings in fuel prices f.o.b. mine, then the average rate per ton should be reduced by 40 per cent of the average reduction in fuel prices; that is, for each 10 cents per ton that the fuel price in eastern district is reduced from an f.o.b. mine price of \$2.80 per ton, the average freight rate should be reduced by four cents per ton. If fuel prices after April 1, 1922, average \$2.23 per ton, a reduction of 57 cents as compared with October, 1921, would be equivalent to 5.7 times four

cents or 23 cents per ton. This would represent 10.1 per cent of the average freight rate on coal.

"This merely represents what might be done if the theory is accepted that all reductions in f.o.b. mine prices of coal should be translated into reductions in coal freight rates, and provided that there is any assurance that the mine prices of railway fuel coal after April 1, 1922, will be as low as \$2.23 per ton. Prices already show a tendency to advance, having risen from an average spot price of \$2.207 on January 30 to \$2.220 on February 13. This tendency will doubtless be accentuated by the prospect of a miners' strike on April 1 and further accentuated after April 1 if a strike actually takes place. Such strike would not only tend to increase the fuel costs to the railroads, but would materially reduce the earnings on coal traffic. If the strike be prolonged, it would also result in a substantial loss of revenue on other freight, because of the necessary closing down or curtailment of operations at such mills as do not have an ample reserve supply of coal, or would be unable to secure the required amount of fuel from non-union mines."

J. J. Campion, vice-president of the Carolina, Clinchfield & Ohio, also expressed the opinion that a rate reduction on coal would not stimulate traffic in that commodity. S. G. Lutz, vice-president of the Chicago & Alton, told the commission that any reduction in coal freight rates would "seriously embarrass many western lines and court disaster for some of them." He said 11 western railroads serving important coal districts, as well as agricultural sections, failed to earn their fixed charges in 1921.

A 10 per cent reduction in bituminous coal rates he said would mean a reduction of 69½ per cent in the net operating income of the Chicago & Alton and more than 26½ per cent in that of the Illinois Central. In the case of the Chicago, Burlington & Quincy, it would mean a reduction of nearly 11 per cent, Mr. Lutz said, 19 per cent for the Chicago, Milwaukee & St. Paul, and more than 19 per cent for the Chicago & Northwestern.

"Nothing should be done at this time to rock the transportation boat by experimenting with reductions in the carriers' revenues," Mr. Lutz concluded. "We all recognize that present freight and passenger rates have not produced an adequate return up to the present time. It seems to me the safer course to pursue would be to test the future by experience and make reductions in the carriers' revenue only when it is clearly apparent that their earnings warrant the reductions and when such reductions can be made with the certainty that they will be generally helpful in bringing up a return to normal economic conditions."

Present Basis of Rates and Costs

Affords Less Than Fair Return

That the net operating income of the railroads would still be considerably less than a six per cent return if they were to do over again the business of 1921 at present rates and costs of operation, allowing for the reductions that have been made recently in both, was shown in exhibits filed at the request of the commission by George M. Shriver for the eastern roads, G. W. Lamb for the southern roads and L. E. Wettling for the western roads. These "constructive year" exhibits showed that the eastern roads would have a net operating income of 5.06 per cent, as against an actual 3.09 per cent in 1921, the southern roads 4.25 per cent as against 2.16 per cent, and the western roads 4.49 per cent as against 3.50.

For the roads as a whole Mr. Shriver's exhibit showed a constructive return of 4.8 per cent as compared with 3.25 actually earned in 1921. Based on the tentative valuation including additions and betterments to September 30, 1921. The adjustment included a reduction of revenues of \$142,000,000 because of decrease in rates and a reduction of \$491,000,000 in operating expenses, but an increase of \$56,2

763,322 in taxes. These changes would produce an increase in net operating income to \$907,693,630.

These witnesses also filed a number of additional exhibits, bringing up to date figures that had previously been introduced and facts in answer to statements made by various witnesses for the shippers. Mr. Wettling gave an estimate that if the railroads were able to pay wages comparable to those paid for similar labor in other work they would save \$27,000,000 a month. Some exhibits were also introduced in reply to the assertion by the Pullman Company that the surcharge was keeping people from traveling. One of these showed that although the surcharge has not recently been in effect in Georgia the number of Pullman passengers on the Central of Georgia was less in January, 1922 than in January, 1921, when the surcharge was in effect.

The Railway and Locomotive

Historical Society

LESS THAN 100 years ago the first locomotive was placed in operation in this country. The development of the railroads which followed brought about such rapid progress that in half a century the continent was settled from the Atlantic to the Pacific and girdled with a network of steel which so hastened its industrial development that within the short span of a century the American republic rivaled in wealth and power the leading countries of the old world. This is but one aspect of the influence of the railroads upon the progress of this nation. The complete story, if it could be told, would be more thrilling than fiction, of deeper significance than military campaigns or battles.

The history of the railroads in the United States is recorded only in fragments. There is no record of many of the important details of the early development and as time goes on the present knowledge will be lost unless carefully preserved. Here and there throughout the country will be found a few earnest workers whose interest in railroad history has led them to collect data on the early progress of rail transportation. In order to make their work more effective, about 50 persons interested in early railroad history have formed an organization under the name of the Railway and Locomotive Historical Society.

The first two bulletins of the society have now been issued, and contain some interesting articles which can be judged from the following titles: Yesterdays on the New York Central; The Story of the New England; America's Most Famous Trains; The Fall River Line Boat Train, Eddy Clocks; Some Experimental and Historical Locomotives of the Chicago & Northwestern; The Rival Builders, the last named giving many important particulars of locomotives built by William Mason and the Taunton Locomotive Works.

The officers of the Railway and Locomotive Historical Society are: president, Charles E. Fisher, Taunton, Mass.; vice-president, Heribert Fisher, Taunton, Mass.; recording secretary, C. W. Phillips, Taunton, Mass.; corresponding secretary, R. W. Carlson, Escanaba, Mich.; treasurer, A. A. Loomis, Jr., Berea, Ohio.

THE SUPREME COURT OF ILLINOIS on February 22 enjoined the Cook County Board of Assessors and the Board of Review of the State from levying \$264,915 in taxes against the Illinois Central, on stocks and bonds of lines to other states, amounting in all to \$10,308,000. When the levies were made in 1919, the road challenged the right of the board to make them, asserting that the securities were an indebtedness rather than a taxable asset. The Supreme Court upholds this view.

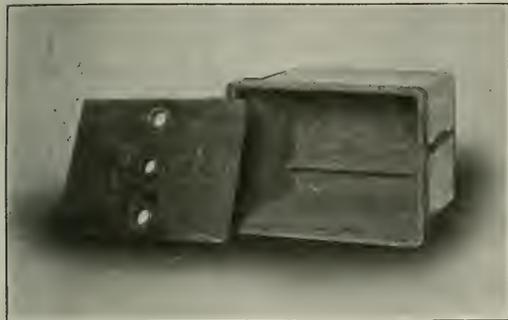
Use of Hard Rubber Battery Jars in Car Lighting

Santa Fe Has Succeeded in Reducing Battery Tank Maintenance
to 30 Cents a Month Per Car

By A. E. Voight

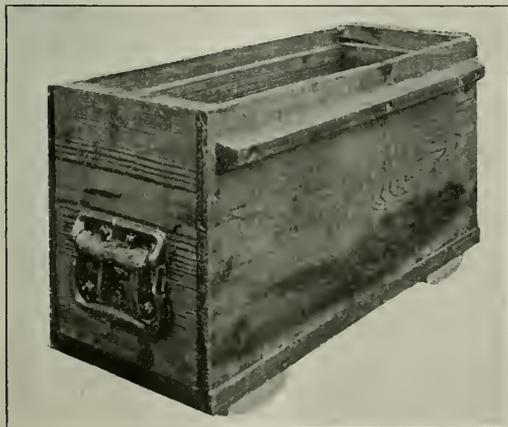
Car Lighting Engineer, Atchison, Topeka & Santa Fe

HARD RUBBER JARS versus lead tanks for use in storage batteries on electrically lighted cars is a popular subject at the present time. In the early days of car lighting quite a few roads used hard rubber jars, but most of



Hard Rubber Battery Tank and Rubber Cover. Bottom Rests Are Molded as a Part of the Tank

them abandoned their use because of the heavy breakages they experienced. The Santa Fe was the only large road that continued their use and went into the subject of overcoming the troubles that were originally experienced; this



The Side of the Crate Is Protected by a Long Wood Strip Instead of the Usual Porcelain Cleats

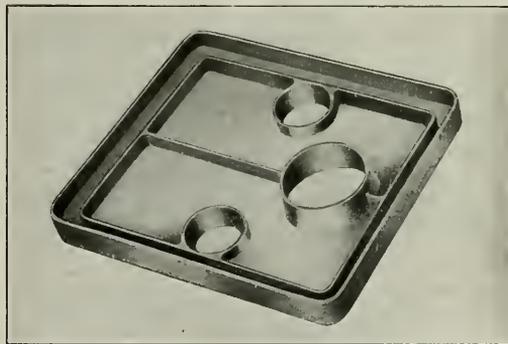
resulted in the making of the jar shown in one of the illustrations.

No doubt a great deal of the trouble that was experienced by some roads was due to their using plates that buckled and grew, thus breaking the rubber jars. This trouble has been

reduced considerably by more modern equipments which protect the batteries from excessive overcharges. If a battery is not subjected to overcharge the plates will not grow much.

The assembly of jars in the crate was found to be an important factor, the best results being obtained where the jars fit snugly so as to give it the benefit of the mechanical strength of the crate. To accomplish this all space around the jar is taken up with thin wood blocks.

The location of side buffers on crates is of importance. We found it good practice to use a wood strip the full length of the crate instead of the short porcelain that was first used, as our experience showed that in cases of accidents or emergency stops the buffer would sometimes be driven through the crate, resulting in the loss of a jar. The crate is made



Lead Antimony Cover for Use With Rubber Jar. Groove Contains Plastic Sealing Compound

of yellow pine and dipped in hot paraffine before and after assembling. The advantages of the rubber jar over the lead tank are as follows:

Lower first cost.

Freedom from grounds.

Freedom from leaks caused by chemical or electrolytic action.

Lower maintenance cost.

Experienced lead burner not required at all terminals to repair leaks.

In support of our statement of lower maintenance cost it may be stated that we have about 1,250 sets of 16 cells of batteries in service and our average jar costs per car per month for the past three years are as follows:

Business Cars	Smokers, Coaches Chairs & Comp. Cars	Diners & Cafe Observation	Pullman Cars
\$0.34	\$0.30	\$0.41	\$0.34

All of our diners and some of our business cars and cafe-observation cars are equipped with 32 cells of batteries. The above figures are about double what they were in 1917, as both the material and breakages went up during the war period. However, the figures show that it is only necessary to replace one jar out of a set of 16 in 13 months.

Another factor in cost that is done away with by the use

of the rubber jar is the side and end rubber liners and plate supports, together with extra amount of labor and equipment that is necessary to assemble them.

The largest item of expense of upkeep experienced with lead tanks is due to leaks caused by electrolytic corrosion. If each lead tank could be perfectly insulated from the other tanks and from the ground this corrosion could be prevented. It is, however, practically impossible to prevent grounds between tanks and the battery box. The wooden trays will become acid soaked and the porcelain skids will become covered with a layer of acid soaked dust, and thus a path for current from the tank to the ground is produced. When two such grounds exist in the same battery, even though of comparatively high resistance, a small amount of current will flow and any small amount of current flowing from one tank to another will start electrolytic corrosion, which will pit the lead tank and cause it to leak. The thin rubber liners used in the lead tanks between the plates and the tank are another source of trouble. The constant rubbing of the plates against the liners will eventually puncture the liners and thus permit the plates to come in contact with the lead tank. This causes internal short circuits, shortening the life of the plates and involving considerable expense for renewing the hard rubber liners.

In sealing our jars we first convex our covers so as to make the vent plug the high point. This prevents dirt and foreign matter from being washed into the jar. We use a form "H" soft rubber bushing of good quality in the cover around the terminal post.

This bushing serves both as a seal and as a buffer, which protects the jar and the sealing compound which holds the cover in place.

A lead antimony cover has recently been placed on the market for use with the hard rubber jars, which has a double groove in which plastic sealing compound is placed; this results in the jar being automatically sealed when the cover is put in place. This lead cover also protects the top of the jar, where most of the breakage occurs.

Finnigan's Automatic Train Control

GEORGE P. FINNIGAN, of Richmond, Va., who made extensive experiments on the Interborough Rapid Transit Lines in New York City in 1910 and 1911, and later for two years on the Pennsylvania Railroad between New York and Philadelphia, is still in the signaling field, and his design of train control apparatus, which was the first to employ a permanent magnet on the roadway, is well known to many signal engineers. He has no installation in service at the present time, but he has favored us with a drawing which illustrates the essential electrical principles of his system. This we shall briefly describe.

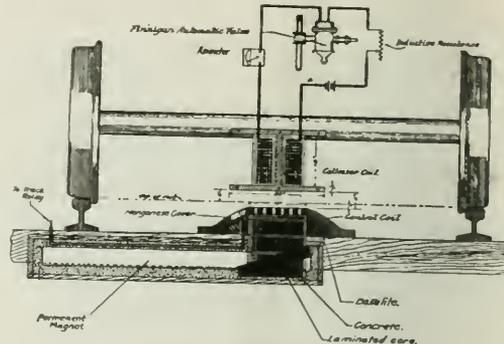
A permanent magnet, in the roadway, when uninfluenced by the condition of the block ahead causes an application of brakes, but when its power is counteracted by an electromagnet, which is energized when the section ahead is clear, the application of brakes is prevented. The arrangement is "normal danger." The permanent magnet is fixed in a wooden box at the level of the ties, the box being packed with cement to afford all necessary protection to the magnet. The box is about 5 in. by 6 in. and about 4 ft. long, extending from the center of the track to the end of the tie at one side. The electromagnet on the roadway is indicated in the drawing as a "control coil." Its winding surrounds a laminated pole piece which extends upward, the top of the outer case being at a height 1 in. lower than the tops of the running rails. This winding is energized by a current controlled by the track relay of the section to be protected.

The iron bar, shown in an inclined position, clamps the

pole piece to the permanent magnet. All this apparatus is thoroughly waterproofed.

The collector coil on the locomotive passes at from 4 in. to 6 in. above the roadway apparatus. This collector coil is a part of a closed circuit (energized by a battery consisting of a single dry cell) which controls the Finnigan automatic air valve shown at the top of the drawing. The inductive resistance in this circuit, shown at the right of the drawing is adjustable, and its function is to determine at what speed the train may pass a control point without an application of the brakes.

The track apparatus is, of course, located full braking dis-



Finnigan Automatic Train Control

tance to the rear of the entrance of the section to be protected.

Assuming a train approaching a control point when the track relay governing the roadway magnet at this point is closed (section ahead clear), the current in the electro magnet diverts the lines of force of the permanent magnet so that they do not affect the engine coil (at any speed).

With the governing track relay opened (section ahead occupied by a train) the flux of the permanent magnet, acting on the engine-carried collector coil affects the engine circuit in accordance with three elements: (1) The speed of the train (above or below a predetermined rate), (2) the number of turns of wire in the collector coil, and (3) the volume of the lines of force from the permanent magnet cut by the engine-carried coil.

Assume that trains are not to be stopped unless moving at 5 miles an hour or faster; that at that speed the train generates 1½ volts, and that the engine battery has a potential of 1½ volts; the E M F generated in the train circuit by the passage of the train then will cause the battery to react, and the air valve will function.

At any speed below five miles an hour the E M F generated will be insufficient to affect the engine-carried battery and no brake application takes place.

It will be noted that all these operations take place without requiring the movement of any part, or the opening or closing of any electric contact.

BAGGAGE TRANSFER CHARGES in New York City are the subject of a complaint which has been made by the Merchants' Association to the Public Service Commission of the State, and on which a hearing was held this week. The complaint is that \$1.25 has been charged for carrying a suit case from the Pennsylvania Station to a hotel not far away. To carry a trunk to Brooklyn from a station in Manhattan, a distance of perhaps 2 miles, it is said a charge of \$2 has been made, whereas the normal rate would not be over \$1.40.

Nothing Very New About the Plumb Plan

Only Another Variation of a Delusion Which Has Wrought
Havoc Many Times in the Past

By Charles Frederick Carter

Author of "When Railroads Were New," "Big Railroadng," Etc.

YES, THE PLUMB PLAN has a past; such a large and lurid past that railroad men, having due care for their reputations, should think twice before recognizing it in public.

Glenn E. Plumb, general counsel of the Railway Employees of America, you remember, has claimed to be the originator of a "plan" by which the government, meaning the representatives whom you elected by your votes, is to buy the railroads from their present owners and hand them to the men who work on the railroads to have and to hold till death or the divorce court do them part, or words to that effect. It will cost only twenty billions, more or less. Who pays it? Why, the public. Who's the public? Let's see: In July, 1919, there were 1,894,287 names on the railroad payroll. The average family is 4.5 persons, so these railroad men represent approximately one-eighth of the population of the United States, and so will have to pay a pretty sizeable share of that twenty billion dollars themselves.

Look Before You Leap

That will be easy, say you? The railroad men, being the owners of the roads, will allow themselves generous salaries. They will merely take money out of their left trousers pocket and transfer it to their right vest pocket. The only difficulty about such a financial transaction is that it doesn't work; the change is pretty sure to slip between your fingers in transit. On the theory that it is just as well to look before you leap, lest in getting out of the frying pan you land in the fire, suppose we give this Plumb plan the once over.

In the first place, it isn't Plumb's plan at all. Glenn simply kidnaped it in France and contrived somehow to smuggle it past the immigration authorities. He has dolled it up in mellifluous verbiage, to be sure, and has put a new groove in the skirt and tacked a flounce around the bottom, providing that the government, meaning the elected representatives of the railroad men, and the public, including a large proportion of railroad men, are to have an equal voice with the railroad men who own the roads in their management. These attempts at disguise do not alter the essence of the proposal in the slightest degree. Any one who cares to take the trouble can find the so-called "Plumb plan" photographed, finger-printed, bertillened and pedigreed in the rogues' gallery of history.

"Plumb plan's" maiden name was "syndicalism," which is the French adaptation of socialism, which, in its modern form, was made in Germany. The socialist idea is for the state to own everything, including the people who constitute it; the syndicalist scheme is to use the state as an instrumentality through which to take possession of all property and hand it over to the workmen employed thereon, the men in each particular factory to have all they can make out of it without the formality of paying rent to the owners. It's a beautiful idea from the point of view of the employee who labors under the delusion that he has nothing to lose and everything to gain; but will it work?

Well, let's see what history has to say on this point.

Seventy-four years ago there was another revolution in France. The people had been fascinated by the misrepresentations of glib-tongued persons with a passionate antipathy to work who assured their dupes that all they had to

do was to kill everyone they caught with a clean collar on, after which they would be free to set up a "Dictatorship of the Proletariat." You probably are fed up on this line of talk, somewhat more than enough of which has been heard in these United States. But, any way, those Frenchmen overthrew the government and for the time being "The Proletariat," as Lenine calls people who do manual labor, found themselves in control of the nation's destinies.

The professional agitators had attempted to convert the people to socialism; but those Frenchmen were clever enough to understand that state socialism meant nothing more nor less than state slavery, and slavery in any form did not appeal to them. So they hit upon a new solution.

Plumb Plan in France in 1848

Louis Blanc, a member of the revolutionary government of 1848, believed, or pretended that he believed, that all wealth was produced solely by manual labor, a theory vociferously asseverated in America in 1920. Therefore, everything belonged to labor, not to the state. They would take possession of their own. The factories would be owned and operated by the employees who would have all they could make. The miners were to own and operate the mines and put the proceeds in their own jeans; the railroad men were to own and operate the railroads as their very own, precisely as Friend Glenn would have the railroad men of America do. Every detail of it was worked out in France before Glenn was born. Capital was to be totally abolished, for according to the syndicalist idea, as well as according to socialist doctrine, it had no right to exist.

Being a man of influence Blanc had ample power to give practical shape to his theories. The first thing to be done was to establish the principle of syndicalism, or Plumb planism, as it is known on this side of the Atlantic, by law. This was done by the decree of February 25, 1848, which was as follows:

"The provisional government of the French Republic binds itself to guarantee the existence of the workmen by means of work. It binds itself to guarantee work to every citizen. It recognizes the right of workmen to unite and to enjoy the fruits of their toil."

The next day another decree completing the Plumb plan was promulgated as follows:

"The provisional government of the French Republic decrees the immediate establishment of national workshops. The minister of public works is charged with the execution of this decree."

Tried Out Under Ideal Conditions

Now take particular notice that this syndicalist (Plumb plan) experiment was tried out under ideal conditions. Everything was in its favor. If it did not work failure could not be attributed to any untoward circumstances, but to inherently wrong principles. You need not take my word for the results of this great experiment. Just get down your French histories, or go to the nearest public library and check up my statements.

"Ateliers Nationaux," which is as near as a Frenchman can come to saying "national workshops," were opened at once. The lucky workmen who found themselves men of

property over night, hustled out and obtained certificates that they were inhabitants of the Department of the Seine, which they presented to the mayor, who thereupon gave them an order for admission to a workshop. If the applicant was received and employed by the workshop he immediately received an order for 40 cents for his day's subsistence; if he was rejected he received only 30 cents. This, naturally, made him feel pretty small, after having done his share to abolish capital. From such incidents originated an Americanism much in vogue twenty years ago—to "Look like thirty cents."

Nine and a half hours were to constitute a day's work. Those untutored peasants could hardly be expected to be sufficiently advanced to put the six-hour day, five-day week idea in force at the first crack out of the box. However, the working hours were merely nominal; actually they were a go-as-you-please affair. Naturally this made a hit. Men rushed in from all quarters, so that by June, 1848, the Ateliers Nationaux had enrolled 125,000 workmen.

An Impossible Plan

It would be as needless as wearisome to take up all branches of this grand experiment. Let a single example suffice. The tailor shops started under exceptionally favorable circumstances. The Hotel Clichy, a debtors' prison, was converted into a workshop at government expense and turned over to the workmen free of charge; that is to say, they got their capital for nothing. Next, they received from the government an order for 25,000 uniforms for the National Guard. In other words, they not only obtained capital for nothing, but they did not have to pay for the business ability to seek and to find a market for their product. Finally, they obtained free of charge from the government a supply of cloth, that is, their raw material, so they did not need credit. Could anything more ideal be imagined? Those Israelites who were fed with manna from heaven had nothing on those French workmen in '48, did they? And, naturally, those tailors got rich quick and retired to a country where capital still had a few rights, didn't they?

Not so you could notice it, they didn't. Let me tell you what happened. The ordinary contract price paid under the old dispensation before the workmen had been emancipated from the despotism of capital was 11 francs a suit. The workmen in the Ateliers Nationaux, with no overhead charges, no expenses of any kind to eat into their receipts, obtained the same price as their former masters who had to pay wages, rent, interest and all the rest of it and still make a profit if they could. Furthermore, the workmen in the Ateliers Nationaux received a subsistence allowance of 40 cents a day. When the job was done they were to divide the profits exactly as Friend Glenn proposes that American railroad men shall divide net railroad earnings after they have received them as a free gift from the government and have helped themselves to all the wages they want. The case is in exact parallel. Now observe what happened:

"The accounts were squared. Eleven francs per suit for so many suits came to so much. Subsistence money at 40 cents a day had to be deducted. The balance was to be divided as profit. Alas! The balance was a loss, not a gain. Subsistence money had been paid out equal to rather more than 16 francs a suit, instead of the 11 francs the former masters received, and out of which they paid all expenses, including good wages to their workmen instead of a daily allowance for bare subsistence."

Victor Hugo thus sums up the result. "The national workshops have proved a fatal experiment. The wealthy idler we already knew well; you have produced a person a hundred times more dangerous to himself, the pauper idler."

The same story with minor variations was repeated in all the Ateliers Nationaux until the National Assembly was forced to close the shops. The closing process cost France lives and nights of street fighting in which twenty thou-

sand lives were sacrificed. There you have the story of France's experience with syndicalism, alias the Plumb plan, seventy-four years ago. What do you think of it?

Another Experiment

To clinch the moral listen to this tale of a private experiment with the Plumb plan which was also staged in France. The story is summarized from an account by Thiers, the famous historian. The owner of a great engine factory lent the works to his men and agreed to buy their output at 17 per cent above cost. The men were to manage the works themselves. That is they took over a going concern with a certain market and a certain profit. Pretty soft, eh?

Well, note what happened. The first thing those men did was to increase wages for the poorer paid workers and lower the wages of the better paid ones, as the railroad reformers would have us do. There has been a lot said about the outrageous salaries paid railroad officers here, you know. Also a lot more about the "aristocrats of labor," meaning the enginemmen. In fact, every detail, under which it was tried out, is matched in the pages of history.

The result of these reforms was a daily tumult in the shop. The men took a holiday whenever they felt like it, and they were very careful not to over-exert themselves when they did honor the plant with their presence. But those were ignorant foreigners, you say? My friend, there is just one thing in this world of eternal change which never changes, and that is human nature. As it was in the beginning, it is now and ever shall be. Let us resume Thiers' narrative.

The workmen elected their foremen as they now do in Russia, with the result that they were changed two or three times every fortnight. Under their old employer the payroll aggregated 367,000 francs in three months; under the new dispensation it was only 197,000 francs for the same period, and the rates were much higher, at that. Furthermore, all the good workmen had left; so that at the end of the three months the association of workmen was bankrupt, the experiment was an utter failure, and the capitalist owner, who had been so blithesomely condemned as a worthless excessiveness on the body politic resumed control and the workmen, such as were left, were humbly grateful for a chance to become "wage slaves" again.

Capital Replaced by Poverty

If these French experiments standing alone are not sufficiently convincing, let me remind you of Gladstone's series of Irish land acts which took rights valued at \$30,000,000 from land owners and gave them to tenants. This was syndicalism, that is, Plumb planism, applied to the land, for it took property from capitalists—that is, the land owners—and gave that property to the workers. If the syndicalists and the socialists and the Plumb planists are right, then Ireland ought to have been richer as a result of this operation.

Well, it wasn't. In the thirty years following the Gladstone land acts, 1,200,000 Irish emigrated, the population decreased by 1,000,000 and the country was poorer than before. Gladstone had made the rich poor all right enough, according to formula; but he had also made the poor still poorer. He had destroyed credit and security and frightened capital out of Ireland. Capital was replaced by poverty; for capital no longer competed for labor.

Such incidents are by no means exceptional. The same dreary tale of delusion, failure and misery has been re-enacted many, many times in Europe, in the United States, in South America and elsewhere from the dawn of history to date. Wherever socialism or syndicalism, which are but aliases for the Plumb plan, has been tried the end has infallibly been disaster.

Now what do you think of syndicalism, otherwise known as "The Plumb Plan"?

Observations of a Transcontinental Traveler

Some of the Things on Which the Public Judges the Roads—Their Effect on Traffic

By William S. Wollner

A TRIP of 18,000 miles over seven of the country's most important railway systems gives the observing traveler an opportunity to come in contact with the attitude of the traveling public and railroad employees toward the national rail transportation problem that unfortunately few railroad executive officers are able to secure at first hand. As a matter of choice, or because their work requires it, general officers, and even the more important division and subordinate officers on some roads, travel in business cars isolated from contact with their roads' patrons, unable to learn, or indifferent to the opinion of the service their roads are rendering to the very people who furnish the revenue that makes the road's operation possible.

It should not be lost sight of that while the public judges the roads through its most intimate contact with them (as passengers), it is this same public that in the final analysis will determine whether the roads are to continue under the present form of management and control or whether some other method of operation shall be experimented with. It is also this same public which, as individuals, pays the country's freight bills as shippers, consignees, or consumers.

Assuming that it is a fact that almost all competitive tonnage is secured through "good will," is there any better way in which to impress a prospective shipper with the road's efficiency than when he is a passenger? The things that were observed on this 8,000-mile trip seem to indicate that at least some managers do not appreciate the value of comfortable, courteous passenger service as a feeder of freight tonnage, or that they are unfamiliar with the manner in which their passenger service is being handled.

Are 10,000 Tons Annually Worth Going After?

Nearly 3,000 miles of the trip which these notes cover were made in company with a man who is the head of a firm that ships between 5,000 and 10,000 tons of freight by rail annually and who is prominently connected with other enterprises whose combined tonnage greatly exceeds this figure. In addition, he is a leader in community affairs and a large owner of railroad securities. In view of his status as a shipper, security owner and community leader, this man's reaction to the treatment he received as a passenger is of especial interest. As he was accompanied by his wife and a young daughter, he required the use of a drawing room and an additional section. He was unable to secure these accommodations on the best train between the starting point of his trip and its destination although he allowed a few days choice in the date of starting. As a consequence he was compelled to travel on the next best train, which his family referred to as "limited in name only."

This train leaves its initial station at 6:30 p. m., but when during the first night's unsuccessful effort to sleep upon a mattress with a lump in its center the lady of the party attempted to secure a drink of water, she found that the reservoir was empty. The drawing room was also devoid of towels and it seemed impossible during the trip to get the porter to keep the room supplied. The party had been generously supplied by friends with tropical fruits and other things that required being kept on ice for their proper care but neither the dining car nor train crew could advise how this could be done. It is impossible to believe that a far-seeing management would permit as important a patron and

as influential a citizen to gain the opinion of the operation of its property that this man gained, and it must therefore be assumed that it has no knowledge of travel conditions on this particular train.

It would be unfair to leave unstated the fact that passengers are receiving far better service than they did a year ago. An outstanding improvement is that trains run on schedule and the annoying delays of the past no longer are the order of the day.

Ticket Sellers Not Salesmen

Do railroad managers expect their ticket sellers to be salesmen in the generally accepted meaning of the term or do they reserve this function for "passenger agents?" A man who found that he must make a hurried trip to a destination several thousand miles distant called at a consolidated ticket office to purchase his ticket. The purpose of his trip required that he visit certain cities en route but he found that the ticket seller was unable to tell him how to arrange his trip so as to include these cities. He consulted other ticket sellers with no better success and then informed the writer of his predicament. The writer telephoned to the passenger agent of a road over which a portion of the trip must be made and a traveling agent was immediately dispatched to the prospective passenger's office who furnished him with all the information he required.

This prospective passenger was a man who had held important positions in the engineering department of railroads for years, but he did not know that railroads provided this service for prospective passengers. Subsequent investigation disclosed the fact that travelers are entirely ignorant of the services that city, district and traveling passenger agents are prepared to render them.

Upon arrival in Chicago early one Sunday morning the writer found that the completion of his business there would permit of his leaving for home the following evening. Having planned to travel over a system favorably known for its treatment of passengers, he telephoned to its depot office to reserve space. He was informed that no reservation could be made nor could he even learn if accommodations were available, as all charts were in the consolidated ticket office and the consolidated office was of course closed on Sunday. Later investigation proved this ticket seller's statement true and that no reservations can be made on Sunday for a later date over this particular road.

Calling the following morning upon the ticket seller for this road in the consolidated office he obligingly showed the writer his charts, explaining that he was unable to say whether some of the space that was assigned to other offices would be used, although these offices had not reported its sale. He said that if the writer would return late in the afternoon he would endeavor to learn if the space were available. Upon being informed that arrangements for the trip must be completed before noon and that the traveler would therefore have to travel over another route, the ticket seller turned away from the prospective passenger without comment and replaced the chart in its pigeon-hole. It should be remembered that the writer posed as a "pay" passenger and the ticket he wished to purchase would have cost nearly a hundred dollars.

Later, when the writer applied at the depot ticket office of

the same company to learn if he could secure accommodations on a train leaving at 10:30 p. m. he showed the ticket seller the pass on which he intended to travel and was informed that the rules of the company prohibited the reservation of space until one hour before the time the train was scheduled to leave. The trip that was to be taken over this particular road was over 3,000 miles in length and while the necessity for this rule is understood, it seems unfair to expect a busy railroad man to wait until 9:30 at night to learn whether he will be able to start on a long trip of this kind. Incidentally, if this treatment were accorded a man in a position to route traffic from a connecting road it might lead to a discrimination against the road according to this treatment.

Dining Car Service

The railroads could engender a kindlier feeling on the part of the general public by giving a more popular service in dining cars and, incidentally, they would find this type of service financially more profitable. It seems almost ridiculous to attempt to give a service on a par with the highest grade hotels on a train carrying two standard Pullmans, four or five tourist cars and several day coaches. It is certain that the majority of people who travel in tourist cars and long distances in chair cars are not accustomed to the class of service given in the diner and can ill afford to pay the prices that must be charged when such a service is attempted.

Some of the roads are trying to popularize their dining-car service by serving "plate meals," but the prices placed on these meals are too high to be partaken of by the tourist car and chair car traveler, and on some roads at least the proper equipment is not provided for efficient service. An outstanding exception to this criticism of dining car service is that of the Baltimore & Ohio whose seventy-five cent commercial traveler's club luncheon offers the opportunity for a person to secure an entire meal at this price. Food and service have been especially provided for this excellent luncheon. The dollar and a quarter dinner served on this road, insofar as the writer is aware, has its equal in no other dining car in the United States.

Plain, wholesome meals served in the simplest possible fashion will not only attract diners from the tourist and chair cars, but will prove pleasing to Pullman passengers also and will prove financially profitable and a big drawing card for the road that undertakes to experiment in this direction. Such a service, should, of course, not be attempted on de luxe trains or other trains carrying only standard Pullman equipment.

Morale

The trip which these notes cover was made during the last two weeks of September and the first two weeks of October, or before the brotherhood executives had given their strike ultimatum. As indicative of the state of morale existing on the roads on which he traveled it may be noted that while a train was traveling as a first-section with a second-section following it through the blocks of automatic block signal territory, the rear brakeman was in the smoking room of the second Pullman from the rear of the train with his coat, vest, collar and necktie removed, shaving, while the train conductor was asleep in a chair in the observation car.

A high-speed train left a large terminal four minutes behind its schedule because the fireman did not look back to receive the trainman's signal and the trainman responsible for giving this signal refused to walk several car lengths to give it verbally. At the end of the four minute period the writer suggested to the trainman that he give the signal on the intercommunicating air signal which he did. During this period the fireman was hanging out of his cab window but did not look back for the signal.

Perhaps the best summing up of the state of mind of railroad men toward their job is the statement of the fact that

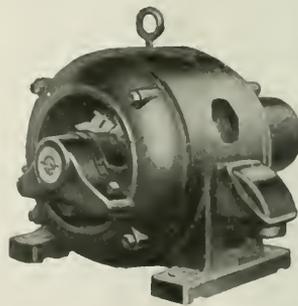
of the several hundreds of railroad employees with whom he spoke, but one mentioned his railroad in the possessive sense. When a rear brakeman was questioned as to the ownership of tracks running out of a large joint terminal, he proudly stated, "Oh, yes, *we* own our own tracks." Although the writer asked many questions designed to give the simple test of whether employees thought of their jobs and roads in the possessive, or the detached sense, this was, as stated above, the only case in which the possessive sense was used.

Conclusion

The public judges the success of the present form of railroad operation and management through its most intimate contact with the service the road renders, that is, as passengers. Freight service must be maintained at its most economical efficiency, but no road can afford to give less than perfect passenger service. The unreasoning public expects trains to be awaiting its bidding at such time as it may desire to travel and to get it to its destination as rapidly and comfortably as it is possible to do so. It is, of course, impossible to give the frequent train service and in some instances the fast passenger service that the public demands, but it is essential to the public's opinion of how railroad management is discharging its stewardship that passengers should be transported comfortably and conveniently and that they should come in contact with nothing but the most courteous employees.

Improved Polyphase Motors

POLYPHASE motors possessing a number of new features have been developed by the Wagner Electric Manufacturing Company, St. Louis, Mo. Improved ventilation is obtained by directing the ventilating air through a large number of definite paths. The coils are wound in phase groups without spliced connections, and they are impregnated



New Polyphase Motor

with insulating compound. Easy connection to external circuits is provided by a pull box attached to the motor into which the motor leads are brought with suitable terminals. An unusually large shaft is provided which decreases deflection and vibration. Quiet operation is obtained by mounting the large shaft in correspondingly large bearings, by arranging the coil slots on a spiral and by clamping the laminations of both stator and rotor under enormous pressure. The bearings are mounted in dustproof housings.

GIVE THE RAILROADS a free hand to work out their own problems. Railroad and coal mining costs must come down before there can be a permanent prosperity, although business is on the upgrade, and has been since July, 1920.—Charles N. Schwenk.

General News Department

The Western Maryland announces that its track repair work has been let to the Dickson Construction and Repair Company, of Youngstown, Ohio, which was formed recently to do similar work on the roadway of the Ohio Region of the Erie Railroad.

The Van Sweringen Company, Cleveland, Ohio, which owns the controlling interest in the New York, Chicago & St. Louis, has acquired control of the Toledo, St. Louis & Western, according to an announcement made by O. P. Van Sweringen at Cleveland on March 8.

The Western Railway Club will hold its next meeting on March 20, at the Great Northern Hotel, Chicago, at which time there will be a further general discussion of the paper, "Some Factors in the Business of Owning Locomotives," which was presented at the February meeting.

The State Highway Commission of Wisconsin has established a railway department, with M. W. Torkelson, former bridge engineer of the commission, in charge. The work of the new department will consist chiefly in the re-location of highways, with special consideration given to the elimination of grade crossings of railroads.

The American Railway Engineering Association will hold its annual dinner in the gold room of the Congress Hotel, Chicago, on Wednesday evening, March 15. The speakers will include General R. C. Marshall, junior general manager of the Associated General Contractors of America, Washington, D. C., and formerly chief of the construction division of the United States army; Hon. James A. Mulligan, K. C., Sudbury, Ontario, and Gus W. Dyer, professor of economics at Vanderbilt University, Nashville, Tenn.

Store Door Delivery

The New York Railroad Club at its meeting at the Engineering Societies' Building on Friday evening, March 17, will have a symposium on store door or direct delivery. The question will be discussed from a variety of angles by men who have had experience with this problem or have given it considerable study.

Commission Asks Information on Power Brakes

The Interstate Commerce Commission, which has ordered a proceeding of inquiry and investigation of the use of power brakes, has addressed an order to the railroads calling for detailed information to be furnished by April 1 regarding the operation, inspection, testing and maintenance of air brake equipment, including statistics regarding accidents resulting from failure properly to control speed of trains on grades.

Atlantic City Conventions in June

Steady progress is being made in developing the programs for the June conventions which will be held at Atlantic City. Division V, Mechanical, A. R. A., will meet from June 14 to 21 inclusive. Division VI, Purchases and Stores, A. R. A., will hold its meeting on June 19, 20 and 21. The Association of Railway Electrical Engineers will hold its spring meeting at the Dennis Hotel on Monday, June 19. The exhibit committee of the Railway Supply Manufacturers' Association met at Pittsburgh yesterday afternoon to assign space to those who have already made applications. Up to March 1, 240 such applications had been received, requiring in the neighborhood of 80,000 sq. ft. of space. A particularly large number of machine tool companies have applied for space in Machinery Hall, and all of the space in this section has been applied for.

Operating Statistics for 1921

The Interstate Commerce Commission has issued its summary of freight and passenger service operating statistics for Class 1 railroads for the year 1921, which shows for 180 roads a total of 344,343,000,000 net ton miles of revenue and non-revenue freight as compared with 499,125,000,000 in 1920. The average miles per car per day for the year was 22.4 compared with 25.1, the net ton miles per car day 389 as compared with 498, the net tons per loaded car 27.6 as compared with 29.3, the train speed 11.5 miles per car as compared with 10.3, the locomotive miles per day 49.9 as compared with 62.5, and the traffic density, the net ton miles per mile of road per day, 4,048 as compared with 5,280.

The Campaign Against the Full-Crew Law

The cost of the full-crew laws of New York, New Jersey and Maryland since they took effect has aggregated \$24,000,000 and active efforts are now going on to secure the repeal of these laws in these states. This and other interesting facts are set forth in a circular which has been issued by the Pennsylvania Railroad. The only definite accomplishments in the three legislative campaigns thus far are a vote in the Senate of the Maryland legislature in favor of repeal of the law; and a similar vote in New Jersey. The full-crew law of Pennsylvania was repealed last year and that of Indiana before that; and in neither of these states has there been any complaint since the regulation of the number of men in crews was put into the hands of the state railroad commission.

Traffic Division—A. R. A.

G. H. Ingalls, New York City, chairman, announces that the general committee of the Traffic Division of the American Railway Association has appointed three standing committees as follows (the first-named, in each, being chairman):

ON STANDARD CONTAINERS, PACKING AND MARKING

R. C. Fyfe, chairman, Western Classification Committee.
F. C. Macey, a-sistant general freight agent, A. T. & S. F.
R. G. Fagan, superintendent of freight protection, S. P.
James McDonnes, freight traffic manager, A. C. L.
F. W. Smith, Chairman, Official Classification Committee.
J. E. Crosland, chairman, Southern Classification Committee.

ON WEIGHING AND INSPECTION OF FREIGHT

A. S. Dodge, superintendent, Western Weighing and Inspection Bureau.
George Merkle, manager, Central Weighing and Inspection Bureau.
W. R. Sichel, manager, Transcontinental W. & I. Bureau.
A. B. Cade, manager, Iron continental Weighing and Inspection Bureau.
I. G. Markey, manager, Southern Weighing and Inspection Bureau.
W. J. Edwards, manager, Trunk Line Freight Inspection Bureau.
G. C. Ransom, chairman, Canadian Freight Association.
A. W. Eppright, superintendent of scales, Pennsylvania Railroad.
Oliver Macey, general supervisor claim prevention, Buck Island Lines.
F. C. Macey, assistant general freight agent, A. T. & S. F.
C. H. Mann, superintendent of scales, Southern Railway.

ON CAR SERVICE, DEMURRAGE AND STORAGE

Rob't C. Wright, general traffic manager, Pennsylvania Railroad.
Fred Zimmerman, vice-president, C. I. and L.
B. Campbell, vice-president, N. Y., N. H. & H.
H. E. Pierron, traffic manager, C. M. & S. P.
W. A. Rambach, freight traffic manager, M. P.
G. W. Luce, freight traffic manager, S. P.
A. R. Smith, vice-president, L. & N.
D. W. Longstreet, traffic manager, I. C.
C. T. Airey, vice-president and traffic manager, Central Ga.

Sixteen Killed in Motor Bus at Crossing

Sixteen persons were killed and nine injured at Painesville, Ohio, on the night of March 3, when a New York Central express train, eastbound, crashed into a crowded motor bus at St. Clair street in that city. The railroad company issued a statement

that the crossing watchman was on duty at the time and signaled the driver of the bus with his lantern to stop. The flagman states that he began to give the bus driver this warning signal when the latter was still from 300 to 500 feet from the tracks, and the train had its electric headlight burning bright and clear; its whistle was sounded twice and the bell was ringing automatically. The driver was among the fatally injured.

International Railway Congress

The Ninth Congress of the International Railway Association will be held in Rome, Italy, from April 18 to April 30. Besides the meetings of the five sections into which the Congress is divided the program includes the following: Banquet by the Italian government April 19; reception at the Capotele April 21; excursion to the Terni Hydro-Electric Works and various establishments April 22; excursion to Naples and Pompeii April 29 and 30; departure from Genoa on May 1 and excursion to the electric traction installations in special train to Modane.

The sections of the Congress are as follows: 1. Way and Works; 2. Locomotives and Rolling Stock; 3. Operation; 4. General; 5. Light Railways.

The following who have been appointed as delegates of the American Railway Association have arranged to attend the Congress: L. A. Downs, chairman, Division IV—Engineering (vice-president and general manager, Central of Georgia Railway); D. Z. Dunott, chairman, Medical and Surgical Section (chief surgeon, Western Maryland Railway); J. E. Fairbanks, general secretary; T. De Witt Cuyler, chairman, Association of Railway Executives; W. W. Atterbury, vice-president, Pennsylvania; George Gibbs, chief engineer electric traction, Long Island; W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific.

The following who have been appointed reporters for the American Railway Association on the subjects indicated also will attend: W. J. Tollerton, chairman, Mechanical Division, A. R. A. (general mechanical superintendent, Chicago, Rock Island & Pacific Railway); "Passenger Carriages," Earl Stimson, chief engineer, Maintenance of Way, Baltimore & Ohio Railroad, "Maintenance and Supervision of the Track;" Samuel O. Dunn, editor of the *Railway Age*, "Net Cost Rates."

The following will go as delegates of their respective railways—Delaware & Hudson, W. H. Williams, vice-president;

Illinois Central, A. S. Baldwin, vice-president, Hugh Pattison, electrical engineer, Donald Rose, European traffic manager; Lehigh & New England, William Jay Turner, vice-president and general counsel; Rollin H. Wilbur, vice-president and general manager, Henry H. Pease, secretary and treasurer; Long Island, Ralph Pcters, president, George Gibbs, chief engineer electric traction; Pennsylvania System, J. V. B. Duer, electrical engineer, W. B. Wood, general superintendent, Illinois division; R. C. Morse, Jr., superintendent freight transportation, Eastern region, J. O. Hackenburg, superintendent, Schuylkill division; Philadelphia & Reading, A. T. Dice, president, F. M. Falck, general manager; Pittsburgh, Shawmut & Northern, H. S. Hastings, receiver.

George Gibbs is the American reporter on "Electric Traction," A. S. Baldwin on "Terminal Stations for Passengers," W. H. Williams on "Slow Freight Traffic."

Besides those mentioned above, the following American railway men have prepared reports: C. H. Ewing, vice-president, Philadelphia & Reading, "Construction of the Roadbed and of the Track;" W. C. Cushing, engineer standards, Pennsylvania System, "Special Steels;" G. A. Haggender, bridge engineer, Chicago, Burlington & Quincy, "Reinforced Concrete;" Howard G. Kelley, president, Grand Trunk Railway, "Freight Stations;" C. W. Crawford, chairman, General Committee, Section 5—Transportation, American Railway Association, "Interchange of Rolling Stock;" A. F. Banks, president, Elgin, Joliet & Eastern, "Workmen's Dwellings;" I. B. Spencer, former director of purchases, United States Railroad Administration, "Special Methods of Traction on Light Railways."

The headquarters of the American delegates will be at the Grand Hotel, a short distance from the Fine Arts Exposition Palace in which the sessions of the Congress will be held.

Tentative Valuations

The Interstate Commerce Commission has issued a tentative valuation as of 1916 of the property of the Maine Central, in which it finds the final value of the property owned, 642 miles, to be \$44,020,662, and of the property used, 1,131 miles, including leased lines, to be \$61,091,384. This considerably exceeds the capitalization outstanding as of the valuation date, \$34,587,465. In addition there was held by or for the carrier \$2,881,643 of stock and \$2,015,500 of bonds. The in-

I. C. C. SUMMARY OF REVENUES AND EXPENSES FOR DECEMBER AND CALENDAR YEAR 1921

Item	December			12 Months
	1921	1920	1921	1920
Average number of miles operated	235,170.42	234,708.98	234,912.85	234,423.77
Revenues				
Freight	\$288,762,008	\$386,564,007	\$3,918,699,970	\$4,323,650,077
Passenger	188,669,910	214,830,002	2,153,752,002	2,287,423,443
Mail	10,014,096	8,711,525	95,810,755	150,816,975
Express	12,158,008	9,656,470	104,633,598	143,858,272
All other transportation	14,297,406	18,522,426	164,757,085	163,771,798
Incidental	9,686,082	11,769,559	118,799,853	150,470,050
Joint facility Cr.	1,824,853	700,123	8,767,197	7,244,911
Joint Facility Dr.	390,070	233,883	1,987,865	1,481,281
Railway operating revenues	485,022,293	550,580,330	5,561,332,215	6,255,417,245
Expenses				
Maintenance of way and structures	49,600,255	70,708,969	761,479,568	1,030,532,557
Maintenance of equipment	92,564,513	147,529,258	1,254,421,290	1,593,481,891
Traffic	7,100,051	7,515,271	84,186,263	73,797,532
Transportation	183,558,753	264,531,899	2,386,043,830	2,901,583,273
Miscellaneous operations	3,686,807	5,036,195	48,938,247	61,886,531
General	13,891,015	15,884,672	167,584,134	174,102,854
Transportation for investment Cr.	1,511,890	437,017	6,973,229	5,029,060
Railway operating expenses	348,829,589	510,769,252	4,597,479,241	5,830,326,656
Net revenue from railway operations	76,112,704	19,811,078	965,752,974	395,090,589
Railway tax credits	19,679,410	39,570,891	280,441,488	280,987,101
Indebtedness railway revenues	78,109	289,487	1,978,578	1,159,363
Railway operating income	104,703,105	18,991,701	1,244,222,884	674,918,329
Equipment rents—Dr. balance	1,191,351	1,745,815	53,330,115	35,078,830
Equipment rents—Dr. balance	745,485	1,952,580	16,129,362	19,613,482
Net railway operating income	1,142,981,941	1,000,699	614,810,531	58,151,863
Other expenses less revenues (car rental)	87,009	177	87,644	93,665

Includes \$ 571,874, sleeping and parlor car surcharge

Includes \$17,716, sleeping and parlor car surcharge

Note: Excludes Dr. Cr. Fuel & traction, report not having been filed

Includes \$32,691,960, sleeping and parlor car surcharge

Includes \$12,014,911, sleeping and parlor car surcharge

Note: Includes late of completion.

vestment in road and equipment as reported by the carrier was \$37,234,525. This is readjusted by the commission to \$35,814,267. The commission has also issued additional tentative valuations in which the final value is stated as follows:

	Used	Owned
Holton Interurban	\$856,349	\$200,349
Portland & Southwestern.....	.....	330,616
Fabor & Northern.....	124,181	120,000
Memphis Union Station.....	2,341,551	2,340,757

Popularizing Safety First

Starting on the first of the year, the Delaware, Lackawanna & Western introduced a system of posters which are issued and distributed weekly and contain, in addition to some pertinent messages on safety, a reproduction of some news event. They are patterned after the news-service picture-placards which are now seen regularly in many store windows and which feature the

Traffic News

Trunk line railroads have filed tariffs with the Interstate Commerce Commission effective on April 1, providing for a reduction of 28 per cent in the rates on iron ore.

C. A. Cairns, passenger traffic manager of the Chicago & North Western, has been elected chairman of the executive committee of the Western Passenger Association for 1922.

Testimony on the "Pittsburgh Plus" case continues to be heard by W. J. Bennett, examiner for the Interstate Commerce Commission, who opened a further hearing at Minneapolis, Minn., on March 6.

The Miami Valley Traffic Club, Dayton, Ohio, has elected the following officers for 1922: President, T. T. Webster; vice-presidents, R. B. Mann, H. T. Ratliff, A. H. Finlay, D. O. Searles and W. W. Winship; treasurer, R. H. Hagerman; secretary, Morris T. Otto.

The Senate committee on interstate commerce, which had called a meeting for March 4 to consider its action on the Capper and similar bills in view of the Supreme Court's decision in the state rate cases, was unable to get a quorum. Chairman Cummins is forming a sub-committee to consider the matter.

The Canadian Pacific and the Minneapolis, St. Paul & Sault Ste. Marie will place in effect on May 15, summer round trip fares from Chicago to Vancouver, Victoria, Portland and Seattle, at \$86, or about \$30 less than last year. Routes are through Canada going and through the United States returning, or vice versa; also a round-trip fare of \$104 has been authorized to California points.

The Chicago Great Western has withdrawn its announcement that it is about to reduce passenger fares between Chicago, St. Paul, and Omaha, as its controversy with competing roads has been settled by their granting to the Great Western and to the Minneapolis, St. Paul & Sault Ste. Marie additional immigrant privileges to and beyond St. Paul and Minneapolis and excursion rights from Chicago and points in Iowa to these northern cities.

Home-seekers' rates of a one way fare plus \$2 for the round trip will be placed in effect on the first and third Tuesdays in each month until November by the Chicago, Milwaukee & St. Paul, the Chicago & Northwestern, the Chicago, Burlington & Quincy and the Chicago Rock Island & Pacific to points in South Dakota and North Dakota; in Washington and Oregon except to certain points in the eastern part; and to all points in Montana and Idaho. The tickets will be open to public purchase and will be good for 21 days, with liberal stopovers.

E. S. Briggs, chairman of the National Perishable Freight Committee, Chicago, has resigned to become manager and secretary of the American Fruit & Vegetable Shippers' Association, with headquarters at Chicago, succeeding R. Cumming. Mr. Briggs has been in railroad service since 1889, serving the Missouri, Kansas & Texas Railway for about 17 years. In 1905 he was made assistant general freight agent of that road at Houston, Texas, and in 1910 was appointed to a similar position at St. Louis. In 1914 he went to the Pacific Fruit Express as traffic assistant at San Francisco; and on May 1, 1917, he was appointed traffic manager of that company. In July, 1920, he was selected by the railroads to take charge of the newly formed National Perishable Freight Committee as its chairman.

Coal Production

The output of soft coal during the week ended February 25 is estimated by the Geological Survey at 10,348,000 net tons, a slight increase over the week preceding in spite of the local observance of Washington's Birthday as a holiday.

LACKAWANNA

SAFETY NEWS SERVICE



HAYS ACCEPTS \$150,000 MOVIE DIRECTORSHIP

Official announcement has been made of the forthcoming resignation of Postmaster General Will H. Hays from Harding's cabinet to accept a \$150,000 salary as head of the American motion picture production industry. Mr. Hays is seen being "shut" after the announcement.

Railroading is normally a safe occupation if men will only let their minds work normally while they are on duty. Heaven protect the man who violates the rules.

latest news events pictorially. The safety message in the Lackawanna posters is printed in large type and in colors. It is short and to the point, as illustrated by that here shown. In this poster, the "news" is in black, and the safety message in bright green. These placards measure about 14 in. by 18 in. and are attracting considerable interest on the part of both employees and the public.

Three Months of Freight Claim Payments

Figures of payments for loss and damage of freight during September, October and November, 1921, have been compiled and summarized recently by the freight claim division of the American Railway Association and are now available for publication. The total freight claim expenditures for the three months amounted to \$18,865,589, of which \$6,640,523 was incurred in September, \$6,441,925 in October, and \$5,783,142 in November, as compared with January, 1921. The November statement shows a decrease of 44 per cent and each month reveals a steady diminution in the amount paid out in claims, \$658,782 less being paid in claims in November than in October, as follows:

September	\$6,640,523
October	6,441,925
November	5,783,142

As compared with January, 1921, November shows a decrease of 44 per cent.

Commission and Court News

Interstate Commerce Commission

The commission has issued an order modifying in certain particulars conditions in its export bill of lading upon recommendations made by the United States Shipping Board.

The commission has suspended until July 3 the operation of certain schedules contained in a supplement to Chicago & Alton and Illinois Traction System tariffs which provide for reductions in rates on grain from points in Illinois to New Orleans, and other Gulf Ports for export.

The commission has issued a decision finding the divisions of joint rates on certain traffic moving between stations on the Chicago & Eastern Illinois and stations on the St. Louis-San Francisco via Chaffee, Mo., unreasonable and inequitable and has prescribed the divisions to be observed for the future.

The commission has suspended until July 1 the operation of schedules contained in Agent E. B. Boyd's tariff which proposes reductions in the rates on sugar from points in Colorado, Idaho, Kansas, Nebraska and Utah to various destinations in Illinois, Iowa, Minnesota, Wisconsin, the Dakotas, Oklahoma, and Upper Peninsula of Michigan.

The commission has reopened the case involving intrastate rates within the state of Illinois, on the petition of the Northern Illinois coal operators for further hearing, for the purpose of determining whether or not the present intrastate rates on coal within the state of Illinois are unduly preferential of intrastate traffic and shippers and of localities within the state, unduly prejudicial to interstate traffic and shippers and to localities outside the state, and unduly, unjustly and unreasonably discriminatory against interstate commerce; and for the purpose of considering whether the orders heretofore made should be modified.

United States Supreme Court

Claim for Express Rates for Carrying Gold as Mail

A claim was made against the government by the New York, New Haven & Hartford for its proportion of express rates for carrying \$5,000,000 in gold from Philadelphia to Boston in 1914, and the passenger fares for seven men acting as guards. The gold was in 1,000 sealed bags, in 167 locked mail pouches. The Treasury prepaid the postage required for fourth class mail matter, at parcel post rates, amounting to \$420. No protest was made by any carrier at the time. The railroad's claim was for \$5,020.65. The Court of Claims dismissed the claim. The Supreme Court of the United States affirms that judgment, rejecting the contention of the railroad that the transaction was not mail service, "the service, rightly or wrongly, was demanded as mail service, was rendered as mail service, and was paid for without protest as mail service"—Opinion by Mr. Justice Holmes. Decided February 24, 1922.

Texas Suit Dismissed

The United States Supreme Court on March 6 dismissed the original suit filed by the state of Texas, which asked the Court to set aside the orders of the Interstate Commerce Commission under the transportation act and decisions of the Railroad Labor Board and which also attacked the constitutionality of the transportation act. The court held that it would set aside original or appeal orders of the Interstate Commerce Commission must be brought in the district courts, and the United States made a defendant. Justice Van Devanter who delivered the unanimous opinion, also said that the bill declared "insuperable obstacles to our entertaining it on any ground." He also directed attention to the fact that many of the questions involved have been disposed

of in the New York and Wisconsin passenger-fare cases decided last week. The bill charged that the commission had placed the carriers of Texas in a territorial rate group and had approved a general increase in their rates regardless of the authority of the state, had authorized the abandonment of certain lines within the state and had exercised a supervision over the issuance of securities. All of these acts, it was alleged, infringed upon the powers reserved to the state. Referring to that part of the bill which sought to question the constitutionality of the provisions providing for the Railroad Labor Board, the court pointed out that the carriers and their employees have put the board's decision into effect and while they would have great concern in any decision of the suit, they were not made parties to the bill.

Unexpected Negligence of Fellow Servant

—Risk Not Assumed

In an action under the federal Employees' Liability Act for the death of an employee, caused by a derailment, held by the court to be due to the negligence of the engineman in disregarding a signal to stop at the derailer, the Supreme Court of the United States has reversed the judgment of the Pennsylvania Supreme Court holding that the deceased had assumed the risk of such negligence. The opinion, by Mr. Justice McReynolds, reads, in part: "In action under the Federal Act the doctrine of assumption of risk certainly has no application when the negligence of a fellow servant, which the injured party could not have foreseen or expected, is the sole, direct, and immediate cause of the injury. To hold otherwise would conflict with the declaration of Congress that every common carrier by railroad while engaging in interstate commerce shall be liable . . . when death results from the negligence of any of the officers, agents, or employees of such carriers."—Reed v. Director General. Decided February 27, 1922.

Thirty Days' Notice of Claim

In an action for personal injuries to a shipper riding on a drover's pass providing for notice of claim to the general manager within 30 days, it appeared that the plaintiff was in a hospital for about 30 days under the care of a doctor employed by the road, but was not disabled from giving the notice. He failed to give it, however. The district court directed a non-suit and its judgment was affirmed by the Circuit Court of Appeals (264 Fed. 664). The Supreme Court of the United States has affirmed that judgment, holding that the requirement as to notice was valid. Knowledge on the part of the railroad's employees was not an excuse for omitting the notice in writing (St. Louis, I. M. & So. v. Starbird, 243 U. S. 522). The only doubt of the court had been as to whether the prohibition, in Act of March 4, 1915, of a requirement fixing less than 90 days for giving notice of claims in respect of goods established a public policy that would affect the present case. "As to goods, a record is kept, yet even there a reasonable prompt notice is necessary as a check upon fraud. There is no record of passengers, and the practice of fraud is too common to be ignored. It is impossible to suppose that Congress, when it was dealing with notices of claims for baggage, 39 Stat. 441,442, should not have thought of passengers' claims for personal injuries, and as it passed them by, we must suppose that it was satisfied to leave them to the Interstate Commerce Commission and the common law."—Opinion by Mr. Justice Holmes.

In a dissenting opinion, in which the Chief Justice and Mr. Justice McKenna concurred, Mr. Justice Clarke thought the statute of 1915 though in terms applying only to damages to goods, should be applied to claims for personal injury; that "the likelihood is much greater that fraudulent claims will be made for injuries to goods, for damages often cannot be discovered until they are unpacked after having left the custody of the carrier, but it must be rare indeed that a passenger can be injured except in the presence of some one or more of the carrier's agents."

The dissenting justices also think the requirement unjust because, "a shipper usually is, at least in physical condition to make prompt claim, but many men are so badly injured in accidents that they are wholly incapable of making claim in writing within thirty days."—Gooch v. O. S. L. Decided February 27, 1922.

Labor Board Decisions

Continuous Time Because of Wash-Out Denied

A passenger train crew on the Great Northern was tied up for 46 hours because of a wash-out, after which they were ordered to dead-head back to their initial terminal. They were paid for their services under Rule 20 of the agreement between the employees and the carrier, but they contended that such service should be paid for on continuous time basis. The Labor Board denied the claim of the employees.—*Decision No. 718.*

Classification of Chauffeur as Mechanic Denied

A chauffeur employed by the maintenance of way department of the Terminal Railroad of St. Louis, to operate a truck used to transport maintenance materials, asked for a reclassification as a mechanic, because he made minor repairs on the truck, the railroad having applied increases and decreases in accordance with Order No. 2 and No. 147 respectively on the basis of "laborer employed in and around shops and roundhouses." The claim for reclassification as a mechanic was denied.—*Decision No. 711.*

Penalty Overtime for Turning Trains Denied

Crews in passenger service on the M. K. & T. claimed one hour additional compensation for turning trains because of having been directed to lead around one leg of a wye and back around another leg to the passenger station at Oklahoma City. The Board decided that such train movements before the day's work is completed are not in violation of the rules of the agreement between the carrier and the employees affected, but that the employees in question are entitled to pay on the basis of actual minutes at pro rata rates in addition to all other time or mileage made on the trip from the time the train passes onto the first leg of the wye until it passes onto the main track from the second leg of the wye.—*Decision No. 719.*

Railroad's Right to Demote Employees

The Baltimore & Ohio made changes in its signal organization, which resulted in the demotion of certain assistant signalmen to helpers. The signal employees protested on the ground that an arbitrary change in classification and rating of employees was in violation of the Transportation Act. At the hearing nothing was introduced to show that the men classified as helpers were required to perform any other work than that within such a classification. The Labor Board decided that the carrier had not violated the provisions of the agreement unless the employees in question are assigned to perform the work of maintainers or assistant maintainers; and further that such demoted employees should be credited with the full time served as assistant signal maintainers and rated on that basis when again promoted.—*Decision No. 709.*

Seniority Rights of Minor Not Allowed

An employee of the American Railway Express Company at Fort Scott, Kan., who was under age, was laid off when forces were reduced, although employees with less seniority were retained. The employees claimed that he should have been allowed to displace another employee junior in service but the carrier stated that there was no position available in the service in which, under its rules, a minor could be employed; the carrier also contended that there was no position to which he could have been appointed and for which he was fit. The Board decided that Rule 4, Article 28, which states that "promotions shall be based on seniority, fitness and ability, and where fitness and ability being sufficient seniority shall prevail," covered the case. It, therefore, upheld the position of the carrier.—*Decision No. 687.*

Monthly Rate of Stationary

Engineers Includes Overtime

Stationary engineers on the Colorado & Southern are paid a monthly rate which has been subject to the increases of Decision No. 2 and decreases of Decision No. 147, but was established on Supplement No. 7 to Order No. 27 on a monthly rate obtained by multiplying a 12-hour working period by 365 and then dividing by 12. This rate was not changed when the men were placed on an eight-hour basis. The employees now contend that the present monthly rate should be considered as being on the basis of a 306-day year so that the men would be paid over-time on Sundays and holidays. The carrier's position, however, was that as the monthly rate is now established it is on a basis including work done on Sundays and holidays and that the change suggested would be equivalent to paying the men double time for Sunday and holiday work. The board denied the claim of the employees.—*Decision No. 717.*

Foremen Need Not Be Employed

for the Full Time Laborers Are at Work

A case was presented to the Labor Board with respect to the question of employing a coal chute foreman for a less number of hours and days than the laborers he supervised. Evidence shows that he was employed with a gang of laborers for 365 days a year and ten hours a day. On March 6, 1920, he was instructed to work only on week days and nine hours a day, the laborers continuing on the old schedule. The United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers contended that in Supplement No. 8 to General Order No. 27 no change in hours was authorized and that the foreman must be permitted to work the same number of hours as the men. The carrier contended that this provision of Supplement No. 8 was canceled by the National Agreement with the Brotherhood and that there is nothing in this agreement which requires the carriers to employ a man in excess of eight hours on regular week days, if his services are not required. The contention of the carrier was sustained.—*Decision No. 713.*

Basis of Monthly Rate for Track and Shop Laborers

An engine watchman was, on January 1, 1918, paid the rate of \$67.50 a month. On September 1, 1918, the effective date of Supplement No. 7 to General Order No. 27, an hourly rate of 38 3/4 cents was established and it remained in effect up to March 1, 1920, when it was changed to a monthly rate of \$145 a month, in accordance with Section a-12, Article V of agreement between the Director General of Railroads and the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers. This rate was increased to \$165.40 a month on May 1, 1920, the effective date of Decision No. 2 of the Labor Board, and was reduced July 1, 1921, to \$145 in accordance with Decision No. 147 of the Labor Board.

The employees contended that the watchman should have received a monthly rate of \$189.64, under Decision No. 2 of the Labor Board, on the claim that he worked 12 hours each night, 365 nights a year at straight-time for 10 hours 365 days a year, and two hours' overtime for 365 days plus 12 hours' overtime for 52 Sundays. The carrier maintained that the actual time put in by this employee and the amount allowed on the hourly basis from August 31, 1918, was slightly less than \$145 a month, and that when the national agreement of the maintenance of way employees, effective December 16, 1919, was received the employee was placed on a monthly rate of \$145, predicated on the average earnings on the hourly basis; that, effective with Decision No. 2 of the Labor Board, the position was increased to \$165.40 a month, and was again reduced to \$145 under the provisions of Decision No. 147 of the Labor Board.

The Labor Board decided that under Section a-12, Article V, of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers' agreement, the monthly rate should be predicated on the hours for which payment was allowed, when rated on the hourly basis.—*Decision No. 714.*

Foreign Railway News

Electrical Standardization in England

LONDON.

Owing to the inability of the companies which form the proposed Southern group of English railways, namely the London & South Western, the London, Brighton & South Coast and the South Eastern & Chatham to agree to some form of uniformity in future plans for the electrification of these lines, the Minister of Transport has appointed a committee under an independent chairman to consider this matter. The committee consists of nominees of the respective companies under the chairmanship of Sir Philip Nash. Other members include Sir Alexander B. W. Kennedy, formerly chairman of the Electrification of Railways Advisory Committee, Sir Philip Dawson, and Theodore Stevens, M. I. C. E., consulting electrical engineer.

Further Consolidations in England

A tentative plan for the consolidation of a number of smaller British railways with the Great Western, under the provisions of the British Railways Act, has been announced. The companies affected are the Cambrian, the Cardiff, the Rhymney, the Taff Vale and the Alexandra Docks & Railways. The proposal now goes to the stockholders for their approval. In general the plan provides for issuing to the holders of securities of the companies to be absorbed stocks and bonds of the Great Western of a character and yield similar to those held in the other companies. A novel provision in the proposals is to be submitted to the stockholders of three of the companies is the indemnity payment to the directors of the old companies to compensate them for the loss of their positions.

Sir Henry Thornton Tells of

Railway Conditions in Britain

Sir Henry W. Thornton, general manager of the Great Eastern (England), and formerly general superintendent of the Long Island, in a communication to the New York Herald says in part:

"The railway industry is uniformly in a bad position in almost every country, although I think in some respects we are better off in England than are the American roads, largely because whatever mistakes our government may have made they did not fall into the cardinal error of mixing politics with the working of the railways, and the administration of transportation in England during the war was left almost entirely to those who were suspected of some knowledge of the business. Railway rates and fares must generally be reduced if industry is to get on its legs again.

"No sane railway administrator takes any other position, but this cannot be brought about until working costs are reduced, which in turn depends to a large degree on wages. Materials in this country have already fallen considerably. Wages are moving downward, but, what is more important, a fine spirit permeates the relations between the railway trade unions and the railway companies.

"There has always been a struggle between the railway workers and the railway companies to force wages up on the one hand and reduce them on the other. Until there is born a spirit of mutual confidence in each other, a desire for fair play, sincerity in negotiation and the execution of agreements, and all those things which make for better relations, the problem of adjusting railway wages will be exceedingly difficult and in most cases the results will be unsatisfactory. It will be said that such conditions as I have described are Utopian and impossible of attainment, but in a large measure they have been attained in England, and I can see no reason why they should not be reached elsewhere. At any rate, until there is worked out a cycle of reduced cost of living, lower wages and less taxation the world is going to be in a very bad way."

Equipment and Supplies

Locomotives

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 50 Mikado type locomotives.

THE FLORIDA EAST COAST has ordered from the American Locomotive Company 7 Pacific type and 3, 6-wheel switching locomotives.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE was incorrectly reported in the *Railway Age* of March 4 (page 546), as inquiring for 20 locomotives.

Freight Cars

THE FLORIDA EAST COAST is inquiring for 10 caboose cars.

THE CHICAGO & NORTH WESTERN is inquiring for 2,700 freight cars of various types.

THE TENNESSEE COAL & IRON RAILROAD is inquiring for 150 ore dump cars of 70 tons capacity.

THE CHICAGO WEST PULLMAN & SOUTHERN is inquiring for from 15 to 50 car bodies of 50 tons capacity.

THE NORFOLK & WESTERN has renewed its inquiry for freight cars and is now inquiring for prices on from 2,000 to 4,000 all steel hopper cars of 70 tons capacity.

THE WESTMORELAND COAL COMPANY reported in the *Railway Age* of February 11 as inquiring for 100 cars, has ordered 100, 55-ton hopper cars from the Cambria Steel Company.

THE CHESAPEAKE & OHIO expects to send out inquiries in the immediate future for building 1,500 57½ ton steel bodies, with an option on 4,500 additional, as soon as drawings and specifications are ready.

THE ATLANTIC COAST LINE has ordered 450 steel underframes and superstructures from the Pressed Steel Car Company and 50 from the Chickasaw Shipbuilding Corporation. These are for box cars to be rebuilt in the railroad company's shops.

Passenger Cars

THE NORFOLK & WESTERN is inquiring for 7 dining cars.

THE BOSTON & MAINE is inquiring for 43 coaches, 12 smoking cars and 5 combination baggage and smoking cars all to be 70 ft. long, also for 4 combination baggage and mail cars, 61 ft. long, and 25 milk cars, 51 ft. long.

THE PENNSYLVANIA RAILROAD has authorized the purchase of 250 all steel cars as follows: 190 coaches, 35 combination passenger and baggage cars and 25 combined baggage and mail cars. Bids will be asked for at once, as cars are wanted for use this coming summer.

Iron and Steel

THE GREAT NORTHERN is inquiring for 1,000 tons of reinforcing bars.

THE NORTHERN PACIFIC has ordered 5,000 tons of rails from the Colorado Fuel & Iron Company.

THE ATCHAFALAYA, TOPEKA & SANTA FE has ordered 10,000 tons of rails from the Colorado Fuel & Iron Company.

THE UNION PACIFIC has ordered 180 tons of structural material for a freight shed at Los Angeles, Cal., from the Llewellyn Iron Works, Los Angeles.

THE UNION PACIFIC has ordered 1,500 tons of tie plates from the Colorado Fuel & Iron Company; 350 tons of track spikes from the Inland Steel Company and 200 tons of track bolts from the Kansas City Bolt & Nut Company.

THE MISSOURI PACIFIC has ordered 20,000 tons of 85 and 90 lb. steel rails allotted as follows: 10,000 tons from the Colorado Fuel & Iron Company; 5,000 tons from the Illinois Steel Company; and 5,000 tons from the Inland Steel Company.

Track Specialties

THE MISSOURI PACIFIC is inquiring for 14,000 angle bars for 90 lb. rails and 39,000 angle bars for 85 lb. rails.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS closed bids recently for low switch stands, split derails, guard rails, rigid spring and solid manganese frogs, switches and switch points, bids for which were submitted to W. J. Hiner, Cincinnati, Ohio, before 12 o'clock noon of March 6.

Miscellaneous

THE NEW YORK, NEW HAVEN & HARTFORD will receive bids until 12 o'clock noon, March 20, at New Haven, Conn., for approximately 300,000 net tons of high volatile R/M bituminous coal to be delivered at South Boston, Mass., between April 1, 1922, and April 1, 1923.

Signaling

THE NORTHERN PACIFIC is inquiring for automatic block signals for installation on 151 miles of single track and 53 of double track between Dilworth, Minn., and Mandan, N. D.

AT ALLEGRIPPUS, PA., on the steep grade west of Altoona, on the morning of February 15, about one o'clock, occurred an accident which might happen any day, on a four track railroad, but which in fact is exceedingly rare; the partial wrecking of two trains both moving, side by side, in the same direction. The reports indicate that no person was injured. Eastbound passenger train No. 16, the Iron City Express, was moving eastward on track No. 2, and a freight train, moving alongside on track No. 1, was suddenly stopped by the derailment of a box car. The derailed car fell towards the passenger train and several sleeping cars were scraped along the sides, a number of windows being broken. The car "London" was considerably damaged about the front end, the freight car having been wedged between the sleeper and a part of the freight train. No. 16 was delayed about two hours.



Crowds Trying to Enter Subway Station in Berlin During Strike

Supply Trade News

The Stowell Company, South Milwaukee, Wis., has moved its Chicago office from 509 Monadnock Block to 628 McCormick building. E. B. Hansen will continue as manager of the Chicago office.

Charles D. Watson has been elected vice-president of the Watson Engineering Company, Cleveland, Ohio, to succeed H. R. Hadlow, who has retired and R. L. Harding has been elected secretary to succeed W. P. Brown, who has also retired. Wilbur J. Watson will continue as president and S. F. Agnew will resume the position of treasurer, succeeding the late A. R. Warner.

William McClellan, president of the American Institute of Electrical Engineers, has announced the incorporation of the firm of McClellan & Junkersfeld, with temporary offices at 141 Broadway, New York. The work of the new organization will be on power plants, transmission systems, water power developments, electrification of railroads and general industrial and utility engineering and construction.

John Lambert, formerly president of the American Steel & Wire Company, died at Pasadena, Cal., of pneumonia, on March 6. Mr. Lambert was born at Lambertville, N. J., on January 12, 1847. After serving with the New Jersey cavalry in the Civil War, he came to Joliet, Ill., in 1867. In 1879, he began the manufacture of steel wire and after a series of mergers became president of the American Steel & Wire Company.

The Dresser-Minton Company, construction engineers, has been organized by F. J. C. Dresser and J. H. Minton, with headquarters in the Arcade building, Cleveland, Ohio. The company has been formed to engage in general building and contracting with special reference to railroad structures. Mr. Dresser has for the last 18 years been concerned with railroad work and was for a number of years with the Chicago & North Western in charge of terminal and bridge work. He was later manager for the contractor in general charge of the construction of engine and car shops for the Pennsylvania and the New York Central. Recently he served as district manager of the Cleveland district of the Austin Company. Mr. Minton was formerly senior assistant engineer in the office of the chief engineer of construction of the Pennsylvania Lines West, at Pittsburgh, Pennsylvania, and has been engaged in railroad construction work for the past 18 years.

The Whiting Corporation, Harvey, Ill., has established its own branch sales office in New York City at 136 Liberty street, having discontinued its agency agreement with the Wonham, Bates & Goode Trading Corporation, New York City, who formerly represented the Whiting corporation in the East. J. Ross Bates, now a vice-president of the Whiting Corp., is in charge of the new office and will be assisted in the New York territory by D. Polderman, Jr. In the New England states he will be assisted by R. C. Maley, who will open an office at Springfield, Mass. All of these men were formerly associated with the Wonham, Bates & Goode Trading Corporation. The Whiting corporation has opened a branch office in Indianapolis, Ind., 305 Merchants Bank building, in charge of S. E. Stout, formerly at the main office, in Harvey. Mr. Stout will cover southern Indiana and adjoining cities in Ohio and Kentucky. The corporation's Detroit office has been moved from Penobscot building to 206 Stahelin building, 3000 Grand River avenue.

Obituary

Otis H. Cutler, chairman of the board of directors of the American Shoe & Foundry Company, New York, died at Miami, Fla., on March 4.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates undertaking numerous improvements and betterments to its lines during the current year, among which are the construction of a new division office building, Harvey hotel and railway reading room at Newton, Kan., a new brick outbound freight house at Dallas, Tex., and extensive additions and improvements to the Harvey house at Gallup, N. M. The aggregated total set aside in the 1922 budget for stations and office buildings is \$1,047,919. New power plants will be constructed at San Bernardino, Cal., and Albuquerque, N. M., and hot-water boiler-washout systems will be installed at Cleburne, Tex., and Temple. The funds appropriated for shop buildings, engine houses, etc., amount to \$960,170, and for shop machinery and tools, \$735,901. Bridge renewals are estimated at \$1,519,203. Automatic signals estimated to cost approximately \$600,000 will be installed between Williamsfield, Ill., and Knox; Dumas, Mo., and Medill; Bucklin, Kan., and Ethel; Melvern, Kan., and Ridgerton; Lebo, Kan., and Emporia; Neva, Kan., and Cedar Point; Wagner, Kan., and Braddock; Walton, Kan., and Newton; Gamesville, Tex., and Ardmore, Okla.; Somerville, Tex., and Caldwell; and in the yards at LaJunta, Colo., Dillon, N. M., and Belen, N. M. In addition to the work already mentioned \$567,443 will be spent on the elimination of grade crossings and \$219,828 on water stations.

BASTROP & LAKE PROVIDENCE.—This company has been organized to construct a railroad from a point near Bastrop, La., eastward to the town of Mer Rouge, and from there to Point Pleasant, a distance of about 10 miles. Eventually the road will be extended to Lake Providence, an additional line of approximately 25 miles.

BOSTON & ALBANY.—This company will in the near future build a temporary passenger subway at Springfield, Mass., to cost approximately \$25,000. New bridges will be built at Webster, Mass., to cost approximately \$25,000, and at West Brookfield, to cost approximately \$50,000. Fender work to be done on the Chelsea creek drawbridge will cost in the neighborhood of \$15,000.

CHICAGO GREAT WESTERN.—This company which was noted in the *Railway Age* of January 28, page 303, as receiving bids for the construction of a steel coaling station at Chicago estimated to cost about \$23,000 has awarded the contract for this work to the Roberts & Schaefer Company, Chicago.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for several extensions to its fire protection pipe lines at its tie plant at Little Rock, Ark.

Dodge City & Cimarron Valley.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from a connection with the existing line at or near Satanta, Kan., in a generally northwesterly and westerly direction through Haskell, Grant and Stanton counties, 55 miles. The line is to be leased to and operated by the Atchison, Topeka & Santa Fe.

GREAT NORTHERN.—This company is receiving bids for the construction of a 500-ton reinforced concrete coaling station at Minneapolis, Minn.

ILLINOIS CENTRAL.—This company has been requested by the city of Arcola, Miss., through a petition to the Mississippi Railroad Commission to construct a new station at that point.

MISSOURI PACIFIC.—This company will receive bids until March 13, for the construction of a frame and steel combination freight and passenger station, 20 ft. by 71 ft. at Jerome, Ark.

MOBILE & OMAHA.—This company, and the St. Louis-San Francisco, have been asked by the Mississippi Railroad Commission to construct sheds over the platforms of their union passenger station at Tampa, Miss.

NATIONAL GREAT WESTERN & ST. LOUIS.—This company, the St. Louis-San Francisco, the Southern, the Union, the Louisville & Nashville, and the City of Memphis, Tenn., will construct a re-

inforced concrete subway under the tracks crossing South Bellevue boulevard in that city. This work is estimated to cost \$300,000, of which 80 per cent will be paid by the railroads and 20 per cent by the city. Plans are now being made and work is expected to be started by summer.

OSAGE.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a line from Foraker, (Okla.), into the Osage County oil fields, a distance of 10.44 miles.

PHILADELPHIA & READING.—This company is rebuilding its draw-ridge, including additional interlocking installations, at Darby Creek, Pa. The company is also rebuilding 11 bridges in the neighborhood of Harrisburg, Pa., an overhead bridge at Mill Creek Jct., Pa., a drawbridge at Atlantic City, N. J., and a bridge at Chester Springs, Pa. The company is rebuilding its coal yard at Twenty-third and Arch streets, Philadelphia, and is eliminating 5 grade crossings between Swatara, Pa., and Hummelstown and one at Douglassville, Pa. A new passenger station at Swatara and a passenger and freight station at Coatesville are under contract. The company is also installing new refrigerating machinery at Reading Terminal Market, Philadelphia.

ST. LOUIS-SAN FRANCISCO.—This company, which was noted in the *Railway Age* of February 25, page 502, as contemplating the construction of a second main track between Spring Hill, Kansas, and Paola, a distance of approximately 13 miles, and between Windsor Springs, Missouri, and Valley Park, a distance of about 5 miles, has awarded a contract for the former to the Walsh Construction Company, Davenport, Iowa, and for the latter work to grant Smith & Company, St. Paul, Minnesota.—this to further include grade reduction work at Garnsey, Missouri, and Crocker and the construction of $3\frac{1}{2}$ miles of second track at Swedenborg, Missouri. The same company will reconstruct with company forces part of its freight house at Henryetta, Oklahoma, recently destroyed by fire.

ST. LOUIS-SOUTHWESTERN.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of two 100-ton, electrically operated, reinforced concrete locomotive coaling plants—one at Camden, Ark., and the other at Plano, Tex.

STATEN ISLAND RAPID TRANSIT.—This company has ordered from the American Car & Foundry Company, Wilmington, Delaware, a wooden, side-wheel terry boat, 143 ft. long with a beam of 34 ft. and a draft of 13 ft. and with a displacement of 618 gross tons. This boat, which will be placed in service between Tottenville, Staten Island, and Perth Amboy, N. J., will be completed in five or six months. The company has recently made some improvements in its passenger terminal at Perth Amboy, including the provision of separate runways for passengers and vehicles and the enlargement of the waiting room.

TOLEDO, ST. LOUIS & WESTERN.—This company has awarded a contract to the Ogle Construction Company, Chicago, for the construction of a 300-ton coaling station at East St. Louis, Ill.



By Tom Kristine Loren

Collision Between Winnipeg Flyer and a Snow Plow

Railway Financial News

ARKANSAS CENTRAL.—Taken Over.—This road, which has been operated by the Missouri Pacific for some time, was absorbed by that company on March 1, and will henceforth be known as the Paris district of the Central division. The Arkansas Central's line extended between Fort Smith, Ark., and Paris, 46 miles.

ATLANTA, BIRMINGHAM & ATLANTIC.—Ask Government Loan.—The receiver has applied to the Interstate Commerce Commission for a government loan of \$529,466 for 15 years.

BALTIMORE & OHIO.—New Directors.—Frederick H. Rawson, of Chicago, and Joseph E. Widener, of Philadelphia, have been elected directors to succeed John G. Shedd and W. Averill Harriman, who have resigned in compliance with the Interstate Commerce Commission's ruling on interlocking directorates.

BIRMINGHAM & NORTH WESTERN.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$400,000 of first mortgage bonds for the purpose of refunding or retiring an equal amount of first mortgage bonds maturing March 1, 1922.

BUFFALO, ROCHESTER & PITTSBURGH.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$8,351,000 of consolidated mortgage 4½ per cent bonds which are not to be sold at present but are to be used to refund existing obligations during 1922 and reimburse the treasury for expenditures. A part of these bonds had been nominally issued before the effective date of the law requiring the authority of the commission and it is proposed to issue an additional amount of \$4,270,000, making the total \$8,351,000.

CANADIAN NATIONAL RAILWAYS.—Notes Offered.—A syndicate headed by Dillon, Read & Co., is offering an issue of \$11,000,000 Canadian Northern three-year 5 per cent notes at 99½ to yield about 5.15 per cent. The notes are a direct obligation of the Canadian Northern Railway Company forming part of the Canadian National Railway system, which is owned by the Canadian Government.

CHICAGO JUNCTION.—Six Months' Guaranty Determined.—The Interstate Commerce Commission has issued a final certificate for the amount of this company's guaranty for the six months' period of 1920 amounting to \$1,563,319. Part of this has been paid and the balance due is \$315,319.

CHICAGO, ROCK ISLAND & PACIFIC.—Court Hearing on Clause in Mortgage.—The Central Union Trust Company and David R. Francis, trustee for this company's first aid refunding mortgage, have been asked to appear before Judge Carpenter in the Federal Court at Chicago on March 11 to show cause why a clause preventing junior encumbrances on the company's property should not be removed from the indenture of that mortgage. The outstanding bonds amount to \$94,941,100. Holders of about \$15,000,000 worth have already assented to removing the clause.

COLUMBUS & GREENVILLE.—Asks Authority to Abandon Lines.—The receiver has applied to the Interstate Commerce Commission for authority to abandon two branches: from Stoneville to Percy, Miss., 23.2 miles, and from Itta Benc to Webb, Mississippi, 34.3 miles.

DENVER & RIO GRANDE.—Bond Deposit Extension.—The Hammond committee, representing holders of the first and refunding 5 per cent bonds and certificates of deposit have extended to March 31, 1922, the time in which bonds may be deposited with the Bankers Trust Company and sub-depositaries signifying approval of the Western Pacific's reorganization plan. The Perkins committee has announced that holders of the first and refunding bonds who have dissented from the plan may deposit their bonds up to March 31 with the Farmers' Loan and Trust Company. The Sutro committee representing the 7 per cent cumulative ad-

justment mortgage bonds has announced that the time of deposit with the American Exchange National Bank has been extended to March 31.

DETROIT, TOLEDO & IRONTON.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$451,000 of first mortgage, 50 year, 5 per cent gold bonds to be sold for cash at not less than par and the proceeds to be used in reimbursement of expenditures for additions and betterments.

ERIE.—Asks Authority to Sell Bonds.—This company has applied to the Interstate Commerce Commission for authority to sell \$5,000,000 of Erie Railway consolidated mortgage 7 per cent extended bonds due September 1, 1920, of which it expects to sell about half at this time and to pledge the balance pending the sale as security for short term notes. The proceeds for the sale are to discharge a like amount of three-year 6 per cent secured gold notes maturing April 1.

MINNEAPOLIS & ST. LOUIS.—Ask Government Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$2,000,000 from the revolving fund for a period of five years' duration to enable it to meet maturities and make certain improvements.

MISSOURI & NORTH ARKANSAS.—To Be Sold.—The date for the sale of this road has been set for April 10.

MISSOURI PACIFIC.—Takes Over Small Road.—See Arkansas Central.

NEW YORK CENTRAL.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$60,000,000 refunding and improvement mortgage 5 per cent bonds. Of the proceeds \$48,055,000 is to be used to pay indebtedness for additions and betterments, or to reimburse the treasury for expenditures and \$11,945,000 is to pay off bonds of subsidiary companies due July 1. The indebtedness for additions and betterments includes several notes to the director general of railroads. The company has been negotiating with J. P. Morgan & Co., for the sale of the bonds and expects to sell them at not less than 90.

NEW YORK, NEW HAVEN & HARTFORD.—Ask Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue first and refunding mortgage bonds in an amount equal to whatever loan may be certified by the commission and applied toward the reduction of the European loan debentures which mature on April 1. The bonds are to be deposited with the Secretary of the Treasury as collateral for the loan. The company had previously applied to the commission for a loan of \$31,000,000, sufficient to pay off the European debentures, but it has also been conducting negotiations with the holders on a plan for extending them.

NORTHERN PACIFIC.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a portion of its branch line in Bayfield County, Wis., between Coda and Washburn, 24 miles. The company had applied for authority to abandon the entire branch from Iron River to Washburn, 33.78 miles.

SEABOARD AIR LINE.—Asks Government Loan.—This company has applied to the Interstate Commerce Commission for a loan for 15 years of a certain sum or sums of money to be determined in detail when, as and if approved by the commission, to the extent necessary to enable it to properly serve the public. The application gives a list of items of maturing indebtedness and additions and betterments amounting to \$14,000,000 and the company desires loans to meet such of these as may be approved by the Interstate Commerce Commission.

UNION PACIFIC.—Authorized to Acquire Control.—The Interstate Commerce Commission has authorized the acquisition of control of the railroad operated by the Saratoga & Encampment Railroad Company by an operating agreement with option to purchase.

More Equipment Trusts Sold

The director general of railroads announced on March 6 that he had confirmed additional sales, at par plus accrued interest, of

railroad equipment trust certificates held by the government, as follows:

To Alfred Borden and National City Company, New York
 Lake Erie & Western, 1923 to 1935, incl. \$561,600
 Spokane, Portland & Seattle, 1923 to 1935, incl. 507,000

The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$220,356,800.

Treasury Payments to Railroads

The Treasury Department has issued a statement showing the total payments made to railroads under the Transportation Act up to February 28 as follows:

(a) Under Section 204, for reimbursement of deficits during federal control.	\$1,374,528.58
(b) Under Section 209:	
(1) To carriers to which final payment of the guaranty has been made under paragraph (c), including previous advances under paragraphs (h) and (i).	5,098,541.23
(2) For advances under paragraphs (h) and (i) to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission.	260,510,874.00
(c) Under Section 213:	
(1) For partial payments in respect to the guaranty provided in Section 209.	165,320,275.05
(2) For partial payments in respect to the reimbursement for deficits during the period of federal control provided in Section 204.	1,815,841.15
(d) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided.	271,154,217.00
Total.	\$705,274,277.01

The statement also shows that loans to the amount of \$47,552,470 from the revolving fund have been repaid by 19 companies.

Dividends Declared

Lackawanna Railroad of New Jersey.—1 per cent, quarterly, payable April 1 to holders of record March 8.
 Lehigh Valley.—Common, 1 3/4 per cent quarterly; preferred, 2 1/2 per cent, quarterly; both payable April 1, to holders of record March 11.

New York, Lackawanna & Western.—1 1/4 per cent, quarterly, payable April 1 to holders of record March 14.

St. Joseph, South Bend & Southern.—Common, 1 per cent, semi-annually; preferred, 2 1/2 per cent, semi-annually; both payable March 15 to holders of record March 11.

Southern Railway (Mobile & Ohio stock transfer certificates).—\$2.00, semi-annually, payable April 1, to holders of record March 15.

Warren Railroad.—3 1/2 per cent, semi-annually, payable April 15 to holders of record April 5.

Western Pacific.—Preferred, 1 1/2 per cent, quarterly, payable April 1, to holders of record March 20.

Trend of Railway Stock and Bond Prices

	March 7	Last week	Last year
Average price of 20 representative railway stocks, close of business.	59.66	60.28	55.72
Average price of 20 representative railway bonds, close of business.	82.31	82.57	74.36

Railway Officers

Operating

T. C. Herbert, division engineer of the St. Louis division of the Pennsylvania, with headquarters at Terre Haute, Ind., has been promoted to superintendent of the Peoria division, with headquarters at Decatur, Ill.

Traffic

J. A. McGill has been appointed general agent of the Canadian Pacific, with headquarters at Ottawa, Ont.

Frank H. Standifer, traveling freight agent of the Louisville & Nashville, with headquarters at Sheffield, Ala., has been promoted to general agent, with the same headquarters.

Mechanical

C. M. Starke, assistant master mechanic of the Illinois Central, with headquarters at Memphis, Tenn, has been promoted to master mechanic with headquarters at Centralia, Ill., succeeding J. W. Branton, deceased.

George E. Lund has been appointed master mechanic of the Mahoning division of the Erie with headquarters at Youngstown, Ohio. Walter L. Barr has been appointed master mechanic of the Kent division.

Special

G. S. Giles has been appointed fire protection engineer of the Union Pacific, with headquarters at Omaha, Neb.

John A. McGrew, superintendent of maintenance of the Delaware & Hudson, has been appointed general superintendent of equipment and way and his former position has been abolished. Mr. McGrew will continue in charge of all maintenance work, both of equipment and way. Mr. McGrew was born June 8, 1873, at Bridgewater, Ohio, and was graduated in civil engineering from Ohio State University in 1895. Upon his graduation he became assistant superintendent of construction of the Columbus & Westernville Electric and, in 1896, entered the service of the Pennsylvania, in its engineering department, at Wellsville, Ohio. From 1899 to 1901 he was assistant engineer, maintenance of way, at Logansport, Ind., and from 1901 to 1903 he was engineer, maintenance of way, at the same point. He was then transferred to Pittsburgh in the same capacity. For six months in 1904 he was special agent for the general manager of the Chicago, Rock Island & Pacific. Then, until 1909, he was a consulting engineer and contractor at Columbus, Ohio, and, latterly, president of the National Engineering Company. In September, 1909, he went to the Delaware & Hudson as inspector of maintenance of its lines, allied properties and street railways. In 1910, he was appointed superintendent of the Saratoga and Champlain divisions with headquarters at Albany, N. Y. From July, 1917, to February 21, 1919, Mr. McGrew was in military service, first as a consulting quartermaster in the construction division and then as a major in the railway division of the American Expeditionary Forces. In April, 1920, he returned to the Delaware & Hudson as superintendent and was appointed superintendent of maintenance on April 1, 1921, which position he held until February 24, 1922, when his promotion became effective.

Obituary

Joseph Wood, formerly first vice-president of the Pennsylvania, Lines West, and a director of the Pennsylvania railroad, died at his home in Pittsburgh on March 4 as the result of a fall on an icy pavement which he sustained several weeks ago.

A. T. Hemingway, assistant secretary of the Ouachita & North Western, secretary of the Leesville, Slagle & Eastern, and treasurer of the Oakdale & Gulf, died in Kansas City, Mo., on February 24, from the effects of influenza and pneumonia, after a brief illness.



German Railroad Strikebreakers

EDITORIAL

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Railway Age

EDITORIAL

DAILY EDITION

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The attendance at the March stated meeting of the Signal section yesterday was much heavier than was anticipated two or three weeks ago. At that time

The Signal Section Attendance

there was a feeling that the meetings of the signal section and also of the American Railway Engineering Association would suffer in attendance because the Interstate Commerce Commission had set March 15 as the latest date on which the railroad's cited in its proposed train control order could show cause why the order should not be made effective, and it was expected that the officers attending these meetings would have to be in Washington for the hearing. When the commission extended the date until March 20, this fear was removed and a large turnout resulted.

The electric wiring of interlocking plants has been done in widely different ways on various railroads. There-

A Guide For Interlocking Wiring

fore, the Committee on Power Interlocking is to be commended for the preparation of specifications for this work. The diversity of construction is indicated by the recent recommendations of three roads interested in a certain interlocking reconstruction. One road recommended underground cables in conduit, another preferred trunking on top of the ground as cheaper, while the third road wanted a combination of trunking and cables placed on cable posts. A certain road is now trying paper-insulated, lead-covered cables for control circuits at power interlockings,

while recent information from Australia, where this construction is used extensively, indicates that it is not considered a success. This committee has an opportunity to point out possible economies to the railroads and the new specifications may be considered as an excellent foundation for the wiring of interlockers.

The new committee on Highway Crossing Protection appointed at the meeting of the Signal section last June has an opportunity to save the rail-

roads large sums of money and prevent extensive loss of life. The report of the Interstate Commerce Commission covering railroad acci-

dents in 1920 states that 1,790 persons were killed at highway grade crossings as compared with 584 persons killed in all collisions, derailments and locomotive accidents. The installation and maintenance of automatic highway crossing bells, wig-wags and similar devices have been handled by the signal departments of the railroads for years. Therefore, it would seem that this new committee will fill a long-felt want in the ranks of the committees of the Signal section. The committee has done well to co-operate at once with the Committee on the Prevention of Accidents at Highway Grade Crossings and Trespassing of the A. R. A., adopting its standard signs for use for fixed approach warning signs. It has also produced a specification for the banner to be used on automatic movable highway crossing signals. The committee has made a good start and railroad officers concerned should give it full assistance.

Members who have attended conventions regularly during the last ten years will note the absence this year of

The Committee on Conservation

any report by the Committee on Conservation of Natural Resources. This committee went out of existence with the presentation of its report at the last convention, it being

the decision of the directors that the purpose for which the committee was organized had been fulfilled. This committee was created in 1910 in conformity with a growing appreciation on the part of the American people of the value of their natural resources, thanks to the impetus given this movement by the late President Roosevelt. Just what part the railroads could play in this scheme for natural conservation was, of course, problematical. In fact, it may be said that the answering of this question was the prime responsibility with which this committee was charged upon its formation. With each succeeding report of the committee at the annual conventions there came a general realization that conservation in so far as it concerned the railroads implied the practice of simple economy in the use of all things required for the construction and operation of the railroads. Obviously, this is not the responsibility of one committee, but of all those having anything to do with the business of running a railroad; for as each member of the association

don't remember. One word "economic" occupies an important place in paragraph 11 of the constitution, which states the object for which the association was organized.

A Good Time to Start Work

MANy INDICATIONS POINT TO THE present as the most suitable time for carrying out construction work since before the world war. As an example of the present trend of developments, slightly more than a month ago a consulting engineer representing a certain city and two large railroads requested proposals for the construction of a 1,500-ft. reinforced concrete viaduct over 23 tracks in the municipality in question. He had, at the completion of preliminary plans last year, estimated the cost of this project at \$220,000. Three weeks ago, however, he revised his former estimates to conform to the changed conditions in the labor and material markets, and informed his clients that the cost of the structure at this time should not exceed \$140,000. When 20 bids were opened on the first of this month he was surprised to find an array of figures ranging from \$92,732.50 to \$211,000, with the low bidder claiming that he was quoting at practically pre-war prices. There has been a notable reduction in the cost of many materials. Then labor conditions generally have improved in most localities. But the one great factor contributing to the lowering of the high cost of construction has been the prevailing "cutthroat" competition among contractors, many of whom now bid for work at cost in order to maintain their organizations. In fact, the writer was recently informed by one contractor that exactly \$7.50 was made on the construction of a depot 1,000 miles from his headquarters, this sum to be divided among his partners and the overhead expense of an office force. Work has been scarce and the railroads have been flooded with requests for opportunities to bid on even small jobs. Why should not the roads take advantage of the present opportunity to start some of their long-deferred work, especially since it is the general belief that prices of materials will again rise and a few months will see an end of low bidding?

Reasons for Optimism

IT NOW REMAINS THE ALMOST entire absence of construction activities on the part of the railways during the last two or three years, the statement of an engineer of over 40 years' experience on one of the leading roads of the country a few days ago, that although he had seen many declines and recoveries in railway construction, he had never regarded the future as optimistically as at present, so refreshing and encouraging to the members of the engineering association as they gather for their convention. To one who recalls the activities of 1905 and 1906 with their widespread programs of extension and improvement, and who contrasts this condition with that of the more recent past, a feeling of redudity is excusable. However, there are now more developments in support of the statement referred to above than is generally realized. Even more encouraging is the common understanding that the work authorized is only the forerunner of even larger programs which are advancing to the point of actual inauguration. There is much justification for the opinion that by the middle of the summer we shall be in the midst of an active construction season, and that the future of putting out a few of the projects that already have been announced and without any further delay or interruption, we will refer to some of the more important ones which have been authorized in recent weeks.

The first of the many projects now in the work on construction is so important that public comment has already been made. It is the intention to construct over 500 miles of new lines this year and contracts have already

been let for at least half of this mileage. Among the projects already authorized are an extension of 55 miles on the Atchison, Topeka & Santa Fe from Saranta, Kan., west, and a line 40 miles long from Pawhuska, Okla., to Owen, which are understood to be the first of several projects which this road has in contemplation. The Dallas-Terrell, a Texas road, has awarded a contract for the construction of 34 miles of line; the Portland, Astoria & Eastern is now building a 32-mile extension at a cost of \$2,600,000; the Chicago, Milwaukee & Gary (Chicago, Milwaukee & St. Paul) will build 29 miles of line between Joliet and Gary at a cost of \$2,700,000; the Minarets & Western has let a contract for 55 miles of new line to cost \$2,500,000; the Kansas & Oklahoma Southern has been authorized by the Interstate Commerce Commission to build 71 miles and the New Holland, Higgsport & Mount Vernon has received permission from the same source to build 35 miles of line.

With reference to second track, the Santa Fe has announced that it will reduce grades and provide an additional track between Yampai, Ariz., and Griffith, 75 miles; the Great Northern will build 47 miles of second track in Washington and elsewhere; the St. Louis-San Francisco has awarded contracts for 20 miles; the Chicago & Alton has started work on 11 miles north of Alton, Ill., which is estimated to cost \$362,000, and the Illinois Central has appropriated \$2,000,000 for the construction of a third track, the reduction of grades and other improvements between Matteson, Ill., and Kankakee.

In so far as terminal facilities are concerned, the Pere Marquette has appropriated \$1,400,000 for the construction of locomotive shops at Grand Rapids, Mich.; the Missouri, Kansas & Texas has awarded contracts for the construction of a new gravity classification yard and shops at Denison, Tex., at an estimated cost of \$3,000,000; the Santa Fe has undertaken the construction of additions to its shops at San Bernardino, Cal., estimated to cost \$224,000; the Erie has awarded a contract for a large pier on the Hudson river at Weehawken, N. J., and the Canadian Pacific has announced its intention of proceeding with the construction of a large ocean terminal on Burrard Inlet, Vancouver.

Among miscellaneous projects may be noted the Canadian Pacific's addition to its Hotel Chateau Frontenac, Quebec, for which \$3,500,000 has been appropriated; the Santa Fe's enlargement of its Alvarado hotel at Albuquerque, which is estimated to cost \$300,000, and a new icing station for the Belt Railway of Chicago, which it has announced will cost \$350,000. The New York Central has awarded a contract for the elimination of grades through North Tonawanda, N. Y., at an estimated cost of \$500,000; the Illinois Central is working on plans for the immediate reconstruction of its bridge across the Ohio river at Cairo, for which \$8,500,000 has been set aside, while the New York Central is advertised for bids for the construction of a high bridge over the Hudson river below Albany, N. Y. The Delaware, Lackawanna & Western has requested manufacturers to furnish estimates of the cost of electrifying its lines near Scranton, Pa., which will cost about \$5,000,000.

In this summary no attempt has been made to present a complete list of the larger projects which have been authorized or those which are in contemplation but concerning which no specific announcement has yet been made, or to include the many smaller projects, such as shops, yard extensions, coaling stations, water treating plants, etc. The list enumerated is, however, sufficient to demonstrate conclusively that the railways are viewing the future with more optimism and are availing themselves of the first opportunity to improve and expand their lines in a manner which will enable them to cope with the next surge in traffic.



C. H. Niemeyer, acting engineer maintenance of way of the Central Pennsylvania division of the Eastern Region of the Pennsylvania, with headquarters at Williamsport, Pa., died on March 4 from an attack of appendicitis.

* * *

The annual meeting of the National Railway Appliances Association will be held in the restaurant of the Coliseum at 11 o'clock this morning for the election of officers and the transaction of such other business as should come before this meeting.

* * *

L. A. Downs, president of the American Railway Engineering Association, was host to the members of the Board of Direction, the Committee on Arrangements and past presidents, a total of 25, at a dinner at the Chicago Athletic Club at 7 o'clock last evening.

* * *

Delegates of the various railway sections of the American Association of Engineers held a business meeting in the Green room of the Congress hotel yesterday to discuss administrative matters of the organization. The conference was concerned primarily with ways and means of developing a more closely knit organization of the railway members of the association.

* * *

C. Y. Tu, a representative of the Chinese Government Railways, who is in this country making a study of railway signal apparatus for his government, attended the Signal section meeting Monday. Mr. Tu has been accepted as a member of the Signal section and intends to follow up the activities of this association.

* * *

From the middle of the Pacific to Chicago for the primary purpose of attending the convention and the N. R. A. A. exhibit is the interesting thing about W. D. Cleveland, Honolulu, unless perchance it is the additional fact that an absence of seven years from the convention has but made him all the more intent upon getting here before another year passes by. Mr. Cleveland is signal supervisor of the Oahu Railway & Land Company, a Class I road of 114 miles, operating between Honolulu and Kuku on the Island of Oahu.

* * *

The annual dinner of the American Railway Engineering Association will be held in the Gold Room of the Congress Hotel tomorrow evening. The speakers will include General R. C. Marshall, Jr., general manager of the Associated General Contractors of America, Washington, D. C., and formerly chief of the construction division of the United States Army; Hon. James A. Mulligan, K. C., Sudbury, Ontario,

and Gus W. Dyer, professor of economics at Vanderbilt University, Nashville, Tenn.

* * *

William John Jackson, division engineer of the Minnesota division of the Chicago & North Western, with headquarters at Winona, Minn., died on March 13 from pneumonia. Mr. Jackson was born at Chicago, Ill., on January 7, 1873, and was educated at the University of Illinois. He began engineering work with the Chicago & Northwestern as a tapeman on April 1, 1899, and served as rodman, instrumentman and assistant engineer until he was appointed acting division engineer of the Minnesota and Dakota division on May 15, 1909. He was promoted to acting division engineer of the Ashland division on April 1, 1912, and division engineer of the Madison division on January 11, 1913, being transferred to the Minnesota and Dakota division on May 12, 1913, where he remained until his death.

The A. R. E. A. Program

The twenty-third annual convention of the American Railway Engineering Association will open in the Florentine room this morning. The program for the three days is as follows, morning sessions extending from 9 to 12:30 and afternoon sessions from 2 to 5:30.

First Day—Tuesday, March 14

President's Address.	
Reports of Secretary and Treasurer.	
Reports of Standing and Special Committees:	
XXIII. Shops and Locomotive Terminals.....	Bulletin 241
XIV. Yards and Terminals.....	Bulletin 239
XXII. Economics of Railway Labor.....	Bulletin 243
II. Ballast	Bulletin 239
XV. Iron and Steel Structures.....	Bulletin 240
Special. Standardization	Bulletin 240
X. Signals and interlocking.....	Bulletin 240
III. Ties	Bulletin 240
Special. Stresses in Railroad Track.....	Bulletin 241

Second Day—Wednesday, March 15

V. Track	Bulletin 243
XXIII. Shops and Locomotive Terminals.....	Bulletin 241
I. Roadway	Bulletin 241
XVI. Economics of Railway Location.....	Bulletin 241
XVIII. Electricity	Bulletins 239, 241
XI. Records and Accounts.....	Bulletin 242
IX. Signs, Fences and Crossings.....	Bulletin 242
XII. Water Service	Bulletin 242
XX. Uniform General Contract Forms.....	Bulletin 242
Annual Dinner at 6:30 P. M. (Gold Room, Congress Hotel)	

Third Day—Thursday, March 16

VIII. Masonry	Bulletin 242
IV. Rail	Bulletin 243
VII. Wooden Bridges and Trestles.....	Bulletin 243
XXI. Economics of Railway Operation.....	Bulletin 243
VI. Buildings	Bulletin 245
XVII. Wood Preservation	Bulletin 245
XII. Rules and Organization.....	Bulletin 245
Memorial Meeting—John Findley Wallace (Bulletin 244).	
New Business.	
Election and Installation of Officers.	
Adjournment.	

Signal Section Program

The following reports will come up for consideration at the meeting of the Signal section at the Drake today:

Committee II—Mechanical Interlocking.
Committee XIX—Railway Economics.
Committee XII—Contracts.
Committee XIII—Electrical Testing.
Committee XV—Valuation.
Committee XVIII—D. C. Track Circuits.



2. R. E. A. Board of Direction in Session Yesterday

The Association's Opportunity for Service

New Conditions in the Railway Field Offer Larger Responsibilities
and Greater Possibilities for Organized Work

WITHIN THE LAST FEW YEARS a marked tendency towards co-ordination of activities has been evident among the organizations in the railway field. This has been evidenced by the amalgamation of a number of associations with the American Railway Association. In the engineering field it has appeared in the form of a co-operative arrangement. The motive prompting this development has been the desire to eliminate duplication of effort and to promote unified action in efforts to increase efficiency of railway operation. Becoming a part of a larger organization interested in all branches of railway operation has tended to stimulate the associations to greater activity along broader lines. This tendency has been particularly marked in the American Railway Engineering Association, for of late it has given more attention to the broader phases of engineering in transportation than ever before. In the first of the two papers which follow, R. H. Nishton, president of the American Railway Association, points out the responsibility which the American Railway Engineering Association (the Engineering Division of the American Railway Association) bears to the railway industry, while in the second paper, L. A. Downs, president of the engineering association, touches on some of the work which the association is now doing in this direction.

What the Association Can Do

By R. H. NISHTON

President, American Railway Association

The period of the world war and the boom which followed was an orgy of spending, much of it necessary, some of it unnecessary. In a way it was a draft made upon the future earning of our country, which, like all other drafts, has to be paid, and the time of payment is now here or past due. Hence the insistence and appeal of the "bal" which has gone out for greater thrift, greater efficiency and greater economy in all lines. Thrift in business, and especially in large business, calls particularly

for the knowledge and training of the engineer, and this was never more so than at the present time. Especially is this true of the engineer whose specialty is in transportation problems.

The costs of transportation as represented in charges for that service are so widely distributed that it is perfectly natural that there is a great or greater interest on the part of the public generally as to whether the railroads are managed economically and efficiently than in other lines of business. This thought has impressed itself upon Congress, as is indicated in the legislation enacted to provide the means under which the railroad corporations were to take over their properties at the end of the period of federal control, which legislation placed upon the carriers the express duty of operating their properties in an honest, efficient and economical manner, and placed upon the Interstate Commerce Commission the necessity of considering this question in fixing the measure of return.

There is no other business so subject to publicity and scrutiny as that of the railroads. This is nothing new, for it has existed for a very considerable number of years. The railroad business, the manufacture of transportation, is an industry by itself, and there are no methods of comparison with other industries that are conclusive. The records made by the railways in safety, in economy and in efficiency have been a continuously progressive movement and the engineer has had a very large part, both individually and through associations such as the American Railway Engineering Association, in the development of this forward movement.

The individual railroads have always striven for the greatest economy of operation. That must be perfectly patent to the average business man from the mere appreciation of the fact that, regardless of their public functions, the railroads are private property, supported and dependent upon private capital, and must therefore show earning capacity. This requires at least the same measure of economy and efficiency as is required of other private

business also engaged in the respectable project of making money for its owners, and of the exercise of courage, initiative and research continually to bring about conditions that will produce greater economies.

The railroads of this country really anticipated the specific obligation which has been laid upon them by the Transportation Act of 1920 back in the early eighties, because it was appreciated many years before the enactment of the present law that the day would come when the railroads of this country could no longer be handled solely as individual units of private property. Arrangements and plans were then made for co-operative effort along lines that were productive of better service, greater efficiency and more economy. The foundation underlying the establishment of the American Railway Association, in the first place, and of all the various associations of men skilled in the different problems entering into transportation has been the recognized necessity for better methods, greater economies, larger efficiency and a better service to the public. The tendency for the last two or three years has been to a further co-ordination of all of these various activities centering through one channel, the American Railway Association, which is now operated really as a divisional organization, having in mind the co-ordination of the efforts of all these various activities in the one direction—economy, efficiency, service.

It has often been said that one defect of committee work is that it requires so much compromise as never to secure the best thought of all members of the committee in the long run, but merely an average. Admitting the partial truth of this statement, the experience of the reorganized American Railway Association thus far would seem to indicate quite clearly a very beneficial result to the railroads. While the standard practices which have been recommended (and this applies particularly to the engineering divisions) may not always have embodied what was considered the best thought on the subject on each individual railroad, it has embodied what was found by the majority action of the various divisions to be the best practice in each case. The recommendation of the association, and it must be understood that the power of the association goes only to recommendation (which, however, means in practically all cases adoption in some form), has resulted in the utilization in many cases of methods and practices which individual railroads, left to their own initiative and experiment, would perhaps have not been able to adopt in the first instance.

The work of the reorganized American Railway Association has only just begun. It is to be expected that it will develop, and develop very rapidly, in the near future. It is perfectly patent that even without the requirement of the statute, the public attitude toward the railroads would have required them so to co-ordinate their efforts in many features of operation and management as to reduce waste and to produce the greatest economy and efficiency. It is quite apparent from the beginning made that there is plenty of room in which yet to turn and a multitude of opportunities for the engineering profession. Much as that profession is already specialized, it is probably true that greater specialization is still possible and advisable, particularly with respect to railroads.

In this rather short sketch of the situation facing the railroads, and the manner in which the roads individually are meeting it, I have endeavored to place before you the important part that the American Railway Engineering Association and the Engineering Division of the American Railway Association have had in the development that has taken place on these lines in the past, and to indicate as my opinion that there never was a period where there were greater opportunities for constructive service in the broader phases of engineering and trans-

portation than the present and the period that lays immediately ahead of this nation.

What the Association Is Doing

By L. A. Downs

President, American Railway Engineering Association

The American Railway Engineering Association, embracing within its membership as it does the leading engineers of the principal railways of the United States and Canada, has an unusual opportunity for service to the railways of this country. Through the personnel of its committees all the varied conditions of the country are represented, and a wide range of information is collected, dissected, digested and distributed for the benefit of all railways.

In addition to its efforts in the direction of distinctly engineering problems connected with the location, maintenance and operation of railways, it has in recent years taken up the study of some problems confronting railway owners to which engineering principles and knowledge can be applied to advantage.

Undoubtedly the question of the economical operation of railways is of more urgent importance at present than at any time in their history. The very existence of many properties is at stake and is dependent on the solution of some of the problems confronting railway managers today.

Among these there can be little doubt that the foremost is the labor question in its widest sense. For the purpose of studying some phases of this question the association has actively at work two committees, one on the Economics of Railway Labor, and another on the Economics of Railway Operation. This latter committee is giving very careful study to such subjects as Methods for Increasing the Efficiency of Employees, Methods for Increasing the Traffic of Railways, and the Effect of Speed of Trains on Cost of Operation. Other committees, such as those on "Yards and Terminals" and "Shops and Locomotive Terminals," are giving very careful study to the problem of producing plants which will facilitate the use of equipment in good order and reduce delay in restoring equipment in bad order to service.

Another committee whose work is tending to produce economy of operation is that on "Standardization." This work is designed to reduce the multiplicity of specifications for the various materials required in daily use on railways, and permit of the production of so-called "standard" materials at very much less cost than is possible under present practices.

A committee whose work should result in economies of much magnitude is that on "Stresses in Railroad Tracks." More exact and complete knowledge than has heretofore existed of the forces which have to be resisted by railway tracks will be available from their work, and this knowledge should make it possible to provide for them with certainty and without waste.

During the past year the necessity for effecting the greatest economies possible has been more pressing than ever before, and I believe the work of the association can well be directed in a large degree in the future to the study of the broad questions of economies of railway operation.

Purdue Luncheon

The annual luncheon in honor of visiting Purdue members attending the American Railway Engineering Association's annual meeting will be held at the Chicago Engineers' Club, 314 Federal Street, at 12:15 p. m. Wednesday, March 15. Dean Potter and others from the University will be in attendance.



Signal Section in Session Yesterday at the Drake Hotel

Signal Section Holds Its March Stated Meeting

Large Number in Attendance at Opening Session in the Drake Hotel Yesterday Morning

DEPARTING FROM THE PRACTICE in the past, the ninth annual session of the Signal Section dispensed with all opening business yesterday morning. The meeting was called to order at 10:15 a. m. by Chairman F. B. Wiegand, signal engineer, New York Central, Lines West, and the reports of committees were taken up immediately for consideration. During the afternoon session F. A. Westbrook, field engineer, Habirshaw Electric Cable Company, gave an illustrated lecture. Ten committees presented reports for action at the meeting yesterday, including those on Maintenance Rules and Instructions; Editing; D. C. Relays; Oils; Highway Crossing Protection; Batteries; Power Interlocking; Standard Designs; D. C. Automatic Block Signals; and Signaling Practice.

The committee on Editing found it necessary to review the General Provisions in the Manual because of the fact that there is now in the Manual a form of contract for block signal and interlocking work, a form of invitation to bidder on block signal and interlocking work, and specifications, which by slight amplification, will cover all of the details under the heading, "General Provisions." The committee also found that Standard Section No. 4 needs consideration. The result of the deliberations were submitted to the meeting. It has also been noted that the question of clearance, or clearance diagram requirements, are referred to in many specifications, so that the committee appended recommendations to its report to cover this deficiency. The identification for a Requisite

Sheet, whether it be part of a Major or Unit Specification, was given consideration, and recommendations are included in the report. There has been some discussion about the Warranty Clause used in the several specifications now in the Manual and recommendations on this subject were also included in the report.



F. B. Wiegand
Chairman

Report of Committee on Signaling Practice

THE COMMITTEE SUBMITTED reports on the following subjects:

The report on colors for signals will be found in the proceedings of the Signal section, pages A-300 to A-409, July, 1920, and the committee recommends that the subject be closed.

The Effect of Electric Headlights on Signals

But little difficulty has actually been experienced due to the effect of locomotive headlights and this has been largely eliminated with the abandonment of the arc light and the use of incandescent lamps in the headlights, with the consequent reduction in candlepower as well as the difference in characteristics of the two lights. The difficulties remaining are of three types:

1. The preventing of a locomotive engineer on one train reading the signals which govern him on account of the headlight on a train in the opposing direction blinding him.
2. Account of headlight on a train in the opposite direction showing through the colored glass on a dwarf signal other than the one in front of the lamp and so giv-

ing a wrong indication. 3. Account of light from locomotive headlight on a train being reflected back from a signal and so giving a wrong indication.

The first of these difficulties has been obviated where they occur, which was mostly on multiple track territory, by having the enginemen dim the headlights when approaching trains running in the opposite direction. The second difficulty has been obviated by arranging a shield on dwarf signals behind the colored glass of spectacles which are not in front of the lamp. The third difficulty has been obviated by either: (a) Adjustment of signal. (b) Use of convex roundels which will obviate the trouble should the signal not be in proper adjustment.

The committee recommended: 1. That a shield be installed on dwarf signals behind the colored roundels, not

in front of the lamp. 2. That convex roundels be used on all new work and renewals.

The committee recommended that the report be accepted as information.

Committee: W. J. Eck (Southern), chairman; W. M. Vandersluis (I. C.), vice-chairman; W. E. Boland (S. P.), A. M. Burt (N. P.), C. A. Christofferson (N. P.), C. E. Denney (N. Y. C. & St. L.), C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), J. V. Hama (K. C. T.), C. J. Kelloway (A. C. L.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), J. A. Peabody (C. & N. W.), F. W. Pflieger (U. P.), A. H. Rudd (P. R. R.), T. S. Stevens (A. T. & S. F.), E. G. Stradling (C. I. & L.), F. B. Wiegand (N. Y. C.).

Discussion

The report was accepted without discussion.

Report on Maintenance Rules and Instructions

In the preparation of rules for signal maintenance, this committee this year submitted those for motor cars, hand cars and velocipedes. Instructions for signal maintenance at mechanical interlockings and general rules for interlocking were also presented. The motor car instructions prescribe the manner in which this equipment must be handled and the precautions which should be taken by the men operating them. The rules for general maintenance at interlockings covers, among other things, the instructions which should be given a new leverman and the inspections necessary around the machine and on the ground.



G. K. Thomas
Chairman

G. K. Thomas has been the chairman of this committee since its organization two years ago. In September, 1911, Mr. Thomas was promoted from signal maintainer on the Atchison, Topeka & Santa Fe to signal foreman, later being advanced to the position of assistant signal engineer of the Santa Fe System. He is an advocate of maintenance rules and instruction as a means of not only increasing the efficiency of the field forces but also as a proper guide for new men entering the service and can present logical proof that proper rules accomplish the desired results. His work along this line on the Santa Fe particularly fits him to act as chairman.

THE COMMITTEE submitted for consideration reports on rules for signal maintenance and on examination papers on signal maintenance. The reports covering motor cars, track circuits and mechanical interlocking were adopted in 1920 and are now in the Manual. In line with the assignments at that time, these reports were presented under the general titles of Examination Papers on Signal Maintenance.

Rules for Signal Maintenance

MOTOR CARS, HAND CARS, VELOCIPEDES, ETC.

- 201. Safety is of the first importance in the operation of motor cars, hand cars, velocipedes, etc.
- 202. Cars are provided to facilitate work and must be used for railroad business only.
- 203. Under no circumstances may anyone be carried on motor or other cars without a permit from the proper official, except employees in the regular performance of their duty.
- 204. Privately owned cars must not be operated without authority from
- 205. Except in cases of emergency, cars must not be operated after dark, nor during storms or foggy weather.
- 206. When necessary to use hand, push or motor cars at night, great care must be taken. A white light must be displayed to the front and red light to the rear.
- 207. Cars must not be run through tunnels except when authorized by, and then only after complying with local requirements.
- 208. Cars must not be run over foreign lines unless authorized by
- 209. When necessary to operate two or more cars connected together, rigid couplings must be used and the propelling car must be in advance. Side drive cars must not be so connected.
- 210. Cars must not be overloaded.
- 211. Heavily loaded cars must be protected by flag.
- 212. Material and tools must be so loaded and secured that

- none can fall off or interfere with moving parts of the car.
- 213. Employees must not get on or off a moving car from the front or side.
- 214. Motor cars must be run with traffic except as covered by local rules.
- 215. Hand cars and velocipedes must be run against traffic except as covered by local rules.
- 216. Motor cars must not be run through spring frogs under power. They must be lifted over, when necessary, thus preventing damage to wheels, boxings and axles.
- 217. Cars must be run slowly over frogs, switches, details, railroad crossings and other danger points.
- 218. Cars must run slowly through towns and over highway crossings and be prepared for immediate stop.
- 219. Cars must be under control and prepared for immediate stop when approaching gangs of workmen.
- 220. Motor cars must be pushed past station when platforms are occupied.
- 221. Motor cars must not be run past standing passenger trains.
- 222. Employees in charge of motor cars must keep themselves informed as to train movements, on constant lookout, and occupy the track only when it is safe to do so.
- 223. Employees in charge of cars must keep constant lookout for other cars occupying the track.
- 224. When a line-up of train movements is obtained it must not be considered final because operating conditions may require running of additional trains.
- 225. When two or more men are with a car, they should flag at curves and cuts where the view is obstructed or the side clearance is not sufficient to take off the car. If the car is operated with but one man, he must proceed with extreme care (walk if necessary), keeping a constant lookout for trains and motor cars in both directions.
- 226. A distance of at least 400 ft. should be maintained between hand cars and a distance of at least 1,000 ft. between a motor car and any other car or the rear end of a moving train.
- 227. Switches must not be thrown to run hand cars, empty cars, or light motor cars to or from the main track.

228. All persons riding on hand cars must be in a standing position, except when side seats are provided.
229. All persons riding on motor cars must be seated.
230. Side drive motor cars must not be run backwards unless they are designed and adjusted so that this movement can be made with safety.
231. The speed of cars must not exceed 5 mi. an hr. when adjacent track is occupied by a moving train.
232. Side drive motor cars must not exceed a speed of 20 mi. an hr.
233. Center drive motor cars must not exceed a speed of 25 mi. an hr.
234. When two or more men are with a car, they should have a thorough understanding as to what part each will take in removing it from the track in emergency.
235. Lookout must be kept for torpedoes on the rail. When such are found, steps should be taken to avoid exploding them, but if exploded, they must be replaced.
236. Motor cars should not be shipped in baggage cars except when it is absolutely necessary, and when so shipped, the fuel tanks must be carefully drained and all tank caps screwed down tightly.
237. Cars must not be left on the track unprotected. If necessary to leave car for any reason, it must be placed at least 6 ft. clear of the nearest rail and locked. Cars must not be left on public highways.
238. Motor cars, when not in use, must be kept under cover. When not in sheds, use canvas cover.
239. Changes in design or the use of special devices are not permitted without authority of
240. If it is necessary to carry an extra supply of gasoline, this must be in a properly constructed gasoline tight container painted red, with tops tightly screwed down.
241. Open lights of any description must not be used near gasoline receptacles.
242. Cars must be kept clean and properly lubricated. All bolts, nuts, screws, and connections must be tight, brakes must be kept in perfect condition and the car must be in gage and alignment. Excessive lost motion must not be allowed and all parts must be kept in good repair.
243. Before use, a motor car must be inspected to see that it is in good condition, a proper supply of gasoline and lubricating oils provided and the necessary tools, lights, tuses, torpedoes, etc., in place.
244. Study the instructions that come with the car. Do not make long runs with a new car. Stop often, lubricate freely and let motor cool.
245. In no case should more than six dry cells be used. Greater voltage may burn out or injure the coil.
246. To attain the best results with two cycle air-cooled motor car engines, oil and gasoline should be mixed thoroughly before it is put into the car, using about one-half pint of proper grade of oil to one gallon of gasoline. Do not mix oil with the gasoline for four cycle engines.
247. If a starting crank is provided it must be pulled upward when the charge is being compressed in the cylinder to avoid personal injury in case the engine should back fire.
248. The radiator and other parts of the cooling system of water-cooled engines must be protected from freezing. They must be drained when not in use.

Rules for Signal Maintenance Interlocking

GENERAL

1001. Levers or other operating appliances of an interlocking plant should not be operated except for inspection or test and then only after a thorough understanding has been reached with the leverman.
1002. The operating lever of a device temporarily inoperative must be blocked and, or marked so that it is easily distinguishable.
1003. When repairs affecting operation are to be made, a thorough understanding must first be had with the leverman, who must again be notified when repairs are completed.
1004. If necessary to disconnect a switch, derail, movable point frog facing point lock, detector bar or its equivalent, all switches, derails and movable point frogs affected must be secured for safe train operation and notified.
1005. When a switch or movable point frog is disconnected, it must be securely spiked with two or more spikes, which are to be placed in the first and second ties back of the point at the closed position.
1006. When a derail is disconnected, it must be securely spiked and fastened in the required position.
1007. If necessary to take one end of a crossover, the other end must be spiked in the corresponding position.
1008. The locking of an interlocking machine must not be changed or removed from the machine, except upon authority of
1009. If the locking of an interlocking machine becomes disarranged or broken, signals affected must be set to display their most restrictive indication; switches, etc., in the route affected, must be secured until repairs are made. In all such cases must be notified.
1010. A new leverman should be given the following instructions:
- How to disconnect and secure switches, derails and other units in an emergency, so as to provide for the safe train operation.
 - How to operate time leases and other forms of special apparatus.
 - How to read the indicators, lights, etc.
 - How to handle levers with special reference to the danger of forcing the lever when the switch points may be obstructed or other dangerous conditions are liable to exist.
 - Any other information which appears to be necessary to the efficient and safe operation of the plant.
1011. Frequent inspection and tests must be made to insure that all signal appliances, including machine locking, etc., are in proper condition.
1012. Bolts, dowels, pins, nuts, nut locks, etc., must be in place and in good condition.
1013. Interlocking machines must be kept in good mechanical and electrical condition, clean, free from excessive lost motion, and bearing parts free and properly lubricated.
1014. Sufficient compression should be kept in latch springs to assure the proper movement of locking.
1015. Special apparatus used in connection with interlocking machines, such as time locks, lever locks, circuit controllers, etc., must be properly sealed or locked and must be opened and inspected upon authority of
1017. When the condition of switches or track does not admit of the proper operation or maintenance of the interlocking plant, must be notified.
1018. If the ties under the switch points are not in proper condition and maintained so that the switch points ride evenly on all tie plates, the track department should be called upon to correct the condition.
1019. The maximum allowable gage of track at interlocked switches, derails, movable point frogs and detector bars is $\frac{1}{2}$ in. wider than standard. When exceeded, the track department must be called upon to correct the condition.
1020. Interlocked switches, split point derails and movable point frogs must be kept so adjusted that they cannot be locked when one $\frac{1}{4}$ in. rod is placed between stock rail and a point 6 in. back from switch point. There must be no excessive spring of point or connections. When the point is open, there must be at least 4 in. between the point and the stock rail.
1021. If the points of an interlocked switch do not fit up to the stock rails properly, adjustments should be made at the switch adjustment. When the points fit properly, the lock rod should be adjusted so that holes are in proper position for the plunger. When adjustments are completed jam nuts must be set up tight.
1022. Switch and lock movements must have full stroke both normal and reversed. Plungers or locking dogs must be kept tight on the slide bar.
1023. Lock rods should enter plunger stand or locking brackets at right angles to the plunger. Holes or notches must have square edges and be no more than $1/16$ in. larger than the plunger.
1024. Detector bar must be maintained so that it will rise a minimum of $\frac{3}{4}$ in. above the top of rail at every point before the function is unlocked and rest a maximum of $\frac{1}{2}$ in. below the top of rail at every point when the stroke is complete. When lever or switch machine is on center, the motion plates or links should be on center. Bar must be straight, without kinks and lie evenly along rail. Rail clips and motion plates and studs must be tight, rollers working freely, all parts free from dirt and excessive grease, and all bearing parts lubricated. Battered rail must be trimmed to prevent interference with the operation of the bar.
1025. Signals must be clean, properly painted and lubricated and working freely. Blades must assume the full position of each aspect.
1026. Circuit controllers on switches, split point derails or movable point frogs must be so adjusted that the contacts will not function when $\frac{1}{4}$ -in. rod is placed between point and stock rail 6 in. back from the point.
1027. Circuit controllers on lifting type derails must be so adjusted that contacts will not function until the derail is within 12 in. of its full non-derailing position.
1028. Machine locking should be lubricated sparingly with oil only.
1029. The prescribed lubricant only must be used in buffers, signal mechanisms and other special parts.
1030. Where no special lubricant is prescribed, black oil or

..... should be used and care taken not to apply it to excess nor on parts which do not require lubrication.

Rules for Signal Maintenance Interlocking

MECHANICAL

1066. If necessary to disconnect a pipe-connected device, this should be done at the first crank nearest the operated device.

1067. A circuit controller operated by a lever latch on a mechanical machine must be adjusted so that a normal contact will open before the latch block has reached a point about $\frac{3}{8}$ in. from its normal position and a reverse contact will not be closed until the latch block is within about $\frac{3}{8}$ in. of its reverse position.

1068. A circuit controller operated directly by a lever on a mechanical machine must be adjusted so that a normal contact will open before the lever is one inch from its normal position and reverse contact will not close until the lever is within one inch of its reverse position.

1069. Leadouts should be kept clean and maintained so as to have no excessive wear in cranks, pins or bearings and aligned so that movable parts do not interfere.

1070. Pipe lines must be kept free from weeds and dirt, in good condition and alignment and at least $\frac{3}{4}$ in. clearance must be maintained between pipe and base of rail. Rivets must be in place.

1071. Broken pipe and loose couplings or rivets must not be permitted. These can usually be detected by the presence of rust.

1072. Pipe carrier foundations should be level, rigid and in alignment.

1073. Pipe carrier foundation tops should be kept clean, level, securely attached to foundations and not less than 2 in. above ground.

1074. Pipe carriers must be clean and securely fastened, all parts in place and rollers free.

1075. The minimum allowable stroke in main pipe lines is as follows:

- (a) For facing point lock and switch and lock movement 8 in.
- (b) For signals 7 in.
- (c) For switches, derails and movable point frogs 6 in.

1076. When the stroke of a pipe in main pipe lines is less than the allowed minimum, it must be increased at the lever.

1077. If necessary to decrease the stroke at a pipe connected device, this should be done by redrilling the crank nearest the operated device.

1078. Cranks, compensators and deflecting bars should be clean, in alignment with pipe line, pins and rollers free and properly lubricated. Moving parts should not interfere nor have excessive lost motion.

1079. Cranks, compensators and deflecting bars should be in the position determined by compensation chart when lever is on center.

1080. The plunger of a facing point lock should have at least 8 in. stroke, and when its lever is in the normal position the end of the plunger should clear the lock rod 1 in. The end of the plunger must have square edges.

1081. When the signal lever is normal, the signal bar of a bolt lock should be up against the stop, the notch in signal bar should not exceed 2 in. in length. The notches must have square edges and the lock rod must enter the stand at right angles to the signal bar.

(a) Bolt locks used with switches, split point derails and movable point frogs should be so adjusted that the signal will not clear when a $\frac{1}{2}$ -in. rod is placed between the point and the stock rail 6 in. back from the point.

(b) Bolt locks used with lifting type derails should be so adjusted that signals will not clear until derail is within $\frac{1}{2}$ in. of the full non-derailing position.

1082. Circuit controllers operated by mechanical signals must be so adjusted that contacts will not function until signal blade is within 5 deg. of the controlling aspect.

1083. Circuit controllers, when operated by switch and lock movement slide bar or facing point lock plunger, must be so adjusted that contacts will not function until the slide bar or plunger has traveled to within $\frac{1}{2}$ in. of its stroke.

Conclusions

The committee recommended that the rules for signal maintainers, for signal maintenance interlocking (general) and for signal maintenance interlocking (mechanical) be approved for presentation at the annual meeting, the latter to supersede similar rules now in the Manual.

In addition to the above rules, examination questions and answers were presented on motor cars, hand cars, velocipedes, etc., signal maintenance, interlocking, me-

chanical, and on signal maintenance interlocking, general. It was recommended that these also be approved for presentation at the annual meeting.

Committee: G. K. Thomas (A. T. & S. F.), chairman; E. A. Black (N. Y. C.), vice-chairman; A. Vallee (D. & H.), vice-chairman; R. C. Bingham (I. C.) O. W. Brandt (U. P.), S. F. Cooper (Erie), A. Davies (C. P. R.), Caleb Drake (C. & N. W.), C. M. Duffy (C. R. I. & P.), H. J. Foale (Wabash), F. C. Foster (L. & N.), A. P. Hix (T. R. R. of St. L.), T. G. Inwood (N. Y. C.), J. A. Johnson (M. K. & T.), Arthur Kelly (C. C. & St. L.), F. A. Selke (C. I. & L.), A. W. Stewart (A. C. L.), F. A. Tegeler (C. B. & Q.), I. A. Uhr, (St. L. S. F.), E. Winans (A. T. & S. F.).

Discussion

G. K. Thomas (Chairman): The committee recommends, and I so move, that the general title of those subjects adopted in 1920 be changed so as to be uniform with the examination papers approved in 1921.

(Motion carried.)

(Chairman Thomas next submitted for consideration rules and revised examination papers on motor cars, hand cars, velocipedes, etc.)

C. K. Kelloway (A. C. L.): I would suggest adding the words "only on the authority of the dispatcher or superintendent" after Rule 204.

Chairman Thomas: Would not that result in considerable delay at times?

Mr. Kelloway: Not necessarily; if the order is given by the superintendent it will be accompanied by a train order to that effect.

W. C. Johnson (C. St. P. M. & O.): Many of the railroads which have lines extending into storm invaded territory have had their telephone lines and signal lines down for weeks, and that would make the delay of the maintainer too long. A signal maintainer should be allowed to use his own judgment if he cannot get authority from the train dispatcher or the superintendent.

T. S. Stevens (A. T. & S. F.): I move that the sentence be allowed to stand as presented.

(Motion carried.)

Mr. Kelloway: If Rule 204 is right, then Rule 207 is inconsistent.

W. J. Eck (Sou.): These rules are not in the same class as the standard code train rules, and at best they will be a guide for any individual railroad which desires to have a set of rules for that purpose. I therefore move the acceptance of the rules and the examination questions as they stand.

(Motion carried.)

(Chairman Thomas' next submitted the rules and examination papers for signal maintenance interlocking.)

J. H. Oppelt (N. Y. C. & St. L.): The remarks of Mr. Eck apply to these rules equally well, and I therefore move that they be accepted as written.

(Motion carried.)

L. L. Whitcomb (N. Y. C.): Rule 1080 states, "The plunger of a facing point lock should have at least an eight-inch stroke," while Rule 310 (e); in the Report of the Committee on Mechanical Interlocking, states "Facing point lock plungers shall have a travel of not less than seven inches." There is a difference of one inch.

Mr. Kelloway: I would suggest that the figure be changed to seven in the maintenance rule.

(The committee accepted the change.)

Chairman Thomas: I move that the rules, questions and answers on motor cars, hand cars and velocipedes, and on interlocking, general and mechanical, be approved for presentation at the annual meeting.

(Motion carried.)

(The committee was dismissed with the thanks of the Signal section.)

Report on Highway Crossing Protection

Highway crossing traffic has become almost as interstate as railroad traffic because of the use of the automobile and the protection of these crossings presents a real problem. The committee feels that in this respect it is very desirable to make the aspects of all signs and signals intended to warn travelers on highways of possible or existing danger at railroad crossings uniform throughout the country. Twelve recommendations were drawn up by the committee and six drawings showing the aspects of the signs and signals accompanied the recommendations. These recommendations should form a basis for the universal standardization of crossing protection.



James B. Latimer
Chairman

James B. Latimer, signal engineer of the Chicago, Burlington & Quincy, is the first man to be appointed chairman of this committee which was authorized at the annual meeting last June. Forty years' experience in the engineering, operating and signal departments of the Chicago, Burlington & Quincy qualifies him to direct the work of this important committee. Owing to his extended contact with the problems of highway crossing protection, Mr. Latimer is able to appreciate the viewpoint of the railroads and also of the general public which is using the highways with volume and character of traffic unlike any thing anticipated in the past.

THIS COMMITTEE WAS appointed at a meeting of the Committee of Direction in Chicago on June 5, 1921.

Owing to the fact that considerable preliminary data as to the practice of various railroads and the requirements of public authorities had to be collected, it was impossible to hold the first meeting until November.

C. L. Bardo, chairman of the committee of the American Railway Association on the Prevention of Accidents at Highway Crossings and Trespassing, advised J. E. Fairbanks, general secretary, that his committee had recommended that the question of the standardization of mechanical and electrical devices installed at highway crossings as a substitute for crossing gatemen and flagmen be referred to the Signal section and that a subcommittee of his committee be appointed to confer with the committee of the Signal section. Mr. Bardo also stated that "the association has adopted standard approach warning signs which have been made legal in several of the states. It is quite important in the interests of safety, both to trains and to travelers on the highway, that the visual aspects of mechanical highway crossing devices should as far as possible be standard or confined within reasonable limits, otherwise the value of mechanical highway crossing signals intended for the control of traffic at grade crossings may be readily lost because of the unfamiliarity of travelers from other localities with that particular device."

Recommendations

It was agreed by the committee on Highway Crossing Protection to present the following recommendations and report for the consideration of the Signal section at the March stated meeting:

1. It is recommended that the use of the advance warning sign recommended by the Committee on Grade Crossing Protection and Trespassing of Division I of the American Railway Association in its report of October 16, 1916, be continued as standard practice.

2. That the use of the hand stop sign recommended by the same committee be continued as standard practice.

3. That the arms of highway crossing gates be painted with alternate black and white stripes diagonally across the arms when in the horizontal position, as recommended by the above named committee.

4. That a sign composed of cross boards bearing the words "Railroad Crossing" in black letters on a white field be recommended as standard practice.

5. That at crossings where it is desired that highway

traffic stop before crossing the railroad tracks, an additional sign bearing the word "Stop" shall be attached to the mast bearing the cross boards.

6. That where conditions justify or require that the sign referred to in recommendation No. 1, or the sign referred to in recommendation No. 5, shall be made conspicuous during the hours of darkness it may be illuminated.

7. That a red light shall be exhibited at crossings at highways with railroads to stop highway traffic only when a train is approaching.

8. That where practicable the sign recommended in recommendation No. 4 or any automatic warning sign should be placed in the center of the highway, provided the railroad company can be relieved from claims arising out of personal injury or damage to property on account of collision with the sign.

9. That while believing that a properly marked crossing coupled with proper responsibility on the part of the public provides best for public safety, automatic devices are sometimes required by law, ordinance or orders of public commissions. When this occurs aspects and operation should be uniform. It is therefore recommended that visual automatic devices to indicate the approach of trains be confined to a swinging disc and light, or a flashing light.

10. That when the swinging disc and light is used, the disc be circular, 24 in. in diameter, with the word "Danger" curved within the circle at the bottom, light in the center, white background, black letters and a black border corresponding with the word "Danger" parallel with the upper edge of the disc and shown on the accompanying diagram, marked Exhibit "F."

11. That where automatic devices are considered necessary or are specified by federal, state or local authorities for the protection of highway traffic, the use of two-position devices provide the necessary and desirable indication.

12. That when automatic signal devices are used to indicate the approach of trains they should be so arranged as to indicate for 20 sec. before the arrival of a train at the crossing, based upon the fastest trains operated over that crossing.

The flashing light signal has been considered, but the committee has not had sufficient time to draft a recommendation as to the proper aspects for such a signal.

The committee believes that these recommendations, if adopted, will form a basis for the universal standardization of highway crossing protection which at present is

anything but uniform throughout the country. The use of the automobile for long journeys has made highway traffic almost as interstate as the railroad traffic itself and the great desideratum, as it appears to the committee, is to make the aspects of all signs and signals intended to warn travelers on highways of possible or existing danger at railroad crossings uniform throughout the country.

In this report the committee has not, it feels, completed its work. A great deal will be gained in the interests of uniformity and economy of installation and maintenance by standardizing many of the parts of the apparatus recommended to be used, for instance, the bolt spacing of the foundations for all iron masts may be standardized to great advantage, also the size and type of socket used in electric light bulbs, size and type of oil lamps for illuminating purposes, and many other small matters. There-



Exhibit F, Banner for Automatic Highway Crossing Signal

fore the committee requests it be continued with a view to taking up such details.

Committee: J. B. Latimer (C. B. & Q.), chairman; C. J. Kelloway (A. C. L.), vice-chairman; C. A. Christofferson (N. P.), W. J. Eck (Sou.), A. R. Fugina (L. & N.), A. H. McKeen (U. P.), C. H. Morrison (N. Y. N. H. & H.), J. A. Peabody (C. & N. W.), E. K. Post (Penna.), W. Y. Scott (B. & M.), T. S. Stevens (A. T. & S. F.).

Discussion

J. B. Latimer (C. B. & Q.), Chairman, presented the report of Committee XX, Highway Crossing Protection.

Chairman Latimer: We were not given a definite assignment, but were asked to co-operate with the Committee on Grade Crossing Protection and Trespassing of Division 1, of which Mr. Barto is chairman.

(A motion to accept recommendations No. 1, No. 2 and No. 3 was carried.)

Chairman Latimer: The idea of this particular sign was taken from the A. R. E. A. crossing protection report, where they recommended cross-boards instead of triangular-shaped signs, and the dimensions were taken from the laws of 11 states.

W. H. Elliott (N. Y. C.): *I move the approval of this sign.*

(*Motion carried.*)

R. B. Elsworth (N. Y. C.): I would like some description of a crossing at which it is desired that a stop should be made before a vehicle or a person crosses the track.

Chairman Latimer: It was the sense of the committee that where we have wigwags and in some other places, it is not necessary for highway traffic to stop.

A. H. Rudd (P. R. R.): Isn't it a fact that the state of Illinois requires this stop sign at extra-hazardous crossings?

Chairman Latimer: I believe they do.

I. S. Raymer (P. & L. E.): I understand that the law in several states requires that in the case of all motor vehicles carrying passengers for fare, and of motor vehicles carrying freight, the driver of the vehicle must stop at all city railroad crossings and ascertain that the track is clear.

W. H. Elliott (N. Y. C.): I believe according to that view that recommendation No. 5 should be changed. I think the following should be included: "At a crossing where visual highway crossing signals are not plainly visible and effective, an additional sign bearing the word 'stop' is required and should be such and such a design."

O. R. Unger (M. P.): The rules for the operation of any particular device should be the same on all railroads, and we ought to arrange to have one system of crossing signals on the railroads at all crossings, so that when the people on the highway see them in the case of one railroad they will know what they mean when they see them on another railroad.

Mr. Elliott: I have suggested that if a light is displayed at a crossing of the highway with the railroad to stop traffic, a red light be used, and that only when a train is approaching.

(The revised wording suggested by Mr. Elliott, having the approval of the committee, was adopted.)

Mr. Rudd: Will the committee be willing to go further and say that where it was impracticable to place the warning sign in the center of the highway, it may be put on the right hand side?

Chairman Latimer: If you have two signs, the right hand one is more important, and if you have only one the center is the place.

J. C. Mock (M. C.): Some of us are figuring on less than ten feet as the height of these signs, because as vehicles approach the crossing the drivers do not look up, and if they are very close they cannot see up.

J. Pilkington (N. Y. N. H. & H.): There is a development, in regard to signboards throughout the country, of having an obstacle in the middle of the road—a concrete group, a mound of dirt, or a wooden fence—and in the center of the obstacle there is placed a sign at a low height, probably within five feet of the base of the mound, or lower. This comes within the range of an automobile headlight.

(Paragraph 8 as revised was adopted, after which Paragraph 9 was read.)

Mr. Rudd: There are many wigwag and flashing lights in service all over the country, but the instructions referred to the committee relate to the question of standardization of mechanical or electrical devices at highway crossings as a substitute for the crossing gateways.

The logical proposition is to display a stop sign stationary when trains are coming, and no sign when no trains are coming. A steady red light to be used when a train is approaching and no light shown when a train is not approaching.

E. G. Stradling (C. I. & L.): This section should not go on record as approving a swinging disc or any other automatic device to protect highway crossings.

Chairman Latimer: The committee does not recommend the use of a wigwag signal or any other automatic signal, but where a wigwag is ordered by the public authorities we think that we should standardize the use of the device.

T. S. Stevens (A. T. & S. F.): We have about 500 automatic flagmen and the Southern Pacific has probably the same number. They are good protection and we are winning suits by their use. We are taking off highway watchmen and putting in wigwags.

Mr. Rudd: *I move that the last three lines read as follows: The committee therefore recommended that visual automatic devices to indicate the approach of trains be confined to either non-flashing light or lights, or to a mechanism displaying a stop sign and red light when train is approaching, no light or sign when train is not approaching*

(Motion carried.)

Mr. Rudd: *I move, the committee having received fairly 50-50 instructions, that this be referred back to the committee for further consideration.*

(Motion carried.)

(Chairman Latimer then read Paragraph 10, after which a motion was made and carried that it be referred back to the committee.)

C. F. Stoltz (C. C. C. & St. L.): I would like to have the committee define a two-position wigwag.

Chairman Latimer: It is the language used by the trade. What the committee had in mind in referring to a two-position wigwag was one which hung still when no train was approaching and moved when a train was approaching.

Mr. Stoltz: *I move that the words "two-position" in the next to the last line of Paragraph 11 be changed to "three-position."*
(Motion lost.)

F. P. Patenall (B. & O.): *I move that the matter in Paragraph 12 be made to read: "so arranged as to indicate for not less than 30 seconds before the arrival of a train at the crossing."*

Mr. Mock: If you make it 30 seconds you are getting away beyond the distance necessary. It means also the revision of all of our bell circuits and crossing circuits.

C. J. Kelloway (A. C. L.): *I move to amend that No. 12 be made to read "so arranged as to indicate for not less than 20 seconds."*
(Motion as amended carried.)

(The committee was dismissed with the thanks of the Signal section.)

Report on D. C. Automatic Block Signaling

Requisites for signal circuits as presented in the report of the committee may be considered as a foundation on which to base a railroad signal system. The fundamentals of these requisites are gleaned from years of experience and conscientious, painstaking study, and will furnish the signal field established standards of control circuits, switch protection, fouling circuits, and proper methods of locating signals in order that traffic may be handled properly. The report on approach lighting includes statistics from 11 roads showing the actual cost of installation and operation of electric lighted signals, together with information on control circuits for the lights.



C. F. Stoltz
Chairman

C. F. Stoltz, signal engineer of the Cleveland, Cincinnati, Chicago & St. Louis was appointed chairman of this committee in 1919. Mr. Stoltz became a member of the Railway Signal Association in 1913, and in 1914 was appointed a member of Committee H. In 1910 he was appointed on the Committee on D. C. Relays where he has rendered valuable assistance in preparing specifications for the operating characteristics of signal relays. Mr. Stoltz entered railway service as a draftsman on the Cleveland, Cincinnati, Chicago & St. Louis in 1906. In 1910 he was appointed assistant signal engineer, and in 1913 he was promoted to signal engineer.

THE COMMITTEE SUBMITTED for consideration reports on: 1, Requisites for circuits, and on 2, Approach lighting of signals.

Requisites for Circuits

1. Insulated rail joints shall be placed opposite each other in main tracks and not less than 5 ft. or more than 15 ft. in advance of the signal.
2. Signals shall be controlled as far as practical by continuous track circuit.
3. All main track circuits shall be connected to provide the best possible protection against broken rails.
4. Turnouts and junctions shall be protected by track circuit extending to the clearance point or siding derail.
5. Non-interlocked clearances between main tracks, and between main and other tracks, shall be equipped with plunger and circuit controllers and locked in the normal position. Lever operated to operate the lock and circuit controllers governing the turnout in the direction signaled shall be located between the tracks in the center of crossover, or independent track circuit for protection of crossovers affecting the signals in the direction signaled may be used in lieu of the above.
6. All interlocked switches, derails, and movable point tracks, or leading to the tracks signaled, shall be equipped with switch circuit controller, or plunger lock circuit controller, or lock.
7. At points where dead sections exceed five feet less than the distance between the inner wheel bases of opposite tracks on main track, or on sidings, or on other special circuits of approved design shall be provided.

8. Track batteries shall be connected to feed away from crossings with electric railroads.
9. Each track circuit shall be insulated on all sides from all other track circuits, and from all siding, junction, and branch connections.
10. Control circuits for signals shall not be carried through contacts of tower indicators, switch indicators, or interlocking relays.
11. Where a signal location is between the fouling point of a trailing switch and a point 500 ft. in advance of the switch, protection shall be provided by the new signal in the rear through the use of an overlap.
12. Where a signal location is between the point of a facing switch and a point feet beyond, the signal shall be arranged to indicate stop when the switch is reversed or misplaced.
13. Where two signals governing in the same direction are located less than braking distance apart, either signal when indicating stop shall cause an approach indication to be displayed at a signal in the rear located at a point equal to or greater than the required minimum braking distance.
14. The aspect displayed to approaching trains must conform to true block conditions. A signal, in changing from proceed to approach, or approach to proceed, must be limited to display either the approach or proceed indication.
15. When a train, followed by a second train, reverses direction while between passing sidings, trains will receive stop indications at the first signal location in the rear of the point where the first train reversed its direction.
16. Circuits shall be so arranged that in no case will a stop signal, or a stop and proceed signal indicate approach until the

rear of a train is under the protection of the next signal governing in the same direction.

17. Circuits shall be so arranged where trains are liable to overrun, making it necessary to back up, such as stations, water tanks, coal chutes, etc., protection should be provided by the next signal in the rear through the use of an overlap.

18. The positive and negative sides of track circuit repeating relays used for controlling signal apparatus shall be broken by the controlling track relay.

19. The positive and negative sides of signal slots or holding coils shall be broken by a relay, or relays, protecting the entire block.

20. The control of signal shall be such as to provide:

(a) That each train is protected in the rear by at least one stop, and one approach indication, or by one permissive signal denoting block occupied by a train running the same direction, and one approach indication.

(b) That where a track is signaled in both directions, each train is protected against opposing movements by at least one approach and one positive stop signal.

(c) An approach indication before reaching a stop indication, excepting at the first signal of an installation or at the starting signal from meeting points, where traffic direction signaling is used, when trains may receive a stop indication without previously receiving an approach indication.

(d) Against misplaced switches or derails by at least one stop and one approach indication in each direction signaled.

(e) That where traffic direction signaling is used, the reversing or misplacing of a switch located between meeting points will set all signals governing toward the switch between it and both meeting points to the stop position.

(f) That two opposing signals governing over the same track will not display approach or proceed indication, simultaneously authorizing two trains to move opposing each other.

(g) That the proceed indication of each signal will be directly controlled by the next signal governing in the same direction.

(h) That in traffic direction signaling two positive opposing signals will not display the proceed (permissive approach or clear) indications, simultaneously authorizing two trains to move from meeting points opposing each other.

(i) That, as far as practicable, apparatus shall be so constructed and circuits so arranged that the failure of any part controlling the operation of a signal shall cause it to display its most restrictive indication.

(j) That the battery or power supply for line circuits be placed at the end of circuit farthest from the function operated.

21. Circuits controlling permissive signals, which denote block occupied, shall provide:

1. A slow speed indication to follow a train into an occupied block.

2. A stop indication against opposing trains in the same block where tracks are signaled in both directions.

3. That opposing signals governing over the same track shall indicate stop when a permissive signal indicates approach.

22. Take-siding indicators, when displaying an indication to take siding, shall cause the next signal in the rear to indicate approach and the automatic signal on the same mast to indicate

CIRCUIT ADJUNCTS

A. Signal governing in one direction caused to indicate stop, when a converging or opposing signal governing over the same track indicates proceed.

B. A timing element interposed between the restoration of a signal to the stop position and the clearing of an opposing or converging signal governing over the same track, thus preventing a hurried change of route.

Report on Approach Lighting of Signals

In gathering data with reference to the subject, inquiry was made, by the committee, of 33 different railroads. Replies indicate progress as follows:

- 11 railroads have extensive installations.
- 11 railroads have test installations.
- 4 railroads have no installations but replies indicate that tests are planned.
- 3 railroads have no installations and indicate no interest in subject.
- 4 railroads made no reply.

The practice of the different roads in automatic lighting is quite varied as to material used, but the circuits all fall within the following four schemes:

- 1. Using back circuit of track relay, when the track circuit is of sufficient length and curvature track such that light be shown before engineman came in view of signal.
- 2. Lighting circuit closed by circuit controller operated by the mechanism of the opposing signal.
- 3. Special relay in series with the control circuit of signal.
- 4. Special relay in series with track battery.

The design of the lamp bulb is a very important element in the successful operation of electric lighted signals. There seems to be in use at the present time two general types of lamps, the 3/2 volt lamp, developed by the Edison Lamp Works of the General Electric Company for this purpose and used on a separate battery, and a higher voltage lamp, about 12 or 13 1/2 volts, which is used on the operating battery. The large majority of roads use the 3/2 volt lamp. Committee VI is now working with lamp manufacturers to develop a suitable standard lamp for this purpose.

The general opinion seems to be in favor of a separate battery where primary battery is used on the signal system, the reasons being given as follows:

Reliability. In case of failure of signal operating battery, the light would still be functioning.

Steady Voltage. Free from the voltage fluctuations of a primary battery operating a motor signal.

No Failures Due to Lightning. Operating battery has line connection subject to lightning discharges and lamps connected thereto would be burned out.

Cost Data. Simple to keep data on cost of lighting signals.

Economical. With the 3/2-volt, 0.25-amp. lamps energy consumption is less than with the 13.5-volt lamp.

There seems to be no objection to the use of approach lighting on double or multiple tracks. The opinion is expressed, however, that on a railroad of four or more tracks, all signal indications in a given direction should light up on the approach of a train on any track. It is evident that this must be done on account of the possibility of a light failure when two or more trains are approaching signals at the same location at the same time. There seems to be no other real complication arising on double track signaling with approach lighting.

There have been several serious objections raised in applying approach lighting to single track signaling. It seems, however, that what appears to be an objection on the part of some railroads, is not seriously objected to by others, or the condition is being met in some way that is safe and satisfactory and preserves the advantages to be obtained by the approach lighting scheme.

It appears that the principal objection raised to the approach lighting scheme is on account of there being no night indications, under certain conditions, requiring either the use of an oil light on certain signals or a continuous burning electric light.

The economy effected by the approach lighting scheme is real and considerable. Data submitted by several railroads vary in some particulars, but the average ratio is 3.5 to 1, showing that it costs 3.5 times as much to light with oil. The committee does not feel that the data submitted have been compiled with the proper accuracy to consider this ratio exactly correct and is of the opinion that the ratio will not be quite as high, possibly more like 2 to 1.

The committee recommended that requisites for circuits be presented for discussion and that the report on approach lighting of signals be accepted as information.

Committee: C. F. Stoltz (C. C. C. & St. L.), chairman; R. E. Green (M. C.), vice-chairman; T. A. Jones (P. R. R.), vice-chairman; F. H. Bagley (L. & N.), M. A. Baird (Erie), F. W. Bender (C. R. R. of N. J.), E. E. Bradley (W. M.), J. H. Buttridge (L. C.), W. A. Dawson (N. Y. C.), G. H. Dryden (B. & O.), T. C. Hansen (N. P.), C. E. Hartvig (C. R. I. & P.), G. A. Kirley (B. & A.), W. J. Kocher (L. V.), H. H. Orr (C. & E. I.), E. B. Pry (P. R. R.), A. Reilly (D. L. & W.), B. H. Richards (D. & H.), C. Soper (L. I.), R. B. Arnold (C. & N. W.), R. S. Turner (U. P.), E. P. Weatherly (T. & P.).

Discussion

E. B. Smith (N. Y. C.): I don't believe that the Maintenance of Way Department will agree with us on installing insulated rail joints opposite each other in main tracks and on curves of more than 2 degrees.

B. J. Schwendt (T. & O. C.): As I understand it, these are requisites for direct current automatic signal circuits.

Chairman Stoltz: I do not see, if these are requisites, but what they would apply in any circuit, and if the gentleman finds that they will not apply in a. c. or in anything but d. c., we will be glad to consider changing them.

F. P. Patenall (B. & O.): Referring to Paragraph 2; "Signals shall be controlled as far as practical by con-

tinuous track circuit." Isn't that rather an unwise remark to make?

Chairman Stoltz: It will be impracticable to insulate a crossing frog and get a continuous track circuit through a solid crossing frog, and in that case the track circuit is not continuous.

Secretary Balliet: That statement is not a fact unless it is a solid frog which has been actually welded solidly—I mean a frog without splice bars in it. It can be done, and has been done for 20 years successfully.

Chairman Stoltz: It is not practicable to do so where there is only one track to cross.

W. H. Elliott (N. Y. C.): It would be well to revise Paragraph 7 to give a minimum length, rather than to state that it shall be 5 ft. less than the distance between the inner wheel bases of the shortest car length, etc. Our shortest car is a scale test car, which is 11 ft., and it is not practicable to arrange a special circuit for a 6 ft. length of dead section.

Chairman Stoltz: The committee will be glad to accept that and give it consideration.

A. R. Fugina (L. & N.): Referring to No. 6, I do not see the necessity of equipping the derail with a switch controller when the derail is pipe connected.

Chairman Stoltz: The committee is willing to go along with Mr. Fugina in a way, but not to eliminate the hand-thrown derail. It is not an interlocking derail, not a pipe connected derail.

J. C. Mock (M. C.): How about the words "provide the best possible protection against broken rails"? What does that mean?

Chairman Stoltz: In cases of junction in track, we can

either follow any junction, or in some cases we can run a series circuit.

E. B. Smith (N. Y. C.): Has the committee decided whether a lock is a better proposition than a series circuit, or a circuit on a cross-over for protection? I believe that the lever is superior to any special track circuit on a cross-over to take care of the condition.

Chairman Stoltz: I will be glad to have your opinion. We have none of our own yet.

Mr. Mock: I think that Paragraph No. 1 is a very expensive proposition. I do not know of many roads that really conform to that now.

Mr. Smith: This runs into money if you go into it wholesale, but it means very little when you are changing rails. When we started to place joints opposite on a tangent track it means a cost of about \$75,000 to make the change, but we placed them all opposite at but little cost when new rails were laid.

Mr. Kelloway: Referring to No. 1, I can readily see the necessity of insulated joints being placed opposite within interlocking territory, but I cannot see the necessity of them in automatic territory.

Mr. Post (P. R. R.): I think the reason that we placed the joints opposite each other was on account of some failures when the front wheels of the engine were passing over a joint—it was only 15 or 20 ft. between joints. The engine was moving very slowly, and in some way the signals were cleared up while the engine was passing that point.

(A motion to eliminate Paragraphs 15 and 17 and Sections F and H was carried, after which the committee was dismissed with the thanks of the Signal section.)

Report of Committee on Standard Designs

Continuing the work of standardization, the committee presented seven revised drawings covering signal pipe, trunking, switch point drilling, electric lock brackets, insulated switch adjustments and highway crossing gate lamps. Progress was reported on designs for switch fittings and on pipe and screw thread standardization. The investigation of and report on the best types of electric lamps for signal work was a subject assigned and after making various field observation tests, tentative voltage and current ratings, filament construction, bulb sizes, base, light center length and adapters were agreed upon. An adapter submitted for test purposes was approved.



F. P. Patenall
Chairman

F. P. Patenall is completing his seventh year as chairman of this committee. He has long been an active member of the association, having been president of the Railway Signal Association in 1914. He has had some forty-one years' experience in the railroad signal field, having started as a clerk in the signal department of the Lancashire & Yorkshire Railway in England in 1881. He worked for Stevens & Sons, signal contractors, for a year, and came to America in 1885 as an assistant foreman for the Union Switch & Signal Company. He was appointed signal supervisor of the Baltimore & Ohio in 1888 and to signal engineer in 1898.

THE COMMITTEE SUBMITTED for consideration the following revised standard designs and revisions in specifications, with the recommendations that they be approved for presentation at the annual meeting.

- 1115 One inch signal pipe and coupling (revised).
- 1176 Trunking—grooved type (revised)
- 1177 Trunking—built-up type (revised)
- 1199 Switch point drilling (revised)
- 1317 Electric lock brackets for applying locks in mechanical work (revised)
- 1392 Switch point bracket—insulated (revised)
- 1400 Highway crossing gate lamp (revised)

Specification for One Inch Soft Steel Signal Pipe

Section 3. Plugs (Revised). Plugs must be merchant steel 10 in. long, 31/32 in. in diam., drilled for 4 1/4

in. rivets with drill .257; spacing to be 1 in., 2 in., 4 in., 2 in., 1 in., the first and third holes to be in the same plane and the second and fourth holes at right angles thereto.

Specification for One-Inch Wrought Iron Signal Pipe

Section 3. Plugs (Revised). Plugs must be wrought iron or merchant bar steel, 10 in. long, 31/32 in. in diam., drilled for 4 1/4 in. rivets with drill .257; spacing to be 1 in., 2 in., 4 in., 2 in., 1 in., the first and third holes to be in the same plane and the second and fourth holes at right angles thereto.

Standard Designs for Switch Fittings

The committee reported progress. Two drawings showing two types of switch fittings are in process of

completion, and if permissible, the committee will submit these for approval at the annual meeting.

The Best Types of Electric Lamps for Signal Work

The committee reported progress.

Acting on the information obtained at the December, 1920, New York meeting, the committee has diligently prosecuted this matter to further conclusion, in connection with which valuable assistance has been rendered the committee by the lamp and lens manufacturers. For the purpose of field observations, the committee met at Corning, N. Y., in August and October, 1921, and after making various observation tests in the field, the following conclusions were tentatively agreed to:

Voltage Ratings. 3.5, 8, 10, 12, 13.5.

Current Ratings. 0.3 amp. for the 3.5 volt lamp, and 0.25 amp. for the 8, 10, 12 and 13.5 volt lamps.

Filament Construction. C-2 for the 3.5 volt lamp, and C-3 for the 8, 10, 12 and 13.5 volt lamps.

Bulb Sizes. S-11.

Base. Bayonet candelabra single contact.

Light Center Length. 1 1/4 in. measured from the top of the pins of the base to the center of the light source.

Adapters. Where an adapter is necessary in present installations to suit medium screw sockets, fitted thereto will be a single bayonet contact candelabra base and lamp.

A sample of this adapter was submitted to the committee and met its approval, and railroads have ordered a number of these adapters and lamps for practical test. The results will be reported at a later meeting.

Progress of Pipe Thread Standardization

The committee appointed E. K. Post as its representa-

tive to co-operate with the American Society of Mechanical Engineers, and a report concerning the conclusions arrived at is in the hands of the secretary. The American Society of Mechanical Engineers committee has been relieved. The committee recommended that the American Engineering Standards, pipe thread, approved December, 1919, as an American standard by the American Engineering Standards Committee be approved for presentation at the annual meeting.

Progress of Screw Thread Standardization

The committee appointed E. K. Post as its representative to co-operate with the American Society of Mechanical Engineers, and reported progress. The progress report made by the National Screw Thread Commission authorized by Congress, July 18, 1918, was approved June 19, 1920. A copy of this report is in the hands of the secretary.

Committee: F. P. Patenall (B. & O.), chairman; E. K. Post (P. R. R.), vice-chairman; C. A. Christofferson (N. P.), W. A. Hanert (N. Y. C.), C. J. Kelloway (A. C. L.), B. H. Mann (M. P.), J. C. Mock (M. C.), C. H. Morrison (N. Y. N. H. & H.), F. W. Pfeleging (C. P.), M. E. Smith (D. L. & W.), T. S. Stevens (A. T. & S. F.).

Discussion

(On motion, Drawings 1015, 1176, 1177, 1299, 1358 and 1499 were appointed. The specifications for one-inch soft steel and one-inch wrought iron signal pipe were also approved for presentation at the annual meeting, after which the committee was dismissed with the thanks of the Signal section.)

Report of the Committee on Batteries

The specifications for storage battery jars, as given in the committee report, offer a definite outline to be followed in the inspection and tests of either glass or hard rubber jars. Although no reference is made to the materials employed, it is presumed that lead jars are not considered as recommended practice to be used extensively in the signal field. In checking the sizes of the jars a mandrel 1/2 in. larger than the maximum outside dimension and 3/8 in. smaller than the minimum inside dimension is used to determine variations in the walls that would otherwise cause trouble when assembling the battery for service.



Albert B. Himes
Chairman

Albert B. Himes has been chairman of this committee for two years. Mr. Himes entered the service of the Pennsylvania Railroad as a clerk in the motive power department. From 1901 to 1903 he was a batteryman on the Lehigh Valley and the Long Island. During the eight years following 1901, he spent considerable time in the signal departments of the Pennsylvania, the Central of New Jersey, the Union Pacific, the Philadelphia and Reading, and the Baltimore & Ohio, being appointed signal supervisor of the last named road in 1909. He was later advanced to signal inspector and then promoted to assistant signal engineer of the B. & O.

THE COMMITTEE SUBMITTED (1) Specification for storage battery jar, and (2) Specification for cement concrete battery box.

Specification for Storage Battery Jar

1. *Purpose.* (a) The purpose of this specification is to provide for storage battery jars.
2. *Drawings.* (a) Purchaser's drawing accompanying this specification and forming an essential part thereof, is as follows: Drawing 1224.
3. *Material and workmanship.* (a) Material and workmanship shall be first-class in every respect.
4. *Variations.* (a) Variations shall be within the limits specified on drawing 1224.
5. *Inspection.* (a) Purchaser may inspect the material at all stages of manufacture.

(b) Purchaser may inspect the completed product to determine that the requirements of this specification have been met.

(c) If the material has not been accepted at point of production and if, upon arrival at destination, it does not meet the requirements of this specification, it may be rejected and the contractor, upon request shall advise the purchaser what disposition is to be made of the defective material. The contractor shall pay all freight charges.

(d) If purchaser is to make inspection at point of production, it shall be so stated.

6. *Tests.* (a) Tests may be made at point of production or on samples submitted and may also be made at destination.

(b) Contractor shall give the purchaser sufficient notice of time when material will be ready for testing.

(c) Contractor shall provide at point of production apparatus and labor for making the required tests under supervision of the purchaser.

(d) If tests are to be made at point of production, it shall be so stated. Purchaser will distinctly indicate which of the tests herein specified are to be made and what portion of the material shall be tested.

(e) In checking the sizes of jars, a mandrel 1/32 in. larger than the maximum outside dimensions and 1/32 in. smaller than the minimum inside dimensions, as specified on drawing 1224, shall be used. Mandrels shall move freely into the inside of jar for a distance of 5/6 of the depth of the jar and over the outside for a distance of 1 in. from the top of jar.

7. *Packing*, 8. *Marking* and 9. *Warranty* are standard sections adopted in 1919.

The committee recommended the approval of these specifications for presentation at the annual meeting.

Committee: A. B. Himes (B. & O.), chairman; A. H. Me-Keen (U. P.), vice-chairman; R. F. Anear (C. R. I. & P.), J. G. Bartell (L. V.), H. Hobson (A. T. & S. F.), J. F. Jacobs (C. R. R. of N. J.), T. L. Johnson (D. L. & W.), E. W. Kolb (B. R. & P.), H. G. Morgau (I. C.), S. U. Rhymer (C. & A.), F. C. Timmons (D. & H.), E. L. Watson (P. R. R.), A. H. Vocum (P. & R.)

Discussion

B. J. Schwendt (T. & O. C.): There is nothing mentioned as to the kind of jar, glass, rubber, or what.

A. B. Himes (Chairman): It is not provided in any place except in the drawing and the drawing will state it is glass.

Mr. Schwendt: May I suggest that the heading be "specification for glass storage battery jar."

Chairman Himes: The committee will consider that.

(On motion the specification was approved, after which the specification for cement concrete battery box was presented.)

T. S. Stevens (A. T. & S. F.): Has the committee given any consideration to the sheet iron cover?

Chairman Himes: The committee has given consideration to the sheet iron cover, and there is a sub-committee working on that subject now. This is a specification for the box which now appears in the Manual which provides for a cover of this kind.

E. J. Relph (U. P.): Committee 2 agreed that we would change our specification for sand to the following: "Sand shall be clean, sharp and coarse, free from humis content and from foreign matter that may contain a clay dust exceeding 5 per cent."

Mr. Kelloway: In accordance with the proposal which has been agreed upon in Committee 2, I would ask that the paragraph read as follows: "The size and pieces shall range from a minimum of 3/4 in. to a maximum of 3/4 in., in their greatest dimensions."

Chairman Himes: The committee will consider Mr. Relph: We also have added another clause which relates to a test for humis deposit in sand. It reads as follows: "Fill a wide-mouth bottle two-thirds full of the suspected material, and add sufficient 4 per cent solution of sodium hydroxide to fill the bottle. Shake occasionally, and if after 24 hr. solution is not darker than a straw color, it is safe; if very dark it must not be used."

(The committee was dismissed with the thanks of the Signal section.)

Report of Committee on Specifications for Oils

In order that the standard requirements for illuminating oils may be raised, permitting a better grade of oil to be obtained for railroad service, this committee has been making a careful study of the provisions which should be included in such a specification. The result of this study is incorporated in the specification presented for illuminating oil. It requires that the oil shall conform to certain requirements as to color, photometric test, flash test, cloud test, floc test, doctor test, sulphur content, distillation range and moisture. The methods to be employed in conducting the various tests are described in detail with a list of the apparatus required.



Ira S. Raymer
Chairman

Ira S. Raymer is completing his third year as chairman of the committee, having been appointed to this position in 1910. Mr. Raymer began work with the Union Switch & Signal Company in 1898 and in March, 1899 entered the signal department of the Pittsburgh & Lake Erie, on which road he is now signal engineer. In 1900 he became a member of the Railway Signal Club, later the Railway Signal Association and now the Signal section of the A. R. A. He has been active in committee work since 1907, when he was on the committee on Storage Batteries. He was also chairman of another committee of the Association for three years.

THE COMMITTEE submitted for consideration a specification for illuminating oil, with the view of raising the standard requirements.

Specification for Illuminating Oil

- Purpose.** (a) The purpose of this specification is to provide for a grade of illuminating oil for use where a long time burning oil is required.
- Material.** (a) The oil shall be free from water, glue and other foreign matter.
(b) The oil shall conform to the following requirements:
 - Color.** The oil shall be clear and the color shall not be darker than No. 21 Saybolt. The sample shall not be filtered before making color test.
 - Photometric test.** At start of test, flame shall be not less

- thancandle power. At 24-hour period, flame shall not be less than candle power. At 48-hour period, flame shall not be less thancandle power. At 72-hour period, flame shall not be less than candle power. At 96-hour period, flame shall not be less thancandle power. At 120-hour period, flame shall not be less than candle power. At 144-hour period, flame shall not be less than candle power. At 168-hour period, flame shall not be less thancandle power.
- Flash.** The flash point shall not be lower than 115 degrees F. (Tag closed cup.)
- Cloud.** The oil shall not show a cloud at 0 degree F.
- Floc.** The floc test shall be negative and shall not darken the color below No. 14 Saybolt.
- Doctor.** The doctor test shall be negative.
- Sulphur.** The sulphur shall not be more than 0.06 per cent.

8. Distillation Range. The temperature limits for the distillation shall be as follows:

	Fahrenheit
Initial boiling point.....	400 deg.
10% shall be distilled below.....	415 deg.
20% shall be distilled below.....	425 deg.
30% shall be distilled below.....	435 deg.
40% shall be distilled below.....	445 deg.
50% shall be distilled below.....	460 deg.
60% shall be distilled below.....	475 deg.
80% shall be distilled below.....	495 deg.
90% shall be distilled below.....	515 deg.
95% shall be distilled below.....	540 deg.
98% shall be distilled below (End point).....	550 deg.

The distillation loss shall not exceed 2 per cent when the residue in the flask is cooled and added to the distillate in the receiver.

9. Moisture. None.

3. Inspection is covered by standard sections (S. S. 6-b) 1919, (S. S. 6-c) 1919, (S. S. 6-d) 1917.

4. Tests. Tests are according to standard sections (a) (S. S. 7-a) 1919; (b) (S. S. 7-b) 1919; (c) (S. S. 7-c); (d) Samples for test shall be taken from near the bottom of the oil in the container by use of a thief.

5. Marking. (a) Purchaser's order, requisition and package number, name of consignor, and name and address of consignee, shall be plainly marked on outside of package.

(b) Detail list of containers and their contents shall be furnished for each shipment. Where carload shipments are made, routing and car identification shall be shown.

(c) Where carload shipments are made, each container shall be marked showing contents; order number and address may be omitted.

6. Packing. (a) The oil shall be put in clean, dry metal containers of the kind and capacity as specified by the purchaser.

7. Methods of testing. (a) Tests shall be made with the following methods and apparatus:

(b) Color Test: 1. Saybolt universal chromometer consists of two similar glass tubes 20 in. long and about five-eighths inch in internal diameter. One tube is open at both ends; the other (the oil tube) is permanently closed at the bottom with a colorless glass disk. The oil tube is provided with a pet cock on the side at the bottom. The tubes are supported in a vertical position above a mirror arranged to reflect light upward through the tubes. Above the tube is an eyepiece so designed that the field of vision is equally divided between the two tubes. A colored yellow glass disk is placed at the bottom of the open tube.

(c) Photometric Test. 1. The apparatus consists of a standard R. S. A. semaphore lamp, burner and chimney with the interior painted a flat black to absorb reflected rays, and a brass disk 5 in. in diameter by 1/2 in. thick, having a 2-in. circular hole in the center, replacing the lens. A 2-in. brass tube is fitted securely in the hole and extended outward 9.72 in. from the nearest surface of the lamp flame. The interior of the brass tube and disk are made a dull black to absorb reflected rays. A MacBeth illuminometer reading direct candle power is attached to the outer end of the brass tube.

2. Twenty-five ounces of the sample of oil to be tested shall be placed in the fount of the standard lamp, using a standard burner and chimney and a wick that has been washed in ether.

3. The wick shall be adjusted after the lamp has been burning one-half hour to get the best candle power of the flame and shall not be changed again during the test. The photometric value of the flame shall be taken one-half hour after the lamp is lighted and at each succeeding 24-hr. period until the end of the test.

(d) Flash Test. 1. The Tag closed tester consists of an oil cup surrounded by a water bath supported over an alcohol or gas burner. The water bath is provided with an overflow tube to maintain a constant level. The apparatus is provided with a cover, thermometer supports, test flame holder, and gage.

(e) Cloud Test. 1. Place 1 1/2 ozs. of the oil to be tested in a 4-oz. sample bottle. Insert cold test thermometer in the cork so that the bulb is centrally placed in the oil. Keep oil cooled to the specified temperature for 10 min. by placing the bottle in a cooling mixture of cracked ice and salt in proportion of one to two. The salt shall be dry and fine enough to pass through a 20-in. mesh screen. To keep all parts of the oil at a uniform temperature, the bottle should occasionally be given a rotary motion. The oil should not show a cloudy appearance at the end of the test.

(f) Flocc Test. 1. Place a small layer of sand in the bottom of a hemispherical iron dish. Filter if necessary to eliminate suspended matter, 300 c. c. of oil, which shall be placed in a 500 c. c. Florence or Erlenmeyer flask. Suspend the thermometer

in the oil by means of a slotted cork. Heat the bath so that the oil will reach the temperature of 255 deg. F. at the end of one hour, maintaining this temperature with a tolerance of 5 degrees for 6 hours. At the conclusion of the test the oil shall comply with the color requirement and on a slight rotary motion of the flask no suspended matter or floc shall be present.

(g) Doctor Test. 1. Preparation of Reagents: Sodium plumbite or "Doctor Solution." Dissolve approximately 125 grams of sodium hydroxide (NaOH) in a liter of distilled water. Add 60 to 70 grams of litharge (PbO) and shake vigorously for 15 to 30 mins., or let it stand with occasional shaking for a least a day. Allow to settle and decant or siphon off the clear liquid. Filtration through a mat of asbestos may be employed if the solution does not settle clear. The solution should be kept in a bottle tightly stoppered with a cork. Sulphur: Pure flowers of sulphur.

2. Making of test: Shake vigorously together two volumes of oil and one volume of the "doctor solution" (10 c. c. of oil and 5 c. c. of "doctor solution") in an ordinary test tube; or proportional quantities in a 4-oz. oil sample bottle may be conveniently used. After shaking for about 15 sec., a small pinch of flowers of sulphur should be added and the tube again shaken for 15 sec. and allowed to settle. The quantity of sulphur used should be such that practically all of the sulphur floats on the surface separating the oil from the "doctor solution."

3. Interpretation of results: If the oil is discolored or if the sulphur film is so dark that its yellow surface is noticeably masked, the test shall be reported as positive and the oil condemned as "sour." If the liquid remains unchanged in color and if the sulphur film is bright yellow or only slightly discolored with gray or flecked with black, the test shall be reported negative and the oil considered "sweet."

(h) Sulphur Test. 1. Apparatus includes a small lamp, an absorber containing glass beads, a chimney, an exit tube, and a wooden base for the absorbers; filter pump or some other means of obtaining an air suction on the absorber, extra wicking for lamps, rubber tubing for suction connected with exit, a solution of HCL (1 c. c.-0.002275 gm.), a solution of Na₂CO₃ (1 c. c.-0.003306 gm.) and a one per cent solution of methyl oranges. The absorber and chimney should be made of glass having a low solubility. For a lamp one can use a small Erlenmeyer flask (25 c. c.). Insert in the flask a cork, through which runs a glass tube. Inside the glass tube insert a wick made of cotton wicking. A slot should be made on the side of the cork to allow air to enter the Erlenmeyer flask and thus avoid a vacuum.

(i) Distillation Test. 1. Apparatus: Distillation flask and support. The flask used shall be the standard 100 c. c. Engler flask, described in the various text-books on petroleum. Position of vapor tube, 9 c.m. (3.55 in.) above the surface of the oil when the flask contains its charge of 100 c. c. The flask shall be supported on a ring of asbestos having a circular opening 1 1/2 in. in diameter.

2. The thermometer shall be made of selected enamel-backed tubing having a diameter of between 5.5 and 7 m.m. The total length shall be approximately 380 m.m. The range shall cover 30 deg. F. to 750 deg. F. with the length of the graduated portion between 280 and 300 m.m.

3. The condenser shall consist of a thin-walled tube of brass or copper, 1/2-in. internal diameter and 22 in. long. It shall be set at an angle of 75 deg. from the perpendicular and shall be surrounded with a cooling jacket of the through type. The lower end of the condenser shall be cut off at an acute angle and shall be curved down for a length of 3 in. The condenser jacket shall be 15 in. long.

The committee recommended that the specification for tests of illuminating oil be accepted for discussion.

Committee: I. S. Raymer (P. & L. E.), chairman; E. B. Smith (N. Y. C.), vice-chairman; C. H. Burnette (Monongahela); C. F. Jones (Sou. Lines West); L. E. Kinch (P. R. R.), B. F. Oler (P. R. R.), D. S. Rice (L. V.), B. H. Richards (D. & H.), W. S. Storms (Erie), Guy Tuft (P. R. R.).

Discussion

I. S. Raymer (Chairman): There is quite a difference of opinion as to how high the flame should be while the lamp is going through the test. We are pretty much of the opinion now that 1/2-in. flame is high enough for the maximum height, and that probably a 3/8-in. flame is not too low for the minimum height. We have found quite a variation in the performance of the wicks under capillary attraction and that temperature has quite an effect on the illuminating power of the oil. A drop of 50 deg. temperature will cause a drop of the flame of 1/8 in. If any oil has been received or is being received that is not sat-

isfactory, the committee would deem it a great favor if about one gallon of that oil were sent by express to the chairman. We are trying to develop information to determine whether it is not a fact that the distillation test, provided the oil is pure, will not run parallel with the illuminating test.

E. B. Smith: We have been trying to check the photometric test with the distillation range, to try to work the specification out so that the photometric test will tell you what your oil is.

Chairman Raymer: The distillation test is the most valuable test in the oil specification. It shows where the manufacturer has made his cut between gasoline and kerosene and between kerosene and the heavier fuel oil. We do not say anything about specific gravity. We do not want it. We want to have the manufacturer cut somewhere between 350 and 400 between gasoline and illuminating oil, and somewhere about 550 between the illuminating oil and the fuel oil. If we can get that put across, and in addition to that the test which will elimi-

nate the impurities, I believe we will have an oil that will burn for 15 or 20 days.

A. T. Ambach (B. & O.): The committee should consider the method of storage and handling of oil. That is one of the most vital things that the railroads are interested in.

Chairman Raymer: We have no instructions about the handling of the oil in the field, but if it is the wish of the Board of Direction to instruct us to bring in rules on the handling of oil, we would be glad to take that matter up.

Mr. Elliott: I would suggest that the Committee on Committees be instructed to look into that matter. We may have a good specification, yet at the same time we would spoil all we have secured by this good specification by improper methods of handling and storage.

The specification for illuminating oil, No. 5003, was approved for presentation at the annual meeting, and the committee dismissed with the thanks of the Signal section.

Report of Committee on D. C. Relays

In presenting tables showing relays of standard resistances and their operative characteristics the committee has attempted only to show those relays which predominate in railway signal work. The characteristics given are based on careful study and tests, and are presented for discussion. The importance of the relay to proper signal operation is unquestioned and it is essential that it operates under certain working conditions in order to reduce to a minimum false operation which might result in false proceed signal indications. Through the use of these tables, railroads may determine the condition of those relays which it has in service or stock.



Edward G. Stradling
Chairman

Edward G. Stradling is completing his fourth year as chairman of the committee, after having served previously as vice-chairman. He first engaged in signal work on the Union Pacific in 1906. After being with this company for two years, he resigned to accept an appointment as signal inspector on the Chicago, Indianapolis & Louisville, being promoted to signal engineer of this road in May, 1911. His jurisdiction was extended and his title changed to that of superintendent of telegraph and signals in May, 1920. He is a thorough student and has made a particularly close study of direct current relays, resulting in much constructive work.

THE COMMITTEE SUBMITTED a table of standard resistances of relays with their operative characteristics. This consisted of two tables showing relays of standard resistances and their operative characteristics.

Sub-committee B received statements showing that many railroads are using track relays of different resistances than the generally recognized 2 ohm and 4 ohm relays and the committee has endeavored to show, in the table, those relays that predominate. The values shown for the 4 ohm relays are in accordance with the requirements of the 1920 specifications of the Signal section, but the committee is of the opinion that with the improvement of the relay it should be possible to specify more desirable values. To obtain the values shown in both tables a relay mechanism built in accordance with the 1920 specification was used and coils of the various resistances shown in the tables were applied to this mechanism and the values secured for the operative characteristics.

The operative characteristics shown in the tables for the relays of the different resistances with the exception of the 7 ohm and 11 ohm relays were obtained by making tests on the relays of the different manufacturers. The characteristics shown for the 7 ohm and 11 ohm relays were obtained from the relays of only one manufacturer, as the others do not have these resistances. The values

were included in the table on account of the greater efficiency of these two relays, due to the characteristics of their coils.

Committee: F. G. Stradling (C. I. & L.), chairman; C. D. Cronk (N. Y. C.), vice-chairman; W. S. Adams (N. Y. C.), C. M. Acker (D. & H.), E. T. Ambach (B. & O.), B. H. Ayers (L. & N.), E. F. Champlin (Eric), J. I. Chaceoran (N. Y. C.), A. R. Engina (L. & N.), H. W. Lewis (L. V.), H. C. Price (Eric), C. E. Smith (U. D.), J. E. Stewart (D. R. R.), C. F. Stoltz (C. C. & St. L.), L. C. Walters (Son), W. B. Weatherbee (D. L. & W.), F. G. Wesson (C. B. & Q.).

Discussion

E. G. Stradling (Chairman): It appeared to the committee that under Table 1 some of these relays could be eliminated. The wide variety of resistances now used necessitates the manufacturer making and carrying on hand too many different resistances for track relays.

C. G. Stoltz (C. C. & St. L.): In order to get the sense of the meeting, I move that the relays of 7, 11 and 16 ohm resistance, shown in the first table, be eliminated as standard resistances.

T. S. Stevens (A. E. & S. E.): I do not believe any of these should be eliminated if they are used. I see no good reason why we cannot print all of these relays if they are in satisfactory operation. We are not recom-

mending them. They are already in use. We are not discrediting their use if we leave them in.

J. B. Latimer (C. B. & Q.): I agree with Mr. Stevens, that we had better leave this paper alone and accept it as it is. The relay question seems to be the most intricate question we have in our profession.

(An amendment was submitted, after which the motion and amendment was put to a vote and lost.)

C. Drake (C. & N. W.): There is quite a large demand for a lower pick-up, four-ohm four-contact relay. I believe such a relay can be built with a maximum pick-up of 65 mils. which is perfectly safe.

F. L. Dodgson (Ten. Ry. Leg. Co.): If we are going to make any practical use of the relay characteristics of different resistances, these characteristics must be based upon some standard. The resistance of the relay is not a standard, because in order to get the specific resistance and have the coil efficient, that is a full coil, one of two things must be done—either you must use odd sizes of wire or the coils must be left small with a lesser number of ampere turns than are necessary.

Chairman Stradling: I think that is taken care of by

the 1920 specifications, where we state, it should have full wound coil.

TABLE NO. I.
Operative Characteristics,
D. C. Relays Used for Track Circuits.

Nominal resistance	Voltage range	No. of front contacts	Physical resistance at 80° F.	Min. front contact pressure	Satur. amp.	Min. drop away with coil contact	Min. drop away with coil contact pressure	Maximum working current	Maximum working voltage
Ohms	Range	Contacts	Inches	Inches	Amps.	Amps.	Amps.	Amps.	Amps.
2	1st	2	.620	.080	4.0	.021	.41	.04	165
2	1st	4	.615	.080	4.0	.020	.47	.10	200
4	1st	2	.620	.080	4.0	.025	.33	.07	160
4	1st	4	.615	.080	3.0	.025	.37	.07	220
7	1st	4	.615	.080	2.60	.011	.027	.040	.081
9	1st	4	.615	.080	2.32	.011	.028	.040	.088
13	1st	4	.615	.080	1.82	.048	.021	.048	.012
12	1st	4	.615	.080	2.04	.048	.024	.061	.071
15	1st	4	.615	.080	1.90	.048	.021	.064	.067

TABLE NO. II.
Operative Characteristics,
D. C. Relays Used for Line Circuits.

Nominal resistance	Voltage range	No. of front contacts	Physical resistance at 80° F.	Min. front contact pressure	Satur. amp.	Min. drop away with coil contact	Min. drop away with coil contact pressure	Maximum working current	Maximum working voltage
Ohms	Range	Contacts	Inches	Inches	Amps.	Amps.	Amps.	Amps.	Amps.
500	1st	4	.615	.080	.038	.0015	.004	.008	.012
1000	2nd	4	.615	.080	.043	.0015	.004	.010	.013
1000	1st	4	.615	.080	.019	.0011	.0025	.0053	.008
1000	2nd	4	.615	.080	.020	.0011	.0025	.006	.008

Operating Characteristics of D. C. Relays

(The committee was dismissed with the thanks of the Signal section.)

Report of Committee on Power Interlocking

In presenting specifications for the electric wiring of interlocking plants the committee has taken a long step in the direction of standardizing such construction. The requirement that 25 per cent space be allowed for additional wires in trunking or conduit, and the limiting of two wires to the terminal are good points in construction that were not considered in many past installations. Limiting the minimum size of conductors for various circuits and requiring the proper tagging are methods that will prove useful to those following the specifications. The requisite sheets will place a contract on a basis fair alike to the railroad and to the contractor.



Frank William Pffefing
Chairman

Frank William Pffefing is completing his first year as chairman of the committee, having been vice-chairman for one year, prior to which time he was a member of the committee for several years. He has been an active member in the signal field for a number of years, having been chairman of the Signal section during the preceding term. Mr. Pffefing entered railroad service as a signal maintainer on the Chicago & Eastern Illinois in 1899 and left this road in 1901 to join the signal department of the Union Pacific, where he was promoted to the position of signal engineer of the Lines East, the position which he now holds.

THE COMMITTEE SUBMITTED specifications for electric wiring for interlocking plants.

General

- (1) Purpose, and (2) Drawings, are standard sections, 1919.
- (3) Tender.—(a) The tender shall be for an installation meeting with the requirements of this specification. If the contractor wishes to vary from the specification, a tender may be submitted covering the changes he desires to make. This tender shall be accompanied by full information showing wherein the requirements of the specification are varied from.
- (4) Requisite Sheet, and (5) Material and Workmanship, are standard sections, 1919.
- (6) Inspection.—(a) Purchaser may inspect the installation at all stages to determine that the requirements of this specification have been met.
- (7) Tests.—(a) Contractor shall make such tests as may be necessary to demonstrate to the satisfaction of the purchaser that the installation is in accordance with the requirements of the specification. The contractor shall provide such instruments and apparatus as may be necessary for making the tests. The instruments and the apparatus shall remain the property of the contractor.
- (8) Warranty.—(a) Contractor shall replace at his own cost any part or parts of the installation furnished by him which shall within a period of one year from date of acceptance of installation fail to perform its proper function because of any defect in the application or erection of same.

- (9) Clearance.—(a) Clearance shall conform to A. R. A. requirements unless otherwise specified on requisite sheet.

Detailed Specifications

WIRING

- (10) Wiring.—(a) Underground and, or, aerial wiring from the interlocking machine to distributing points and between distributing points shall be multiple conductor cable, unless otherwise specified on requisite sheet. When not more than 10 wires are required, the aerial installation may be of single conductor wire.
 - (b) The wiring between apparatus in tower or power house and distributing points in tower shall be single conductor, unless otherwise specified on requisite sheet.
 - (c) The wiring from distributing points to units operated shall be of single conductor, unless otherwise specified on requisite sheet.
 - (d) Wire in trunking, chases or conduits shall be laid loosely without stretching or crowding, allowing a minimum of 25 per cent space for additional wires.
 - (e) Insulated wires or cables shall be drawn in by straight-away pull and wire shall not be bent or kinked in gripping to pull, or shall not be pulled around corners.
 - (f) Not more than 2 wires shall be connected to one binding post or terminal screw and they shall be separated by a washer.
 - (g) Wire leads to relays or other instruments which may be moved while in service, shall be of flexible wire as specified on requisite sheet.

(h) Wire and cables shall conform to A. R. A. Signal section specification, unless otherwise specified on requisite sheet.

(i) The wiring in tower and other associated buildings, shall be placed in metal conduit, unless otherwise specified on requisite sheet.

(11) **Underground Wiring.**—(a) Braided cable shall be used, unless otherwise specified on requisite sheet.

(b) Underground cable shall be drawn in accordance with A. R. A. specification, unless otherwise specified on requisite sheet.

(12) **Aerial Wiring.**—(a) Multiple conductor cable

1. Aerial braided cable, A. R. A. Signal section specification, shall be used, unless otherwise specified on requisite sheet.

2. Aerial braided cable shall be installed in accordance with A. R. A. specification, unless otherwise specified on requisite sheet.

3. Cables shall terminate in cable boxes, as shown on purchaser's drawings.

(b) Single conductor wiring

1. Line wire shall be as specified on requisite sheet.

2. Line wires shall be supported at each pole by crossarm, pins and insulators.

3. Crossarms, also braces, pins, bolts and other hardware shall be in accordance with A. R. A. Signal section specifications.

4. Line wires shall terminate at a crossarm.

(13) **Cable.**—(a) Cables shall be composed of conductors as specified on requisite sheet.

(14) **Wire Joints.**—(a) Wire joints shall be in accordance with A. R. A. Signal section specification.

(b) Potheads and cable splices shall be in accordance with A. R. A. specifications, unless otherwise shown on requisite sheet.

(c) Joints or breaks shall not be made in other than open line except by permission of the purchaser.

(d) Wire ends terminating on binding posts shall be formed according to A. R. A. Signal section specification unless otherwise specified on requisite sheet.

(15) **Conductors.**—(a) Gauge of conductors shall be of sufficient size to permit operation of apparatus in accordance with A. R. A. Signal section specifications.

(b) No single conductor wires smaller than No. 16 A.W.G. shall be used for interior wiring.

(c) No smaller than No. 14 A.W.G. shall be used for exterior wiring.

(d) Line wire with breaking strength less than that of No. 10 A.W.G. hard drawn copper shall not be used.

(e) In main line cable work spare wires up to 25 per cent and in branch cable up to 10 per cent of the number in use shall be provided, unless otherwise specified on requisite sheet. When spare wires are required in other than cable work, the number and size shall be specified on requisite sheet.

(f) Connections to track shall be in accordance with A. R. A. Signal section drawing, unless otherwise specified on requisite sheet.

(16) **Tagging.**—(a) Each wire shall be identified near each terminal by means of a non-metallic tag or label, on which is stamped the wire designation corresponding to that shown on the circuit and wiring plan.

(b) Where practicable, the tags shall be securely fastened adjacent to the terminal, so that the number can be easily read.

(c) A non corrosive metal tag identifying each line wire shall be nailed to the side of crossarm at each pole where wire terminates, unless otherwise specified on requisite sheet.

(17) **Lightning Arresters.**—(a) Lightning arresters shall be provided as specified on requisite sheet.

(b) Lightning arrester grounds shall conform to R. S. A. specification.

(c) Separate grounds shall be provided for high tension and low tension lightning arresters.

(18) **Wire Terminal.**—(a) Terminal blocks for wire and cable conductors shall be in accordance with R. S. A. 1056 and shall be installed in an accessible position and neatly arranged on terminal blocks in hoistings as shown on purchaser's plan.

(b) Wires used for maintainers' telephone shall be terminated as provided on requisite sheet.

The committee recommended that these specifications be adopted for presentation at the annual meeting.

Committee: J. W. Pileston (U. P.), chairman; B. J. Schwendt (C. & N. W.), vice-chairman; W. C. Sibola (N. Y. C.), vice-chairman; J. J. Altman (K. C. T.), E. T. Ambach (B. & O.), J. L. Ball (D. I. & W.), L. E. Carpenter (P. R. R.), S. L. Dewey (C. & C. S.), L. E. N. Fox (B. & M.), James Gultz (T. & E. A.), N. S. Lynch (Mo. Pac.), J. W. MacCormack (K. T.), W. W. Morrison (N. Y. C.), J. H. Oppelt (N. Y. C.), E. L. T. C. Seibert (C. B. & Q.), Walter Tyler (L. I.),

O. R. Unger (Mo. P.), W. R. Young (G. T.), G. A. Ziehlke (U. P.).

Discussion

E. B. Smith (N. Y. C.): Section 10, Paragraph G, states: "Wire leads to relays or other instruments which may be moved while in service, shall be a flexible wire as specified on requisite sheet." I do not understand what "may be moved" means there. I know several years ago we used flexible wire connections to our relays, but we have them all out today and find much better service by running a solid wire to the relay.

B. J. Schwendt (Vice-Chairman): The committee had in mind shelf pipe relays or any other type.

B. F. Oler (Penna.): It would be well to use eyelets instead of "flexible wire."

Vice-Chairman Echwendt: The matter of making wire ends is referred to further on, and while eyelets are not specified, we specified the method used by the R. S. A., and made provision for other usages that may cover your point. The breaking strength of No. 10 A. W. G. hard-drawn copper is 894 lb. Is this minimum high enough?

W. H. Elliott (N. Y. C.): Would it not be advisable to place the breaking strength of No. 10 A. G. W. hard-drawn copper wire in this specification, to make it clear as to what the desired minimum strength should be?

Vice-Chairman Schwendt: The committee will be very glad to do that.

Mr. Smith: I would like to know if the committee has taken into consideration the use of a smaller wall for the wall insulation on the wire used for the interior work; in other words, go from 5/64 to 3/64 wall for the interior wiring.

Vice-Chairman Schwendt: The tendency seems to be to use smaller wall insulation in tower or interlocking station wiring, and the provision herein will give you that opportunity.

R. M. Phinney (C. & N. W.): In Paragraph 17, the words "high tension" and "low tension" are used. These are indefinite terms, and I suggest that the voltage ranges be specified instead.

Vice-Chairman Schwendt: The committee is glad to accept that.

(The committee was dismissed with the thanks of the Signal section.)



On the "River Division"

Registration of Signal Section, A. R. A.

THE REGISTRATION OF members and guests of the Signal Section of the American Railway Association at the Drake hotel yesterday totaled 334, as compared with a similar registration for the first day two years ago (the last March meeting of the Section) of 346.

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 McKithan, R. B., sig. supr., G. C. & S. F.
 Mumford, R. W., div. engr., C. & O.
 Peet, Wm. H., draftsman, A. T. & S. F., Topeka, Kans.
 Penrod, V. J., Jr., B. & O.
 Pettus, J. K., asst. engr., N. S.
 Prother, I. E., elec. for., C. C. & St. L., Springfield, Ohio.
 Rice, D. S., supr. sigs., I. C., Savre, Pa.
 Ryan, F. J., supr. sigs., I. C., Freeport, Ill.
 Stephenson, sig. engr., Chicago Elevated Ry., Chicago.
 Thompson, S. R., supr. sigs., C. & O., Huntington, W. Va.
 Thompson, Thos. P., sig. for., M. M. & S. E., Marquette, Mich.
 Toucher, Chas. I., chl. sig. draftsman, Mo. Pac., St. Louis, Mo.
 Van Etten, J. H., supr., T. T. & S. C. M. & St. P., Terre Haute, Ind.
 Watters, H. N., div. engr., C. & O.

Board of Direction Meeting

The Board of Direction of the American Railway Engineering Association met in session at the Congress hotel yesterday to complete the work of the year and to prepare for the convention.

Annual Exhibit of the N. R. A. A. at the Coliseum

"Harding" Blue With White Features Decorative Scheme.
All Exhibit Space Taken by 176 Firms

"THE CANOPY MARKS THE ENTRANCE." With these words C. W. Kelly, secretary of the National Railway Appliances Association, concluded his remarks to the writer regarding the annual exhibit of that body which opened at the Coliseum yesterday. By way of the canopy, then, one enters the exhibit area which is located in the Annex and Coliseum, where every available inch of space has been taken up by the 176 exhibiting members at this year's show. The ballroom space has not been utilized, as a result of which it has been necessary in some instances to provide special table space for exhibitors.

The decorative scheme of this year is "Harding" blue with white and is most attractive. The booths are separated by white paneling, edged with "Harding" blue, while the firm names are in green on a white background and here and there the crest of the Association is emblazoned on the paneling. Festoons of yellow material are draped at short intervals across the false ceiling of oatmeal color, which is finished off where it strikes the booths with a flounce of the same material. The "Harding blue" effect is carried out further in the literature and badges.

The four days' attendance is expected to break all previous records, as it will be enlarged this year by the visitors to the March meeting of the Signal Section. Passes have been issued to the number of 13,500 and 75,000 invitations have been sent to railway officers, members of the Interstate Commerce Commission and like bodies, and to technical colleges. As was the case last year, a new record has been made in tickets requested by railway officers for themselves and subordinates; the number this year is greater than ever before. These facts and the large number of visitors on the first day forecast a record attendance.

Though there will be no band concerts this year, other arrangements will remain about the same as in the past. Public stenographers are in attendance and separate registration booths have been provided on the right as one enters the Annex for the members of the American Railway Bridge and Building Association, the Roadmasters' and Maintenance of Way Association, the Scalesmen's Association and the Signalmen's Association. A first class dining room is in operation at the show and great care has been taken to make the food and service of the best. One can therefore eat on the premises and it will not be necessary to go downtown to get a "regular" meal. The Association will hold its annual meeting in this dining room, which is down the stairs on the east side of the Coliseum, Tuesday morning at 11 o'clock.

The exhibit will be open each day from 8 a. m. to 6:30 p. m., with the exception of Tuesday, when the doors will be open until 11 p. m., and the last day, when they will be closed at 1 p. m.

The officers and members of the board of directors of the National Railway Appliances Association for the past year were: President, G. C. Isbester, American Chain Company, Chicago; vice-president, T. W. Aislton, National Malleable Castings Company, Chicago; secretary-treasurer, C. W. Kelly, Kelly-Deby Company, Chicago; honorary director, J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.; directors, E. A. Johnson, Duff Manufacturing Company, Pittsburgh, Pa.; W. J. Gillingham, Hall Switch & Signal Company, Garwood, N. J.; L. W.

Shugg, General Electric Co., Schenectady, N. Y.; A. J. Filkins, Paul Dickinson, Inc., Chicago; A. A. Taylor, Fairbanks-Morse & Co., Chicago; and G. E. Geer, Wyoming Shovel Works, Chicago.

LIST OF EXHIBITORS

The following is a list of firms presenting exhibits, with the devices on display and the names of the representatives present at their booths:

Adams & Westlake Company, The, Chicago.—Signal lamp; lantern, stop sign; long time burners; switch lock; etc. Represented by A. S. Anderson, F. W. Foehringer, Wm. J. Pierson, Chas. B. Carson, J. F. Stender, H. G. Turney and G. L. Walters. Spaces 87, 88, 106 and 107.

Adams Motor & Manufacturing Company, Chicago.—Gasoline operated motor cars. Represented by W. E. Adams, R. S. Adams, W. M. McClintock and L. Gerhardt. Spaces 218 and 218½.

Air Reduction Sales Company, New York City.—Welding and cutting torches; oxyacetylene welding and supplies; oxygen and acetylene gas. Represented by H. H. Melville. Spaces 167, 167½ and 168.

American Abrasive Metals Company, New York City.—Safety treads. Represented by C. A. Barker. Space 172.

American Car & Foundry Company, Chicago.—Electric rivet heater; electric stock heater. Represented by C. P. Dickerman, A. F. Frost and A. G. Wood. Spaces 203 and 212.

American Chain Company, Inc., Bridgeport, Conn.—Welded-weldless chain; railroad specialties; castings and valves. Represented by W. T. Morris, A. P. Van Schaick, G. C. Isbester, A. H. Weston, R. T. Hatch, J. N. Ferguson, M. L. Chase, W. V. Walsh, G. B. Kutz and J. N. Lee. Spaces 81, 82 and 83.

American Hoist & Derrick Company, St. Paul, Minn.—Railroad ditcher. Represented by Helen M. Hoeller, W. B. Maurer, W. L. Manson, F. J. Johnson and J. L. Hickey. Space 88½.

American Kron Scale Company, New York City.—Automatic dial scales. Represented by Carl F. Larson and Ernst Ohnell. Space 125.

American Malleable Castings Association, Cleveland, Ohio.—Certified malleable castings and tests on same. Represented by Frank J. Lanahan and Enrique Touceda. Spaces 181, 182 and 183.

American Radiator Company, Chicago.—Heating outfits for stations and interlocking towers. Represented by J. H. Davis and W. J. Tuttle. Space 190.

American Steel & Wire Company, Chicago.—Wire rope; electrical wires and cables; rail bonds; trolley wire; fence; steel fence posts; steel gates. Represented by L. P. Shanahan, B. H. Ryder, J. W. Collins, A. R. Waterman, A. W. Froude, M. E. Evans and J. F. Alexander. Spaces 51½ and 52.

American Valve & Meter Company, The, Cincinnati, Ohio.—Water columns; Interlocking switch stand; safety switch lock; switch stands. Represented by J. T. McGarry, D. J. Higgins, F. C. Anderson and J. DePinal. Spaces 130, 131 and 132.

American Vulcanized Fibre Company, Wilmington, Del.—Vulcanized fibre for rail joint; steel tie; switchrod; bridge and hand-car insulation; fibre for mechanical and electrical use. Represented by C. W. Sutton, C. C. Bell, H. C. Hackett and John Barron. Space 126.

Argyle Railway Supply Company, Chicago.—Track devices; motive power; freight car specialties. Represented by George W. Bender and A. H. Green. Space 163½.

Armo Culvert & Flume Manufacturing Association, Middletown, Ohio.—Ingot iron culverts and sheets. Represented by G. F. Ahlbrandt, W. W. Lewis, Fred Melhope, H. L. Harris, H. W. Rinearson and A. B. Reineke. Spaces 99 and 100.

Asphalt Block Pavement Company, Toledo, Ohio.—Compressed asphalt flooring; paving blocks. Represented by E. J. Snyder, Fletcher Rogers and J. B. Weed. Space 166½.

Atkins, E. C. Company, Inc., Indianapolis, Ind.—Saws. Represented by L. L. Okey and E. S. Norvell. Space 219½.

Baker R & L Company, Cleveland, Ohio.—Crane truck; elevating platform truck; 3-wheel tractor. Represented by T. W. Barnes. Space 225.

Balkwill Manganese Crossing Company, The, Cleveland, Ohio.—Articulated cast manganese railroad crossings. Represented by Stephen Balkwill. Spaces 201 and 202.

Barrett Company, The, New York City.—Roofing; waterproofing for bridges and building foundations; tunnels and reservoirs;

wood preserving; road beds. Represented by William S. Babcock and Carl T. Bilyea. Spaces 107¹/₂ and 108.

Barrett Cravens Company, Chicago.—Lift trucks; portable floor crane; industrial tractor; steeple platforms. Represented by Edm' J. Heimer, C. F. Martin and V. M. Barrett. Space 14.

Bethlehem Steel Company, Bethlehem, Pa.—Switch stands; solid manganese tongue switches and mates; manard frogs. Represented by N. E. Salisch, G. S. Vickery, Fred Weymouth, B. W. Barnwell, Marshall Carroll, Harry Weymouth, G. H. Riddle, E. B. C. Goyne and J. S. Clark. Spaces 118, 119, 137 and 138.

Blaw-Knox Company, Pittsburgh, Pa.—Clam shell buckets; handy hoses. Represented by Irving G. Jackson, R. D. Allrich, R. B. Randall, I. A. Pfeil, W. H. Schutte, J. H. Flynn and C. H. Lehman. Space 89.

Boss Nut Company, Chicago.—Lock nuts; bolts; rivets and track bolts. Represented by J. A. MacLean, J. W. Fogg, J. P. Crowley, A. W. MacLean, W. G. Wilcoxson, E. T. McAuliffe and C. Beaumont. Spaces 1 and 2.

L. S. Brach Manufacturing Company, Newark, N. J.—Lightning arresters and signal accessories. Represented by G. Gort and L. S. Brach. Space 3.

Brown Hoisting Machinery Company, The, Cleveland, Ohio.—Locomotive cranes; car dumpers; buckets; boat unloaders. Represented by Geo. F. Chimo, J. P. Case and R. L. Meade. Space 4.

Bryant Zinc Company, Chicago.—Railway signal supplies. Represented by S. C. Bryant. Spaces 154 and 155.

Bucyrus Company, South Milwaukee, Wis.—Spreader plows; wrecking cranes; excavating machinery. Represented by Mark J. Woodhull. Spaces 213 and 214.

Buda Company, The, Chicago.—Motor cars; power car with tie tampers and electric bond drill and wood drill; electric head-light; all steel bumping post; switch stand; power unit; jacks; tool grinder; electric crossing gate; car replacers; rolled steel motor car; hand and push car wheels; track drill; bonding drill; track level; track gauge. Represented by L. M. Viles, F. E. Place, R. B. Fisher, C. H. Bull, M. H. Harkless, J. B. Conant, E. J. Conant, E. D. Conant, J. J. Gard, H. M. Sloan, H. L. Miller, C. T. Miller, J. R. Mayeskie, C. N. Bradley, M. A. Ross, W. P. Hunt, H. P. Bayley, G. E. Brvar, J. L. Artmaier, M. A. Evans, G. W. Hoover, J. E. Murray, F. R. Taggart and Wm. S. Weston. Spaces 61, 62, 63, 64 and 65.

Carbic Manufacturing Company, New York City.—Portable lights; motor car lights; welding and cutting outfits; acetylene generators. Represented by D. C. Duncan, A. D. Guthrie, Gordon Paterson and C. H. Bolinder. Space 15.

Carter Blossom Floor Company, Chicago.—Flooring. Represented by M. G. Truman, C. J. Carter, R. G. Stowell, A. B. McHenry, J. G. Galvin and F. L. Bronez. Space 219.

General Electric Company, Chicago.—Wires; cables; tape; lighting units; receptacles; plugs. Represented by A. L. McNeil, J. M. Lorenz, L. R. Mann, E. H. McNeil and R. N. Baker. Space 17.

Challenge Company, Batavia, Ill.—Complete working model of steel structure; 50,000-gallon tank with railroad fixtures. Represented by Frank Snow, E. W. Johnson, J. A. Anderson, D. C. Harker and R. L. Lewis. Space 109.

Chicago Bridge & Iron Works, Chicago.—Conical bottom and elliptical bottom; elevated locomotive water tanks; non-freeze spout fixtures. Represented by Merle J. Trees, H. C. Brown, L. McDonald, J. L. Zeller, H. B. Murphy, Ralph Green, R. M. Campbell, K. J. Small, Wallace Wyman, I. R. Donaldson, C. H. Schuman, C. S. Saugedahl, F. E. Alt, Clint M. Ladd and Cedric B. Smith. Spaces 33 and 34.

Chicago Malleable Castings Company, Chicago.—Two-way rail anchors; rail anchor tie plates. Represented by J. S. Ullwellen, Warren Osborn, W. L. Beudway, G. B. Greene, Geo. W. Stevens, A. R. Anderson and Watter Osborn. Space 142.

Chicago Pneumatic Tool Company, Chicago.—Electric and pneumatic appliances for track work. Represented by H. G. Barlee, A. Andreu, H. S. Runsey, N. S. Thulin and John D. Crowley. Spaces 200 and 215.

Chicago Railway Signal & Supply Company, Chicago.—Signal ing apparatus. Represented by F. W. Vogel, A. C. Dunne, R. S. Froese, A. E. Ferguson, John S. O'Fallon, Sidney Johnson, C. R. Ahrens, D. J. McCarthy, Wm. C. McClintock and C. A. Sahr. Spaces 77 and 79.

Chapman Chemical Engineering Company, Inc., New York City.—Chemical weed killer and equipment for application of chemical. Represented by R. N. Chapman, R. B. Davis and M. McComb. Space 90.

Cleveland Railway Supply Company, The, Cleveland, Ohio.—Steel wheels, wood rails, end guards, flange wheels; tie bolts and iron wheels, cranes. Represented by F. A. Peck, W. P. Stevens, A. W. Winger and C. F. Cary. Space 133.

Crescent Company, Inc., The, Hoboken, N. J.—Rail anchors. Represented by P. F. Erwin, John T. Reagin and Ray Dinklage. Space 7.

Crerar, Adams & Co., Chicago.—Track tools; jacks; track drills; rail saws; bonding drills. Represented by G. D. Bassett, J. A. Martin, Ed Mahlke, W. I. Cloek, E. C. Poehler, C. W. Gregory, Russell Wallace and R. M. Bullard. Space 28.

Deleo Light Company, Dayton, Ohio.—Light plants. Represented by J. A. Harlan. Space 7.

Detroit Graphite Company, Detroit, Mich.—Paints. Represented by T. R. Wyles, L. D. Mitchell, H. I. Miller, W. D. Waugh, C. A. Nye, J. R. C. Hantz, L. F. Flanagan and E. Booth. Space 108¹/₂.

Detroit Steel Products Company, Detroit, Mich.—Steel sash; sidewall sash. Represented by R. S. Bishop, Geo. P. Clagson, R. E. Tackaberg and H. C. Bruce. Space 166.

Diamond State Fibre Company, Bridgeport, Pa.—Methods in miniature of the manufacture of fibre insulation. Represented by G. Swallow, J. B. Rittenhouse and C. J. Simmons. Space 51.

Paul Dickinson, Inc., Chicago.—Jacks; chimneys; roof ventilators; model engine house. Represented by K. E. Cates, J. Brand, H. Knutson and A. J. Filkins. Space 98.

Dilworth, Porter & Co., Inc., Pittsburgh, Pa.—Spikes; tie plates. Represented by W. F. Schleiter and Joseph Dilworth. Space 27.

Direct Sales Company, The, Chicago.—Dry cell battery; carbon brushes; dry graphite; graphite lubricants; graphite paints; commutator stones; safety switches. Represented by Walter R. Pfisterer, Chas. S. Pfisterer, Chas. A. Robinson, C. P. Diebel and J. G. Drought. Space 156.

Doty Business Machines Company, Chicago.—Record calculating machines. Represented by Henry H. Doty, Henry F. Doty, A. C. Morgan, R. K. Buckman and E. H. Spencer. Space 164.

Duff Manufacturing Company, Pittsburgh, Pa.—Track jacks; car jacks; locomotive jacks; journal jacks. Represented by E. A. Johnson, C. N. Thulin, G. E. Wats, C. A. Methiessell, G. E. Anderson and W. G. Robb. Space 89¹/₂.

Edison, Inc., Thomas A., Bloomfield, N. J.—Batteries for signal and switch lighting; aligning instruments. Represented by L. W. McChesney, R. E. Trout, A. J. Loughren, L. S. Dunham, P. A. Garrity, E. W. Newcomb, E. W. Brown, B. F. Hines, F. S. Stallknecht and R. J. Frost. Spaces 18 and 19.

Edison Storage Battery Company, Orange, N. J.—Storage batteries; car lighting and signaling. Represented by D. C. Wilson. Space 20.

Electric Storage Battery Company, Philadelphia, Pa.—Storage batteries; floating systems for signals; highway crossing signal operations. Represented by Godfrey H. Atkin, Harry B. Marshall, H. B. Crantford, H. M. Beck, Stuart J. Dewey, Paul M. Eppers and T. Milton. Space 60.

Ellwell-Parker Electric Company, Chicago.—Heavy duty shop crane; elevating truck; heavy duty 3-wheel tractor. Represented by Joseph M. Brown, L. C. Brown and G. W. Brown. Spaces 226 and 227.

Engineering & Contracting, Chicago.—Copies of Engineering & Contracting Magazine. Represented by Lewis S. Louer, Robert W. Hume and Chas. T. Murray. Space 165.

Fymon Crossing Company, The—Marion, Ohio.—Continuous-rail crossing; cast manganese continuous rail. Represented by Byron E. Wilson, G. T. Wiswell, A. C. Queen and J. H. Fymon. Space 169¹/₂.

Fairbanks, Morse & Co., Chicago.—Gasoline motor cars; stand-pipe; type V oil engine; scale beam; centrifugal pumps; electric motors. Represented by A. A. Taylor, F. M. Condit, J. L. Jones, E. E. Pendray, L. H. Matthews, B. S. Spaulding, E. C. Golladay, F. J. Lee, D. K. Lee, H. E. Vogel, R. F. Lane, E. J. Coverdale, E. M. Underwood, W. F. Anderson, F. J. Davidson, F. D. Drinker, L. C. Flanagan, J. T. Frame, P. H. Gilleland, H. L. Hilleary, K. Jurgensen, G. W. Lewis, Stephen Smith, F. N. Whitesell, M. O. Southworth, S. G. Eaton, C. G. Mahana and H. E. Thompson. Spaces 73, 74, 75, 76, 92, 93, 94 and 95.

Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn.—Motor cars, engines and wheels, inspection cars. Represented by H. F. Wade, W. F. Kasper, W. D. Brooks and J. P. Dunning. Spaces 41, 42 and 43.

Federal Electric Company, Chicago.—Electric lanterns; re-charge batteries; renewable fuses; renewable fuse plugs; multi-phase renewable fuses, electric sirens, charging rack for lantern storage batteries. Represented by F. T. Baird, R. F. Powell, H. W. Neal, E. D. Forges, O. S. Burks and J. W. Curran. Space 169.

Federal Signal Company, Albany, N. Y.—Audible signal; switch current controller, direct current relays; alternating current relays, electric interlocking, electric switch machine; interlocked circuit controllers; automatic signal. Represented by A. H. Renshaw, Paul Renshaw, M. R. Briney, Carl Heuze, H. C. Ware, J. J. Hubbard, J. F. Kelley and S. J. Turrell. Spaces 47 and 48.

H. K. Ferguson Company, The, New York City.—Gap crane for locomotive shops; standard round house. Represented by H. K. Ferguson, H. S. Jacoby and K. C. Ferguson. Spaces 152 and 153.

Flanery Bolt Company, Pittsburgh, Pa.—Nuts and grease cups. Represented by F. S. Fitzsimmons and Wm. M. Wilson. Space 90.



T. W. Aishton, Vice-President
 E. A. Johnson, Director
 A. A. Taylor, Director

A. J. Filkins, Director

J. B. Strong, Honorary Director
 G. C. Isbester, President

C. W. Kelly, Secretary-Treasurer
 L. W. Shugg, Director
 G. E. Geer, Director

W. J. Gillingham, Director

Frog, Swift & Manufacturing Company, The, Carlisle, Pa.—Manganese insert frogs, spring rail frogs. Represented by L. E. Weidman, A. Gordon Jones and T. B. Kennedy, Jr. Spaces 52½ and 53.

General Automatic Scale Company, The, St. Louis, Mo.—Heavy cut automatic weighing devices. Represented by W. F. Siegmund, H. E. Price and E. D. Gordon. Space 134.

General Electric Company, Schenectady, N. Y.—Semi-automatic arc welding—headlight sets; lamps. Represented by J. Roberts, C. C. Bailey, H. M. Jacobs, I. W. Shugg, W. M. Brady and C. Dartniss. Spaces 31, 32 and 33.

General Railway Signal Company, Rochester, N. Y.—Low voltage signal; color light signal; electric interlocking lever and lock; relays; clockwork release; desk controller, etc. Represented by M. Wuerpel, F. W. Moffett, W. K. Howe, F. L. Dodgson, W. S. Henry, S. N. Wicht, P. E. Carter, L. Thomas, C. M. Deardorff, J. R. Wills, J. A. Gemeser, W. H. Workman and H. W. Lucia. Spaces 49 and 50.

Gosso Company, The, Chicago, Ill.—Represented by A. E. Gosso, A. B. Brinker, Thos. Harned, Jr., and L. Jensen. Space 188.

Graver Corporation, East Chicago, Ind.—Water softener. Represented by W. R. Toppin and J. J. Felsceker. Spaces 96 and 97.

Gurley, W. & L. E., Troy, N. Y.—Engineering and surveying instruments; hydraulic engineering instruments, including transits, levels, alidades, compasses, rods, current meters, water stage registers, etc. Represented by H. M. Dibert and C. H. Smart. Space 60½.

Hal Switch & Signal Company, Garwood, N. J.—Color light signals; motor signals; relays; switch controllers and selectors. Represented by H. W. Jiff, W. J. Gillingham, H. L. Hollister, O. S. Field, T. J. O'Meara, J. C. Donaldson and D. R. Day. Spaces 85 and 86.

Hayes Track Appliance Company, Richmond, Ind.—Derrails. Represented by R. H. Gausepohl, S. W. Hayes, L. S. Hillman, H. H. Jenkins, J. C. Lowry, H. J. Mayer and F. C. Stowell. Spaces 140 and 141.

Hazard Manufacturing Company, Chicago.—Insulated wires and cables. Represented by W. S. Hart, H. B. Pfisterer, T. A. Keefe and Sidney Johnson. Spaces 21 and 22.

Headley Good Roads Company, Philadelphia, Pa.—Railroad crossings. Represented by F. X. Kern. Spaces 158 and 158½.

Hughland Iron & Steel Company, Chicago.—Common and refined iron. Represented by W. C. Wolfe and E. J. Murray. Spaces 81, 82 and 83.

Howlett Construction Company, Moline, Ill.—Electric automatic hoist for coaling station; blue prints and photographs coaling stations. Represented by W. E. Howlett and S. M. Howlett. Space 187.

Hulbard & Company, Pittsburgh, Pa.—Railroad track tools; shovels; scoops. Represented by J. V. Smith, W. H. Remmel, S. F. Remmel and O. W. Youngquist. Space 143.

Illinois Steel Company, Chicago.—Rolled steel wheel; spikes; track spikes, screw bolts, track angle bars and joints. Represented by C. B. Friday, O. H. Baker, P. A. Selby, C. R. Moffatt, L. A. McCreb, B. T. Wherry and R. G. Glass. Spaces 70½ and 71.

Ingersoll Rand Company, New York City.—Air operated labor saving tools used in track and bridge construction and maintenance. Represented by W. H. Armstrong, J. N. Thorp, Jr., Chas. Dougherty, J. P. Gillet and Chas. W. Melcher. Spaces 200 and 209.

Johns-Manville, Inc., New York City.—Asbestos roofing, shingles, transite smoke jacks, industrial flooring, electrical materials; asbestos pipe and boiler insulations; piston packings. Represented by J. F. Beck, J. C. Yangle, G. A. Nicol, P. C. Jacobs, P. R. Arntin, C. D. Higgins, G. W. Bush, C. S. Clinegan, E. E. Colburn, L. J. Colby, George Christensen, H. J. Crowe, F. W. Doty, H. Flanagan, C. D. Edson, R. V. Hamaker, W. J. Hennessy, F. J. Hume, J. D. Johnson, B. J. Jordan, M. S. Kelly, W. H. Lawrence, H. L. Leach, A. H. Pardon, C. E. Murphy, H. G. Newman, C. M. Patten, E. J. Owen, H. B. Sewell, R. C. Simmons, A. C. Towne, J. H. Tracy, F. B. Walker and J. S. Willour. Spaces 174, 175, 176 and 177.

Jordan, D. E. Company, East Chicago, Ind.—Spreader, ditch marks and photographs. Represented by A. E. Greenbaum, Al. J. Jones, Carl J. Nelson, A. A. Wahlstrom, Ray Groszove and A. B. Patten. Spaces 17 and 17½.

Kalamazoo Pipe & Steam Pipe Company, Kalamazoo, Mich.—Manganese lined water pipes, manholes, levels, track drills, Ford pipe, etc. Represented by J. M. Kimura, Frank J. McAllister, D. W. Murray, W. E. Wagner, H. R. Miller, W. D. A. Voth, E. G. O'Connell, G. P. L. Williams. Spaces 8, 9, 23, 24 and 25.

Kalamazoo Pipe & Steam Pipe Company, Kalamazoo, Mich.—Waterless tools, etc. Represented by D. A. Voth, W. E. Wagner, H. R. Miller, W. D. A. Voth, E. G. O'Connell, G. P. L. Williams. Space 29.

Kalamazoo Pipe & Steam Pipe Company, Kalamazoo, Mich.—Waterless tools, etc. Represented by D. A. Voth, W. E. Wagner, H. R. Miller, W. D. A. Voth, E. G. O'Connell, G. P. L. Williams. Space 29.

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for surfacing roadways, crossings, station platforms, shop floors, etc. Represented by W. H. Tarvin, Wallace L. Caldwell and W. F. Pollard. Space 161½.

Kerite Insulated Wire & Cable Company, Inc., The, New York City.—Insulated wire; cable. Represented by B. L. Winchell, Jr., Axel Ames, P. W. Miller, J. W. Young, J. A. Renton, E. L. Adams, C. A. Reece, W. H. Fenley and J. A. Hamilton. Spaces 68 and 69.

Keuffel & Esser Company, New York City.—Surveying instruments; measuring tapes; slide rules; drawing instruments and drawing materials. Represented by J. J. Carlisle, Edgar R. Lathrop, H. E. Andrews and J. J. Burggraf. Space 40.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.—Railroad tool grinders. Represented by S. S. Newman and L. J. Cooney. Space 193.

Kilbourne & Jacobs Manufacturing Company, The, Columbus, Ohio.—Photographs of all steel automatic air dump cars. Represented by J. N. Markel and Jess Mossgrove. Space 45.

Koehring Company, Milwaukee, Wis.—Concrete mixer equipped with water tank; batch meter; power charging skip. Represented by K. H. Talbot, W. E. Hughes and G. E. Hillman. Spaces 207 and 208.

L. & R. Culvert Company, Chicago.—Cast iron culverts. Represented by T. F. Landeragan and R. F. Repasz. Space 192½.

Lehon Company, The, Chicago.—Roll roofing; asphalt shingles; waterproof and insulating papers; asphalt paints and coatings; roofing; sill covering; car seal; refrigerator car compound; waterproofing membranes and burlap; waterproofing compounds; asphalt specialties. Represented by Tom Lehon, John Eipper, Charles Jung and E. Franklin. Space 91.

Lorain Steel Company, Chicago.—Switches; frogs; switch stands; special track work. Represented by Carrol Burbon, A. S. Littlefield, S. P. McGough, S. J. Catsworth, W. W. Kingston, J. C. More, E. B. Entwistle and H. C. Stiff. Spaces 204, 205, 210 and 211.

Lutkin Rule Company, The, Saginaw, Mich.—Measuring tapes; wood and steel rules; mechanics' tools. Represented by Robert M. Benjamin, Theo. P. Young and George C. McBeth. Space 121.

Lundie Engineering Corporation, The, New York City.—The plates; duplex rail anchors. Represented by John Lundie, L. B. Armstrong, W. S. Boyce, W. Brooke Moore and Eugene Brandies. Space 70.

M. W. Supply Company, Philadelphia, Pa.—Rail benders; switch heaters and guard rail fastenings. Represented by Chas. Z. Vaughan. Space 101.

MacRae's Blue Book Company, Chicago.—MacRae's Blue Book. Represented by Albert MacRae, Thos. H. MacRae, L. R. Rollins, L. Simonsen, C. Hill, F. O. Rice, G. M. Hamilton, L. A. Walsh, R. S. Jaquith, H. Deeming, W. F. Miller, D. N. Peirce, F. L. McCabe and R. S. Lumley. Space 91½.

Magnetic Signal Company, Los Angeles, Cal.—Three position magnetic flagman; two position magnetic flagman; simplex relay. Represented by H. W. Remick. Space 165½.

Maintenance Equipment Company, Chicago.—Power ballast screen; rail laying machinery; shovels; friction car stop; derail; switchpoint straightener; steel fence posts; tie spacer. Represented by H. C. Holloway, J. A. Roche and F. Overmier. Spaces 194 and 195.

Massy Concrete Products Corporation, Chicago.—Battery receptacles for signal work; concrete telephone booths; reinforced concrete pipe; concrete poles. Represented by C. Gilman, G. H. Redding, D. A. Hultgren, J. A. Higgs, C. H. Hunsaker, P. E. Longstreet, P. Kircher, W. L. McDaniel and D. B. Hanna. Spaces 54 and 55.

McGraw Hill Company, Inc., New York City.—McGraw Hill publications. Represented by Wm. Foxman, F. G. Hudson, F. F. R. Trautman and W. W. DeBerard. Space 185½.

Mechanical Manufacturing Company, The, Chicago.—Bumping posts. Represented by H. E. Johnson and H. C. Huggins. Space 172½.

Metal & Thermit Corporation, New York City.—Welding appliances and rails, welded frogs. Represented by Henry S. Mann and Wm. H. Moore. Space 6.

Metzler, George H., Halifax, Canada.—Portable tram stop. Represented by George H. Metzler. Table space.

Middle Steel & Ordnance Company, Cambria Steel Company, Philadelphia, Pa.—Historical photographs of Cambria plant, rail sections and examples of unusual hogging chips cut from armor plate with high speed steel tools. Represented by J. C. Holding, Stuart Hazlewood, Ward A. Miller and George A. Richardson. Spaces 71 and 72.

Miller Train Control Corporation, Danville, Ill.—Instrument attached to engineer's running brake valve, shoe, housing and connections mounted in table. Represented by H. B. Miller, W. B. Murray, Eugene Murray, F. J. Murray and P. H. Herren. Spaces 197 and 197½.

Milwaukee Tank Works, Milwaukee, Wis.—Gasoline and oil storage tank section houses, oil warehouses and shops. Represented by Lou Davis and W. C. Gibson. Space 229.

Minwax Company, Inc., New York City.—Waterproofing materials. Represented by A. S. Harrison. Table space.

Morden Frog & Crossing Works, Chicago.—Switches; manganese steel frogs; steel yard frog with adjustable blocks; automatic ground throw switch stand; guard rail clamps; switch adjustments; rail braces; slide plates; open side sockets. Represented by W. J. Morden, Joseph Karcher, B. T. Gibbs, George Killmer, W. H. Hartz and H. Macke. Spaces 199 and 216.

Mudge & Co., Chicago.—Motor cars; combination trailer and push cars; pressed steel wheels. Represented by Burton Mudge, Robert D. Sinclair, Karl J. Eklund, H. W. Cutshall, E. R. Borden, J. M. Mulholland, J. K. Vanatta, C. P. Benning, L. O. Stratton and A. L. Pearson. Space 127.

National Boiler Washing Company of Illinois, Chicago.—Stemotomographs. Represented by Spencer Otis, Frederick A. Gale, John S. Maurer, J. M. Weir, T. G. Dalton, F. S. Wichman and F. W. Gale. Space 12.

National Carbon Company, Inc., Cleveland, Ohio.—Caustic soda; cells; carbon products. Represented by J. M. Spangler, A. E. Pratt, W. H. Arkenburgh, D. H. Green, P. G. Pendorf, J. S. Gemmill, R. J. Cox and W. A. Sisler. Spaces 150, 150½ and 151.

National Lead Company, New York City.—White lead; red lead and linseed oil. Represented by A. H. Sabin, W. B. Carlyle, R.

Hass, L. C. Ryan, W. H. Kofmehl, H. W. Schulze, A. N. Lucas, R. Rivett and Wm. Hogan. Spaces 10 and 11.

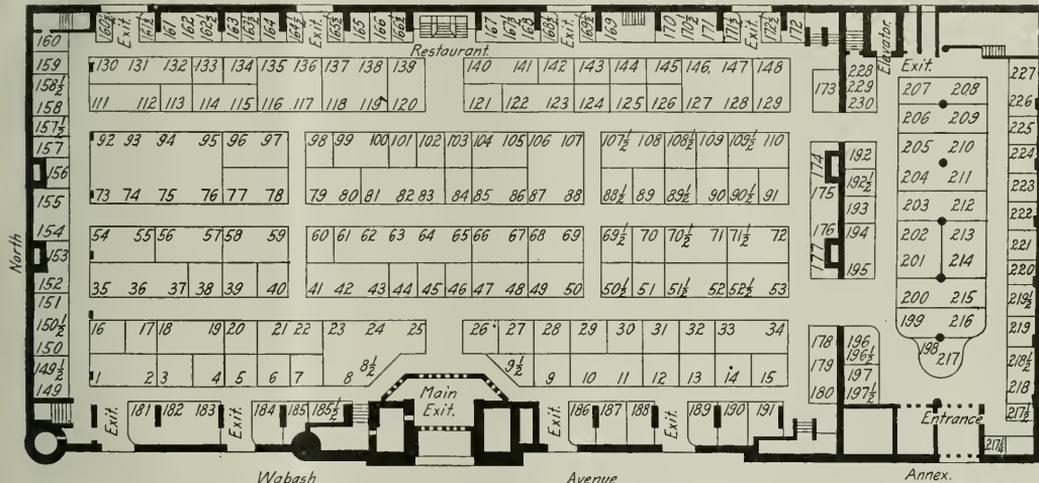
P. & M. Company, The, Chicago.—Rail anti-creeper or rail anchors, and bond wire protectors. Represented by F. A. Poor, Philip W. Moore, Fred A. Preston, Fred N. Baylies, D. T. Hallberg, H. G. Warr, S. M. Clancy, T. J. Byrne, John J. Gallagher, Frank N. Gray, Royal D. Hawley, George E. Johnson, J. E. Mahoney, William A. Maxwell, George E. Olson, William H. Reeves, P. V. Samuelson, L. S. Walker, Perry H. Hamilton and John Ritchie. Spaces 122 and 123.

Page Steel and Wire Company, Bridgeport, Conn.—Welding rods and electrodes; galvanized wire; track bonds, signal and telegraph wire. Represented by W. T. Kyle, C. A. McCune, E. J. Flood and W. A. Berner. Space 84.

Patterson, W. W., Company, Pittsburgh, Pa.—Tackle blocks. Represented by W. W. Patterson, Jr. Space 145.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.—Steel tanks. Represented by Messrs. A. C. Pearsall, H. W. Smith, J. E. O'Leary, O. D. DeHart, I. A. Bickelhaupt, M. P. Cogswell, W. A. DaLee and Max Whitacre. Space 157.

Pocket List of Railroad Officials, The, New York City.—Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Space 26.



Floor Plan of the Coliseum and Annex

E. Wallace, F. A. Gregory, Jr., F. M. Hartley, Jr., W. B. Schofield, Chas. Haws and S. V. Van Riper. Space 9.

National Lock Washer Company, The, Newark, N. J.—Nut locks. Represented by J. Howard Horn, F. B. Archibald, A. T. Thompson, R. L. Cairncross, James J. Crawford, R. B. Cardozo and C. C. Washer. Space 192.

National Malleable Castings Company, Cleveland, Ohio.—Wrecking hooks; rail braces; the plates; bridge washers and spools. Represented by T. W. Aishton, R. W. Chambers, G. A. Fultz, C. H. Krakau, G. R. Rasmussen and L. S. Wright. Space 102.

Nichols, Geo. P., & Bro., Chicago.—Electric turntable tractor; model of electric transfer table. Represented by S. F. Nichols, N. Fries and G. M. Shearer. Space 173.

North Western Motor Company, Eau Claire, Wis.—Motor cars and engines. Represented by F. W. Anderson, A. H. Nelson and R. R. Rosholt. Space 196.

Ogle Construction Company, Chicago.—Model of concrete coaling station, with ground storage and reclaiming equipment in connection. Represented by C. F. Bledsoe, M. W. Powell and J. G. Forster. Space 157½.

Okonite Company, The, Passaic, N. J.—Insulated wires and cables; insulating tapes. Represented by F. Cazenove Jones, Lewis G. Martin, J. Delmar Underhill, Francis J. White and W. R. Van Steenburgh. Space 16.

O'Malley-Bear Valve Company, Chicago.—Globe, angle and check valves; blow-off cocks; locomotive valves; locomotive and car brasses. Represented by Thomas O'Malley, Edward O'Malley, J. N. Gallagher, J. M. Pigott, Walter Morris and J. E. Brown. Spaces 114 and 115.

Osweld Railroad Service Company, The, Chicago.—Welding and cutting equipment; welded frogs; switch points; battered rail joints and track tools. Represented by G. M. Crownover, F. C.

Portland Cement Association, Chicago.—Railway uses of concrete. Represented by D. A. Tomlinson, A. C. Sydel and J. A. Dunn. Space 217½.

Positive Rail Anchor Company, Marion, Ind.—Guard rail plates and fastenings; rail braces; the plates; rail anchors; wire rope clips. Represented by A. H. Told, E. A. LeBeau, L. C. Ferguson and J. T. Gelder. Spaces 178, 179 and 180.

Pyrene Manufacturing Company, Inc., New York City.—Hand fire extinguishers; chemical engines; gas masks; safety devices; safety cleaner. Represented by G. P. Rogers, J. P. Maloney and C. A. Ragland. Space 186.

Q & C Company, The, New York City.—Derails; compromise joints; bonzano joints; insulated joints; guard rail clamps; target stands; rail braces; car and engine replacers; replacer clamps; snaw melters; switch stands. Represented by R. J. McComb, E. R. Packer, L. T. Burwell, Lewis Thomas, E. M. Smith, J. L. Terry, F. F. Kister and C. F. Quincy. Spaces 120 and 139.

Rail Joint Company, The, Chicago.—Rail joints; continuous, compromise and frog and switch joints. Represented by V. C. Armstrong, J. C. Barr, B. G. Braine, E. A. Condit, Jr., Alex Chapman, C. A. Disbrow, J. A. Greer, C. B. Griffin, H. C. Hickey, Chas. Jenkinson, G. H. Larson, Milton Markley, J. N. Meade, J. G. Miller, R. W. Payne, F. C. Runyon, Thomas Ryan, R. R. Seward, E. F. Schermerhorn, McLeod Thomson, F. C. Welby, G. T. Willard, Benj. Wolhaupter, D. P. Wolhaupter and W. P. Thomson. Spaces 79 and 80.

Railroad Accessories Corporation, New York City.—Steel signal blades; power rail drilling machines; channel pins; bonds; lightning arresters; electric brackets. Represented by F. C. Lavarack and E. M. Deems. Space 184.

Railroad Herald, The, Atlanta, Ga.—Reception booth. Represented by E. C. Laird. Space 161½.

Railway Purchases & Stores, Chicago.—Publications. Represented by Edward J. Wray. Space 163.

Railroad Supply Company, The, Chicago.—Tie plates; derailleurs; wig wags; bell signals; relays; time element and car counter; compensating coils for relays; channel pins; lightning arresters; meters; etc. Represented by E. H. Bell, Paul W. Kohnen, H. M. Buck, T. B. Bowman, A. H. Smith, G. W. Xibbe, H. G. Van Nostrand, M. J. Fox, F. M. Hill, R. E. Bell, G. M. Kenyon, F. C. Webb, T. W. Nicholson and Geo. J. Schmitt, Jr. Spaces 104 and 105.

Railway Review, The, Chicago.—Railway Review, publications. Represented by Harold A. Smith, A. E. Hoover, J. E. Gougeon, Chas. L. Bates, C. H. Gertner and W. M. Camp. Space 44.

Ramapo Iron Works, Hillburn, N. Y.—Crossings; switch stands; manganese reinforced flange frogs; manganese reinforced switch point; double shoulder solid bottom switch slide plates; switch heel plates; guard rail clamps; adjustable rail braces. Represented by Thomas E. Akers, J. Edgar Davidson, R. J. Davidson, Jr., W. C. Kidd, Douglas E. Snow, John B. Snow, William W. Snow and James B. Stroug. Spaces 109₂ and 110.

Rawls Machine & Manufacturing Company, Chicago.—Track mower. Represented by S. E. Rawls, S. F. Francks, R. King and W. C. Irwin. Spaces 161, 162 and 162₂.

Raymond Concrete Pipe Company, Chicago.—Operating model of pile driver driving concrete piles; concrete piles and composite piles. Represented by H. D. Raymond, E. D. Watt, A. C. Everham and A. E. Cummings. Space 188.

Reade Manufacturing Company, Jersey City, N. J.—Equipment in operation showing the distribution of weed exterminator by the spray method. Represented by W. L. Geggus, R. C. Robins and R. H. Bogle. Spaces 228, 229 and 230.

Reliance Manufacturing Company, The, Massillon, Ohio.—Nut locks. Represented by H. C. Mull and H. J. McGinn. Space 221. Richards-Wilcox Manufacturing Company, Aurora, Ill.—Door hardware for engine houses and car repair shops; door hangers; overway conveying systems. Represented by A. J. Eggleston, E. J. G. Phillips, A. J. LaFluer, J. H. Wise and T. G. Perry. Spaces 170, 170₂ and 171.

Roberts, Geo. T. Company, The, Dayton, Ohio.—Miniature railroad water treating system in operation. Represented by John C. Jamieson. Spaces 160 and 160₂.

Sellers Manufacturing Company, Chicago.—Anchor bottom wrought iron tie plates. Represented by J. M. Sellers, G. M. Hogan, R. A. VanHouten, T. D. Crowley and R. J. Platt. Space 124.

Sherwin-Williams Company, The, Cleveland, Ohio.—Paints. Represented by P. L. Maury, R. V. Goodremont and W. F. Gallinger. Space 13.

Signal Accessories Corporation, Utica, N. Y.—Directional track instrument; switch point adjusters; signal blades; pipe carrier tops; screw locks; rail braces; foundation extensions; signal blade cleaners; terminals; lamp blocks. Represented by Wm. F. Bossert, Sidney G. Johnson and O. S. Flath. Space 113.

Simmons-Boardman Publishing Company, Chicago.—Railway publications, Railway Age; Railway Maintenance Engineer; Railway Signal Engineer; Railway Mechanical Engineer; Railway Electrical Engineer; Maintenance of Way Cyclopedia; Boiler Maker; Marine Engineering. Represented by L. B. Sherman, Henry Lee, F. H. Thompson, F. C. Koch, R. F. Dusters, J. M. Rutherford, B. J. Wilson, E. A. Lundy, Samuel O. Dunn, E. T. Howson, W. S. Lacher, K. E. Kellenberger, Milburn Moore, C. B. Peck, J. E. Cole, J. H. Dunn, Homer Beach, W. F. Rench and D. A. Steel. Space 46.

Snow, T. W., Construction Company, Chicago.—Water cranes; tanks and fixtures, tower hoists; coaling spouts; bucket loaders. Represented by T. W. Snow, O. T. Snow, B. I. Snow, S. C. Crawford and W. A. Lathrop. Space 50₂.

Templeton, Kerly & Co., Ltd., Chicago.—Lifting jacks. Represented by H. B. Burlow, A. C. Lewis, J. L. Crowley, P. H. McManis, J. S. Dolar, S. A. Nelson, M. T. Evans, J. J. O'Fallon, A. E. Ferguson, E. T. Schroeder, W. K. Kerly, T. L. Simpson, Wm. Simon and A. C. Mills. Space 32.

Thompson Bros. Company, Chicago.—Danger signals. Represented by W. F. Thompson, R. A. Thompson, E. W. Johnson, W. W. Beekwith and G. F. O'Connell. Table space.

Tobac Pipe Threading Machine Company, The, Toledo, Ohio.—Pipe threading and cutting tools. Represented by D. A. Langenacker. Space 31.

Track Supplies Company, Inc., New York City.—Guard rail bolts, rail points, guard rail braces, spikes, anchor plates, bolted, armored insulated track bolts, rail braces, track shims, etc. Represented by W. B. Tice. Space 39.

Traco Control Appliance Company, El Paso, Tex.—Automatic stop. Represented by M. B. Billa and J. P. Naso. Space 171₂.

Truway Anchor Company, St. Paul, Minn.—Rail anchors. Represented by J. L. VanDreuer. Table space.

U. S. Water Engine & Pump Company, Batavia, Ill.—Water pumps; water column valves; automatic control valves; pumps; etc. Represented by Tarkenton and Wood of Tark Materials. Rep-

resented by L. E. Wolcott, J. P. Prindle, F. E. Pearson, C. E. Ward and T. S. Daniels. Spaces 111 and 112.

Union Switch & Signal Company, Chicago.—Signals; relays; switch circuit controllers; rail joints; clockwork time release; detector bar rail clip. Represented by W. P. Allen, C. R. Beall, G. A. Blackmore, W. H. Cadvallader, Roy Clayburn, J. P. Coleman, J. Cozzens, A. Dean, M. L. Gray, H. W. Griffin, H. R. Shene, J. S. Hobson, L. F. Howard, L. V. Lewis, J. L. Locks, George Marloff, W. P. Neubert, H. McCready, J. E. Saunders, W. W. Talbert, J. F. Talbert and V. K. Spicer. Spaces 66 and 67.

Verona Tool Works, Pittsburgh, Pa.—Track tools; levels; gauges; track jacks; nut locks; verona rail springs. Represented by E. Woodings, J. S. Wincerantz, A. T. Richardson, W. W. Glosser, Porter L. Laughlin, F. B. Nimmo and Wm. F. Hart. Spaces 129 and 148.

Volkhardt Company, Inc., Stapleton, S. I., N. Y.—Railroad water hydrants, etc. Represented by Wm. Volkhardt. Space 160.

Wailes Dove-Hermiston Corporation, Cleveland, Ohio.—Protective coatings for steel bridges, tanks, buildings and other structures. Represented by Irving Noonan, J. A. Graves and Wm. P. Tobin. Spaces 149 and 149₂.

Warren Tool & Forge Company, The, Warren, Ohio.—Picks; adzes; track chisels; bars; punches. Represented by H. C. Mull, M. J. Konold and Geo. F. Konold. Space 222.

Waterbury Battery Company, The, New York City.—Unit cylinder cells and renewals. Represented by M. L. Martus, O. B. Frink, G. A. Nelson, G. S. Gaunt and S. J. Hough. Space 38.

Wayne Tank & Pump Company, Fort Wayne, Ind.—Portable rivet heaters; lubricating oils; storage systems; oil burning apparatus; oil filtration systems; water softeners. Represented by Fred H. McCulloch, F. J. Panot and James Stokoe. Space 144.

Werner Machine Company, West Allis, Wis.—Spike shakers. Represented by Ed J. Wind and F. A. Gardner. Space 164₂.

West Disinfecting Company, Chicago.—Insector devices; insecticides; roach powders; fumigators and disinfectants. Represented by H. E. Daniels, W. L. Larry and E. C. Daniels. Space 159.

Western Electric Company, Inc., Chicago.—Electrical lighting; power devices and supplies. Represented by George Hull Porter and Otis B. Duncan. Spaces 58 and 59.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.—Portable arc welding set; industrial motors; industrial control; turbine generator set; head lighter turbine sets. Represented by G. H. Jaspert. Space 191.

Wm. Wharton Jr. & Co., Inc., Easton, Pa.—Manganese steel tipped split switches; manganese steel rail-bound and plain bolted frogs, etc. Represented by H. F. McDermott. Spaces 116, 117, 135 and 136.

Wood Shovel & Tool Company, The, Piqua, Ohio.—Shovels; scoops; machine for testing wear and strength of shovels. Represented by C. L. Butts, M. H. Lytle and J. W. Browning. Space 185.

Woods Bros. Construction Company, Lincoln, Neb.—Standard current retard method of river bank protection, using as the anchors, concrete pile hydraulically sunk below scour. Represented by Bert Faulkner, J. G. Aldrich, Wayne Pringle and S. J. Chakow. Space 224.

Woolery Machine Company, Minneapolis, Minn.—Railway motor car and engines. Represented by H. E. Woolery and C. E. Berg. Space 223.

Wyoming Shovel Works, The, Wyoming, Pa.—Track shovels; picks; scuffle hoes. Represented by H. T. Potter, G. E. Geer and S. H. Smith. Space 103.

Engineers Hear Talk on Building Failures

The failure to employ competent structural engineers in the design of the Knickerbocker theatre at Washington, D. C., and the Masonic temple at Salina, Kans., was the underlying cause of the recent collapse of these two structures. This was the conclusion reached by T. L. Condon, consulting engineer, Chicago, in a paper presented last night to an audience of 260 in the rooms of the Western Society of Engineers. Mr. Condon made careful investigations and detailed reports on each of these failures and was able to show conclusive evidence of gross incompetence in the designs of these two buildings. The roof failure at Washington, which resulted in the loss of 98 lives, was caused by glaringly inadequate structural steel framing. "The lesson in these failures," said Mr. Condon, "is that the structural design of buildings cannot be entrusted to anyone who is not qualified by training and experience to take full responsibility for it."

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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NEW DEVICES

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White oak has long been considered the best of woods available in any commercial quantity for cross tie purposes, a condition which the Committee on Ties duly realized in submitting its plan for a standard test tie. The life of ties varies widely, however, even within the same class of wood, as the discussion brought out and as the committee no doubt realized. Two valuable suggestions were made during the discussion, namely, that the standard test tie shall be all heartwood and that all such ties shall be secured from the same section of the country. Since the number of ties needed for the purpose of establishing a basis of comparison will naturally be small and since the expense will likewise be small, if not even infinitesimal, when the advantages of the plan are considered, why not go a little further? Why not draw up a special specification for a standard test tie more rigid than the regular specification for white oak cross ties and incorporate in it every requirement necessary to secure a tie as uniform in its growth, structure and other characteristics as it is possible to get? Certainly such a specification could be compiled with easily for the limited quantities required and such a specification would render comparisons of tie life far more reliable and trustworthy. There is the objection to this that it might prevent a road from securing and installing standard

Securing the Best Test Tie

test ties but, on the other hand, it is reasonable to assume that any road sufficiently desirous of securing more comparable data through the use of a standard test tie, will not hesitate over the slight additional trouble caused by a more rigid specification.

test ties but, on the other hand, it is reasonable to assume that any road sufficiently desirous of securing more comparable data through the use of a standard test tie, will not hesitate over the slight additional trouble caused by a more rigid specification.

Define instructions for the making of shop or field tests and inspections of signal relays are presented for the first time in the report of the Committee on Electrical Testing. The reliable operation of the relay is of paramount importance in the working of railway signal apparatus. However, too

Testing Signal Relays

many roads neglect the proper inspection of relays at specified intervals, resulting in some cases in serious accidents. These specifications fix concisely the contact opening, the contact resistance, and the drop-away and pick-up values to be adhered to, leaving no room for the inspector to introduce individual opinions or erroneous instructions in this important part of signal maintenance work. It would seem advisable for roads which do not now have a complete system of testing to incorporate these specifications in their rules for signal maintenance.

There is food for thought in President Down's comments on the employment of engineers in railway service.

It Is Up to the Management

In his address yesterday morning he presented two pertinent facts—(1) that the railways are not getting their proportion of the engineering graduates and (2) that in one section of the country at least, the roads are paying the men from the technical schools less, to start, than they are paying firemen, brakemen or switchmen. Of course, the initial employment of the graduate on a railroad is in the nature of an apprenticeship during which he receives a training offering much greater opportunity for advancement than that open to the man entering train service. But whatever the merits from the standpoint of fair compensation, the real problem is a rate of pay for technical graduates which will attract high grade men. The efforts of an organization of technical men to cope with this problem were founded on an unsound premise and have been a conclusive failure. This is a problem for the managements, therefore it is up to the higher engineering officers to bring it to their attention.

The first report of the new committee on Economics of Railway Signaling, was presented at the meeting of the Signal section Tuesday.

Economics of Railway Signaling

The function of this committee is to secure information on the relative economic value of railway signaling installations as a means of protecting and facilitating the movement of trains and causing reductions in the cost of railroad operation. The members of this committee are in a position to secure accurate information presented in terms of dollars and cents regarding the actual economics derived from signal installations now in

service or installations that are proposed. Heretofore the real proof of the economic advantages of automatic signals has been more or less intangible. However, there is every evidence that the Signal section, by means of this new committee, means to show the railroad managements the benefits of signaling. It is to be hoped that the members of the Operating and Engineering divisions of the A. R. A., interested in this subject will give their assistance in the studies to be made by this new committee to the end that the railroads may be advised fully of the possible economies without delay.

Engineer or Railroad Man?

WHAT SHOULD BE the real purpose of the work of the civil engineer in railroad service? It should be the same as that of every man in every branch of the operating department. It should be to help the railways produce more and better ton miles and passenger miles and produce them cheaper.

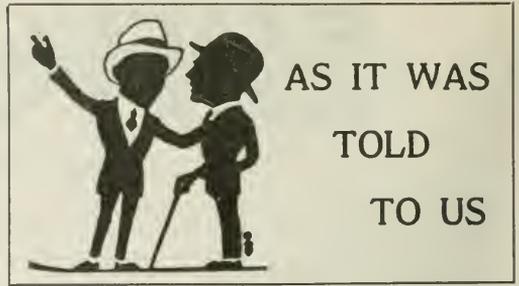
The railroad is simply one kind of a factory. It makes freight and passenger transportation. The only way men in the operating department, whether they be transportation men, mechanical men or engineering men, can contribute effectively toward the success of the railroads is by helping furnish better transportation and furnish it at the minimum practicable cost.

No engineer can do his part in bringing about the desired end unless he is a good engineer. It is equally true that no railroad-engineer can do his work efficiently unless he is a good railroad man. The best designed, constructed and maintained track, bridge or building, does not serve its true purpose unless it is so designed, constructed and maintained as to enable the railway to render service better or at a lower cost.

It is obvious, therefore, that an engineer, to be a real success in railroad work, must know a great deal besides engineering. This thought is implicit in the article by President Ashton of the American Railway Association, which was published in the Daily of March 14, although it is not expressed in so many words. No engineer can be of the greatest practicable value to his railroad unless in everything he does he considers clearly and thoroughly the effect it is going to have upon the efficiency and economy with which passenger and freight service are rendered. But nobody can clearly and fully consider the effect a piece of engineering work is going to have on the efficiency and economy of operation unless he constantly studies and acquires a thorough understanding of the economies of operation.

Unfortunately, some technical men on the railways do not recognize this fact and act accordingly. They study engineering mainly as a distinct science and carry on engineering work as a distinct art, instead of studying thoroughly its relationship to railroad operation and always doing their work with the definite purpose of providing facilities which the maintenance department and the operating department can use with the greatest economy.

It is a notable fact that the engineers who have risen to the highest executive positions on the railways always have been men of all railway men. That is the real test that has to be met to be the highest position. The engineer who never finds in engineering terms, reads only engineering literature and never considers any of the problems of any branch of the railroad business except the engineering part, will always be an engineer rather than a railroad man and will never rise above a subordinate position even in the engineering department. For every important civil engineer in the country is quite conversant with railroad work in its economic part.



The Atchison, Topeka & Santa Fe, Coast Lines, are proceeding with the construction of a second track on 75 miles of line between Yampai, Ariz., and Griffith, which will be equipped with color-light automatic block signals, operated by alternating current.

K. Furukawa, electrical engineer on the Japanese Government Railways, Tokyo, Japan, was in attendance at the Signal section meeting at the Drake hotel yesterday. He also intends to spend considerable time at the Coliseum, investigating various labor saving and other devices which are on exhibit.

The regular weekly luncheon of the Chicago Association of Commerce at the Hotel LaSalle this noon will be conducted under the auspices of the Railway Supplies Division of the association. Samuel O. Dunn, editor of the Railway Age, will speak on The Railway Situation to Date.

Among the roads which are going to heavier rail this season may be included the Great Northern, which has ordered a sufficient tonnage of 130-lb. P. S. rail to lay 5½ miles on sharp curves on its western mountain divisions. Up to the present time, rail of 90-lb. section has been the heaviest used on this road and so far as it is known this is the first instance of rail as heavy as 130-lb. being installed west of Chicago.

The executive committee of the Roadmasters' Association met at the Auditorium hotel yesterday to consider the affairs of that organization. A number of chairmen and members of the committees joined with the executive committee at luncheon at 12:30 after which the afternoon was spent in the consideration of the reports of the committees which will be presented at the convention in Cleveland in September.

Jukichi Fuzine of the South Manchuria railway, Dairen, Manchuria, probably holds the record of having traveled the longest distance to attend the convention. Mr. Fuzine registered yesterday as did also Leon F. Lomblad, consulting engineer, Latiba railway, Honduras, C. A. Mr. Lomblad was formerly chief engineer of the Missouri, Kansas & Texas of Texas.

The attendance at the Signal section stated meeting for the two days was the largest of which there is record, the total registration at the time of closing amounted to 100, 112 of whom were affiliated members and two guests. Five railroad departments were represented at the meeting, men being present from the operating, telegraph, maintenance of way and electrical departments in addition to representatives of the signal departments.

On Friday, March 17, the members and guests of the association are invited to visit the Buffington, Ind., plant of the Universal Portland Cement Company. Transportation to and from the plant will be provided either with motor buses traveling over the boulevard and park system of Chicago, or via a train leaving at 10 a. m. Luncheon will be served at the plant and the return trip made in time to reach the hotels at 3:30.

* * *

The Pittsburgh & Shawmut has recently awarded a contract to the Concrete Steel Bridge Company, Clarksburg, W. Va., for the construction of a reinforced concrete highway bridge at Colwell, Pa. The structure will be 220 ft. long with a 180-ft. span, 24 ft. wide and 110 ft. high. A contract has also been awarded to the Dwight P. Robinson Company, New York, for lining the Mauk tunnel with concrete.

* * *

The Northern Pacific is asking for bids for the installation of automatic block signals between Fargo, N. Dak., and Mandan, 151 miles of which is single track and 53 miles of double track, which will require 383 three-position upper-quadrant signals. This installation will be completed this summer and will constitute the last big gap not automatically block signaled between the Great Lakes and Puget Sound, a distance of about 2,227 miles.

* * *

Hjalmar Aberg, chief engineer, and Ture Hard, chief signal engineer, respectively, of the Swedish State Railways, are visiting the Railway Appliances Exhibit and the Signal convention in company with Hugo Wilson, chief engineer of the Switch and Signal Company of Sweden. Mr. Aberg and Mr. Hard are making an investigation of the application of automatic block signals to electrified track. An important feature of their tour of inspection was a study of the electrified lines of the Chicago, Milwaukee & St. Paul.

* * *

Members of the Santa Fe Signal Supervisors Committee, consisting of several officers of the signal department of the Santa Fe and former members of this organization, held their eighth annual luncheon at the Drake Hotel on March 13. Those present included T. S. Stevens, signal engineer system; L. Brown and G. K. Thomas, assistant signal engineers; H. Hobson, E. Hanson, E. Winans, signal engineers; G. R. Cowherd, signal engineer, E. P. & S. W.; B. T. Anderson, assistant signal engineer, D. L. & W.; H. K. Ferguson, president, The H. K. Ferguson Co.; P. B. Hyde, vice-president, General Battery Co.; J. S. Hobson, western manager, Union Switch & Signal Co., and J. E. Saunders, assistant chief engineer, Union Switch & Signal Company.

* * *

As an indication of the lively interest of the manufacturers of railway supplies in conventions being held by railway associations, it is of interest to note the action taken last Thursday and Friday in Pittsburgh, Pa., by the exhibit committee of the Railway Supply Manufacturers' Association. This committee definitely assigned and received payment for 91,000 sq. ft. of exhibit space on Young's "Million Dollar" steel pier at Atlantic City, out of a total of the 94,000 sq. ft. available for the June conventions of Section V, Mechanical Association; Section VI, Purchases and Stores; the A. R. A., and the semi-annual meeting of the Association of Railway Electrical Engineers. Two hundred and seventy-five exhibitors were given space, leaving only a few scattered spaces yet to be assigned. While some doubt was entertained initially as to the Machinery Hall being fully taken, all spaces in this section were definitely assigned.

Tickets for the annual dinner of the A. R. E. A., which will be held in the Gold room at 6:30, may be secured from W. A. Wallace of the Arrangements committee in the lobby back of the registration booth this morning. General R. C. Marshall, Jr., general manager, Associated General Contractors of America, Washington, D. C., and formerly chief of the Construction Division of the United States Army, will speak on "Some Needs of the Railroads"; Judge James A. Mulligan, Ottawa, Ontario, will discuss "Canada's Destiny," and Gus W. Dyer, Professor of Political Economy, Vanderbilt University, Nashville, Tenn., will talk on "Government and Business."

* * *

The St. Paul Sectional Committee of the Signal section, A. R. A., will hold its fifth meeting at Room 1110, in the Northern Pacific railway general office building, St. Paul, Minn., at 9:30 a. m., on Tuesday, March 28. Papers will be presented on the "Operation, Maintenance and Lubrication of Motor Cars," by W. E. Adams, president, Adams Motor & Mfg. Co.; "Armco Bond Wires for Signal Use," by Mr. McCune of the Page Steel & Wire Co.; "Grounds on Signal Circuits, Their Cause and Effects," by a representative of the General Railway Signal Company, and "Operation of Automatic Block Signals, Single and Double Track," by a representative of the Northern Pacific.

* * *

J. Beaumont, chief engineer for the Regan Safety Devices Company, Inc., interests abroad with offices in London and Paris returned to the United States on February 6, and was appointed vice-president and sales manager of this company, effective March 1. Mr. Beaumont's headquarters will be in Chicago. A. G. Shaver, chief engineer, has been appointed vice-president and chief engineer for this company, effective March 1, with headquarters at Chicago. B. W. Meisel has been promoted from engineer to resident engineer in the sales department, effective March 1. F. J. Le Preau, manager of the railroad department of the Macbeth-Evans Glass Company, has resigned to accept a position as resident engineer with the Regan Safety Devices Company, Inc., with headquarters for the present at Chicago. His appointment was effective March 12.

A. R. E. A. Program

The program of the American Railway Engineering Association for today is as follows, the morning session convening at 9 a. m. and the afternoon at 2 p. m.

V. Track	Bulletin 243
XXIII. Shops and Locomotive Terminals.....	Bulletin 241
I. Roadway	Bulletin 241
XVI. Economics of Railway Location.....	Bulletin 241
XVIII. Electricity	Bulletins 239, 244
XI. Records and Accounts.....	Bulletin 242
IX. Signs, Fences and Crossings.....	Bulletin 242
XIII. Water Service.....	Bulletin 242
XX. Uniform General Contract Forms.....	Bulletin 242

Signal Section Committee Meeting

The following committees of the Signal section, A. R. A., will meet Wednesday morning at 9 a. m., in the offices of the Association, in the Manhattan Building, Chicago.

- Committee V—Sub-Committee 2.
- Committee II—Mechanical Interlocking.
- Committee XIII—Electrical Testing.
- Committee V—Maintenance Rules and Instructions—will meet on Thursday morning at the same office.



The A. R. E. A. in Session at the Congress Hotel Tuesday Afternoon

Railway Engineering Association Proceedings

Crowd at Opening Session Yesterday Morning Taxed
Capacity of Florentine Room

ALL RECORDS OF attendance at an opening session of the conventions of the American Railway Engineering Association were broken yesterday when the meeting was called to order by President L. A. Downs, vice-president and general manager, Central of Georgia. Mr. Downs spoke briefly extemporaneously in lieu of a prepared address after which the reports of the secretary

and treasurer were presented. The association then began the consideration of the reports of the various committees.

Reports were presented by the committees on Yards and Terminals, Economics of Railway Labor, Ballast, Iron and Steel Structures, Standardization, Signals and Interlocking, Ties and Stresses in Railroad Track.

Address of President Downs

WE ARE JUST ABOUT ready to pass the twenty-third milestone in the existence of the American Railway Engineering Association, and I am pleased and happy to advise you that we did not move backward during the past year. Our financial statement is good. I am pleased to advise you that we made all of our expenses and nearly \$1,800 in addition, so that our financial affairs are in very good shape.

Our membership has increased. We received 129 new members into this association during the past year. That is on top of the big drive for membership made in the previous year when there were nearly 600 new members admitted, and we think that the record for last year is very gratifying. We now have a total of 1,960 members in the Association. We dropped an unusually large number of members the past year—115, on account of non payment of dues, the largest number we have ever dropped, but the home was cleaned this year and we have now a good going organization. There were 16 deaths during the past year, among the members of our association, one being C. O. Webb, of the Board of Directors, and another our first president, John L. Wallace.

We have resumed our relations with the American Railway Association in a very creditable manner, and I am pleased to announce to you that this convention is a meeting of the Engineering Section of the American Railway Association and the reports to the American

Railway Association. We have co-operated with other organizations during the past year, especially with the Joint Committee on Concrete and Reinforced Concrete of the American Society of Civil Engineers, and the American Society for Testing Materials.

We have continued our contact, or rather tried to, with the universities. Dean Potter of Purdue University has invited a committee from this association to visit Purdue and it is hoped that a meeting there will be held in the near future. The association has authorized the appointment of a committee to work out a means whereby a better contact with universities could be made. We are very mindful that such a thing is necessary. I regret to say, nothing has been done, but we expect something constructive to be accomplished during this coming year and we hope that something will be done. We need the universities and the universities need us.

I sent a questionnaire to 19 universities a short time ago—19 representative technical schools of the United States—to which I received 15 replies. Out of these 15 replies there were 12 that gave definite information as to their graduates. During the past 10 years, from 1911 to 1921, there were 3,003 graduates in civil engineering, and, surprising as it may seem, only 272 or 9 per cent are working for railroads. I did not find out how many of the men of the engineering departments of the railroads were graduates of engineering schools, but in the case of

two railroads, where I had a count made, that employed about 350 engineers, only about 50 per cent are graduates of technical schools. Something must be done to bring technical men into railroad work.

In the southeast, I made a canvass to discover what wages are paid to the young engineering graduate who desires to enter railroad work in the engineering department, and I found that the average salary is \$118 monthly. I am not in sympathy with the so-called welfare work of another engineering society in its uplifting of wages, but I want to say that if the managers of the railroads of the United States want the services of trained men they must fix some attractive wage for college graduates to start on. When we pay a fireman \$175 a month to start, a flagman \$141, a switchman \$181, a car repairer \$143, and a graduate of a technical engineering school \$118, there is something wrong with the principles of the wages paid on railroads. (Applause.)

The real test of the work of this association is what the railroads are doing with our reports. The real test of the good that we may do is whether they are put into use on the railroads. Every head of every railroad in the United States should put it up to the head of his engineering department and ask him if he is using the reports of the A. R. E. A. on the railroad and if he is not, to give a reason for not doing so. The answers to that question to the heads of the railroads will be constructive criticism, and our association will know its destiny by such reports. I thank you. (Applause.)

Report of the Secretary

Exhibit A, appended hereto, gives a detailed record of the receipts and expenditures, from which the following items are abstracted:

Receipts	\$48,111.75
Expenditures	46,358.46
Excess of Receipts over Expenditures	\$ 1,753.29
Total Cash Assets.....	\$44,742.51

The following is a report on the present membership of the Association:

Membership March 1, 1921.....	1,951
Deceased members	16
Resignations and dropped	115
	—131
Additions during the year.....	128
Loss	3
Total membership March 1, 1922.....	1,948

DECEASED MEMBERS

The losses sustained by death during the year were:

- F. E. Bissell, consulting engineer.
- J. S. Browne, assistant to engineer maintenance of way, New York, New Haven & Hartford.
- F. F. Busteed, ex-general superintendent, Canadian Pacific.
- H. C. Ferris, receiver, Muskogee, Oklahoma & Gulf.
- F. W. Leatherbury, division engineer, Gulf, Colorado & Santa Fe.
- W. H. Given, operating department, Chicago, Rock Island & Pacific.
- J. F. Keegan, general superintendent, Baltimore & Ohio.
- G. C. Millet, assistant to chief engineer, Atchison, Topeka & Santa Fe, Coast Lines.
- Major John W. Moore, assistant engineer, Illinois Central.
- R. J. Parker, general manager, Atchison, Topeka & Santa Fe, Western Lines.

- R. M. Pearce, resident engineer, Pittsburgh & Lake Erie.
- C. W. Pifer, office engineer, U. S. Railroad Administration.
- J. R. Savage, general superintendent, Long Island Railroad.
- Colonel George D. Snyder, consulting engineer.
- John Findley Wallace (past-president), chairman, Chicago Railway Terminal Commission.
- Colonel George H. Webb (director), chief engineer, Michigan Central.
- John Ehrke, assistant to general superintendent, Grand Trunk, Chicago.
- C. H. Niemeyer, acting engineer maintenance on the Pennsylvania System, Williamsport, Pa.

THE REVISED MANUAL

Further time is requested in which to complete work on the revised Manual. Five hundred pages of the volume are already printed. It is now expected to have the Manual ready for distribution about June 1, 1922.

The recommendations adopted at the March, 1921, annual meeting of the American Railway Engineering Association—functioning also as the Engineering Division of the American Railway Association—were presented to the November, 1921, session of the latter organization for endorsement and a great many subjects received such endorsement by the American Railway Association.

STANDARDIZATION

The American Railway Association has taken out membership in American Engineering Standards Committee, and designated a member of the Engineering Division to be its official representative on that body. E. A. Frink, chairman of the Standardization committee of the Association, has been appointed to act in that capacity, with J. R. W. Ambrose as alternate.

Among the matters now pending before the A. E. S. C., with the view of standardization, in which the Association is concerned, are the following: Railroad cross-ties and switch-ties, pipe flanges and fittings, steel railway bridge specifications, grading of lumber, testing of wood, steel forgings, bolt, nut and rivet proportions, steel shapes, insulated wires and cables, overhead crossing specifications, electrical symbols, electrical power control and aluminum for conducting purposes.

AMENDMENTS TO CONSTITUTION

Two amendments to the Constitution were submitted to vote by letter-ballot during the year: (1) To amend Article V, Section 4, paragraph b, and (2) to amend Article VI, Section 2—the first amendment contemplating the inclusion of past or present members of the Board of Direction for eligible candidates for president and for vice-president; and the second amendment requiring the Nominating Committee to select two candidates for vice-president instead of one candidate.

Both amendments having received a majority number of those voting, the two amendments become effective immediately.

The vote on the two amendments is as follows:

For Amendment No. 1.....	658
Against Amendment No. 1.....	58
For Amendment No. 2.....	685
Against Amendment No. 2.....	31

Respectfully submitted,

E. H. FRITCH, Secretary.



**L. A. Downs
President**

EXHIBIT A—FINANCIAL STATEMENT FOR CALENDAR
YEAR ENDING DECEMBER 31, 1921

Balance on hand January 1, 1921.....\$42,989.22

RECEIPTS

Membership Account	
Entrance Fees	\$ 1,970.00
Dues	11,152.15
Subscriptions to Bulletin	11,152.15
Binding Proceedings and Manual	1,652.05
Badges	15.00
Sale of Publications	
Proceedings	4,406.11
Bulletins	1,242.22
Manual	32.80
Specifications	539.35
Leaflets	28.75
General Index	4.50
Advertising	
Publications	2,192.30
Interest Account	
Investments	2,022.50
Bank Balance	65.86
Annual Meeting	
Sale of Dinner Tickets	1,212.00
Miscellaneous	274.52
American Railway Association	
Rail Committee	10,149.49
Total	\$48,111.75

DISBURSEMENTS

Salaries	\$ 6,800.00
Proceedings	9,566.26
Bulletins	12,649.11
Manual	76.05
Stationery and Printing	670.18
Rents, Light, etc.	845.00
Telegrams and Telephone	37.83
Supplies	188.36
Expressage	875.96
Postage	1,016.39
Exchange	99.86
Committee Expenses	77.18
Officers' Expenses	2,227
Annual Meeting Expenses	2,271.37
Refunds Account Duplicate Payments	14.60
Audit	150.00
Reprints of Report Joint Committee on Concrete and Reinforced Concrete	325.00
Rail Committee	10,308.20
Miscellaneous	364.84
Total	\$46,358.46
Excess of Receipts over Disbursements	\$ 1,753.29
Balance on hand December 31, 1921	\$44,742.51

Consisting of:	
Bonds	\$40,565.65
Cash in S. T. & S. Bank	4,151.86
Petty Cash Fund	25.00
Total	\$44,742.51

STRESSES IN TRACK FUND

Balance on hand January 1, 1921	\$ 954.85
Received from interest during 1921	26.47
Total	\$ 981.32

DISBURSEMENTS

Transportation	\$ 9.84
Hotels and Meals	7.30
Supplies	1.98
Total	\$ 19.12

Balance on hand in S. T. & S. Bank, December 31, 1921	\$ 962.20
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Respectfully submitted,

BOARD OF DIRECTORS.

REPORT OF THE TREASURER

Balance on hand January 1, 1921	\$42,989.22
Receipts during 1921	\$48,111.75
Paid out on audited vouchers, 1921	46,358.46

Excess of Receipts over Disbursements.....\$ 1,753.29

Balance on hand December 31, 1921.....\$44,742.51

Consisting of:

Bonds	\$40,565.65
Cash in S. T. & S. Bank	4,151.86
Petty Cash Fund	25.00

\$44,742.51

STRESSES IN TRACK FUND

Balance on hand January 1, 1921	\$ 954.85
Received from interest during 1921	26.47

Total.....\$ 981.32

Paid out on audited vouchers, 1921	19.12
Balance on hand December 31, 1921	962.20

The securities listed above are in a safety deposit box of the Merchants' Loan & Trust Safe Deposit Company, Chicago.

Respectfully submitted,

GEO. H. BREMNFR, Treasurer

Report on Yards and Terminals

In constructing warehouses in connection with l. c. l. freight houses some handicaps may be obviated by organizing a subsidiary company or by leasing to an independent company. It is desirable to eliminate interference between employees and patrons, and this can be done by providing separate facilities for each. The container system for l. c. l. freight shows many possibilities for economical operation. It is believed that no revisions are necessary in the present recommended lump grades in classification yards, and that in many of the lump yards now in existence, a departure yard is not required, while in many others its provision is problematical.



A. Montzheimer
Chairman

A. Montzheimer is completing his first year as chairman, having been vice-chairman for three years, prior to which he had been a member of the committee for 14 years. He has been chief engineer of the Elgin, Joliet & Eastern for 10 years. As this road is primarily a belt and switching line, Mr. Montzheimer has been brought intimately into contact with terminal operations on his own road and through observation with those on connecting lines. He is therefore particularly well qualified to direct the work of this committee in the investigation of subjects which are receiving so much attention from railway officers today.

Conclusions

1. The committee recommended the following definition for insertion in the Manual:

IN APPENDIX A, THE COMMITTEE submitted a report on the handling of freight, etc. A report was also submitted on classification and departure yards in Appendix B.

Sorting Yard.—A yard in which cars are classified in greater detail after having passed through a classification yard.

2. The committee recommended that its reports be received as progress reports.

Committee: A. Montzheimer (E. J. & E.), chairman; Hadley Baldwin (C. C. & St. L.), vice-chairman; J. E. Armstrong (C. P. R.), F. J. Ackerman (K. C. Term.), J. H. Brinkerhoff (N. P.), J. D'Esposito (Chi. Union Sta.), A. W. Eppright, Reuben Hayes (Sou.), J. B. Hunley (C. C. & St. L.), F. E. Morrow (C. & W. I.), O. Maxey (C. R. I. & P.), H. J. Pfeifer (St. L. Term. Assoc.), C. E. Smith (Cons. Engr.), C. H. Spencer (I. C. C.), E. E. R. Tratman (Engr. News Record), C. A. Briggs, Miles Bronson (N. Y. C.), A. E. Clift (I. C. C.), L. G. Curtis (B. & O.), H. T. Douglas, Jr. (C. & A.), E. M. Hastings (R. F. & P.), L. J. F. Hughes (C. R. I. & P.), D. B. Johnston (Penna.), B. H. Mann (M. P.), C. H. Mottier (I. C. C.), S. S. Roberts (Cons. Engr.), J. G. Wishart (C. R. I. & P.).

Appendix A—Warehouses in Connection With L.C.L. Freight Houses

Some of the principal advantages of constructing warehouses in connection with l. c. l. freight houses may be briefly stated as follows:

(1) The development of the air rights above the freight house for warehouse purposes creates an added source of revenue which helps reduce the charge for high land values which would otherwise be absorbed entirely by the freight house.

(2) The warehouse, by being located on the railroad company's property, attracts traffic to the railroad which might otherwise be lost.

(3) The occupant of the warehouse is saved the usual time and expense necessary to truck his goods between warehouse and freight station. In many locations, where streets are narrow and already congested with traffic, this elimination of trucking is desirable, both from the standpoint of the warehouse operator and the municipality.

Some of the principal disadvantages of constructing warehouses in connection with l. c. l. freight houses may be expressed as follows:

(1) There might be created by this arrangement considerable interference between the employees and patrons of the warehouse and those of the freight station, which would be objectionable.

(2) Railroads are not organized to conduct a warehouse business and some of them are legally restricted from engaging in such activities.

(3) A warehouse operated by a railroad company is governed by the regulations of the Interstate Commerce Commission, which is not the case with a privately operated warehouse company. This places the railroad company on an unfavorable competitive basis with the private company.

In numerous cases the last two handicaps have been overcome by the railroad company by either organizing a subsidiary warehouse company to operate the property or leasing it for a period of years to an independent company.

If a warehouse is to be operated most successfully in connection with an l. c. l. freight house, particularly if the latter is of some magnitude, it is desirable to eliminate interference between employees and patrons of the two facilities. It is, therefore, desirable in so far as possible, without a too great duplication, to provide separate and independent facilities for each. This applies particularly to tailboard space, railroad trackage, shipping platform space and elevator service. Adequate facilities should be provided for the warehouse without interfering with the freight house operation. To do this, it is necessary to determine the amount of trackage, tailboard space, shipping platform area and elevator service required for a given warehouse floor area.

Elevators.—The question of amount of warehouse space per elevator is one which does not admit of a definite solution and a very great variation might, therefore, be expected. The more recent installations have elevators with a capacity of four trucks, which requires an elevator platform approximately 9 ft. by 17 ft. It is also evident that the capacity of elevators in pounds has been increased in proportion to their size. There

has also been a tendency to increase the speed, but as an increase in speed very materially increases the cost of elevators the progress in this direction has not been as rapid as in the size and capacity.

In arriving at a suggested area of warehouse floor space per elevator, it is assumed that elevators will be installed of a size sufficient for four trucks, with a corresponding capacity and speed as dictated by modern warehouse practice, which seems to be a capacity of 10,000 lb. per elevator and a speed of 150 ft. per min.

Shipping Platform Space.—By shipping platform space is meant the area of platform adjacent to the railroad siding used exclusively for warehouse shipping. In numerous warehouses this space is made larger than required for shipping purposes in order to provide a small amount of storage space which, under certain conditions, is very desirable. The amount of space actually required in proportion to the total storage area of the warehouse depends largely on the extent to which the warehouse is supplied by rail.

From the data available it would appear that an allowance of 4 per cent would be ample and should allow some space on platform for storage purposes. The information would indicate that 3.5 per cent might be considered a reasonable minimum allowance.

The Amount of Railroad Car Trackage.—The amount of trackage required depends upon the extent to which the warehouse is supplied by rail and whether the shipments are from rail to rail or from rail to team or rail to boat. It is evident that the trackage requirements should be the greatest when shipments are from rail to rail. The length of turnover also influences the amount of trackage required.

Tailboard Frontage.—The amount of tailboard space is dependent upon the frequency of turnover and the extent to which teaming is used as a means of handling goods to and from the warehouse. It would appear from figures presented and observation of the warehouses that an allowance of 1,100 sq. ft. of warehouse floor space per foot of tailboard frontage is reasonable. If we use this figure and the suggested 17,600 sq. ft. of storage space per railroad car, it follows that 16 ft. of tailboard frontage should be provided per car.

Summary.—Summarizing the foregoing report as to the suggested relation between the various factors of design, we have the following, which are suggested for warehouses where the turnover of goods is moderately rapid.

(1) One elevator should be provided for each 40,000 sq. ft. of warehouse space served.

(2) The shipping platform area should be 4 per cent of warehouse storage floor area.

(3) There should be one car length of track siding for each 17,600 sq. ft. of warehouse storage area.

(4) There should be one foot of tailboard frontage for every 1,100 sq. ft. of warehouse storage area.

(5) There should be 16 ft. of tailboard frontage for each car length of siding.

The above figures do not represent exact limits of design, but are indicative of the proper relation which should exist based on experience of the warehouses studied in this report. An idea of the permissible variation from these figures may be obtained by a review of the foregoing tables.

HANDLING L. C. L. FREIGHT BY THE CONTAINER SYSTEM

In the handling of freight by mechanical means a recent development is the use of the container system for moving l. c. l. freight in lots between certain points. This system has been applied mainly to the transfer of freight in cities, but is used also in its transportation between cities. In both cases possibilities have been

developed in economy in time, cost, use of cars and freight house space.

City Transfer of L. C. L. Freight—The committee outlined the systems in use in Cincinnati and St. Louis and on the Chicago, Northshore & Milwaukee.

Inter-City Transfer of L. C. L. Freight—An experiment with railway transportation of freight and express in containers was begun early in 1921 by the New York Central Railroad but no regular service has been established. This system is being tried for handling freight between Cleveland and Chicago, and mail and express matter between New York and Chicago.

Container Systems on Foreign Railways—Both motor-truck and tractor-trailer container systems have been introduced by several European railways, largely for the store-door delivery service which is common in Europe. The railroad transportation of containers has been used by English railways for some years, particularly in handling mails, baggage and parcels where steamer transfer is involved, as on routes to France and Ireland.

Appendix B—Classification Yards, Including Methods of Switching From Classification Yards to Departure Yards

A questionnaire in regard to details of design and operation was sent to the railways which had constructed hump yards since the list appearing on page 133 of Volume 15 of the Proceedings was compiled, and a further questionnaire in regard to methods of switching from classification to departure yards, and in regard to the utility of sorting yards auxiliary to classification and departure yards, for more detailed classification of cuts, was sent to these railways as well as to all of the railways previously listed. A further investigation on the part of the sub-committee indicates that the Peoria & Pekin Union has converted its East Peoria hump yard to a flat yard; that the Nashville, Chattanooga & St. Louis has temporarily abandoned hump operation at Atlanta, and that the Kentucky & Indiana Terminal has abandoned hump operation in its Youngstown Yard at Louisville. Further revisions necessary to bring the list on page 133 of Volume 15 of the Proceedings up to date, in so far as the committee now has information, are the addition of:

Name of Railway	Location of Hump Yard
Canadian Pacific	Fort William Winnipeg City Calgary Vancouver
Central Railroad of New Jersey	Pembiscot, Pa.
Illinois Central	Markham (near Chicago)
Louisville & Nashville	DeCreev (near Cincinnati)
Milwagan Central	Niles
New York, New Haven & Hartford	Cedar Hill Providence
Norfolk & Western	East Portsmouth Wilhamston West Roanoke
Pennsylvania System	Cape Charles Renova Hawthorne (near Indianapolis)

HUMP YARD DESIGN AND OPERATION

An analysis of the information received leads the sub-committee to believe that no revisions are necessary in the present recommended hump grades. Although it is probable that these precise grades cannot be used in any given instance, they are a guide as to the grades which will probably be required under given conditions and if needed can readily be altered, as may be necessary to meet the exact conditions of any given climate or traffic.

The sub-committee believe that where it is possible economically to construct a classification yard of suffi-

cient length and number of tracks to permit of using it as a departure yard without interfering materially with its operation as a classification yard, a departure yard is not required and is an undesirable addition to the layout. When the volume of traffic is such as to require the constant use of the maximum economical classification yard, or when the tracks in the classification yard are shorter than the usual road train and cannot or should not be extended, a departure yard for the purpose of combining short cuts from several classification tracks into a single road train, and for the purpose of storing this road train during the interval between its assembly and the time of its departure, is of very great advantage in relieving congestion in the classification yard and in minimizing terminal delays. When a departure yard has been installed it may also be economically used for a certain amount of additional sorting of cars by flat switching after they have had a preliminary classification over the hump. It should not, however, be installed primarily for this purpose.

When the amount of business will not permit of re-humping cars, relief may be secured by building a flat sorting yard so located that cuts may be pulled from the classification yard by a sorting engine, resorted into these tracks, reassembled, and moved directly into the departure yard. If in any case the amount of re-sorting to be done should attain such magnitude that flat switching in this manner is no longer economical, a second hump yard tributary to all or any part of the classification yard and located between the classification yard and the departure yard in such a manner as to permit of re-humping cars without interfering with the operation of the main hump might be considered. The number and length of tracks required in a sorting yard depends upon the amount of resorting to be done and the number of secondary classifications to be made.

Based upon the information now in hand the sub-committee believes that in many of the hump yards now in existence a departure yard is not required, and that only in isolated cases where a departure yard is used, would a sorting yard be an economical adjunct.

CONCLUSIONS

The sub-committee is not yet prepared to make a definite recommendation as to when a departure yard, or a sorting yard for intermediate switching between the classification and departure yard is required, but submits the foregoing as information.

The sub-committee believes that no alterations should be made at the present time in the hump grades as now recommended.

Discussion

The report was presented by Chairman Montzheimer and the chairman of the sub-committees. Mr. Montzheimer presented the conclusions as given at the head of the report, and his motion that they be adopted was carried.

Chairman Montzheimer: I do not know of any subject that is more important to the railroads of this country than the question of reduction in the preparatory time and the leaving time of trains at terminals. It is a well known fact that there is a lot of time lost from the time the crew is ordered until they get out of the yard, and if the committee can go into the subject and present something that will be of value to this association, I think it will be well worth the time that we put in on the subject.

E. H. Lee (C. & W. I.): This is really a very important question, and I am very glad to see that the committee intends to devote some attention to this particular angle of the terminal situation during the coming year.

The speaker quite a number of years ago had occasion to investigate this precise question and some very astonishing results were developed at that time both to the men who made the investigation and to the men who were operating the railroads. I think our association is particularly well qualified to develop a great many of the fundamental facts on perhaps a great many railroads that many of the engineers, as well as operating men, do not at this time seem to understand.

R. G. Kenly (M. & St. L.): It is the function of this association so to design the engine lead from the house to the departure yard, or vice versa coming in, that it will take into consideration the question of facilities for

pumping up car line car inspection. I think it would be very pertinent if the functions of this committee can be enlarged to take care also of a little bit of the road facility. It has always been my idea that even the poorest of our railroads ought to have a bit of second track extending through its most important yards, and at least, far enough out into the country for the despatcher to get hold of his trainmen.

E. R. Lewis (M. C.): I would like to ask a little further consideration from the committee on subject No. 6, Transfer of laden bad order cars.

(The committee was excused with the thanks of the Association.)

Report of the Committee on Ballast

Time studies of track raising on stone and gravel ballast were utilized in the preparation of diagrams showing the organization and distribution of small ballast gangs. Detailed figures are given on the costs of ballasting, showing the time required as reduced from reports of representative railroads. Old style wooden "D" shovel handles are believed to be uneconomical because of breakage and the waste of material in manufacture. Neither are malleable "D" handles entirely satisfactory. The committee submitted designs for handles as information; and recommended the inclusion in the Manual of specifications for ballast shovels and a design of spot board.



F. J. Stimson
Chairman

F. J. Stimson is rounding out his first year as chairman, after serving as vice-chairman for one year. He has been a member of the committee for 16 years. Mr. Stimson was appointed chief engineer maintenance of way of the Southwestern Region of the Pennsylvania System on the reorganization of that road, which position he has held since March 1, 1920, prior to which time he was a division superintendent for several years. From over 25 years' experience in the maintenance engineering corps of the Grand Rapids & Indiana, during ten years of which time he was roadmaster he has acquired a thorough acquaintance with ballast problems.

IN APPENDIX B THE COMMITTEE submitted data received from various railroads compiled as far as practicable in uniform statements; also diagrams showing the proposed organization and distribution of men in a small emergency ballast raising gang (1) for stone ballast and (2) for gravel ballast. Appendix C gives proposed specifications for track shovels, suggested plans for different types of shovel handles and a plan for a Spot Board.

Conclusions

1. The committee recommended that there be added to the Manual the following definition:

SPOT BOARD—A sighting board laid across the rails in advance of a raising gang to govern the amount of raise and insure uniform grade line.

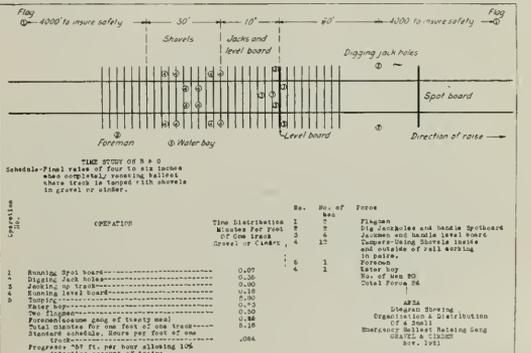
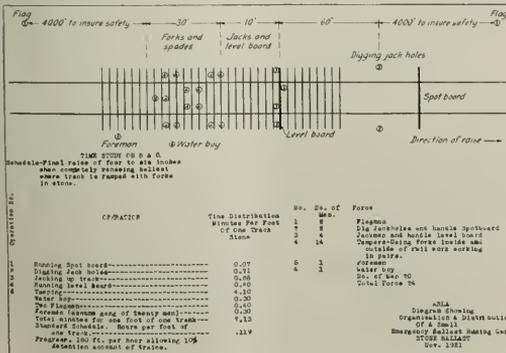
2. The committee recommended:
(a) That the diagrams in Appendix B be approved as recommended practice and printed in the Manual.

(b) That the matter referring to cost of ballast be accepted as information and the subject continued.

3. The committee recommended:
(a) That the specifications for ballast shovels shown in Appendix C be approved as recommended practice and printed in the Manual.

(b) That the plans of track shovels as shown in Appendix C be accepted as suggestions for trial and that the subject of the design of track shovel be continued.

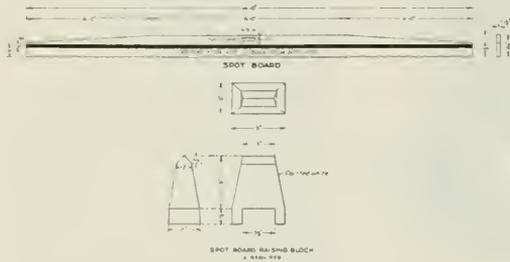
(c) That the plan of Spot Board as shown in Appendix C be approved as recommended practice and printed in the Manual.



Committee F. J. Stimson (Penna.), chairman; G. H. Harris (M. C.), vice-chairman; C. W. Baldrige (A. T. & S. F.), O. F. Barnes (Eric), Theo. Bloecher, Jr. (B. & O.), H. E. Boardman (N. Y. C.), C. J. Coon (Grand Cent. Term.), C. E. Dare (W. S.), H. M. Doughty (D. L. & W.), Paul Hamilton (C. C. C. & St. L.), A. G. Holt (C. M. & St. P.), F. A. Jones (M. P.), J. S. McBride (C. & E. I.), H. L. Ripley (N. Y. N. H. & H.), F. R. Ramsey (T. St. L. & W.), Hans Schantl (M. R. & B. T.), M. A. Stainer (F. W. & D. C.), Paul Sterling (N. Y. N. H. & H.), D. W. Thrower (L. C.), P. H. Winchester (N. Y. C.), Leif Winship (M. P.).

Appendix B—Application of Ballast

From time studies of raising track on both stone and gravel ballast, which were made available by the Baltimore & Ohio, diagrams were prepared showing the organization and distribution of small ballast gangs for the two classes of ballast, stone and cinders or gravel.



Details for a Standard Spotboard

It is considered that so far as application is concerned cinders and gravel will require the same kind of gangs. The diagrams as presented are recommended for adoption as recommended practice.

COST OF BALLASTING

A form which was prepared and sent out the early part of last year, asking for reports of the costs of ballasting in detail, brought replies from four railways.

Table No. 1—A, B, C, D and E, give the figures taken from the reports which were returned in the form asked for by the committee.

TABLE I-A—TIME REQUIRED AND COST OF SKELETONIZING TRACK PER CUBIC YARD OF MATERIAL REMOVED

Railway	Single or Double Track	Kind of Material	Number of Men in Gang		Time Removing Material From		
			Foremen	Men	Crib	Center Ditch	Shoulder
6	Cleaning	Stone	1	13	70 min	53 min	33 min
7	Ballasting	Gravel	1	11	25 min	20 min	18 min
8	Ballasting	Dirt	2	13	19 min	52 min	6 min

Depth Cut	Cu. Ft. Material Removed Per Foot of Track		No. in Gang	Total Time Per Yd.	Time Cu. Yd. Lost Per Yd.	Total Time Per Ft.	Total Time Per Mile
	Double	Single					
10"	1.5	1.0	10	10 min	10	10 min	1056
12"	1.43	0.96	10	9 min	9	9 min	544
14"	1.38	0.90	10	8 min	8	8 min	484

TABLE I-B—TIME REQUIRED AND COST OF UNLOADING BALLAST PER CAR LOAD

Railway	Kind of Ballast	Kind of Car	Plow or Drag	Number of Men		TIME		
				Foremen	Men	Placing Plow or Drag	Releasing Bottoms	
6	Cleaning Ballast	Stone	Hopper	1	17	5 min.	3	3 min.
7	Ballasting	Stone	Hopper	1	10	4 min.	4	4 min.
8	Ballasting	Gravel	Reg. Bal	2	13	4 min.	1	1.5 min.
9	Ballasting	Chats	Reg. Bal	1	8	0.5 min.	6	min.

Placing Stay Post	TIME				Yards Per Car	Linear Ft. Track Per Yard	Yards Per Mile	Total Time Per Car	Total Hours Per Mile
	Shoveling Down	Winding Up	Lost						
8 min.	140 min.	8 min.	266 min.	30	3.3	2685	435 min.	645	
2 min.	5 min.	5 min.	38	1.44	3152	20 min.	75		
	27 min.	8 min.	93.5 min.	25	2.7	1950	135 min.	254	
				3.47	1520	135 min.	90		

TABLE I-C—TIME REQUIRED AND COST OF PLACING BALLAST PER LINEAR FOOT OF TRACK

Railway	Kind of Ballast	No. of Men		Average Height First Raise	Running Spot Board	Digging Jack Holes	Jacking Up Track
		Foremen	Men				
6	Cleaning Ballast	1	14	3 in.	1.66 min.	2.1 min.	4.66 min.
7	Ballasting	1	40	12 in.	0.5 min.	0.5 min.	2.0 min.
8	Ballasting	3	18	6 in.	0.21 min.	0.42 min.	1.0 min.
9	Ballasting	2	57	4 in.	0.024 min.	0.24 min.	0.48 min.

Running Level Board	Forking and Tamping	Water Boy	Flag and Protection	Foremen	Total Time Per Linear Foot	Amount of Interference	Hours Per Mile
4.1 min.	9.3 min.	0.9 min.	5.91 min.	3.8 min.	28.96 min.	8.5%	2540
0.5 min.	14.5 min.	0.5 min.	1.0 min.	0.5 min.	20 min.		1760
0.21 min.	4.30 min.				6.14 min.		540
0.20 min.	9.136 min.	0.36 min.		0.24 min.	10.65 min.		940

TABLE I-D—TIME REQUIRED AND COST OF DRESSING BALLAST PER LINEAR FOOT OF TRACK

Railway	Single or Double Track	Kind of Material	No. of Men		Building Shoulder	Lining Edge of Ballast
			Foremen	Laborers		
6	Cleaning Ballast	Double	1	9	6 min	6 min.
7	Ballasting	Double	1	11	3.75 min	2.5 min.
8	Ballasting	Single	2	9	2.90 min.	1.8 min.
9	Ballasting	Single	1	56	2.10 min	1.8 min.

Dressing Between Rails	Dressing Center Ditch	Moving Surplus Ballast	Foremen	Total Time Per Linear Foot	Total Man-Hours Per Mile
4.9 min.	4.0 min.	8.0 min.	3.21 min.	20.80 min.	11'
1.375 min.	1.375 min.	5.0 min.	1.28 min.	14.5 min.	1276
1.10 min.		1.15 min.	1.72 min.	8.35 min.	733
3.0 min.		1.29 min	0.15 min.	8.35 min.	782

TABLE I-E—RECAPITULATION—COST OF BALLASTING COST PER MILE EXPRESSED IN PAY-ROLL HOURS

Railway	Kind of Ballast	Single or Double Track	Kind of Cars	Hours Skeletonizing Track	Unloading Ballast	
6	Cleaning	Stone	Double	Hopper	9474	\$26 hr.
7	Ballasting	Stone	Double	Hopper	1379	75 hr.
8	Ballasting	R. Gravel	Single	Reg. Bal	684	254 hr.
9	Ballasting	Chats	Single	Reg. Bal	1204	90 hr.

First Raise	1 in. loading Ballast	Second Raise	Dressing Ballast	Lining Track	General Supervision	Total Labor	Work In Progress	Train Car Hours
894 hr	80 hr	830 hr	1984 hr	464 hr	178 hr	16672	78.1	91.6
760 hr	80 hr	600 hr	1276 hr	80 hr	150 hr	5530	26.0	550.0
540 hr			733 hr		16 hr	2170	21.0	462.0
440 hr		140 hr	753 hr	80 hr	10 hr	2913	12.0	40.0

RECAPITULATION

Cost per mile of single and double track.						
(1) One raise, giving from four to six inches of ballast under ties.						
Ballast Delivered in	100,000-lb. Gondolas		100,000-lb. Hoppers		Roger Ballast Car	
	Single	Double	Single	Double	Single	Double
Stripping track	732	1667	732	1667	732	1667
1—Unloading ballast	186	460	34	87	22	51
2—Unloading ballast	866	1732	866	1732	866	1732
3—Unloading ballast	186	460	34	87	22	51
Dressing ballast	1225	1468	1225	1468	1225	1468
Total	3195	5787	2801	5041	2867	4969
Plus W. T. Service in 8-hr. days..... 5.2 12.8 1.0 2.4 1.6 3.8						
Cost per mile of single track and double track.						
(One) Two raises, giving from 10 to 12 inches of ballast under ties.						
Ballast Delivered in	100,000-lb. Gondolas		100,000-lb. Hoppers		Roger Ballast Cars	
	Single	Double	Single	Double	Single	Double
Stripping track	732	1667	732	1667	732	1667
1—Unloading ballast	186	460	34	87	22	51
1—Raising track	523	1045	523	1045	523	1045
2—Unloading ballast	186	460	34	87	22	51
2—Raising track	866	1732	866	1732	866	1732
3—Unloading ballast	186	460	34	87	22	51
Dressing ballast	1225	1468	1225	1468	1225	1468
Total	3904	7292	3448	6173	3412	6065
Plus W. T. Service in 8-hr. days..... 7.8 19.2 1.5 3.6 2.4 5.7						

The costs of ballasting given above, are the bona fide figures presented by representative railways of the United States of America and of Canada, and are offered to the association as information.

Appendix C—Ballast Tools

The report of the committee presented to the 1921 convention included a suggested design for a track shovel. The sub-committee during the past year investigated the matter of handle design with special reference to the "D." It is found that the old style wooden "D" handle requires in its manufacture a large waste of material and also is very apt to be broken in use, thereby resulting in the loss of the entire shovel unless some other form of "D," which can be applied to a handle with a broken "D," is available. The malleable iron "D" as furnished in the past has not been altogether satisfactory, largely, it is felt, because of the metal spool or hand hold.

With a view to developing the utility and practicability of "D's" which can be applied to handles without "D's" the committee has prepared the designs which are shown herewith. It is hoped that the types of handles shown will be tried out and the committee will be able to secure information which will enable it to recommend a definite design.

The sub-committee has also prepared a design for a spot board with the necessary holders and raising blocks. This follows the design which is quite generally used on various railroads and is recommended for adoption as recommended practice and inclusion in the Manual.

SPECIFICATIONS FOR BALLAST SHOVELS

Scope.—1. These specifications cover ballast shovels.

Material.—2. Blades shall be open hearth, crucible or alloy steel.

3. Straps shall be of softer steel than blades.

4. Handles shall be smooth and properly seasoned of the best grade straight, grained, commercial XX second growth, northern ash.

Design.—5. The dimensions of shovels shall conform to plans which are made a part of these specifications.

6. Carbon steel blades shall be not less than No. 13 gage and alloy blades shall be not less than 14 gage U. S. standard.

7. The straps shall be one gage heavier than the blade and rolled down to one gage lighter at the extreme and farthest end and shall be welded or riveted to the blade.

8. The straps shall be pressed flush with the handle. All the rough edges pressed down to uniform surface with the other parts of the handle and fastened to the handle by three rivets, the edges of which shall be pressed down flush with the surface of the straps.

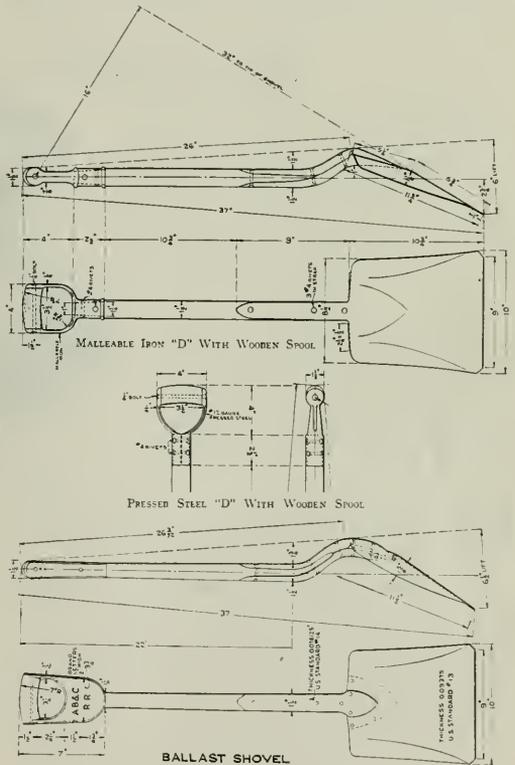
Physical Properties.—9. Shovels shall be made in a workmanlike manner and free from all defects. The handles shall be bent to shape and free from knots, shake, wane or worm holes.

10. The blades shall be of natural color and coated with a high proof rust preventative and the entire strap shall be polished. 11. Blades shall show a Brinell hardness of not less than 300, readings to be taken anywhere on the blade, and the Brinell readings shall not show greater than 400 in a carbon blade or 470 in an alloy blade.

12. The shovel as a whole shall not be deformed permanently more than 1/2 inch of its lift after six 2-minute applications made at 2-minute intervals of the following test:

The point of the blade shall rest on a support; at a point 10 1/2 inches from the edge of the blade, a chain shall be passed over the heel of the blade and drawn up and blocked with no slack and to be fastened to an eye-bolt in the floor; a ratchet jack standing on a platform scale shall be placed under the "D" of the handle and the jack pumped until 175 lb. (plus the weight of the jack and the paraphernalia used in making the test) is registered on the beam of the scale.

13. The manufacturer's name, quality of the steel and the date of manufacture shall be stamped plainly on the back strap and



Details for Standard Shovels

the name of the railroad shall be stamped on the front strap of each shovel.

Inspection.—14. For the Brinell test and the test of strength, the inspector shall select at random one shovel from every ten dozen of each type purchased and should this shovel fail to meet the requirements in paragraphs 11 and 12, two more shovels shall be selected from the ten dozen and both must meet the specification requirements.

15. Inspection of tools shall ordinarily be made at the place of manufacture. The manufacturer shall notify..... of the railroad company at least..... days in advance when shovels will be ready for shipment.

16. The manufacturer shall allow the railroad company's inspectors such access to the work as may be necessary to satisfy them that the provisions of these specifications are carried out.

17. The manufacturer shall furnish, without charge, all necessary facilities, and assistants, for making thorough inspection and tests at the works.

Rejection.—18. Individual tools, defective in any respect, and lots of tools not meeting the above requirements, shall be rejected.

Discussion

(The report was presented by Chairman Stimson, who moved the adoption of the definition for "spot board." The motion was carried. C. W. Baldridge (L. A. T. & S. F.) as chairman of the sub-committee on application of ballast, presented Appendix B and moved the adoption of the chart on gang organization. The motion was carried. A. G. Holt (C. M. & St. P.) as chairman of the sub-committee on ballast tools presented Appendix C.)

Chairman Stimson: While the recommendation of the committee is to the effect that the specifications for ballast shovels shown in Appendix C be approved as recom-

mended practice and printed in the Manual, it has seemed best to make these specifications in the nature of information instead of recommended practice, I therefore move that the specification for ballast shovels in Appendix C be accepted as information.

(Upon a question by President Downs it developed that the Ballast committee had not conferred with the Track committee with respect to the shovel designs, with the result that two designs were submitted.)

E. A. Frink (S. A. L.): It seems to me that both the specification and the design for shovels is exactly in the proper shape for presentation to the American Engineering Standards committee. I move to amend the motion before the house by substituting this motion: That the design and specifications for shovels prepared by this committee on Ballast be presented to the American Engineering Standards committee for their procedure.

(The motion as amended was carried and the committee was dismissed.)

Report on Iron and Steel Structures

Three changes are recommended in the general specification for steel railway buildings, 1920. Specifications for the erection of steel bridges are submitted for information. These specifications cover the erection of fixed spans less than 300 ft. long and include terms, materials, bearings, equipment, etc. The committee also submitted specifications for movable railway bridges, with specific and detailed rules for the design and manufacture of such structures as a guide to the designers and the shops. The specifications are based on the best general practice in the accepted types now in use on standard American and Canadian railways.



O. E. Selby
Chairman

O. E. Selby is completing his fifth year as chairman and his eleventh year as a member of the committee. Prior to his appointment as chairman he served for five years as vice-chairman. With the exception of one year he has been connected with the engineering department of the Cleveland, Cincinnati, Chicago & St. Louis and its subsidiary, the Louisville & Jeffersonville Bridge Company since 1890 and has been bridge engineer since 1905, taking over additional duties when he was appointed principal assistant engineer in 1915. He is a man of a scientific turn of mind with an active interest in organized technical work among engineers.

IN THE GENERAL SPECIFICATIONS for Steel Railway Bridges, 1920, three changes are recommended for adoption and printing in the Manual:

Article 47—Change the last sentence to read: "The unit stresses specified in Article 38 may be increased one-third for a combination of the secondary stresses with the other stresses, but the section shall not be less than that required when secondary stresses are not considered."

Article 48—Change to read: "The gross area of the compression flanges of plate girders and rolled beams shall not be less than the gross area of the tension flanges, but the stress per square inch shall not exceed

$$16000 - 150 \frac{l}{b}$$

l = the length of the unsupported flange between lateral connections or knee braces.

b = the flange width"

Article 243—Omit all of the fourth sentence after the word "Engineer," making the Article read

Eye-Bars.

243. Eye-bars shall be straight, true to size, and free from twists, folds in the neck or head, and other defects. The heads shall be made by upsetting, rolling or forging. Welding will not be allowed. The form of the heads will be determined by the use in use at the work where the eye bars are made, if not factor 1 to the Engineer. The thickness of the head and neck shall not vary more than $\frac{1}{16}$ in for bars 8 in. or less nominal size, nor more than $\frac{1}{8}$ in for bars more than 8 in. and not more than $\frac{1}{4}$ in for bars more than 12 in. wide.

The committee in Appendix A, submitted specifications for the Erection of Steel Railway Bridges as infor-

mation, but following the practice of the committee with respect to other important specifications in the past, desires that they appear in bulletin form for a year or so that the committee may get the benefit of a trial and discussion by users. In Appendix B, the committee submitted Specifications for Movable Railway Bridges as a conclusion for printing in the Manual. The statement in the appendix gives the history of their development. The committee believes them to be the best specifications for movable bridges now available.

Committee: O. E. Selby (C. C. & St. L.), chairman, P. B. Motley (C. P. R.), vice-chairman; F. Arnyausen (L. I.), J. A. Bohland (G. N.), W. S. Bouton, A. W. Carpenter (N. Y. C.), M. F. Clements (N. P.), J. F. Crawford (N. & W.), O. E. Dalstrom (C. & N. W.), F. O. Dufour (Stone & Webster), Thos. Earle (Beth Steel Brg. Corp.), W. R. Edwards (I. C. C.), C. R. Fiekes (C. B. & Q.), G. A. Haggander (C. B. & Q.), R. L. Huntley (L. P.), B. R. Leffler (N. Y. C.), P. G. Lang, Jr. (B. & O.), Albert Reichmann (Am. Brg. Co.), O. B. Robbins, A. F. Robinson (A. T. & S. F.), H. N. Rodenbaugh (E. F. C.), W. R. Roof (C. G. W.), J. M. Salmon (L. & N.), I. L. Simmons (C. R. I. & P.), I. E. Stern (Cons. Eng.), H. B. Stuart (G. T.), G. F. Tebbetts (Roberts & Schaefer), E. F. Turneure (Un. of Wis.), Dr. J. A. L. Waddell (Cons. Eng.), S. T. Wagner (P. & R.), H. T. Welty (N. Y. C.)

General Specifications for the Erection of Steel Railway Bridges

(For Fixed Spans Less Than 300 Ft. in Length)

Definitions of Terms.—1. The term "Engineer" refers to the chief engineer of the company or its subordinates in au-

thority. The term "Inspector" refers to the Inspector or Inspectors representing the Company. The term "Company" refers to the railway company or railroad company party to the agreement. The term "Contractor" refers to the erection contractor party to the agreement.

Work to Be Done.—2. The Contractor shall erect the metal work, make all connections and adjustments, remove the old structures and falsework and do all work required to complete the bridge or bridges, as covered by the agreement, in accordance with the plans and these specifications.

Drawings to Govern.—3. Where the drawings and the specifications differ, the drawings shall govern.

Plant.—4. The Contractor shall provide all tools, machinery and appliances, including drift pins and fitting up bolts, necessary for the expeditious handling of the work. The Contractor shall protect the Company against claims on account of patented devices or parts used by him on the work.

Plans.—5. The Company will furnish complete detail plans for the structure or structures to be erected, including shop details, camber diagram, erection diagrams, match-marking diagrams, list of field rivets and bolts, and copy of shipping statements showing a full list of parts and weights.

Materials.—6. The Contractor shall receive, f. o. b. cars, at the siding to be designated in the information to be given bidders, all materials entering into the finished structure.

Handling and Storing Materials.—7. The Contractor shall unload material promptly upon delivery, otherwise he shall be responsible for demurrage charges. Stored material shall be piled securely outside the tracks, and no material shall be placed closer than six feet to the nearest rail. Material shall be placed on skids, above the ground, be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members, such as columns and chords, shall be placed on skids near enough together to prevent injury by deflection. The Contractor shall check all material turned over to him against shipping lists and report promptly in writing any shortage or injury discovered. He will be held responsible for the loss of any material while in his care, or for any damage resulting from his work.

Falsework.—8. Unless otherwise provided, the Contractor shall prepare and submit to the Engineer for approval, plans for falsework or for changes in the existing structure necessary for maintaining traffic. The falsework shall be properly designed and substantially constructed and maintained for the loads which will come upon it. Approval of the Contractor's plans shall not be considered as relieving the Contractor of any responsibility. Temporary structures or falsework placed by the Company, if suitable, may be used by the Contractor.

Masonry.—9. The Company will construct the masonry to correct lines and elevations, and will establish the lines and elevations required by the Contractor for setting the steel.

Bearings and Anchorage.—10. Bed plates, bolsters and shoes shall be set level in exact position. They shall be given full and even bearing by setting them on a layer of Portland cement mortar or dry cement, or by tightly ramming in rust cement after blocking them accurately in position, as directed by the Engineer.

11. The Contractor shall drill the holes and set the anchor bolts, except where the bolts are built into the masonry. The bolts shall be set accurately and fixed with Portland cement grout completely filling the holes.

Methods and Equipment.—12. Before starting work, the Contractor shall advise the Engineer fully as to the method he proposes to follow, and the amount and character of equipment he proposes to use, which shall be subject to the approval of the Engineer. The approval of the Engineer shall not be considered as relieving the Contractor of the responsibility for the safety of his method or equipment or from carrying out the work in full accordance with the plans and specifications. No work shall be done without the sanction of the Engineer.

Assembling Steel.—13. All parts shall be accurately assembled as shown on the plans and any match-marks carefully followed. The material shall be carefully handled so that no parts will be broken or damaged. Hammering which will injure or distort the work will not be permitted. Bearing surfaces and surfaces to be in permanent contact shall be cleaned just before the members are assembled. Unless erected by the cantilever method, truss spans shall be erected on blocking so placed as to give the trusses proper camber until all tension chord splices are fully riveted and all other truss connections pinned and bolted. Rivets in splices of butt joints in compression members shall not be driven until the span has been swung. Splices and field connections shall have one-half of the holes filled with bolts and cylindrical erection pins (half bolts and half pins) before riveting. Splices and connections carrying traffic during erection shall have three-fourths of the holes so filled.

Fitting up bolts shall be of the same nominal diameter as the rivets, and the cylindrical erection pins shall be $\frac{1}{2}$ inch larger.

Riveting.—14. Riveting preferably shall be done with pneumatic riveters and buckers. Rivets larger than $\frac{7}{8}$ inch in diameter shall not be driven by hand. Connections shall be accurately and securely fitted up before the rivets are driven. Light drifting will be permitted to draw the parts together, but drifting to match unfair holes will not be permitted. Unfair holes shall be reamed or drilled. Rivets shall be heated to a light cherry color, and in driving shall be upset to completely fill the holes. Heads shall be full and symmetrical, concentric with the shank, and shall have full bearing all around. They shall be the same shape and size as the heads of the shop rivets. Rivets shall be tight and shall grip the connected parts securely together. No recupping or caulking will be permitted. Rivets shall not be overheated or burned. In removing rivets, the surrounding metal shall not be injured; if necessary, such rivets shall be drilled out. Cup faced dollys, fitting the head closely to insure good bearing, shall be used.

Bolted Connections.—15. In bolted connections, bolts shall be drawn up tight and threads burred so that nuts cannot become loose.

Pin Connections.—16. Pilot and driving nuts shall be used in driving pins. They will be furnished by the Company and shall be returned to the Company on completion of the work. Pin nuts shall be screwed up tight and threads burred so that the nuts cannot become loose.

Deck.—17. Where so specified, the ties, guard timbers, guard rails, fire decking, concrete decking, waterproofing, ballast, and deck planking, and the track rails and tie plates, shall be placed by the Contractor. The timber deck, if untreated, shall be framed and placed in accordance with the Company's plans. The ties shall be framed to give a full and even bearing on the girders and under the rails. The guard timbers shall be dapped and framed to a snug fit over the ties and fastened as shown on the plans. If treated timber is used, the Company will deliver it properly framed to the Contractor. If necessary to do any framing or cutting of treated timber, the resulting surfaces shall be given a brush treatment with wood preservative, as directed by the Engineer. Where concrete decking is used, or waterproofing is required, the specifications therefor will be furnished by the Company.

Misfits.—18. Corrections of minor misfits and a reasonable amount of reaming will be considered as a legitimate part of the erection. Any error in shop work which prevents the proper assembling and fitting up of parts by the moderate use of drift pins, and a moderate amount of reaming and slight chipping or cutting shall immediately be reported to the Inspector, and his approval of the method of correction obtained. The correction shall be made in the presence of the Inspector, who will check the time expended. The Contractor shall render within thirty days an itemized bill for such work of correction for the approval of the Engineer.

Painting.—19. Heads of rivets shall be painted by the Contractor. This painting shall not be done until the Inspector has examined the rivets and found them satisfactory. The tops of stringers and girders which are to carry ties shall be given one coat of field paint.

If the field painting is to be done by the Contractor, the specifications therefor will be furnished by the Company.

Removal of Old Structure and Falsework.—20. The Contractor shall dismantle the old structure and falsework and load the material on cars for shipment, or pile it neatly at a site immediately adjacent to the tracks, at a convenient elevation for future handling, as directed by the Engineer. When the old structure is of iron or steel and is to be used again, it shall be dismantled without unnecessary damage and the parts match-marked.

21. The Contractor shall remove the piling to the surface of the ground and all debris and refuse resulting from his work, leaving the site in good condition.

Superintendence and Workmen.—22. During the entire progress of the work the Contractor shall have a competent foreman or superintendent in personal charge of the work. Instructions given to the foreman or superintendent shall be considered as given to the Contractor. All work shall be done by skilled, competent workmen.

Interference With Traffic.—23. The Contractor shall conduct his work in such a manner that the track, while in service, will be safe and clear for the passage of trains. Tracks shall be disturbed or removed for the prosecution of the work during such times only as allowed by the Company. While the Contractor is actively engaged in the erection, trains will be required to approach the bridge prepared to come to a stop before crossing and will proceed only on signal. During the time the Contractor operates his equipment on the tracks or has occasion to make the tracks unsafe for the operation of trains, his operations will be in charge of a conductor or pilot who will arrange and control the train movements.

Company Equipment.—24. When the agreement provides that the Company shall furnish equipment to the Contractor,

such as flat cars, water cars, bunk cars, etc., the Contractor shall repair all damage to such equipment furnished for his use and return it in as good condition as when he received it.

Work Train Service.—25. When under the contract work train or engine service is furnished the Contractor without charge, the Contractor shall state in his bid the number of days such service will be required. Any excess over the time specified in this bid shall be paid for by the Contractor at the Company's schedule of rates.

Risk.—26. The Contractor shall be responsible for loss of or damage to materials and for all damage to persons or property and for casualties of every description caused by his operations during the progress of the work. Injuries or losses due to events beyond the control of the Contractor shall not be borne by him unless they occurred because of his dilatory methods in handling the work, extending the time beyond the time limit designated in the contract.

Inspection.—27. The work shall be subject at all times to inspection by the Engineer.

Laws and Permits.—28. The Contractor shall comply with federal, state and local laws, regulations and ordinances, and shall obtain at his own expense the necessary permits for his operations.

Appendix B—Specifications for Movable Railway Bridges

The purpose of the committee which wrote these specifications was to formulate specific and detailed rules for the design and manufacture of movable railway bridges, as a guide to both the designer and the shop, rather than to confine the specifications to a statement of principles or to limit them to rules defining the duties of the contractor. The intention was to describe the best general practice in the accepted types now in use for standard American and Canadian railways and to advance the causes of good design and workmanship. The requirements of light and branch railways and foreign practice have not been considered.

The specifications in preliminary form were printed in Bulletin No. 204 and in the Proceedings, Vol. 19, and

discussions and suggestions were invited. The discussions received were printed in Bulletin No. 228 in 1920. These, together with later written and verbal discussions, were considered by the committee in the final revision.

(These specifications covered 54 pages of Bulletin No. 240, too long to be reproduced here.)

Discussion

Chairman Selby submitted the recommendations for adoption and printing in the Manual as given at the head of the report and moved their approval by the convention. Motions to this effect were passed. He also introduced an additional change to article 157 of the specifications not covered in the committee's report as published in the bulletin. This provides that there is to be added under table of physical properties the following:

Elongation in 2 in. minimum per cent 22.

This change was also approved.

Mr. Selby then introduced specifications for the erection of steel railway bridges, explaining that these were submitted as information and that any comments or criticisms of these specifications would be considered by the committee in reviewing these specifications for re-submission in final form next year. A number of speakers submitted suggestions which the committee will take under advisement. A motion by Mr. Selby that the specifications be received as information for publication in the proceedings was carried.

The specifications which the committee submitted for movable railway bridges as referred to in Appendix B of the report was then submitted by Mr. Selby and after pointing out a number of typographical errors, he moved the adoption of these specifications for printing in the Manual. This motion was carried and the committee was dismissed with the thanks of the association.

Report on Signals and Interlocking

A committee of the American Railway Association is now studying the subject of automatic train control. The substitution of incandescent lamps in headlights results in the elimination of many difficulties in signal visibility due to the glare of arc lights. The committee recommends the installation of an arrangement of shields to prevent the light on approaching trains from showing through colored glass on dwarf signals and giving a wrong indication. Wrong indications due to the reflection of light can be eliminated by the use of convex roundels or the adjustment of the signal; the committee recommends the adoption of the former for new work and renewals.



W. J. Eck
Chairman

W. J. Eck is finishing his second year as chairman, after having served for four years as vice-chairman. He has been a member of the committee since 1911. Mr. Eck has been signal and electrical superintendent of the Southern Railway System since 1907. He has taken an active interest in the development of signal and electrical standards and has done much to promote their use, being one of the pioneers in the introduction of alternating current signals in this country. He has also been active in the work of the Railway Signal Association, now the Signal Section of the Engineering Division of the American Railway Association.

REPORTS ON COLORS for signals, light signals, requisites for signal locations and the aspect indicating that a train must take siding at a non-interlocked switch will be found in the proceedings of the American Railway Association, Signal Section. The subject of automatic train control is now being handled by the Joint Committee on Automatic Train Control.

The Effect of Electric Locomotive Headlights on Signals

But the difficulty has actually been experienced due to the effect of locomotive headlights and this has been largely eliminated with the abandonment of the arc light

and the use of incandescent lamps in the headlights, with the consequent reduction in candlepower as well as the difference in characteristics of the two lights. The difficulties remaining are three:

- (1) The inability of an engineman on one train to read the signals on account of the headlight on a train in the opposing direction blinding him.
- (2) The headlight on a train in the opposite direction showing through the colored glass on a dwarf signal other than the one in front of the lamp and so giving a wrong indication.
- (3) The light from a locomotive headlight on a train being reflected back from a signal and so giving a wrong indication.

The first of these difficulties has been obviated where they occur by having the enginemen dim the headlights

when approaching trains running in the opposite direction.

The second difficulty has been obviated by arranging a shield on dwarf signals behind the colored glass of spectacles which are not in front of the lamp.

The third difficulty has been obviated by either: (a) Adjustment of signal. (b) Use of convex roundels.

The use of such roundels will obviate the trouble should signal not be in proper adjustment.

The committee recommended:

(1) That shields be installed on dwarf signals behind the colored roundels not in front of the lamp.

(2) That convex roundels be used on all new work and renewals.

Committee: W. J. Eck (Sou.), chairman; W. M. Vandersluis (I. C.), vice-chairman; Azel Ames (Cons. Engr.), H. S. Balliet (N. Y. C.), A. M. Burt (N. P.), C. E. Denney (N. Y. C. & St. L.), F. L. Dodgson (Gen. Ry. Sig.), W. H. Elliott (N. Y. C.), G. E. Ellis (Aut. Train Con. Com.), J. G. M. Leisenring (I. T. S.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), J. A. Peabody (C. & N. W.), A. H. Rudd (Penna.), A. G. Shaver (Cons. Engr.), T. S. Stevens (A. T. & S. F.), E. E. Worthing (S. P.).

Discussion

W. J. Eck (Chairman): The material which the com-

mittee is reporting is for the purpose of information only.

C. E. Lindsay (N. Y. C.): What are the recommendations on the subject of railway lamps?

Chairman Eck: At the meeting of the Committee on Standardization, where the subject of railway lamps was discussed, the chairman of the Committee on Signals and Interlocking presented the series of lamps which had heretofore been adopted by the Signal Association. Since that meeting, however, the Signal Section has presented a revised drawing of one of the lamps and it was voted on yesterday. On account of the proposed revision of one of the lamps in the series, the chairman of the committee did not think the series was in shape to present to you today.

G. A. Mountain (Can. Ry. Co.): Has the committee considered the question of eliminating guard rails at interlocking crossings?

Chairman Eck: I have been a member of the committee for many years, and do not not recall the subject being discussed by the committee.

(The motion to accept the report as information was moved and carried.)

Report of Committee on Standardization

The committee reports progress in its efforts to secure the adoption of standards already approved by the association as well as in harmonizing differences of opinion regarding other specifications. Sponsorship for the unification of specifications for cross-ties and switch-ties offered by the American Engineering Standards Committee to the Association was accepted and the specifications approved by the Association will be offered as a basis for unified specifications. The belief is expressed that the present specifications for creosote oil tend to exclude what seems to be genuine coal tar creosote oils and that some change should be made to cover that point.



E. A. Frink
Chairman

E. A. Frink has been chairman of this special committee since its organization three years ago, the remainder of the committee consisting of the chairmen of the standing committees with two additional representatives from Canada. Mr. Frink has been principal assistant engineer of the Seaboard Air Line since April, 1914, prior to which time he was bridge engineer for eight years. He has long been an advocate of the more extensive use by the railways of the standards adopted by the association, and after the committee was organized to promote this end he was the logical selection for chairman. He also is a member of the A.E.S. Committee.

THE ASSOCIATION has approved as recommended practice, specifications and designs of the Ballast committee covering tamping bars, tamping picks and ballast forks of the Proceedings for 1921. These specifications and designs are being handled by this committee with the purpose of securing their adoption by the roads and producers.

Ties.—The association was represented by the Tie committee in a conference called by the American Engineering Standards Committee on the unification of Specifications for Cross-Ties and Switch Ties and the association was nominated as a sponsor for the project. The sponsorship has been accepted and Committee III expects to present the specifications approved by our association as a basis for unified specifications.

Rail.—During the year, the Rail committee endeavored to harmonize differences with the rail manufacturers on the standard specification for open-hearth steel rail, but so far without success. However, it is expected that some progress may be made, which will be reported to the convention.

Track.—The committee is glad to report that the manufacture of frogs and switches, previously adopted by the

association, is increasing rapidly and that the use of the association's accepted designs for cut and screw spikes is being promoted as much as possible.

Masonry.—The Committee on Masonry recommends that the Specifications and Tests for Portland Cement, adopted as recommended practice by the American Railway Engineering Association at the convention in 1917, be accepted for standardization, except that paragraph 36 be omitted, as noted in the report of that committee.

Signals and Interlocking.—The committee recommends that the following drawings showing oil burning railway lamps and detail parts, RSA 1100-1101, and ARA Signal Section Drawings 1430, 1440-1441-1442-1443-1445-1459-1460-1461-1470-1480-1496-1497-1498-1499, be submitted to the American Engineering Standards Committee for standardization.

Water Service.—The committee recommends the standardizing of the American Water Works Association's standards for cast iron pipe, hydrants, and valves.

Wood Preservation.—It would appear the present American Railway Engineering Association specifications for creosote oils tend to exclude what seem to be genuine coal tar creosote oils, and it is expected that there will

have to be a change in our creosote oil specification before the next annual meeting.

Electricity.—If approved by the convention, the specifications for friction and rubber tape will be presented to the American Engineering Standards Committee for standardization.

Conclusions

The committee recommended that the following subjects be submitted to the American Engineering Standards Committee by a representative of the American Railway Association before that committee as a basis for standardization:

1. American Water Works Association standards for cast iron pipe, hydrants and valves.
2. Tamping bars, tamping picks and ballast forks.
3. Specifications as prepared by the Tie Committee of the A. R. E. A.
4. Railway Lamps.
5. Commercial Adhesive Tape and Rubber Insulating Tape.

Committee: E. A. Frink (S. A. L.), chairman; J. R. W. Ambrose (Toronto Term.), vice-chairman; W. C. Barrett (L. V.), F. L. C. Bond (I. C.), W. A. Clark (D. & I. R.), A. F. Dorley (M. P.), W. T. Dorrance (N. Y. N. H. & H.), W. J. Eek (Sou.), J. M. R. Fairbairn (C. P. R.), W. D. Faucette (S. A. L.), A. S. Going (G. T.), W. H. Hoyt (D. M. & N.), Maro Johnson (I. C.), C. E. Johnston (K. C. S.), Edwin B. Katte (N. Y. C.), A. Montzheimer (E. J. & E.), F. E. Morrow (C. & W. I.), G. J. Ray (D. L. & W.), L. S. Rose (C. C. C. & St. L.), O. E. Selby (C. C. C. & St. L.), F. J. Stimson (Penna.), H. M. Stout (N. P.), C. M. Taylor (C. of N. J.), W. P. Wiltsee (N. & W.), J. J. Yates (C. of N. J.).

Discussion

(The report of the committee was presented by Chairman Frink who read a report outlining the purposes and functions of the American Engineering Standards Committee and reporting the progress in standardization in this country and abroad.)

Mr. Frink: I think that more assistance will be obtained from the American Engineering Standards Committee in the matter of standardization than in any other way that we might select. I therefore urge all, if possible, to vote favorably on the committee's recommendation to refer these five matters to the American Engineering Standards Committee for their action.

I move the approval of the Recommendations 1 to 5.

H. R. Safford (C. B. & O.): I am thoroughly in accord with the recommendation and the comment I make is merely upon a technicality, as to whether we should take the action contemplated, especially with reference to item No. 4, which says: "Railway lamps as developed by the Committee on Signals and Interlocking, to be presented by that committee at the next convention." The point I want to raise is, can we at this time take action that places this matter before the American Engineering Standards Committee until it has been acted upon by the body from which it originated?

Chairman Frink: Our sending anything to the American Engineering Standards Committee does not signify that the Association has approved it at all. It simply means that the Association thinks that that particular thing should be standardized, and that we are willing to be sponsor for such standardization, but that we will not accept it unless it suits our convention after it is done.

J. J. Yates (C. of N. J.): I am a member of the Standards committee. The Standards committee in accepting a suggestion for standardization considers that the Association has come to an agreement on the specification and are ready to back it up. I think you are a little premature in subscribing a specification now that has not had the approval of this association.

C. A. Morse (C. R. L. & P.): I cannot help but agree

with the last speaker. It seems to me that we ought to be able to back these five things that we are to present to the Standardization committee.

Chairman Frink: It is almost inconceivable that anything that we may get up, no matter how carefully it is done, will suit all the different interests who are on the sectional committees of the American Engineering Standards Committee. If a subject has been approved by this convention, the Standards committee will be placed in the unenviable position of being asked to agree to a modification of something which the convention has approved.

W. M. Camp (Railway Review): If something which has been approved by this convention and is in our Manual is presented to the American Engineering Standards Committee will it come back to the A. R. E. A. to be modified?

Chairman Frink: It will come back to us, but not to be modified except as regards ourselves. We are our own court of last resort in regard to our own practice. We will adopt it or not, as we see fit.

Mr. Morse: In looking over these resolutions, I understand No. 4 is part of the work of the Committee on Signals and Interlocking, and that it is to be presented to this convention. No. 5 is part of the Committee on Electricity, and it is to be presented to this convention. It seems to me we could pass these resolutions as Mr. Frink wants with the proviso that if the convention approved them when they are reported from the various committees they are presented by, they are all right; if not, they are not.

Chairman Frink: The committee will accept that suggestion, I am sure.

(The motion was carried.)

Chairman Frink: Referring to the method of handling projects with the Engineering Standards Committee, I want to offer this motion:

Resolved, That whenever a project prepared for or approved by the proper standing committee is reported to the Board of Direction of the Association by our Committee of Standardization, with a recommendation for presentation to the American Engineering Standards Committee, said Board of Direction be and is hereby authorized to, in its discretion, present such project to said American Engineering Standards Committee with a request for action, this association to be a sponsor for such project.

That covers the point made by Mr. Safford a little while ago, but instead of making your standardization committee the direct intermediary with the Engineering Standards Committee, it makes the Board of Direction the intermediary.

H. Churchill (N. & W.): This motion is all right with one proviso, i. e., that this committee stand between this association and the A. R. E. A.

Chairman Frink: Inasmuch as the Board of Direction would take the action, and inasmuch as our secretary is also secretary of the Engineering division of the A. R. E. A., it was sufficiently safeguarded.

F. J. Stimson (Penna.): It should be made plain to the A. R. E. A., and I move that the resolution be amended in such a way as to provide that one year after the adoption of the A. R. E. A. recommended practice, that the Board of Direction, . . . We do not want to go on record at this time as authorizing the Standardization committee to make recommendations to the Board of Direction, and have the Board of Direction take action with the American Engineering Standards Committee before the matter has come before the convention.

(Motion as amended carried.)

(The committee was dismissed with the thanks of the association.)

Report of the Committee on Ties

Satisfactory reports on cross ties and preservative treatments are difficult to secure because of lack of proper data, and much trouble has arisen because of the effort to secure absolute rather than relative values for tie life. To remedy this a standard tie should be adopted and comparative tests made with other ties, according to a prescribed method. Tie plates should have a shoulder to maintain gage and to transmit the thrust properly to the tie through the plate. No movement should be allowed between the tie plate and the tie while a free-way of $\frac{1}{16}$ in. to $\frac{3}{16}$ in. should be maintained between the spike head and the rail base.



W. A. Clark
Chairman

W. A. Clark is completing his first year as chairman of this committee, prior to which he served as vice-chairman for two years. He has been a member of the committee for nine years. Like his predecessor, F. R. Layng, he is connected with one of the railway properties of the United States Steel Corporation, being chief engineer of the Duluth & Iron Range. He has long been an active student of the tie question and has had much to do with the work of the committee in its investigation of the relative economics of ties of various materials as well as of its inspections and reports on the various installations of substitute ties for steam railroads.

IN APPENDIX A the committee submitted the results of its study on the economics of the use of the various classes of cross-ties and various kinds of preservative treatment and also the classification of ties for various kinds of service.

The committee also presented its usual report on substitute ties. A report on the effect of the design of tie plates and track spikes on the durability of cross-ties and the results of improperly protecting ties from mechanical wear was given in Appendix C.

Conclusions

The committee recommended the following action on its report:

1. That the report covered in Appendix A be received as information and the recommendations pertaining to standard test ties be approved.
2. That the report on substitute ties be received as information.
3. That the report on Care of Ties after Distribution be continued.
4. That the report covered in Appendix C be received as information and the subject discontinued.

Committee: W. A. Clark (D. & I. R.), chairman; W. J. Burton (M. P.), vice-chairman; W. C. Baisinger (A. T. & S. F.), M. S. Blaiklock (G. T.), F. Boardman (N. Y. C.), S. B. Clement (T. & N. O.), E. L. Crugar (I. C.), John Foley (Penna.), O. H. Frick (C. M. & St. P.), G. F. Hand (N. Y. N. H. & H.), F. R. Layng (C. & L. E.), R. M. Leeds (D. L. & N.), A. F. Maischaider (C. C. & St. L.), A. J. Neafie (D. L. & W.), G. F. Palmer (E. & O. C. T.), L. J. Riegler (Penna.), E. W. Boots (P. & L. E.), H. A. Cassil (P. M.), F. W. Cherrington (Jennison-Wright Co.), J. F. Deimling (M. C.), H. C. Hayes (I. C.), Lowry Smith (N. P.), H. A. Anderson (S. P.).

Appendix A—Economics of the Use of Various Classes of Cross-Ties and Various Kinds of Preservative Treatment and Also the Classification of Ties for Various Kinds of Service

Satisfactory report on these subjects would require tie life data which is non-existent, and not only is this true, but the committee, after a careful consideration of the requirements, is of the opinion that the data from tests now under way will hardly be satisfactory for use in solving these problems. As the need for proper data will increase rather than decrease, with the diminishing timber supply, the committee desires to point out wherein tie-life data is unsatisfactory and wherein tests may be made to produce more usable results. The

committee realizes the difficulty of comparing installations under different conditions and is of the opinion that much of the trouble is due to an effort to obtain absolute rather than relative values for tie life.

If, in every test installation, there could be included a standard tie, to serve as a unit of comparison, the result, as measured by the standard tie, could be applied anywhere, where knowledge of the performance of the standard tie is available. The committee, therefore, recommended that in order to provide suitable data in the future the following practice with regard to test installations be followed:

- (a) Install at the same point, in the same track, under the same traffic and under the same conditions of rail, ballast, drain-

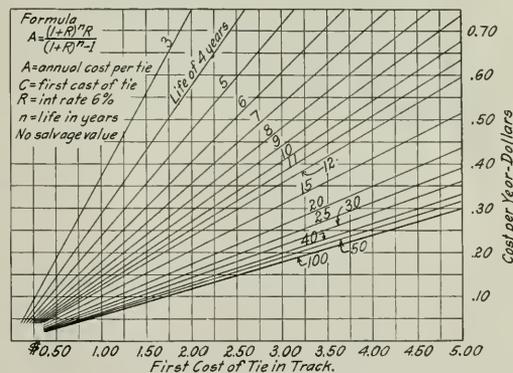


Fig. 1. Annual Renewal Costs, 6 Per Cent Compound Interest

age, sunlight, etc., an equal number, up to not less than 100, "Standard Test" ties.

- (b) Continue the test record until all standard test ties have been removed as well as all other ties of the test.

(c) Standard test tie to be A. R. E. A. 1921 specification, grade 3 (6 in. by 8 in.), class U, white oak, 8 ft. long, untreated.

(d) Record should include information called for on Form No. 1, Report of Experimental Test Tie Sections, as recommended by the Tie Committee, see page 339 of volume 22, A. R. E. A. Proceedings.

In using this form the following data should be given:

1. Gross tons per year passing over the test, freight plus passenger.

2. Average annual rainfall.
3. Mean temperature of locality for January, and July, and highest and lowest extremes.
4. Ballast—kind and depth.

The tie selected as standard test can be secured, at least in the small numbers needed for test installations, without an undue amount of transportation to most of the country. The Grade 3 is selected instead of Grade 5 because it has shorter life.

MECHANICAL STRENGTH

A tie performs three principal functions: (a) Acts as a beam to distribute the load, (b) Acts as a block to transmit the load from rail to ballast, and (c) Holds the rails in place.

It is, therefore, required to possess beam strength, crushing strength and ability to hold fastenings. As between the three, the beam strength is fundamental, because, if deficient in any given tie, there is no remedy, whereas a deficiency in crushing strength or ability to stand compression across the grain can be remedied by suitable tie plates and the ability to hold fastenings modified by the design of the fastenings.

EFFECT OF SIZE AND TIE PLATES

The replies to the committee's questionnaire indicated a general belief that ties 7 inches by 9 inches would outlast ones 6 inches by 8 inches when subjected to the

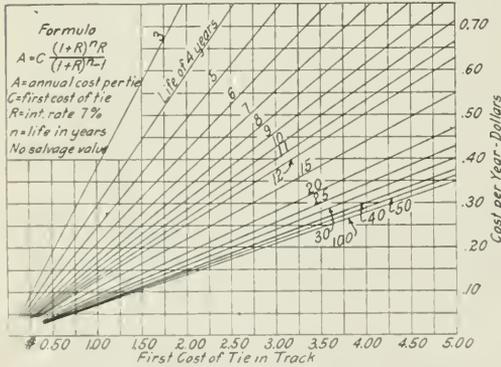


Fig. 2. Annual Renewal Costs, 7 Per Cent Compound Interest

same conditions. The replies would, perhaps, average 25 per cent. The data given in the questionnaire relative to ties failing by decay shows an average of 30 per cent greater life for the 7 inch ties, plated, over the 6 inch ties and 20 per cent for the 7 inch ties, unplated, over the 6 inch ties. These check the opinions fairly well. It is also found that the value of the tie plate in the case of 6 inch ties is 12 per cent, and in the case of the 7 inch ties 21 per cent. All of these percentages must be considered only approximate, due to the character of the data.

Figure 1 and 2 have been prepared from the formula recommended by this committee for ascertaining annual cost. They are self explanatory.

CONCLUSIONS

The life data does not exist from which satisfactory conclusion may be reached on the subjects assigned. Information lacking is partly as follows:

- (b) Information as to how the "average" life reported is obtained.
- (c) Information as to whether the relative resistance to decay of various woods is independent of climate.
- (d) Information as to whether the best decay resisting tie untreated is also the best decay resisting tie when treated, whether treatment results in the addition of a uniform number of years' life to all kinds of timber, or more to some kinds than others, or whether it results in giving all kinds of ties the same average life under the same conditions.
- (e) How mechanical strength is related to resistance to mechanical wear.
- (f) How mechanical strength varies with time in track, i. e., from the condition new to the condition when decay necessitates removal.

RECOMMENDATIONS

- (1) The inclusion of the standard test tie in all test installations, for the purpose of comparison, as more particularly outlined above.
- (2) The adoption of white oak ties, grade 3 (6 in. by 8 in.), class U, untreated, 8 ft. long, as standard for test purposes.
- (3) Laboratory test of the mechanical properties of tie timber, which has been subjected to contact with the soil for varying periods under conditions similar to those to which ties are subjected in track. Such tests should develop the relationship between strength and time exposed to the tie destroying agencies other than traffic.

Appendix C—Effect of the Design of Tie Plates and Track Spikes on the Durability of Cross-Ties

The following features should be provided for to ensure a minimum of damage to the tie:

- a. Adequate strength and area to prevent buckling and excessive settlement in the tie. The required bearing area and thickness will be governed by the kind of wood and character and amount of traffic. The distance the plate extends beyond either side of the rail base should be so proportioned as to prevent uneven settlement of the plate into the tie and consequent rolling of the rail. Allowance should be made for the deterioration of the tie plate which will normally take place, particularly near salt water or where there are brine drippings.
- b. It is important that the tie plate have a shoulder to maintain gage, so that the thrust from the rail is transmitted to the tie through the bearing area of the tie plate and the spikes as a unit, instead of being directly resisted by any spike.
- c. There should be no movement between the tie plate and the tie. The effect of any looseness is to make a "track which rattles," causing damage to the plate bearing area of the tie and enlargement of the spike holes. This close connection between tie plate and tie can best be accomplished by the use of separate fastenings which do not touch the rail and whose only function is holding down the plate. The ordinary means is to provide projections on the bottom of the tie plate; these should be deep enough to provide the required bond and to do their part in strengthening the tie plate, but so shaped and of a depth to do as little damage as possible to the tie, and it is believed that the depth of such projections should not exceed 3/8 in., and be so shaped as not to cut the fiber of the wood. When screw spikes are used, a rest shoulder should be provided on which the screw spike bears when driven home, leaving a freeway between the rail base and the under side of the spike head; this aids in making the bond between tie plate and tie. The freeway between the underside of the spike head and the rail base is of great importance and should be from 1/8 to 3/8 inch., depending on character of the subgrade.

SPIKE—EFFECT OF DESIGN

Safe and good track can be obtained by use of either screw spikes or different forms of cut spikes, and the choice between these is purely a question of which is more economical, all things considered; there is no evidence at this time that the screw spike in itself prolongs the life of the tie. The thread on the spike must be accurate in dimension and pitch (made to fit gages as recommended by the association standard), and so made in conjunction with a leader that the spike can be easily started in the hole in the tie by a light tap from a hammer. These features are provided for in the associa-

tion standard, and failure to observe them results in destruction of the screw threads in the wood either in the initial application of the spike or in replacing spikes when renewing rail. The necessary freeway between the screw spike head and the base of the rail should be secured through the design of the tie plate.

METHOD OF APPLICATION

The surface of the tie should have an accurate bearing surface to receive the tie plate; this is best accomplished by machine adzing. There is considerable advantage in prolonging the life of the tie by boring holes to receive the spikes; this is, of course, necessary to the application of screw spikes. If cut spikes are used the expense of boring untreated ties is not warranted, but all treated ties should be bored for spikes if the maximum life of the timber is to be secured. Such holes should preferably be bored entirely through the tie to ensure adequate depth when the tie plate has settled into the tie.

When treated ties are used all adzing and boring should be done before treatment. In case it becomes necessary to bore any holes in treated ties in the field, as in the case of switch ties, or to use tie plugs, the holes should receive an application of preservative before the spike or plug is applied. All tie plugs used in treated ties should be treated.

Attention is called to the danger of over-spiking. When the number of spikes is sufficient to hold the rail and gage properly, any additional spiking unnecessarily injures the tie at the most critical point. Additional spikes may be driven when actually required.

Discussion

V. K. Hendricks: The committee could get more reliable information by a study of the actual renewals on the different railroads, by going into more detail than has heretofore been done.

W. H. Courtenay (L. & N.): The committee seems to indicate that a white oak tie will last 6 yr. and a cypress tie will last 5.4 yr. This is certainly not true of certain parts of our country. In our part of the country a white oak tie, produced in that territory, will not last more than six years, and I have actually seen cypress ties

that have been in use for over 30 years. It is a matter of extreme difficulty to get correct information about ties.

W. J. Burton (Vice Chairman): Last year we tried to get information about cypress ties, but the L. & N. did not reply to it. We realize that this whole subject is one which with our present knowledge cannot be determined with mathematical accuracy.

F. J. Stimson (Penna.): The committee adopted the 6-in. tie, because it had a shorter life than the 7-in. I was looking at table one, which I understand shows the same life for the 6-in. white oak as for the 7-in. white oak.

Vice Chairman Burton: That is accounted for by the fact that the larger ties in general are used on roads of heavier traffic, and they are worn out.

W. R. Armstrong (O. S. L.): What application will this have to western roads that do not have any oak ties and do not use 6-inch ties?

The President: The idea is that the standard tie be used for testing, and not adopted as a standard tie for the roads.

J. L. Campbell (E. P. & S.): The ratio of the durability of the redwood ties, which go to make up the statement of these tables, as compared with the white oak appears to be surprisingly low on the basis of the quality of the redwood that used to be secured, but is not too low on the basis of some of the redwood ties that are secured in these days.

F. J. Angier (B. & O.): If you are basing the different ties on 6-in. by 8-in. white oak ties, giving a certain length of life, what kind of oak tie do you refer to—northern, southern, chestnut oak, i. e., what species of oak is it?

Vice Chairman Burton: That question is answered by the specification for white oak ties in last year's report. The proportion of sap and heart average is specified.

J. R. Leighty (Pres. Conference Committee): It is entirely possible that the plan the committee has outlined will establish what seems to me a very valuable factor for guiding the service-life of timber from the same species obtained in different parts of the country.

(The committee was dismissed with the thanks of the Association.)

Report of Special Committee on Stresses in Track

Discussion

Prof. A. N. Talbot (Chairman): This is only a progress report. The committee has some further work in charge, the results of which we hope to present in our next report.

C. H. Mottier (I. C.): Has the committee given any attention to the distribution of earth pressure or is that a field for further work.

THE PRINCIPAL WORK OF 1921 has been the reduction and correlation of the data of the field tests made in 1920. It will be recalled that tests were conducted on the tracks of the Illinois Central in Illinois, the Delaware, Lackawanna & Western in New Jersey, and the Atchison, Topeka & Santa Fe in New Mexico and Iowa. These tests were made on tangent and curved track, several different curvatures being used. A principal purpose of the tests was to find the effect of curvature of track upon the stresses in the rail (including lateral bending stresses) caused by locomotives of different types run at different speeds, as compared with the stresses developed in straight track. The time required for the reduction of the large amount of data accumulated in the tests has been much greater than was anticipated. The work has been carried on steadily, however, and good progress has been made. It is hoped that the committee will be able to present another report during this year. The results found indicate that information of value on stresses developed in curved track may be expected. Laboratory and field tests have also been conducted on rail joints and interesting results have been developed.

A. N. TALBOT (Univ. of Ill.), *Chairman*.

Chairman Talbot: The work on that has not gone very far. Tests in the laboratory were conducted which are applicable to the transmission of pressures through any granular material, and during the year some further effort has been made to find out whether there would be results of value following these tests in the laboratory on the way in which the pressures are transmitted in any granular material. So far as an attempt to do this in an embankment is concerned, I am afraid it would not result in anything of value unless it was done on such a greatly increased scale and under so many different conditions that the cost of the work would be entirely prohibitive.

(The committee was dismissed with the thanks of the Association.)

Report on Economics of Railway Labor

Considerable study was given to such data as could be acquired in order that conclusions might be drawn that would be of value in solving individual as well as general labor problems. The plans, submitted for insertion in the Manual, cover methods for obtaining railway labor and methods for training and educating employees in engineering and maintenance work, with definite conclusions. In studying the performance of maintenance of way work it was found that there was a remarkable uniformity in the output of gangs working under apparently widely varying conditions. Fundamental principles of good management are based on accurate units of measure.



C. E. Johnston
Chairman

C. E. Johnston is finishing his second year as chairman and his fourth year as a member of the committee. Mr. Johnston has been general manager of the Kansas City Southern for four years, prior to which he was chief engineer. He has taken a keen interest in maintenance of way labor problems for many years and has maintained a close contact with his forces. With his knowledge of the problems confronting the operating as well as the engineering officer, he has brought to the committee a breadth of vision and a realization of the magnitude of the labor problem, which has contributed much in a practical way to the work of the committee.

THE WORK OF THE COMMITTEE during the past year has, to a large extent, embraced a study of the data assembled during 1920, and the co-ordination of certain well-defined principles and practices in order to formulate conclusions that may be helpful to the railways in solving their individual as well as general labor problems. The committee recommended that the conclusions in Appendices A, B and C be approved and published in the Manual.

Committee. C. E. Johnston (K. C. S.), chairman; C. H. Stein (C. of N. J.), vice-chairman; W. J. Backes (N. Y., N. H. & H.), A. F. Blaess (I. C.), B. M. Cheney (C. B. & Q.), C. C. Cook (B. & O.), L. E. Dale (Penna.), John Evans (M. C.), R. H. Ford (C. R. I. & P.), L. C. Hartley (C. & E. I.), J. L. Haugh (U. P.), T. T. Irving (G. T.), R. E. Keough (C. P. R.), E. R. Lewis (M. C.), R. M. Pearce (P. & L. E.), W. H. Penfield (C. M. & St. P.), John C. Sesser (W. & L. E.), J. R. Sexton (Erie), Earl Stimson (B. & O.), R. C. White (M. P.).

Appendix A—Plans and Methods for Obtaining Railway Labor

The conclusions reached are as follows:

1. The problem of obtaining railway labor is broad and one deserving of careful consideration and organization.
2. In the interest of efficiency and economy maintenance employees should have the necessary mental and physical qualifications.
3. Best results may be obtained by providing some officer or some organization to supervise the selection and care of employees.
4. The living conditions of employees should be sanitary and comfortable. Food should be wholesome and of sufficient quantity, and work so regulated as not to be injurious to health.
5. Every encouragement, consistent with economy and efficiency, should be given to permanent employment throughout the year.
6. To avoid abuses, free transportation for railway labor should at all times be within the control of regularly delegated officers or employees.

RECOMMENDATIONS

That the conclusions reached by the committee with reference to methods of obtaining labor be adopted and embodied in the Manual.

Appendix B—Methods for Training and Educating Employees in Engineering and Maintenance Work

The study was considered in the following light

- (A) Training and educating engineers or employees in the Engineering Department in maintenance work; and,
- (B) Training and educating employees (other than engineers) in the Maintenance of Way Department, looking to greater economy and efficiency as well as promotion.

CONCLUSIONS ON SUBJECT A

1. Engineers trained in maintenance work are essential to an efficient organization.
2. The systematic training of young engineers for maintenance work should be carefully undertaken, and if in due course they do not display necessary qualifications to combine practical and technical training with ability to organize, direct and supervise work, they should not be retained in this branch of service.
3. Training of young engineers in maintenance work may best be accomplished by rotation in service.
4. It is essential to the training of young engineers that they familiarize themselves with the rules and practices of the operating and accounting departments.
5. In the interest of an efficient organization it is desirable to maintain a fixed minimum engineering force throughout the year.
6. It is desirable that there be practical co-operation between railway managements and schools and colleges offering technical courses for the better preparation of young engineers entering railway service.

CONCLUSIONS ON SUBJECT B

1. A thorough and systematic method of training employees in maintenance work is essential for efficiency and for promotion to advanced positions.
2. In promotion, merit and fitness should govern. Employees having necessary qualifications should be given every legitimate opportunity and encouragement to obtain necessary training and experience.
3. To accomplish best results, methods should be installed to promote individual effort and interest. Personal contact and personal interest shown on the part of the supervisory forces will go far to bring this about in all cases.
4. Employees should be encouraged to seek additional and more thorough education from outside sources on general principles of railway operation, such as through correspondence, night schools and periodicals on railway maintenance.

Appendix C—Standard Method for Performing Maintenance of Way Work for the Purpose of Establishing Units of Measure of Work Performed

(1) STANDARD METHODS AND SCHEDULES

Standard schedules, or units of performance, should be established with great care, as it is essential that they be correct and that the organization of the gang and method of doing the work are the best that can be worked out.

The standard performance, or 100 per cent efficiency, is the output of a first-class gang working at a speed which can be continuously maintained without physical harm to the men, following an approved method of doing the work and consisting of the most effective number of men for the kind of work to be done.

To arrive at the 100 per cent standard, first-class gangs are to be selected and detail time studies made of the performance, the time studies being divided into as many moves and as much detail as possible in order that the various studies may be compared in detail and a standard method worked out which will eliminate all unnecessary moves. If it appears that an improvement can be made, the organization of the gang and the method of doing the work should be altered and new studies made. When the most satisfactory organization and method has been found, a final detail study is made of the performance of the gang, and this is established as 100 per cent efficiency and issued as a standard schedule. In this way schedules may be established for all of the more important items of maintenance work.

(2) INSTRUCTIONS TO FOREMEN

To form an accurate comparison of the performance of the various gangs, uniformity in the reports submitted by the foremen is necessary. Owing to the difficulty some foremen have in making reports, it is desirable to have all forms used by them as simple as possible.

A daily report by the foreman of time spent and the work done by each gang is necessary. Where there is in use a form of daily time report, it can readily be made suitable for this purpose.

It is, however, necessary that the distribution shown on the daily time report be made with care, so that each item of work can be correctly graded. To secure this result detail instructions governing the distribution and reporting of the time charges are required.

(3) PLANNING AND DISPATCHING

To outline the order of the work and to assign it to the gangs to follow in sequence, so as to reduce the loss of time consumed by the unnecessary movement of the gangs from place to place, a system of planning and dispatching is needed.

Early in the year the program of work for the season should be decided upon and charted on a planning sheet, the proposed work being shown in yellow. Thereafter as the work progresses, monthly planning sheets are prepared; the completed work is shown in green and the monthly program in red. A few days before the close of the month the division engineer calls a meeting of the supervisors for the purpose of planning the work for the month. The work to be done, the location and the relative order in which it is to be undertaken is decided upon and shown in red on the chart. The quantity of work to be accomplished is computed from the standard schedules and the force allotted for the month. The direction in which the work is to progress, the date on which it is to be commenced and the calculated date of completion are to be shown on the chart.

The chart is prepared in duplicate, one copy to be retained by the division engineer and the other for the use of the supervisor. Upon his return to headquarters, the supervisor transmits the program to the foreman by means of work orders, giving him the program for the entire month, or any part of it, as he may see fit. For this purpose a work order, or dispatch book, is provided. The book is bound in stiffback, note-book form, and contains 100 perforated leaves.

The work order is made out in duplicate, the carbon copy being filed on the dispatch board, serving as a ready reference showing the work being done by each gang and where working. The work order states the kind, location, amount of work to be done and the time to be consumed. Upon completion of the work the foreman dates and signs the order and returns same to the supervisor. The foreman is given a work order for all work to be done. This, however, does not relieve him of the responsibility of making unforeseen and emergency repairs.

(4) FORM AND REPORTS

For the purpose of recording the performance of the gangs two forms are used—one, a Daily Record of Track Work Performance, the other, a Monthly Record of Track Work Efficiency.

The result of each day's work as sent in by each foreman on the Daily Time Report is posted on the Daily Record Sheet, and the efficiency per cent of the day computed.

At the close of the month the "Monthly Record of Track Work Efficiency" is compiled from the totals of the "Daily Record." The monthly record shows the percentage of efficiency made by every gang on each class of work, the average of every gang on all work, and the average for the supervisor's subdivision—in other words, a detailed and an accurate record of the actual performance of every gang as compared with the standard performance. The "Standard" divided by the "Actual" gives the efficiency per cent.

The supervisors should not be required to handle the details of the operation of this system, as it is impossible for them to do so in addition to their regular duties. Each supervisor should be given an assistant, who devotes his entire time to the study of standard schedules and methods, to the recording and study of performances, to the instruction of the foremen in regard to standard practice, and to checking in the field the reports of work done to guard against errors.

(5) FORCE DISTRIBUTION

Incidental to standard methods in maintenance of way work is the feature which will provide for an equitable distribution of the available track force to the various sections. A procedure which the committee suggests for consideration is the reduction of all features of track to the equivalent of one mile of first main track. A table of values, derived from actual costs extending over a period of years, for a main line division which was subject of special study, follows:

One mile of first main track equivalent to:

- 1.15 miles of second main track;
- 1.33 miles of third or fourth main track;
- 2.00 miles of branch line track;
- 2.00 miles of passing and throughfare track;
- 3.33 miles of yard tracks;
- 12 main track switches;
- 20 side track switches;
- 10 railroad crossings;
- 12 city street crossings;
- 25 to 50 county road crossings;
- ½ miles track pans;
- 4 miles ditches.

For the purpose of elasticity in use of the above form to meet the changing conditions of various elements of the track, it is suggested that the condition of the main elements per section be stated monthly and a "Condition Per Cent" of the whole section determined. This result applied to the equivalent mileage of the preceding form gives the equated mileage for the section. The ratio of the equated mileage of the section to the total equated mileage of the division determines the number of men to be allotted to that section from the total number of men allotted the division. A form for noting "Condition Per Cent" per section shows tentative relative values for certain elements of track as determined from an analysis of the records of previous years modified so as to meet the renewal program and other seasonal work.

This force distribution plan is a product of the application of standard methods and schedules, and is a development of the methodical direction and measurement of track work. It is described herein simply to indicate the form in which it may be developed.

RECOMMENDATIONS

(1) That the main feature of this plan, as described in—

Section 1—Standard Methods and Schedules.

Section 2—Instructions to Foremen.

Section 3—Planning and Dispatching.

Section 4—Forms and Reports; also some supplementary matter, designated as Exhibits "A" to "H," inclusive, be adopted and published in the Manual.

(2) That Section 5—Force Distribution be received as information.

Discussion

This report was presented by Chairman Johnston.

E. A. Frink (S. A. L.): I would like to inquire whether the committee in conclusion number 3 means that some one officer, or some one organization should be entrusted with the matter of selecting and supervising the employees of the entire system. If that is what it means, it is open to objection, because it does not seem to me a central organization could handle the question of obtaining track labor and mechanical repair men and bridge men so well as the organizations that are right on the ground.

Chairman Johnston: It means that an executive or general officer should be charged with the responsibility of looking after that important part of the business, centralizing it so that it may be run as an important part of the business. It means that this one man will be at the head of the organization which will bring about these results.

Maurice Coburn (Penna.): We have had many discussions about methods of selecting employees, and whether intelligence tests, such as those the army uses should be adopted by us. Has the committee discussed this to any extent?

Chairman Johnston: The committee has discussed that feature a great deal, and its conclusion with respect to it is that each line must handle its individual conditions.

W. D. Faucette (S. A. L.): I would like the chairman to explain how he understands the machinery of conclusion 3 would work. Suppose the officer who is to supervise the selection of men is 1,000 miles away from where the men are to select, tracklaying gangs, bridge gangs, crane gangs, clerical help, etc.

Chairman Johnston: This man would be head of a personnel department. He would not personally supervise the employment of men 1,000 miles away, but he

would get a record of their physical examination and other data. He could lay down the particular section of the line on which a certain number of men would be required during certain seasons of the year, and he could be in touch with the executive who shifts the men from place to place.

Mr. Frink: This subject is of sufficient importance to be gone into a little further than the committee has gone in recommendation No. 3. I agree that the matter should be supervised by a central authority, but if the committee would map out how that can be best accomplished it would be much more helpful.

Chairman Johnston: We feel this way about the matter—this is the result of some few years' study of this problem, and to cover it generally is about as far as the committee feels it should go.

C. E. Lindsay (N. Y. C.): The subject is one of great importance, not only for the present maintenance of way organizations but for such organizations in the future. The past four years has given emphasis to seniority rights. Therefore, it behooves us to lay the foundation now for a system which will allow only those to enter the service who give promise of development and adaptability to the service that is necessary.

Chairman Johnston: *I move that the Conclusions on Subject A be adopted and published in the Manual. (Motion carried.)*

Chairman Johnston: The next is report upon methods for training and educating employees in engineering and maintenance work.

J. R. W. Ambrose (Toronto Term.): *I move the adoption and placing in the Manual.*

J. A. Stocker (T. & O. C.): Concerning the remarks in regard to the treatment of the young engineer. It occurs to me that many of us who are at the heads of the engineering departments forget how we felt as we came on up the line, and do not do our full duty towards these men along the lines of training and encouragement. Most of us are standing between our organizations and a superior, the president, vice-president or general manager, who may not appreciate the conditions, may not realize the value of training competent engineers, and I wonder whether we always do what we should do to present the case of the organization to the superior who controls our actions, and incidentally the treatment of all of these men?

Mr. Lindsay: I have listened carefully to your opening address, Mr. Chairman, and I was impressed with it. When a young man puts his foot on the bottom of the ladder in entering the railroad service, he should or must look to the top. If the railroad will have a well-defined ladder for an engineer entering the service, it will save them much trouble and will give great benefit to the engineer.

W. H. Courtenay (L. & N.): If a young man is charged with any investigation and makes a report, and the report is exceptionally good, it has been my practice when reporting to my superior to submit the young man's report. It gives the management some idea of the ability of the men in the engineering department; and it is fair to the young man.

Prof. A. N. Talbot (U. of Ill.): I am particularly pleased with the committee's recommendation concerning the training and education of the younger men, and the necessity for them taking part in conferences and having more responsibility.

W. L. R. Haines (Penna.): I think that Mr. Courtenay's suggestion that the report of the young engineer should be forwarded needs a little supplementing. When the young engineer makes a report which for some reason cannot be followed, he should be advised in what

respect his report or recommendation is faulty. That is quite as much a part of his education as any other part of his education.

H. T. Porter (B. & L. E.): When a young man enters our employ, I generally have a little conversation with him and I say to him: "Now if at any time you find that you are not getting along as fast as you would like to, and you hear of an opportunity of doing better elsewhere, you can follow this matter up openly, because I promise you that I am ready to help you."

R. H. Ford (C. R. I. & P.): Departmentalism is one of the features which works to the detriment of the average young engineer. The engineer from his training is more of a technical man, and too frequently his superior officer holds him too long on those features of work. Unless the young engineer can have an opportunity to display his talents other than in the narrow lines of the engineering departments, he will not get very far.

The committee this year in discussing this subject gave this a great deal of consideration, and you will note in its conclusions that they also give a great deal of weight to other departments.

P. H. Winchester (N. Y. C.) (after reviewing the circumstances attending railway employment at some length concluded as follows.) If the committee had presented nothing else outside of its six conclusions, I think its work has been well spent. They embody ideas that have not been presented on this floor in all the years of the history of this association. Ideas as forcible, as pertinent to the upbuilding and training of engineers in the railroad service, have never been presented before.

(The motion to adopt the conclusions on subject A was carried.) (Chairman Johnston then read the conclusions on Subject B.)

Chairman Johnston: The committee recommends that these conclusions be adopted and published in the Manual.

(The motion was carried.)

(Earl Stimson (B. & O.) then presented the portion of the report covered in Appendix C and moved that action be taken by the meeting as outlined in the "Recommendations." The motion was carried and the committee excused.)

Hearings Before the Labor Board

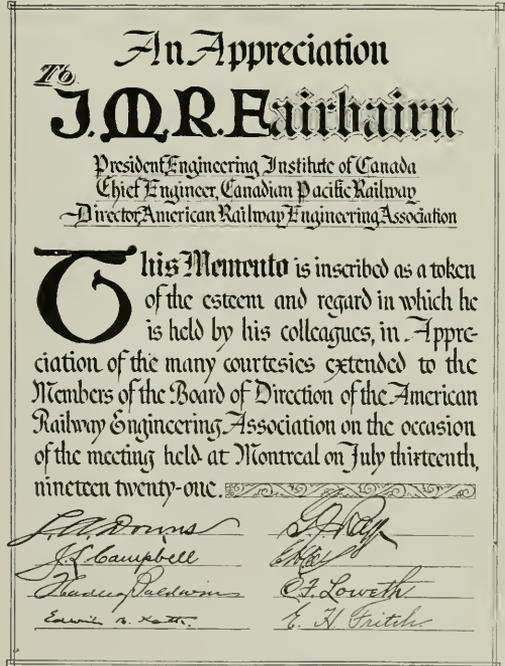
HEARINGS ON THE REQUESTS of practically all of the larger railroads of the country for reductions in the rates of pay of various classes of railway employees, including those in the maintenance of way department, are now being held before the Railroad Labor Board at its rooms in the Kesner building, Madison street and Wabash avenue. These hearings were opened on March 6, but because of a ruling made by the Board at that time, the discussion of rates of pay of maintenance of way workers will probably not begin until next week.

The opening statement of J. W. Higgins, executive secretary of the Association of Western Railways, however, contains an indication of the decreases in the pay of maintenance of way workers which are being sought at this time by the western railroads. Mr. Higgins, on behalf of 101 western carriers, at that time asked that authority be given these railroads to pay the prevailing rates in the territory employed for track and common labor in the maintenance of way department, now being paid from 28 to 40 cents per hour; for laborers around shops, now being paid from 31 to 43 cents per hour; for station and platform employees, now being paid from 37 to 49 cents per hour; and for common labor in station

forces now receiving from 28 to 40 cents per hour. Mr. Higgins also asked for authority to pay drawbridge tenders and assistants, now receiving \$75 a month, the prevailing rates in the territory in which they are employed. For mechanics in the maintenance of way and bridge and building departments, Mr. Higgins asked for a decrease of 5 cents per hour, the proposed new rate being 53 cents per hour, as compared with the present rate of 58 cents per hour. Other decreases requested by Mr. Higgins on behalf of the western carriers include mechanics' helpers, maintenance of way and bridge and building departments, from 44 cents to 36½ cents per hour; boiler room, water tenders and coal passers, from 35-40 cents to 31-42 cents per hour; signalmen, leading maintainers, gang foremen, etc., 78 to 72½ cents per hour; signalmen and signal maintainers, from 73 cents to 60-67½ cents per hour, and assistant signalmen and assistant signal maintainers, from 54-68 cents to 40-54 cents per hour.

Presentation to Mr. Fairbairn

AT THE INVITATION OF J. M. R. FAIRBAIRN, director of the American Railway Engineering Association and chief engineer of the Canadian Pacific, the Board of Direction of the A. R. E. A. held its mid-summer meeting at Montreal, Que., on July 13, at which



A Copy of the Expression of Appreciation

time those in attendance were the recipients of many courtesies extended by Mr. Fairbairn and his engineering colleagues of that city. At a later meeting of the Board of Direction in New York in November a beautifully engrossed expression of appreciation of this hospitality, autographed by those members of the Board who were present at the meeting, was presented to Mr. Fairbairn, a copy of which is shown herewith.



Signal Bridge, Chicago Terminal, Supported on Timbers as the Result of Recent Derailment.

Signal Section Concludes Its March Stated Meeting

Proposed Regulations Presented at Meeting for Government and Guidance of Signal Section

IMMEDIATELY AFTER THE OPENING of the session yesterday morning, Chairman F. B. Wiegand called on W. J. Eck, signal and electrical superintendent, Southern Ry., as chairman of the sub-committee of the Committee of Direction to report on the proposed regulations for the government and guidance of the Signal section which had been prepared by this sub-committee. In presenting these, Mr. Eck said that they are based largely on the constitution of the old Railway Signal Association and that the internal organization of the Signal section will be practically the same as that which was so successful with the R. S. A. during the existence of this body.

In the proposed regulations it is suggested that the membership of the Signal section shall consist of six classes—representative, representative of member, railway affiliated, affiliated, life and honorary. The regulations then defined the eligibility required for the various classes of members. The annual fee for railway affiliated members, which is to cover the cost of Advance Notices and Proceedings, shall be \$3; and for affiliated members, \$6; while representatives, representatives of members, life and honorary members will pay no fees. The officers of the Signal section shall consist of the chairman, a first vice-chairman, a second vice chairman and a secretary. These officers in addition to three directors are to be elected at each annual meeting from the representative and representative of members.

The Committee of Direction will consist of a chairman, first and second vice-chairmen and nine directors, together with the three latest past chairmen. The term of office for the chairman and vice-chairmen will be one year, while that of the directors will be three years. The regulations then specify the way in which the election of officers is to take place, and how the affairs of the Signal section are to be handled. The way in which the various committees are appointed and work to be assigned is specified. Meetings of the Signal section are to be held at a time and place to be fixed each

year by the Committee of Direction. The method in which business is to be handled is specified and the manner in which amendments must be presented is outlined.

Report on Economics

The Committee on Economics of Railway Signaling presented a progress report. This committee was appointed at the meeting of the Committee of Direction, Nov. 17, 1921. Three committee meetings have been held to organize the sub-committees, and the following committee assignments as indicated below have been made:

1. To determine the relative economic value of railway signaling as a means for protecting and directing the movement of trains and for reducing the cost of operation.

This will require the sub-committee to determine upon methods of procedure, roads to be studied, select the men to make the studies, compare results and submit a report covering the results of train operation as outlined in the assignment. On account of the large mileage of single track, there being over 200,000 miles in the United States, of which only 9 per cent is equipped with automatic block signals, the first studies of the committee should be confined to single track.

2. Study avoidable train delays, their causes and cost. Also report on delays at non-operated passing switches and the economic advantages of operating these switches by the installation of interlocking plants or low voltage switch machines.

3. Single track operation by signal indication, with particular reference to train orders, train order signals, train dispatching, and block signal systems.

Committee: B. T. Anderson (D. E. & W.), Chairman; F. L. Dodgson (Gen. Ry. Sig. Co.), W. M. Post (P. R. R.), F. W. Pfleging (C. P.), J. A. Peabody (C. & N. W.), H. M. Sperry (Publicity Representative), W. E. Boland (S. P.), A. R. Eugina (L. & N.), L. B. De Meritt (C. of Ga.), and G. S. Pfisterer (N. C. & St. L.)

Report of Committee on Electrical Testing

The new specifications for testing direct current relays present for the first time a complete set of directions and data on this subject. Definite limits of contact opening, armature end-play and air gap are set. Exact methods of testing the pick-up and drop-away are given for the direction of shop and field inspectors. In the past the railroads have in some cases depended too much on the personal experience of the inspectors to judge the proper limits to be used in checking relay operation, therefore these new specifications will answer a real need in the field by producing safer signal operation and therefore better train operation.



P. M. Gault
Chairman

P. M. Gault has been chairman of the committee for four years, and a member since 1915. His connection with the Railway Signal Association dates back to 1900, while he has a record of membership on two committees antedating his assignment to this one. Mr. Gault has seen service with two railroads. From 1906 to 1913 he was in the signal department of the Pennsylvania Lines, and since that year with the Illinois Central. In addition to a general field experience in signaling he served as pilot signal engineer and assistant engineer in the valuation department of the Illinois Central from 1917 to December, 1920, when he was made office engineer.

THE COMMITTEE SUBMITTED: 1. Instructions for inspecting and testing d.c. relays and indicators. 2. Method of testing first range d.c. bottom of mast, upper quadrant, motor signals, push clear type, in service. 3. Method of testing first range, upper quadrant, d.c. motor signals, top mast or bottom of mast types, having pull clear connections.

Instructions for Inspecting and Testing Direct Current Relays and Indicators.*

SHOP TESTS AND INSPECTIONS

1. **Coils.**—(a) At 20 degrees C., 68 degrees F., the percentage variation in the resistance of individual coils must not exceed: For 5 ohms, or less, plus or minus, 5 per cent. Above 5 ohms, plus or minus, 10 per cent.
- (b) When in place, coils must be fixed to prevent vibration.
2. **Binding Posts.**—(a) Right or left hand coil terminal, as specified, must be marked plus (+) and used for positive connections.
3. **Flexible Connections.**—(a) Flexible conductor connecting binding post and contact finger must be formed and attached so as not to affect the pickup or dropaway of the armature.
4. **Contacts.**—(a) Flexible part of fingers must be stiff enough to exert a contact pressure of not less than 1 oz. when armature is against the stop pin.
- (b) Finger contacts must meet contact surfaces squarely and simultaneously.
- (c) Finger contact must have a horizontal contact slide movement of not less than .010 in. against contact surfaces.
- (d) Metal support of the non-fusible contact element must be not less than 1/16 in. from the contact surface.
- (e) Opening between finger contact and back contact surface, with front contact just closed, must be not less than .020 in.
- (f) Front and polar contact openings for first range voltage must be not less than .050 in.
- (g) Front contact opening for second range voltage must be not less than .090 in.
- (h) Back contact opening for first range voltage with "working current or voltage" applied must be not less than .040 in.
- (i) The initial cleaned contact resistance when relay is energized at "working current or voltage" must not exceed the following: Metal to metal, .03 ohm per contact; metal to carbon, .18 ohm per contact; carbon to carbon, .40 ohm per contact.
5. **Armature End Play.**—(a) Armature end play must be not less than .010 in. and not more than .020 in.
6. **Air Gap.**—(a) Relays with adjustable stop pins. 1. A minimum working magnetic air gap (both neutral and polar) of .020 in. for a relay with two neutral contacts, and of .015 in. for a relay with three or four neutral contacts must be maintained by an adjustable hard drawn phosphor bronze stop pin so placed that its position relative to the cores will be fixed and so that when armature is picked up it will strike against the stop near the edge farthest from the bearings and midway between the cores. The physical working air gap (both neutral and

polar) must be not less than .018 in. for a relay with two neutral contacts and .013 in. for a relay with three or four neutral contacts. 2. A non-adjustable stop pin of phosphor bronze must be placed near each core near the edge farthest from the bearings protruding .010 in. from the under side of the core or the upper side of the armature for safety purposes.

(b) Relays without adjustable stop pins. The minimum working magnetic air gap (both neutral and polar) of .020 in. for a relay with two neutral contacts, and .015 in. for a relay with three or four neutral contacts must be maintained by two non-adjustable hard drawn phosphor bronze stop pins. The physical working air gap (both neutral and polar) must be not less than .018 in. for a relay with two neutral contacts and .013 in. for relay with three or four neutral contacts.

7. **Gaskets.**—(a) Defective gaskets must be replaced.
8. **Case.**—(a) Case must be so fixed as to insure a minimum clearance of 1/8 in. between it and movable parts.
9. **Meter Calibration.**—(a) Meters for shop use must be calibrated monthly.
10. **Repairing.**—(a) Test relay for defects, giving special attention to those noted on repair tag A. R. A. Signal section form 14. Make repairs and adjustments. Make and record test. A. R. A. Signal section form 10.

11. **Testing.**—(a) Pickup and dropaway must be determined as follows: 1. Initial charge. (a) Initial charge as specified on table No. 1, must be applied to coils for one minute.

2. Dropaway. (a) The initial charge must be applied to coils, then gradually reduced to the value at which front contacts open. This value is the dropaway with contact pressure.
3. Direct pickup. (a) Apply initial charge and take dropaway readings, then open circuit and again apply current to coils and gradually increase until front contact just closes. This value is direct pickup.
4. Reverse pickup. (a) Apply initial charge to coils in normal direction and decrease to zero. Reverse polarity and gradually increase energy to value at which front contact closes.
5. Direct working current or voltage. (a) Apply initial charge to coils in normal direction and decrease to zero. Gradually increase energy in same direction to value required to bring armature against stop pin.
6. Reverse working current or voltage. (a) Apply initial charge to coils in normal direction and decrease to zero. Reverse polarity and gradually increase energy to value required to bring armature against stop pin.
7. Polar pickup. (a) Without current in either direction, polarized armature with or without contact pressure must not move to the position opposite the last position operated. The current or voltage required to reverse the position of the polarized armature will be the polarized pickup.
8. Polar working current or voltage. (a) The value required to bring polar armature against stop pin in either operating position is the polar working current or voltage.
- (b) Relay operating requirements must be in accordance with Table 1.
- (c) In taking current readings the voltmeter should always be disconnected. In taking voltage readings the voltmeter should be directly across the coils of the instruments.
- (d) Tests as required by A. R. A. Signal section form 11 and

*The term "relay" where used in these instructions includes indicators other than switch indicators.

A R. V. Signal section forms 12 and 13 must be made and recorded at time relay is tested.

(e) Front, back and polar contacts of relays must be tested for contact resistance after case is in place and before relay is sealed.

(f) Insulation tests must be made between binding posts and relay tops. The insulation resistance must be not less than 1 meg-ohm.

(g) In determining the resistance of coils or contacts by ammeter and voltmeter method, simultaneous reading should be taken of current and voltage.

12. **Inspection.**—(a) Determine by actual operation that relay has a positive dropaway and relay contacts open without retardation of movement due to friction or external force.

(b) Before the case is placed, subject the relay to air blast to remove any foreign matter, then check to see that all parts are in proper position and in good condition.

13. **Sealing.**—(a) Relay case must be sealed.

14. **Final Test.**—(a) After relay is sealed, final dropaway, pick-up and working current test should be made. The values obtained should not vary more than 2 per cent from those of the previous test.

15. **Shipping.**—(a) Relays must be tested and must meet shop requirements before shipment.

(b) Each relay must be put in a separate carton or suitably wrapped before being placed in packing box.

FIELD TESTS AND INSPECTIONS

16. **Meter Calibration.**—(a) Meters must be calibrated before each cycle of test and as often as necessary for field use.

17. **Testing.**—(a) Test required by Sections 11-(f) and 12-(a) and A. R. A. Signal section form 11 must be made annually.

18. **Inspection.**—(a) Relays must meet shop requirements when placed in service, except in emergency, when relays meeting field requirements may be used.

(b) It must be determined by observation that sufficient front, back and polar contact opening exists.

(c) Determine by observing operation of relay, that sufficient clearance exists between case and movable parts.

(d) Parts enclosed must be free from foreign matter, in proper position and in good condition.

(e) Relays not meeting field requirements must be taken from service as promptly as possible.

19. **Repairing.**—(a) Emergency repairs and adjustment to insure positive operation of relay, for temporary use in emergency, may be made in the field by an authorized relay inspector.

20. **Recording.**—(a) Relays must be identified by serial number, which must be recorded. Manufacturer's serial number must be used if available.

(b) Inspectors must re-mark indistinct serial numbers.

(c) Relays that have illegible or no serial number must be assigned serial number, preceded by a letter. The letter to be used will be assigned by

(d) Inspectors must immediately record field readings on A. R. A. Signal section form 11, which, when filled, must be forwarded to

(e) Field readings must be transferred weekly from A. R. A. Signal section form 11 to A. R. A. Signal section form 10. One A. R. A. Signal section form 10 must be used for each relay.

The committee recommended that the instructions for inspecting and testing direct current relays and indicators be approved for presentation at the annual meeting.

Committee: P. M. Gault (I. C.), chairman; I. S. Gensheimer (P. R. R.), vice chairman; Harry Combs (I. F. & W.), Caleb Drake (C. & N. W.), C. I. Fairhart (A. & A.), Thos. Holt (C. U. D. Co.), I. E. Ireland (C. I. & L.), Malcolm McIntyre (M. C.), I. D. Moorchart (C. M. & St. P.), J. P. Miller (Southern), T. J. O'Mara (N. Y. C.), C. O. Seifert (B. & O.), E. B. Smith (N. Y. C.), I. L. Whitcomb (N. Y. C.), G. H. Person (B. R. & P.).

Discussion

A. R. Fugina (I. & N.): The relay specification does not provide for a non-adjustable pin.

E. B. Smith (N. Y. C.): There are relays in service with adjustable top pins and a lot with non-adjustable.

E. T. Ambach (B. & O.): What did the committee have in mind when they require a meter calibration to be made annually? What kind of calibration do you expect to make a shop calibration or a manufacturers' calibration?

P. M. Gault (Chairman): It was the intention of the committee that that would mean that the meter should be compared with some other meter that is known to be correct.

Mr. Ambach: Referring to Table No. 1 the initial charge is shown as four times the direct pick-up. Now, under the shop requirements, what is this direct pick-up, with or without contact pressure? If the recommendations of Committee VII, which were accepted yesterday on operating characteristics of relays, are to be used in this particular instance it would mean a saturation of 393 mils against the recommendation of Committee VII of 450 mils. On the 2-ohm relay it is essential that you have 450 mils in order to get contact pressure on your fingers.

J. S. Gensheimer (Penna.): The initial charge in checking most of the relays against the present relay specification works out very well on four times the direct pick-up. This was checked with the manufacturers when this table was tentatively agreed upon.

S. M. Day (Gen. Ry. Sig. Co.): In 8-G, it states that simultaneous readings should be taken of current and voltage. If you take a simultaneous reading of current and voltage you are going to be led into error because your ammeter will indicate the current by the volt.

Chairman Gault: The committee will consider Mr. Day's suggestion.

G. K. Thomas (A. T. & S. F.): If the committee would make a definite recommendation as to the box in which the relays should be shipped, how it should be packed and going into details of that kind, it would help.

Mr. Gensheimer: The committee did go into that and found that several methods were suitable but we did not feel we should pick any one of those methods as the only method of shipping a relay.

Mr. Fugina: Referring to Table 1, the dropaway for motor contact states, "not less than 65 per cent of the original marking nor less than 35 per cent of pick-up—" I wonder why we have two values? I think the 70 per cent of the original marking is the proper value to use.

Mr. Gensheimer: To make that more accurate, it should say 70 per cent and the other one, I agree, it really should be 33 1/3. I worked it out that 33 1/3 and 70 will agree. The object of specifying the two was so that your direct pick-up would not increase on your drop-away figures.

Mr. Fugina: Will the committee take into consideration then to use the value of 33?

Chairman Gault: The committee will consider that. Mr. Fugina: Under 5-B of the Method of Testing First Range, Upper Quadrant, D. C. Motor Signals, it seems to me the wording "45 deg. position" could be eliminated. I do not believe you could make a test without having a 45-deg. position.

Chairman Gault: The committee will consider that.

Mr. Fugina: The specifications for the push-clear type are identical with those of the pull-clear type, except for a few tests. These two specifications could be combined by merely adding to the push-clear specification a clause at the end, that the following tests shall be made for the pull-clear type, and one paragraph in addition to 2-B, 2-E, 3-C and 4. Outside of this section, the two specifications are exactly identical.

Chairman Gault: The committee will consider the question of combining these instructions in one instruction.

(The instructions were approved for presentation at the annual meeting after which the committee was dismissed with the thanks of the Signal section.)

Report of Committee on Valuation

The average service life in years of the important units of the different types of signal installations is one of the most important questions occupying the attention of this committee. There has been a debated question between railroad and government forces from the time valuation work first started, as it is one on which little authentic information was to be had at that time. The committee presents the results of several years' study of the average service life of materials. A uniform method of reporting the materials used and the labor performed in construction has been a subject for careful study and suggested forms have been prepared.



J. M. Carley
Chairman

J. M. Carley was appointed chairman in December, 1918, when the committee was formed. He entered the service of the Lehigh Valley as a helper and telegraph operator in 1892, resigning in November, 1899, to go with the Buffalo, Rochester & Pittsburgh as a station agent. Two years later he went with the New York Central as a relief signalman. He served as one of the inspectors making a tentative valuation of signal equipment in 1911. Later Mr. Carley was transferred to the signal engineer's office at Albany, N. Y. In May, 1917, he accepted a position as signal estimator on the Boston & Albany, and is still engaged in valuation work.

THE COMMITTEE submitted for consideration reports on the average service life in years of the important units of the different types of signal installations and forms for reporting the distribution of signal labor and material charges and credits. The committee recommended that these reports be approved for presentation at the annual meeting.

Average Service Life of Signal Units

(Obsolescence not considered)

Unit.	Service Life	
	Min.	Max.
Air compressor, steam.....	30	50
Air compressor, internal combustion.....	20	40
Air compressor, electric motor.....	40	60
Arms, cross, wood untreated.....	10	25
Arms, cross, treated.....	15	40
Arresters, lightning, over 600 V.....	20	50
Arresters, lightning, over 600 V.....	15	40
Bars, detector complete.....	10	20
Bars, deflecting.....	15	35
Batteries, portable storage.....	5	14
Batteries, stationary storage.....	6	25
Bells and buzzers.....	20	50
Bonding.....	5	20
Bonds, impedance.....	30	75
Brackets, signal.....	25	75
Bridges, signal.....	25	75
Cable, aerial, braided.....	15	40
Cable, aerial, lead sheath.....	25	60
Cable, aerial, steel sheath.....	20	50
Cable, submarine, armored.....	30	60
Cable, underground, braided.....	15	25
Cable, underground, lead sheath.....	25	50
Cable, underground, steel sheath.....	20	40
Carriers, pipe.....	20	50
Carriers, wire.....	20	50
Compensators.....	10	30
Conduit, clay.....	50	100
Conduit, concrete.....	50	100
Conduit, fibre.....	7	15
Conduit, fibre in concrete.....	25	50
Conduit, iron.....	20	50
Conduit, wood, untreated.....	7	15
Conduit, wood, treated.....	15	30
Concrete.....	50	100
Controllers, switch circuit.....	10	25
Controllers, all other circuit.....	25	50
Couplers, bridge (pipe and wire).....	15	35
Cranks.....	10	30
Engines, internal combustion.....	20	40
Engines, steam.....	30	50
Foundations, concrete.....	50	100
Foundations, iron.....	20	40
Foundations, wood.....	10	25
Gates, highway crossing, electric.....	20	40
Gates, highway crossing, mechanical.....	20	40

Gates, highway crossing, pneumatic.....	20	40
Gates, railroad crossing, electric.....	20	40
Gates, railroad crossing, mechanical.....	20	40
Gates, railroad crossing, pneumatic.....	20	40
Generators, electric.....	30	75
Housings, concrete.....	100	
Housings, iron.....	30	75
Housings, wood.....	10	25
Indicators, switch.....	30	60
Indicators, in buildings.....	30	75
Insulators, glass or porcelain.....	100	
Insulation, pipe.....	25	50
Jaws.....	10	25
Layouts, mechanical switch or derail.....	8	40
Layouts, power switch or derail.....	10	50
Locks, bolt.....	25	50
Locks, electric, switch.....	15	35
Locks, electric, lever.....	25	50
Locks, plunger.....	20	50
Locks, time.....	30	75
Lugs.....	10	30
Machine, mechanical interlocking.....	25	60
Machine, power interlocking.....	30	50
Movements, mechanical switch.....	10	40
Movements, power switch.....	15	50
Motors.....	30	75
Pipe, galvanized iron signal.....	25	50
Pipe, galvanized steel signal.....	15	30
Pipe, black iron signal.....	25	50
Pipe, steel signal.....	10	20
Poles, wood signal.....	15	30
Poles, iron signal.....	25	75
Poles, wood cable.....	8	20
Poles, iron cable.....	15	50
Poles, line, untreated.....	15	45
Poles, line, treated butt.....	20	45
Poles, line, treated.....	25	60
Poles, line, concrete.....	50	100
Rectifiers (mercury arc).....	30	60
Relays.....	20	50
Releases, electric clock work.....	20	75
Releases, mechanical.....	20	75
Screws, pipe adjusting.....	20	50
Screws, wire adjusting.....	20	50
Shafts, rocking, and fittings.....	25	60
Selectors, pipe or wire.....	20	50
Signals, mechanical, high.....	25	65
Signals, mechanical, dwarf.....	20	40
Signals, power, high.....	25	75
Signals, power, dwarf.....	20	60
Switchboards and accessories.....	25	75
Terminals.....	40	75
Transformers.....	15	50
Trunking (see conduit).....		
Wheels, chain.....	10	30
Wire, bare, copper.....	100	
Wire, bare, copper clad.....	15	50
Wire, bare, iron.....	30	75
Wire, bare, steel.....	10	40

Wire, rubber-covered, copper, smaller than 12 A.W.G.	7	25
Wire, rubber-covered, copper, 12 A.W.G. and larger...	7	30
Wire, weatherproof	15	30
Wire, galvanized messenger, stranded.....	10	60
Wire, galvanized guy, stranded.....	10	40

Forms for Reporting Distribution of Signal Labor and Material Charges and Credits

Forms have been prepared to meet the requirements of Valuation Order No. 3 of the Interstate Commerce Commission, and, in addition, to provide for the allocation of costs, for estimating and statistical purposes, to the composite units shown to be printed on the back thereof. The use of the word "month" is merely as an example and the committee believes that the form may be used as a progressive or final statement or for such period as the supervising officer may elect, with practically the same results.

Where the word "Account" appears it will be understood to mean "Road and Equipment" (R. & E.), "Profit and Loss" (P. & L.), and Operation Expense Accounts, as shown in the classification of accounts for steam railroads, issued by the Interstate Commerce Commission, effective July 1, 1914.

Committee: J. M. Carley (B. & A.), chairman; C. Homewood (P. R. R.), vice-chairman; E. T. Ambach (B. & O.), B. T. An-

derston (D. L. & W.), R. B. Arnold (C. & N. W.), G. E. Beck (N. Y. C.), P. M. Gault (I. C.), C. O. Glenwright (P. R. R.), W. J. Koerber (L. V.), G. W. Kydd (B. & O.), S. W. Law (N. P.), J. W. MacCormack (K. C. Term.), J. P. Robinson (S. P.), C. H. Wiegand (A. C. L.), J. P. Zahnen (C. R. I. & P.).

Discussion

Mr. Stevens: The report states "obsolescence not considered." Obsolescence is a big thing. It seems to be the opinion of some public utility people that some value might be arrived at for obsolescence to take care of the actual value of stuff in service.

J. M. Carley (B. & A.): The committee has never taken any action on the subject of obsolescence.

A. H. Rudd (Penna.): I would like to ask if the committee took into consideration at all wear and tear in connection with this minimum life, or if they arrive at this in some other way.

Chairman Carley: This table was based on minimum ages of apparatus being used in the service and operated continuously, with maintenance but without any accidents, or anything except normal and natural wear.

(Sections 4 and 5 were approved for presentation at the annual meeting after some recommended changes in the column heading of the latter. This committee was then dismissed with the thanks of the Signal section.)

Report of Committee on D. C. Track Circuits

A discussion of the factors involved in the standards of safety for track circuits is one subject of importance presented by this committee. The track circuit is the foundation on which modern signal practice is based and many have had an erroneous idea that because of its apparent simplicity there are no complex characteristics to be considered. In establishing track circuit standards, factors such as ballast and rail resistance, train shunt resistance, switch fouling resistance, switch box shunt resistance, insulated joint and switch rod resistance, battery, relay characteristics and limiting resistance between battery and track must be considered.



A. R. Fugina
Chairman

A. R. Fugina has been the chairman of this committee since its organization two years ago. The need for such a committee was shown by the research work inaugurated by Mr. Fugina on his lines, which made it apparent that there were many problems to be solved. His appointment as chairman is in recognition of this work. Mr. Fugina entered railroad service in engineering location work on the Chicago & North Western in western Minnesota early in 1890. In July, 1907, he was transferred to the signal department of this road as assistant engineer. In December, 1910, he was appointed signal engineer of the Louisville & Nashville

THE FOLLOWING FACTORS involved in the safety of track circuits must be taken into consideration in the study of the track circuit and each has a vital bearing in establishing track circuit standards: Ballast resistance, rail resistance, train shunt resistance, switch fouling resistance, switch box shunt resistance, insulated joint and insulated switch rod resistance, battery, characteristics of the relay, and the limiting resistance between the battery and track.

Values for the various factors must be such as will prove practicable, and these must correlate properly with each other. The value of one is dependent upon the value of the others, and therefore in order to fix upon a standard value for any one of the factors, we should know what effect such value will have on the other factors.

The effect of the train shunt and the limiting resistance between battery and track in a typical track circuit, assuming different conditions for the battery, ballast and the relay. The fundamental conditions should be such that the relay will open when the track is shunted, either by a train or an opened switch, and will pick up again

when the shunt is removed. Assume a length of track circuit, 3,000 ft.; a 4 ohm 4 point track relay with R. S. A. pick-up; .078 amp. and drop-away .037; 3 cells caustic soda battery connected in multiple; gravel ballast reasonably well cleared from rails, and the resistance of the rails and bond wires 0.3 ohms. The limiting resistance between battery and rails, including the connecting wires, 2 ohm, this being within the R. S. A. recommended limit.

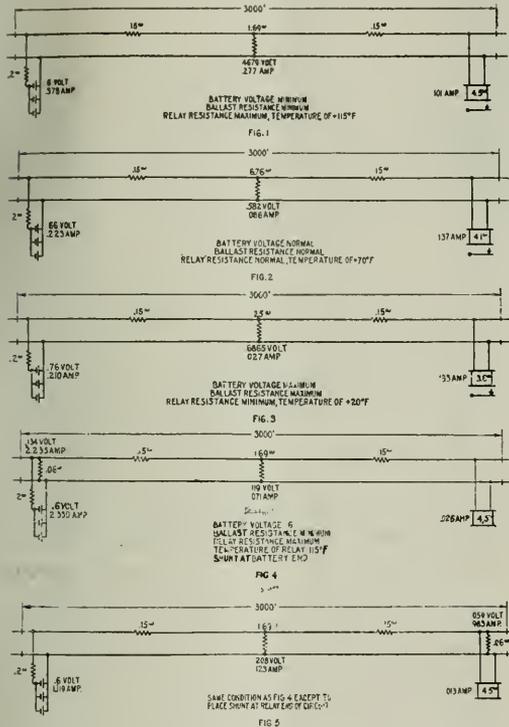
With these conditions we want to be assured that the relay will open when the track is shunted, and that the relay will again close when the shunt is removed.

It has been learned from experience that the adverse condition of battery, ballast and relay, as affecting the pick up of the relay, are present at the beginning of a rain on a hot summer day after a dry spell, with the battery nearing exhaustion and the resistance of the coils of the relay higher than normal, due to high temperature. Under these conditions the current and voltage readings of the circuit will approximate those shown in Fig. 1.

In Fig. 1, as well as in all of the following figures, the resistance of the wire connections between relay and rail

is assumed to be .1 ohm, and this is included in the figure of 4.5 ohms for the relay. When all conditions of the circuit are normal, the current and voltage readings will approximate those shown in Fig. 2.

When all conditions of the circuit are favorable, for example, in the winter time with the ballast frozen, just after the battery has been renewed, the current and voltage readings will approximate those shown in Fig. 3.



Diagrams of Track Circuit Tests—Figs. 1 to 5

It will be noted that under the adverse conditions we have .101 amp. flowing through the relay as compared with .183 amp. under the most favorable conditions. With the adverse conditions the relay will pick up with sufficient slide on the contacts to properly close the line circuits. Let us now see if the relay will drop away when the track is shunted.

Under our assumption, the limiting resistance between the battery and the track is within the limit set by the R. S. A. standard for direct current track circuit safety. This standard is based on a train shunt of .06 ohm, which figure is used for the shunt in checking the circuit. Conditions are assumed for the circuit and battery as shown in Fig. 1. We will first place the .06 ohm shunt across the rails at the battery end of the circuit as indicated in Fig. 4, and then at the relay end, as shown in Fig. 5.

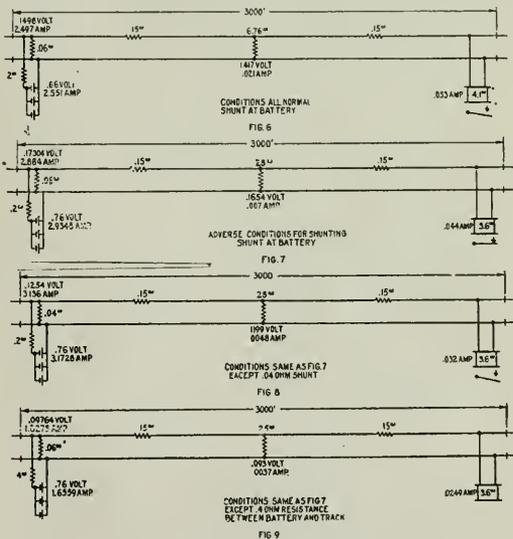
From Figs. 4 and 5 it will be noted that with the shunt at the battery end, the current flow through the relay is .026 amp., while with the shunt at the relay end the current flow through the relay is .013 amp. It is evident, therefore, that the shunt at the battery end is the more adverse as regards the shunting of the relay. In the fol-

lowing we will assume that the shunt will always be located at the battery end of the track circuit.

We will now assume conditions for the circuit and battery as shown in Fig. 2, which represents the normal condition, and will place a .06 ohm shunt across the rails. The results are illustrated in Fig. 6. Under Fig. 7 we assume the same conditions for the circuit and battery as shown in Fig. 3, which represents the adverse condition for shunting of the relay, with a .06 ohm shunt across the rails.

Therefore, under the three assumed conditions as shown in Figs. 4, 6 and 7, the following current flows respectively through the relay—.026 amp., .033 amp. and .044 amp. Under the last conditions with a .06 ohm shunt connected across the rails at the battery, there is a current flow of .044 amp. through the relay, whereas the R. S. A. drop-away value for the relay is .037 amp. The limiting resistance, shunt and battery voltage are within the standards as prescribed by the R. S. A., and yet there is enough current flowing through the relay to keep it from opening.

Obviously the R. S. A. standards should be adjusted, and apparently there are two ways to do it, namely: by reducing the resistance of the train shunt, or by increasing the resistance between the battery and track. The effect of using a .04 ohm train shunt instead of one of .06



Tests of D. C. Track Circuits—Figs. 6 to 9

ohm, is shown in Fig. 8, in which all conditions except the shunt are the same as given in Fig. 7.

Reducing the shunt from .06 ohm to .04 ohm reduces the current flow through the relay from .044 amp. to .032 amp. If a .02 ohm shunt is used, the current flow will be only .0175 amp. If instead of reducing the resistance of the train shunt we increase the limiting resistance between the battery and track from .2 ohm to .4 ohm we shall have the results shown in Fig. 9.

The increase of the limiting resistance from .2 to .4 ohm reduces the current flow through the relay from .044 amp. to .0249 amp. If a .6 ohm limiting resistance is used, the current flow through the relay will be reduced to .0174 amp.

In the foregoing the rail resistance has been considered

as a constant. To vary the rail resistance will, of course, give still different results.

D. C. Track Circuit Tests for Rail and Ballast Resistance

The formula for ballast resistance as printed in Committee IV's report on page 27 of the March, 1919, advance notice is in error. The formulae for rail and ballast resistance as printed in Committee IV's report on pages A-52 and A-53 of the 1919 proceedings are correct. The formula for ballast resistance as printed in Committee V's report on page A-159 of 1920 proceedings is in error, while the formula on page 14 of the 1920 letter ballot covering the report of Committee V is correct.

The committee has prepared a form covering instructions for making measurements and computations for rail and ballast resistance and for recording the same, which it proposes to use for collecting data concerning rail and ballast resistance.

The committee recommends that the form for direct current track circuit rail and ballast resistance report be approved for presentation at the annual meeting, being meanwhile referred to Committee XIII, Electrical Testing.

Committee: A. R. Fugina (L. & N.), chairman; R. M. Phinney (C. & N. W.), vice-chairman; B. T. Anderson (D. L. & W.), H. H. Appleton (P. R. R.), F. W. Bender (C. R. R. N. J.), Dwight Byers (N. Y. C.), E. B. DeMeritt (C. of Ga.), R. E. Green (M. C.), H. G. Morgan (L. C.), D. S. Rice (L. V.), K. W. Spain (R. I.), W. S. Storms (Eric), J. B. Weigel (L. & N.), L. S. Werthmüller (Mo. Pac.), A. J. Yarrell (C. I. & L.).

Discussion

A. R. Fugina (Chairman): The committee presents the report for discussion more as a thesis, discussing the factors involved in the standards of safety of track circuits. This is merely submitted to the association as information.

F. L. Dodgson (Gen. Ry. Sig. Co.): I think you know what the 0.06-ohm shunt meant, and how it was arrived at. The committee has shown quite conclusively that if the shunt on the relay is 0.06 ohm, under certain conditions the relays will not be properly shunted. This value of 0.06 ohm, when it is applied to a single car, even on a running line, has a very large factor of safety, probably a factor of safety greater than 10; but when it is applied to a shunt on a side track or a shunt track, the factor of safety in some cases may be zero, in fact, really no shunt at all. I would suggest to the committee that in their further consideration of this subject they divide track circuits which have switch shunts in them or switches, and prepare a table of limiting resistances for track circuits which do not have switches, and which are always in the running rail, that is, the running rail is clean, and another table for track circuits in which there are switches and practically

shunt tracks, and then consider what is going to happen in the shunt circuits under rusted rail conditions.

Chairman Fugina: The committee expects to present various tables of limiting resistances for various train shunts. I doubt very much whether we are going to be able to select a train shunt that will do for the side track fouling section, and will do for the main line. What we do attempt is to present a series of resistances that may be used on main line track, varying from 0.01 to 0.06 ohm, and then the engineer may take the table which he believes his standard will permit him to operate on. The present table of limiting resistances that is used will not hold good with the 0.06 train shunt.

A. J. Kelly (C. C. C. & St. L.): Where a 0.6-volt battery is used with a 2-ohm relay, the minimum allowable resistance, which is 0.3, is wrong. It is possible that you would have 0.5 volt at your relay. Now, transferring a 2-volt battery onto that same circuit, using the minimum allowable resistance, which is 1.1, you might have 2 volts or 5 mils flowing through. If it is not safe with the lower voltage battery, why is it with the 2-volt?

Chairman Fugina: Generally it will be found that the circuit will be safer with the higher voltage battery, because it is possible to cut in more limiting resistance between the battery and the track.

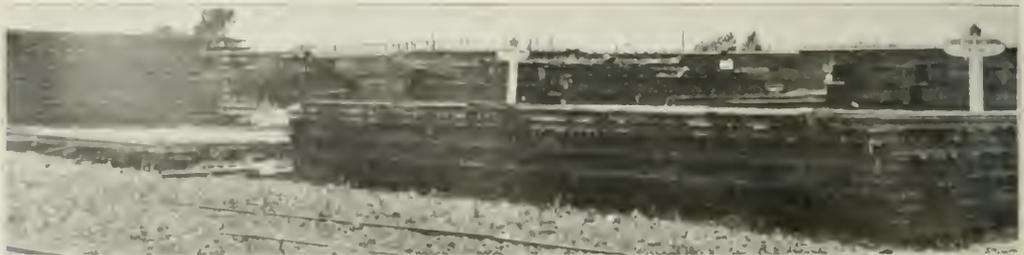
Mr. Kelly: Following the limiting resistance by the R. S. A., what is the guide to the maintainer? The maintainer is told that he may reduce his resistance to 1.1 ohms with a 2-volt battery and a 2-ohm relay, but by doing that it is possible he might get 500 mils through his relay.

Mr. Fugina: I stated before that the present table of limiting resistances is not correct for all values. With the 0.06 train shunt, the table of limiting resistance is all right. If the train shunt is different from that it will not work out.

S. M. Day (Gen. Ry. Sig. Co.): There are two ways, apparently, of adjusting the present R. S. A. standards, namely, by reducing the resistance in the train shunt, or by increasing the resistance between the battery and the track. That is perfectly correct, as far as it goes, but there are other ways still. One of the most important of them is to use a more efficient relay; in other words, if you use a relay which has a lower drop-away, cutting your minimum drop-away of a relay in service to a specified point which is higher than what it is now, a track circuit can be obtained which will give a much better characteristic.

Chairman Fugina: The committee appreciates that, but we have not a more efficient relay available; although we hope that we are going to get it.

(The report of the committee was approved for presentation at the annual meeting, after which the committee was dismissed with the thanks of the Signal section.)



Stock Piles of Relay Rails

Report of Committee on Mechanical Interlocking

Concrete trunking, capping and supports are being used more extensively than formerly and the committee provided specifications covering the character of materials to be used and the workmanship necessary for a uniform product. The compensation of a pipe line is important, as the proper working of the operated unit depends on expansion and contraction being neutralized. The committee accordingly presented specifications and compensation charts pertaining to this work. The specifications for mechanical interlocking are brought up to date with the presentation of a revised specification in which is incorporated a requisite sheet covering construction.



Charles J. Kelloway
Chairman

Charles J. Kelloway is completing his twenty-fourth year as chairman of the committee, having held this office since the committee was organized, with the exception of the one year, 1920, during which he was chairman of the Signal division, A. R. A. As signal engineer of the Atlantic Coast Line he has had occasion to install and test out much of the mechanical interlocking apparatus recommended by the committee. Mr. Kelloway has also been in charge of the installation of the signaling and interlocking of the Jacksonville Terminal Company during the past three years. His untiring efforts have contributed largely to the excellent specifications produced.

THE COMMITTEE SUBMITTED specifications for concrete trunking, and unit specifications for universal compensation of pipe lines, together with drawings 1536; instructions for locating compensators, and compensating cranks 1537; compensation chart and 1538, crank chart, and revised specifications and requisite sheet for mechanical interlocking.

Specification for Concrete Trunking, Capping and Supports

(1) Purpose, (2) Drawings, (3) Material and Workmanship, are standard sections.

(4) Reinforcement.—(a) Reinforcing material shall be $\frac{3}{4}$ in. deformed square rod or its equivalent.

(5) Cement.—(a) The cement shall comply with specifications of the purchaser.

(6) Sand.—(a) Sand shall be clean, sharp and coarse. It shall be free from sticks and other foreign material, but may contain clay or loam not to exceed 5 per cent.

(7) Water.—(a) Water should be clean, fresh (not salt) and free from sewage or other impurities detrimental to the concrete.

(8) Stone or Gravel.—(a) Stone or gravel shall be sound, hard and durable and shall be clean and free from shale, dust, loam, clay or any foreign substances. If necessary to meet these requirements, broken stone shall be screened and washed. The size of pieces shall range from a minimum of $\frac{1}{4}$ in. to a maximum of $\frac{3}{4}$ in.

(9) Proportions.—(a) The concrete shall be mixed in the proportion of 1 part of cement to not more than 2 parts of sand and 2 parts of stone or gravel, measured, separately.

(10) Mixing.—(a) The mixing shall be done in a machine of the batch type.

(b) Each batch to be mixed not less than 1 minute nor more than $1\frac{1}{2}$ mins.

(11) Consistency.—(a) The material shall be wet mixed and of such consistency as to cause it to flow into a form and about the metal reinforcements without permitting a separation of the coarse aggregates from the mortar, while the concrete is being conveyed from the place of mixing to the forms.

(12) Placing of Concrete.—(a) The concrete shall be spaded along each surface of the form as it is deposited, to insure the smoothest possible finish. Every section shall be completely filled before any portion of the concrete has set.

(b) Concrete that has partially set or has been mixed 30 mins. shall not be used.

(13) Temperature.—(a) Concrete shall not be mixed or placed when the temperature is below 40 degrees F.

(14) Forms.—(a) The forms shall be substantially built in such manner that the product shall conform accurately to the measurements as specified on drawings. The forms shall be water-tight and shall be coated with oil or grease to prevent adhesion to the concrete. The oil or grease shall be of such character that it will not discolor the concrete.

(15) Removing Forms.—(a) Forms shall not be removed until the concrete has attained a set sufficiently hard to prevent its adhering to the forms when they are removed.

(16) Tests, (a), (b), (c) and (d) are according to standard sections.

(f) Material shall be cured not less than 28 days before testing. Trunking shall be supported for a distance of 3 in. at each end. Where side walls are 5 in. high, outside dimensions, it shall support a weight of 500 lb., concentrated within 12 in. in the center, without showing cracks. Where side walls are 6 $\frac{1}{2}$ in. high, outside measurement, it shall support a weight of 800 lb., concentrated within 12 in. in the center, without showing cracks.

(17) Finishing.—(a) Before concrete is fully set, all sharp edges shall be removed.

(18) Outlets.—(a) Outlets for branch leads, when specified, shall be provided when pouring concrete, using blocks of the size required to admit branch leads.

(19) Finished Product.—(a) Trunking and capping shall be true to form and have a uniform thickness throughout not varying in thickness from drawings more than $\frac{1}{8}$ in.

(20) Curing.—(a) Upon removal of the forms the finished product shall be protected from the direct rays of the sun and wind for a period of 48 hr. and shall be kept wet by sprinkling for at least 7 days. The temperature of the air in which the curing is done shall be maintained above 40 degrees F., 4.44 degrees C., but artificial heat exceeding 110 degrees F. shall not be used.

(21) Inspection, (22) Packing, (23) Marking, and (24) Warranty, are standard sections.

The committee recommended that the specifications for concrete trunking, capping and supports be approved for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

Specification for Universal Compensation of Pipe Line

(1) Purpose.—(a) The purpose of this specification is to provide for universal compensation of pipe line.

(2) Details of Work.—(a) Details of work are to be as herein described.

(3) General.—(a) Compensators shall be in accordance with R. S. A. 1013, 1014 and 1231, unless otherwise specified on requisite sheet.

(b) Drawing 1536, instructions for locating compensators and compensating cranks, shall govern: 1. Location of compensators and compensating cranks. 2. Reduction of stroke of cranks (note 1). 3. Determination of distance "B" (note 2).

(c) Ln connecting pipe to compensator, be governed by compensation chart 1537.

(d) In territory where temperature variation is less than 120 degrees F., compensation shall be provided for each pipe line as follows:

1. For switches, movable frogs and point details with 10x13-in. compensator cranks.

For 8 $\frac{3}{4}$ -in. stroke, lengths 40 to 800 ft.

For 9 $\frac{3}{4}$ -in. stroke, lengths 40 to 600 ft.

2. For facing joint locks, switch and lock movements, lift details and signals, with 10x13-in. compensator cranks.

For 8 $\frac{3}{4}$ -in. stroke, lengths 80 to 800 ft.

For 9 $\frac{3}{4}$ -in. stroke, lengths 80 to 900 ft.

3. For switches, movable frogs and point details with 10x16-

in compensator cranks, unless otherwise specified on requisite sheet

For 8 1/4-in. stroke, lengths 40 to 1100 ft.

For 9 3/4-in. stroke, lengths 40 to 900 ft.

4. For facing point locks, switch and lock movements, lift derails and signals, with 10x16-in. compensator cranks, unless otherwise specified on requisite sheet.

For 8 1/4-in. stroke, lengths 80 to 1100 ft.

For 9 3/4-in. stroke, lengths 880 to 900 ft.

(c) In territory where the temperature variation is more than 120 degrees F., compensation shall be provided for each pipe line as follows:

(i) In territory where the temperature variation is more than 120 degrees F., compensation shall be provided for each pipe line as follows:

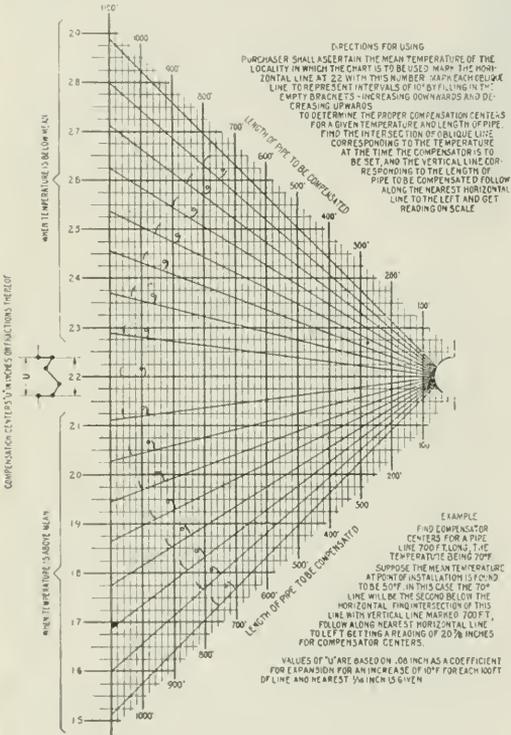
For 8 1/4-in. stroke, lengths 470 ft.

For 9 3/4-in. stroke, lengths 290 ft.

The committee recommended the approval of specification for universal compensation of pipe line and drawings 1536, 1537 and 1538 for presentation at the annual meeting.

Complete specifications for mechanical interlocking apparatus, a consumption of years of work on this subject, together with requisite sheets, were presented by the committee for approval for presentation at the annual meeting.

Committee: C. J. Kelloway (A. C. L.), chairman; W. N. Spangler (P. R. R.), vice-chairman; W. F. Zane (C. B. & Q.), vice-chairman; T. S. Adams (N. Y. C.), Larsen Brown (A. T. & S. F.), W. F. Cook (D. & H.), Oswald Frantzen (N. Y. N. H. & H.), Wm. Hiles (C. C. & St. L.), F. E. Jacobs (C. & W. L.), H. F. Lomas (I. C. E.), E. M. Mack (C. & E. L.), J. W. McClelland (P. & R.), W. B. Morrison (D. L. & W.), G. S. Pfisterer (N. C. & St. L.), E. J. Relph (N. P.), C. Smith (St. L.-S. F.), Chas.



Pipe Compensation Chart

1. For switches, movable frogs and point derails with 10x13-in. compensator cranks.

For 8 1/4-in. stroke, lengths 40 to 700 ft.

For 9 3/4-in. stroke, lengths 40 to 500 ft.

2. For facing point locks, switch and lock movements, lift derails and signals, with 10x13-in. compensator cranks

For 8 1/4-in. stroke, lengths 80 to 700 ft.

For 9 3/4-in. stroke, lengths 80 to 500 ft.

3. For switches, movable frogs and point derails with 10x16-in. compensator cranks, unless otherwise specified on requisite sheet

For 8 1/4-in. stroke, lengths 40 to 1000 ft.

For 9 3/4-in. stroke, lengths 40 to 800 ft.

4. For facing point locks, switch and lock movements, lift derails and signals with 10x16-in. compensator cranks, unless otherwise specified on requisite sheet

For 8 1/4-in. stroke, lengths 80 to 1000 ft.

For 9 3/4-in. stroke, lengths 80 to 800 ft.

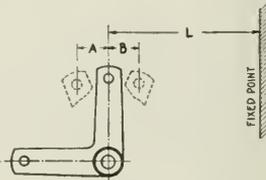
(f) Horizontal cranks shall be in accordance with R. S. A. 1511

(g) Crank chart 1538 shall govern the setting of cranks in re-quirement of temperature

(h) In territory where temperature variation is less than 120 degrees F., compensation shall be provided for each pipe line as follows:

For 8 1/4-in. stroke, lengths 470 ft.

For 9 3/4-in. stroke, lengths 290 ft.



DIRECTIONS FOR USING
WRITE THE MEAN TEMPERATURE (IN F. DEGREES) FOR LOCALITY IN WHICH THE CHART IS TO BE USED IN DEGREE COLUMN OPPOSITE MEAN TEMPERATURE. GRADUATING UP FOR EACH SPACE INCREASING UPWARD AND DECREASING DOWNWARD. THE FIGURE IN SQUARE OPPOSITE TEMPERATURE AT TIME OF INSTALLATION AND UNDER THE NUMBER OF FEET (L) BETWEEN CRANK AND FIXED POINT IS THE DISTANCE (A OR B) IN INCHES. THE CRANK SHOULD BE SET TOWARDS DRAW FROM THE FIXED POINT.

F°	20'	40'	60'	80'	100'	120'	140'	160'	180'	200'	220'	240'	260'	280'	300'	L
0	1/8	5/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2
10	1/8	1/4	7/16	9/16	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
20	1/8	1/4	3/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4	2 3/4
30	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
40	1/8	3/16	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
50	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
60	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
70	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
80	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
90	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
100	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
110	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
120	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
130	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
140	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
150	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
160	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
170	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
180	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
190	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
200	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
210	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
220	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
230	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
240	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
250	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
260	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
270	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
280	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
290	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4
300	1/8	1/4	5/16	3/4	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 1/2	2 3/8	2 3/4

Table of Crank Adjustments With Temperature Changes

Stephens (C. & O.), M. F. Sutherland (Maine Cent.), R. W. Taylor (B. & O.), J. I. Vernon (N. Y. N. H. & H.), E. L. Waltz (C. & W.)

Discussion

E. T. Ambach (B. & O.): The statement was made yesterday that there are no specifications for cement. The American Railway Engineering Association has a specification on cement and also on reinforced concrete.

The committee would do well to adopt something that some other section has, rather than to leave it open.

C. J. Kelloway (Chairman): The specification is very broad here. "Cement shall comply with specifications of the purchaser."

(A motion that the specifications for compensation of concrete trunking for presentation to the annual meeting was carried.)

Chairman Kelloway: The committee found that the clause for compensation was too voluminous to include in the major specification, and we have prepared a unit specification for compensation of pipe lines.

(A motion that the specifications for compensation of pipe line, and drawings 1536, 1537 and 1538, be accepted

for presentation to the annual meeting, was carried.)

Chairman Kelloway: The specifications for mechanical interlockers were discussed at length at the last meeting of this association. Most suggestions made have been incorporated in the specifications. The committee desires to change the paragraph on painting to read: "All unfinished parts of interlocking machine above the floor, including the levers, shall be painted one coat of red lead and three linseed oil and two coats black."

(A motion to this effect was carried.)

(A motion to the effect that the specifications for mechanical interlockers be approved for presentation at the annual meeting, with requisite sheets, was carried.)

(The committee was excused with thanks of section.)

Reports of the Committee on Contracts

The table of recommended unit values for the division of expense of installation, maintenance and operation of joint interlocking plants as applied to mechanical plants varies but little from the table adopted by the association in 1907. It has been supplemented by a few additional items for mechanical plants and by values assigned for power operated units which are considered equitable. Any table of units will prove equitable for dividing the cost of ownership installation, operation and maintenance when applied fairly and the law of averages allowed to apply, although it is conceded that no table can be made entirely equitable.



George E. Beck
Chairman

George E. Beck has been chairman of this committee since it was organized two years ago, prior to which time he was chairman of the old R. S. A. Committee on Storage Batteries and Charging Equipment. He started as a blacksmith in the signal department of the Michigan Central in 1898 and three years later transferred to the Lake Shore & Michigan Southern. He was promoted to foreman in March, 1902, and was appointed assistant supervisor two years later, being promoted to signal supervisor in 1906 and in 1913 to chief signal inspector. He was appointed assistant signal engineer of evaluation, N. Y. C., Lines West, in 1916.

THE COMMITTEE submitted a report, including a table of recommended unit values for the division of the expense of installation, maintenance and operation of joint interlocking plants.

In arriving at the following table it will be noted that the committee did not materially vary from the table of unit values adopted by the American Railway Engineering Association in 1907, as applied to mechanical plants.

The table has been supplemented by (a) a few additional items for mechanical plants and by (b) values assigned for power-operated units which are considered equitable either when used in a plant that is entirely power-operated or in combination.

The committee concedes that no table of units can be made which will be entirely equitable for dividing all the cost of ownership, installation, operation and maintenance, but experience has demonstrated that almost any table of units will prove equitable when applied fairly and the law of averages allowed to apply.

The committee recommended that this table of interlocking units and values be accepted for approval for presentation at the annual meeting.

Committee: G. E. Beck (N. Y. C.), chairman; H. F. Haag (K. C. S.), vice-chairman; J. B. Latimer (C. B. & Q.), H. C. Lorenzen (P. M.), J. C. Mock (M. C.), J. A. Peabody (C. & N. W.), W. F. Seemuth (C. M. & St. P.).

Discussion

R. M. Phinney (C. & N. W.): The use of the indicator for a unit is not good because it is not positive to determine just how many indicators are going to be used in a plant of that kind. The use of the railroad indicator leaving out the relay discriminates against the use of indicator or indicating relay.

R. B. Arnold (C. & N. W.): Is it the intention of the committee to call a lock, an indicator or an annunci-

Table of Interlocking Units and Values

Unit No.	Unit	Description	Mechanically Operated Units	Power Operated Units
1	ea.	Fixed signal arm or light (or combined)	1	1
2	ea.	Non-operated signal complete (mast, blade or light)	2	2
3	ea.	Signal operated by switch or derail	1	1
4	ea.	Signal, 2-position	4	4
5	ea.	Signal, 3-position	8	8
6	ea.	Single switch (2 points) derail, or torpedo machine	4	8
7	ea.	Derail pipe connected to, and operated by switch	1	
8	ea.	Movable point frog (4 points)	8	12
9	ea.	Single slip end (2 points)	4	8
10	ea.	Double slip end (4 points)	8	12
11	ea.	55 ft. of detector bar (or fraction thereof) on plant	2	2
12 (a)	ea.	Facing point lock or drawbridge lock with lever connection	2	6
(b)	ea.	Each additional lock when operated with other unit	1	1
13 (a)	ea.	Drawbridge circuit controller or pipe coupler when operated separately	4	8
(b)	ea.	Each additional controller or coupler when operated with other unit	2	2
14	ea.	Complete track circuit	2	2
15	ea.	Lock, indicator, annunciator, slot	1	1
16	ea.	Electric lock for outlying switch controlled from tower	2	2

ciator, one unit each in the table of units? It is common practice to include the lever lock and indicator in

The Making of the Railway Age March Dailies

Prompted by Numerous Inquiries the Editors Relate
How the Work Is Done from Beginning to End

ANOTHER YEAR HAS COME and with it the meetings of the American Railway Engineering Association and the Signal Section of the American Railway Association that bring you to Chicago. Perhaps as you sat down to your breakfast this morning you dwelt a little upon that thought. And as you turned it over in your mind while your fingers idly ruffled through the pages or marked a place where you had been reading in your copy of the Railway Age March Daily, another thought may have occurred to you. Whether your first Daily or, with the familiarity of an old member, your thirteenth Daily, your interest was aroused, maybe for only a moment, and you wondered how we did it, when and where. Regularly and unobtrusively, the Dailies, the largest issued by any publisher, have appeared at your hotel ready for you when you awoke to give you accurately and concisely the doings of the previous day's sessions and surrounding activities. To us familiar with the making of the Dailies, the complexities and details of publishing one every 24 hours, an issue of the size and character of the Railway Age March Daily, are still interesting. We think you will find them equally so.—
(THE EDITORS.)

The heart of the convention is the Florentine Room and it is there that much of the real benefit of the meeting is obtained. Discussion, as we all know, is the quickest way of smoothing out differences of opinion and advancing the status of engineering. The man who could attend all the sessions, hear all the discussion of all the reports, select the wheat from the chaff, keep his head clear and unconfused, store away in his mind what he has learned, visit with acquaintances, inspect the exhibits and discuss the things which he has seen, is not nor cannot be. It is too much for the most ambitious of men. He can only choose what is closest to his interests. Hence the Dailies, where he may review at his leisure moments during and after the sessions, the activities he was unable to take part in.

For weeks before the convention the work of organizing for the publication is carried on by the regular Railway Age staff and that staff alone carries it on through to the end. There is first among many things the reading and editing of the reports of the committees, the separating and condensing of data so that duplication may be avoided, retaining the heart of the report and yet keeping it all within the bounds of a paper that will be and can be read without taking too much of the valuable convention time. Illustrations for the reports must be prepared and portraits of the officers and others of the association must be secured, mounted, measured and photo-engravings made. Not one portrait can be dispensed with. The series must be complete.

From the experience gained in the past, it is possible to estimate the space required to cover the various activities which will take place during the convention. This estimate includes editorials, special articles, reports and discussions, news, articles about new devices and other miscellaneous matters and forms the nucleus around which the Dailies are built. While the reports are being edited and the photographs procured, arrangements are being made for the remainder of the editorial articles which can be prepared in advance. Heads are written for the reports and all material is sent to the printshop as soon as it is written. All of this done, the type must be meas-

ured for length, recorded and indexed, the proofs read, corrected and approved and everything put in readiness so that when wanted there will be no hitch to tangle up or slow down the work of publication when the real rush begins.

The things enumerated above are only the high points of the before-the-convention editorial work. From four to five editors are on this assignment regularly, yet it must not and does not interrupt or interfere with the regular publication work or the other papers of this company. Many a night sees the lights burning over editorial matter for the Dailies. It is not amiss to add here that the work, arrangements and schedules outlined above as well as those that will be mentioned later cover only the meetings of the American Railway Engineering Association. When the signal meetings are held, as they are this year and as they were two years ago, the work of preparation, not to speak of that of the actual publication, is increased twofold, yet the same staff handles both. Duties already double normal become quadrupled—still the Dailies appear.

In the meantime, arrangements are being made for the removal of the Railway Age staff from its regular offices to temporary offices in the hotel. Rooms must be acquired, furniture moved and procured, and living quarters assigned, for our editors must live at the hotel during the convention. Time is precious. Minutes, not hours, are the divisions. Printshop facilities, engravings, messenger, taxi, phone and telegraph service are arranged for, keyed up to the requisite speed and scheduled. Court reporters familiar with the convention work are secured. With all these thousand and one details, large and small, of which we have only suggested the high spots here, finished, the opening day of the signal meeting—one day previous to the A. R. E. A. convention—has arrived. One final conference of the staff is held, at which all of the details are checked carefully, assignments rehearsed, and then the real work starts.

The problem is to present the real meat of the discussion verbatim—not some one editor's impressions of what some member may have said, and again, as with the reports, to keep them within the bounds of a readable paper. Close up to the officers' table, the court reporter sits, taking down word for word what each member says. The senior member of the reportorial staff that takes down your words has seen each March Daily come and go since their inception. He knows most of the members by name and by road and, unless we are badly mistaken, we believe that in many cases he often knows what some are going to say before they have said it. At intervals each reporter is relieved by another, the break being made after short periods of time in order to speed up the transcription. The discussion already taken down in shorthand is then dictated to an experienced typist, who has also seen many an A. R. E. A. convention come and go. From the beginning of the morning session to well after the end of the afternoon session, this typist transcribes rapidly and steadily the words used but a few minutes before on the floor of the convention. Two copies are made and as soon as each sheet is completed, one copy is sent immediately to a nearby room where two editors are stationed in readiness, with everything necessary for the efficient, accurate and speedy editing of the discussion or "running

report," as it is called. This includes among many things, copies of the original reports, galley proofs of the reports as edited, estimates of space, pencils, ruler, scissors, paste pots, blank paper. Virtually if not actually, for quiet and freedom from interruption are paramount, these editors are locked in their room.

As each sheet of the discussion is received, it is read carefully, its importance weighed carefully, names, figures, words and expressions corrected where wrong, condensed where possible by judicious cutting, then check-read, numbered, stamped with the report number according to our print-shop and copy list schedule, approved and sent on its way. The next stop is the desk of the editor in charge of the Dailies who, closely familiar with the work of the convention, passes upon it to see that everything has been covered properly, that it has not been edited too closely or too loosely and that it is free from mistakes. An estimate is made of the length of the discussion of each report and its identification marks are re-checked to prevent any possible confusion. It is then dispatched by special messenger service to the printshop where the linotype operators seize upon it and quickly convert it into slugs of type. Galley proofs are struck off, submitted to the editorial make-up man and his assistant, both of whom are editors familiar with all phases of the publishing work and stationed at the printshop. They read, correct, measure and schedule them. This transposition of words to type actually takes only a short time, so smoothly and speedily does this system work.

While this work of editing the running report of the session is on, other editors are busy mixing with the members, sitting in the session, making notes on important points for editorial comment, studying the exhibits and otherwise doing the hundred and one little things that go to the securing and publishing of the up-to-the-minute news of the convention. Lines, paragraphs, articles, even photographs and whatnot from various sources and directions are correlated, passed upon, and dispatched to the linotype machines—all through one central "clearing house." At the registration desk two members of the staff aid in the registration of the members attending each session. At intervals during the day duplicate lists of the registrations are made up and sent to the editor in charge. These lists are checked against the membership list of the association and other data to insure accuracy, after which one copy is forwarded to the printshop. Each succeeding list is handled likewise, the names being arranged alphabetically after being set up in type. The duplicate list or lists are retained by the member of the staff who is in charge of the delivery of the Dailies. He arranges the names, not according to the letter of the alphabet, but according to the hotel addresses and room numbers of the members, and from this he is able to make his plans for the delivery of the copies.

By early afternoon, it is possible for the editor in charge, working with the editors in the printshop, to obtain a fairly accurate estimate of the amount of printed matter, better known as "copy," which will appear the next morning. Space is then allotted by pages to the various sections of the paper, after which the mechanical make-up is started—usually this is late in the afternoon. Careful attention to what may be considered by the layman as the way it is done, the type is assembled or, in the vernacular, the paper is made up, by sections, starting at the foot or editorial page, at the beginning of the convention session and at the last page. The first two sections are made up, working toward the back of the paper, while the third is worked forward. The closing of the paper is of course, delayed until the last copy has

come through and has been set up in type, but in the meantime, three-fourths or more of the paper has been put in page form, proofs have been taken, read and corrected for size of type, spacing, headings and typographical errors.

As soon as each page is made up it is placed in the forms, where it remains until all the spaces in the 4, 8 or 16-page forms, depending upon the number of pages in the paper, have been filled and the pages finally passed and approved. The forms are then locked and sent to the press room. Ordinarily this work, as outlined, is completed and the forms released by midnight or a little after, the scheduling calling for the press to be started on the last four by 2 o'clock in the morning at the latest. In order to catch any possible errors, one or more of the editors closely familiar with the sessions of the day and the editing of the running report go to the printshop in the evening after their other work has been completed to remain until the forms go on the press.

When photographs are taken of the convention in session added complications arise. Detailed arrangements are made beforehand for the photographer to take his picture with the minimum interruption to the meeting. The engraver is waiting for the photograph to be taken and accompanies the camera operator to his studio, where the plate is developed, a print made, and blotted to hasten its drying. He then takes it to his engraving shop by taxicab, where special men are retained to perform all of the complicated operations entering into the making of a half-tone. These operations being completed, in turn, the copper engraving is dispatched, again by messenger, to the printshop, where it is inserted into a space carefully measured beforehand and left for it and the forms are sent to the press.

The paper, as it leaves the press, is seized by the binders, still wet from the printing, who fold, bind, trim and handle it in quantities of 100 copies. This, as you may well surmise, happens along near the time when the sun is beginning to appear. Each lot of 100 copies is then loaded into taxicabs and accompanied by members of the Railway Age staff, delivery is begun. Time is still precious, for a copy must be addressed for each member attending the meeting and it must be delivered at the door of his room before the time he has decided to arise in the morning. Not only that but all of the regular subscribers of the Railway Age located in the downtown district of the city must also receive their copies by special messenger. In the meantime other copies are bound and taken to the postoffice for mailing to the subscribers to the Railway Age. By eight o'clock at the latest, and usually much before that, delivery is completed and another March Daily is out. Thus, the Railway Age March Dailies, no longer an innovation in magazine publishing but an institution, combining newspaper promptness and activity with magazine size, thoroughness and accuracy, are brought before you each morning.



First Railway Station at Anchorage, Alaska

American Railway Engineering Association Registration

THE REGISTRATION OF MEMBERS and guests of the American Railway Engineering Association yesterday totaled 666. This is the highest first day's registration in the history of the association, comparing with 593 last year and 534 in 1920. The crowded condition of the convention room and the numerous complaints from members who were unable to secure seats reflected this condition.

The registration follows:

- Abbott, F. E., insp. engr., Lackawanna Steel Co., Buffalo, N. Y.
 Abbott, R. B., asst. gen. supt., P. & R., Reading, Pa.
 Ackerman, F. J., sig. engr., K. C. Term., Kansas City, Mo.
 Albright, C. C., assoc. prof. ry. engr., Purdue Univ., Lafayette, Ind.
 Allen, L. B., engr. m. of w., C. & O., Huntington, W. Va.
 Allen, L. J., chf. engr., A. A., Owosso, Mich.
 Ambrose, J. R. W., chf. engr., Tor. Term., Toronto, Ont.
 Ames, Azel, Kerite Insulated Wire & Cable Co., New York.
 Amoss, F. X., Winnipeg, Man.
 Anderson, Irving, div. engr., A. T. & S. F., Marceline, Mo.
 Angerer, Victor, vice-pres., William Wharton, Jr. & Co., Easton, Pa.
 Angier, F. J., supt. timber pres., B. & O., Baltimore, Md.
 Armour, Robert, mas. engr., G. T., Montreal, Can.
 Armstrong, J. E., asst. engr., Can. Pac., Montreal, Can.
 Armstrong, W. R., asst. chf. engr., O. S. L., Salt Lake City, Utah
 Arn, W. G., asst. engr. m. of w., I. C., Chicago.
 Atwill, A. Lce, asst. engr., C. G. W., Chicago.
 Atwood, Col. Wm. G., National Research Council, New York.
 Austill, H., bridge engr., M. & O., St. Louis, Mo.
 Aylsworth, R. G., asst. engr., C. B. & Q., Denver, Colo.
 Backes, W. J., engr. m. of w., N. Y. N. H. & H., New Haven, Conn.
 Backus, M. M., dist. engr., I. C., Waterloo, Ia.
 Badger, O. C., asst. engr., A. T. & S. F., Chicago.
 Baird, R. C., asst. engr., C. R. I. & P., Chicago.
 Baisinger, W. C., rdmaster, A. T. & S. F., Ottawa, Kansas.
 Baker, J. B., engr. m. of w., Penna., Cleveland, Ohio.
 Bakhshi, S. R., asst. chf. draftsman, C. B. & B., Chicago.
 Baldridge, C. W., asst. engr., A. T. & S. F., Chicago.
 Baldwin, A. S., vice-pres., I. C., Chicago.
 Baldwin, R. A., dist. engr., Can. Nat., Toronto, Ont.
 Baluss, F. C., engr. b. & b., D. M. & N., Duluth, Minn.
 Banks, T. G., dist. engr., M. K. & T., Oklahoma City, Okla.
 Bardwell, R. C., engr. water serv., Mo. Pac., St. Louis, Mo.
 Barrett, J. E., supt. b. & b., L. & H. R., Warwick, N. Y.
 Barrett, W. C., trnmstr., L. V. R., Sayre, Pa.
 Bartlett, Calvin, sup. land apprs., Wabash, St. Louis, Mo.
 Batchelder, F. L., chf. engr., Cop. Range, Houghton, Mich.
 Bates, F. E., asst. bridge engr., Mo. Pac., St. Louis, Mo.
 Bathellor, F. D., div. engr., B. & O., Garrett, Ind.
 Bates, Onward, cons. engr., Chicago.
 Beach, Dr. S. C., health officer, I. C., Chicago.
 Beckett, F. T., engr. m. of w., C. R. I. & P., El Reno, Okla.
 Belcher, R. S., manager treating plants, A. T. & S. F., Topeka, Kansas.
 Bell, Gilbert J., dist. engr., A. T. & S. F., Topeka, Kansas.
 Bell, H. C., supt. the treating plant, N. & W., East Radford, Va.
 Benjamin, H. I., office engr., Sou. Pac., San Francisco, Cal.
 Bennett, Edgar, asst. engr., Southern, Chattanooga, Tenn.
 Bennett, V. A., asst. engr., Nor. Pac., Fargo, N. D.
 Bernhardt, J. E., brdg. engr., C. & E. J., Chicago.
 Blackie, G. F., asst. chf. engr., C. B. & St. L., Nashville, Tenn.
 Blaess, A. F., engr. m. of w., I. C., Chicago.
 Blaiklock, M. S., engr. m. of w., G. T., Montreal, Can.
 Blanchard, A. M., pilot engr., G. T., Montreal, Can.
 Blocher, Theo., Jr., div. engr., B. & O., Baltimore, Md.
 Blum, Bernard, engr. m. of w., Nor. Pac., St. Paul, Minn.
 Boardman, Francis, div. engr., elec. div., N. Y. C., New York.
 Boardman, H. E., engr. asst. to gen. val. con., N. Y. C., New York.
 Bohland, J. A., bridge engr., G. N., St. Paul, Minn.
 Bond, L. H., dist. engr., I. C., Chicago.
 Boyce, W. S., west mgr., Lundie Engineering Corp., Chicago.
 Boyd, G. E., Roseville, Ill.
 Bradley, A. C., div. engr., C. R. I. & P., Chicago.
 Brameld, W. H., engr. asst. to gen. mgr., Erie, New York.
 Breckinridge, W. L., asst. chf. engr., C. B. & Q., Chicago.
 Breed, Chas. W., office engr., C. B. & Q., Chicago.
 Breen, J. E., office engr., Long Island, Richmond Hill, N. Y.
 Bremner, Geo. H., consult. engr., Chicago.
 Brewer, H. H., asst. gen. mgr., Can. Nat., Winnipeg, Man.
 Brown, A. V., engr. m. of w., Lake Shore Elec., Sandusky, Ohio.
 Brown, C. W., supt., L. & N. E., South Bethlehem, Pa.
 Brown, E. H., supt., B. & N. Nor. Pac., Minneapolis, Minn.
 Brown, G. H., asst. chief engr., m. of w., Penna., Philadelphia, Pa.
 Brown, H. C., Jr., Chicago Bridge & Iron Works, New York.
 Brown, H. W., div. engr., Penna., Zanesville, Ohio.
 Brown, J. M., corp. engr., maint. & conts., C. R. I. & P., Chicago.
 Browne, H. L., res. engr., C. B. & Q., Pineville, Ky.
 Brumley, D. J., chief engr., Chicago term. imp., I. C., Chicago.
 Brunner, John, asst. insp. engr., Illinois Steel Company, Chicago.
 Burnett, W. S., engr. m. of w., C. C. & St. L., Springfield, Ohio.
 Burrage, W. H., pilot, val. dept., N. Y. C. & St. L., East Cleveland, Ohio.
 Burrell, Chas. F., engr. m. of w., K. & I. Term., Louisville, Ky.
 Burton, W. J., asst. val. engr., Mo. Pac., St. Louis, Mo.
 Busch, Harry F., div. engr., St. L.-S. F., Fort Scott, Kan.
 Butterworth, A. S., chief engr., G. F. & A., Pensacola, Fla.
 Byram, C. R., asst. engr. rdway., I. & G. N., Palestine, Tex.
 Camp, W. M., editor, Railway Review, Chicago.
 Campbell, H. A., Chicago.
 Campbell, J. L., chf. engr., E. P. & S. W., El Paso, Tex.
 Carmichael, J. W. M., Hagerstown, Md.
 Carothers, J. B., asst. to gen. mgr., B. & O., Cincinnati, Ohio.
 Carroll, G. A., div. engr., C. R. I. & P., Kansas City, Mo.
 Cassil, H. A., engr. m. of w., Pere Mar., Detroit, Mich.
 Chase, J. A., asst. engr., B. & A., Boston, Mass.
 Cheney, B. M., gen. inspr. perm. way, C. B. & Q., Chicago.
 Chevalier, C. R., rdmstr., Port. Term., Portland, Me.
 Chinn, Armstrong, instrumentman, eng. dept., C. B. & Q., Chicago.
 Christian, W. A., cons. engr., City of Chicago, Chicago.
 Christiansen, Eli, asst. engr. bldgs., C. R. I. & P., Chicago.
 Churchill, Chas. S., vice-pres., N. & W., Roanoke, Va.
 Clapper, Leland, engr. b. & b., D. & L. Two Harbors, Minn.
 Clark, W. A., chief engr., D. & I. R., Duluth, Minn.
 Clarke, A. C., dist. engr., B. & O., Pittsburgh, Pa.
 Clarke, H. S., engr. m. of w., D. & H., Albany, N. Y.
 Clarke, R. N., asst. engr., Mo. Pac., Kansas City, Mo.
 Clements, M. F., bridge engr., Nor. Pac., St. Paul, Minn.
 Cleveland, G. C., chf. engr., N. Y. C., Cleveland, Ohio.
 Coburn, Maurice, engr. m. of w., Penna., Indianapolis, Ind.
 Colladay, W. E., asst. engr., I. C., Chicago.
 Connor, E. H., chief engr. Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
 Conway, T. H., asst. engr., Nor. Pac., Livingston, Mont.
 Cook, C. C., maint. engr. (corp.), B. & O., Baltimore, Md.
 Cook, O. U., insp. engr., Tennessee Coal, Iron & Railroad, Birmingham, Ala.
 Cook, R. L., office engr., Cent. of Ga., Savannah, Ga.
 Coon, C. J., engr., Grand Central Term., N. Y. C., New York.
 Cooper, S. D., asst. mgr. treating plants, A. T. & S. F., Topeka, Kan.
 Courtenay, W. H., chf. engr., L. & N., Louisville, Ky.
 Craine, Arthur, dist. engr. m. of w., C. B. & Q., St. Louis, Mo.
 Crane, E. B., engr.-audi., C. M. & St. P., Chicago.
 Crites, G. S., div. engr., m. of w., B. & O., Baltimore, Md.
 Crompton, Arthur, val. engr., G. T., Montreal, Can.
 Cummins, R. R., rdmstr., Cent. of G., Macon, Ga.
 Cunningham, C. C., div. engr., C. R. I. & P., Herington, Kans.
 Curd, W. C., consult. engr., Chicago.
 Curtis, L. B., asst. engr., Nor. Pac., St. Paul, Minn.
 Cushing, W. C., engr. of stand., Penna., Philadelphia, Pa.
 Dale, L. E., sup., Penna., Philadelphia, Pa.
 Daley, C. A., office engr., Erie, Hornell, N. Y.
 Dalstrom, O. F., engr. of bridges, C. & N., Chicago.
 Dare, C. E., res. engr., R. F. & P., Alexandria, Va.
 Davidson, Geo., M., ind. engr., C. & N. W., Chicago.
 Davidson, J. H., water engr., M. K. & T., Dallas, Tex.
 Davis, A. L., prin. asst. engr., I. C., Chicago.
 Deckert, J. E., chf. draftsman, val. dept., C. B. & Q., Chicago.
 Delo, C. G., chf. engr., Chi. Gt. W., Chicago.
 Dennis, W. O., sup., L. & N. E., Pen Argyle, Pa.
 Dorsey, J. C., div. engr., D. & H., Albany, N. Y.
 Dodgson, F. L., cons. engr., General Railway Signal Co., Rochester, N. Y.
 Donahey, J. A., Cleveland, O.
 Dorrance, W. T., des. engr., N. Y. N. H. & H., New Haven, Conn.
 Dorsey, J. C., div. engr., D. & H., Albany, N. Y.
 Douglas, H. T., Jr., chf. engr., C. & A., Chicago.
 Downs, J. L., rdmstr., I. C., Champaign, Ill.
 Downs, L. A., vice-pres. & gen. mgr., Cent. of Ga., Savannah, Ga.
 Doyle, T. L., asst. div. engr., Penna., Grand Rapids, Mich.
 Duffour, F. O., prof. civ. engr. & dir. mat. test. lab., Lafayette College, Easton, Pa.
 Dugan, G. H., engr. m. of w., D. & W., Washington, D. C.
 Duncan, K. B., dist. engr., G. C. & S. F., Galveston, Texas.
 Dyke, R. L., div. engr., Erie, Hornell, N. Y.

- Lloyd, H. A., maint. insp., Erie, New York.
 Lombard, L. F., consult. engr., La Ceiba, Honduras, C. A.
 Loweth, C. F., chf. engr., C. M. & St. P., Chicago.
 Lowther, W. H., div. engr., Un. Pac., Denver, Colo.
 Lull, H. M., chf. engr., Sou. Pac., Houston, Tex.
 MacFarland, H. B., Chicago.
 MacLaren, G. P., engr. m. of w., Can. Nat., Toronto, Ont.
 Mack, W. C., chf. drftman., C. R. I. & P., Chicago.
 Maddock, J. B., engr. bridges and builds, Cen. of Ga., Savannah, Ga.
 Maischaider, A. F., engr. m. of w., C. C. C. & St. L., Mattoon, Ill.
 Mann, B. H., sig. engr., Mo. Pac., St. Louis, Mo.
 Manson, E. F., asst. engr., C. R. I. & P., Chicago.
 Martius, F. T., Chicago.
 Masters, F. H., asst. chf. engr., E. J. & E., Joliet, Ill.
 McBride, J. S., engr. val., C. & E. I., Chicago.
 McClanahan, S. L., div. engr., C. R. I. & P., El Reno, Okla.
 McComb, R. J., Q. & C. Co., Chicago.
 McCooe, David, supt. of track, G. T., Toronto, Ont.
 McDade, W. F., div. engr., G. M. & Nor., Laurel, Miss.
 McDonald, Hunter, chf. engr., N. C. & St. L., Nashville, Tenn.
 McFadden, J. H., div. engr., Mo. Pac., Atchison, Kans.
 McLeod, H. W., asst. engr., Can. Pac., Winnipeg, Mann.
 McNab, William, chrnm., val. com., G. T., Montreal, Canada.
 McVay, C. M., div. engr., K. & M., Charleston, W. Va.
 Meigs, M. C., asst. engr., Y. & M. V., Memphis, Tenn.
 Melton, J. K., official photographer, I. C., Chicago.
 Merritt, F., chf. engr., G. C. & S. F., Galveston, Tex.
 Metcalf, E. W., loc. engr., M. K. & T., St. Louis, Mo.
 Metcalf, J. M., prin. asst. engr., M. K. & T., St. Louis, Mo.
 Michel, Wm., ch. engr., H. V., Columbus, Ohio.
 Middleton, R. J., asst. chf. engr., C. M. & St. P., Seattle, Wash.
 Miller, C. F., div. engr., L. A. & S. L., Los Angeles, Cal.
 Miller, J. L., engr. bridges, N. Y. C., Yonkers, N. Y.
 Mock, J. C., sig. elec. engr., M. C., Detroit, Mich.
 Montzheimer, A., chf. engr., E. J. & E., Joliet, Ill.
 Moore, Milburn, eastern engr. editor, Railway Age, New York.
 Moore, S. B., spec. engr., Sou. Pac., La Porte, Texas.
 Morphy, L. G., chf. engr., Rutland, Rutland, Vt.
 Morrison, W. W., chf. engr., P. S. & N., Brownsville, Pa.
 Morrow, F. E., asst. chf. engr., C. & W. I., Chicago.
 Morse, C. A., chf. engr., C. R. I. & P., Chicago.
 Motley, P. B., engr. bridges, Can. Pac., Montreal, Canada.
 Mottier, C. H., office engr., I. C., Chicago.
 Mountain, G. A., chf. engr., Canadian Railway Commission, Ottawa, Canada.
 Moursund, E. M., dist. engr., M. K. & T., Dallas, Tex.
 Myers, J. B., engr., r. & t., B. & O., Baltimore, Md.
 Nelson, N. P., div. engr., C. B. & O., Casper, Wyo.
 Neubert, John V., engr. m. of w., N. Y. C., New York.
 Newbegin, P. C., maint. engr., B. & A., Houlton, Maine.
 Newton, A. W., ch. engr., C. B. & O., Chicago.
 Nicholson, F. L., chf. engr., N. S., Norfolk, Va.
 Niehaus, C. B., val. engr., Cent. of Ga., Savannah, Ga.
 Norris, W. H., bridge engr., Me. Cent., Portland, Maine.
 Nuelle, J. H., gen. mgr., N. Y. O. & W., Middletown, N. Y.
 O'Donnell, J. E., asst. engr., Cent. Ver., St. Albans, Vt.
 O'Rourke, G. M., rdmstr., I. C., Mattoon, Ill.
 Olson, E. H., asst. engr., A. T. & S. F., Chicago.
 Palmer, G. P., engr. maint. & const., B. & O. C. T., Chicago.
 Parker, W. A., asst. engr. m. of w., Un. Pac., Omaha, Neb.
 Patenall, F. P., sig. engr., B. & O., Baltimore, Md.
 Patterson, F. M., Chicago.
 Patterson, J. C., reg. engr., Erie, Jersey City, N. J.
 Patterson, R. E., div. engr., L. V., Hazelton, Pa.
 Peabody, G. A., ch. engr., Cleveland Frog & Crossing Co., Cleveland, Ohio.
 Pearson, R. L., maint. engr., N. Y. N. H. & H., New Haven, Conn.
 Pence, W. D., editor, Chicago.
 Pendleton, D. E., asst. engr., C. & W. I., Chicago.
 Penfield, W. H., engr. m. of w., C. M. & St. P., Chicago.
 Persons, C. L., asst. ch. engr., C. B. & O., Chicago.
 Peterson, John, Cotton Belt, Illma, Mo.
 Petri, Philip, div. engr., B. & O., Cumberland, Md.
 Pettierew, C. B., div. engr., St. L. S. W., Illmo, Mo.
 Pettus, J. K., asst. engr., N. S., Norfolk, Va.
 Pfeifer, H. J., ch. engr., Terminal Railroad Association of St. Louis, St. Louis, Mo.
 Phillips, H. C., cons. engr., Chicago.
 Pierce, A. B., engr. water sup., Southern, Washington, D. C.
 Pickles, J. L., ch. engr., D. W. & P., West Duluth, Minn.
 Pinson, J. F., dist. engr., C. M. & St. P., Seattle, Wash.
 Pittman, T. M., Jr., rdmaster, I. C., Water Valley, Miss.
 Porter, H. T., ch. engr., B. & L. E., Greenville, Pa.
 Porter, J. W., spec. engr., Can. Nat., Winnipeg, Man.
 Pringle, J. F., asst. engr., G. T., Montreal, Canada.
 Quigley, C. N., ch. engr., B. C. G. & A., Boyne City, Mich.
 Radspinner, W. A., spec. engr., B. & O., Cincinnati, Ohio.
 Ray, G. J., chf. engr., D. L. & W., Hoboken, N. J.
 Reagan, J. H., supt. track, G. T., Detroit, Mich.
 Reamer, R. V., engr. m. of w., Cent. of N. J., Jersey City, N. J.
 Reasoner, R. B., div. engr., O. S. L., Pocatello, Idaho.
 Reece, A. N., ch. engr., K. C. S., Kansas City, Mo.
 Reichmann, Albert, div. engr., American Bridge Co., Chicago.
 Reimann, Robert, asst. engr., B. & O., Relay, Md.
 Reinholdt, J. H., supt., M. & St. L., Fort Dodge, Iowa.
 Rench, W. F., civil engr., Chicago.
 Ridgway, A. O., asst. ch. engr., D. & R. G., Denver, Colo.
 Righter, G. E., div. engr., Erie, Buffalo, N. Y.
 Righter, H. M., div. engr., Erie, Susquehanna, Pa.
 Riley, D. A., engr. dept., B. & O., Baltimore, Md.
 Riley, F. L., asst. engr. bldgs., B. & O., Baltimore, Md.
 Ripley, H. L., corp. and val. engr., N. Y. N. H. & H., Boston, Mass.
 Robinson, A. F., bridge engr. sys., A. T. & S. F., Chicago.
 Rogers, E. I., ch. engr., P. & P. U., Peoria, Ill.
 Rohan, E. N., asst. engr. m. of w., Wabash, Moberly, Mo.
 Roof, W. R., bridge engr., C. G. W., Chicago.
 Rossiter, L. P., div. engr., L. V., Buffalo, N. Y.
 Rudd, A. H., ch. sig. engr., Penna., Philadelphia, Pa.
 Ruff, J. S., div. engr., N. Y. N. H. & H., Boston, Mass.
 Ruppel, H. C., gen. rdmstr., Nor. Pac., Pasco, Wash.
 Rust, T. E., ch. engr., W. C. F. & N., Waterloo, Iowa.
 Safford, H. R., vice-pres. C. B. & Q., Chicago.
 Salmon, J. M., bridge engr., L. & N., Louisville, Ky.
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 Schmitt, F. E., assoc. editor, Engineering News-Record, New York.
 Schnacke, A. D., asst. engr., A. T. & S. F., Topeka, Kans.
 Schofield, J., arch. can., Nat., Toronto, Ont.
 Scholes, T. R., asst. to ch. engr., C. B. & Q., Chicago.
 Schram, I. H., reg. engr., Erie, Hornell, N. Y.
 Scott, H. E., asst. engr., Wabash, Moberly, Mo.
 Scowden, A. B., asst. engr. bridges, B. & O., Cincinnati, Ohio.
 Selby, O. E., prin. asst. engr., C. C. C. & St. L., Cincinnati, Ohio.
 Sesser, John C., engr. m. of w. & struc., W. & L. E., Brewster, Ohio.
 Sexton, J. R., reg. engr., Erie, Huntington, Ind.
 Sharp, J. S., engr. m. of w., Southern, Macon, Ga.
 Sharpley, H. F., Jr., prin. asst. engr., Cent. of Ga., Savannah, Ga.
 Shaver, A. G., consult. elec. and sig. engr., Chicago.
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 Shurtleff, A. K., Chicago.
 Silliman, Charles, group engr., President's conference committee, Washington, D. C.
 Sills, J. M., dist. engr., St. L.-S. F., Springfield, Mo.
 Simmons, I. L., bridge engr., C. R. I. & P., Chicago.
 Sitton, G. L., engr. m. of w., Southern, Danville, Va.
 Slibeck, G. J., ch. engr., Pettibone, Mulliken Co., Chicago.
 Sloane, F. M., dist. engr., C. M. & St. P., Butte, Mont.
 Sloggett, L. O., engr. of surv., I. C., Chicago.
 Smith, F. A., civil engr., Chicago.
 Smith, G. H., div. engr., T. & O., Bucyrus, Ohio.
 Smith, G. L. G., asst. engr. of track, Nor. Pac., St. Paul, Minn.
 Smith, H. C., div. engr., P. & R., Philadelphia, Pa.
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 Smith, Huntington, office engr., N. Y. C. & St. L., Cleveland, Ohio.
 Smith, Lowry, asst. dist. engr., Nor. Pac., St. Paul, Minn.
 Smith, R. M., asst. engr., Mo. Pac., St. Louis, Mo.
 Snyder, G. W., gen. strkpr., Penna., Philadelphia, Pa.
 Sparrow, L. L., prin. asst. engr., A. C. L., Wilmington, N. C.
 Speller, W. A., asst. engr., A. B. & A., Atlanta, Ga.
 Spencer, P. B., engr. of struct., N. Y. N. H. & H., New Haven, Conn.
 Stansbury, H. E., res. engr., E. P. & S. W., Tucumcari, N. M.
 Stejda, W. H., asst. engr., M. St. P. & S. M., Superior, Wis.
 Steinmayer, O. C., supr. timb. pres., St. L.-S. F., Springfield, Mo.
 Stelle, C. A., res. engr., C. & A., Chicago.
 Stephenson, James, asst. engr., A. C. L., Wilmington, N. C.
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 Stout, H. M., record engr., Nor. Pac., St. Paul, Minn.
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 Stuart, H. B., struct. engr., G. T. R., Montreal, Canada.
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 Swartz, F. P., div. engr., St. L.-S. F., Fort Smith, Ark.
 Swift, E. D., engr. m. of w., Belt, Chicago.

Ray, A. L., instman, G. T., Durand, Mich.
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 Ruthwen, A. L., Simplex Train Control, Rochester, N. Y.
 Schauble, F., asst. supr. of track, B. & A., Pittsfield, Mass.
 Scharbach, G. F., asst. engr., D. L. & W., Binghamton, N. Y.
 Schultz, T. G., instman, G. T., Durand, Mich.
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 Smith, H. E., asst. engr., G. T., Montreal, Que.
 Starkie, J. L., office engr., G. C. & S. F., Galveston, Tex.
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 Swartz, H. C., G. T., Montreal, Que.
 Tisdale, A. A., asst. to gen. mgr., C. N., Winnipeg, Man.
 Tomlinson, D. A., bgr. rgr. btr., Portland Cement Association, Chicago.
 Ueckert, H. H., engr. struct., S. P., Houston, Tex.
 Wain, J. B., asst. engr., G. T., Montreal, Que.
 Wamsley, Gale, sr. asst. engr., M. P., St. Louis, Mo.
 Webster, J. W., E. J. & E., Joliet, Ill.
 Weymouth, F. A., Bethlehem Steel Co., Bethlehem, Pa.
 Wheeler, F. S., div. engr., Erie, Salamanca, N. Y.
 Whellans, W. J., supt. work equip., C. N., Winnipeg, Man.
 Wood, J. P., supvr. b. and b., P. M., Saginaw, Mich.
 Worthington, E. D., asst. engr. val. dept., M. P., St. Louis, Mo.
 Work, W., bldg. insp., G. T., Montreal, Que.

Schultz, E. E., engr., sig. dept., C. & N. W., Chicago.
 Starkweather, F. E., asst. sig. engr., P. M., Detroit, Mich.

Affiliated Members

Fenley, W. H., sales engr., Kerite Insulated Wire & Cable Co., Chicago.
 Frink, O. B., gen. inspr., Hall Switch & Signal Co., Garwood, N. J.
 Garrity, P. A., west. sales mgr., Thos. A. Edison, Inc., Chicago.
 Reichard, W. H., asst. gen. mgr., Federal Signal Co., Albany, N. Y.

Guests

Behymen, R. H., sig. maint., C. & O., Covington, Ky.
 Class, E. K., supt. teleg. & sigs., C. G. W., Dubuque, Ia.
 Claus, draftsman, I. C., Chicago.
 Ferguson, J. L., supr. sigs., N. & W., Bluefield, W. Va.
 French, C. C., asst. sig. engr., C. C. C. & St. L., Cincinnati, Ohio.
 Hard, Ture, sig. engr., Stockholm, Sweden.
 Johnson, Homer C., sig. inspr., C. & O., Cincinnati, Ohio.
 Love, Luther J., Kenmore, Ohio.
 Mogen, D. B., Edison Storage Battery Co., Orange, N. J.
 Mullen, W. G., gen. sig. inspr., C. G. W., Chicago.
 Partridge, G. F., supr. sigs., A. C. L., Florence, S. C.
 Piper, Arthur G., Toronto, Ont.
 Rice, Robt., W., sig. maint. D. & H., Castleton, Vt.
 Shotwell, E. V., sig. supr., C. & N. W., Chicago.
 Takeguchi, H., sig. engr., Southern Manchuria, New York.
 Wilson, Hugo, chf. engr., A. B. Vaxlar & Signals, Orebro, Sweden.

Registration of Signal Section, A. R. A.

THE FOLLOWING registered at the meeting of the Signal Section, A. R. A., at the Drake yesterday, bringing the total registration of members and guests for the two days to 400:

Representative Members

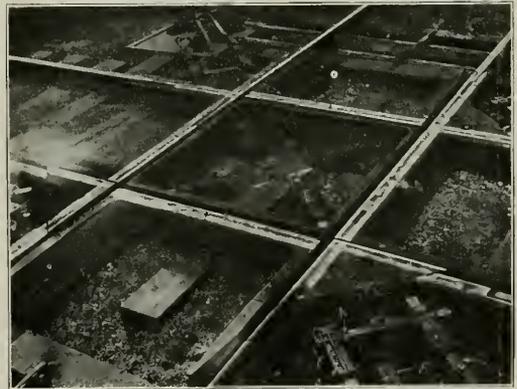
Acker, C. M., asst. sig. supr., D. & H., Albany, N. Y.
 Anderson, A. H., sig. supr., C. B. & Q., Alliance, Nebr.
 Bennett, C. H., sig. supr., L. & H. R., Warwick, N. Y.
 Bishop, C. T., sig. supr. C. B. & Q., Aurora, Ill.
 Cook, W. F., gen. mech. inspr., D. & H., Albany, N. Y.
 Cormick, J. H., sig. engr., Can. Nat., Winnipeg, Man.
 Gilbert, A. M., sig. supr., C. C. C. & St. L., Mattoon, Ill.
 Green, R. E., asst. sig. engr., M. C., Detroit, Mich.
 Hattery, C., asst. sig. supr., C. R. I. & P., Fairbury, Nebr.
 Hemphill, F. J., supr. sigs., C. R. I. & P., Trenton, Mo.
 Hiles, W., chf. sig. inspr., C. C. C. & St. L., Cincinnati, Ohio.
 Hilliard, E. J., supr. sigs., C. & N. W., Boone, Ia.
 Hoffman, S. C., sig. supr., I. C., Champaign, Ill.
 Homuth, W., asst. sig. engr., C. & N. W., Allis, Wis.
 Ishler, O. A., asst. supr. tel. & sigs., Penna., Pittsburgh, Pa.
 Johnson, T. L., sig. supr., D. L. & W., Binghamton, N. Y.
 Jones, I. S., elec. engr. of sigs., Nor. Pac., St. Paul, Minn.
 Kunde, F. L., sig. supr., C. B. & Q., Ottumwa, Iowa.
 Lollis, B. F., gen. sig. inspr., C. B. & W., Chicago, Ill.
 Mansfield, C. C., asst. sig. supr., C. & N. W., Maywood, Ill.
 Mill, J. C., sig. engr., C. M. & St. P., Milwaukee, Wis.
 Mock, H. F., sig. supr., C. & N. W., Green Bay, Wis.
 Orr, H. H., sig. engr., C. & E. I., Chicago.
 Parker, C. W., sig. engr., Can. Pac., Montreal, Canada.
 Palmer, A. C., supr. sigs., Vicksburg, Miss.
 Pileging, F. W., sig. engr., U. R., Omaha, Nebr.
 Rhymer, S. U., supt. tel. & sigs., C. & A., Bloomington, Ill.
 Seifert, T. C., gen. sig. inspr., C. B. & Q., Chicago.
 Smith, L. W., asst. sig. engr., C. M. & St. P., Tacoma, Wash.
 Snyder, J. W., supr. tel. & sigs., Penna., Madison, Wis.
 Tyler, R. F., gen. sig. for., C. M. & St. P., Tacoma, Wash.
 Weatherby, E. P., sig. engr., T. & P., Dallas, Tex.
 Wells, F. G., sig. supr., C. & N. W., Chicago.
 Wiegand, C. H., sig. supr., A. C. L., Savannah, Ga.

Railroad Affiliated Members

Bears, A. M., sig. supr., Can. Pac., Winnipeg, Man.
 Bills, H. R., sig. supr., Wabash, Lafayette, Ind.
 Gardner, R. C., sig. inspr., Can. Nat., Saskatoon, Man.
 Hossman, W. R., sig. supr., K. C. Term., Kansas City, Mo.
 Leisenring, J., sig. engr., Ill. Trac., Springfield, Ill.
 Leonard, F. A., sig. constr., acct., C. & N. W., Chicago.
 McConahay, J. F., sig. maintr., Nor. Pac., Verdale, Minn.
 Punter, W. M., sig. engr., Can. Nor., Toronto, Ont.
 Ryan, F. J., supr. sigs., I. C., Freeport, Ill.

Improvements in the Eymon Continuous Rail Crossing

IMPROVEMENTS IN THE method of operating and locking the movable blocks in the Eymon continuous crossing have added materially to the ease of connecting it with interlocking facilities and to the safety of its operation. The principal feature of this crossing is four triangular blocks of steel, designed to fit into the exterior angles of the four corners of the crossing and arranged to slide in a direction perpendicular to a line bisecting the angle of a corner, so that either one or the other flangeway is



Photograph of a Crossing in Service

closed. Thus a continuous rail may be provided for either track at will.

The new system of operation and locking of the movable blocks is accomplished by the "lock and block" movement, shown in the photograph. This apparatus has been designed particularly for this crossing and yet employs the principle of locking familiar to interlocking men. The lock of this movement locks normal in one position and reverse in the other position, and is unlocked or neutral on the center. The quadrant of the locking lever in the interlocking machine is "notched" on the center to hold

the lever in the unlocked position, while throwing the lever used for shifting the movable blocks.

Referring to the photograph, it will be seen that the movable block "F" is held in its position by the locking rod "C," which fits in bar "D" attached to the movable block. When changing the line-up for traffic on the other road, the first movement is to withdraw the locking rod "C" and by switching the operating rod "B" away from the reader the block "F" is moved in the direction of the arrow by means of lugs on the bottom, which fit over an offset on the rod "B," which extends on through to the bearing "E." It will be seen that as the block "F" moves over the locking bar "D" is carried along to such a position that it is now possible to push the rod "A" into the notch "X."

By means of this apparatus it is possible to operate and lock the entire crossing with one lever in the interlocking machine. However, it should be understood that if the levers are available in the interlocking machine there would be no objection to using one lever to operate and another lever to lock each crossing, which is a question to be decided by the signal engineers of the individual roads. This crossing is manufactured by the Eymon Crossing Company, Marion, O.

Recent Developments in the Use of Concrete Poles on Railroads

THE LAST FEW YEARS have witnessed a considerable interest on the part of the railroads in the use of reinforced concrete poles and other similar structures, particularly where the requirements of low cost and utility are coupled with a desire for architectural treatment. In this connection, therefore, it is of interest to note the type of pole recently installed by the Pere Marquette at its depot at Belding, Mich.

These standards were furnished by the Massey Concrete Products Corporation, Chicago. They are 13 ft. high, of hexagonal cross-section, and embody what is known as the Hollowspun type of construction, the essential feature of which is the placing of a wet mixture of concrete in a form containing the reinforcing steel and revolving at a high rate of speed, an operation which not only serves to compact the concrete around the reinforcing steel but also to leave a cylindrical opening throughout the length of the pole, thereby reducing the weight and the attendant inconvenience of handling. The type of pole used in this case is shown in the accompanying illustration.



The Posts at Belding

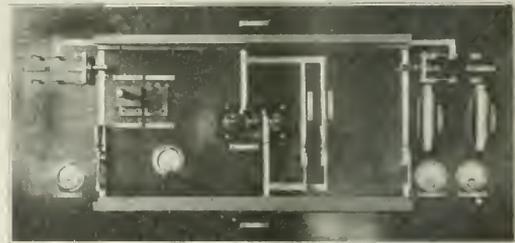
A similar type of lighting standard, though shorter in length, has been developed by the same company for mounting on bridge railings, and poles of the same construction, though circular in section, have recently been installed on several railroads as bridge warning supports. Examples of the latter are to be found in the poles used on the Illinois Central bridge over the Kankakee river at Kankakee, Ill., also the poles erected on the Pennsylvania at Philadelphia, the New York Central at Lyon, N. Y., and in the electrified zone of the Norfolk & Western near Norfolk, Va. One interesting observation to be made in connection with the strength of the pole is to be found in the survival of a transmission line of the American Telephone & Telegraph Company during a storm in New England last December,

which proved disastrous to most of the transmission lines in the section.

Miniature Track Circuit for Testing

SIGNALMEN HAVING trouble with track circuit adjustments are frequently required to wait from week to week in order to catch the extremes of wet track, frozen ballast or dry weather. On account of this tedious program the limiting resistance is often reduced to the minimum and left at this adjustment in order to insure proper operation during extreme conditions, regardless of the energy consumed. Also during tests carried on to determine the operating characteristics of track relays of different resistances, a means of expediting adjustments for different ballast conditions is very desirable.

The miniature track circuit shown in the photograph incorporates in a space readily seen at a glance, connections for the various batteries, resistance units, relays and



The Miniature D. C. Track Circuit

used in an ordinary track circuit. The double-pole double-throw switch at the right, when in the normal position, connects a primary battery to the rails and when reversed connects a storage battery to the circuit. A limiting resistance of 3.5 ohms is connected in series with the storage battery and a 0.3 ohm in series with the primary battery. The one ammeter indicates the battery discharge to the track circuit, while the other shows the charging rate of the storage battery.

The double-pole, double-throw switch at the left of the picture, when in the normal position, connects a 4-ohm relay to the rails or a 2-ohm relay to the same circuit when reversed. The ammeter below this switch indicates the milli-amperes going through the relay coils. The voltmeter between the rails may be connected by means of the multiplying switch to indicate the track volts at the relay end, the track volts at the battery, the voltage of the primary battery or the storage battery.

Each rail has a resistance of 0.3 ohms and between the rails is mounted an adjustable resistance box, by means of which resistances in tens, units and tenths may be set up to represent various track circuit leakages. The closing of either of the single pole switches to the right of the resistance box represents a train shunt of 0.12 ohms or with both closed a resistance of 0.06 ohms. The single pole switch at the left end of the rails acts as a train shunt at the relay, while the switch of the right end represents a train shunt of the battery end.

By assembling the various functions of the track circuits it is readily seen that the action of different units may be checked at one time. As a means of training new men in the signal work or as a method of demonstrating to maintenance of way or operating officers why certain track circuits need cleaning out, such a model should serve a valuable purpose. The Electric Storage Battery Company, to whom we are indebted for the photographs,

now have two such miniature track circuits which are used for demonstrating purposes.

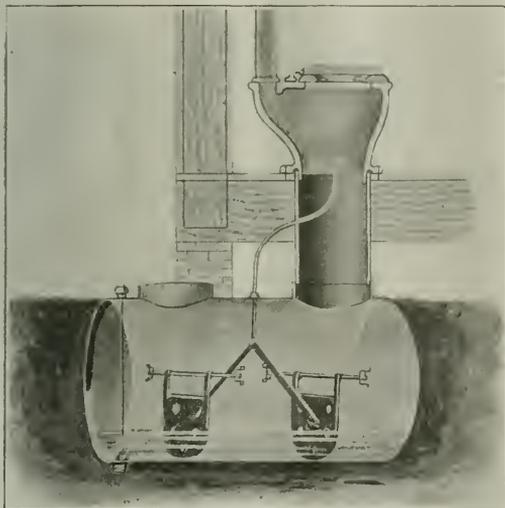
Chemical Toilets for Railway Service

THE CHEMICAL TOILET is a development of recent years. A system of sewage disposal based upon the deodorizing, decomposing and purifying action of a chemical solution and adapted to installation indoors is a marked improvement over the privy vault as a method of meeting the toilet problem at points where a sewerage system is either not possible for lack of a water supply for flushing and disposal purposes or an unwarranted ex-

The chemical itself is a caustic preparation which is prepared for use by dissolving in a pail of water, after which it is dumped into the tank and sufficient water added to give a three or four inch depth to the solution. The action of this chemical and the agitator serves thereafter to liquify all solid matter, kill germs, and suppress all offensive odors until after five or six months when the tank becomes about three-fourths full, when the contents are pumped out through the man-hole provided on the upper side of the cylinder or removed through the drain hole at one end of the under side, this drain being controlled, as shown in the photographic illustration, by a rod which extends up through the upper side of the tank.

For the use of this system in outfit cars a tank is now made of a size and shape which permits of its being installed securely above the truss rods at one end of the car. As shown in the illustration, the tank is secured to the car floor by two U-bolts. Within the car the equipment differs from the standard single bowl equipment in the use of a long steel tube of 12-in. diameter in the place of the shorter tube surmounted by the vitrified bowl. Similarly to the vitrified bowl this tube accommodates an appropriate cover and the regular ventilating system, but affords a less expensive construction. With this equipment it is necessary only to erect a false floor around the drop pipe to complete the installation for such purposes.

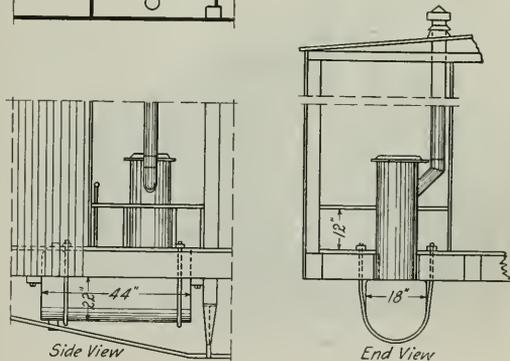
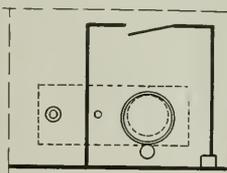
Constructed in the manner described the system allows adequate clearance below the car and occupies but little



A Sectional View of the Wolverine System

pense. On railways it thus invites consideration in connection with passenger depots, small shops, and construction camps at outlying or other points where the privy vault is tolerated only because of the lack of better facilities, and merits consideration also with respect to signal towers, watchmen's shanties and outfit cars, where, although some facilities are greatly to be desired, even the privy vaults are often wanting.

Constituting one of these systems the Wolverine equipment presents a new point of interest for railway men in the provision which has been made for its installation in outfit cars and similar places where space is limited and inexpensive though durable equipment is required. The modifications made in the equipment to this end will be more clearly brought out by first reviewing the design of the standard system. As shown in the accompanying illustration, the equipment consists of a cylindrical tank, horizontally placed beneath the building, and a pipe which extends to the floor line, where it connects with a vitrified bowl, this bowl carrying an appropriate seat and cover and accommodating a ventilating system which in turn consists of galvanized piping extending far enough above the roof to establish an effective draft. Within the cylinder are two paddles, each suspended from a horizontal shaft and both so connected to a rod extending above the floor as to require only a push on the rod to effect a proper mixing of the chemical with the other contents of the tank.

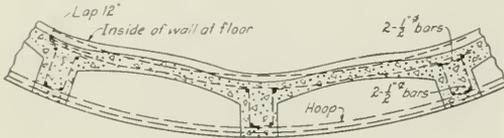


Method of Installing the Toilets in Outfit Cars

space within it. Obviously its value is particularly to be realized in bunk cars occupied during the winter season, and during summer seasons in those cases where cars are allowed to stand in one spot for long periods of time. The units require no more attention than should reasonably be given to a water flushed system and present no offensive features in connection with their emptying and recharging. The chemical is furnished in batch quantities, in cartons ready for mixing and while destructive to organic matter is not corrosive to the metal of the tanks. These systems are sold by the Superior Supply Company, Chicago.

New Data Bearing on Gunite in Tank Construction

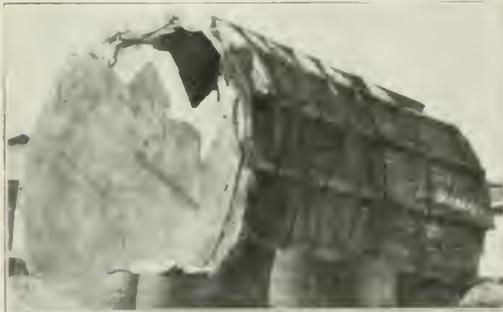
AN ACCOUNT of an old gunite-constructed tank was recently unearthed by the Cement-Gun Company, Inc., Chicago, to which considerable interest attaches by reason of the showing made by the gunite in this kind of construction and in the study it affords in structural design. A view of the tank as it was last found is shown in the accompanying illustration, it having been abandoned for purposes mentioned later. This tank was built in Henrietta, Okla., in 1917 for oil storage purposes and stood for 3½ years in such service, when a new purchaser of the property, who did not need the tank in



A Section of the Side of the Tank

his business and found it in the way of a building he desired to construct, undertook to remove it. Three shots of dynamite beneath the tank failing to do more than loosen ground around the foundation, resort was had to block and tackle and horses and finally after tipping the tank over on its side, it was rolled by means of tackle for a distance of 900 ft. to the point shown in the photograph. At the time the tank held about a half a car of crude oil, which was removed by drilling through the tank. It was also observed that no signs of oil were to be found on the exterior of the tank or other indications of any seepage through the structure during its life.

The excellent showing made by the tank during the 3½



The Tank After Its Demolition

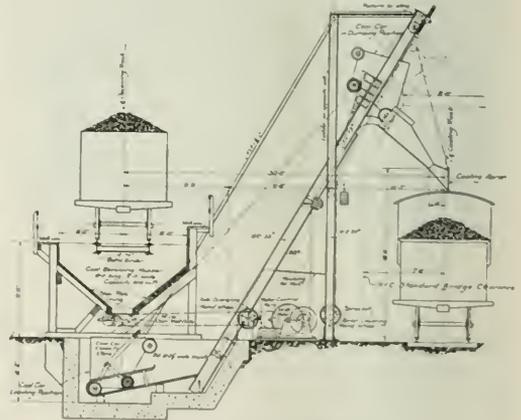
years in which it was in service and the resistance it presented to demolition are attributed to the manner in which the tank was constructed. The nature of this construction may be gathered from the accompanying photograph and drawing, in which it will be noted that the tank is essentially a system of vertical ribs occurring at intervals around the shell, coupled with a system of horizontal ribs situated at intervals above each other, varying according to the intensity of the pressure. In each vertical rib was a rod of reinforcing steel. The shell was built up by applying gunite to a steel mesh and, as is particularly to be noted, the term steel was entirely external, appearing in the photograph as so many hoops around the tank. By reason of this design, expansion and contraction was

evidently taken up adequately and the concrete was maintained under compression.

A New Development in Engine Coaling Equipment

IN THE ACCOMPANYING view is shown one of two small plants, one electrically and the other pneumatically operated, which have recently been developed by the Roberts & Schaefer Company, Chicago, to replace the old hand shoveling methods of coaling locomotives at outlying points, where the installation of more elaborate coaling facilities is not warranted, where the problem of engine coaling is of a nature to invite scientific treatment.

In these plants the coal is dumped from a gondola car into a receiving hopper, which can be designed for a capacity of 600 to 2,000 cu. ft. This receiving hopper is equipped with a 24 in. by 36 in. clam-shell gate, which is operated by a hand wheel in the hoist house, thereby making it possible for the coal to be fed by gravity into a two-ton car below the hopper. This car when filled is then elevated by air or electricity on a structural steel supporting frame to the dumping point above the coaling track, where a hooded apron is provided, by means of which the coal is spouted into the tender. When dumping, the coal car or bucket is supported on substantial



Plan of the Coaling Plant

dumping castings, and when empty is returned by gravity to the loading position. The trip from the loading point to the dumping point and return takes about 1½ min.

The electrically-operated plant is provided with a 20 hp. electric motor, with Cutter-Hammer hand controller, solenoid brake and a machine time limit switch, which automatically stops the bucket at the dumping point, and prevents any overwind. The motor is direct connected through cut steel gears to a cast iron base winding drum hoist. Standard New York Central bridge clearances are adhered to in designing the structure, which makes it possible to install this plant on main line, or yard tracks.

The operation of the plant is simple, the regular shop or yard forces being able to take care of the coaling of the engines along with their other duties. It is therefore possible to release cars promptly and to avoid keeping laborers on duty at all times to shovel coal by hand. As an additional feature or possibility of the plant obviously lies in the adaptability of it for transferring material from bad order cars.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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It may reasonably be asserted that no phase of railroad-ing has been the object of more "wishy-washy" thinking, or the recipient of more "bunk" pass-

The Engineer and Corrosion

ing under the guise of scientific observations than the subject of pitting and grooving in locomotive boilers, unless, of course, it is the subject of boiler waters in general, of which pitting and grooving is an element. And yet it is important that the railroads understand thoroughly the phenomenon of corrosion in order that they may exercise a control over its underlying causes and thereby avoid the very considerable losses which arise annually from it. In view of this it is highly gratifying to note not only that the subject of pitting and grooving has been assigned for study to a special committee of the American Railway Engineering Association but also that definite progress has already been made. That is getting down to a proper appreciation of the subject and much of benefit should come of it. Contrary to the idea apparently entertained by some that pitting and grooving must remain a grievous trouble in the territories where it is encountered until some distinguished appearing individual appears on the scene with the solution of the problem in capsule form; pitting and grooving, while admittedly a baffling study and certainly a trouble not to be corrected by half-measures, is but a problem in science, which can be solved to the satisfaction of all con-

cerned. It is properly a problem for the attention of the engineer, and the Water Service committee in devoting attention to its solution, may not only derive satisfaction in the realization of its opportunity to work a very material and tangible benefit to the railroads, but also in its opportunity to show those who are skeptical, that the engineer is no less competent in this field of science than he has proven himself in others.

The constant growth in the American Railway Engineering Association from year to year has been emphasized in a striking manner this year by the inability of the Congress hotel to provide rooms for all who desired them and by the insufficiency of the seating capacity during sessions of the convention in the Florentine room. It is not the fault of the Congress hotel that this is so, for the housing of the annual meeting of an organization such as the Engineering Association, with its 2,000 members, augmented by those participating in the exhibit at the Coliseum, is a big task. It is evident, however, that the Board of Direction of the association must give careful attention to the matter of hotel facilities in the very near future. One of the provisions of the original constitution fixes Chicago as the location for the annual meeting, and few things have contributed more to the success of the meetings and to the constructive work of the association. The association cannot consider another city as its place of meeting. It should be mentioned, in this connection, that the Congress hotel is planning to build an addition.

Hotel Facilities
Becoming
Inadequate

The report of the Committee on Signs, Fences and Crossings calls attention to one feature of the permanent way which has been the subject of considerable development work during the last three years, namely, the highway crossing. There has been a concerted endeavor to devise substitutes for the plank crossing which has been the accepted standard on American railways for so long. This movement is probably receiving its principal impetus from the gigantic campaign of highway construction now-sweeping over this country, but higher costs of lumber and certain inherent disadvantages of the plank crossing are no doubt contributing factors. It is of interest to note in this connection that this subject has been given considerable attention by the Roadmasters' Association, that organization having received several committee reports bearing on this problem. The substitute crossings developed thus far may in general be divided into two classes—those comprising unit members capable of installation and removal in much the same manner as crossing planks, and the integral construction built in place over and around the cross ties so as to form

Substitute Highway Crossings

Substitute
Highway
Crossings

a fixed roadway which cannot be removed without more or less complete reconstruction. Judging from the reception which these two types of crossings have received from the roadmasters it would seem that the latter type has been considered with somewhat greater favor, objections arising from an inability to remove the crossing construction intact being answered by suggestions for securing a character of track construction that will insure reasonable security of surface and alinement within the limits of the crossing. The use of special length rails to avoid splices is one specific measure proposed in this connection. Obviously improvement in the character of roadway afforded the highway traffic is an important consideration and one to which the railway engineer must, of course, give reasonable consideration because of its influence on public relations. However, he must not lose sight of the fact that insofar as he is concerned the condition of the track structure is of first importance.

Secretary Fritch is to be congratulated on the improved presentation of the committee reports in the bulletins issued in advance of this convention.

An Improvement in the Bulletins

Obviously, some introductory statements are necessary to outline the work completed or under way by the committee, but this has been reduced in most cases to a brief synopsis. There is still room for some improvement in the way of a more uniform presentation by the various committees, but this is a condition for which the secretary cannot very well be held responsible. There is a definite limit to the possibilities of editorial modification by the secretary after the report leaves the hands of the committee chairman. One consideration which should be taken well into account in the preparation of committee reports is the impression to be made on the non-member. To this end introductory matter must be placed in a form that is readily understood without a detailed knowledge of the workings of the association. The A. R. E. A. is fortunate in having adhered to a simple form of procedure for the submission of matter and its approval by the convention. Certain other technical societies have fallen into the unfortunate error of adopting a complex procedure entailing the use of a cryptic nomenclature which makes the process virtually inexplicable except to the thoroughly initiated. This procedure cannot but discourage interest on the part of the outsider and the A. R. E. A. is fortunate in having avoided it.

No greater tribute can be paid to the memory of John F. Wallace than to point to the American Railway Engineering Association as a creation of his far sighted vision. To Mr. Wallace belongs the credit for the suggestions leading to the organization

A Tribute to

John F. Wallace

of this association and it was largely under his guidance during the first years of its organization that the association established for itself the principles which have been so largely instrumental in keeping it on a true course of constructive work which is excelled by none and equalled by few technical associations. At the memorial meeting yesterday morning reference was made repeatedly to the principles which he enunciated during the formative years of the association, which have now become such established practice that they are accepted as a matter of fact, whereas in their inception they were pioneer in their character. The fixing in the constitution of a central location for the meeting, the

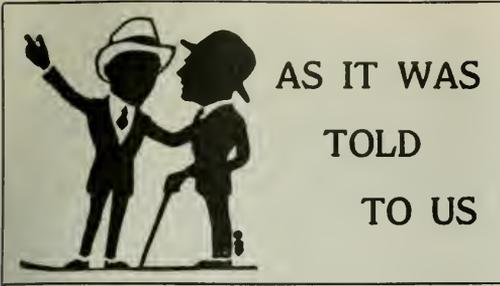
elimination of all social features, the separation of the commercial from the technical and the placing of the proceedings upon a high plane have served as a pattern for many other organizations since that time. It is impossible to estimate the present influences of the association in railway engineering matters in North America or, in fact, in the entire world. To Mr. Wallace and also his associates of those early days all credit is due and it was fitting that this should be freely expressed yesterday morning.

Readers of Chicago papers were given their daily thrill yesterday at the expense of the Chicago, Burlington & Quincy, which suffered the loss of a modern office building and records and files, the value of which cannot be estimated at this time. The Burlington building was a modern "fireproof" structure in the sense in which that term is commonly understood—a steel frame protected against damage from fire by a covering of refractory material of accepted standards. Insofar as protection for the steel frame is concerned, there is reason to believe that the fireproofing functioned effectively. More than this cannot be said for it. The building stands, but everything in it not enclosed in vaults has been destroyed. On the sides of the building facing the interior of the block in which it stands, the windows were of wire glass set in hollow sheet metal sash. On the sides facing on Jackson boulevard and Clinton street, the windows were of ordinary glass with wooden frames. This difference in the window construction is in accordance with the provisions of the Chicago Building Ordinance and is founded on the supposition that exposure to fire in buildings across a street of ordinary width is much less than from a fire immediately adjacent. The fire on Tuesday night demonstrated that this is a rather fine-haired distinction. The conflagration in the block across the street from the railroad building was of such magnitude that the width of the city street afforded no protection. The windows were quickly destroyed and the fire swept into the interior. No doubt the temperatures prevailing, as in the case of other great American fires, was so high that even the best of window construction would not have availed. However, it might have served to have delayed the progress of the fire in the Burlington structure to an extent that would have reduced the total damage done. If all buildings in the city were of fireproof construction so that any fires originating in them would be restricted to the burning of the contents of the individual rooms, the volume of the fire and the temperature attained probably would not be sufficient to communicate with buildings separated by the width of a street. But unfortunately, a great many highly combustible buildings are still in use today and consequently many so-called "fireproof" buildings are exposed to fire hazards against which they are not adequately protected. One lesson to be drawn from this is the greater use of more effectively protected window openings, but the real lesson lies in the elimination of combustible buildings which comprise a menace against which no building no matter how well constructed may be assumed to be fireproof.

"Fireproof" Buildings

Union Train Control on the Pennsylvania

The Pennsylvania has arranged with the Union Switch & Signal Company, Swissvale, Pa., for an installation of the Union full speed train control system on 49 miles of line between Lewistown and Sunbury, Pa.



Among the railway systems with large attendance at this convention, the Grand Trunk has, so far as known, taken the lead with 41 representatives.

* * *

George T. Stewart, chief engineer of the Cuba Railway, with headquarters at Camaguey, Cuba, registered at the convention at the Congress hotel Tuesday morning.

* * *

The Interstate Commerce Commission announced yesterday that the first of a series of hearings on its tentative consolidation plan will begin at Washington on April 24 before Commissioner Hall, with particular reference to the Southeastern region.

* * *

Lieutenant Colonel W. B. Causey, U. S. R., technical adviser to Austria, with headquarters at Vienna, registered yesterday. Colonel Causey has long been an interested attendant at the conventions of the Engineering Association.

* * *

William D. Pence, for eight years a member of the Engineering Board, Bureau of Valuation, Interstate Commerce Commission, and prior to that time engineer for the Wisconsin Railroad and Tax Commissions for seven years, has returned to practice as a consulting engineer with office at 108 South Dearborn street.

* * *

In spite of the remoteness of the headquarters of the Gulf, Colorado & Santa Fe, which are at Galveston, Tex., the engineering department of that road is well represented at the convention. F. Merritt, chief engineer, is here accompanied by J. L. Starkie, office engineer; K. B. Duncan, district engineer, and E. Hanson, signal engineer.

Excursion Plan Completed

Word has been received from the Universal Portland Cement Company that a sufficient number of railway men have signified their intention of taking the trip to Buffington to warrant arrangements for a special train. This train will leave the La Salle Street Station over the New York Central at 10 a. m. Friday.

Today's Program

The program for the American Railway Engineering Association today is as follows:

- VIII. Masonry Bulletin 242
- IV. Rail Bulletin 243
- VII. Wooden Bridges and Trestles..... Bulletin 243
- XXI. Economics of Railway Operation..... Bulletin 243
- VI. Buildings Bulletin 245
- XVII. Wood Preservation Bulletin 245
- XII. Rules and Organization..... Bulletin 245
- New Business.
- Election and Installation.
- Adjournment.

Burlington Building Damaged by Fire

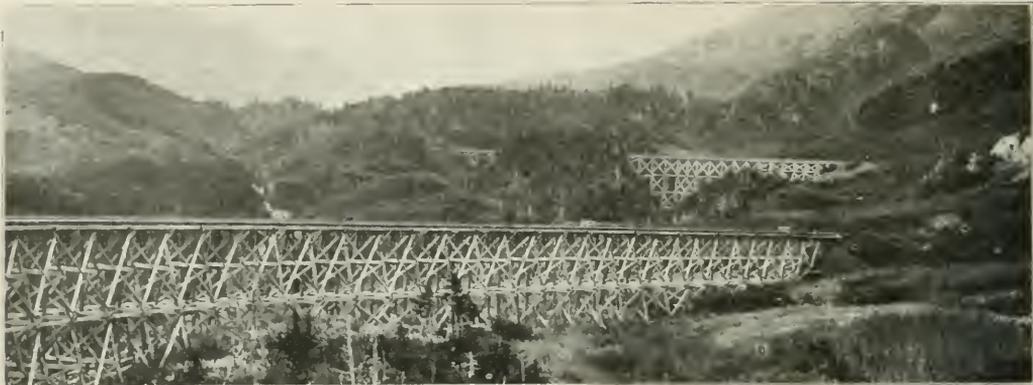
FLAMES, WHICH FOR A TIME, threatened to repeat the famed Chicago fire of 1871, swept through the Union Depot business district of that city early yesterday morning and badly damaged in part the 15-story office building of the Chicago, Burlington & Quincy. The fire supposedly started at one o'clock in the morning in a building at 521 W. Jackson boulevard, just a few doors east of Clinton street and the Burlington headquarters, which are located at 547 W. Jackson boulevard. The flames spread with astounding rapidity among the neighboring buildings, which was due perhaps to a large quantity of oils and paints stored within several of the burning structures. The intense heat and blaze are first believed to have attacked the Burlington building at the thirteenth floor from which it soon spread to the two floors above, and five below. The city fire equipment was only capable of reaching as high as the eighth floor with water (this to be noted in the accompanying illustra-



Interior of the Burlington Office Building Burning During the Fire Early Tuesday Morning

tion), and while the lower part of the building remains practically untouched from the fire, this accounts for but a skeleton form supporting the upper seven floors. Windows on all of the top floors were blown out, with many likewise on the lower stories, especially on the Clinton street side and the rear of the building. Officers of the road were informed of the fire within a short time after the general alarm was turned in, and many were soon on the scene of activity.

Meetings were held throughout yesterday at temporary headquarters installed in the Otis Elevator building, one block west of the Burlington offices. It was decided then that if building inspectors would permit the company to use the first seven floors, steps would be taken immediately to utilize that space for all departments but the traffic, which has already been transferred to the old general office building. It is believed that many important papers, valuation records, engineering plans, and other valuable documents, some of which have been many years in the process of making, are destroyed, though it has been stated that some may be replaced from like copies on file with the Interstate Commerce Commission.



On the Famous Loop, Alaskan Railway

Railway Engineering Association Proceedings

An Account of Wednesday's Sessions, Including the Presentation of
Nine Committee Reports With Discussions

THE SECOND DAY'S SESSIONS of the convention of the American Railway Engineering Association was called to order promptly at 9 o'clock by President Downs. In spite of the early hour the room was well filled and every seat was taken within a short time. A special feature of the program was the setting aside of an hour at the close of the morning session for a memorial meeting for John F. Wallace, one of the founders

and the first president of the association, and Colonel George H. Webb, a member of the Board of Direction, both of whom died during the year. Reports were presented by the committees on Track; Shops and Locomotive Terminals; Roadway; Economics of Railway Location; Electricity; Records and Accounts; Signs, Fences and Crossings; Water Service and Uniform General Contract Forms.

Association Pays Tribute to John F. Wallace and Geo. H. Webb

SHORTLY BEFORE THE CLOSE of the morning session yesterday, the American Railway Engineering Association paused in its deliberations for a few minutes to pay tribute to the memory of John F. Wallace, one of the organizers and the first president of the association, and to Colonel George H. Webb, a member of the Board of Direction. In referring to Mr. Wallace, L. A. Downs, president, said:

"I consider it a great personal privilege to preside this morning. I regarded Mr. Wallace as a father, and those of you who were present at the annual dinner last year will recall that he spoke of me as one of his boys. He started, like most of us, as a rodman on a railroad out west, and came to the Illinois Central as chief engineer, where I first knew him. He advanced step by step after he left the road, and he went to Virginia, taking me with him. He remained there only a few months when he came back as assistant to the second vice-president and finally was made general manager of the Illinois Central.

"He was then appointed by the President of the United States as one of the Canal Commissioners, and was later made its first chief engineer. An unusual thing happened on his resignation as chief engineer of the Panama Canal, for he was publicly rebuked by the then secretary of war, a man who afterwards became President of the United States and is now Chief Justice. It was an unwarranted and uncalled-for action.

"I had occasion to visit the Panama canal while it was building, and found that the plans originally made by

Mr. Wallace were carried out to their completion. All honor to Col. Goethals for completing the Panama canal, but let us not forget the man who made the plans that were carried out. Robert Emmet said when he was condemned to die: 'Let no man dare, when I am dead, to charge me with dishonor. Let no man taint my memory by believing that I could have engaged in any cause other than that of my country's liberty and independence. Let not my epitaph be written until my country takes her place among the nations of the earth. Then, and not until then, let my epitaph be written.' I say—let not the epitaph of John F. Wallace be written until a committee of engineers, unbiased by politics, decide whose brains it was that built the Panama canal.

"Mr. Wallace returned from the canal broken in health. I visited him quite often at his home, and when he recovered he became president of Westinghouse, Church, Kerr & Co., afterwards becoming a consulting engineer. He was one of the few engineers who capitalized his brains and reaped a satisfactory dividend from it. He died in the harness on July 4, 1921, when he was in Washington to testify before the Interstate Commerce Commission. I admired Mr. Wallace as an engineer. I esteemed him as a superior officer on the railroad where I worked, and I loved him as a man."

Further tributes were made to Mr. Wallace by Hunter McDonald, Charles S. Churchill, W. C. Cushing, A. S. Baldwin, C. F. Loweth, C. A. Morse, T. L. Condron, J. L. Campbell, G. J. Ray, E. H. Lee, Edwin F. Wendt and W. M. Camp.

Following the conclusion of the tributes to Mr. Wallace, A. S. Baldwin referred to the death of Colonel Webb, in which he said in part:

"He was a very fine character and a very able man. I have never dealt with a man whom I believed to be fairer or more straightforward in his dealings than was Colonel Webb. At the call of his country he entered

the service of the United States and served in Europe for the entire period of the war, returning to this country after serving with distinction as a colonel of the United States Army."

Further tributes were paid to Colonel Webb by S. E. Emmons, W. E. Biggs, G. A. Mountain, J. F. Deimling and E. T. Howson.

Report of the Committee on Track

Supplementing the specifications for frogs, switches, crossings, and guard rails adopted last year, specifications covering the general conditions and imperfections of manganese steel track castings are submitted for insertion in the Manual, in addition a few other recommended revisions and additions. A number of typical plans of turnouts, crossovers, etc., were submitted for adoption, while a few were submitted for information only. After collaborating with the Committee on Ballast, plans for a number of track tools were recommended. No definite conclusions have been arrived at in regard to the effect of brine drippings on the plates or the canting of rail.



W. P. Wiltsee
Chairman

W. P. Wiltsee is completing his fourth year as chairman and his sixth year as a member of the Track Committee. He also served the Roadmasters and Maintenance of Way Association as president last year, while he is now a member of the American Railway Association's Committee on Train Control. Mr. Wiltsee is principal assistant engineer of the Norfolk & Western. As chairman of the Track Committee he has been particularly successful in enlisting the co-operation of the manufacturers of special track work in the preparation of standard designs for frogs, switches and crossings, which will be satisfactory alike to the builder and the user.

1. THE COMMITTEE recommended that the additions to the Manual as submitted in Appendix A be approved.

Conclusions

1. The committee recommended that the additions to the Manual as submitted in Appendix A be approved.
2. The committee recommended certain plans for adoption and others to be received as information. Appendix B also covers a progress report on uncompleted work, and reassignment of the subject is requested.
3. The committee recommended that the plans submitted be adopted and that the subject be reassigned, that the preparation of specifications which could not be completed may be continued.
4. The committee recommended that the specifications submitted be adopted, and the committee be authorized to continue its work on this topic.
5. The committee recommended one plan for adoption and another to be received as information, and submitted a list of certain A. R. A. signal section plans, which it recommended for endorsement by the association, and a progress report to be received as information. The committee recommended that this subject be continued.
6. The tables submitted in Appendix A, Item III, and explanatory report in Appendix F completes the work of this sub-committee. The committee recommended that this subject be discontinued.
7. The committee recommended that the progress reports in Appendix G and Appendix H be accepted as information and that the subject be continued.

Committee: W. P. Wiltsee (N. & W.), chairman; J. V. Neubert (N. Y. C.), vice-chairman; L. B. Allen (C. & O.), V. Anger (Wm. Wharton, Jr., & Co.), J. B. Baker (Penna.), R. A. Baldwin (C. N. R.), C. W. Breed (C. B. & Q.), G. H. Bremner, H. G. Clark (C. R. I. & P.), E. A. Hadley (M. P.), G. W. Hegel (C. S.), E. T. Howson (*Railway Age*), T. T. Irving (G. T.), H. A. Lloyd (Erie), J. deN. Macomb (A. T. & S. F.), W. S. McFetridge (B. & L. E.), F. H. McGuigan, Jr. (U. S. R. A.), J. B. Myers (B. & O.), F. L. Nicholson (N. S.), J. H.

Reinholdt (M. & St. L.), G. J. Slibeck (Pettibone-Mulliken), J. B. Strong (Ramapo Iron Works), J. R. Watt (L. & N.).

Appendix A—Revision of the Manual

The committee recommended the following supplement to the Specifications for Switches, Frogs, Crossings and Guard Rails, adopted March, 1921:

MANGANESE STEEL TRACK CASTINGS

1. General Conditions.—Castings shall be reasonably smooth and true to pattern in accordance with good foundry practice. Large lumps, sharp fins, sand and chills on the outside of castings shall be removed. The castings shall be free from such blow holes, sand holes, cracks, cold shuts and other defects which would impair their serviceability and as further specified below. Castings must be out of twist and reasonably true, both as to general surface and alignment, and must not show any signs of straining or undue denting produced in the straightening process.

The bottom part of castings which rest on ties shall be reasonably straight and out of twist, and shall be free from lumps or such imperfections as would prevent a good bearing.

2. Imperfections.—Tread surfaces within 2½ in. of gage line and side of groove 1 in. down from tread shall be free from physical defects, such as shrinkage cracks, sand holes, blow holes, cold shuts or segregation of metal, unless such defects are so small that they have been practically removed by the finish grinding, and there must be no indication of unsoundness of the metal. Shrinkage cracks, cold shuts or segregation of metal will not be allowed in any part of the tread surfaces. Sand holes, blow holes, and cold shuts in portions of the casting where they will not appreciably weaken the casting, or impair its wearing qualities, will be permitted. Castings must be free from shrinkage cracks running vertically in web members of solid work or horizontally at or near the ends or in corners of junction of projecting members or longitudinally in grooves. Other small shrinkage cracks which do not materially weaken the casting will be acceptable.

ITEM II

The committee recommended that plan No. 252, dated November, 1921, and titled "Details of Lamp Tips for Switch Stands," be adopted, and that Section 12 of "Requisites for Switch Stands, Including Connecting

Rods," adopted March, 1921, be revised to refer to this plan, to read:

"12. Lamp tips shall conform to plan No. 252."

In reference to article "Gage on Curves," adopted, Vol. 11, Part 2, 1910, pp. 942, 954, 955; Vol. 16, 1915, pp. 733, 1145, reading:

"GAGE ON CURVES"

Present

"Curves 8 deg. and under should be standard gage. Gage should be widened $\frac{1}{8}$ in. for each 2 deg. or fraction thereof over 8 deg., to a maximum of 4 ft. $9\frac{1}{4}$ in. for tracks of standard gage. Gage, including widening due to wear, should never exceed 4 ft. $9\frac{1}{2}$ in.

"Where frogs occur on the inside of curves, the gage at the frog should be standard or the flangeway of the frog should be widened to compensate for the increased gage."

Proposed

For general conditions in main line tracks, curves 8 deg. and under should be standard gage. Gage should be widened $\frac{1}{8}$ in. for each 2 deg. or fraction thereof over 8 deg., to a maximum of 4 ft. $9\frac{1}{4}$ in. for tracks of standard gage, including widening due to wear, should never exceed 4 ft. $9\frac{1}{2}$ in.

Where frogs occur on curves, the gage at the frog should be standard or the flangeway of the frog should be widened to compensate for the increased gage.

For the widening of gage and flangeways on curves for the operation of specific locomotives or for special conditions and for curved crossings, refer to Tables No. 1 and No. 2 for "Gages and Flangeways in Curved Track."

The committee recommended that the following supplementary tables be adopted and published in the Manual:

Table No. 1, dated November, 1921, and entitled "GAGES AND FLANGEWAYS IN CURVED TRACK"

Table No. 2, dated November, 1921, and entitled

"GAGES AND FLANGEWAYS IN CURVED TRACK—GAGE DIAGRAMS FOR RIGID WHEEL BASE LOCOMOTIVES"

An explanation of these tables is given in Appendix F.

Appendix B—Typical Plans of Turnouts, Crossovers, Slip Switches, Double Crossovers and Railroad Crossings

The committee recommended the following plans for adoption:

Bolted Rail Crossings

- Plan 701. Three rail design, angles 90 deg. to 50 deg. inclusive.
 Plan 702. Two rail design, angles 90 deg. to 50 deg., inclusive.
 Plan 703. Three rail design, angles below 50 deg. to 35 deg., inclusive.
 Plan 704. Two rail design, angles below 50 deg. to 35 deg., inclusive.
 Plan 705. Three rail design, angles below 35 deg. to 25 deg., inclusive.
 Plan 706. Two rail design, angles below 35 deg. to 25 deg., inclusive.
 Plan 707. Single rail design and two rail design with short easer rails, angles below 25 deg. and above 14 deg. 15 min.
 Plan 708. Single rail design and two rail design, angles below 25 deg. and above 14 deg. 15 min.
 Plan 709. Single rail design and two rail design with short easer rails, angles 14 deg. 15 min. to 8 deg. 10 min., inclusive.
 Plan 710. Single rail design and two rail design, angles 14 deg. 15 min. to 8 deg. 10 min., inclusive.

Manganese Steel Insert Crossings

- Plan 711. Design and dimensions of inserts, angles 45 deg. to 14 deg. 15 min., Detail "A."
 Plan 712. Design and dimensions of inserts, angles 45 deg. to 14 deg. 15 min., Detail "B."
 Plan 713. Design and dimensions of inserts, angles 14 deg. 15 min. to 8 deg. 10 min., inclusive.
 Plan 714. Three rail design, angles below 15 deg. to 35 deg., inclusive, Detail "A."
 Plan 715. Two rail design, angles below 45 deg. to 35 deg., inclusive, Detail "A."

Plan 756. Three rail design, angles below 35 deg. to 25 deg., inclusive, Detail "A."

Plan 757. Two rail design, angles below 35 deg. to 25 deg., inclusive, Detail "A."

Plan 758. Two rail design with short easer rails, angles below 25 deg. and above 14 deg. 15 min., Detail "A."

Plan 759. Two rail design, angles below 25 deg. and above 14 deg. 15 min., Detail "A."

Plan 760. Single rail design with short easer rails, angles below 25 deg. and above 14 deg. 15 min., Detail "A."

Plan 761. Single rail design, angles below 25 deg. and above 14 deg. 15 min., Detail "A."

Plan 762. Three rail design, angles below 45 deg. to 35 deg., inclusive, Detail "B."

Plan 763. Three rail design, angles below 35 deg. to 25 deg., inclusive, Detail "B."

Plan 764. Two rail design with short easer rails, angles below 35 deg. to 25 deg., inclusive, Detail "B."

Plan 765. Two rail design with short easer rails, angles below 25 deg. and above 14 deg. 15 min., Detail "B."

Plan 766. Single rail design with short easer rails, angles below 25 deg. and above 14 deg. 15 min., Detail "B."

Plan 767. Two rail design, angles 14 deg. 15 min. to 8 deg. 10 min., inclusive.

Plan 768. Single rail design, angles 14 deg. 15 min. to 8 deg. 10 min., inclusive.

Twelve of the above crossing plans were presented as information in report for annual meeting of March, 1921. These were resubmitted with such revisions as were found desirable, with additional plans to make the set complete.

The committee also recommended that the following plans be received as information only:

Plan 801. No. 8 double slip switch with movable center points with uniform risers.

Plan 802. No. 8 double slip switch with movable center points with graduated risers.

Plan 851. Details of No. 8 double slip switch with movable center points with uniform risers.

Plan 852. Details of No. 8 double slip switch with movable center points with graduated risers.

Appendix D—Specifications and Unit Track Work Schedules for Contracting Maintenance Work

The committee has confined its attention this year to the preparation of specifications and unit schedules for those classes of work which lend themselves most readily to unit measurements. Specifications and unit schedules are therefore presented for (1) the laying of rail, (2) the stripping of track, the removal of ties and the re-spacing of ties and (3) for ballasting.

SPECIFICATIONS FOR THE RELAYING OF RAIL

(1) The railway company's authorized representative shall arrive at a clear understanding with the contractor as to the force to be employed, the speed with which it is desired to have the work proceed, and the general traffic situation in the territory to be relaid, in order that proper plans may be made to proceed economically with the work specified. Prior to starting the work the contractor shall notify the railroad company's representative a sufficient time in advance so that speed and traffic restrictions in the territory in which the work is to be performed may be arranged with the operating department of the railway company.

(2) Rail must be closed for all scheduled passenger trains and as soon as possible after arrival, for all freight trains.

(3) Rail may be closed temporarily for the passage of trains during the hours while the work is in progress, inserted according to the standards of the railway company. All connections left in the track over night must be made with rails of full section and standard angle bars or joints. The railway company shall provide and the contractor shall pay for competent flagmen during the continuance of this work, to flag in accordance with the rules of the company for the protection of the work and traffic.

(4) The railway company will unload and distribute all rail, joints, bolts, spikes, tie plates, rail anchors and other materials to be inserted in the track.

(5) The contractor shall provide all tools needed in connection with this work.

(6) The railway company will provide the necessary inspector or inspectors and the instructions of such inspectors regarding the quality and type of work to be done shall be complied with at all times by the contractor.

(7) The contractor shall supply the necessary foremen and labor to prosecute the work properly and in such numbers as may be required by the chief engineer or his authorized representative, and at the request of the chief engineer or his representative will remove any foreman or man not satisfactory to the railway company.

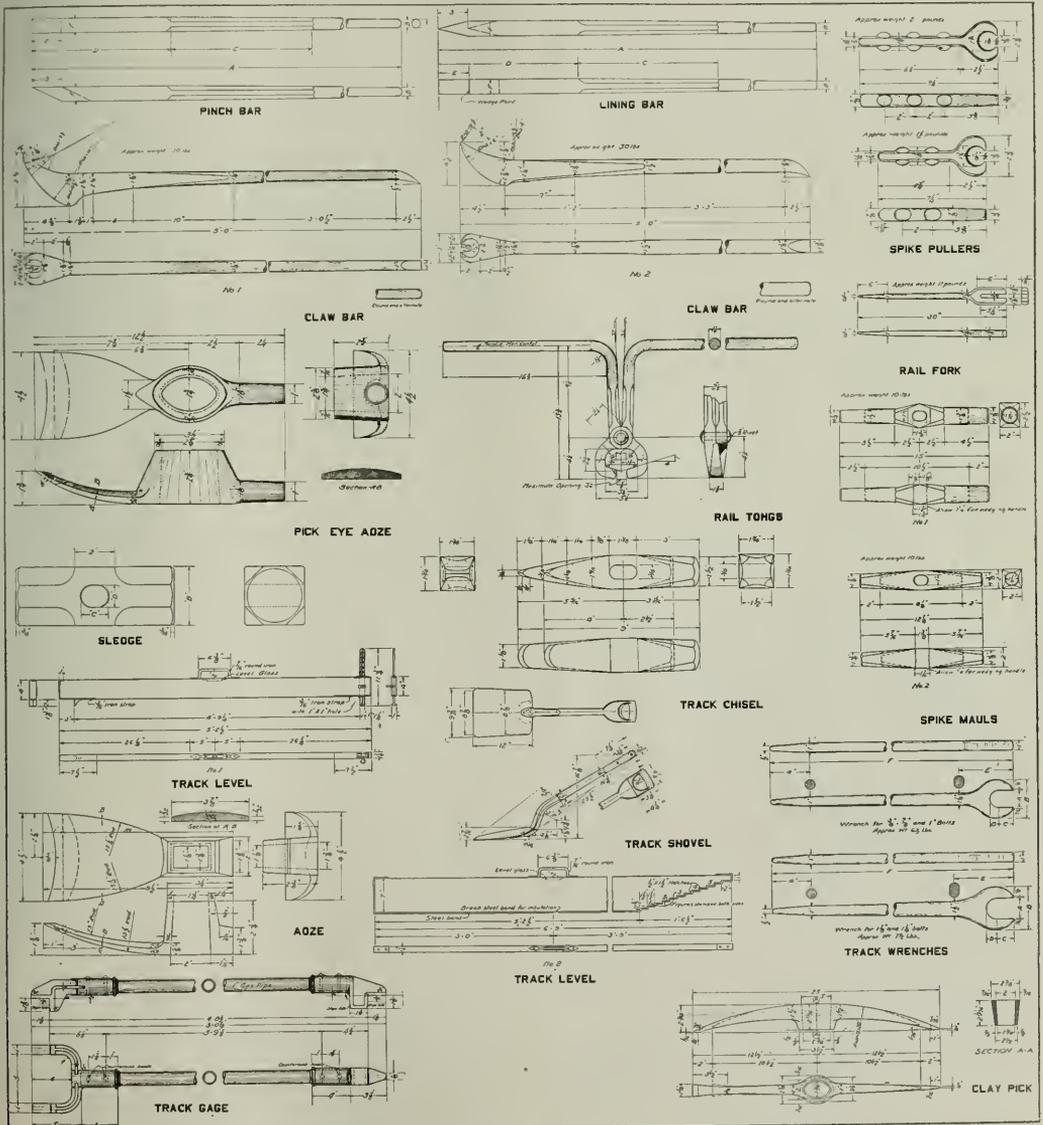
(8) Trains must not be permitted to use the track on tangents with spikes out of more than two consecutive ties and not more than six ties to any one rail, or on curves with the spikes removed from two consecutive ties. Proper gage must be maintained and all ties on which the rail does not have a full bearing must be tamped up and spikes driven down to avoid bending the rail.

(9) Track must not be allowed to go over night with spikes drawn in advance of the work.

(10) All spike holes must be plugged prior to adzing ties for rail or tie plate bearing.

(11) Ties must be adzed carefully, giving full bearing with the least possible cutting of ties. The bottom of the rail, the tie plate and the bearing surface of the tie shall be cleaned before the rail is laid. When replacing rail with rail of the same section, unless changing or adding tie plates, only two rows of spikes may be drawn, provided proper gage is maintained; in replacing rail with different section, three or four rows of spikes shall be drawn, as is necessary.

(12) Tie plates, when furnished, must be applied in a workmanlike manner at time rail is laid to avoid unnecessary spiking and must be so placed that the shoulder is in contact with the base of rail or the splice bar for the entire length of the shoulder.



(13) Metal expansion shims must be used to provide for the proper openings between the rails and a thermometer shall be used to determine the thickness of the shims to be used, in accordance with the standards of the American Railway Engineering Association.

(14) At the close of each day's work all joints shall be full bolted, the bolts made tight and the rail full spiked.

(15) Necessary gaging must be done at the time rail is laid and should conform to the railway company's standard practice.

(16) Old rail must be left parallel with the track with joints uncoupled and all old bolts, nuts, spikes, tie plates, joints, etc., must be gathered up and left in neat piles on the ground, separated as between usable and scrap material in accordance with the railway standards, convenient for picking up by work trains.

(17) Excess material distributed for rail laying must be picked up by the contractor and taken ahead where it can be used.

(18) In laying rail on tangents the staggering of joints must be provided and in laying rail on curves care must be taken to put in short length rails at proper intervals in the low rail and to maintain the proper stagger throughout the curve.

(19) As far as possible all joints should be kept out of street and road crossings, using long or short rails for this purpose.

(20) Rails must be spiked in full to each tie. The inside and outside spikes shall be as far apart as the face and character of the tie will permit. The inside spikes shall be on the same side of the tie.

(21) All spikes shall be started vertically and square with the rail and so driven that the face of the spike shall have a full hold on the base of the rail. Spikes must not be straightened while being driven.

(22) Spikes must be drawn carefully with a view of using them again.

(23) All switches, frogs and guard rails must be placed in accordance with the railway company's standards.

(24) Switches must be left in proper adjustment, special care being given to bending of the stock rail.

(25) The contractor must restore and secure promptly all stock-guards, crossing plank, or other facilities displaced by reason of the rail laying, and must replace all safety and foot blocking removed in changing out switches, frogs and guard rails.

(26) The contractor is to understand that any work not specifically mentioned in the specifications, but which is necessary, either directly or indirectly, for the proper carrying out of the intent thereof, shall be required and applied, and he shall perform all such work just as if it were particularly delineated or described. Unless specifically mentioned above, all work shall conform to the standards of the railway company.

SPECIFICATIONS FOR THE BALLASTING OF TRACK BY CONTRACT

(1) The railway company's authorized representative shall arrive at a clear understanding with the contractor as to the force to be employed, the speed with which it is desired to have the work proceed, the source of ballast supply and the general traffic situation in the territory to be ballasted, in order that proper plans may be made to proceed economically with the work specified. Prior to starting the work the contractor shall notify the railway company's representative a sufficient time in advance so that speed and traffic restrictions in the territory in which the work is to be performed may be arranged with the operating department of the railway company.

(2) The railway company will provide the necessary inspector or inspectors, and the instructions of such inspectors regarding the quality and type of work to be done shall be complied with at all times by the contractor.

(3) The contractor shall supply the necessary foremen and labor to prosecute the work properly and in such numbers as may be required by the chief engineer or his authorized representative, and at the request of the chief engineer or his representative will remove any foreman or man employed not satisfactory to the railway company.

(4) The railway company shall provide and the contractor shall pay for competent flagmen during the continuance of this work, to flag in accordance with the rules of the company for the protection of the work and traffic.

(5) Where required, links shall be widened to the proper width prior to starting ballast work and a sufficient time in advance so that there will be no interference. Such widening of embankments and the proper grading of public or private cross-roads shall be done by the railway company unless specific instructions are given by the representatives of the railway company to the contractor to do such work.

(6) If contractor is to do link widening work, specifications for such work must be provided.

(7) Grade stakes will be set to the proper grade by the

representative of the railway company before the ballast material has been dumped and spread.

(8) All tile, box or other drains required to take care of water between the tracks shall be placed before the ballast material is unloaded.

(9) The railway company will supply all equipment and train crews required for the loading, transporting, unloading and spreading of the ballast. The contractor shall supply all tools needed in connection with this work.

(10) The railway company shall furnish all ballast as required in its own cars and shall transport and switch such ballast free of cost to the contractor to the point where it is to be applied.

(11) Ballast shall be unloaded by the contractor by dumping or plowing as the means provided by the railway company permit. If the ballast is in center dump cars it shall be unloaded by having one or more cars opened at a time, allowing the required amount of ballast material to flow out as the train is moved along slowly. If the material is on flat or open cars, it shall be plowed off by means of an unloading machine while the train is moving at such a rate of speed as to provide the desired amount of material as uniformly distributed as possible. The unloaded material shall be leveled down by means of a ballast plow or spreader. Care shall be taken not to destroy or disturb the grade stakes.

(12) The preliminary surfacing gang shall follow the unloading as closely as the regularity of the ballast supply will permit. In using jacks, they must be placed close enough together to prevent undue bending of the rail or strain on the joints. Both rails must be raised at one time and as nearly uniformly as possible. The track shall be so lifted that after a period of not less than three days after the last lift it will be necessary to give it a final lift of not less than one inch nor more than two inches to bring it to the grade of the stakes. All ties that are pulled loose or renewed shall be replaced to proper position and must have a bearing against the rail and be fully spiked, with all spikes driven home before tamping. In driving spikes, all spikes shall be started vertically and square with the rail, and so driven that the base of the spikes shall have a full hold on the rail. Spikes must not be straightened while being driven. Ballast shall be well packed or tamped with pick, shovel, tamping bar or tamping machine, as directed, from a point eighteen inches inside of each rail on both sides of the ties to the end of the ties, tamping the outside of the tie first.

(13) When the track has been raised to within one or two inches of the final grade and properly compacted by traffic, a finishing lift shall be made by jacking up the track to the exact height provided for by the grade stakes. All allowance for settlement shall be taken care of in the setting of the stakes and the necessary ballast forked or shoveled in, and then driven to place by tamping machines, tamping picks, bars or shovels, as directed by the proper representative of the railway company. In making the finishing lift the spot board and level board must be used with care and the track brought to as true a surface as possible.

(14) The track shall be placed in good alignment before the finishing lift is made, but a lining gang shall follow one or two days behind the finishing lift and shall spot in all places found not to be holding up to proper surface, and shall line the track to as accurate an alignment as possible. Center stakes shall be set for the alignment before the finishing lift is made and the final alignment must conform to the center stakes.

(15) The contractor shall trim the ballast to conform to the standard roadbed section, and the railway company for this purpose shall supply its standard cross-section template. The portion of the sub-grade outside the ballast line shall be left with a full even surface and the shoulder of the embankment properly dressed to the standard roadbed section. The contractor shall dispose of any surplus ballast after trimming the ballast section as directed by the representative of the railway company.

(16) The contractor must restore and secure promptly all stock-guards, crossing plank, or other facilities displaced by reason of the ballasting.

(17) After ten days' use of the track by the railway company the contractor shall go over same and surface and line low joints and spots which may have developed without extra charge to the railway company.

(18) The contractor shall remove from the railway company's property all rubbish and waste from any ballast work, or dispose of it as directed by the representative of the railway company. After completing the work the contractor shall remove from the railway company's property, and from all public and privately-owned property, at his own expense all temporary structures and waste resulting from his camping operations.

(19) In measuring the work, lining, surfacing and trimming turnouts and crossovers shall be considered as main track.

(20) The contractor is to understand that any work not specifically mentioned in the specifications, but which is necessary, either directly or indirectly, for the proper carrying out of the

intent thereof, shall be required and applied, and he shall perform all such work just as if it were particularly delineated or described. Unless specifically mentioned above, all work shall conform to the standards of the railway company.

SPECIFICATIONS FOR THE STRIPPING OF TRACK, THE RENEWAL OF TIES AND THE RESPACING OF TIES

(1) The railway company's authorized representative shall arrive at a clear understanding with the contractor as to the force to be employed, the speed with which it is desired to have the work proceed, the source of ballast supply and the general traffic situation in the territory in question, in order that proper plans may be made to proceed economically with the work specified. Prior to starting the work the contractor shall notify the railway company's representative a sufficient time in advance so that speed and traffic restrictions in the territory in which the work is to be performed may be arranged with the operating department of the railway company.

(2) The railway company shall furnish the ties required for renewal purposes at convenient points along the right-of-way.

are sidetracks on each side of the main track, the side track ties must be lined to the outside of such tracks.

(9) Picks should not be stuck into a tie to drag it into place, nor should ties be struck on the end with a tamping pick or spike maul. Tie tongs should be used to handle all ties.

(10) When old ties are taken from track, all tie plates and spikes must be carefully removed and preserved. The old ties shall be neatly piled for such inspection and disposition as the railway company's rules require.

(11) Ties should not be stood on end in close cuts.

(12) All treated ties shall be dated and where standard galvanized dating nails are used they shall be applied the day the ties are placed in the track. The position of the nail should be in accordance with standard instructions for that year.

(13) The spiking of the rails shall be done as directed by the railway company's representative. Where splices are slotted, spikes must be driven in the slots, except on bridges and open deck trestles, where spikes must not be driven either in the slots or against the ends of the splices. Two spikes shall be used with tie plates except when otherwise directed by the railway company's representative, only good or new spikes to be used. Spikes must be driven plumb and touching the base of the rail, so that when driven they will hold the rail to gage, and the under side of the head will have full bearing on the base of rail. They must be driven down until the head is tight against the rail, but no further blows should be struck after the spike has been driven home. Every hole from which a spike is drawn must be plugged in advance of the adzing. Spikes much be drawn carefully with a view of using them again.

(14) Joint ties shall be spaced in accordance with the railway company's standard plans, intermediate ties shall be spaced uniformly and all ties shall be laid square with the rail. The number of ties per rail shall be as required by the railway company's standard plans.

(15) The contractor is to understand that any work not specifically mentioned in the specifications, but which is necessary, either directly or indirectly, for the proper carrying out of the intent thereof, shall be required and applied, and he shall perform all such work just as if it were particularly delineated or described. Unless specifically mentioned above, all work shall conform to the standards of the railway company.

Table 1—Gages and Flange-Ways in Curved Track. TABLE No. 1. RIGID WHEEL-BASE LOGISTIC AND GAGE. Includes columns for 3 Spikes, 4 Spikes, 5 Spikes, 6 Spikes, 7 Spikes, 8 Spikes, 9 Spikes, 10 Spikes, 11 Spikes, 12 Spikes, 13 Spikes, 14 Spikes, 15 Spikes, 16 Spikes, 17 Spikes, 18 Spikes, 19 Spikes, 20 Spikes, 21 Spikes, 22 Spikes, 23 Spikes, 24 Spikes, 25 Spikes, 26 Spikes, 27 Spikes, 28 Spikes, 29 Spikes, 30 Spikes, 31 Spikes, 32 Spikes, 33 Spikes, 34 Spikes, 35 Spikes, 36 Spikes, 37 Spikes, 38 Spikes, 39 Spikes, 40 Spikes, 41 Spikes, 42 Spikes, 43 Spikes, 44 Spikes, 45 Spikes, 46 Spikes, 47 Spikes, 48 Spikes, 49 Spikes, 50 Spikes, 51 Spikes, 52 Spikes, 53 Spikes, 54 Spikes, 55 Spikes, 56 Spikes, 57 Spikes, 58 Spikes, 59 Spikes, 60 Spikes, 61 Spikes, 62 Spikes, 63 Spikes, 64 Spikes, 65 Spikes, 66 Spikes, 67 Spikes, 68 Spikes, 69 Spikes, 70 Spikes, 71 Spikes, 72 Spikes, 73 Spikes, 74 Spikes, 75 Spikes, 76 Spikes, 77 Spikes, 78 Spikes, 79 Spikes, 80 Spikes, 81 Spikes, 82 Spikes, 83 Spikes, 84 Spikes, 85 Spikes, 86 Spikes, 87 Spikes, 88 Spikes, 89 Spikes, 90 Spikes, 91 Spikes, 92 Spikes, 93 Spikes, 94 Spikes, 95 Spikes, 96 Spikes, 97 Spikes, 98 Spikes, 99 Spikes, 100 Spikes. Includes notes on minimum wheel base, gage, and flange-way.

Table 1—Gages and Flangeways in Curved Track

(3) The contractor shall supply all tools needed in connection with this work.

(4) The railway company shall provide the necessary inspector or inspectors and the instructions of such inspectors regarding the quality and type of work to be done shall be complied with at all times by the contractor.

(5) The contractor shall supply the necessary foremen and labor to prosecute the work properly and in such numbers as may be required by the chief engineer or his authorized representative, and at the request of the chief engineer or his representative will remove any foreman or man employed not satisfactory to the railway company.

(6) The track shall be skeletonized not to exceed two days in advance of the unloading of the ballast. Where the old material is suitable for sub-ballast and conditions permit the raising of the track, it will be raised and the old material spread under and between the ties to the proper width as uniformly as practicable. When conditions do not permit the raising of the track, the old material shall be removed to the required depth and disposed of as directed, or where the material is not suitable for sub-ballast, it shall be removed to the plane of the bottom of the ties, or deeper if necessary to preserve the grade line, and shall be placed on the outer shoulder of the road bed, preferably at such points as will tend to even up the line of the shoulder. Upon the completion of this work the surface of the sub-grade shall be sloped with reasonable uniformity so as to provide proper drainage to the shoulder of the embankment.

(7) Following the skeletonizing of the track, all old ties which are not fit for more than one year in track where gravel or cinder ballast is to be used, or for more than two years in track where stone or hard slag is to be used, shall be removed and new ties inserted in their places. The largest and best ties shall be used at the joints. The heart side of ties should generally be turned down, but they should be laid so as to obtain the best bearing. The adzing shall be done carefully and so as to provide full bearing for the tie plate or rail, with the least cutting possible to obtain bearing on solid wood.

(8) On single track ties shall be lined with the line rail on tangents, and with the inside rail on curves. On double track ties shall be lined to the outside of both tracks. Where there

Appendix E—Plans and Specifications for Switch Stands, Switch Lamps and Switch Locks

In Appendix A, Item II, plan 252, covering details of lamp tips for switch stands, was submitted for adoption as a supplement to the Manual, completing Section 12

Table 2—Gages and Flangeways in Curved Track. TABLE No. 2. GAGE DIAGRAMS FOR RIGID WHEEL-BASE LOGISTIC. Includes diagrams for guarded curves and plain unguarded curves. Includes notes on minimum practical gage, allowance for play at journals, and intersection of diagonal wheel-base line and vertical bogie line.

Table 2—Gages and Flangeways in Curved Track

of Requisites for Switch Stands, including Connecting Rods, adopted March, 1921.

The committee submitted plan No. 254 of 10-inch and 9-inch day target gages for attachment direct to switch lamps for low and extra low switch stands, and recommended that it be adopted as standard. This is an outline plan only and conforms to dimensions on A. R. A. Signal Section plan No. 1445 for the 10-inch day disc, to which reference is made for further details.

The committee also recommended that the following A. R. A. Signal Section plans of switch lamps be ap-

proved and endorsed without publication in the A. R. E. A. records:

Plan 1440. Switch lamp (spherical type), approved March, 1921.

Plan 1441. Switch lamp base-socket for spherical type switch lamp (Plan 1440), approved March, 1921.

Plan 1442. Lens, hoods and couplings for switch and semaphore lamps (see plans 1440 and 1460), approved March, 1921.

Plan 1443. Oil fount for spherical type lamp (Plan 1440), approved March, 1921.

Plan 1460. Switch lamp (cylindrical type).

Plan 1461. Switch lamp base-socket for cylindrical type switch lamp (Plan 1460).

Appendix F—Gages and Flangeways for Curved Crossings

Tables 1 and 2 are submitted in Appendix A, Item III, for adoption and publication in the Manual. Table 1 is based on the theoretical study submitted in last year's report. The columns on the left give the approximate rigid wheel base of locomotives in combination with the number of pairs of flanged drivers stated that will operate on the gage of the track shown on the right under "Degrees of Curvature." Two columns are given for the wheel bases; one for plain, unguarded curves, and the other for guarded curves and curved crossings.

Table 1 is sufficiently correct for general practical purposes. The figures for the gage are within $\frac{1}{8}$ in. and the figures for the wheel base within 6 in. in order to avoid the use of smaller fractions.

For finding the more nearly exact gage necessary for a given locomotive on a given curve in cases where it may be desirable, the graphic Table 2 is also submitted.

Discussion

(Chairman Wiltsee presented the report and moved the adoption of plans 701 to 710, bolted rail crossings.)

C. W. Baldrige (A. T. & S. F.): I do not find any built-up crossing showing an easer rail extending beyond the joint of the rail. I have had occasion to follow up some crossings with long easer rails, as compared with short easer rails, and an easer rail extending the matter of 14 or 18 in. beyond the joint will last longer than a similar crossing with a short easer rail.

(Motion carried.)

Mr. Wiltsee: I move the adoption of Plans 751 to 768 inclusive—Manganese Steel Inset crossings. These plans have been before the committee for several years, and are the result of the work of the Committee of Manganese Track Society in this committee.

(Motion carried.)

There seemed to be some misunderstanding. We did not print in this addendum the specifications which should have accompanied these crossing frog plans, and I will read them.

(Mr. Wiltsee then read the following):

APPLICATION OF CROSSING DESIGNS AND RECOMMENDED PRACTICES

1. Plans Nos. 701 to 710, inclusive, for bolted rail crossings, and plans Nos. 751 to 768, inclusive, for manganese steel inset crossings, are applicable for all rail sections from 80 pounds per yard up, and from 2½ to 3 in. inclusive, width of head.

2. The plans represent recommended practice for general conditions and are subject to modifications under special conditions. Added features such as guard rails or easer rails extended beyond the end joints may be specified without departing from the general design.

3. The single rail design for crossings below 25 deg. angles are recommended only for tangent track or for curved track not exceeding 6 deg.

4. Plain center frogs are not recommended below 8 deg. 15 min. on tangent track. For curved track the recommended bottom angle to road center frogs is 9 deg. 30 min. for curves 6 deg. and under, increasing one degree for each 2 degrees of angle over and under, to a maximum angle of 15 deg. 30 min. for 15 deg. curve and over. Movable point crossings are recommended below 25 deg. angles.

5. The gage of crossings in tangent track and curves up to 6 deg. shall be standard of 4 ft. 8½ in., and flangeway standard of 1¾ in. wide. In crossings on sharper curves the gage and width of flangeway shall be widened, if required, to suit the equipment operating through them. For economy in maintenance, curved crossings requiring wider than 4 ft. 9 in. gage, and 2¼ in. flangeway are not recommended.

6. In laying out bolted rail crossings to a given angle falling within the limits given on typical plans, follow general design, adjusting bolt spacing to suit angle, using number of bolts shown on plan.

7. Designs with easer rails are recommended for all but light traffic.

8. The use of base plates (either corner plates or continuous plates) is recommended for all bolted rail crossings from 35 deg. up and for designs with easer rails below 35 deg. For crossings of frog construction, 14 deg. 15 min. and under, special tie plates may be used in place of base plates.

9. For manganese steel inset crossings the size of the insert is determined by the formulae on plans Nos. 751, 752 and 753, for angle "A" of crossing expressed in degrees and decimals of a degree, and typical design followed in all other respects. For angles from 45 deg. to above 14 deg. 15 min. the plans cover two general types marked Detail "A" and Detail "B," respectively, to be selected as may be preferred.

10. Base plates on manganese steel inset crossings are recommended for all angles above 14 deg. 15 min. For crossings of frog construction, 14 deg. 15 min. and under, special tie plates may be used when so specified.

The President: Is there any discussion of these specifications?

J. V. Neubert (N. Y. C.): As I understand it, these are not specifications, but merely explanations of these plans.

Chairman Wiltsee: If it is in order, I will move the adoption of these explanations to be printed with the plan in the Manual.

Earl Stimson (B. & O.): In seconding the motion I would like to express confidence in the committee, that what they have to offer is not a specification, but merely an explanation, and that the plan would be rather incomplete unless that was included.

Mr. Neubert: I feel it is very improper to print something as recommended practice that has not been considered by the association.

E. A. Frink (S. A. L.): It will be unfortunate if this committee has to see the results of its work carried over for another year. A large part of it is explanatory, which we can adopt without question.

(A motion was then made to read the section by paragraphs, after which the entire section was adopted.)

(The motion to include the matter under consideration in the Manual was put and carried. Chairman Wiltsee then presented revisions of the Manual (Appendix A) which was adopted. T. T. Irving ((Grand Trunk)) then presented Appendix C on track tools and said):

"There is one dimension missing in the pick eye adze. In the elevation drawing the bottom dimension should be marked 3 in."

Chairman Wiltsee: I move the adoption for printing in the Manual of the following plans: Pinch bar, living bar, claw bar, track wrenches, adze, pick eye adze, spike pullers, rail fork, track gage, rail tongs, track chisel, clay pick, spike mauls, sledge, track level, track shovel.

C. E. Lindsay (N. Y. C.): The limit of wear on lining bars and switch bars is indicated in outline in the drawings by a measurement from the initial point of the bar. If the point is worn off there is no place to measure from. Also, I think it necessary to show the owner's name on the bar as the manufacturer's name. Why is it necessary to have bars of 18 lb. weight and bars of 20 lb. weight? Why not have two classes—18 lb. and 20 lb.?

Mr. Baldrige: The size of the jaws of the rail tongs appear unnecessarily close to the size of the present rail head. Rail tongs ordinarily last a good while and it would be better to allow a little larger spread and depth

to take care of a variation greater than is shown. I believe that 2¼ in. depth, which is the amount allowed here, is hardly enough clearance to protect against what may occur in the design of rail heads in the future, and there is no reason for holding to a close fit between the depth of the grip of the tongs and the rail head.

L. J. F. Hughes (C. R. I. & P.): In determining upon a design of track gage was the type of gage considered in which there is a curved fillet on the face that bears against the rail to allow for a possible bead on the rail? If this has been considered what are the reasons for not embodying this feature in the one set forth as standard?

Earl Stimson (B. & O.): The double-ended track wrench is in quite general use and I would like to have some expression from the committee as to why they limit the design to the single-ended wrench.

Chairman Wiltsee: The question of the track gage with a beaded edge to take care of the lip on the rail was before the committee and discussed considerably. On account of the wear, and not being able to get a very strong gage, especially at that point, the committee thought that this type of gage, which provides for gaging the track at a gage point ⅝ in. below the top, was a strong gage and better in all respects. In regard to the double-ended track wrench, the committee did consider that question, but decided that the single end wrench was preferable, although there is no objection to using a double-ended wrench if anyone desired. I think that ordinarily for rail-laying gangs the single-ended wrench is preferable, particularly with the drift end, but possibly on a section the double-ended wrench may be preferable. I did not include the track shovel in my motion to adopt this plan.

Mr. Baldrige: I am inclined to agree with the gentleman that spoke in regard to the track gage. This form of track gage as shown is all right to put on new rail, but practically all rail of the present day acquires a V, or an overhang projection on the gage side of the rail after comparatively short service. On the Santa Fe we use a gage which provides a recess at the upper corner under the gage at the gage point to take care of that irregularity in the head of the rail, and I think that such a gage is preferable to the one shown.

(The portion of the report in Appendix D was presented by E. T. Howson (*Railway Age*), chairman sub-committee.)

Chairman Wiltsee: *I move the adoption of the specifications in Appendix D be adopted and printed in the Manual.*

Mr. Stimson: Will the committee please state whether the unit track work schedules are to be made part of the specifications, and if not, just what they are supposed to be.

Mr. Howson: The unit track work schedules were submitted in accordance with our instructions and also as an example of the operations included within this specification.

Mr. Baldrige: I suggest, that a clause be inserted between articles 19 and 20, in the specifications for relaying rail, reading:

"New rail shall be so laid that insulated joints will be brought near enough to the old location of the insulated joints so that it will not be necessary to move trunking, wiring, etc.

Chairman Wiltsee: The committee will accept that amendment.

W. C. Barrett (L. V.): Has the committee considered in this specification for laying rail, the use of machines by contractors? Apparently the specification calls only for the laying of rail by hand.

Mr. Howson: The committee soon realized that it must confine its specifications to those details of work which were of fairly common application and endeavored to provide a skeleton and the basic principles which would serve any individual road, so reference to the use of mechanical equipment, which varies in detail, was left out.

Chairman Wiltsee: If the members will apply these specifications to their own conditions, they will find some few changes or revisions, which are naturally to be expected. I just had occasion to do this on our own road, and found that I had only a few changes to make to suit our conditions.

Mr. Lindsay: I would dislike very much to see this convention degenerate into a rubber-stamp. The committee gave no indication that this subject was to be included in the Manual. I think we should jealously safeguard the Manual. The whole subject of contract work is boiling. Nobody knows where we are. These specifications will be of value in guiding those who are undertaking other processes, but I submit that there has not been sufficient time to study this subject in its entirety and to go into it as it should be done before it is inserted in the Manual. *I therefore move to amend the motion to the effect that this subject be accepted as information and placed in the Proceedings.*

Mr. Stimson: I must say I concur fully in Mr. Lindsay's amendment. The question asked the committee was not answered with sufficient clearness as to just what use or what purpose unit track work schedules serve in the specification.

(*Mr. Lindsay's motion was adopted; also the original motion as amended.*)

(That portion of the report on plans and specifications for switch stands, switch lamps and switch locks was presented by J. deN. Macomb, A. T. & S. F., chairman of the sub-committee. Appendix E was then discussed and this was followed by a reference to six Signal section plans, the intention being to read them into the Manual, but not to republish the drawings or material as it is a duplication of Signal section material. In that connection the committee felt that this is the border line between the Signal section's jurisdiction and A. R. E. A. jurisdiction, and that recognizing the Signal section's standard is as far as it could go.)

Chairman Wiltsee: *I move the adoption and printing in the Manual of Plan No. 254 of 10 and 9 in. targets.*
(*Motion carried.*)

Chairman Wiltsee: *I move the adoption for printing in the Manual of our approval of the Signal section plans Nos. 1440-41-42-43-1460-61, these to be approved and endorsed without publication of the plans.*

(*Motion carried.*)

Chairman Wiltsee: (Reading on pp. 671 and 672.) *I move the adoption for printing in the Manual of Plan No. 252, and also the revision of Sec. 12 as proposed.*

(*Motion carried.*)

(Appendix F was presented by V. Angerer, chairman of sub-committee on Gages and Flangeways for Curved Crossings.)

Chairman Wiltsee: *I move that Tables Nos. 1 and 2 be adopted and printed in the Manual.*

(*Motion carried.*)

Chairman Wiltsee: There is revision of the Manual necessary in connection with Gage on Curves in Appendix A.

I move that these be adopted and printed in the Manual.

(*Motion carried.*)

On the subject, "(a) Tests of tie plates subject to

brine drippings; (b) effect of brine drippings on track appliances," we expect to conduct further inquiries and the committee will report at a later time.

The next subject is: "Investigation on reduction of

taper of tread to 1 in 38 and on canting the rail in track inward." The sub-committee has not been able to get much of value, and the report is submitted as information.

Report on Shops and Locomotive Terminals

The dependable operation of ash pits hinges on such factors as the use of mechanical equipment to make work more attractive to labor, the availability of spare parts to insure uninterrupted service, the provision for liberal storage space for ashes and their actual disposal. The recommendations of the committee outline how dependability may be obtained under different circumstances and with different classes of equipment. The committee presents a plan of a typical engine terminal for a 30-stall house and shop facilities with suggestions for adapting the plan to lesser needs. The design provides also for a future expansion of 100 per cent.



F. E. Morrow
Chairman

F. E. Morrow is finishing his second year as chairman of this, the newest of the association's standing committees, its appointment having been authorized only two years ago. In his capacity as assistant chief engineer of the Chicago & Western Indiana, the largest terminal railway in the Chicago district, Mr. Morrow is brought into daily contact with the problems of the committee. Because of this concentration upon terminal matters he is particularly well fitted to direct the committee in the development of its plans for the preparation of standard designs of the various types of terminal buildings and allied facilities for a period of over ten years.

THE COMMITTEE recommended that the findings and conclusions on Ash Pits, as embraced in the summary of Appendix A, be adopted and placed in the Manual in lieu of the material now appearing in the Manual under this subject.

The committee recommended that the findings and conclusions on Ash Pits, as embraced in the summary of Appendix A, be adopted and placed in the Manual in lieu of the material now appearing in the Manual under this subject.

The committee recommended that the findings and conclusions on Engine Houses, as shown in Appendix B under recommended changes in Manual, be adopted and placed in the Manual.

The committee recommended that the reports on Engine House Layouts and Car Shops, as shown in Appendices C and D, be accepted as information only and incorporated in the Proceedings.

Committee: F. E. Morrow (C. & W. I.), chairman; A. T. Hawk (C. R. I. & P.), vice-chairman; C. N. Bainbridge (C. M. & St. P.), Leland Clapper (D. & T. R.), George H. Gilbert (Son.), F. M. Haas, G. W. Harris (A. T. & S. F.), L. P. Kimball (B. & O.), M. A. Long, J. W. Pfau (N. Y. C.), John Schofield (C. N. R.), A. M. Zabriskie (C. of N. J.), G. W. Burpee, W. H. Cookman (Penna.), Walter Goldstraw (G. T.), R. J. Hammond (B. & M.), E. A. Harrison (A. T. & S. F.), W. T. Krausch (C. B. & Q.), J. B. Maddock (C. of Ga.), L. K. Silcox (C. M. & St. P.), L. L. Tallyn (D. L. & W.).

Appendix A—Ash Pits

(The following is an abstract of the summary of the report on this subject.)

RECOMMENDATIONS REGARDING COMMON TYPES OF ASH PITS AND METHODS OF ASH DISPOSAL.

(1) All ash pits should have water pipes conveniently arranged for quenching fire and for attachments of hand hose for use of fire cleaners on each side of each engine.

(2) In estimating ash storage, and deciding the required size of skips, hoppers, etc., the average amount of ash per engine and the maximum amount for any one engine should be determined from a knowledge of local conditions. With such information lacking, the average amount of ashes per engine should be assumed as not less than two yards and preferably two and one-half

yards; and in the design of skips and hoppers the maximum amount of ashes from any one engine should be assumed as not less than two and one-half yards and preferably three yards.

(3) Length of pits handling two engines per track should be from $1\frac{1}{2}$ to $1\frac{3}{4}$ times the length of a single engine, and length of pits handling three engines per track should be between $2\frac{1}{2}$ and $2\frac{3}{4}$ times the length of a single engine. The length of engine selected should suitably reflect existing and probable future operating needs.

(4) The cleaning of locomotive fires on the line is often an operating necessity, though it involves some risk to traffic unless ashes receive proper attention. Such fire cleaning should be prohibited, except at designated locations between fixed limits where proper attention can be given to the removal of the ashes.

(5) Where only a few engines are handled daily, many small ash pit arrangements may be suitable, but consideration should be given to the use of a shallow pit constructed of non-combustible material and located between the rails.

(6) The depressed track pit, with ashes removed to cars by hand, has given fairly satisfactory service throughout the country for many years at terminals handling from a few up to a hundred or more engines per day. With modern labor conditions and operating requirements, the general use of this type of pit is not recommended, though under favorable labor conditions, and under conditions not favorable to the use of machinery, such pits will probably continue in satisfactory service at some terminals. Where such pits are to be used, it is recommended that they generally embody the following features:

- (a) The concrete should be of a dense and rich mixture, with preferably slag or trap rock used for the aggregate.
- (b) For safety and economical maintenance, both rails should be supported on cast iron or cast steel pedestals, even though a continuous curtain wall be used under one rail.
- (c) The pavement should be of vitrified or fire brick on a concrete base.
- (d) The distance from base of rail to pavement should be not less than three, nor over four feet.
- (e) To prevent the washing of ashes down onto the depressed track, the retaining wall should project slightly above the paving, with drain holes through it.

(f) The vertical distance from top of rail of the depressed track to the edge of the shoveling platform should be not less than 4 ft. 6 in. and usually not over 5 ft. 6 in., based upon easy shoveling into cars of ordinary height and possible shoveling into cars nearly 11 ft. high.

Deep water pits are recommended for use where 60 or more engines are handled daily, provided the engine terminal layout is so fixed that the ash pit investment may be considered reasonably permanent, and provided that the climate is not so cold that great trouble is apt to be experienced with frozen ash cars. It is recommended that such pits embody the following features or ideas:

(a) Ashes should be removed to cars with clam shell buckets operated by locomotive, gantry or overhead cranes. At double pits, if the use of a locomotive crane is required for more than two or three hours per day, then dependability of operation will begin to be affected and an overhead crane should be installed.

(b) Engine and ash car tracks should be spaced far enough from adjacent tracks to afford suitable clearances for the future construction of an overhead crane runway.

(c) The smaller layouts should provide at least two engine tracks, or consist of two separate, single engine pits in the same track, with suitable crossovers to a running track and with an independent ash car track, this latter arrangement being recommended only where local conditions make the usual two-engine pit undesirable.

(d) The larger layouts should provide at least two engine tracks and one or more independent ash car track, all spanned or served by a crane. Where the extra cost involved can be justified, complete non-interference between the work of loading ashes and the cleaning and handling of engines can be obtained by locating the ash track between the engine tracks.

(e) The distance center to center of engine tracks over pits should be not less than 18 ft., and correspondingly increased if sidewalks are provided. The depth of pit and the slope of the side walls should be such that ashes will slide freely to the middle, where they can readily be reached by the bucket. Ashes will not flow freely on a slope less than one to one.

(f) Such rails as do not bear on side walls should be supported on pedestals spaced relatively close together in order to permit the use of shallow beams and reduce maintenance cost in the replacement of these beams. Spare bearing beams should be kept in stock at all times so that prompt replacement of defective beams can be made. The use of bare beams probably will be safer and cheaper than to attempt to protect such beams from rust and warping from the heat.

(g) The bottom of the pit should be protected with old rails or otherwise to guard against blows and scraping action of the clam shell bucket.

(h) Special attention should be given to the use of catch basins and other arrangements to keep the cinders from filling up drain pipes.

(i) Consideration should be given to safeguards against accidents resulting from men falling into the pit. Good protection is afforded by inner sidewalks with railings. These can be installed only when so provided in the original design, and even then at a decided increase in cost on account of increased track centers and depth of pit for equal ash storage.

Shallow water pits are recommended for use under and about the same conditions as are deep water pits. In all cases, the ashes should be handled by overhead crane. Comparing these two types, it may be said for equal lengths, the shallow water pit will be cheaper construction, and therefore more economical in fixed charges. If, however, on account of the reduced ash storage the length of the pits be increased, then the advantage of economy may be partly or wholly lost. Such pits should embody the following features:

(a) Engine tracks and ash car tracks should alternate in either a three or five track unit under one crane.

(b) The pits should be as wide between the rails as they can be constructed. The side walls and bottom of the pit should be protected against rubbing by clam shell bucket, which should be extra long to obtain good capacity. Height of pit walls should be not less than four feet or more than four feet six inches.

(c) Between tracks a water shedding pavement should be provided so sloped as to drain to the pits.

Appendix B—Engine Houses

The committee recommended that the text now appearing in the Manual, 1915 Edition, under the title "En-

gine House Design" be changed to read as follows. Sections changed are indicated by an asterisk:

Form.—*(a) The circular form under ordinary conditions is preferable.

*(b) Special conditions may render a rectangular house desirable, such as restricted location, small number of engines handled, greater ease of providing "X" than turntable, etc.

(c) At shops where a transfer table is used, a rectangular engine house served by the transfer table may be desirable.

Turntable.—(a) The turntables should be long enough to balance the engine when the tender is empty.

*(b) A deck turntable is preferable to a through table when the cost of construction is no greater.

*(c) At important terminals, turntables are most economically operated by mechanical means.

*(b) Where electric power is available, an electric tractor is the most efficient means of operating a turntable. The power wires may be led to the table either underground or overhead.

*(b) Where electric power is not available, a compressed air motor may be used to propel the table. In this case, the locomotive itself usually furnishes the compressed air.

(d) The deck on the turntable should be wide enough to provide a walk on each side and be protected with hand rails.

Turntable Pit.—*(a) The turntable pit should be drained and paved.

*(b) The circle wall should be of masonry, with proper supports and fastenings for rails on the coping. A timber coping is considered a proper support and preferable to a rigid masonry coping.

*(c) The circle rail should preferably bear directly on masonry base.

(d) Easy access to the parts of a turntable for the oiling of bearings, painting and inspection should be provided in the design of the turntable pit, unless ample provision is made in the turntable itself.

Door Openings.—*The clear opening of entrance doors should not be less than 13 ft. in width and 17 ft. in height.

Doors.—Doors should be easily operated, fit snugly, be easily repaired and maintained, and should admit of the use of small doors.

Tracks.—(a) Lead tracks to the turntable should line up with tracks of the engine house where possible.

(b) Tracks should be on a level grade and should be provided with stop blocks.

(c) Special fastenings of the track rails at the circle wall and on the turntable are desirable to prevent movement of the rails, to give good bearing and to lessen the damage from derailed wheels.

Position of Locomotive.—In a circular house the locomotive should stand normally with the tender toward the turntable.

Length of House.—The length of stall along center line of track should be at least 20 ft. greater than the overall length of the locomotive to provide trucking space of 10 ft. in width in front of the pilot and space in which to detach the tender and provide a walkway between it and the engine without opening the door.

Materials.—(a) The materials used in construction of the house should be non-corrosive, unless proper care be taken to prevent corrosion.

*(b) The additional security against interruption to traffic from fire warrants serious consideration of the use of a fireproof roof or dividing the engine house into units of approximately 10 stalls by the use of division walls of fireproof material.

*(c) Omit.

*(c) The portion of the wall directly in line of the track where the engine is liable to run into it, should be so constructed as to be easily replaced or repaired when damaged.

Engine Pits.—Engine pits should extend from a point 10 ft. from the inner circle columns to a point 13 ft. from the inner face of the outer circle wall. The clear width should be 4 ft.; depth below base of rail, minimum 2 ft. 6 in., increasing with the slope of the floor of the pit to at least 3 ft. 0 in. The walls should be about 2 ft. 7 in. thick to provide proper support for jacking timbers. The clear width may be reduced a few inches when direct heating is used to permit the provision of recesses in the side walls for radiators and still allow ample support for the rails.

The floor should be convex and the drainage toward the turntable unless topographical conditions dictate otherwise.

Smoke Jacks.—The smoke jacks should be fixed. The bottom opening should be not less than 42 in. wide, and long enough to receive the smoke from the stack at its limiting positions, due to the adjustment of the driving wheels to bring the side rods in proper position for repairs. The bottom of the jack should be as low as the engine will allow, and it should be furnished with a drip trough. The slope upward should be uniform to the

flue. The area of the cross-section of the flue should be not less than 7 sq. ft. The jack should be preferably non-combustible. Wooden jacks properly built are considered reasonably non-combustible.

(This type of jack applies to all houses where regulations will permit. In some cities, where smoke abatement laws are in force, special types of jacks are necessary.)

When the engine house is without a turntable, smoke jacks should be located at each end of each engine space.

***Floors.**—The floors should be of permanent construction sloped so as to drain properly. The floor around the outer circle and for the outer bay or outer two bays where trucking is carried on and most of the work is done, may advantageously be constructed of wood block, or vitrified brick on a concrete base, while the remainder of the floor between pits may for the sake of economy be of concrete.

***Drop Pits.**—The number and type of drop pits depends on the purpose for which the particular house is used and the class of power handled.

Ordinarily, a drop pit should be provided for driving wheels and supplemented as required by drop pits for engine truck, trailer, and tender wheels.

At points where considerable work is customarily performed on the wheels, the use of a drop table or unwheling hoist should be considered.

Heating.—(a) Heat should be concentrated at the pits.

(b) The general temperature of the house should be kept between 50 and 60 deg. F.

(c) The recommended method for heating houses of 10 stalls or over is by hot air driven by fans through permanent ducts located under the floors where practicable. The outlets should be located in the pits under the engine portion of the pits, and fitted with dampers to shut off the heat when necessary. Temperature of the hot air at the pits should be 130 to 150 deg. F.

The fan and distributing system should have a capacity for changing the air from 3 to 4 times an hour. The fresh air should be taken from outside the building. The fan intake should be so designed as to permit the use of all fresh air, all inside air, or part fresh and part inside air. A certain amount of recirculation, depending entirely on conditions, is permissible, particularly when the doors stand open for any length of time.

(d) In a small house, or in a larger house in some climates, analysis may show the direct system of heating to be more desirable. In such a case, the vacuum return system should be used. Radiators should be placed in the pits and properly protected from falling parts, and also on the outer walls and end or fire walls. Radiators on the outer walls should be so located as to be clear of the path an engine would take in going through the outer wall.

Windows.—(a) The disadvantages of skylights are so much greater than their advantages as to make them undesirable.

(b) Windows in the outer walls should be made as large as practicable with the largest glass or light area consistent with the strength of the structure. In general, the lower sill should be not more than four (4) ft. from the floor and the space between window frames and columns or pilasters and girders only that necessary to secure the window frames.

Windows in doors, when provided, should be furnished with wire glass.

***Electric Lighting.**—General distribution of illumination should be provided either by:

(a) Individual lights between pits arranged to avoid shadows, 300 to 500 watts to a stall, or;

(b) Flood lights on the outer and inner circle walls so arranged as to diffuse rays, eliminate the glare common with flood lights and avoid deep shadows. Usually two 100-watt lamps on the outer wall and one 60-watt lamp on the inner wall are sufficient.

Either system should be supplemented by plug outlets for drop cord lamps in each alternate space between pits.

Piping.—(a) The engine house should be provided with piping for air, steam and water supply and for boiler blow-off. The latter line should discharge outside the house and when a cooler washout system is installed, should discharge into the boiler reservoir.

(b) A boiler washout and refilling system is ordinarily desirable to provide hot water for washing and refilling and to make use of the steam and water blown off from locomotive for the purpose.

(c) The steam inlet should be located near the front end of the boiler. The blow-off line, the air, washout and refilling lines, and the hot water connection should be near the front end of the fire box. Connections should be provided in alternate spaces between stalls, except for the blow-off line, to which connections should be provided between each stall.

(d) Steam and hot water piping should be installed

***Machine and Tool Equipment.**—The space provided for machine tools and the extent of machine and tool equipment will depend entirely upon the location and method of operation of the house and must be made a subject of study for each house.

***Mechanical Handling Devices.**—Consideration should be given in the design of an engine house to the use of traveling cranes, jib cranes or monorails and provision made in the design of the structure for future installation if such is considered probable.

Appendix C—Engine Terminal Layouts

The committee presented a report, together with a plan of a typical engine terminal for a 30-stall engine house, indicating how it may be enlarged for the future, and suggesting that by a simple process of elimination, the terminal may be built for a twenty-stall or a ten-stall house. In arriving at the typical layout, the following assumptions controlled the committee's decision affecting the terminal layout:

(a) This is a division terminal not served by a back shop, but only where running repairs are made to about 150 locomotives daily.

(b) The terminal is situated near the throat of a freight yard and at a point near where power is released or returned to road service.

(c) In selecting a site, it is assumed that the terminal is within walking distance or at least a street car ride of an adequate supply of labor.

(d) Site to be selected after investigating the cost of real estate, restrictions by municipalities, ease of drainage, amount of grading and proximity of ample water supply.

(e) Trackage and other facilities are arranged, having in mind that the terminal will be called upon to clear from four to five locomotives per stall per day, and that the power may arrive in fleets at certain periods.

(f) It is assumed that in addition to the road power (passenger and freight) this terminal also serves a number of switching engines.

(g) No attempt has been made to fix the lengths of the inspection and ash pits, the capacity of the coaling station, the lengths of the turntable, the depth of the house, as these are subjects being handled by another sub-committee.

(h) Provision has been made for expanding the terminal capacity 100 per cent by adding to all facilities and by providing a second 30-stall house and a second turntable.

(i) The layout committee has been governed by the principle that it is not enough for an engine terminal layout and facilities to meet the normal demands, but if properly designed, it will function under the severest traffic and weather conditions.

Appendix D—Design of Car Shops

The committee made the following general comments and recommendations for the various subdivisions which make up a large passenger shop layout.

Coach Paint Shop.—The paint shop should be of fire-proof construction, light, airy, roomy, free from dirt and dust, and should be well heated in cold weather. The tracks should be 25 ft. from center to center. The floor should be concrete and should pitch to floor drains to allow for scrubbing and quick drying after.

Traveling cranes and supply tracks are not needed. Permanent scaffolds should be provided. Ample space should be allotted for storing and mixing paints. Ample toilets, wash and locker rooms should be provided.

Coach Repair Shop.—The same width and track arrangement is recommended as for the paint shop. The building should be divided into two main bays, one on either side, with a center aisle about twenty feet wide in which should be installed a fifteen-ton traveling crane.

The floor should be wood block. Permanent scaffolds should be provided.

The shop should be piped for compressed air, steam, water and acetylene, and ample electric connections should be provided. A certain space should be set aside for tools and machinery. The pipe shop, air room and tin shop should be annexed to this building, if possible, as the greater portion of that work comes from and goes back to the cars while in this shop.

Wash House.—The committee recommended that a separate department be assigned and be properly equipped for washing cars. The wash house should be well lighted, heated and ventilated so the cars will dry quickly. It should have a concrete floor, properly pitched, with frequent floor drains to give good drainage. Scaffolds should also be provided and the shop should have water and steam connections.

Stripping and Trimming Shop.—The committee recommended provision for a place for stripping cars of sash, doors, upholstery and fixtures as they pass into the shops and another for trimming them as they go out with space in between where the parts removed can be repaired.

Truck Shop.—A separate truck shop should be provided according to a transverse arrangement, with room on each track for two sets of trucks. The building should have two main bays on either side and a narrow bay at the center with a ten-ton traveling crane. A longitudinal track should run the full length of the building to facilitate the handling of mounted wheels and axles.

Wheel and Axle Shop.—This shop should be conveniently located to both the freight and passenger repair shops. Large yard space is necessary in connection with this department for the storage of wheels and axles, both mounted and unmounted. Free movement of this operation is essential to economical production and great care should be exercised in laying it out. Monorails form the best method for serving this shop.

Blacksmith and Machine Shop.—These two shops are treated together because most of the work progresses through the smith shop into the machine shop to be finished. They should be very conveniently located with respect to the truck shop and easily accessible for the coach repair shop, as these two departments furnish practically all the work.

Wood Mill, Pattern and Cabinet Shops.—These three sections are closely related. All do wood work, and in the majority of layouts are combined under one roof and it is proper that they are. The mill should be conveniently located with respect to both passenger and

freight car repair shops and should be so placed that ample yard and storage space is available for the storing of lumber. It should have as an accessory a dry kiln and large sheds for the storing of dried lumber.

Some means of disposing of sawdust and shavings must be provided. The preferable means of disposal is to bale for a commercial trade. If many patterns are to be made and stored, a separate fireproof storage should be provided.

Power Plant.—This involves a study in itself.

Discussion

(Chairman Morrow outlined the contents of the report and introduced G. H. Gilbert (Sou.), chairman of the sub-committee on Ash Pits, who presented the report on its subject, concluding with a motion to adopt the committee's conclusions for inclusion in the Manual.)

J. L. Campbell (E. P. & S. W.): Is the committee submitting this as information or statement of practice?

Mr. Gilbert: Both.

O. E. Selby (C. C. C. & St. L.): Without attempting to discredit the valuable work of the committee, I believe what they have submitted here is information and not recommended practice. I think the Manual would be better off without anything on the subject than to have something as general as this put in.

I move to amend the motion before the house by printing this as information in the Proceedings, and not in the Manual.

(The amendment was carried.)

(In the absence of Mr. Burpee, chairman of the sub-committee on engine houses, Mr. Kimball presented the report.)

L. P. Kimball (B. & O.): As a result of further study there is a recommendation for the replacement of the existing matter. (Appendix B.)

I move that this matter be accepted by the association and substituted for the present engine-house material in the Manual.

(Motion carried.)

Chairman Morrow: The work on engine house and power plants and shop extension was initiated in connection with our collaboration with the Mechanical section committee. This is presented simply as information.

This is followed by Appendix D, "Design of Car Shops," Report on Passenger Car Repair Shops. This is also presented as information.

The President: The convention will receive it as information. The committee is dismissed with the thanks of the association.



Coal Train on the Alaskan Railway

Report of Committee on Roadway

In the treatment of sliding cuts and fills as well as soft spots in excavations and embankments, all precautions should be taken to keep water away. Various methods designed to meet different conditions, but all based on the fact that the primary cause of slides is a lack of proper drainage, are submitted by the committee for inclusion in the Manual. Trestles should not be allowed to deteriorate too far before filling, otherwise serious difficulties will ensue. Drainage should be given careful attention, while allowance for probable future highways should be considered. Where possible, mechanical equipment should be used for ditching.



J. R. W. Ambrose
Chairman

J. R. W. Ambrose is a veteran in committee service, having been a member of the Roadway committee for twelve years. He is now rounding out his third year as chairman. Mr. Ambrose is chief engineer of the Toronto Terminal Railway Company, an organization created by the Canadian Pacific and the Canadian National railways to build and operate the new Union Station and adjacent terminal at Toronto. As a construction engineer of long experience Mr. Ambrose is in a position to appreciate the importance of drainage and the other problems of roadway construction and to direct studies leading to their solution in the future.

THE ACTION RECOMMENDED by the committee was:

1. That the definitions of terms under Revision of Manual (Appendix A) be approved for insertion in the Manual.
2. That the report on shrinkage and swell of grading material (Appendix B) be received as information.
3. That the conclusions in reference to methods employed and results secured in the treatment of sliding cuts and fills and soft spots in excavation and embankments (Appendix C) be approved and inserted in the Manual.
4. That a brief report on the effect of heavier power and increased tonnage upon roadbed previously considered stabilized be received as information.
5. That the report on filling of bridge openings (Appendix E) be received as information.
6. That the conclusions in the report on "Ditching" (Appendix F) be approved and inserted in the Manual.
7. That the report on chemical killing of weeds be received as information.
8. That a report on the design and use of reinforced concrete culvert pipe be received as information.
9. That a brief report on excessive cost of maintenance during the early period of operation be received as information.

Committee: J. R. W. Ambrose (Toronto Term.), chairman; C. M. McVay (K. & M.), vice-chairman; H. G. Aylesworth (C. B. & Q.), E. W. Bayer (C. C. C. & St. L.), C. W. Brown (L. & N. E.), H. W. Brown (Penna.), R. K. Brown (S. L. & U.), A. S. Butterworth (G. F. & A.), C. C. Cunningham (C. R. I. & P.), W. C. Cird (Cons. Engr.), C. A. Daley (Erie), S. B. Fisher (M. K. & T.), R. D. Garner (S. N. E.), R. C. Gowdy (C. & S.), F. M. Graham (Penna.), H. Hawgood (Cons. Engr.), E. G. Hewson (G. T.), W. H. Jaekle (S. F.), A. A. Matthews, W. H. Penfield (C. M. & St. P.), P. Petri (B. & O.), Frank Ringer (M. K. & T.), H. A. Roberts (O. W. R. R. & N.), R. B. Robinson (U. P.), R. A. Rutledge (A. T. & S. F.), G. L. Sitton (Son), E. G. Taber (S. I. R.), H. F. Tyrrell (Son), C. E. Weaver (C. of Ga.), W. H. Woolburly (D. & I. R.), J. C. Wrenshall (P. & R.).

Appendix A—Revision of Manual

The committee recommends the following definitions for the Manual.

Castings (verb).—Disposing of excavated material by a single operation either by hand or machinery.

Station Men (noun).—Men engaged in station work.

Station Work (noun).—A small piece of grading work extending over one or more stations.

Appendix B—Shrinkage and Swell of Grading Material

Considerable correspondence has been carried on by the sub-committee and additional information requested

from various sources, but very little has been received that would add to what has already been reported. The committee found nothing that would lead it to change any conclusions previously made as to this subject. No further density tests have been reported and there is nothing to add to the report of a year ago in this regard. It is hoped that some of the railroads will do more with this matter in the ensuing year. The committee again recommended that the subject be closed until additional investigation and experiments are available on this subject.

Appendix C—Methods Employed and Results Secured in the Treatment of Sliding Cuts and Fills and Soft Spots in Excavations and Embankments

Surface slides occur in nearly every class of material and combination or mixture of materials, except rock, in both excavations and embankments and are caused largely by the ground becoming saturated. The extra weight of the water in the ground upsets the equilibrium and reduces the cohesion and a slide is the result. In northern climates the action of frost greatly facilitates the action of the water by opening up crevices and making the ground porous.

Treatment in Excavations.—Surface water should be kept from the face of cuts as much as possible by the use of intercepting ditches constructed well back from the top of cut. These ditches should be constructed with care and should be well maintained so as not to let pockets form to hold water that will eventually soak into the ground and may be the cause of a slide.

Where cuts have a large number of springs on their surface, small concealed tile drains have been laid down the slopes of the ditches in order to keep the water from the numerous springs and saturating the soil. In many cases excellent results have been obtained by facing cuts with layer of engine cinders or fine slag about six inches deep. This tends to distribute any water reaching the face of the cut and prevents cutting, and also lessens the action of the frost. Where this method is used the cut should be faced to a reasonably true plane before the application of the coating.

In cities and towns sodding of slopes has been carried out with good success, but on account of the cost, this method of treatment has been confined mostly to densely inhabited districts where the esthetic value of this method is given consideration. The planting of vegetation (not trees) on the slopes of cuts has proven very successful in the cure of slides.

Embankments.—Small slides of embankments are treated in practically the same manner as above mentioned in cuts except for the drainage. The slopes have been sodded and faced with cinders in a manner similar to the treatment of cuts and with equal success. The flattening of the slope and the weighing of the toe of the slope with derrick rip rap where it is practical to do so, and where the toe of the slope is subject to the action of running or standing water, has proven successful.

In low-lying country where there is a large amount of surface and ground water, considerable trouble has been experienced in holding fills. To overcome this ditches have been dug near the right-of-way line some distance from the toe of the slope and the ground water level lowered with exceedingly good results. The depth of the ditches to be dug depends on the fall that can be obtained.

Slides or slips of great volume are hard to remedy. Each case must be studied and the cause determined, if possible, and this cause then removed. In nearly every case it is underground water or seepage that causes the trouble.

When a study has been made of the movement and its cause determined it is generally found that the slipping occurs on a stratum of inclined rock or clay. Sometimes the stratum of clay is only an inch or so thick. Water reaching the stratum of rock or clay is retained and forms a lubricant which upsets the equilibrium of the mass and the slide starts. The remedy is, of course, to intercept the water and to prevent it following the strata.

In many cases where the volume of the slip amounts to several thousand yards, the movement has been stopped by the use of concrete retaining walls, or pile bulkheads. A concrete retaining wall can be used only where a good foundation is procurable and its use is, therefore, considerably limited. In many cases, pile bulkheads have been the correct solution.

Soft Spots.—Soft spots in excavations and embankments, the origin of which is the result of geological formation, are hard to contend with and no uniform treatment can be applied to all cases. A method that has been successfully used in both excavations and embankments is the use of long ties. One of the railroads in the northwest reports an effective method of treatment by the construction of a reinforced concrete slab 12 in. thick, on which the track is carried. The foundation for the concrete slab is prepared by leveling off the sub-grade and applying a 12-in. layer of good engine cinders. The cinders furnish good drainage and the concrete slab distributes the load uniformly.

In some cases soft spots in cuts have been treated by driving piles along the ballast line with the idea of confining the material, and by driving pile butts from 6 to 12 ft. in length spaced from 3 to 4 ft. directly under each rail and sinking them 2 or 3 ft. below sub-grade. The latter method is reported as being more satisfactory. An effective method reported in the treatment of soft spots under embankments is the widening of the embankment until a point is reached where the pressure, due to the load, is distributed over a very large area.

CONCLUSIONS

The committee recommends the substitution of the following conclusions for those published in the new Manual, as follows:

(1) The primary cause of slides is the lack of proper drainage.

(2) In the construction of a new line when conditions indicative of future trouble with soft spots or slides are encoun-

tered, special attention to the diversion of the springs or streams which are likely to cause the trouble should be given.

(Change the numbers of Conclusions 1 to 9, inclusive, now in the Manual.)

(3) Conclusion 10. Facing the slopes with a coating of engine cinders or fine slag will prevent small slides.

Soft Spots.—Where soft spots cannot be effectively drained the bearing area of the track structure must be increased.

Definition of Soft Spot.—Soft spots are small areas in excavation or embankment, or the sub-soil under an embankment, saturated with water and having a relatively small supporting power.

Appendix E—Filling of Bridge Openings

A preliminary investigation must develop especially: The size of culvert necessary, which will generally govern the type of culvert to be used. The character of foundation available for the culvert. The character of foundation for the new fill.

The condition of the moisture with regard to withstanding the stresses incident to filling and carrying traffic at the same time; for if a trestle is allowed to deteriorate too far before filling, serious difficulties will be encountered in keeping the structure safe for traffic during the progress of filling. The availability and quality of material for making the fill, as both will affect the first cost, and the latter the future maintenance of the fill.

Whether or not the advantage of widening adjacent cuts from which the filling material may be excavated will by improved drainage and increased snow room justify this method of procedure as against getting all the material from one place.

Consideration should be given to the necessity of providing undergrade crossings to accommodate future as well as existing highways. Elimination of fire hazard by reason of filling wooden trestles should be taken into consideration.

CONSTRUCTION OF FILL AND CARE OF STRUCTURE DURING FILLING

Before starting to construct the fill, see if there are any springs in the area covered, and if so, build concrete boxes over them and pipe the water beyond the limit of the new fill. Where rock is available and fall is sufficient, french drains may be substituted for the pipe. In certain sections of the country where trestles are to be filled in marsh land, it is frequently found advantageous to lay a grillage consisting of a double layer of small tree trunks.

With wooden trestles, before starting a new fill, the trestle must be carefully gone over and put in shape to stand the stresses incident to filling.

In the case of iron and steel viaducts which are usually of greater height than wooden structures, precautions must be taken to prevent distortion of the columns. This can be accomplished by encasing the columns in reinforced concrete up to a point within 20 ft. of base of rail, or where there is no danger from fire satisfactory results have been obtained by the erection of intermediate wooden bents at suitable intervals in order to reduce the load upon the towers.

As the filling of the viaduct proceeds, all bracing, both longitudinal and transverse, should be cut loose from the bents as the fill reaches the connection points, for this bracing transfers a great deal of load to the bents, which increases the settlement and has a tendency to work the viaduct out of line. Vertical bracing need only be cut loose at the upper connection points.

Where foundation is good, and in case of low trestles, where it is not good, fills can be made by dumping directly from the structure to be filled. Good results may be obtained by use of a ditching machine in conjunction

with two 16-yd. air dump cars for jobs of approximately 5,000 cu. yd. or less, and by steam shovel and air dump cars for jobs of over 5,000 cu. yd., though this dividing line is by no means fixed, as it depends on the haul, the depth of cuts from which material is available, and the relative need for ditching the cuts in the vicinity of the structure.

Before dumping from the trestle, the wooden guard timbers should be removed and plank about 2 in. by 2 in. should be spiked on top of the ties, close to the rail, to prevent the ties from bunching. This applies to side dumping. When center dumping is employed, the same method may be followed by cutting out alternate ties between the inside line of the stringers.

When filling high trestles where the foundation is very bad and liable to give trouble due to settlement, and traffic may be sufficiently heavy to justify it, it may be advisable to build temporary trestles on each side of the main trestle, and located so that material dumped from them will spread to cover the area of the completed fill. The use of grab buckets from a cable way or the use of an endless belt conveyor may be employed to advantage in making fills of this character. Then by dumping simultaneously from all three trestles, or dumping simultaneously from the main trestle and cable ways, the settlement may be reduced and kept fairly uniform.

It is often advisable to haul filling material further, in order to obtain a better grade of material to stabilize the fill and reduce the cost of future maintenance.

Immediately after the completion of the filling of low trestles, the stringers should be removed, but in cases of high trestles, the stringers should not be removed until the fill has settled about all it will without the load of trains; except that, if trestle has become so badly out of line and surface that it cannot be resurfaced and relined, it is better to remove the stringers at once and put the load on the green fill, even if this requires considerable watching and resurfacing of track for some time.

Appendix F—Ditching

Ditching on different railroads is done under many varying conditions; using practically the same method, the unit costs for work of like character vary about as follows:

Casting	\$0.42 to \$1.00	per cu. yd.
Company forces with wheelbarrow or		
push cars .....	.50 to 1.95	per cu. yd.
Spreader car .....	.09 to 1.75	per cu. yd.
Ditching machine .....	.04 to .72	per cu. yd.
Teams and scrapers .....	.50 to 1.37	per cu. yd.

These figures may have some significance, but are of little value in drawing conclusions without a complete statement of the conditions under which each job was done.

Good roadbed drainage is the foundation of economical track maintenance; therefore, the ditching of cuts is of great importance and should be carried out currently with the regular yearly maintenance program.

Ditching, in ordinary material, may be subdivided into two principal classes:

Class "A"—Cuts not more than six feet deep in average open country.

Class "B"—Cuts more than six feet deep.

CLASS "A"—CUTS LESS THAN SIX FEET DEEP

Company forces. On line where traffic is heavy and ditching is done currently the work can usually be done economically by company forces, the material being cast out of the cut and leveled back so as to prevent it from washing down into the ditches.

Contract forces; station men; teams and scrapers. These methods are found to be economical on lines of

heavy traffic where, on account of deferred maintenance or nature of material, the volume to be handled is large.

Spreader cars equipped with wings for shaping ballast shoulders, roadbed shoulders, ditches and slopes; These machines may be used to advantage on lines of moderate traffic in ordinary material, but their use is not recommended on heavy traffic, single track, lines with frequent trains; nor is the use of other ditching machines recommended under similar conditions.

CLASS "B"—CUTS MORE THAN SIX FEET DEEP

Company forces provided with push cars and dump beds, wheelbarrows or trackbarrows. Loading and hauling out: This method will be found to be economical on heavy traffic lines, and also on lines with moderate traffic, where ditching machines are not available, or where the volume of material to be handled would not justify their use.

The use of work trains with hand labor is generally uneconomical, and is not recommended.

Teams and scrapers on yardage basis: Where the character of material is suitable, and the volume to be handled comparatively large, teams and scrapers may be used to advantage under unit cost contract provided the cuts are of sufficient width to permit of safe operation.

Auxiliary track and small cars: This method may be used economically on heavy traffic lines where operating tracks cannot be interfered with and where there is sufficient clearance, provided the haul is long and volume of material to be handled would justify the initial cost of the plant installation.

DITCHING MACHINES

The use of steam ditchers and their equipment is recommended in work where the cuts are long and deep, or where the volume of material to be moved is great; or where the material is wet and difficult to handle by other methods. Their use is also recommended where cuts are resloped or widened to such a limited extent as not to justify the use of steam shovel. Under similar conditions they may be used for widening embankments. They are particularly efficient in removing small slides or other like emergencies where material is wet or hard to handle.

Locomotive cranes equipped with clam-shell buckets of 1 to 1½ cu. yd. capacity can be used successfully in cleaning out cut ditches where it is desirable not to disturb the slopes and will produce a ditch of uniform width and depth without handling surplus material or requiring any redressing by hand.

Where, on account of long haul in disposing of material, it is necessary to load many cars before dumping, ditching equipment is recommended which will operate over a series of flat cars with a proper mechanical device or plow for unloading.

There may be isolated cases where it is economical to use scoop ditches, but it is believed the steam ditcher or the locomotive crane will accomplish the same results with a greater flexibility.

Work incidental to ditching such as shaping roadbed and ballast shoulders is primarily hand work after the major work of ditching is complete, but by the use of spreader cars with proper attachments this work may be done at a cost that is comparatively very low and their use is recommended for these purposes when the nature of material will permit and where traffic conditions are not such as to prohibit such interference.

Discussion

Chairman Ambrose: The first subject is Revision of the Manual under Appendix A. I move that these be approved and placed in the Manual.

(Motion carried.)

(The subject, Shrinkage and Swell of Grading Material, Appendix B, was presented by the sub-committee chairman, C. M. McVay (K. & M.) and was accepted as information.)

Edwin F. Wendt: Before that subject is passed I note that in the text your committee have expressed a desire that further consideration of shrinkage and swell of grading material be discontinued at least temporarily. I trust that the committee will not press that request, and that the Board of Direction and the Committee on Outline of Work will continue this subject. The subject is one of much more importance than is generally understood. The committee states that there is no real information on this subject. It seems to me that is a very good reason why the committee should constantly be looking for added and reliable data.

The President: Your suggestion will be given consideration by the Committee in Outline of Work.

(The matter on Appendix C, "Methods Employed and Results Secured in the Treatment of Sliding Cuts and Fills and Soft Spots in Excavations and Embankment," was presented by C. H. Daley, chairman of the sub-committee.)

Chairman Ambrose: *I move that the conclusions in Appendix C be adopted and placed in the Manual as read.*

(Motion carried.)

(The subject relating to the filling of bridge openings was presented by J. C. Wrenshall (P. & R.)

Mr. Wrenshall: It is the thought of the sub-committee that this report dealing with the physical character of the work should be continued with advantage and amplified by a consideration of the economics of fillings, and I would like to see the committee continued along those lines. *I therefore move that the report be received as information and published in the Proceedings of the association.*

(Motion carried.)

Chairman Ambrose: Mr. Wrenshall's committee in reality has prepared a specification. I think that the information in this report will form the basis for a perfectly good specification for bridge filling.

(In the absence of H. E. Tyrrel, chairman of the sub-committee on Ditching, Appendix F, this report was presented by F. Ringer (M. K. & T.)

Chairman Ambrose: *I move that these conclusions be approved and placed in the Manual.*

C. A. Morse (C. R. I. & P.): I would like to hear some discussion with reference to the use of spreader cars equipped with wings for shaping ballast shoulders, road shoulders, ditches and slopes.

R. H. Ford (C. R. I. & P.): Mechanical ditching as a part of the regular program, and on heavy and light traffic lines, has become a factor from which we cannot get away. There is no reason why a mechanical ditcher cannot be used on lines of all classes of traffic. There is no justification for spending our money on maintenance by hand ditching. It should be all done mechanically, and mechanical means have been developed for the purpose, irrespective of the traffic on the lines. The Rock Island is ditching at the rate of about twenty-five miles a day with ditching machines. With reference to the height of the cuts, I think that point is open to some question, but I did not take exception to it. The feature Mr. Morse raises is very pertinent. The density of the traffic does not interfere.

Chairman Ambrose: Perhaps Mr. Morse was a little misled. If you will notice, you are quoting on the section under shallow cuts.

Mr. Ford: I want to make it plain that it does not make

any difference whether it is a shallow cut or a deep cut. Ditching can be done better by mechanical means irrespective of the size or depth of the cut or of the density of traffic.

Mr. Ringer: I do not think the sub-committee could agree with Mr. Ford that the density of traffic is not a factor in the cost of ditching. I think it is just the reverse. The recommendation will not tend to increase the use of the spreader car and ditching equipment on modern traffic.

Mr. Ford: I hope the convention will be willing to require the committee to take this subject under further consideration next year. I have no objection to the first definition and its conclusion.

J. A. Stocker (T. & O. C.): I agree with Mr. Ford. I think it is a mistake in this report not to put more emphasis on mechanical ditching and less on hand ditching. We use mechanical ditchers for depths less than 6 ft. I think we use them for ditching 6 in. deep.

Chairman Ambrose: The committee's idea is based on economy, and we are for mechanical ditching just so long as it spells economy. If we find we can ditch by hand for less money than otherwise, we prefer that.

J. V. Hanna (K. C. T.): I would like to ask whether the committee has any actual cost figures to support its claim that there are times when hand work is economical.

Mr. Ringer: One answer to that is the fact that it is being done.

Mr. Hanna: I want to ask Mr. Ford if he has included in hand work the use of teams?

Mr. Ford: No, I excluded teams. We had a case on one division on spreader work where there was a difference of over \$200,000 as to team work done one year and the complete elimination the second year. *I want to ask that the motion for the approval of this report be confirmed only to the first paragraph under conclusions, and that all others be referred back to the committee.*

J. V. Neubert (N. Y. C.): I would like to ask Mr. Ford how he is going to handle it in rock cuts?

Mr. Ford: The first thing to do is to get enough rock out so that some means can be taken mechanically to remove it.

W. H. Penfield (C. M. & St. P.): In listening to Mr. Ford it occurred to me that he is only talking of one class of ditching machines. The committee, before preparing any conclusion or recommendation, went into the matter thoroughly, and they outlined here some of the machines that were recommended as being in use on the various railroads in the country. The spreader cars that Mr. Ford speaks of are comparatively new in the bulk of the railroads, and I think the questionnaire that we sent out brought out replies from but a few railroads that were familiar with them; at least, the replies would indicate that they had not been used to any extent. I was in thorough accord with the committee's conclusions or recommendations, and I think that that was borne out by what little data we could get as to the cost of ditching.

R. G. Kenly (M. & St. L.): I would like to suggest the last paragraph under class A the committee consider eliminating the last three lines, from the word "but." We have had exactly the same experience as the Rock Island, not in such an extensive way probably, but the spreader car has come to stay.

The President: Will that satisfy you, Mr. Ford?

Mr. Ford: It will satisfy me this way, that it leaves the report without any punch in it, and it seems to me that what the committee ought to do is to take it back, because seriously it represents one of the greatest opportunities for saving, it is one of the places where we can get some money. This committee ought to come

back next year with a report, which is a good one, and take the other back for a year and give it some study.

(*Mr. Ford's amendment was carried.*)

The President: Now we have reached the motion to print the first paragraph in the Manual.

(*Motion carried.*)

(S. B. Fisher (M. K. & T.) presented the report of the sub-committee on "Chemical killing of weeds on and removal of killed weeds from the roadbed.")

The President: This is to be received as information. Any discussion? If not, we will pass to the next.

(W. C. Curd, chairman of the sub-committee on design and use of reinforced concrete pipe, next reported and his report was received as information.)

(The excessive cost of maintenance during the early

period of operation was presented by C. C. Cunningham (C. R. I. & P.), chairman of the sub-committee, and it was received as information.)

Mr. Wendt: I note that this subject is entitled "The excessive cost of maintenance." I would like to suggest to the committee as well as to the Board that the word "excessive" gives rise to a very false understanding. I would suggest that the word "excess" be eliminated because it gives rise to a false understanding.

Mr. Ray: The committee used the word excessive, where the instructions said excess. It makes quite a little difference.

Chairman Ambrose: We stand corrected.

(The committee is dismissed with the thanks of the association.)

Report on Records and Accounts

The forms for recording data for keeping up to date records of property changes and valuation of railroads which were submitted as information last year were presented again and recommended for inclusion in the Manual. It was the opinion of the committee that the electric wiring symbols adopted by the National Electrical Contractors' Association and the American Institute of Architects should be adopted. The study on the feasibility of reporting railway engineering data in graphic form will be continued as well as the study of the feasibility of reducing the number of forms used in the engineering and maintenance of way departments.



H. M. Stout
Chairman

H. M. Stout, who is completing his second year as chairman and his eighth year as a member of the committee, is record engineer of the Northern Pacific. He is therefore in a position to appreciate the value of records to an extent not commonly found among engineers and to realize their present limitations and short-comings. At the present time there is need for more complete and accurate records to meet the demands of regulating authorities and valuation officers, and this committee can do much constructive work. From his long contact with the problems on which the committee is working Mr. Stout is peculiarly qualified to direct its work on constructive lines.

THE COMMITTEE submitted a number of proposed changes in the Manual in Appendix A. A progress report was submitted on cost-keeping methods and statistical records and also on forms for recording data for keeping up to date records of property changes and valuation of railroads. In Appendix D the committee submitted a report on conventional signs for architectural details.

Conclusions

1. The committee recommended that changes in the Manual, as submitted in Appendix A, be approved and the revised matter be substituted for the present subject-matter in the Manual.

2. The committee reported progress on the subject of cost-keeping methods and statistical records, and recommended that it be reassigned.

3. The committee submitted three forms, shown here as Exhibits A, B, and C, revisions of those offered last year, and recommended their adoption and publication in the Manual. The committee recommended the continuation of the subject.

4. The committee has under study the subject of the feasibility of reporting engineering data in graphic form and recommended that it be reassigned.

5. The committee reported progress on the subject of the feasibility of reducing the number of forms used in the engineering and maintenance of way departments, eliminating forms and simplifying those retained, and recommended that it be reassigned.

6. The committee recommended the adoption and publication in the Manual of the electrical symbols given

under Exhibit D and that a set of architectural symbols be accepted as information and the subject continued.

7. The committee reported progress and recommended reassignment of the subject of methods for recording and accounting for the determination of proper allowances for maintenance of way expenses due to increased use and increased investment.

Committee: H. M. Stout (N. P.), chairman; Henry Lehn (N. Y. C.), vice-chairman; A. M. Blanchard (G. T.), H. Bortin (Cons. Engr.), H. A. Campbell, Armstrong Chinn (C. B. & Q.), R. A. Cook (C. & A.), E. B. Crane (C. M. & St. P.), E. B. Fithian (M. P.), J. H. Milburn (B. & O.), W. F. Ogle (C. R. I. & P.), H. J. Sargent (Wabash), H. F. Sharpley (C. of G.), Chas. Silliman (Pres. Conf. Comm.), C. W. Simpson (D. I. & W.), T. H. Strate (C. M. & St. P.), W. A. VanHook, V. R. Walling (C. & W. E.), W. D. Wiggins (Penna.).

Appendix A—Revision of Manual—Definitions

Account (present text)—A statement required to enable payment to be made for labor performed and material furnished or to establish the detail, total and comparative cost of work and various classes of expenses.

Account (revision)—A statement required to enable payment to be made for labor performed, material furnished or to establish the detail, and total cost of work or class of expense.

Ledger Accounts (present text)—Statement kept in ledger form in order to establish the detail, total and comparative cost of individual pieces of work or classes of expenses.

Ledger Account (revision)—An account of an individual piece of work or class of expense kept in ledger form.

Appendix C—Forms for Recording Data for Keeping Up to Date Property Changes and Valuation of Property of Railroads

Three forms which were submitted to the association last year as information were presented again as Exhibits A, B, and C, and were recommended for adoption.

Appendix D—Conventional Signs for Architectural Details

Electrical wiring symbols, designated as Exhibit D, and which have been adopted by the National Electrical Contractors' Association and the American Institute of Architects, were submitted and it was the opinion of the sub-committee that these symbols should be approved and adopted.

Discussion

(Chairman Stout abstracted the report and moved that the revised definitions be accepted and substituted for those appearing in the Manual.)

E. F. Wendt (Con. Engr.): The definitions which now appear in the Manual have been there for over 15 years. They were formulated very largely by the late

Walter E. Berg, chief engineer of the Lehigh Valley, than whom there was no greater authority on definitions. When they were adopted they were thought to be as near perfect as they could be made. I would like to have the committee explain what difference there is between the definitions now in the Manual and the proposed revised ones.

(Chairman Stout gave a brief explanation of changes made.)

(Motion carried.)

(E. B. Crane (C. M. & St. P.) presented the matter under Appendix C.)

Chairman Stout: *I move that the three forms referred to, together with the specifications and instructions, be accepted and published in the Manual.* (Motion carried.)

Chairman Stout: *I move that the electrical symbols shown in Exhibit D be accepted and published in the Manual.*

(Motion carried.)

(The architectural symbols under Exhibit E were received as information and the committee was excused with thanks.)

Report on Uniform General Contract Forms

Some revisions in the Manual are submitted to secure uniformity and to coordinate certain matters in relation to specifications for roadway which were compiled before the organization of the Committee on Uniform General Contract Forms. A recommendation is made that the two committees concerned revise the specifications so that the "General Conditions" of the specifications now included in the Manual may be omitted and in the future be covered by the General Conditions of the construction contract forms. A Form of License for Wires, Pipes, Conduits and Drains on Railroad Property was submitted for inclusion in the Manual.



W. D. Faucette
Chairman

W. D. Faucette is finishing his second year as chairman of the committee, of which he has been a member for six years. He has been in the continuous service of the Seaboard Air Line since 1901 and has been chief engineer since January 1, 1913, prior to which time he was an assistant engineer and later for three years chief clerk to the president. In directing the work of this committee he has done much to stimulate interest in what is commonly regarded as an uninteresting subject. He represented the association in a recent meeting called by the Associated General Contractors at Washington to consider a uniform contract form.

IN APPENDIX A, covering revision of the Manual, certain changes were recommended for adoption by the association. In Appendix B was submitted the final draft of a "Form of License for Wires, Pipes, Conduits and Drains on Railroad Property," which was recommended for approval and insertion in the Manual. An agreement for private road crossing was submitted in tentative form in an appendix.

Conclusions

(1) The committee recommended the changes in the Manual as set forth in Appendix A be adopted and that the Committee on Roadway be requested to make the revisions referred to in Appendix A.

(2) The committee recommended "Form of License for Wires, Pipes, Conduits and Drains on Railroad Property," printed in Appendix B, adopted and printed in the Manual.

(3) The committee recommended that the report in its Appendix C on "Form of License for Private Road Crossings" be received as information, with the request that any criticism and suggestions be given this committee in order that a final report may be made next year.

Committee: W. D. Faucette (S. A. L.), chairman; C. A. Wilson (Cons. Engr.), vice-chairman; C. F. Allen (M. I. T.), J. C. Irwin (B. & A.), C. B. Niehaus (C. of Ga.), O. K. Morgan (C. C. & O.), H. A. Palmer (G. T.), C. J. Parker (N. Y. C.), E. L. Taylor (N. Y. N. H. & H.), Frank Taylor (C. P. R.), A. C. Shields (C. R. I. & P.), J. B. Carothers (B. & O.), W. H. Brameld (Erie), W. A. Duff (C. N. R.), F. H. Fechtig (A. C. L.), Clark Dillenebeck (P. & R.).

Appendix A—Revision of Manual

PROPOSED REVISIONS TO THE MANUAL—"Form of Construction Contract," Section 38, "Final Estimates," page 665:

(1) It was recommended that the word "whole" be omitted from the second line, as indicated below:

Upon the completion and acceptance of the work, the Chief Engineer shall execute a certificate over his signature that the whole work provided for in this agreement has been completed and accepted by him under the terms and conditions thereof, whereupon the entire balance found to be due to the Contractor, including said retained percentage, shall be paid to the Contractor at the office of the Treasurer of the Company within days after the date of said final certificate.

(2) As regards the use of the word "railway" and the word "railroad" in the Manual, for uniformity it is

recommended that hereafter the word "Railway" shall be used in all forms and specifications, and when the Manual is reprinted wherever the word "railroad" occurs it shall be changed to "Railway."

(3) "Specifications in the Manual in connection with which any uniform general contract form would or should be used."

It has been found that the Specifications for Roadway were compiled before the organization of the Committee on General Contract Forms, and included therein general conditions for the construction of such roadway and stated in these conditions that the Specifications and General Conditions formed the entire agreement. The committee recommended that the Committee on Roadway and the Committee on Uniform General Contract Forms be requested to revise the Specifications for Roadway so that the "General Conditions" of the Specifications as now printed in the Manual be omitted from the Specifications and covered by the General Conditions of the Construction Contract Form.

Appendix B—Form of License for Wires, Pipes, Conduits and Drains on Railway Property

THIS AGREEMENT, made this day of 19....., by and between the hereinafter called the Railway Company, and having a principal office or place of business in hereinafter called the Licensee, WITNESSETH:

WHEREAS, the Licensee desires to construct, maintain and use upon the property of the Railway Company, situated and substantially as shown on the plan hereto attached, designated as dated and made a part hereof:

It is mutually agreed as follows:

- 1. The Railway Company grants permission to the Licensee to construct, maintain and use upon the property of the Railway Company, in accordance with said plan and the specifications forming a part hereof, and subject to the requirements of the Railway Company.
2. In consideration of this license, the Licensee shall pay to the Railway Company, in advance, the sum of per beginning
3. Every cost and expense of construction, maintenance, use and removal resulting from this license, shall be paid by the Licensee. The Railway Company may perform, without notice, any work which it considers necessary to the safe operation of the railroad. The Licensee shall do no work under this license, which may interfere with the operation of the railroad without the written permission of the Railway Company.
4. Use of the property of the Railway Company, however long continued, shall not create any estate or easement in the Licensee or any rights other than license.
5. The Licensee shall indemnify, protect, and save harmless, the Railway Company from and against all claims, suits, costs, charges, and damages, made upon or incurred by the Railway Company in connection with this license.
6. This agreement may be terminated by either party by notice to the other party, or without notice on disuse by the Licensee for
7. Any notice given by the Railway Company to the Licensee

shall be deemed to be properly served if the notice be delivered to the Licensee, or if left with any responsible agent of the Licensee, or if mailed, postpaid, addressed to the Licensee at the last known place of business of the Licensee.

8. Upon termination hereof the Licensee shall forthwith remove all the Licensee's constructions from the property of the Railway Company, to the satisfaction of the Railway Company. In case of the Licensee's failure so to do, the Railway Company may at its option either retain such construction or remove them at the cost of the Licensee.

9. This agreement shall not be assigned or in any manner transferred, without the written consent of the of the Railway Company.

10. Until terminated as hereinbefore provided, this agreement shall inure to the benefit of and be binding upon the legal representatives and successors of the parties, respectively.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the day and year first above written.

WITNESS RAILWAY COMPANY.
WITNESS LICENSEE.
By.....

Discussion

(The report on Uniform General Contract Forms was presented by W. D. Faucette (C. M. & St. P.). Appendix A was presented and adopted for inclusion in the Manual.)

(Chairman Faucette then abstracted Appendix B and said:) There seems to be a great deal of difference among ourselves as to a proper liability clause in this tentative report, and we were unable to come to any final conclusion. In this connection it is proper to say that this committee has been in contact with the American Railway Development Association and will report to you next year what we have developed.

Chairman Faucette: Mr. Irwin will present the report on "Form of License for Wires, Pipes, Conduits and Drains on Railway Property."

J. C. Irwin (B. & A.) then abstracted the report.)

Chairman Faucette: I move that the proposed form be adopted and printed in the Manual.

Hunter McDonald: I assume of course that this committee has been in touch with the Committee on Electricity. Are you satisfied there will be no objection raised by that committee?

Mr. Irwin: This committee has conferred with the Committee on Electricity and the Committee on Roadway and they are in agreement with it.

(Motion carried.)

Mr. Irwin: The further work of the sub-committee consists of a typical form of agreement for trackage rights, which is based on agreements of 34 roads throughout the United States and Canada, and we have started on the preparation of such a typical form and propose to present it next year.

(The committee was then excused.)

Report on Economics of Railway Location

THE COMMITTEE has studied the effect of curvature on cost of maintenance of way and equipment and has reached the conclusion that it is difficult to present information on this subject that would be of practical value. It would be possible to work out results for a larger number of factors after extended research, tests and experiments; but the practical value of such results would be doubtful. For these reasons, it was the recommendation of the committee that this subject be dropped.

The sub-committee assigned to the subject of Railway

Locomotive Power is making a study of locomotive tractive effort and the various processes proposed for predicting tractive effort at various speeds, in the expectation of revising the present section on "power" in the Manual, where necessary. This work could not be completed in time for presentation with this report. It was therefore recommended that the subject be continued for the ensuing year.

(Committee: A. S. Going (G. T.), chairman; H. R. Carpenter (M. P.), vice chairman; F. H. Alfred (P. M.), R. N. Bejten (B. & O.), C. T. Delamere (C. P. R.), W. A. James (C. P. R.),

Fred Lavis (Cons. Engr.), E. C. Schmidt (U. S. A.), A. K. Shurtliff (A. R. E. A.), C. W. Stark (N. Y. N. J. Com.), Walter Loring Webb (Cons. Engr.), M. A. Zook (I. C. C.), Willard Beahan (N. Y. C.), J. C. Beye, A. S. Cutler (Univ. of Minn.), E. E. King (Univ. of Ill.), E. H. McHenry, H. C. Searls, C. H. Splitstone (Eric), J. G. Sullivan (Cons. Engr.), J. W. Walter.

Discussion

The report of the Committee on Economics of Railway Location was presented by A. S. Going, Engineer of Construction of the Grand Trunk and was considered as a progress report.

Report of Committee on Water Service

Attention is called to the regulations directing the notification of health authorities of water supply points, ownership of sources and other details. The enforcement of provisions of the Interstate Quarantine Regulations prohibiting the contact of ice with water for drinking purposes has been set forward to July 1, 1921. Local deposits are an important factor to be considered in relation to the pollution of surface and shallow well water supplies. A questionnaire sent out for the purpose of securing data on the pitting and corrosion of boiler tubes and sheets brought out some interesting replies on the possible causes and their remedies.



A. F. Dorley
Chairman

A. F. Dorley is the dean of the committee chairmen of the Association, as he is rounding out his ninth year in this position. He has been a member of the committee for eleven years. Mr. Dorley is district engineer on the eastern lines of the Missouri Pacific, prior to which time he was engineer of water service for a number of years. He has given close attention to water treatment and was instrumental in the launching of an extensive program of this character on his road several years ago. Under his leadership the committee has done much to stimulate interest in this important but too frequently neglected phase of railway operation.

THE COMMITTEE requested the following action on its report:

- (1) That the definitions given be approved and inserted in the Manual; and that the subject of examination of the subject-matter in the Manual be again referred to the committee for further study and report.
- (2) That the report on progress of drinking water regulations be received as information and that the subject be reassigned to the committee for further study and report.
- (3) That the subject of specifications for contracting water service work be reassigned to the committee for further study and report.
- (4) That the final report on effect of local deposits on the pollution of surface and shallow well water supplies be received as information.
- (5) That the progress report on the study of pitting and corrosion of boiler tubes and sheets be received as information, and that the subject be reassigned to the committee for further study and report.
- (6) That the report on specifications for the various chemicals used in water treatment be adopted and published in the Manual.
- (7) That the report on centrifugal pumps for railway water service be received as information.
- (8) That the specifications of the American Water Works Association covering cast iron pipe and special castings, and hydrants and valves be adopted and published in the Manual.
- (9) That certain reference to work of interest to railway water supply being done at universities be accepted as information.

Appendix A—Revision of Manual

Due to an oversight, the following definition for a continuous treating plant was omitted last year:

Continuous Plant.—"One so designed that the untreated water may be pumped to it without interruption and where the volume of the chambers through which it passes before flowing to storage is sufficient for complete chemical reaction and precipitation."

The committee added the following explanatory note at the bottom of Table 2, shown on page 450 of the 1915 Manual:

"Table is based on use of calcium oxide or lump lime. To obtain equivalent value for hydrated lime, multiply lime value shown in table by 1.32."

Under definitions published in Volume 21 for insertion in the new Manual, the following corrections have been made: Group A, third item, eighth and twenty-second words, "strainer" to read "screen," to conform with the sixth item.

Considering the definitions, the word "penstock" has been eliminated in question 23, under "Examination Questions for the Care of Boilers."

The committee recommended the following additions and changes in the new Manual:

Under Definitions of Terms used in Railway Water Service, Group G, are definitions for single and double-acting pumps. The following definition for a double-stroke pump should be added:

Double-Stroke Deep Well Pump.—One that employs two separate balanced lines of pump rods and attached water pistons. The two lines of pump rods and their respective pistons alternate with each other in such a way that the weight, or load, lifted by each rod is carried only in its tension, or upstroke.

Alkali Water.—A term in common use, meaning water containing in solution any compound of sodium or potassium in appreciable amounts.

Corrosion.—The eating away of the surface of metal by chemical action, either regularly and slowly as by rusting in air, or irregularly and rapidly as by pitting and grooving in the interior of boilers.

Appendix B—Federal or State Regulations Pertaining to Drinking Water Supplies

The Interstate Quarantine Regulations and Standard Railway Sanitary Code furnish full information on subjects pertaining to railway sanitation and laws governing same and is recommended to the notice of all concerned. The committee desires to call attention to the regulations

directing the notification of health authorities as to the location of the water supply points and ownership of sources, this to be done twice yearly with proper certification and permission of the surgeon general for use of water on interstate carriers. The posting of signs forbidding the use of water considered unsafe for public use is now done by federal or state health authorities and notice is signed either by the United States Public Health Service, or the state health authorities or both, thus relieving the railroads of this responsibility. The collection of water samples from indicated sources of supply is performed in most of the states by state health authorities, the iced containers being shipped by the railroads to the state laboratories for analysis. The examination is usually without cost to the railroad.

Section 19, Subdivision (d), Interstate Quarantine Regulation, provides that drinking water shall be handled in such a manner as not to impair its sanitary quality or safety and already surveys have been made by state and federal health authorities tending towards betterment in methods of handling now being followed, their recommendations being directed toward the cleanliness of drinking water coolers, containers used in carrying water from source to coolers, and directing that ice shall not come in contact with water. This latter provision, it will be noted, is not in accordance with an already existing provision that properly handled ice shall not necessarily be kept separated from water until July 1, 1922, and in accordance with recently received information contained in Circular No. 2131, Medical and Surgical Section, American Railway Association, and dated March 7, 1921, an enforced separation of ice and water has been postponed until July 1, 1924.

Instructions are also given that containers shall be cleaned once each week and that storage tanks shall be flushed and drained once a month; hose used in filling containers shall have a protected metal nozzle kept clean by flushing and washing.

Circular No. 2140 of the American Railway Association contains, among other matters, a letter written by Assistant Surgeon General McLaughlin, "that if permission to use water is given a community by the state having jurisdiction the use of such water by a carrier should be permitted." This brings up the question of temporary provisional certification, which is for water not fully approved by reason of a by-pass in the water system, connection with impure water supply for emergency use, unsatisfactory operation or similar reasons, the intent and purpose of such certification being to give opportunity for advised and needed repairs or improvements. This matter was taken up with the United States Public Health Service and it was stated that a ruling covering provisional certification would be contained in the revised edition Interstate Quarantine Regulations, which, however, was omitted.

The appointment of a joint committee from the Medical and Surgical Section, also the Mechanical Section, of the American Railway Association and from the Water Service committee of the American Railway Engineering Association, is looked upon as a valuable forward step in the splendid efforts which the railroads are putting forth to give the public their best, in service, in equipment and in courtesy, and the resultant action is looked forward to by all.

Appendix D—A Report on the Pitting and Corrosion of Boiler Tubes and Sheets

It cannot be expected that the committee can find the solution of this problem in a short space of time and this report is submitted as a progress report only. The following questionnaire prepared at a committee meeting in Chicago on May 6, 1921, was sent to all members of

the sub-committee and replies were received from nine of the eleven members:

(1) *What In Your Experience Have Been the Causes of Corrosion?*

The experience of the committee indicates that general corrosion is prevalent where acid waters, or waters with a high percentage of chloride or sulphate hardness are used without treatment.

(2) *What In Your Experience Has Been the Cause of Pitting?*

The replies indicate that pitting in locomotive boilers results from electrolytic action, the underlying causes of the electrolytic action being due to chemical or mechanical action or both.

The presence in the water of an electrolyte such as sodium sulphate or sodium chloride is necessary in sufficient quantities to convey the electric current between spots of impurities in the material which have different potentials, thereby resulting in a wasting of the metal at the negative pole. The presence of dissolved oxygen in the water materially assists the electrolytic action by removing the corrosion by-products and allowing the destructive action to continue.

(3) *What In Your Experience Has Been the Cause of Grooving?*

The causes of grooving are also ascribed to electrolytic action. The strained metal of a boiler plate that is not completely covered by a rivet head becomes eaten away or perhaps a plate becomes strained at a point by temperature stress, and the strained streak is corroded. In each case the strained metal is of greater corrosibility and it acts as one of the plates of an electric battery, in which the other plate of the battery is the unstrained metal of the boiler shell and the electrolyte is the water in the boiler.

(4) *What Is Your Method of Prevention?*

To date efforts toward prevention of corrosion, pitting and grooving have been chiefly confined to chemical treatment of the water. No means of complete prevention have as yet been found although in actual practice the trouble has been very materially decreased on some railroads by maintaining a caustic alkalinity in the boilers which appears to have an inhibitive effect on the corrosive action. Apparently, little work has been done toward improving the character of boiler materials and methods of handling with a view to securing a more homogenous material and eliminating strains and stresses which appear to be responsible in part at least for much of the grooving, ring pitting and similar forms of corrosion.

(5) *Have You Laboratory Tests Confirming Specific Causes of Corrosion, Pitting and Grooving?*

Laboratory tests were reported which indicated that pitting takes place in commercial boiler steel immersed in water very readily where oxygen and carbon dioxide are present and is accentuated by increased amounts of sodium sulphate or sodium chloride and also by higher difference of potential with an increased rate of electrolysis. It is also shown that this action is inhibited to a considerable extent by the addition of sodium carbonate or caustic soda. Other tests were presented which strongly indicated the presence of spots of impurities which had been rolled into the material and made up into flues.

(6) *Have You Any Laboratory Tests to Suggest to Confirm Your Findings or That Would Be of Assistance In the Study of This Subject?*

Inasmuch as it has been found in practice, that treatment with caustic soda inhibits to a greater or lesser extent the pitting action, it is suggested that during the coming year careful tests be made to determine the minimum and maximum effective limit of caustic soda treatment with special relation to varying concentrations of sodium sulphate and sodium chloride, these being the principal electrolytes found in boiler waters.

This subject in general is intimately connected with departments other than engineering and it is respectfully suggested that the Board of Direction request that a committee be appointed from the mechanical section to work in coöperation with this committee, so that all phases including the manufacture and fabrication of material may be considered as well as the character of the water supply.

Appendix E—Specifications for Various Chemicals Used in Water Treatment

STANDARD SPECIFICATIONS FOR SODA ASH TO BE USED IN WATER TREATMENT

Definition.—1. Soda ash is the anhydrous normal carbonate of soda.

Classes.—2. Soda ash is commercially divided into two classes:

- (a) Light;
- (b) Dense.

3. Dense soda ash shall be rejected.

(I) Chemical Properties and Tests

Sampling.—4. The samples shall be a fair average of the shipment, and shall be taken from the surface to the center of package.

The vendor shall take a one pound sample from four packages in various locations in each carload or less and forward to the purchaser. The sample, on receipt by the purchaser, shall be immediately transferred to air-tight containers in which the unused portion shall be stored until the soda ash has been finally accepted or rejected by the purchaser.

Check tests on samples taken from cars at their destination will occasionally be made, and should agree within reasonable limits with initial sample.

Chemical Properties.—5. (a) The classes and properties of soda ash shall be determined by standard methods of chemical analysis.

(b) Soda ash shall conform to the following requirements as to chemical composition:

Normal sodium carbonate—95 per cent minimum.

(II) Physical Properties and Tests

6. The material shall be in dry powdered form and shall be free from lint, chips, ash or other foreign matter.

Fineness.—7. A 100-gram sample shall not have more than 0.5 per cent by weight, insoluble in cold distilled water.

(III) Packing and Marketing

Packing.—9. Soda ash shall be packed in cloth or duck bags of not more than 100 lb. net weight, or in paper bags of not more than 50 lb. net weight.

Marking.—10. The name of manufacturer and net weight shall be plainly marked on each package, or attached by tag thereto.

(IV) Inspection, Penalization and Rejection

Inspection.—11. (a) All soda ash shall be subjected to inspection.

(b) The soda ash may be inspected at the place of manufacture or point of delivery, or both, as arranged at the time of purchase.

(c) The inspector representing the purchaser shall have free entry at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the soda ash ordered. The manufacturer shall afford the inspector all reasonable facilities for inspection and sampling, which shall be so conducted as not to interfere unnecessarily with the operation of the works.

(d) The purchaser may make the tests to govern the acceptance, penalization or rejection of the soda ash in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

Penalization.—12. All prices shall be based upon the percentage of normal sodium carbonate. If a lower grade is furnished than the one specified, provided it is not less than 80 per cent sodium carbonate, it may be accepted by the purchaser upon the vendor making a rebate equal to percentage of sodium carbonate below the minimum designated.

Rejection.—13. (a) Unless otherwise specified, any rejection based on failure to pass tests prescribed in these specifications shall be reported within 10 working days from the taking or receipt of samples by the purchaser.

(b) Rejected soda ash shall be returned to the shipper or as he may direct. All freight charges in both directions to be paid by the shipper.

Rehearing.—14. Samples which represent rejected soda ash shall be preserved in air-tight containers for 10 working days from the date of test report. In case of dissatisfaction with the result of the tests, the manufacturer may make claim for a rehearing within that time.

STANDARD SPECIFICATIONS FOR HYDRATED LIME TO BE USED IN WATER TREATMENT

Definition.—1. Hydrated lime is a dry flocculent powder resulting from the hydration of quicklime.

Classes.—2. Hydrated lime for water treatment is commercially divided into two classes:

- (a) High-Calcium;
- (b) Calcium.

Basis of Purchase.—3. The particular class of hydrated lime desired shall be specified in advance by the purchaser. Unless otherwise specified high-calcium lime shall be furnished.

(I) Chemical Properties and Tests

Sampling.—4. The sample shall be a fair average of the shipment. Three per cent of the packages shall be sampled. The sample shall be taken from the surface to the center of the package. A 2-lb. sample to be sent to the laboratory shall immediately be transferred to an air-tight container, in which the unused portion shall be stored until the hydrated lime has been finally accepted or rejected by the purchaser. Check tests on samples taken from cars at their destination will occasionally be made, and should agree within reasonable limits with initial sample.

Chemical Properties.—5. (a) The classes and chemical properties of hydrated lime shall be determined by standard methods of chemical analysis.

(b) The hydrated lime shall conform to the following requirements as to chemical composition:

High Calcium—Not less than 90 per cent Calcium Hydroxide (Ca(OH)₂).

Calcium—Not less than 85 per cent Calcium Hydroxide (Ca(OH)₂).

(II) Physical Properties and Tests

Fineness.—6. A 100-gram sample shall leave by weight a residue of not over 2 per cent on a standard 100-mesh sieve and not over 0.5 per cent on a standard 20-mesh sieve.

(Note—Paragraphs covering Packing and Marking; and Inspection, Penalization and Rejection, are all the same as given for soda ash.)

STANDARD SPECIFICATIONS FOR QUICKLIME TO BE USED IN WATER TREATMENT

Definition.—1. Quicklime for use in water treatment is a material the major part of which is calcium oxide, which will slake on the addition of water.

Grades.—2. Quicklime is divided into two grades:

(a) Selected.—Shall be well-burned, picked free from ashes, coke, clinker or other foreign material.

(b) Run-of-Kiln.—Shall be well-burned, without selection. It shall be free from large lumps of unburned or foreign material.

Forms.—3. Quicklime is shipped in two forms: (a) Lump—shall be kiln size. (b) Pulverized—shall be reduced in size to pass a 1/2-in. screen.

Classes.—4. Quicklime for water treatment is divided into two classes: (a) high calcium, (b) calcium.

Basis of Purchase.—5. The particular grade, form and class of quicklime desired shall be specified in advance by the purchaser. Unless otherwise specified, high-calcium quicklime shall be furnished.

(I) Chemical Properties and Tests

Lime in Barrels.—6. Quicklime shall be shipped in barrels, or other containers of similar size. At least 3 per cent of the number of barrels shall be sampled. They shall be taken from various parts of the shipment, dumped, mixed and sampled. The samples shall comprise at least 10 shovelfuls taken from different parts of the shipment. The total sample taken shall weigh at least 100 lb. and shall be crushed to pass a 1-in. ring, and quartered to provide a 15-lb. sample for the laboratory.

Laboratory Samples.—7. All samples to be sent to the laboratory shall be immediately transferred to an air-tight container in which the unused portion shall be stored until the quicklime shall finally be accepted or rejected by the purchaser.

Check tests on samples taken from car at destination will

occasionally be made, and should agree within reasonable limits with initial sample.

(B) Chemical Tests

Chemical Properties.—8. (a) The classes and chemical properties of quicklime shall be determined by standard methods of chemical analysis.

(b) Samples shall be taken as specified in sections 6 and 7.

(c) Quicklime shall conform to the following requirements as to chemical composition:

Chemical Composition

Properties Considered	High-Calcium		Calcium	
	Selected	Run-of-Kiln	Selected	Run-of-Kiln
Calcium Oxide, per cent	90 (min.)	90 (min.)	85-90	85-90
Calcium Oxide plus Magnesium Oxide, min., per cent	90	85	90	85
Carbon Dioxide, max., per cent	3	5	3	5
Silica plus Alumina plus Oxide of Iron, max., per cent	5	7.5	5	7.5

(II) Inspection, Penalization and Rejection

(Same as for soda ash.)

STANDARD SPECIFICATIONS FOR SULPHATE OF ALUMINA TO BE USED IN WATER TREATMENT

Definition.—1. This chemical shall be the commercial product known as Basic Sulphate of Alumina.

(1) Chemical Proportion and Tests

Sampling.—2. The sample shall be a fair average of the shipment. Five per cent of the packages shall be sampled. The sample shall be taken from the surface to the center of the package. A five-pound sample shall be sent immediately to the laboratory and transferred to an air-tight container in which the unused portion shall be stored until the alumina has been finally accepted or rejected by the purchaser.

Check tests on samples taken from cars at their destination will occasionally be made, and should agree within reasonable limits with initial sample.

Chemical Properties.—3. (a) The chemical proportion of basic sulphate of alumina shall be determined by standard methods of chemical analysis.

(b) Basic sulphate of alumina shall contain not less than 17 per cent water soluble aluminum oxide (Al_2O_3); 3 per cent by weight of the aluminum oxide shall be in excess of the theoretical amount required to combine with the sulphuric acid present.

(II) Physical Properties and Tests

4. The material shall be in dry lump form and shall be free from lint, chips, ash or other foreign matter.

(III) Packing and Marking

5. Basic sulphate of alumina shall be packed in cloth or duck bags of not more than 50 lb. net weight, or in barrels or containers of not more than 300 lb. net weight.

6. The name of manufacturer, net weight and percentage of water soluble alumina shall be plainly stencilled on each end of package or marked on tag securely attached thereto.

(IV) Inspection, Penalization and Rejection

(Same as for soda ash.)

STANDARD SPECIFICATIONS FOR SULPHATE OF IRON TO BE USED IN WATER TREATMENT

Definition.—1. Sulphate of iron is the ferrous sulphate, the chemical formula of which is $FeSO_4 \cdot 7H_2O$.

Classes.—2. Sulphate of iron commercially does not have exactly seven molecules of water combined with one molecule of anhydrous ferrous sulphate.

3. Commercially there are three grades:
 (a) Prime green, sectets, or stick crystal.
 (b) Seconds or bottom.
 (c) Green lat or sugar sulphate of iron.

(1) Chemical Properties and Tests

Sampling.—4. The samples shall be a fair average of the shipment and shall be taken from the surface to center of each package.

Five one-pound samples shall be taken from packages in various positions in each rail or lot. These samples shall be thoroughly mixed and quartered. One quarter shall then be placed in a suitable container and submitted to the purchaser's laboratory for tests.

Check tests on samples taken from cars at their destination will occasionally be made, and should agree within reasonable limits with initial sample.

Chemical Properties.—5. (a) The chemical properties of the material shall be determined by standard methods of analysis, and the shipments shall conform to the following minimum requirements:

- (b) Impurities: Not over 2 per cent.
 (c) Anhydrous ferrous sulphate $FeSO_4$: Not less than 53.5 per cent.
 (d) Free Sulphuric Acid: Not over .025 per cent.

(II) Physical Properties and Tests

Physical Properties.—6. Shipments of seconds or bottoms shall be rejected. Either Grade (a) or Grade (c) shall be furnished as specified on the purchase order. Unless otherwise specified, Grade (c) shall be furnished.

(III) Packing and Marking

Packing.—7. Sulphate of iron shall be packed in cloth or duck bags of not more than 100 lb. net weight, or in barrels or containers of not more than 250 lb. net weight as specified in purchase order.

Marking.—8. The name of the manufacturer, net weight and grade of sulphate of iron shall be stencilled on each package, or marked on tag securely attached thereto.

(IV) Inspection and Rejection

(Same as for soda ash.)

Appendix G—Standards

During the past year the committee gave careful consideration to the adoption of standard specifications covering cast iron water pipe and special castings, and standard specifications for hydrants and valves. The conclusion reached was that the standard specifications of the American Water Works Association were complete in every detail and so well established that practically all cast iron pipe specials, valves and hydrants now used by railroads were furnished under these specifications. Therefore, upon the recommendation of the Standardization committee, the Board of Direction instructed the committee to present these specifications to the Association for approval.

The specifications are Standards for Cast Iron Water Pipe (adopted by the American Water Works Association May 12, 1908) and Standards for Hydrants and Valves (adopted by the American Water Works Association June 24, 1912. Revised June 9, 1916).

Discussion

(In the absence of Chairman Darley through illness, C. R. Knowles (I. C.) presented the report. Mr. Knowles abstracted Appendix A appertaining to the revision of Manual and moved that the report be accepted, which motion was carried.) Mr. Knowles then presented in their turn, Appendix B, on federal or state regulations pertaining to water supplies; Appendix C, appertaining to the effect of local deposits in pollution of surface and shallow well water supplies; and Appendix I, appertaining to studies on pitting and corrosion, all of which were accepted either as information or a report of progress.

Mr. Knowles then abstracted Appendix E, appertaining to the specifications for soda ash in water treatment and moved that the specification be approved for publication in the Manual. The motion was carried. Mr. Knowles then abstracted Appendix F, appertaining to centrifugal pumps and moved that this be accepted as information. Motion carried.

Mr. Campbell (E. P. & S. W.): In our experience we find the centrifugal pump a very useful and economical means of lifting water in reasonable limits, up to 200 ft. We have one installation in which we are lifting water 400 ft., but we are not finding that economical, and we are now proposing to take that out and substitute another style of pump.

(Mr. Knowles abstracted Appendix G and moved that these specifications be adopted for publication in the Manual.)

The President: May I ask if the American Water-

works Association collaborated with your committee when these standards were adopted?

Mr. Knowles: They did not. They gave us permission to use them.

C. E. Lindsay (N. Y. C.): Will the committee consent to substitute the word "specification" for the word "standards" in the large heavy type "Specifications for cast iron water pipes" and "specifications for hydrants and valves"?

Mr. Knowles: The committee will accept that.

Mr. Lindsay: Also omit "standard" from the word "specifications" following.

Mr. Knowles: The committee will be glad to accept that.

(Motion carried.)

(Mr. Knowles abstracted an Appendix appertaining to the university work of interest to railway water supply, and said:) It is the desire of the committee to cooperate with the universities in the study of this work, so that the results will be consistent, and not in conflict with actual practice and experience. This report is submitted as information.

D. A. Steel (*Railway Age*): Concerning the review made by the committee of the work done by me at the University of Montana in 1920, I do not want to convey the impression of criticizing this review, because I am very grateful to know that the committee saw fit to take notice of the work, and I realize that in making the review the sole desire was to bring out the interest on the part of the universities throughout the country to cooperate with the railways in solving this problem, but I am afraid that some of the phraseology in this review might have a damaging effect on the value of the report. Take, for instance, the words "electrolytic phase" in the statement of the review, "An investigation of interest in connection with the study of the electrolytic phase of pitting and corrosion was carried on." I think the inference which would be drawn by almost anyone in reading this casually would be that the committee referred to the report as a brief for a definite school of thought on

this subject. On the contrary, the work involved no underlying intention of supporting any one school of thought, simply to bring forth some very patent observations in connection with the corrosion, so that all parties concerned might appreciate the nature of it.

Mr. Knowles: The objections raised by Mr. Steel do not seem to be very serious, and I think with his explanation included, it will be clear to all who read it.

I know it was Mr. Dorley's intention to make a few comments on water service, and in his absence I have a few remarks which, with your permission, I will present to the convention.

(Mr. Knowles then presented the following:)

A water supply, ample in quantity and of satisfactory quality, is one of the essential requirements for the successful operation of a steam railroad. A survey of the field in this country indicates that a conservative estimate of the annual water consumption on American railroads is approximately nine hundred billion gallons. In the neighborhood of 14,000 water stations are required to supply this amount of water, involving a very large initial investment. The annual expenditure for operation and maintenance is in excess of \$100,000,000. While this figure represents an important item of expense in railroad operation, it is small in comparison to the expense involved from the effect on locomotive upkeep and operation, caused by use of unsatisfactory or inadequate supplies, and the time will come when the extravagance of water waste and scale in boilers will not be tolerated.

There appears to have been but little progress in the development of suitable organization to handle this important feature of railroad operation. It is a significant fact that where special attention has been given this subject, very satisfactory economies have been effected, together with improvement of the property and power. It is therefore desired to call the attention of the members of the association to the possibilities of the water service organization as approved last year for publication in the Manual of recommended practice.

(The committee was excused with thanks.)

Report on Signs, Fences and Crossings

A questionnaire sent to the railroads in regard to the location of signs did not disclose any laws or orders of public utility commissions which conflict with or vary much from the recommendations in the report of the committee. Wherever possible a uniform distance for all signs from the center of the track is better than variable distances for different classes of signs although a uniform distance will require the widening of the roadbed at the location of the sign on fills. A total of 17 substitutes for wood crossing planks were grouped in five classes, installations of most of which have been in service too short a time to offer any definite conclusions.



Maro Johnson
Chairman

Maro Johnson is rounding out his first year as chairman of the committee after serving as vice-chairman for one year. He has been a member of the committee for eight years. He is an assistant engineer on the staff of the bridge engineer of the Illinois Central, in which capacity he was in charge of the construction of the St. Charles Air Line bridge with its 260-ft. bascule span across the Chicago river at Chicago, which was placed in service about a year ago. As a member of this committee he has been active in the preparation of standard designs for roadway signs and in the promotion of uniform practices in their installation.

Conclusions

THE COMMITTEE SUBMITTED A REPORT on the location of roadway signs in Appendix A. A report on substitutes for crossing planks was presented as information in Appendix B.

In Appendix C were presented tentative specifications for all concrete posts and tentative plans for round and square line posts.

The committee recommended that the statement in Appendix A relating to the location of signs be adopted and printed in the Manual.

Committee: Maro Johnson (I. C.), chairman; T. E. Rust (W. C. F. & N.), vice-chairman; Anton Anderson (C. I. & L.), Arthur Anderson (N. Y. C.), F. D. Batchellor (B. & O.),

C. H. N. Connell (C. N.), A. Crumpton (G. T.), L. B. Curtis (N. P.), A. Daniels (C. M. & St. P.), G. N. Edmondson (N. Y. C.), W. J. Harris (C. B. & Q.), R. A. Harry, S. C. Jump (I. C.), L. C. Lawton (A. T. & S. F.), O. H. Sessions (G. T.), S. E. Shoup (K. C. S.), W. C. Swartout (M. P.), R. L. Turner (Erie), W. D. Warren (N. Y. N. H. & H.), K. G. Williams (Union).

Appendix A—Location of Signs

In studying the location of signs, the committee sent a circular to a large number of railroads asking for information as to their general practice in locating signs, with the purpose of finding out if there were any unusual conditions which should be taken into consideration, also with the idea of avoiding a recommendation that would vary too much from present practice. The information obtained included the location of signs with relation to the track; location with relation to the objects affected, and details of local, state, or public service commission laws or orders applying to the location of signs.

SUMMARY OF REPLIES TO QUESTIONNAIRE

Distances from the track: The replies to the questionnaire show considerable variation in the distances used, but the majority are less than recommended in this report.

Distances along track, from the object affected: In most instances, the sign itself indicates the location. Where it does not, varying locations are given in the replies.

Laws or orders of public utilities commissions: These affect primarily highway crossings, drawbridges and whistle posts. The questionnaire does not disclose any law or order which will conflict with, or vary much, from the recommendations of this report. If such variations do occur, the law, of course, will govern.

Safety and clearance are naturally combined. This association has previously adopted a clearance diagram applying to bridges requiring horizontal clearance of eight feet from the center of the track and signs should not encroach on this.

The committee believes it would generally be better to adopt a uniform distance for all signs wherever possible rather than vary it for different classes of signs, the main consideration being safety for employees, which is controlled by distance from the track.

Roadbed width may also be considered important; by roadbed width we mean the width of sub-grade. Even with the widest roadbed now in use, based on this information, it would be necessary, in order to get good clearance from the track, to build out the shoulder properly to support signs located on embankments.

Clearance required for snow plow wings, roadbed spreaders and weed destroyers which are used on practically all railroads has been investigated and we believe that sufficient clearance has been provided for this equipment.

The committee recommended the distances given on a table of signs submitted with its report, appreciating the fact that widening of the roadbed on fills will be necessary, and further, that this is the practice in vogue on railroads at the present time where signs are located at a sufficient distance from the track to require it.

Appendix B—Substitutes for Wood Crossing Planks

In 1913 this committee submitted a report on "Track Construction and Flagways at Paved Street Crossings and in Paved Street," which applied more particularly to crossings constructed of the same material as the adjoining street. The present preliminary report is more general and includes all kinds of crossings.

In recent years the high price of wood crossing plank

has resulted in the introduction of a number of substitutes, of which 17, if paving blocks are included, have come to the attention of this committee. These may be grouped in five classes in accordance with the material of their construction. So classified, these substitutes are listed below. The figures under the group headings indicate the number of crossings of that group included in this report.

Concrete 21	(a) Solid Concrete. (b) Precast slab. (c) Concrete plank.
Bituminous Material 57	(a) Tarvia. (b) Headley Good Roads Oil (c) Emulsified Asphalt. (d) Kentucky Rock Asphalt. (e) Sheet Asphalt. (f) Paving Pitch.
Steel or Iron 3	(a) Innu Armo Iron Highway Crossing. (b) Jennings Steel Crossing (c) Railroad Rails.
Paving Blocks 8	(a) Granite. (b) Brick. (c) Wood.
Ballast Material 1	(a) Gravel. (b) Disintegrated Granite.

For the most part, these crossings have been in use but a short time, and definite conclusions as to maintenance cost and serviceability cannot be reached. A number of roads, however, in addition to those reported on, are giving consideration to the adoption of one or the other of the substitutes.

Briefly summarized, the status of each group is as follows:

Solid Concrete—We do not find many crossings of this type, and, where used, they have been on tracks where there is little railroad traffic.

Precast Concrete Slab—This type of crossing has been used on a number of railroads, though of varying design. Most of the installations have been made subsequent to 1919, so that they have hardly been in service long enough to obtain information as to their durability and cost of maintenance. One thing that has been demonstrated is that when concrete slabs are placed, crossings should have good drainage to prevent heaving in winter time.

Concrete Plank—The C. B. & Q. has tried out a number of these crossings. The main trouble seems to be that the upper corners of the concrete plank disintegrate under service, indicating that such plank should have some sort of corner protection.

Bituminous Materials—There are more crossings of this type in service than any of the others. The first cost of installation is lower and they are easily installed.

Steel or Iron, Plate Type—This type of crossing is not used extensively and seems to be in an experimental stage. One of these was installed in 1918, on the C. C. C. & St. L., at Seventy-first street, Carthage, Ohio. After 17 or 18 months it was taken up on account of the plates not being heavy enough to carry the trucks which passed over them. These crossings are now being made of heavier material. One will be installed on the B. & O., at Cincinnati, Ohio. There seems to be a tendency for horsedrawn vehicles to avoid this type of crossing when possible.

Railroad Rails, Steel or Iron—These crossings consist of rails laid between the running rails, and spaces filled in with concrete or other material. They have not been used in high speed tracks.

Paving Blocks—This type of crossing is used mostly

in cities and particularly where the adjacent street is paved with blocks or where ordinances require their use.

Ballast Material—Crossings of this type seem to be used mostly at farm crossings, and on highways with light traffic.

Appendix C—Specifications for Concrete Fence Posts

(I) MATERIALS

1. **Intent.** The intent of these specifications and the plans of which they form a part is to produce concrete fence posts having a uniform and sufficient strength and durability at a minimum of cost. On account of the thinness of the section, this can only be accomplished by intelligent and constant attention to securing proper proportions of all ingredients.

2. **Cement.** Cement shall conform to the present Standard Specifications and Tests for Portland Cement of the American Railway Engineering Association and subsequent revisions thereof.

3. **Fine Aggregate.** Fine aggregate shall consist of sand, stone screenings, or a combination thereof, having clean, hard, strong, durable, uncoated grains, and free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances. It shall range in size from fine to coarse, preferably within the following limits:

- Passing through a No. 4 sieve.....not less than 95%
- Passing through a No. 50 sieve.....not more than 30%
- Weight removed by decantation.....not more than 3%

4. **Coarse aggregate.** Coarse aggregate shall consist of crushed stone, gravel, or combination thereof, having clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, organic or other deleterious matter. It shall range in size from fine to coarse within the following limits:

- Passing a 1/2" screen.....not less than 95%
- Passing a No. 4 screen.....not more than 15%
- Passing a No. 8 screen.....not more than 5%

5. **Bank Gravel.** Natural combinations of fine and coarse aggregate, in the form of bank gravel, may be used providing its particles meet all the requirements in paragraphs 2 and 3 above, and provided such particles are properly graded from fine to coarse within the following limits:

- Passing a 1/2" screen.....not less than 95%
- Passing a 3/4" screen.....from 35% to 55%
- Passing a No. 50 screen.....not more than 15%
- Weight removed by decantation....not more than 1 1/2%

6. **Water.** Water for concrete shall be clean and free from oil, acid, alkali, organic or other deleterious substance.

7. **Metal Reinforcement.** Steel reinforcement shall be hard steel and shall conform to the present Standard Specifications for Steel Reinforcement of the American Railway Engineering Association or, if wire is used, to the present Tentative Specifications for Cold-Drawn Steel Wire of the American Society for Testing Materials, or to such modifications of either of such specifications as may hereafter be adopted by the American Railway Engineering Association. Reinforcement shall be in the form of round or square bars, preferably deformed, or steel wires. Crimped, stranded or flat reinforcing shall not be used. Reinforcing, before being placed in the molds, shall be thoroughly cleaned of mill and rust scale, and of coating that will destroy or reduce the bond.

(II) PROPORTIONING AND MIXING CONCRETE

8. **Proportioning.** The unit of measure shall be the cubic foot. One bag of Portland cement shall be considered as one cubic foot. Each of the constituent materials shall be measured separately by volume, using a method which will secure the specified proportions. The water shall be measured by an automatic device that will secure the same quantity in successive batches.

9. **Strength.** The proportion of cement, water and aggregate shall be such as to produce a concrete having a compressive strength at 28 days of 2,000 lb. per sq. in. The proportions of fine and coarse aggregate to produce such a concrete shall be determined by making a screen analysis of the available aggregates and using such a mixture as will secure a maximum density. To such a mixture sufficient cement shall then be added to produce concrete of the desired strength. If bank gravel is used it shall be screened and remixed, if necessary in order to produce concrete of the desired strength, or if such screening and remixing will produce concrete of the desired strength with enough less cement so that the saving in the cost of cement will exceed the cost of screening and remixing.

10. **Consistency.** No more water shall be used than is necessary to produce a concrete which can be worked thoroughly

into the forms and around the reinforcing. The consistency shall be measured by the slump test in the method described in the 1921 report of the Committee on Masonry, American Railway Engineering Association. The maximum slump shall not exceed six inches. The consistency shall be checked up from time to time.

11. **Mixing.** Mixing shall be done in a batch mixer of approved type, equipped with a suitable charging hopper, water storage, and water measuring device. The entire contents of the drum shall be discharged before recharging. Each batch shall be mixed for not less than 1 1/2 min. after all the materials are in the mixer, during which time the mixer shall rotate at a peripheral speed of about 200 ft. per min. The volume of the mixed batch shall not exceed the manufacturer's rated capacity. The retémpering of concrete which has partially hardened shall not be permitted. In cold weather aggregate shall be heated, if necessary, to remove frost and frozen lumps.

(III) DEPOSITING CONCRETE

12. **General.** Before depositing concrete the molds shall be thoroughly cleaned and coated with non-staining mineral oil or other approved material. The mixer should be so located that the concrete can be discharged directly into the molds or conveyed to the molds in such a manner as to cause no separation of the ingredients. Each mold shall be completely filled in one continuous operation.

13. **Molds.** Molds shall be substantial, rigid, and true to plan. Metal molds are more satisfactory than wooden molds.

14. **Placing Reinforcing.** The reinforcing shall be securely and continuously held in its proper position in the post during the placing of the concrete and until the post is removed from the mold. Metal spacers that would cause distinct lines of cleavage in the post shall not be used. The reinforcing shall be supported as often as is necessary to prevent its sagging into any appreciable extent due to its own weight or to the weight of the wet concrete.

15. **Compacting.** Concrete shall be thoroughly compacted into the molds and around the reinforcing. This is best accomplished by giving the molds a joggng or vibratory motion during and after depositing.

16. **Finish.** All posts shall have a clean, smooth finish. If any pockets or holes are discovered upon removal from the molds, they shall be immediately filled with a mixture of one part cement to two parts fine aggregate. Pockets or holes more than 1/2 in. in depth or more than 1/2 in. in diameter, or any exposure of the reinforcing shall cause the rejection of the post.

(IV) CURING AND HANDLING POSTS

17. **Curing.** The posts shall remain in the molds until the concrete has thoroughly hardened and in no event for less than 24 hours after placing. During this time and until they are cured the posts shall be carefully handled and protected from shock. When the posts are removed they shall be stocked in a nearby vertical position and protected from direct sunlight. They shall be kept wet by sprinkling for eight or ten days after being made. They should be cured for not less than 90 days, when cured naturally, before being shipped or set. Posts shall not be cured out of doors during freezing weather.

(V) MISCELLANEOUS

18. **Inspection.** All materials and all processes of manufacture shall be subject to inspection and approval at all times. Free access shall be provided for all authorized inspectors to all parts of the plant in which the posts or the materials are made, stored or prepared.

19. **Tests.** All testing of materials used in the manufacture of posts, all preparing, storing and testing of concrete specimens, as provided in Section 8 hereof, and all screen analyses of aggregates, shall be made in accordance with the methods adopted or approved by the American Railway Engineering Association and in effect at the time such tests, analyses, etc., are carried out. In case the American Railway Engineering Association shall not have approved or adopted any methods for such tests, analyses, etc., the same shall be made in accordance with the methods then adopted or approved by the American Society for Testing Materials.

20. **Patents.** The manufacturer or contractor shall pay all royalties for the use of patented designs or devices or forms of construction and protect the railway company from all claims of infringements or liability for the use of such patents.

Discussion

Chairman Johnson abstracted the report and moved the adoption of the conclusions.

(Motion carried.)

A. V. Brown (Lake Shore Elec.): The highway crossing signs for the purpose of warning the public is not the

same which was adopted by the association several years ago.

Chairman Johnson: It is not the intention to differ from the sign shown in the Manual and adopted some years ago.

C. E. Lindsay (N. Y. C.): The committee says it would generally be better to adopt a uniform distance for all signs wherever possible rather than vary it for different classes of signs, the main consideration being safety for employees, which condition is controlled by distance from the track.

I agree with that. There are some signs which have been obscured by other signs not necessary for the en-

gineer, and they should be placed a certain distance from the track, otherwise there may be some conflict.

Chairman Johnson: The third subject is "Highway grade crossings." The committee has not concluded its work on that subject. The next subject is "substitutes for wood crossing planks." That part of the report will be presented by Mr. Batchellor.

(F. D. Batchellor (B. & O.) abstracted the report and offered it as information.)

(T. E. Rust, chairman of the Subcommittee on Fence Posts, presented his report and it was received as information.)

(The committee was dismissed with thanks.)

Report of Committee on Electricity

Lack of sufficient time to study the Super Power Survey prevented the submission of an extensive report on it, although a summary is given. The survey deals with the sources of power available for railroad operation within economical reach of the Niagara and St. Lawrence rivers and tributaries. The National Electrical Safety Code standards are satisfactory and in accord with good practice. They are not intended as a designing specification but are primarily rules establishing minimum requirements. Working specifications including lower factors of safety are not consistent with the code and the revision of the Manual is therefore recommended.



Edwin B. Katte
Chairman

Edwin B. Katte has been chairman for five years and a member of the committee for eleven years. As chief engineer of electric traction of the New York Central since 1906 he has been in intimate contact with the Grand Central terminal development of that road since its inception. He has thus had intimate contact with the development of steam railway electrification from the construction and more recently from the operating standpoint. This extended experience peculiarly qualifies him to direct the work of this committee in a field which is now receiving increasing attention from year to year as its possibilities become better understood.

1. THE COMMITTEE recommended that its report on Electrical Interference be accepted as information, published in the Proceedings and the subject continued.

1. The committee recommended that its report on Electrical Interference be accepted as information, published in the Proceedings and the subject continued.

2. The committee recommended that the report on Water Power (see Appendix B) be accepted as information, published in the Proceedings and the subject continued.

3. The committee recommended that its report on Electrolysis and Insulation be accepted as information and published in the Proceedings, that the subject be continued and the committee authorized to continue its representation on the American Committee on Electrolysis and that the report of the American Committee on Electrolysis be accepted, printed in the Manual and in the Bulletin for convenient reference.

4. The committee recommended that its report on the National Electrical Safety Code (see Appendix D) be accepted as information, published in the Proceedings and the committee authorized to continue its conference with the U. S. Bureau of Standards.

5. The committee recommended that the progress report on Overhead Transmission Line Construction be accepted as information, published in the Proceedings and the subject continued.

6. The committee recommended that its Third Rail and Overhead Clearance Tables be accepted as information and published in the Proceedings.

7. The committee recommended that its report on collaborating with the committee on Economics of Rail-

way Location be accepted as information and the cooperation continued.

8. The committee recommended that (a) the Railroad Specifications for Commercial Adhesive Tape for Electrical Purposes, and (b) the Railroad Specifications for Rubber Insulated Tape (see Appendix H) be approved and printed in the Manual as recommended practice.

9. In an addenda to its report, the committee submitted a revision of the association's "Railroad Specifications for Wire Crossings," with recommendation for their approval.

Committee: Edwin B. Katte (N. Y. C.), chairman; D. J. Brumley (I. C.), vice-chairman; H. M. Bassett (N. Y. C.), R. D. Coombs (Cons. Engr.), J. C. Davidson (N. & W.), G. Eisenhauer (Erie), F. D. Hall (B. & M.), G. W. Kirtledge (N. Y. C.), W. L. Morse (N. Y. C.), M. Schreiber (P. S. R. of N. J.), W. M. Vandersluis (I. C.), S. Withington (N. Y. N. H. & H.), R. Beeuwkes (C. M. & St. P.), F. J. Correll (B. & O.), J. V. Duer, R. H. Ford (C. R. I. & P.), H. K. Lowry (C. R. I. & P.), A. E. Owen (C. of N. J.), E. B. Temple (Penna.), L. S. Wells (I. C.).

Appendix B—Water Power

The committee was instructed to continue the subject and report on the utilization of water power for railroad electric operation, cooperating, if desirable, with the United States Geological Survey in its Super Power Survey. The report of the Super Power Survey was not available until shortly prior to the conclusion of this report and the committee therefore was not afforded opportunity to give it the comprehensive study that the importance of the subject deserves. It studied the sources of electric power available for the operation of railroads, within economical reach of the Niagara and St. Law-

rence rivers and tributaries of the St. Lawrence river and presented the following conclusions:

SUMMARY

1. There are at present at Niagara Falls Hydro-Electric developments under United States control totaling 486,000 h. p., of which amount practically none is available for railroad electrification.

2. There are being developed at Niagara Falls under existing treaty revisions 600,000 additional h. p., of which 210,000 is on the American side. Of this latter amount 100,000 h. p. is available for railroad electrification and is sufficient for local requirements only.

3. There are possibilities, subject to Treaty revisions, of developments on the American side of 600,000 additional horsepower, of which the greater part may be available for railroad electrification. This would be sufficient to furnish power to a large portion of the steam railroads within economical transmission distance.

4. There are existing, or under development, other installations, such as the Canadian Chippewa-Queens-town project and that at Shawinigan falls. Power from these plants is not available for railroad electrification in the United States.

5. There are under contemplation other projects, such as the Niagara Falls Junior and the St. Lawrence Waterway. While such power would be available for railroad electrification, it is not believed that such projects have yet reached the stage where this committee can report as to their applicability.

6. The transmission of power developed at Niagara Falls is limited in distance only by ability to economically construct and safely insulate the transmission lines.

7. Power from Niagara Falls can be delivered to large consumers, within economical transmission distance, at approximately 1 cent per k. w. hr., which figure is sufficiently attractive as compared with present cost of steam production to warrant serious consideration as to its use for railroad electrification.

8. Hydro-electric power from Niagara Falls is constant because of the enormous storage reservoir afforded by the Great Lakes. None of the Niagara plants are augmented by steam electric stations common to many other hydro-electric installations.

Appendix D—Co-operation With the U. S. Bureau of Standards

The committee was directed to continue co-operating with the U. S. Bureau of Standards in the revision of the National Electrical Safety Code. The third revision of this Code is dated October 31, 1920, and was distributed in April of this year, printed in two volumes of the "Handbook Series" of the Bureau of Standards. The committee prepared a commentary on the national electrical safety code, with the object of acquainting the members of the association with the manner in which it can be used to advantage and wherein the Code requirements differ from accepted railroad practice.

CONCLUSIONS

1. The Code purports to establish a National Standard of Safety for the users of electrical apparatus. In general the standard is satisfactory and in accordance with good practice.

2. The rules establish minimum requirements. Greater margins of safety are not prohibited. The committee does not therefore fail to support the Code when as in the case of Part 2 it suggests greater safety provisions.

3. It was not the intention of the Bureau of Standards that the Code should be regarded as a designing specification. It is therefore not inconsistent that the

Code be supplemented by working specifications that specify factors of safety not less than those established by the Code.

RECOMMENDATIONS

The committee recommended that the Railroad Specifications for Electric Light, Power Supply and Trolley Lines Crossing, Steam and Electric Railways, adopted by the Association and printed in the Proceedings, Volume 21, 1920, page 208, be opened for revision with a view to make them conform with the Code as far as consistent with established railroad standards.

Appendix H—Standardization

The committee elected this year to report on friction and other tapes presented specifications which were the result of review of the A.S.T.M. specifications, somewhat modified but agreeable in such form, to the committee of the A.S.T.M. and to be by them in that form adopted. It was pointed out that the A.S.T.M. proposes these specifications as tentative, which is their practice with regard to all specifications for the first year after adoption. It is recommended that these specifications be adopted as recommended practice and printed in the Manual.

Discussion

(The report of the Committee on Electricity was presented by Chairman Katte.)

Chairman Katte: This year the Committee on Direction charged the Committee on Electricity with reporting on 9 subjects.

(The second subject, that of electrical interference, was presented by the chairman of that sub-committee, W. M. Vanderluis (I. C.). The report was received as information. W. L. Morse (N. Y. C.), chairman of the sub-committee on Water power, presented the report, which was received as information. The report on "Electrolysis" was presented by Chairman Katte.)

Chairman Katte: The sub-committee on electrolysis devoted its time during the past year to cooperation with the American Committee on Electrolysis. You will find this report of considerable value as a book of reference, as it contains the very last word on methods for mitigating electrolytic damage.

The committee moves that the report of the American Committee on Electrolysis be accepted as information, and published in the Manual as valuable permanent engineering data.

(Motion carried.)

Chairman Katte: The next item, "Co-operation with the U. S. Bureau of Standards," is shown in Appendix D. Since the committee formulated the conclusions there has been considerable activity in the matter of overhead crossings, and the committee has prepared an addenda to its report which is submitted as information. If this addenda is accepted it will form a part of the existing specifications.

I move that this addenda be approved and made part of the existing wire-crossing specifications.

(Motion carried.)

("Overhead Transmission Line Construction" was presented by S. Withington (N. Y. N. H. & H.), chairman of the sub-committee, and was received as information.)

(Chairman Katte reported on "Clearances—Rail and Overhead," in the absence of Mr. Bassett, while W. L. Morse reported on collaboration with Committee XVI—Economics of Railway Location, in the absence of Mr. Brumley. These reports were received as information.)

Chairman Katte: Appendix H—Standardization. This specification as written is precisely as the existing tentative specification of the A. S. T. M. and since the print-

ing a number of important changes and additions have been made and the committee therefore does not desire to recommend that the specification as printed in the Bulletin be adopted.

I move that these specifications, instead of being submitted as recommended practice, be accepted as information.

(This portion of the report will be received as information.)

Chairman Katte: Since the committee's report was completed, the Board of Direction submitted another subject to the committee, viz.: "The Protection of Oil Sidings from Danger Due to Stray Currents."

The President: The report will be received as information.

Chairman Katte: I move that the report of the Committee on Electricity as modified by this meeting be accepted.

(Motion carried.)

G. J. Ray (D. L. & W.): As a matter of information I would like to get straight the motion which was passed at the beginning of the committee's report to place the entire report on electrolysis in the Manual. Is that the intent of that motion?

Chairman Katte: Yes, that was the intention. You will find that that report is really a valuable book of reference. Only a limited number were printed.

Mr. Ray: I think it should appear in the Annual Proceedings. We had a similar case yesterday and the matter was negated on account of the length and character of the report. This would make a very large addition to the Manual.

Chairman Katte: The reason the committee recommends putting it in the Manual is that in effect it is a book of rule; it is a standard work, and we thought that the Manual was a handy place for it where it would not be forgotten.

H. L. Ripley (N. Y. N. H. & II.): We are loading our Manual to a point where it is no longer a hand book but has become a text book.

Chairman Katte: *I move that portion of the motion be reconsidered, and in lieu thereof that the report on electrolysis merely appear in the Manual by reference and cross-reference so that its location in the proceedings can be readily found.*

(The motion was carried and a motion that the report be referred to by cross-references in the Manual was carried. The committee was then dismissed.)

Engineering Association Holds Annual Dinner

Three Speakers Addressed Twenty-third Annual Banquet
in Gold Room Last Evening

THE ANNUAL DINNER of the American Railway Engineering Association was held in the Gold room of the Congress hotel last evening with President L. A. Downs presiding. R. C. Marshall, Jr., general manager, Associated General Contractors of America, Washington, D. C., spoke on Some Needs of the Railroads. Judge James A. Mulligan, Ottawa, Ont., discussed The Basis of Patriotism, and Gus M. Dyer, professor of political economy, Vanderbilt University, Nashville, Tenn., talked on Government and Business. An interesting feature of the dinner was the presentation to President Downs of a badge by his fellow alumni of Purdue University. The presentation was made by A. A. Potter, dean of engineering of that institution, who spoke in part as follows:

"The Purdue members of the A. R. E. A. have requested me to present to you in their name a token of their esteem. They are greatly appreciative of your truly human qualities which have endeared you to your associates and to those who have been so fortunate as to have been employed under you. These alumni of Purdue University are pleased and proud of your accomplishments, of your unselfish devotion to your professions and of your active interest in your alma mater. It is with a deep sense of pleasure, Mr. President, that I now avail myself of the honor of presenting to you this certificate on behalf of the Purdue Alumni, together with their sincere wishes for your continued happiness and success."

Brief abstracts of the addresses follow:

General Marshall's Address

The United States has approximately 260,000 miles of railroads in operation or 2,600 miles per 1,000,000 inhabitants, whereas in 1910 we had 2,700 miles per million inhabitants. The amount constructed in the decade just passed is less than 50 per cent of that constructed 1880-1890 and less than that constructed in any decade since 1860. The decrease in railroad construc-

tion has occurred since 1913. To make up that deficiency as well as to keep pace with the normal increase in population will require building 6,000 miles of new track this year and every year for 10 years.

After the civil war this country gradually awoke to the fact that the construction of transportation facilities would open the avenue for national development, which in turn paid the debt of the war. It is a fact that more than 50 per cent of our vast country is even now unused and waiting to be developed. Much of this development depends upon reclamation and irrigation. But perhaps more important than any of these, our development requires an adequate transportation system, whether that be through roads, railroads, or canals.

A great deficit in railroad construction has piled up year by year since 1913. Railroad construction is not the only construction that has so piled up a deficit. This is also true of public utilities, public works, water developments, hydraulic developments, reclamation and irrigation, and housing. This creates an accumulated demand for construction such as exists in no other industry. The general contractor is only one element of the construction industry; but he is an element through whose hands a large percentage, if not all almost all, of the money passes that goes into that industry.

One of the great criticisms heard concerning construction companies is that they are not managed along the lines recognized and established in other industries, and that they are far behind in matters of estimating and cost accounting. An extensive study into these matters has shown that this condition will not be overcome until the basic agreements under which they work are brought into some semblance of harmony. Many revelations of conditions existing in the building and general construction industries during the past two years, show a need of better understanding between that industry and the others for which it works. It is only in recent years that building contracts have been drawn so that they contained any semblance of mutuality.

In the case of the railroads some years ago construction contracts as drawn by the legal department were about in keeping with the general policies of sovereignty pursued by the roads and had it not been for the fairness with which engineers administered these contracts it is questionable whether railroad development could have taken place. The American Railway Engineering Railway Association has done an excellent work in standardizing railroad contracts, but advices from various sections of the country indicate that in many cases the railroads have not grasped the value and scope of such an undertaking. Some action should be taken to show them that a very urgent need in future railroad development is a standard of contractual relation which will permit dealing along the lines recognized and approved by modern industry.

The fundamental principle that these contracts should express the rights of contractor and owner, so that the laws of proper economics might be carried out, has been working in the minds and consciences of those in the industry until at last it has found voice. This is recognized by the fact that in December a committee representing eight great national Associations got together to consider this subject. It seems to me perfectly clear that if this committee were to come to a unanimous conclusion, representing the composite individual opinions of those on the committee, after they have extensively discussed the several questions involved, that each of us should realize that we would be acting in the common good should we accept that conclusion without reservation.

It has been suggested that a universal construction agreement be adopted which will cover the obligations common to all work, leaving to several sets of general conditions those provisions which are peculiar to each individual type. In such manner we would be able to set up clearly the obligations of construction and to build up a strong foundation of precedents which would establish an ethical practice throughout. The principal idea behind the move for standardization is to coordinate these existing standards and adopt universal clauses wherever they can be used. Though the legal talent might not profit by such standardization the engineering department and individual engineers and architects undoubtedly would. This is one need of the railroad which concerns the engineering department directly and which the engineers will have to sponsor if it is carried out properly.

There is still another need of the railways which greatly concerns their future expansion, and in which the engineer will doubtless find an interest. This is the development of more executives with both engineering skill and a knowledge of business and transportation economies.

The difficulties attending future development of railways as private projects have greatly increased in complexity since the last generation. Railway executives are faced today with more puzzling difficulties than ever before. Labor troubles, legislation, government regulation and transportation economics greatly complicate the study to be made in pushing out new lines. There will doubtless be a closer liaison between engineering and the study of present and future markets. These new problems open an extensive field for combined engineering and economic studies. There is every reason to believe that the engineer can take up these studies of railroad building and solve their problems more readily than an executive with no engineering experience. This new field offers an opportunity for development of the highest type of executive ability, and with it will doubtless go a high degree of prestige and compensation.

Government and Business

In discussing this subject, Mr. Dyer said in part: "I have much sympathy for the railway officer today. Every man should be an optimist under present conditions. However, if a railway man is an optimist today, the Labor Board will hold him up, while if he is a pessimist, his bankers will hold him up. If he is an optimist he must be a pessimistic optimist, while if he is a pessimist, he must be an optimistic pessimist.

"Our industrial life is controlled by great natural laws. Is it not controlled by chance. When natural laws are violated, disease results. When laws of industrial life are violated, trouble and panic result. Much of our trouble today is because of the belief that wages result from bargaining between employer and employe. A second fallacy is that wages and profits come out of the same fund and that wealth comes from the exploitation of labor.

"The present wage levels of railroad employes are now on an artificial level far above their natural rates. Because of the specialization which has come in industry we need some common standard as a basis for all wages.

"Our chief troubles today are a result of the mistakes of government in its relations to business. It is the function of government to see that fair play exists between groups. But we are departing from this theory. Under the Labor Board government is entering as a co-director of business. Any kind of a co-directorship is antagonistic to efficiency. Furthermore, when the government has no definite policy business cannot anticipate its actions and this uncertainty is deadly. The Adamson law and the legislation creating the Labor Board are ransoms paid to organized minorities.

"The time has come when intelligent leadership in business shall stand together and demand that the government withdraw from the sphere of production, that it shall curb any organization which tries to interfere with productive efficiency and that it shall define some theory of relation with industry and stand by it against minorities."

James A. Mulligan

The Canadian speaker was James A. Mulligan, of Ottawa, Ont, who opened his address by a tribute to the engineering profession. In his opinion its services to society are not appreciated in full measure. His real theme was the Government of Canada, its differentiation from that of the United States and the possibilities of any change from its present form. Mr. Mulligan punctuated his remarks with many a pointed story, and his address was enjoyed thoroughly by those present.



In the Snowshed

The A. R. E. A. Elects New Officers

Results of Annual Election Announced Yesterday; Sketch of
President-Elect J. L. Campbell

AT THE CLOSE OF THE SESSION yesterday afternoon President Downs announced the results of the election of officers for the ensuing year. The names of those elected are as follows:

President—J. L. Campbell, chief engineer, El Paso & Southwestern, El Paso, Tex.

Vice-President—G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J.

Treasurer—George H. Bremner, consulting engineer, Chicago.

Secretary—E. H. Fritch, Chicago.

Directors—D. J. Brumley, chief engineer, Chicago Terminal Improvements, Illinois Central, Chicago; Maurice Cohn, engineer maintenance of way, Pennsyl-

vania System, Indianapolis, Ind.; H. T. Douglas, Jr., chief engineer, Chicago & Alton, Chicago.

the fact that, like other men coming from the more remote portions of the country who are denied the opportunities of intimate contact with men in the same line of work, he has felt that the annual conventions afford him an opportunity which he desired to utilize to the utmost. In spite of the obstacle of remote residence, Mr. Campbell has set an excellent example in his whole-hearted interest in committee work, which has repeatedly won him the offer of chairmanships but which he has as consistently declined because he felt that others more conveniently located could conduct the work of committees with greater effectiveness.

In Mr. Campbell's presidency the great west is for the first time truly represented, for he is truly of the west.



E. H. Lee
First Vice-President

J. L. Campbell
President

G. J. Ray
Second Vice-President

vania System, Indianapolis, Ind.; H. T. Douglas, Jr., chief engineer, Chicago & Alton, Chicago.

Nominating Committee—A. M. Burt, assistant to vice-president operation, Northern Pacific, St. Paul, Minn.; J. V. Hanna, chief engineer, Kansas City Terminal, Kansas City, Mo.; P. B. Motley, engineer bridges, Canadian Pacific, Montreal, Que.; W. J. Backes, engineer maintenance of way, New York, New Haven & Hartford, New Haven, Conn.; A. O. Ridgway, assistant chief engineer, Denver & Rio Grande Western, Denver, Colo.

John Logan Campbell, President of the American Railway Engineering Association

J. L. Campbell, the twentieth president of the American Railway Engineering Association, needs no introduction to those of its members who have attended the convention, for few men have taken a more consistent and regular part in the discussions. By the same token, few of the members who participate in the work of the association have carried a more painstaking study of the reports in advance of the meetings. Nor is this characteristic to be only attributed. His consistent attendance at every session portrays a broad scope of interest which has been equaled in few men. Perhaps

Going from his home in Illinois to El Paso as a young man in 1888, he participated in the pioneer development of a new country and as the sober, law abiding element was gradually organized to establish law and order, John Logan Campbell, the engineer and railway officer, identified himself as a citizen who saw responsibilities outside the scope of his regular employment.

There is a departure from the conventional in Mr. Campbell's career as a railway man. Normally the young man in railway service is transplanted from his home surroundings to distant places by reason of his employment by the railroad. But we find that young Campbell went into western Texas to take up land and mining engineering and was established as a resident of western Texas for some years before he entered railway employment. In fact, he served for four years as city engineer of El Paso, Tex., before becoming a resident engineer on the construction of the Rio Grande Northern in 1894, his first railway connection. Developing proficiency in railway location and construction, his employment carried him over a considerable area of the west for a period of nearly ten years. But the fates decided that he was to be returned to the scene of his first engineering experience and for the last 17 years he has been responsible

for maintenance of way, location and construction on the El Paso & Southwestern System—from 1905 to 1920 with the title of engineer maintenance of way and since 1920 as chief engineer. Fortune was also kind to him in that she placed his destinies with a railway property of more than average financial stability. Virtually his position has been that of development engineer for the Phelps-Dodge mining interests and he has in consequence been afforded opportunities for the exercise of engineering ability along broader lines than those permitted the engineering officers of less favored properties. His connection for a number of years with the Water Service Committee of the association may properly be explained by his own interest in water service problems, as these have comprised one of his major responsibilities on the El Paso & Southwestern.

The White Mountain water supply system, with a capacity of 7,000,000 gal. daily and a pipe line 141 miles long, which is probably the most comprehensive water service project ever carried out by any railroad, was developed under his direction and embodies many features that bear the stamp of the master engineer.

N. R. A. A. Past Presidents Group

FOR THE FIRST TIME in the history of the National Railway Appliances Association all of the past presidents were present at the exhibit Wednesday afternoon. These men, with the exception of N. Hench, and with C. W. Kelly, secretary and treasurer of

- G. Stanton, Cleveland Railway Supply Co.
- W. F. Schleiter, Dilworth, Porter Co.
- T. W. Snow, T. W. Snow Construction Co.
- R. E. Belknap, American Chain Co.
- A. P. Van Schaick, Bethlehem Steel Co.
- T. R. Wyles, Detroit Graphite Co.
- N. Hench, Carnegie Steel Co.
- P. W. Moore, P. & M. Co.
- H. M. Sperry, Signal Companies.
- E. H. Bell, Railroad Supply Co.
- M. J. Trees, Chicago Bridge & Iron Works.
- P. C. Jacobs, Johns-Manville Inc.
- J. B. Strong, Ramapo Iron Works.
- G. C. Isbester, American Chain Co.
- T. W. Aishton, National Malleable Casting Co.
- C. W. Kelly, secretary and treasurer, Kelly-Derby Co.

A. R. E. A. Registration

THE REGISTRATION of members of the American Railway Engineering Association yesterday aggregated 146 and of guests 48, making a total registration for the day of 193. Including the registration of 666 Tuesday, the total registration for the two days reaches 859, as compared with 718 for the same period last year. Of this latter total 687 were members.

- Abbott, W. P., asst. div. engr., B. & O., Cincinnati, Ohio.
- Anderson, Arthur, instrumentman, N. Y. C., Chicago.
- Armstrong, H. J., asso. prof. c. e., Armour Institute, Chicago.
- Bainbridge, C. N., engr. of des., C. M. & St. P., Chicago.
- Baldwin, Hadley, asst. ch. engr., C. C. C. & St. L., Cincinnati, Ohio.
- Ballard, E. E., office engr., M. K. & T., St. Louis, Mo.



Top Row, Left to Right—H. M. Sperry, E. H. Bell, M. J. Trees, C. W. Kelly, P. C. Jacobs, J. B. Strong, G. C. Isbester and T. W. Aishton.

Bottom Row, Left to Right—G. Stanton, W. F. Schleiter, T. W. Snow, R. E. Belknap, A. P. Van Schaick, T. R. Wyles and P. W. Moore.

the association, were assembled at 3:30 for a group photograph. These men each served a year as president of the association and are named in order as here given, starting with 1909.

- Barnhart, E. H., asst. engr., B. & O., Baltimore, Md.
- Barry, G. R., div. engr., Penna., Loganport, Ind.
- Beach, D. P., div. engr., Penna., Indianapolis, Ind.
- Bennett, W. R., asst. engr., Washab, St. Louis, Mo.
- Bertram, H. A., div. engr., C. & O. Ry. of Ind., Peru, Ind.

- Botts, A. E., div. engr., C. & O., Huntington, W. Va.
 Bowser, F. H., supt. timber dept., I. C., Memphis, Tenn.
 Bragg, R. R., div. engr., C. R. I. & P., Dalhart, Texas.
 Briggs, Z. M., asst. engr., Penna., Pittsburgh, Pa.
 Broeke, G. D., supt. trans., B. & O., Cincinnati, Ohio.
 Brown, W. E., div. engr., C. R. I. & P., Fairbury, Neb.
 Buehler, Walter, engr. wood pres., New York.
 Burt, J. W., engr. m. of w., C. C. C. & St. L., Indianapolis, Ind.
 Butler, F. S., asst. val. engr., M. K. & T., Parsons, Kan.
 Carpenter, H. R., asst. ch. engr. c., Mo. Pac., St. Louis, Mo.
 Chipman, Paul, val. engr., P. M., Detroit, Mich.
 Clark, H. G., asst. to pres., C. R. I. & P., Chicago.
 Clement, S. B., ch. engr., T. & N. O., North Bay, Ont.
 Condon, T. L., cons. engr., Chicago.
 Congdon, C. O., dis. engr., Mo. Pac., Kansas City, Mo.
 Cook, R. A., val. engr., C. & A., Chicago.
 Copeland, R. D., asst. engr., Wabash, Moberly, Mo.
 Correll, E. J., div. engr., B. & O., New Castle, Pa.
 Cowherd, Geo. R., sig. engr., E. P. & S. W., El Paso, Tex.
 Cowper, J. W., pres., J. W. Cowper Co., Buffalo, N. Y.
 Cox, J. B., con. engr., Chicago.
 Crable, Arthur, engr. m. of w., H. V., Columbus, Ohio.
 Crowe, S. N., supt., Wabash, Montpelier, Ohio.
 Crugar, E. L., dist. engr., I. C., New Orleans, La.
 Dames, J. E., div. engr., Wabash, Decatur, Ill.
 Darrow, F. T., asst. ch. engr., C. B. & Q., Lincoln, Neb.
 Davidson, J. C., engr. elec. trac., N. & W., Bluefield, W. Va.
 Davis, Garrett, div. engr., C. R. I. & P., Cedar Rapids, Iowa.
 De Geer, B. W., engr. water serv., G. N., St. Paul, Minn.
 Deslauriers, L. W., asst. engr., Can. Pac., Montreal, Canada.
 Dewees, A. R., div. engr., P. M., Saginaw, Mich.
 Dick, H. B., asst. val. engr., B. & O., Baltimore, Md.
 Duer, J. W., B., elec. engr., Penna., Altoona, Pa.
 Duffy, C. M., asst. sig. engr., C. R. I. & P., Des Moines, Iowa.
 Eby, C. W., asst. engr., W. C. F. & N., Waterloo, Iowa.
 Emmons, S. E., asst. engr., A. A., Owosso, Mich.
 Engle, C. W., engr. m. of w., C. C. C. & St. L., Wabash, Ind.
 Etter, W. K., Sr., asst. to vice-pres. in chg. of op., A. T. & S. F., Chicago.
 Fair, J. M., supt., Penna., Philadelphia, Pa.
 Fairbairn, J. M. R., ch. engr., Can. Pac., Montreal, Canada.
 Fowler, W. E., ch. engr., Montour, Coraopolis, Pa.
 Freygang, A. H., div. engr., B. & O., Grafton, W. Va.
 Garner, R. D., engr. const., S. N. E., Providence, R. I.
 Gault, J. J., asst. engr., C. M. & St. P., Chicago.
 Giles, W. H., asst. engr., Mo. Pac., St. Louis, Mo.
 Gilkey, R. H., supt. b. & b., Cent. of Ga., Savannah, Ga.
 Gowdy, R. C., ch. engr., C. & S., Denver, Colo.
 Grisswald, H. C., Louisville, Ky.
 Hales, E. S., asst. engr., N. Y. C. & St. L., Cleveland, Ohio.
 Hallsted, R. H., div. engr., M. P., Wymore, Ark.
 Hanna, John V., ch. engr., K. C. Term., Kansas City, Mo.
 Hansen, H. J., office engr., C. M. & St. P., Chicago.
 Harting, O. J., asst. ch. engr., St. L. Term., St. Louis, Mo.
 Hayes, W. P., div. engr., Mo. Pac., Monroe, La.
 Hezgie, W. G., office engr., G. T., Detroit, Mich.
 Heritage, C. S., bridge engr., K. C. Sou., Kansas City, Mo.
 Hersh, C. E., B. & O., Chillicothe, Ohio.
 Holm, R. H., div. engr., Mo. Pac., Chester, Ill.
 Howard, R. H., ch. engr. m. of w., Wabash, St. Louis, Mo.
 Irwin, J. C., val. engr., B. & A., Boston, Mass.
 Jacobs, H. S., The H. K. Ferguson Co., Cleveland, Ohio.
 Jenkins, J. B., val. engr., B. & O., Baltimore, Md.
 Johnson, Noah, val. engr., Wabash, St. Louis, Mo.
 Johnston, D. B., div. engr., Penna., Louisville, Ky.
 Jones, I. A., div. engr., Mo. Pac., Falls City, Neb.
 Jones, Paul, supt., Penna., Fort Wayne, Ind.
 Judd, I. R., engr. of bldgs., I. C., Chicago.
 Jump, S. C., asst. engr., I. C., Duluque, Iowa.
 Kato, Edwin B., ch. engr. elect. tract., N. Y. C., New York.
 Kieglar, W. C., engr. m. of w., C. C. C. & St. L., Gallon, Ohio.
 Kinsley, R. J., pilot engr., B. & O., Baltimore, Md.
 Kumbal, J. P., engr. of bldgs., B. & O., Baltimore, Md.
 Lalmer, J. A., prin. asst. engr., Mo. Pac., St. Louis, Mo.
 Larkins, A. M., ch. engr., Miami Conservancy District, Dayton, Ohio.
 Livingston, H. T., div. engr., C. R. I. & P., Manly, Iowa.
 Lusk, J. B., ch. engr., United of St. Louis, St. Louis, Mo.
 Lyon, W. P., supt. of track, Wabash, Montpelier, Ohio.
 Lombard, M. J., div. engr., Wabash, Montpelier, Ohio.
 Lombard, J. H., div. engr., A. T. & S. F., Chicago.
 Macintosh, W. S., pres. trans. eng. P. & L. E., Greenville, Pa.
 MacKay, J. M., ch. engr., S. A. L., Platt City, Mo.
 Mack, J. C., ch. engr., St. L. Term., Detroit, Mich.
 Major, S. J., asst. ch. engr., M. & St. L., Minneapolis, Minn.
 Major, S. J., supt. of eng. N. Y. C., New York.
 Malin, J. W., supt. gen. mgr., Southern A. P. & Sulphur Co., St. Louis, Mo.
 Murray, W. A., engr. of track, N. Y. C., New York.
 Nagel, John R., div. engr., Mo. Pac., Wichita, Kan.
 Neiler, S. G., con. engr., Neiler Rich & Co., Chicago.
 Ogle, W. F., sales mgr., W. S. Track Sales Co., Chicago.
 Passmore, E. W., div. engr., C. B. & Q., Alliance, Neb.
 Perkins, C. D., div. engr., N. Y. C. & H., Stamford, Conn.
 Petticrew, C. B., div. engr., St. L. S., Illino, Mo.
 Podmore, J. M., div. engr., N. Y. C., Toledo, Ohio.
 Post, W. M., supt. tel. & sigs., Penna., Pittsburgh, Pa.
 Puffer, F. R., asst. reg. engr., U. S. Railroad Administration, Chicago.
 Ramsey, F. R., ch. engr., T. St. L. & W., Frankfort, Ind.
 Richardson, C. P., engr. track elev., C. R. I. & P., Chicago.
 Riggs, H. E., prof. of c. e., University of Michigan, Ann Arbor, Mich.
 Ringer, Frank, ch. engr., M. K. & T., St. Louis, Mo.
 Rist, C. J., div. engr., P. M., Saginaw, Mich.
 Roach, J. H., val. engr., N. Y. C., New York.
 Robertson, T. H., asst. engr., I. C., West Frankfort, Ill.
 Rogan, J. E., rdmsr., I. C., New Orleans, La.
 Rohbock, W. L., ch. engr., W. & L. E., Cleveland, Ohio.
 Koller, W. L., assist. engr., H. V., Columbus, Ohio.
 Rose, L. S., assist. to gen. mgr., C. C. C. & St. L., Cincinnati, Ohio.
 Schmid, R. L., div. engr., N. C. & St. L., Atlanta, Ga.
 Schmidt, Edward C., prof. of ry. eng., University of Illinois, Urbana, Ill.
 Sedwick, T. D., engr. of tests, C. R. I. & P., Chicago.
 Senter, S. S., ch. engr., A. C. & Y., Akron, Ohio.
 Sessions, O. H., gen. rdmsr., D. & T. S., Monroe, Mich.
 Shaw, H. J., div. engr., Penna., Cambridge, Ohio.
 Shouse, G. B., first asst. on engr. corps, B. & O., Flora, Ill.
 Sillock, A. K., gen. supt. mot. power, C. M. & St. P., Chicago.
 Smith, A. C., vice-pres., Morden Frog & Crossing Works, Chicago.
 Smith, C. E., cons. engr., St. Louis, Mo.
 Smith, D. W., val. engr., H. V., Columbus, Ohio.
 Snyder, J. A., rdmsr., M. C., Jackson, Mich.
 Sperry, H. M., New York.
 Steel, D. A., asso. editor, Railway Age, Chicago.
 Stevens, J. W., div. engr., N. Y. C., New York.
 Strong, J. B., vice-pres., Ramapo Iron Works, Holburn, N. Y.
 Thompson, F. W., div. engr., C. R. I. & P., Des Moines, Iowa.
 Tuttliff, G. C., bridge engr., M. C., Detroit, Mich.
 Van Antwerp, E. I., real est. insp., G. T., Detroit, Mich.
 Vant, F. G., asst. engr., I. C., Chicago.
 Vent, B. A., instrumentman, C. R. I. & P., Des Moines, Iowa.
 Walsh, G. R., assist. engr., Mo. Pac., St. Louis, Mo.
 Warden, R. E., assist. engr., Mo. Pac., Little Rock, Ark.
 Waterman, J. H., supt. timber pres., C. B. & Q., Galesburg, Ill.
 Wilbur, O. G., pilot engr., B. & O., Baltimore, Md.
 Williams, C. C., prof. c. e., University of Kansas, Lawrence, Kan.
 Williams, H. W., spee. repr. to supt. of motive power, C. M. & St. P., Chicago.
 Wilson, C. A., cons. engr., Cincinnati, Ohio.
 Woodbury, W. H., val. engr., D. & I. R. and D. M. & N., Duluth, Minn.
 Wyant, Leroy, prin. assist. sig. engr., C. R. I. & P., Chicago.

Guests

- Bolin, W. C., pilot engr., B. & O., Baltimore, Md.
 Cornell, A. M., ch. engr., P. & M. Co., Chicago.
 Dennis, Olive W., (Miss), draftsman, B. & O., Baltimore, Md.
 Derrig, J. T., dist. engr., N. P., St. Paul, Minn.
 Dreshow, C. A., Rail Joint Co., New York.
 Dowdall, Universal Portland Cement Co., Chicago.
 Eckles, H. F., I. C., Chicago.
 Gaffney, T. H., rdmsr., Montour, Coraopolis, Pa.
 Gilbert, W. T., cons. engr., Headley Good Roads Co.
 Grover, C. H., C. R. I. & P., Manly, Ia.
 Hartley, J. G., asst. div. engr., Penna., Pittsburgh, Pa.
 Hawkins, C. L., engr. of w. and str., United Ry. Co. of St. Louis, St. Louis, Mo.
 Hayes, J. R., civil engr., Gary, Ind.
 Hicks, P. R., American Wood Preservers Ass., Chicago.
 Huffman, C. B., asst. engr., M. P., Falls City, Neb.
 Hughes, R. P., asst. to engr. of w. agt., A. T. & S. F., Topeka, Kan.
 Hunter, H. L., div. engr., A. T. & S. F., Chillicothe, Ill.
 Irwin, W. B., of engr., G. N., St. Paul, Minn.
 Jerkinson, C., insp., Rail Joint Co., New York.
 Jones, D. J., mech. asst., I. C., Chicago.
 Komer, R. J., rdmsr., I. C., N. Y., Scranton, Pa.
 Kelley, J. B., asst. gen. rdmsr., M. St. P. & S. S. M., Minneapolis, Minn.
 Kelly, J. H., insp. m., M. & St. L., Minneapolis, Minn.
 Kirklev, T. M., mech. asst. to gen. supt. ch. pr., C. M. & St. P., Chicago.
 Lichtenwahr, G., instrumentman, G. T. W., Battle Creek, Mich.

Lind, F., rdmaster, C. P., Golden, B. C.
 Longstreet, P. E., res. mgr., Massey Concrete Products Corp., Chicago.
 Marshall, Jr., R. C., gen. mgr., Asso. General Contractors of America, Washington, D. C.
 McNutty, J., rdmaster, C. R. & P., Waterloo, Iowa.
 Morgan, A. L., ch. engr., Des Moines Union, Des Moines, Ia.
 Nichols, J. A., asst. div. engr., C. C. C. & St. L., Galion, Ohio.
 Perkins, J. R., rdmaster, C. R. I. & P., Carlisle, Ia.
 Price, T. E., div. engr., C. P., Vancouver, B. C.
 Potter, A. A., dean of engr., Purdue University, La Fayette, Ind.
 Purdy, J. W., asst. div. engr., B. & O., Garrett, Ind.
 Reinert, W. A., asst. prof. c. e., Armour Institute, Chicago.
 Robinson, C. R., vice-pres., Inland Steel Co., Chicago.
 Robinson, Lec, shop engr., I. C., Chicago.
 Scratzman, R. F., asst. engr., C. M. & St. P., Chicago.
 Smith, R. C., prin. asst. engr., M. & St. L., Minneapolis, Minn.
 Strong, C. H., engr., Georgia Railway & Power Co., Atlanta, Ga.
 Swanson, A. J., rdmaster, C. P., Ignace, Ont.
 Tranzon, F. C., supr. b. and b., G. T., Durand, Mich.
 Wales, D. C., assi. engr., G. T., Durand, Mich.
 Warren, T. P., of. engr., C. R. I. & P., Des Moines, Ia.
 Watson, W. J., cons. engr., Cleveland, Ohio.
 Weymouth, H., Bethlehem Steel Co., Baltimore, Mo.
 Whipple, W. J., insp. of track, C. & O., Richmond, Va.
 Wilkinson, J. F., engr., G. T., Detroit, Mich.

ing 20 to 26½ brake horsepower; unit 25 running at 900 to 1,400 r. p. m., and developing 20 to 28 brake hp.; unit 30, running at 800 to 1,250 r. p. m. and developing 24 to 35 brake hp.; unit 40, running at 800 to 1,000 r. p. m. and developing 31 to 40 brake hp., and unit 50, running at 700 to 1,000 r. p. m. and developing 30 to 51 brake hp.

While particularly adapted for the generating of electric current for use in lighting, storage battery charging, arc-welding outfits, or electric operation of machines, the plant is also adapted to drive triplex and other types of pumps, various kinds of hoists, concrete mixers, air compressors and other kinds of machinery. When connected to an electric generator the plant will furnish power according to the following table:

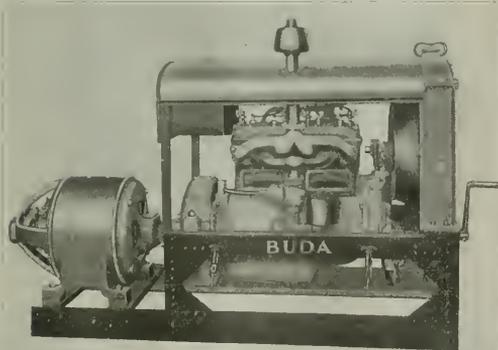
Unit No.	Direct Current		Alternating Current	
	R. P. M.	K. W.	R. P. M.	K. W.
20	1450	16.5	1200	14
30	1200	20	1200	20
40	1000	25	900	22.5
50	925	30	900	30

The engine is furnished with or without the generator, together with radiator, complete head and side covers, water pumps, fan and belt, carburetor, air cleaner, magnet with coupling, muffler, flexible power transmission coupling, starting crank, gasoline tank and speed-regulating governor, and, where required, is also furnished with a friction clutch or with a driving pulley for attaching to the drive shaft. Before leaving the factory each engine is subjected to a series of tests covering three periods; the first covers the running-in process and the second the power test. After this the engine is completely dismantled, inspected and re-assembled for the final test which is made to ascertain what electric power it is capable of delivering.

Obviously the character of the device gives it a wide scope of use in railway service such as that of furnishing lighting at outlying depots or shops, of furnishing power to operate machinery in shops or of pumps in water stations and for use in track maintenance in supplying electricity for arc-welding sets or in driving air compressors. The machine runs 10 hours on 1 gal. of gasoline.

A General Utility Power Plant

AMONG A NUMBER of recent developments in equipment and machinery of interest to railways is a four-cylinder gasoline-operated power unit now being manufactured by the Buda Company, Chicago. The machine is essentially an automobile engine, which has been modified only enough to permit of general use. Originally designed and perfected for the propelling of heavy duty motor trucks and still manufactured on a large scale for this purpose, the power unit presents a particularly interesting object of study on the part of railway



The Buda Unit Power Plant Connected to an Electric Generator

engineers by reason of such features as the workmanship it embodies, the efficiency of its operation and performance, its adaptability for many kinds of service for which an automobile type of engine is particularly suited, and for the relatively low cost permitted by the large scale upon which the engines are manufactured.

As shown by the illustration, the plan consists simply of accommodating the engine to a steel platform and hood by reason of which it may be transported from place to place for use in a variety of operations or bolted to a permanent foundation. The machine weighs about 1,000 lb., and is manufactured in five sizes, unit 20 running at 1,000 to 1,450 r. p. m., and develop-

Automatic Protector for Controllers

EVERY USER of electric controllers has experienced more or less trouble from arcing and burning of the contacts, especially where there are unskilled attendants or where frequent electrical inspection is not the rule. The burning takes place when the contact is made or broken, especially where heavy current is handled or high voltage is used.

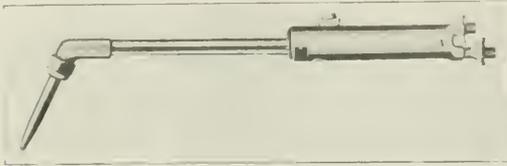
An automatic device has recently been developed that completely eliminates this objectionable burning and the consequent replacement of fingers and contacts by making and breaking the circuit entirely outside the controller. By positive mechanical means the first motion of the controller handle actuates a switch in the closing coil circuit of a magnetic switch or circuit breaker which closes the circuit just after the first contact is made by the controller fingers. The circuit is held closed as long as it is desired to operate the motor. The least motion of the controller handle toward the off position opens the auxiliary switch, thereby opening the motor circuit through the circuit breaker with no possible burning of the controller contacts. The handle has to be returned to the off position before the switch can be closed again.

In short, with this protector, which is made by Geo. P. Nichols & Bro., Chicago, the controller performs all its usual functions, except the actual making and breaking of the circuit, and burning of the contacts is made impossible. Furthermore, its use makes it possible to em-

ploy the ordinary types of controller where otherwise contactor panels with master switches would have to be used.

A New Acetylene Torch for Welding and Cutting Operations

IN THE LAST FIVE YEARS there has been an extensive development in the use of the gas flame and electric arc in railway service and the interest taken in them by railway engineering officers has increased accordingly by reason of the possibilities afforded of effecting economies or facilitating work in the field as well as in the shop. As might be expected from the fact of its receiving such attention, extensive developments have also been made in the equipment used for the purpose.



The Milburn Cut-Weld Torch

One development of a recent date along this line is a combination cutting and welding torch now being manufactured by the Alexander Milburn Company, Baltimore.

The torch is known as the cut-weld torch. Having been designed to meet the need of apparatus equally adapted to both welding and cutting operations, it is of particular interest to railway officers by reason of the diversified nature of the service ordinarily required of any one outfit. With this torch it is possible to cut 19-in.



Cutting a 19-in. Billet in One Operation

steel and by merely changing the tip to weld any thick metal lending itself to welding. As the hose connections are not disturbed, no gas is wasted. The accompanying illustration shows the torch in the process of cutting 19 in. steel with one cut, for which purpose a four foot oxygen manifold is used, furnishing oxygen at 190 lb. and acetylene at 15 lb. pressure. As a further illustration of the ability of the torch the manufacturers call attention to a test recently made in an eastern railway shop in which 341 1/2 in. rivets were cut per hour, a performance which is said to have established a new speed record for the entire system.

In railway service, in addition to rivet cutting, the torch has also shown decided economies thus far in such work as the cutting of locomotive fire box sheets, steel ties and frames, and in the wrecking of bridges and steel structures, as well as in reclamation yards and in the cutting of steel cars. The torch is claimed to be economical in its consumption of gas, both in cutting and in welding work. When welding 1.2-in. metal with a gage pressure of acetylene at 6 1/2 lb. and the oxygen at 9 lb., the torch consumes 72 cu. ft. per hour of each gas.

A Jack for Extracting and Lowering Poles

IT IS NOT UNCOMMON in railway service to encounter jobs involving the withdrawing of poles from the ground or their lowering into position. In such cases it is often the practice to perform the work with whatever equipment is at hand. In view of this fact, it is



Two Joyce Pole Jacks in Position for Extracting a Loaded Pole

of interest to note a recent development for this purpose.

The Joyce Pole Jack No. 88, as this device is known, is designed both for pulling and replacing loaded poles. As shown in the illustration, it is built upon a pivoted base and has an unusually long rack which carries a dog at the top to hold the chain. This jack is 38 in. high, has a lift of 27 in., weighs 150 lb. complete with chain and lever, and has a lifting capacity of 15 tons. The mechanism consist of two coils and a large spring, and the construction is such as to afford security against breakage at any point, particularly in the base, which is usually the weakest point of such devices.

The jack is operated by means of a lever as any ordinary jack and is secured against the possibility of dropping the load, the operation of lowering the pole requiring the operator only to reverse the control lever at the side of the jack whereupon the load is lowered automatically one notch at a time, in the same manner as it was raised. The double lever socket shown in the illustration is provided to permit of its easy operation when

the jack is pivoted on its base against the pole. Where it is simply required to extract the pole, one jack is sufficient, the reason for using the two jacks shown in the illustration arising from the fact that the pole was a loaded one which it was intended to hold in place while the butt end was sawed off. This device is manufactured by the Joyce-Cridland Company, Dayton, Ohio.

A Coaling and Sanding Plant With Ground Storage Facilities

THE CENTRAL VERMONT has recently replaced its coaling plant at St. Albans, Vt., with facilities which present a distinctly novel treatment of the coal and sanding problem. The installation is a creation of the Roberts & Schaefer Company, Chicago, and consists essentially of a 300-ton capacity Roberts & Schaefer counterbalanced bucket, shallow pit type coaling station of frame construction and a 50-ton "RandS" gravity sand plant, together with ground storage facilities for 20,000 tons of coal.

The novel features of this installation will be apparent from an examination of the illustrations and from the following description of its operation: The coal is first dumped into a receiving hopper 20 ft. in length, from which it is fed through an undercut gate into a 2-ton capacity elevating bucket, which is then hoisted in the usual manner to the point of dumping. Unlike the usual design, however, the coal in this case may either be

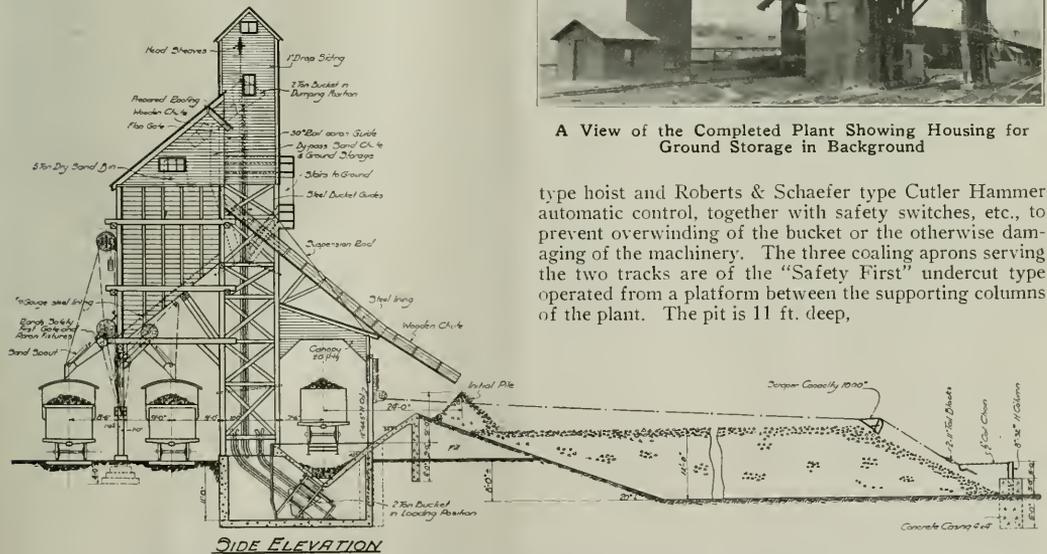
coal the operation then consists simply of dragging the coal by means of the drag scraper into the initial storage pit and over the hump into the coal hopper, from which it is elevated into the bin by the elevating buckets the same as coal from cars.

In the case of the sand plant, the wet sand is elevated in the same bucket used for coal and is spouted into a 50-ton capacity storage bin, from which it is fed by gravity into a Beamer Patent steam sand dryer. When dry the sand is then elevated by air pressure to an overhead storage bin of 5 tons capacity, from which it is fed by gravity to the engine as required.

The coaling plant has an elevating capacity of 75 tons per hour. The elevating bucket is self-opening and self-closing and all elevating machinery is automatic in its operation, the latter equipment consisting of a 22-hp. General Electric reversible motor with cast iron base drum



A View of the Completed Plant Showing Housing for Ground Storage in Background



SIDE ELEVATION

Diagrammatic View of Central of Vermont Coaling and Sanding Plant at St. Albans, Vt., Showing Ground Storage Arrangement

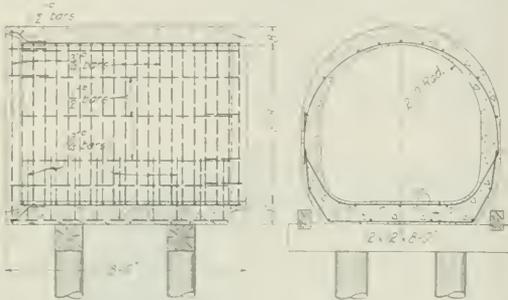
dumped directly into the coal bin or into a by-pass chute, as shown in the drawing, the latter serving to divert the coal into a storage pit situated on the ground at one side of the plant, all coal intended for storage thenceforth being distributed by means of a 1,000-lb. capacity drag scraper over the storage area, where it may be piled to a depth of 13 ft. When it is desired to use this storage

type hoist and Roberts & Schaefer type Cutler Hammer automatic control, together with safety switches, etc., to prevent overwinding of the bucket or the otherwise damaging of the machinery. The three coaling aprons serving the two tracks are of the "Safety First" undercut type operated from a platform between the supporting columns of the plant. The pit is 11 ft. deep,

The storage machinery consists of a double drum hoist and belt drive motor, located in a separate building at the side of the coaling plant, together with a system of I-beam posts distributed around the storage area to guide the drag scraper. The capacity of the machinery is about 100 tons per hour. The ground storage equipment was furnished by the R. H. Beaumont Company, Philadelphia.

Something Different In Pre-Cast Concrete Pipe

THE "SOMETHING DIFFERENT" in pre-cast concrete pipe alluded to in the title has reference to the design of sewer pipe recently adopted by the Lehigh Valley in connection with the filling in of a considerable area around the Jersey shore of the New York harbor incident to the development of the new Claremont freight terminal. In connection with this improvement it was nec-



Something Different in Pre-cast Concrete Pipe—Details of One of the Pipe

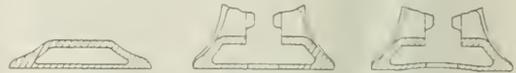
essary to extend two Jersey City sewers a distance of about 2,000 ft. As the area to be filled in was covered with about 4 ft. of water at low tide, and as it was necessary to locate the sewer extension above high tide, the problem involved the adopting of a type of construction which could be installed without interfering with the remainder of the work and at the same time provide for the proper handling of the discharge from the two city sewers. Having determined to support the new sewer on a pile trestle at the elevation of high tide, it then remained to select a suitable type of sewer. To this end consideration was given to the use of monolithic concrete, but on account of the possible action of salt water to which the concrete would be exposed, it was decided to use pre-cast concrete.

As shown in the accompanying drawing, the pipe was furnished in 8 ft. tongue and groove sections, 7 ft. 2 in. high and 7 ft. 2 in. wide over all with a flat trough; the flat floor having been adopted to insure the maximum stability of construction. Each section weighed 17,800 lb., as a result of which a rather difficult problem in handling presented itself. The new fill on which the Lehigh Valley yard will be laid will bury the pipe to a depth of about 6 ft.

This pipe was made by the Massey Concrete Products Corporation at its Newark, N. J., plant, according to a design worked out under the direction of F. E. Schall, bridge engineer of the Lehigh Valley. The work of installing the pipe was handled by Henry Steers, Inc., New York.

A New Form of Track Jack Base

THAT THE CONSTRUCTION of the base of a track is a detail which often has a marked influence upon the utility of such a tool in performing track work is well known by officers who have occasion to use such equipment or who have had such work under their charge. Particularly is the tendency of the base of any jack to bend a defect of consequence. Such a jack is a source of more or less danger on the one hand by reason of tendency to kick out from under its load and



Cross-Sectional Views of the Jack Base

on the other hand it often gives rise to trouble in lining track by reason of the tendency of the jack to cant and otherwise fail to hold its proper position. In view of this it is of interest to note the development which has been made by the Templeton Kenly Company, Chicago, in the construction of the base of its Simplex track jack.

The construction is shown in the accompanying illustration, the drawing at the left being a section through the toe of the jack and that in the middle a cross-section through the center. As noted, the feature of this base lies in the cored or hollow construction, as distinguished from a solid section. Aside from furnishing a stable support for the load, this base was constructed primarily to overcome bending, and thereby to eliminate the troubles that arise from bent bases while in use and the damage that frequently arises from fractures by repeated efforts to straighten bases which have bent while in service. The fact that the metal in the base is thin is also claimed to be an advantage on the hypothesis that a heavier section of metal in the base than in the standard often gives rise to stresses and strains during cooling or annealing of the casting which result in weakness. Furthermore, as the base is malleable, it adapts itself to the line of pressure, and ultimately assumes a concave base surface under service, thus transmitting the burden of the load to the rim. This feature is shown in the illustration at the right, which represents the base of the jack after the pressure has produced a permanent set.



The Pre-Cast Sewer Extension in Process of Construction

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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Many visitors at the National Railway Appliances exhibit at the Coliseum do not have an opportunity to talk to representatives of the different companies about their products on exhibit and as a result they only casually glance over the contents of the booths. In this way, many an interesting point or special feature of a device is overlooked by those whom the exhibitors wish to reach. Because of this fact, some few exhibitors have labeled their various devices with attractive placards, to bring out the points of interest regarding them. Unfortunately, many other companies have made no effort to do this. It is to be hoped that this expedient may receive more general application next year. In this way greater interest will be manifested in the exhibit as a whole and in many individual devices as well.

Why Not Label Exhibits?

The American Railway Engineering Association has shown wisdom in the selection of its presidents. As men with executive training they have manifested skill in conducting the sessions. Be this as it may, few of the past presidents, if any, have equalled the record of President Downs as presiding officer. With a voice which could be heard in the remote corners of the hall, he set an excellent example for clear and distinct speech, so necessary in the Florentine room, but his real service to the association was in the expeditious conduct of the transactions. The organization has grown to be a large one;

L. A. Downs Presiding Officer

the committee reports are voluminous, and it is only by strict adherence to the business in hand that the program of the convention may be completed. It is possible that some committee reports were not given as much time as they deserved. However, there is no question but that the time available in the five short sessions was applied in the most profitable manner under the able leadership of President Downs.

From the comments which have come to our attention it is evident that the suggestion made in yesterday morning's daily that the Board of Direction of the American Railway Engineering Association give more attention to the hotel facilities necessary to house the convention properly, have been misunderstood in some quarters. It is a fact that the Congress hotel was unable to care for all of those who desired rooms, but the same would be true of any hotel which might endeavor to house as large an organization as this. It is not to be hoped that all of the members who desire can be taken care of in any hotel, particularly those who make reservations late or who come without reservations. The principal criticism has been with the inability of all who desired to secure seats in the convention in the Florentine room. This condition indicates the necessity for the Board of Direction considering the advisability of transferring the convention to the Gold room in the same hotel, which room will seat more than twice as many as the Florentine room. It is unfortunate that arrangements were not made for the convention to be held there this year, particularly since the hotel was in a position to offer this room until a late date. If our editorial of yesterday morning was not understood, it was because of the fact that we did not make reference to the Gold room, thinking that all of the members knew of it.

Not long ago a manufacturer of railway equipment approached the president of a large road with figures showing that an investment in this equipment would yield the road a return of 18 per cent. The president's reply was, that if he had the money which the investment in this equipment would require he could put it to other use on the line where it would yield even larger returns and that these other investments must therefore receive first consideration. There is, therefore, competition between manufacturers of non-competing equipment for the funds which the railways have available for investment. Numerous recent developments in equipment and materials offer possibilities for large reductions in cost, frequently sufficient to pay for the equipment within a relatively short time. Railway officers are unusually alert for opportunities to effect savings at the present time. Under these conditions the manufacturers of equipment

Buying With Savings Produced

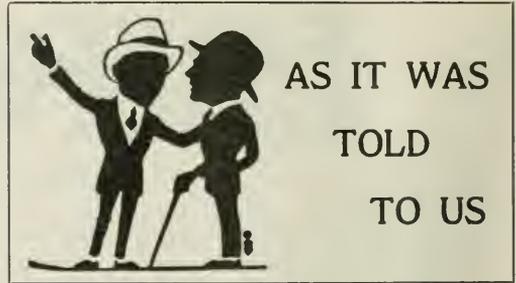
which will produce economies in a limited time are sure of securing a hearing. That the manufacturers are alive to this condition was evident at the Coliseum this week, where a number of devices were offered with the understanding that if they did not produce the economies which would pay for them in the course of a short time they could be returned. As earnings are improving and as the necessity for the restriction of expenditures is being correspondingly decreased, the roads are in a better position to avail themselves of new equipment of this character.

Is Your Road Represented?

FOR SOME YEARS the American Railway Engineering Association has been confronted with a serious problem in determining the committee personnel because of the rapid increase in the number of members. Thus in only ten years the membership of the association has practically doubled, while but little increase has occurred in the number of places on committees. At present there are about 2,000 members and only 500 places on committees, so that only one man in four can participate in the committee work.

In one sense this is not an unmixed evil. It affords considerable choice in the selection of the committee personnel, which, theoretically at least, is governed by considerations of special qualification and training, and partly by a due allowance for geographic distribution and proportionate representation by the railways. However, as the Association is one of individuals rather than of railways the last consideration is not a primary one.

There is no question but that the officers and directors of the association are meeting this problem with reasonable discretion and that those who desire places on committees are accommodated in so far as practicable. Actually, personal acquaintance and a degree of interest on the part of the individual play an important part in the determination of committee personnel with the result that some railroads receive much greater representation than others. Excluding the Committee on Electricity, which is concerned with problems peculiar to a small number of roads, there are 22 regular committees with an enrollment of about 450 men, of whom 400 are directly in the employ of railroads. Of this number 119, or 30 per cent, are connected with six roads covering 43,000 miles of line or about 14 per cent of the total railroad mileage of the United States and Canada. This preponderance of representation is easily explained. It means that these six roads are represented in the membership of the association by a large number of men with enough initiative and industry to strive for places on the committee and who show by their efforts that their selection has been well founded. There is, however, one other factor which must not be overlooked and that is the attitude of the railway managements toward participation in association affairs on the part of their officers and employees. If a considerable number of men from any railroad are prominently identified in the work of the association, it is proof positive that they are receiving a considerable measure of encouragement from the management, that their superior officers are also active in the work or that they have been given to understand that it is incumbent at conventions and committee meetings to be considered as justifying absence from their place of duty. Railway executives who will review the work of the American Railway Engineering Association in the light of the part which their own men are taking in it may well consider what they can do to see that their roads bear a proportionate share in the work.



Antonio E. Vera, assistant chief engineer, National Railways of Mexico, Mexico City, spent the last two days studying the exhibit at the Coliseum.

* * *

The friends of C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, among the members of the American Society of Civil Engineers in the vicinity of Chicago, have inaugurated a movement to secure his nomination as a candidate for president of that society. One hundred members signed the original petition and this number is being augmented daily. The members will receive requests from the secretary of the society in April to indicate their preference for nominations for officers in 1923. Mr. Loweth has served the A. R. E. A. as a member of the board of direction during the last three years.

A. R. E. A. Registration

Twenty-six members and eight guests registered yesterday in addition to the 687 members and 172 guests who registered on the two preceding days.

Baldwin, L. W., vice-pres., I. C., Chicago.
 Barry, H. B., princ. asst. engr., St. L.-S. P., St. Louis, Mo.
 Bassett, J. S., asst. engr., Mo. Pac., St. Louis, Mo.
 Dougherty, R. E., des. engr., N. Y. C., White Plains, N. Y.
 Farrin, J. M., asst. engr., I. C., Chicago.
 Fatherson, T. W., supt., C. G. W., Clarion, Iowa.
 Fithian, E. B., div. engr., Mo. Pac., Poplar Bluff, Mo.
 Fritch, L. C., vice-pres. in charge of construction, maintenance and capital expenditures, C. R. I. & P. and M. & St. L., Chicago.
 Heimerding, W. E., asst. engr., C. R. I. & P., Estherville, Ia.
 Hodgman, B. B., vice-pres. and ch. engr., National Water Mau Cleaning Co., New York.
 Irwin, A. Chas., engr., struct. bur., Portland Cement Association, Chicago.
 King, H. F., spec. engr., Erie, New York.
 Knecht, H. D., asst. engr., Mo. Pac., St. Louis, Mo.
 Lewis, E. M., engr. m. of w., C. G. W., Des Moines, Iowa.
 Lynch, H. A., asst. engr., B. & O., Wheeling, W. Va.
 Mains, J. S., asst. engr., G. T., Detroit, Mich.
 Maynard, R. P., asst. engr., G. N., Hibbing, Minn.
 McNally, J. F., asst. supt., A. T. & S. E., Emporia, Kan.
 Petersen, W. H., engr. m. of w., C. R. I. & P., Des Moines, Iowa.
 Rex, George F., vice-pres., Natl. I. & B. Co., Kansas City, Mo.
 Sexton, H. J., dis. engr., G. N., Superior, Wis.
 Snyder, H. G., asst. div. engr., B. & O., Garrett, Ind.
 Splintstone, C. H., supt. of cons. & surveys, Erie, New York.
 Teal, J. E., asst. engr., B. & O., Baltimore, Md.
 Westcott, G. R., asst. engr., Mo. Pac., Poplar Bluff, Mo.
 Wouison, S. L., br. engr., Mo. Pac., St. Louis, Mo.

Guests

Borrett, P. T., of engr., C. & W. I., Chicago.
 Cayley, W. G. T., Stratford, Ont.
 Jaff, S. R., C. B. & Q., Chicago.
 Liebbourne, W. B., and b. supt., London, Ont.
 Lachy, C. A., gen. insp., C. & N. W., Chicago.
 Sims, H. A., railroad contractor, Chicago.
 Remert, W. A., asst. prof. of e., Armour Institute, Chicago.
 Wheaton, F. L., div. engr., D. L. & W., Buffalo, N. Y.



A Suburban Station on the Lackawanna.

Proceedings of the Engineering Association

The Last Day's Sessions Included the Presentation of Seven Reports and Installation of Officers

THE TWENTY-THIRD ANNUAL CONVENTION of the American Railway Engineering Association came to a close at four o'clock yesterday afternoon after the officers had been installed for the coming year. Although it has been the custom of the association in recent years to complete all of its work on the last day in one session, the discussion yesterday morning was so

valuable that President Downs permitted it to run at some length, with the result that adjournment was taken at 12:30 until 2 o'clock with three reports held over for the afternoon session. The reports presented were those of the Masonry, Rail, Wooden Bridges and Trestles, Economics of Railway Operation, Buildings, Wood Preservation and Rules and Organization committees.

Report on Economics of Railway Operation

Last year the report and the discussion were largely in respect to the theoretical factors which determine the traffic capacity. For that reason the committee undertook to secure data covering actual phases of operation to substantiate or disprove what had been already covered. The data secured covered 23 operating districts, each being somewhat of a problem in itself and more or less complete. It was found that trains can be operated successfully on multiple tracks against the current of traffic and this method should receive serious consideration when it is necessary to secure increased capacity on lines already seriously congested.



L. S. Rose
Chairman

L. S. Rose has been a member of the committee since its organization in 1918, and is completing his second year as chairman. He has long exhibited a particular interest in the operating phases of engineering problems. As division engineer of the Cleveland, Cincinnati, Chicago & St. Louis for six years and later as signal engineer, he gave much attention to the operating possibilities of engineering improvements. As assistant to the general manager for the last three years he has specialized in the study of methods of promoting economics of operation through the more intensive use of existing facilities, a circumstance beneficial to the Association.

REPORTS ON METHODS for increasing the traffic capacity of a railway, the effect of speed of trains upon the cost of operation and methods for the determination of proper allowances for maintenance of way expenses due to increased use and increased investment are contained in Appendices "A" and "B."

A report on the economical operation of trains against the current of traffic on multiple track railroads is contained in Appendix "D," with definite recommendations.

Action Recommended

1. That the conclusions of the committee given in Appendix D, relating to the economical operation of trains against the current of traffic on multiple track railways, be approved and published in the Manual.

Committee: L. S. Rose (C. C. C. & St. L.), chairman; G. D. Brooke (B. & O.), vice-chairman; E. G. Allen, W. G. Arn (I. C.), J. B. Babcock, 3d (M. T. T.), M. C. Blanchard (A. T. & S. F.), J. M. Brown (C. R. I. & P.), J. W. Burt (C. C. C. & St. L.), M.

Coburn (Penna.), H. H. Garrigues (Penna.), H. B. Grimshaw (S. A. L.), R. B. Jones (C. F. R.), E. T. Howson (*Railway Age*), E. E. Kimball (Gen. Elect.), F. H. McGuigan, Jr., F. G. Nicholson (C. & E. I.), J. F. Pringle (G. T.), W. G. Raymond (Un. of Iowa), H. A. Roberts (O. W. R. R. & N.), Mott Sawyer (C. M. & St. P.), R. T. Scholes (C. B. & Q.), D. L. Sommerville (N. Y. C.), J. E. Teal (B. & O.), F. H. Watts (Penna.), J. L. Wilkes (Jacksonville Term.), C. C. Williams (Un. of Kans.), Louis Yager (N. P.).

Appendix A—Methods for Increasing the Traffic Capacity of a Railway

Last year the report dealt in part with a few of the physical elements which more or less determine the capacity of a railroad. The discussion was largely academic and requires results of actual operations to prove its value. For this reason the committee undertook to collect data on the physical characteristics of a number of different roads and the traffic which was being handled, for the purpose of noting to what extent the theory was applicable to practical operation. Replies to a questionnaire have been received covering the characteristics and operating data of 23 operating districts.

It has, therefore, been decided to use one or two of the simpler cases which have been worked up to develop the theoretical discussion a step or two farther so that next year wider applications of the theory can be made.

THE DETERMINATION OF THE TRAFFIC CAPACITY—CONCLUSIONS

1. The committee has not been able to analyze sufficient data to show how close it is possible to approach the theoretical limit of track capacity in actual practice. Two essentially single track divisions with very few passenger trains have been partially analyzed, but the conclusions which can be drawn from the analyses of these two cases cannot be taken as final. Before making final conclusions it is important to know if there are any other divisions which are doing better with equal facilities and also to secure opinions from those operating these divisions regarding their estimates of how soon additional track facilities will be required.

2. It has been found that train operations can be represented by a mathematical law, the development of which was given in an Exhibit A of the committee's report.

3. The application of this law to different sets of observations makes it possible to compare several months' operation of a given division on a more equal basis. Likewise operations of different divisions which are more or less similar can be compared on more nearly the same basis.

4. By such comparisons it is felt that the effect of extreme weather conditions, greater track facilities, characteristics of motive power, character of commodities and supervisory methods on the average time on the road can be more accurately determined.

Appendix B—Effect of Speed on the Cost of Operation—Tentative Conclusions

1. Other conditions remaining unchanged, the cost of maintenance of way increases with increased speed of operation.

Exact relation has not been established nor can it be established alike for all conditions of track, roadbed and traffic.

For minor differences in cost due to minor changes in speed not requiring changes in maintenance standards it may be assumed, until experiment proves otherwise, that the cost of maintenance of way varies with speed of operation as set forth in the report of the committee in the Proceedings of 1921 at pages 760 to 772.

2. Cost of transportation will vary materially with variation in speed, but it is not possible to determine in general a most economical speed expressed in miles per hour. The effect of variations of speed will depend on the characteristics of the division under consideration, on the wage system, on the character of the traffic, and on commercial considerations.

a. Since varying speed affects the load that can be hauled, the effect of speed cannot be considered apart from the train load. Provided there are no pusher grades, and that the wage system is a straight hourly pay system, traffic that does not require quick movement is moved most economically in maximum trains, defined to be those that can be handled at minimum speed on the de facto ruling grade of the division. Under these conditions the most economical speed for the maximum train is the fastest speed that can be made safely over the division.

b. Subject to the limiting effect of pusher grades and wage system it may be said that with a given weight of train the most economical speed is the fastest that can be made safely over a division.

c. The operating cost is a minimum under conditions "a" and "b" when the resulting speed is the one which permits the locomotive to be operated at the most economical rate of power production.

Appendix D—The Economical Operation of Trains Against the Current of Traffic on Multiple Track Railways

A questionnaire was sent to the chief operating officers of 48 roads whom it was thought might be able to present information on the subject.

CONCLUSION

The replies to the questionnaire have demonstrated that trains can be operated successfully on multiple tracks against the current of traffic in the regular course of business, thereby facilitating their movement and effecting material economies without introducing additional hazards when proper precautions are taken; also in some cases avoiding or delaying the construction of additional main and passing tracks. The following is, therefore, recommended for insertion in the Manual:

Operation of trains against the current of traffic on multiple tracks should receive consideration with other methods whenever congestion, delay or overtime prompt investigation of means of facilitating the movement of traffic or increasing the capacity of a line.

Discussion

(The report of the committee was introduced by Chairman Rose and presented in sections by the various chairmen of the sub-committees, the first section dealing with the methods for increasing the traffic capacity of a railway being presented by G. D. Brooke (B. & O.).

Mr. Brooke: The high ratio of actual track capacity to theoretical track capacity which the committee has been able so far to develop has been about 25 per cent and the highest number of trains per day over a single track railroad for a period of a month is a little below 30. There are doubtless engine districts, single track, in the country which are handling more traffic than that, but the railroads have not reported to the committee.

Hunter McDonald: We have on our line a section of about 45 miles, principally mountain road, where we have to operate over a single track a minimum in normal times of practically 60 trains a day, and we sometimes go as high as 90. The success of that operation is brought about by cooperation among the operating men. The average speed of freight trains over that section is

about 8 mi. an hr. We have lately presented a report to our management to the effect that by the installation of automatic signals and complete interlocking and the absolute annulment of all train orders we would increase the capacity of the line to 12 mi. an hr. The investment in one instance represents about \$125,000, most of which can be recovered when double tracking is resorted to, as against \$2,200,000 for double-tracking. There was also a section of 6 miles of track that was divided into three block controls, and during the 24 years of that operation we moved, if I remember correctly, as high as 119 trains over that single track and 220 trains over the double track.

Mr. Brooke: The committee will be indeed glad to get the information as to this piece of busy railroad. It will be most interesting, I think, for the committee to follow the development of the traffic and to make use of that in developing our studies of the subject.

(J. H. Brown, chairman of the sub-committee on the

subject of operating trains against the current of traffic, next presented that section of the report, the conclusion being approved by the association for inclusion in the Manual. Prof. C. C. Williams (U. of Kans.) then presented the portion of the report relating to the effect of speed on the cost of maintenance of way. The committee also reported progress on other subjects assigned to it.)

C. A. Morse (C. R. I. & P.): I was very much interested in what this committee has done. I have had occasion to try to justify the installing of double track more or less in the last 20 years, and every time I went into the literature to find out what had been said on the subject, I found that everybody was steering clear of it. The committee has it in hand and I hope they will keep at it.

(Mr. Morse then cited some practical problems in second track in which the work of the committee would be of value. The committee was then excused with thanks.)

Report of Committee on Buildings

The preparation of specifications for buildings for railway purposes which was begun last year was continued along similar lines and has resulted in the presentation of specifications covering seven subjects. The proper arrangement of icing facilities is found to have important relationship to economies of operation. Duplicate handling such as the back travel of ice must be avoided as well as the use of tunnels, the construction and maintenance of which are expensive. Since the failures of creosoted structures can be attributed largely to untreated surfaces left by sawing, etc., instructions for field treatment are very necessary.



W. T. Dorrance
Chairman

W. T. Dorrance, who is rounding out his second year as chairman of the committee, is designing engineer of the New York, New Haven & Hartford. In his seven years' service with the committee he has had an active part in the constructive work which it has done in standardizing methods of construction of railway buildings and of the materials which enter into them. The report of this year is a continuation in this respect of those of previous years. Mr. Dorrance's experience on the New Haven, with its intensive development in the industrial centers of New England, gives him a fund of information to draw on in directing the committee's work.

THE COMMITTEE PRESENTED specifications covering seven subjects relating to Appendix A. These covered 64 pages, too long to reproduce here. The committee offered as information a report on ice houses and icing stations given in Appendix B. The committee offered as information a preliminary report on floors for railway buildings in an Appendix C. No matter was offered by the committee for approval and inclusion in the Manual.

Committee: W. T. Dorrance (N. Y. N. H. & H.), chairman; J. W. Orrock (C. P. R.), vice-chairman; G. A. Belden (C. of Ga.), Eli Christiansen (C. R. I. & P.), D. R. Collin (architect), Arthur Crable (H. V.), W. L. Darden (S. A. L.), F. M. Davison, J. B. Gaut (G. T.), A. M. Griffin (A. C. L.), A. C. Irwin (Portland Cement Assoc.), F. R. Judd (I. C.), G. A. Mitchell (G. T.), Hugo Filippi (I. C.), R. V. Reamer (C. of N. J.), C. W. Richey (Penn.), G. A. Rodman (N. Y. N. H. & H.).

Appendix B—Ice Houses and Icing Stations

Ordinarily not enough thought is given to arrangement of rooms and machinery. Poor arrangement will increase the cost of filling a house as much as five or more per cent per ton. This also applies to the movement of ice from storage to cars. Some consider the number of rooms an essential point; the larger the number of rooms, the easier to keep things moving smoothly—in fact, the amount of ice that can be harvested is proportionate to the number of rooms. Wide doors are also a help. The doors must be wide enough to admit a chute built so that the ice can run either way—i. e., wider in the clear than the diagonal of the cake.

An icing station of simple construction is usually a one-room storage with a gig elevator at one end which runs in a vertical direction through the ante-room annex to the storage room. Below the ante-room is an unloading platform of 3 ft. 6 in. above rail. This is not enclosed. Directly above the ante-room is the crusher room to which block ice is delivered. The gig may be reached at any one of the three elevations or at any elevation from the storage side. The opening to the storage side may be enclosed with hinged doors or boarded up and insulated as the house is filled, removing them as the ice is removed. The floor of the ante-room should be pitched, with a trough or gutter at one side. The ante-room is used mainly as a storage space for block ice and carts for handling crushed ice, which facilitates the quick icing of a train. Platforms are usually 12 ft. wide by 200 ft. or more in length and 16 ft. 6 in. high, running parallel to ice house and directly connected with ante-room of same. These ice houses are usually of frame construction, asphalt shingles, and a straw or hay loft constructed between the collar beams and rafters of the roof construction.

A wall construction that has been successful in this type of house is constructed of 2 by 12 studs, placed 24-in. centers, covered on either side with 1 by 6 D. & M., diagonally, and over this a good, waterproof paper. On the interior an additional layer of 1 by 6 is laid; on the exterior, drop siding. The space between the studs is filled with dry, handmade, white pine shavings or similar material which will not pack. To prevent the passage of

moisture to the insulation above, due to capillary action, it is preferable to fill the lower seven to ten feet of wall with granulated cork.

On the interior surface of the building it is desirable to use a good, waterproof paint, or spar varnish. The underside of the roof rafters should be ceiled up, leaving space at the ends of about two feet, forming a channel parallel with the rafters, allowing a circulating space for the warm air to ascend to ridge of the building. There should be an open monitor on the ridge of the roof. This need not be very high—just enough so that the rain will not beat in, and allow enough space for the warm air to pass out. One of the essential points in wall construction is that careful consideration be given to the sill plate that there be no air leaks. This can be effected by the use of offset joint well coated with car glue or other waterproofing material.

Due to the difference in temperature between the exterior and interior, walls exposed to the sun for a large portion of the day, especially south walls, are liable to warp. To overcome this, an additional air space formed of 2 by 6 studs and one layer of drop siding is built on the exterior face of the building after the storage wall is finished. There should be an open space left at the bottom and top for circulation, allowing hot air to pass out at the top.

The floors of some refrigerated houses are constructed of cinders 12 in. thick and in some cases over this a two-inch plank floor on sleepers has given good results. The floors should pitch slightly toward the center, so that when the house is filled the ice forms an arch and does not throw any stress on the outside walls. In floor construction, water has to be contended with, due to poor drain-

age, and also where there is a great amount of shrinkage of ice on account of the heat transmitted from the ground.

There seems to be a difference in opinion as to the width of platforms. Some roads build platforms 12 ft. wide; these being constructed of wood posts, joists and 2-in. plank floor, with guide strips for ice of oval iron let down flush with the floor, with slots between for dripping.

On the far side from the track, platforms have a guard railing, usually 3 feet high with electric light poles with an overhanging arm. These poles are generally placed 32 ft. on centers. The arm projects out to the opposite side of the platform so as to get a maximum amount of light at the desired point at side of car. Some roads use island platforms between tracks. This has some advantage, as it allows two trains to be iced at one time.

Salt boxes are installed in connection with platforms. These are spaced about forty feet apart and hung below the floor boards of the platform. The salt is handled by means of a shovel from car to storage box. In some cases elevators are used to carry salt, receiving supply from cars delivered to an overhead bin, using overhead trolley buckets or wheelbarrows to transfer to boxes under platform or other location.

Where crushed ice is handled, loaded wheel carts are stored until train time. Loading is then made by spouts or troughs, which allows for a double deck platform.

Discussion

(The report of the Committee on Buildings was presented by W. T. Dorrance, Chairman, who outlined the work which the committee had been doing during the past year; after which the report was accepted as information by the association and the committee dismissed with the thanks of the association.)

Report of the Committee on Rail

The rail failure statistics for 1920 show that there was a continuous decrease in failures from 1908 to 1917, the latter year being the low one to date, with a gradual increase in failures up to 1917. The figures for 1916 and 1917 are, of course, based on a study for short periods of service. War conditions were believed to be the cause of the increasing number of failures which will probably reach a peak for the year 1917. Data include both Bessemer and open hearth steel—A schedule for the inspection of steel rails was submitted for inclusion in the Manual, consisting of a chief rail inspector, three or more assistant inspectors, some clerks and a chemist



G. J. Ray
Chairman

G. J. Ray is rounding out his fourth year as chairman and his sixth year as a member of the committee. He has also been active in other work of the association, having served as chairman of the Track Committee for several years and a member of the Board of Direction from 1914 to 1917, and again for the year now closing. He has been chief engineer of the Delaware, Lackawanna & Western for 12 years, during which time this road has carried on an unusually extensive construction program. Mr. Ray has been a keen student of the rail problem for years, and has pioneered in a number of developments relating to both construction and maintenance.

THE REPORT ON THE RAIL FAILURE STATISTICS for the period ending October 31, 1920, is submitted as Appendix A. The committee in Appendix B presented abstracts of the replies to a questionnaire, a discussion of the methods used for the inspection of steel rails and a schedule of Recommended Practice for Inspection of Steel Rails. The committee recommended the schedule of recommended practice for the inspection of steel rails, submitted in Appendix B, be adopted and included in the Manual.

Committee: G. J. Ray (D. I. & W.), chairman, J. M. R. Kelley (C. P. R.), ex-chairman, J. F. Adams (U. P.), J. C. Gault (H. C. & O.), W. C. Barnes, W. C. Gusting (Penn.), P. J. Conroy (N. Y. C. & O.), J. W. Leitch (A. T. & S. F.), L. C. French (C. R. & P.), J. H. Galloway (N. & W.), A. W. Gibbs

(Penn.), C. R. Harding (S. P.), J. D. Isaacs (S. P.), H. G. Kelley (G. T.), H. D. Knecht (M. P.), R. Montfort (L. & N.), A. W. Newton (C. B. & Q.), J. R. Onderdonk (B. & O.), F. S. Stevens (P. & R.), F. M. Waring (Penn.), M. H. Wickhorst, J. B. Young (P. & R.)

Appendix A—Rail Failure Statistics for 1920

By M. H. WICKHORST

This report covers rollings for 1915 and succeeding years and the ages of the rolling would average in track about the years shown below:

1915—5 years	1918—2 years
1916—4 years	1919—1 year
1917—3 years	1920—several months

The tonnages and track miles of rail represented by the statistics in this report are as follows:

Year Rolled	Tons	Track Miles
1915	1,091,876	7,346.50
1916	1,193,905	8,062.10
1917	1,096,395	7,334.40
1918	990,820	6,658.80
1919	989,398	6,676.60
1920	759,071	5,064.20
Total	6,121,465	41,142.60

The average results of all the rails reported on are shown in Table 1, together with the results taken from previous reports, including both Bessemer and open-hearth rails. The measure of the performance of a lot of rails as regards failures is taken as the failures per 100 track miles for five years' service and it will be noted that there was a continuous decrease in the failures from the rails rolled in 1908 with a record of 398.1 to those rolled in 1914 with a record of 74.0. The rails rolled in 1915 showed an increase to 82.4 failures per 100 track miles for five years' service and a study of the records for lesser periods of service indicates that the rails rolled in 1916 and 1917 will show successively increased numbers of failures. This unfortunate performance is probably to be regarded as a by-product of the war and the manufacturing conditions that prevailed during the war and for a while thereafter. Under-maintenance during the same period probably contributed to increase the general failure records, but it is to be noted that the 1914 rails, which have given the best record, also went through the same period of under-maintenance. The general average results for the whole country are presented diagrammatically in Fig. 1. Here again will be noted how the failure curve showed continuous decrease in failures until the present year, which shows an increase. The curve will acquire an ugly hump which we hope will reach its peak in the record of the 1917 rails. As interesting information, the average weight of the rails rolled at each of the mills is presented in Table 2.

In conclusion it may be remarked that the failures had been showing a gratifying decrease from year to year until the World War came on. The "war-time" rollings, however, and particularly the rails rolled in 1917, are not showing up so well, due probably to the unfavorable manufacturing conditions that prevailed when they were made and also to the lack of the usual care in the track that the railroads were able to give them during the same period.

TABLE 1—AVERAGE FAILURES PER 100 TRACK MILES

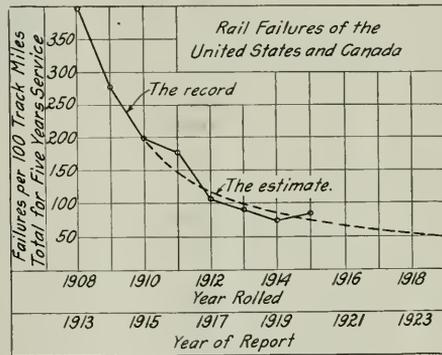
Year Rolled	Years Service					
	0	1	2	3	4	5
1908						398.1
1909					224.1	277.8
1910				124.0	152.7	198.5
1911			77.0	104.4	135.3	176.3
1912		28.9	32.1	49.3	78.9	107.1
1913	2.0	12.5	25.8	44.8	69.5	91.9
1914	1.2	8.2	19.8	32.9	50.8	74.0
1915	0.7	8.9	19.0	34.2	53.0	82.4
1916	1.6	11.8	29.2	47.7	70.6	
1917	5.3	21.6	38.9	66.0		
1918	1.6	8.9	27.6			
1919	2.0	14.8				
1920	3.9					

TABLE 2—AVERAGE WEIGHTS OF RAILS COMPILED FROM TONNAGES USED IN THIS REPORT

Mill	1915	1916	1917	1918	1919	1920
Algoma	90.1	90.1	85.0		94.2	101.7
Bethlehem	98.6	99.2	103.0	104.3	109.3	120.3
Cambridge	102.5	103.4	115.4	118.9	112.1	130.0
Carnegie	89.8	100.7	100.2	104.1	105.6	101.7
Colorado	89.8	89.0	90.4	90.3	87.7	90.5
Dominion	93.3	92.9		85.0	85.0	
Hills	96.7	94.9	92.9	93.3	92.1	95.5
Lackawanna	96.7	94.9	97.1	95.3	95.2	96.1
Maryland	104.4	102.8	106.7	104.2	93.6	85.0
Pennsylvania	104.6	102.0		100.0	101.2	103.0
Tennessee	88.1	88.5	87.9	88.3	89.1	88.6
Average	94.6	94.3	95.1	96.1	94.2	95.4

Appendix B—Recommended Practice for Inspection of Steel Rails

- Chief Rail Inspector.
- Three or more assistant inspectors as size of mill and rate of rolling may require.
- One or more checkers, depending upon rapidity of loading.
- One chemist if check analyses are made in mill laboratory.
 - The chief rail inspector shall supervise the inspection force, mill practice, drop tests and make records.
 - One assistant inspector shall follow the mill practice closely, i. e., time of charging, time of tapping, cutting of tests, etc.; record any irregularities, such as too rapid pouring, charging cold ingots, rolling cold bloom, low finishing temperature, behavior of rails under straightening presses or any other departures from good mill practice which may affect the service of the rails.
 - One assistant inspector for night duty shall make drop tests if necessary and follow the mill practice.



The Rail Failure Record to Date

- One or more assistant inspectors shall inspect the rails on the loading beds for surface defects, straightness, etc.
- One or more checkers shall record the number of rails of each heat accepted and loaded in each car. A record of the car number and the number of rails of each heat in the car shall be sent to the division engineer, the supervisor, the roadmaster or other officer to whom the rails are consigned. This prevents the loading of rails rolled from odd ingots, or the loading of more rails than were originally rolled in a heat, or the loading of rails from rejected heats. It also furnishes a check record of the location of the rails if at any time in the future it is desired to remove the rails of a particular heat for any cause whatever.
- A chemist shall make check analysis of drillings taken from corner of head of the rail, no rails being loaded until the check analysis is finished. The office to which the rail inspection force reports should keep a record of the history of each heat in a convenient form, so the results obtained from the service of the rails may be traced to the manufacture of the steel or rails.

Rail inspectors should be selected with care and men not familiar with rolling mill practice should not be sent to inspect rails except under the supervision of an experienced rail inspector. As far as possible the inspections should be made by the same men, as they then become familiar with the methods of manufacture peculiar to each mill, for no two mills follow the same procedure even though owned by the same company.

Acceptance of heats meeting the technical require-

ments of specifications, but in the judgment of the inspector of inferior quality should be deferred pending decision of engineer of tests after full report and review of conditions; conversely, rejections of heats whose deficiencies may be technical only should be similarly governed. The inspectors cannot be too careful and must exercise good judgment and all possible tact.

Discussion

(The report of the Committee on Rail was presented by G. J. Kay, Chairman, the section under Appendix B, Recommended Practice for Inspection of Steel Rails, being approved by the Association for inclusion in the Manual. The chairman next brought up the question of a revision of the specification which the committee expected to present at this meeting.)

Chairman Ray: During the past season the committee has paid particular attention to mill practice at various mills, and as a result of the studies which have been made the committee thought best to prepare a new specification or to revise the old specification with a view of eliminating segregated steel as far as possible. We have felt it advisable to get the manufacturers to produce the steel in the furnace as far as possible, rather than in the ladle or in ingot. We have before us an experiment specification which has not been passed on by the committee, in which we are endeavoring to get a rail which will be without excessive segregation. This may permit the manufacturer to eliminate the nick-and-break test from the specification. I will say frankly that some of the members of the committee think that it is a mistake to eliminate this test. We do not want to get steel which is piped, but if we permit the manufacturer to roll his steel which contains a pipe in the ingot, rather than segregated steel, we hope to get steel which is safer in the track than much of the steel we get now, which we know is often badly segregated. There is a general impression about piped rails that is not founded on proper knowledge of the situation. If the rail is badly segregated and exceedingly hard, it will be safer on the outside, because the carbon and sulphur are segregated towards the center, and it will break down in the head. That rail is a dangerous rail compared with a piped rail or a rail which has a natural lamination in the center due to the cavity in the top of the ingot. We think that most of the trouble is due to split-head rails, which are caused by bad segregation. Therefore, the specification is gotten up with the idea of producing an ingot which will contain what is known as piped steel rather than segregated steel. We are not looking for piped steel, but we are trying to get away from the segregated steel, and we want to give the manufacturer an opportunity to do that.

C. W. Gennet, Jr. (Robert W. Hunt & Co.): Indisputably the best rails are produced when the steel mills are running constantly, for then the various steps of the process are in better harmony and the machinery and the workmen are keyed to the proper pitch. In 1921 the inspection of approximately two million heavy section rails produced about 1.8 per cent of No. 2 rails and about 1.9 per cent of scrap rails, all so classified because of flaws, which figures are fairly representative of good practice. Of these rails approximately 40 per cent were made to some specification requiring a nick and break test from "A" or top rails and then classifying according to the appearance of the fracture. The number of "A" rails condemned because of showing interior defects on the fracture test amounted to 1.3 per cent of the total rolled under such specifications, but the number from one mill amounted to 0.2 of 1 per cent, while that from another mill amounted to 4.2 per cent. These figures

emphasize the wide difference that may be found in mill practice.

No important change in any customary mill practice has marked the past year, but of course, the times have not been propitious for making either radical changes or improvements. A new rail manufacturer, the Standard Steel Company, has entered the field, however, and among the facilities for rail-making that have been provided in the mill, are the adaptation for delivering long rails, and the disposition into other products, including tie-plates, of what would ordinarily be the "A" or top-rail metal.

Experience has demonstrated repeatedly that the most constant cause of criticism is the incessant fault found with the action of "A" or top rails in track. It is plain that until the mills generally adopt some method of casting hot-top and big-end up ingots the liability of obtaining piped and segregated unhomogeneous steel in the top rails is so great as to require the adoption of more positive methods for combating the difficulties. Testing the top rail of each ingot is one method for protecting against the shipment of inferior metal. In lieu of such testing methods, it has now been deemed practicable to provide for the disposition of the "A" rail metal by agreeing to its use in the form of hot worked tie plates. It is hoped that early in the future, more mills may see their way clear to adapt themselves to such manufacture.

It has been suggested that rail steel should contain a higher silicon content than heretofore has been common in this country, although some English rail steel has long been conspicuous for its high silicon. The English steel contains much less carbon than ours does, and the question of possible brittleness in the high carbon steel containing high silicon and perhaps silica, is important for investigation. No doubt, the more extensive use of silicon, if possible, at the mills, will make the steel more homogeneous in some directions, but it is hazardous to expect it to so reduce segregation as to make that evil a matter of history, and seriousness of the increased piping must not be underestimated.

W. C. Cushing (Penna.): Several large railroads have been considering increasing the weight of rail in use on these roads, and studying the design which they should use in making that change. The Rail committee is not ready to make any report on the subject. It has been estimated that the 130-lb. rail on the Pennsylvania System outlasts the 100-lb. section by 2½ times and is worth 23 per cent more in reduced maintenance on heavy curvature districts. It has also been well established that the failures of 130-lb. rail on the Pennsylvania System are many times fewer than those of the 100-lb. section, notwithstanding the fact that they are located where the traffic and alignment conditions are of the severest. I do not believe that the time has come for making any change in the present adopted "RE" sections, especially as the 100 lb. and 130-lb. sections are now rolled.

Hunter McDonald (N. C. & St. L.): I would like to bring to the attention of the Rail committee with as much emphasis as I can the problem that a number of our roads have before them of recommending an increase in rail section. I know that the tendency of most of the roads having dense and heavy traffic has been to make one big jump from a 100-lb. section or perhaps 105-lb. section to as high as 130 and 136-lb. The committee now has under consideration the using of a 150-lb. section, as announced by the chairman. I think the majority of our membership is much more interested in the establishment and stabilizing of the intermediate sections between 100 and 150 than they are in the completion of the 150-lb. section. The question of whether he is likely to strike what will be the future standard

when he goes from a 90-lb. rail to a higher section, is very important, and it devolves upon the engineer making this recommendation to forecast correctly what the final action of the committee is to be. An effort should be made to stabilize this question as quickly as possible.

I would also like to ask the committee if it will not revive the question of using longer rails than 33 ft.

The President: That concludes the report of the committee, and it is dismissed with the thanks of the Association.

Report of Committee on Masonry

The committee recommended that the paragraph dealing with the permissible variation in the fineness of cement be omitted from the Manual since by agreement among the parties interested it has been omitted from the specifications which, as so amended, have been adopted by the American Engineering Standards Committee as tentative standards. The elimination of this clause will make the two specifications identical in content. In view of the advancement in concrete work, it was recommended that certain changes be made in the Manual dealing with consistency, impurities and steel reinforcement so as to keep the specifications up to date.



J. J. Yates
Chairman

J. J. Yates, chairman of the committee, is completing his third year in this capacity and has been a member of the committee since 1912. During this long period of service he has played an important part in the work. He has served as the representative of the Association on the joint committee on specifications for Portland cement and is now vice-chairman of the new joint committee on concrete and reinforced concrete. As bridge engineer of the Central Railroad of New Jersey he has had an opportunity to obtain a first hand contact with a variety of problems relating to concrete, particularly those concerning its use in salt water.

THE COMMITTEE recommended that the following action be taken on its report:

1. That the following requirement as it appears in the 1921 Manual, covering a variation in fineness of cement, be omitted and the remaining paragraphs renumbered. See Appendix A.)

Permissible Variation.—36. A permissible variation of 1 will be allowed, and all results in excess of the specified limit, but within this permissible variation shall be reported as 22 per cent.

2. That the revisions and additions as they appear in Appendix A be issued as a supplement to the Specifications for Plain and Reinforced Concrete and for Steel Reinforcement as it appears in the Manual.

3. That Appendix B covering specifications for cold drawn wire, Abrams' selective concrete strength tests and the colorimetric test of sands be received as information.

4. That an Appendix C reporting progress of the Joint Committee on Specifications for Concrete Pipe be received as information.

5. That the recommendations of the committee as they appear in its Appendix D be approved as the outline work for the ensuing year.

Committee: J. J. Yates (C. of N. J.), chairman; Job Tuthill (P. M.), vice-chairman; J. T. Andrews (B. & O.), R. Armour (G. T.), T. L. Condon (Cons. Engr.), W. A. Christian, J. E. Freeman (Port. Cem. Assoc.), T. L. D. Hadwen (C. M. & St. P.), Dr. W. K. Hatt (Purdue Univ.), S. C. Hollister (Cons. Engr.), Richard L. Humphrey (Cons. Engr.), Noah Johnson (Wabash), S. A. Jordan (B. & O.), W. S. Lacher (Railway Age), J. C. Nagle (A. & M. Col.), C. P. Richardson (C. R. I. & P.), F. E. Schall (L. V.), Z. H. Sikes (N. Y. C.), F. P. Sisson (G. T.), G. H. Tinker (N. Y. C. & St. L.), C. C. Westfall (I. C.).

Appendix A—Revision of Manual

Since the adoption of a Specification and Tests for Portland Cement in 1917, the allowance of a variation of 1 per cent passing the No. 200 sieve, as provided in the Tests for the Determination of Fineness, has under an agreement by those interested been omitted from the specification. The specification as amended has been

approved on January 15, 1921, as "Tentative Standard" by the American Engineering Standards Committee. The committee is recommending that we omit paragraph 36 in order to make our specification identical.

The Progress Report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete was submitted to the constituent organizations June 4, 1921, and it has been issued to the members of the American Railway Engineering Association. It is the recommendation of the Masonry committee that certain changes and additions to the Specifications for Plain and Reinforced Concrete and for Steel Reinforcement be issued as a supplement to the Manual as follows:

For Paragraph 11, on Consistency, substitute the following:

11. (a) The quantity of water used in mixing shall be the least amount that will produce a plastic or workable mixture which can be properly compacted in the forms and around the reinforcement. Under no circumstances shall the consistency of the concrete be such as to permit a separation of the coarse aggregate from the mortar in handling.

(b) The Engineer shall determine and specify the consistency of the concrete for various portions of the work based on test of the materials to be used. The consistency of the concrete shall be measured by the slump test (for description of test and methods of making slump tests, see Vol. 22, Proceedings for 1921, pages 553 to 564, inclusive).

(c) The consistency of the concrete shall be checked at the beginning of each daily run, and at least once a day thereafter during the progress of the concreting, or when the size of any aggregate or its moisture condition changes.

Under the general heading of Materials, Paragraphs 1 to 7, inclusive, add the following paragraph:

ORGANIC IMPURITIES IN SAND.—Natural sand which shows a color darker than the standard color when tested in accordance with the Colorimetric Test for Sands (see Appendix B) shall not be used unless the concrete made with the materials and in the proportions to be used on the work is shown by tests to be of the required strength.

As a footnote to the section on Steel Reinforcement, Paragraph 7, add the following:

See Appendix C for "Tentative Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement."

Include under section on Steel Reinforcement the following:

Standard Sizes of Bars. Reinforced bars shall conform to the areas and equivalent sizes shown in Table 1.

TABLE 1—SIZES AND AREAS OF REINFORCED BARS

Size of Bar Inches	Area, sq. in. Round	Square
3/8	0.110	.....
1/2	0.196	0.250
5/8	0.307	.....
3/4	0.442	.....
7/8	0.601	.....
1	0.785	1.000
1 1/8	.....	1.266
1 1/4	.....	1.563

The areas of deformed bars shall be determined by the minimum cross-section thereof.

Include under Section 11, on Depositing, Paragraphs 23 to 28, the following provision for Spouting:

SPOUTING.—When authorized by the engineer, concrete may be conveyed by spouting, in which case the plant shall be of such size and design as to insure a practically continuous flow in the spout. The angle of the spout with the horizontal shall be such as to allow the concrete to flow without separation of the ingredients. The spout shall be thoroughly flushed with water before and after each run. The delivery from the spout shall be as close as possible to the point of deposit. When operation must be intermittent, the spout shall discharge into a hopper.

Appendix B—Developments in the Art of Making Concrete

TENTATIVE SPECIFICATIONS FOR COLD-DRAWN STEEL WIRE FOR CONCRETE REINFORCEMENT*

Material Covered.—1. These specifications cover cold-drawn steel wire to be used as such, or in fabricated form, for the reinforcement of concrete, in gages not less than 0.080 in. nor greater than 0.500 in.

Basis of Purchase.—2. When wire is ordered by gage number the following relation between number and diameter, in inches, shall apply unless otherwise specified.

Gage Number	Equivalent Diameter, Inches	Gage Number	Equivalent Diameter, Inches
00000000	0.4900	5	0.2070
0000000	0.4615	6	0.1920
000000	0.4305	7	0.1770
00000	0.3938	8	0.1620
0000	0.3625	9	0.1483
000	0.3310	10	0.1350
00	0.3065	11	0.1205
0	0.2830	12	0.1055
.....	0.2625	13	0.0915
.....	0.2437	14	0.0800
.....	0.2253	.....	.....

(I) Manufacture

Process.—3. (a) The steel shall be made by either or both the following processes: Bessemer or open-hearth.

Drawing.—(b) The wire shall be cold drawn from rods hot rolled from billets.

(II) Physical Properties and Tests

Tension Tests.—4. (a) The wire, except as specified in paragraphs (b) and (c), shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	80,000
Reduction of area, per cent	30

(b) For wire to be used in the fabrication of mesh a minimum tensile strength of 70,000 lb. per sq. in. shall be permitted.

(c) For wire testing over 100,000 lb. per sq. in. tensile strength the reduction of area shall be not less than 25 per cent.

Bend Tests.—5. The test specimen shall withstand being bent cold through 180 deg. without cracking on the outside of the bent portion, as follows:

For wire 0.3 in. in diameter or under a pin the diameter of which is equal to the diameter of the specimen.

For wire over 0.3 in. in diameter, a pin the diameter of which is equal to twice the diameter of the specimen.

Test Specimens.—6. Tension and bend test specimens shall be of the full cross section of the wire as drawn.

Number of Tests.—7. (a) One tension and one bend test shall be made for each 10 tons or less of each size of wire. (b) If any test specimen shows defects or develops flaws, it may be discarded and another specimen substituted.

(III) Permissible Variations in Gage

8. The difference in gage shall not vary more than 0.003 in. from the nominal gage.

(IV) Workmanship and Finish

9. The finished wire shall be free from injurious defects and shall have a workmanlike finish with smooth surface.

(V) Inspection and Rejection

Inspection.—10. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the wire is being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

Rejection.—11. Wire which shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

Discussion

(The revision of the Manual, Appendix A of the report, was presented by the chairman of the sub-committee, W. S. Lacher (*Railway Age*). Following is an explanation of each section, J. J. Yates (chairman of the committee) moved its adoption. All clauses were approved by the Association in turn with the exception of the clause relating to the spouting of concrete.)

Mr. Lacher: The present specification makes no reference to spouting concrete. It is the opinion of the committee that the user of the specification has a right to some information, to some of the best thought, at least, on the subject of spouting, and for that reason the committee at this time submits a specification for the spouting of concrete, this being the clause that the Joint committee has now in its tentative specification. This clause does not say that spouting must be done. It still puts the matter up to the engineer on the job, but if the engineer decides that he does want to permit spouting of concrete, this clause gives him a specification under which that may be done.

Chairman Yates: I move the adoption of this clause for insertion in the Manual.

G. J. Ray (D. L. & W.): I should hate to see that part of the report go into the Manual at this time. As I understand the situation the committee does not recommend and will not recommend to the Association at the present time the adoption of the joint report. This clause is to bring our specification up to conform to the joint report. I think some of us do not yet agree that we should adopt the joint report, and until that is done I hardly see the necessity of putting into our specification a clause which stamps our approval on spouting. I therefore wish to make an amendment to the motion, that this clause be inserted merely as information for the present, and not be inserted in the Manual.

Chairman Yates: There has been a demand on the Masonry committee for a clause on spouting. We have had many discussions on this subject, both in the Joint committee on concrete and reinforced concrete, and in the Masonry committee itself, and this clause appears therein to meet that demand. It is the best we can do at the present time. It agrees quite closely with the Joint committee's report.

(Motion as amended carried.)

(Chairman Yates then reviewed the work of the committee with respect to the Joint committee for concrete and reinforced concrete.) * * *

Mr. Ray: I would like to call the attention of all concerned to the importance of this report. This Association is going to be called upon in another year to pass on this joint report or this tentative report which is now before us, and it is of the utmost importance that every man in the Association study that report and be prepared to submit to this committee his conclusions and recommendations with respect to it. The suggestion that the contractor will be required to make concrete which will meet definite requirements as to strength is an all-important and far-reaching proposition. My own thought

* From A. S. T. M. Technical Bulletin, 1909, p. 41.

is at this time, after looking it over quite carefully, that it will mean a very material increase in the price of concrete if it is put in under that specification. I have during the past season been carrying on a few tests in an experimental way in actual practice to see what we could do ourselves in meeting the requirements of that specification. I have been amazed to find out how difficult it is for us to do it. If we cannot do it ourselves, how

can we expect the contractor to know what he does when he bids on our work?

Chairman Yates: The Joint committee's report is a preliminary report, and there is no doubt there will be many modifications and changes, and we want the benefit of discussion on this matter.

(The committee was dismissed with the thanks of the Association.)

Report of Committee on Wood Preservation

A revision of the Manual covering the retention of creosote oil in timber and the permeation of the sap wood was submitted to change the specifications for the preservative treatment of wood by the empty cell process with final vacuum. As everyone who is interested desires definite information regarding tie life, nothing but completed tests should be published in the future. Due to the price and scarcity of creosote oil, it was thought imperative that, in order to treat sufficient ties and to secure the greatest economy in tie life, the Burnett process should be used. Good creosoting offers the best protection to marine piling found so far.



C. Marshall Taylor
Chairman

C. Marshall Taylor is completing his fourth year as chairman and his twelfth year as a member of the committee. He has also been president of the American Wood Preservers' Association during the last year. Mr. Taylor is an enthusiastic advocate of the more extended use of treated timber by the railways and has done much to stimulate its consumption individually and through association activities. As superintendent of the Port Reading creosoting plant of the Philadelphia & Reading and the Central Railroad of New Jersey, he has been able to bring to the committee the combined viewpoint of the plant operator and the railway engineer.

PROPOSED CHANGES or additions to the Manual are indicated by italics in the appendices. In Appendices

A, F and G the committee submitted changes and additions and recommended their adoption under the heading of "Conclusions." In Appendix B the committee submitted tables (omitted here) indicating the life of ties treated with zinc, zinc creosote and creosote, taking as a basis the service life of ties of the different kinds of woods in various sections of the country. Also, the committee made definite recommendations covering the selection, installation and record of test sections. In an Appendix D the committee on Pacific Coast Marine Piling gave the history of the protection that has been used in that territory, and also submitted information concerning the biological phases of our problem, together with records of some structures that have given excellent service in that district. The committee on Research covering Marine Piling gave a full report of the investigations that have been carried out in this country and abroad considering a problem that has come to the attention of engineers the world wide. A brief summary of this report is given in Appendix E. In Appendix F the committee submitted for adoption definite additions to the General Requirements, and which are recommended for adoption as Recommended Practice under the heading of "Conclusions." In Appendix G the committee submitted additions to the General Requirements and recommended them for adoption as Recommended Practice under the heading of "Conclusions."

Conclusions

The committee made the following recommendations to the association for adoption and publication in the Manual:

Subject (1)

(a) Revise specifications for the Preservative Treatment of Wood with Creosote Oil (Empty Cell Process with Final Vacuum).

(b) New specification for Preservative Treatment to be used on Piles and Timbers in Land Construction.

(c) New specification covering Methods for Storing Lumber and Piling for Air-seasoning Preliminary to Preservative Treatment.

Committee: C. M. Taylor (C. of N. J.), chairman; S. D. Cooper (A. T. & S. F.), vice-chairman; F. J. Angier (B. & O.), R. S. Belcher (A. T. & S. F.), H. C. Bell (N. & W.), E. H. Bowser (I. C.), Z. M. Briggs (Penna.), W. E. Burkhalter (O. W. R. R. & N.), H. A. Dixon (C. N. R.), C. F. Ford (C. R. I. & P.), Andrew Gibson (N. P.), C. E. Gosline (D. L. & W.), W. L. R. Haines (Penna.), E. B. Hillegass (A. C. L.), R. H. Howard (Wabash), A. B. Ilsley (Sou.), W. H. Kirkbride (S. P.), J. K. Melton (I. C.), J. F. Pinson (C. M. & St. P.), B. H. Prater (O. S. L.), H. von Schrenk (Cons. Engr.), W. D. Simpson (S. A. L.), O. C. Steinmayer (St. L.-S. F.), J. H. Waterman (C. B. & Q.).

Appendix A—Revision of the Manual

The committee has revised the specification for the Preservative Treatment of Wood with Creosote Oil (Empty Cell Process with Final Vacuum), as shown on page 332 of the 1920 Proceedings. The third paragraph of the specification has been changed to read as follows:

"The material shall retain an average of at least 6 pounds of creosote oil per cubic foot which will permeate all of the sapwood and as much of the heartwood as practical," and no charge shall contain less than 90 per cent nor more than 110 per cent of the quantity per cubic foot that may be specified.

Appendix B—Service Test Records

There are many different chemical preservatives used, and as creosote oil, zinc chloride, and a mixture of these two, are more widely used than the others, these only will be discussed in this report.

Of these preservatives there is no question about the use of creosote oil being preferable. Zinc chloride and a mixture of zinc chloride and creosote oil are used with much success in certain regions.

The committee is of the opinion that it will be much more desirable in the future to publish nothing but completed tests. Completed tests will be reported each year.

ZINC CHLORIDE (BURNETTIZING) PROCESS

With the present scarcity of creosote oil resulting in high prices, and the large number of cross ties to be

treated, economy demands that some other preservative be used. For some time there will not be sufficient creosote oil to treat the required number of ties. Therefore, it is imperative that the Burnett process of treatment be more widely used in order to secure the greatest possible economy in the use of ties.

Below are given the governing features for maximum service life and economy in the use of ties treated by this process:

Conditioning required for satisfactory treatment:

(1) Preliminary seasoning—Be sure that the ties to be treated have been thoroughly seasoned and that decay has not already begun.

(2) Proper treatment—To secure this the treatment should be supervised by a competent treatment inspector under the jurisdiction of the engineering department of the railroad.

(3) Subsequent seasoning—Care should be taken to see that the ties are thoroughly seasoned after treatment. They should be piled in close piles with end ties on edge (as per sketch), to prevent excessive checking.

(4) All piles should be placed in dry places and kept free from weeds.

Maximum service results will be obtained only upon observance of the following:

(1) Drainage—Good drainage of the roadbed is absolutely necessary to secure maximum results.

(2) Ballast—The ballast should be sufficient and of the best available materials, and should be kept clean.

(3) Tie plates—Tie plates of proper size and thickness should be used on all treated ties to prevent destruction by mechanical wear.

(4) Rail anchors—Use rail anchors where necessary to prevent creepage of rail, and slewing of ties.

(5) Distribution of ties—When practicable use hardwood ties on curves and softwood ties on tangents.

(6) Tie plugs—Whenever it is necessary to re-spike a treated tie, treated tie plugs should be applied, and when possible to do so the spike should be redriven into the tie plug.

(7) "S" Irons—"S" irons should be applied to hardwood ties before treatment, preferably in the woods at time of manufacture, or, if not then, immediately after the inspection.

Appendix E—Research Work on Marine Piling

Wooden piles used in marine construction have since the earliest days been subject to attack by various forms of marine borers, including members of the genera, *Teredo*, *Nyctrotya*, *Limnoria*, *Sphaeroma*, etc. Very little definite information, however, is available with reference to exact distribution of the various forms, their specific identity, the conditions under which they live, influence of temperature and salinity of waters, the methods of reproduction, feeding habits and kindred points.

Realizing the international character of marine borer activities, the National Research Council was appealed to for the purpose of formulating a broad program to co-ordinate the various investigative activities now being conducted and to stimulate additional research work. The committee recommended that the A. R. E. A. continue to actively participate in the prosecution of the research work so necessary for a proper understanding of the habits of marine borers and methods for their control.

Recommendations: The result of examination of service records of piling on all coasts during the past few years leads the committee to recommend that good creosoting will offer the best protection so far found. By good creosoting the committee means a treatment conforming to the recommended practices of the A. R. E. A. both as to oil and treatment. It does not believe that there is sufficient knowledge as yet to warrant the use of special oils and that the A. R. E. A. No. 1 creosote oil should still be regarded as the standard for piling protection.

Appendix F—Preservative Treatment to Be used on Piles and Timbers in Land Construction

The committee recommended the following additions to the General Requirements:

Piling for Land Construction

Treatment shall be in accordance with specifications for preservative treatment of wood with creosote oil (full cell process). The net amount of oil left in the piling shall be not less than 15 lb. per cu. ft. of wood.

Timbers in Land Construction

Treatment shall be in accordance with any of the following specifications:

1. Specification for preservative treatment of wood with creosote oil (full cell process).

2. Specification for preservative treatment of wood with creosote oil (empty cell process, with final vacuum).

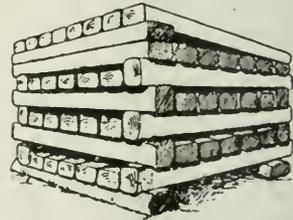
3. Specification for preservative treatment of wood with creosote oil (empty cell process, with initial air and final vacuum).

The various processes of treatment shall be so manipulated as to reach a net retention of not less than 12 lb. of oil per cubic foot in all timbers, excepting bridge ties and guard rails in which the minimum amount may be not less than 8 lb. of oil per cubic foot of wood.

Failure of some creosoted structures in the past can be attributed to untreated surfaces exposed to decay when sawing off piles, framing, and boring of holes. The committee is of the opinion that instructions for field treatment of creosoted materials are very necessary and offered the following:

Instructions for Field Treatment for Creosoted Material

All treated timber and piling which is cut or bored after treatment shall have the surfaces so exposed covered with creosote oil. Where cut, the surfaces shall be painted thoroughly with



Method of Piling Zinc Treated Ties

creosote. Where holes are bored, they shall be poured full of creosote where possible.

Horizontal holes such as those for Stave Brace Bolts shall be filled by pouring creosote into them through a bent funnel.

The creosote shall be heated before using.

Where it is absolutely necessary to bore holes in piles to support scaffolding, or for other reasons, the holes shall not be left open, but shall be poured full of creosote and a tight-fitting creosoted timber plug inserted.

Appendix G—Methods for Storing Lumber and Piling for Air-Seasoning Preliminary to Preservative Treatment

It is the opinion of the committee that the top of the treated sills or stringers used for piling and lumber should be at least 12 in. above the ground instead of 6 in., as now provided; and it is suggested that the Manual be revised to read as below, with the changes underscored:

"Material should not be treated until seasoned. If it arrives at the treating plant in a seasoned condition, ready to treat, it may be loaded directly from the cars to the trams; otherwise it shall be stacked; if ties, they should be stacked in layers of one or two and seven to ten, depending on the width of the ties, with alleys at least 3 ft. wide between rows of stacks extending between tracks, and at least 6 in. off the ground on treated sills; if lumber, it shall be segregated according to size and each layer in the pile shall be separated by at least 4-in. strips with an air space of 1 in. or more between each piece of lumber in any layer. For caps, stringers and other large timbers, 4-in. by 4-in. strips should be used to separate layers in piling, with alleys at least 3 ft. wide between rows of stacks extending between tracks and at least 12 in. off the ground on treated sills; if piles, they shall be stored in a like manner, placing only one length in a pile, using strips 4 in. by 4 in. or saplings of equal size between each layer; reversing all sticks in every other layer in order to keep the pile level, with alleys at least 3 ft. wide between rows

of stacks and at least 12 in. off the ground on treated sills. The space under and between the rows of stacks at all times should be kept free of rotting wood, weeds, or rubbish. The yard to be so drained that no water can stand under the stacks or in their immediate vicinity."

The following paragraph should be added as the next to the last paragraph, under General Requirements:

"In some localities, where weather conditions make it difficult to properly season piling or large timbers, it may be found desirable to locate the piles with ends to the east and west in order to secure direct rays of the sun on the ends of the sticks."

Discussion

(The report of the committee was presented by C. M. Taylor, Chairman. The section regarding the revision of the Manual on the recommended practice for the empty cell treatment with final vacuum was accepted. Mr. Taylor stated that the use of white oak for a standard test tie was acceptable to the committee. He called attention to the successful use of dating nails and urged that the railroads give this method of keeping accurate track of the life of their ties wise and serious consideration. F. J. Angier (B. & O.) stated that although

he had used them for a long term of years, the Baltimore & Ohio had given up the use of dating nails, believing that they were a needless expense when considered in connection with the numerous reports which it is customary to make when they are used. G. J. Ray (D. L. & W.) stated that the Lackawanna had been using dating nails for 12 years and expected to continue as he believed the psychological effect of the nail on the foreman to be good. It was the sense of the meeting that dating nails be used in treated ties.

(The discussion on dating nails was followed by the presentation of the sections on the Preservative Treatment of Douglas Fir and the Treatment of Piles and Timbers for Marine Structures and Appendix E on Research Work on Marine Piling which were accepted as information. The sections in Appendix F dealing with the preservative treatment of piling and timbers in land construction, and the sections in Appendix G concerned with the methods of storing lumber and piling were adopted for inclusion in the Manual.

(The committee was dismissed with the thanks of the Association.)

Report on Wooden Bridges and Trestles

Following out its work on plans for wooden trestles, the committee recommended a number of plans for insertion in the Manual this year covering open deck pile and frame trestles, of both light and heavy design and a standard ballasted deck trestle. While a 12-ft. span was recommended in the progress report last year to avoid the use of large sized stringers it was thought advisable because of varying conditions to include also a 16-ft. span. The use of the open system of stringers with plank covering was considered better for ballasted deck trestles because of its convenience for repair, the lessened tendency to decay and the economical use of material.



W. H. Hoyt
Chairman

W. H. Hoyt has served as chairman of the committee for four years, prior to which he was vice-chairman for the same period. He has been intimately connected with the railway development on the Missabe range since its earliest days, having been assistant chief engineer of the Duluth, Missabe & Northern for 19 years and chief engineer for the last two years. In these capacities he has had supervision over the construction and maintenance of the large elevated ore docks of that road at Duluth. Mr. Hoyt is an enthusiastic worker in the engineering societies, particularly in the Duluth Engineers' Club and the Federated Engineering Societies of Minnesota.

IN APPENDIX A are given the changes and addition to the Manual assigned to this committee.

In Appendix B the committee reported on wooden trestles—open deck, multiple-story and ballast-deck.

In Appendix C the committee submitted a report on fireproofing wooden bridges and trestles.

Conclusions

The committee recommended that the changes and additions to the Manual as given in Appendix A be approved. The committee recommended that the plans for standard Open-Deck Pile Trestles, Light Design; standard Open-Deck Pile Trestles, Heavy Design; standard Open-Deck Frame Trestle, Light Design; standard Open-Deck Frame Trestle, Heavy Design; and standard Ballast-Deck Trestles; be approved for printing in the Manual as recommended practice. The committee recommended that the recommendations as good practice in the report on fireproofing wooden bridges and trestles, as given in Appendix C, be approved for printing in the Manual.

Committee: W. H. Hoyt (D. M. & N.), chairman; A. O. Ridgway (D. & R. G. W.), vice-chairman; H. Austill (M. & O.), O. C. Badger (A. T. & S. F.), C. H. Blackman (L. & N.), H. J. Hansen (C. M. & St. P.), W. E. Hawley (D. M. & N.), H. T. Hazen (C. N. R.), C. S. Heritage (K. C. S.), E. M. Lewis (C.

G. W.), J. B. Maddock (C. of Ga.), D. W. Smith (H. V.), L. L. Sparrow (A. C. L.), G. C. Tuthill (M. C.), A. M. VanAuken, S. L. Wonson (M. P.).

Appendix A—Revision of Manual

The committee recommended the following changes in the Definitions, now in the Manual:

PRESENT FORM	PROPOSED FORM
Cap —The horizontal member upon the top of piles or posts, connecting them in the form of a bent.	Cap —A horizontal member on the top of piles or posts, connecting them to form a bent.
Straight —Having a straight line of an axis.	Straight —Having a right line axis.

Add the following definition:

Ballast Curb—A longitudinal timber placed along the outer edge of the floor on ballast deck bridges to retain the ballast.

Appendix B—Standard Plans for Wooden Trestles

The committee spent a large amount of time and thought on the length of spans to be recommended. In last year's progress report it suggested a 12-ft. span. After careful consideration of the advantages of a 16-ft. span, where flood conditions exist and in zones where western fir can be readily secured, it decided to include both spans. The committee carefully considered the loadings and decided to keep in harmony with those of

the steel specifications, which are Cooper's E-60 and a load which shall not be in any case lighter than three-fourths of the above. The committee believes that for any structures designed to carry more than E-60, steel and concrete will be given serious consideration.

The question of design stresses was carefully investigated and studied. Without holding too closely to fixed stresses, the committee wished to be consistent in the choice of design stresses for all four designs and has, therefore, not exceeded 1,481 lb. per sq. in. in extreme fiber in bending, and 221 lb. per sq. in. in compression between the cap and stringer. The stresses have been investigated on the basis of possible actual sizes, the minimum sizes permitted by the specifications of A. R. E. A., rather than the nominal sizes.

The committee believes that conservation of our present timber supply is necessary and therefore that the use of a 7-in. by 16-in. stringer, which can be cut from the smaller timber is a measure of conservation in that it increases the number of trees which can supply stringer material.

The committee recommended four-pile bent for the light 12-ft. span, five-pile bent for the heavy 12-ft. span, five-pile bent for the light 16-ft. span and six-pile bent for the heavy 16-ft. span, and that the same number of posts be used in timber bents as for the corresponding spans and loadings of the pile bent designs. This gives a consistent series considering the loading and spans without excessive pile loading. All but the center one or two piles are shown driven on a batter to give greater stiffness to the bent.

The committee in presenting plans for ballast deck timber trestles felt that experience indicates that the open system of stringers with plank covering was the better type because of convenience of repair, less tendency to decay and the economical use of stringer material. The committee chose the single span length stringer lapping by on the caps the full width of cap because this plan enables the use of shorter timbers, the removal and repair of one panel at a time, and where creosoted timber is used, the avoidance of cutting the stringers after treatment.

Appendix C—Recommendations on Fireproofing

All locomotives shall have adequate and well maintained spark screens in the front end and ash pans shall be maintained with a tight fit so that fires and hot coals cannot drop out.

The decks of wooden bridges shall be protected from fires starting from hot coals dropped from locomotives, preferably by adopting ballasted deck trestles; otherwise, by covering the deck with rust-resisting sheet metal or covering the stringers and caps with rust-resisting sheet metal.

When ties or other timbers are exposed, all decayed timber shall be kept trimmed off.

All brush and weeds shall be kept cut down for a distance of at least 25 ft. from the bridge, both underneath and on the embankment at the ends of the bridge. Also all sod shall be removed from under timber bridges for a distance of three feet outside of the timber.

Water barrels with buckets shall be maintained on all timber bridges, one barrel each for structures up to 50 ft. long and one additional barrel for each additional 150 ft.

On long bridges it is advisable to protect the bridge by introducing fire barriers at intervals of about 400 ft. This will reduce the hazard by preventing loss of the entire structure in case of fire.

Special fire fighting apparatus and watchman shall be employed in unusual cases where conditions warrant.

Discussion

(A. O. Ridgway (D. & R. G.) presented the matter on changes in the Manual and *moved its adoption*. The motion was carried.)

Chairman Hoyt: The second subject assigned to the committee is "Wooden Trestles—Open-Deck, Multiple-Story and Ballast Deck." *I would move the acceptance of the plans for standard open-deck trestles, light design, and also heavy design; standard open-deck frame trestle, light design and heavy design, as given in the committee's report for inclusion in the Manual.*

A. F. Robinson (A. T. & S. F.): In my opinion, this report is all right if it is submitted as a progress report and not submitted for inclusion and publication in the Manual.

There are features in these plans that I do not think any of us would want to accept in the way that they are given. There are some features that are admirable, others not so good. For example, the plans do not give any working dimensions. They say a 12-in. by 14-in. cap, a 7-in. by 16-in. stringer, and all these must have working depths. Another item on the sheet shows that the sills of frame bents are concrete. They are only frames in name. They have the braces at the bottom, but if you are to have a bent that will do service it is best to have a bent with a cap and a sill.

I do not think the longitudinal bracing has been carefully studied out.

To go to the ballast deck, you will find 8-in. by 8-in. ballast guards with vertical bolts down through them. You will not be able to hold these in that position without "S" straps.

It would be interesting, perhaps, to know something about how the unit stresses in the stringer run. I note that they show 7 in. by 16 in. stringers and 9 in. by 18 in. The plans also show 12 in. by 14 in. caps, and also 14 in. by 14 in. They ought to be made one or the other.

In running over hurriedly the 12-ft. panels, the light design, I find that they allow the impact conditions that are required by our steel bridge specifications under the E-60 loading, in which case the fibre stresses show 3,290 lb. per sq. in. In the 16-ft. panel, light design, the fibre stresses in the stringers E-60 are 3,520 lb. Another feature is that we are figuring now on the E-60 loading, but we are going to get heavier loading and we must provide in advance for further increases. Let us hold off for another year; until the committee can get the question of impact and unity stresses in line and have their plans thoroughly and properly worked out. I do not believe any of you would accept the plans presented for drafting room work. I hope the committee will change their recommendation and submit the plans as a progress report.

Chairman Hoyt: Mr. Robinson has referred to several items that will come up later. We are only submitting now the four standard for light and heavy, pile and frame trestles. The committee did not ignore the question of impact by any means. It was thoroughly and carefully considered, but in submitting the plans the committee did so on the basis that the design was amply strong to take care of the strains within reasonable limits, as they would be applied. In adopting the E-60 it was assumed—and I think rightly—that most roads will give consideration to their steel or concrete structures. That is the basis on which they arrive at these points.

On the matter of simplifying the number of spans, it seemed impossible to submit a standard trestle with a

standard stringer, or a standard cap that would fit all conditions. It was the aim of this committee to submit something toward which the designs can be brought, in order to bring about more or less standardization and provide a larger market for standard sized timbers and as to various other points.

Mr. Robinson: As these plans are designed, they will oblige us to use fir timber almost entirely for our stringers. When you get to the 9-in. by 16-in., it is practically impossible to obtain southern pine that is more than 16 in. in depth for stringers. We should not make our design so that it will rule out all of the territory that is supplied with material and stringers from the south.

E. A. Frink (S. A. L.): I would go further than Mr. Robinson in regard to the size of the stringers. Instead of saying that the stringer should not be over 16 in., I

would say that 14 in. would be sufficient. We must not make the mistake of placing too great importance on theoretical designs in a matter where some of the assumptions are somewhat doubtful.

(The motion made by Chairman Hoyt for the adoption of the designs of trestles was carried.)

Chairman Hoyt: *I move that the report of the committee for multiple story trestles be approved and printed in the Manual.*

(Motion carried.)

Chairman Hoyt: *I move that the recommendation of the committee for ballast for trestles be approved and printed in the Manual.*

(Motion carried.)

(The recommendations on fireproofing were approved for printing in the Manual. The committee was then excused.)

Report on Rules and Organization

Some revision of the Manual in respect to the duties of signal maintainers was thought necessary in order to make such rules harmonize with the rules of the signal section of the A. R. A. A part of the report, covering rules of conduct of work, signals and interlocking, was recommended for insertion in the Manual as an addition to the Manual of Rules for the Guidance of Employees of the Maintenance of Way Department. An organization should be developed on the railways which would be responsible for the proper handling of mechanical work equipment and tools. The head of this organization should be a supervisor of work equipment.



W. C. Barrett
Chairman

W. C. Barrett, who is now completing his second year as chairman of the committee and his fourth year as a member of the committee, has been able to bring to it the mature viewpoint of the operating officer with an engineering training. As a trainmaster on the Lehigh Valley and formerly a division engineer, he is in a position to appreciate the importance of well thought out, practical rules for the guidance of employees engaged in the maintenance of railway tracks and structures. Mr. Barrett is a thorough student of fundamental problems and has brought to the work of this committee the results of intensive study to the advantage of that work.

THE COMMITTEE SUBMITTED its report on revision of the Manual in an Appendix A. In its Appendix B the committee recommended for adoption and printing in the Manual, rules for conduct of Signal Work, and presented for information only, rules for the conduct of bridge and building work. The use of mechanical appliances and tools, and organization of labor involved was covered in Appendix C and presented for information only.

Conclusions

1. The committee recommended the adoption of that portion of Appendix A covering duties of signal maintainers, and that these rules be substituted for those now appearing in the Manual under the same heading.
2. The committee recommended the adoption of that portion of Appendix B covering rules for conduct of work, Signals and Interlocking, to be added to the "Manual of Rules for the Guidance of Employees of the Maintenance of Way Department," and printed in the Manual.

Committee: W. C. Barrett (L. V.), chairman; E. H. Barnhart (B. & O.), vice-chairman; F. D. Anthony (D. & H.), D. P. Beach (Penna.), H. L. Browne (C. B. & Q.), S. E. Coombs (N. Y. C.), J. L. Downs (I. C.), H. H. Edgerton (C. G. W.), J. M. Fair (Penna.), R. H. Gaines (T. & P.), R. H. Hallsted (Mo. Pac.), H. H. Harsh (B. & O.), B. Herman (Sou.), E. F. Manson (C. R. I. & P.), E. L. Martin (M. K. & T.), R. N. Priest (A. T. & S. F.), R. E. Warden (M. P.), A. A. Woods (Sou.).

Appendix C—Use of Mechanical Appliances and Tools

The committee recommended the following organization for handling and care of the work equipment of a railroad. At the head of this organization there should be a supervisor of work equipment, reporting to the chief engineer, or to the chief engineer of maintenance. This officer's duties include the following:

He has charge of all work equipment including—Hoists or clam shells, in the yards, at the roundhouse or out on line; hoists in the store department; steam shovels; ditchers; spreaders; motor cars; weed mowers; tie tampers; rail layers; portable rail saws, etc.

He arranges for systematic inspection of equipment.

Instructs operators in charge of equipment.

Has charge of all equipment inspectors.

Has general supervision over district or division repairmen on special equipment.

Arranges for distribution of equipment and transfer of equipment when so directed by his superior officer.

He has charge of repair shops where machines are repaired if there is sufficient work to justify one shop, otherwise he instructs and directs shop superintendent as to nature and amount of repairs to be done.

Engineers on hoists and every one above the rank of laborer on all steam work equipment are employed by the supervisor of work equipment and then are turned over to the division forces. But, they must be satisfactory to the division men to whom they report. They are responsible only to the supervisor of work equipment for care of the machine they are in charge of.

ORGANIZATION OF OUTFITS

Steam Shovels.—The equipment moved over the system as a unit includes a shovel, a bunk car, a tool car and dump cars. The crew comprises an engineer, a crane-man, a fireman and a watchman. They are employed by the supervisor of work equipment and carried on the division payroll.

Ditchers: Each one is considered as a complete unit and moved together over the system. It consists of a ditcher, a flat car, a dump car, a bunk car, a spreader and a clam shell attachment.

The crew comprises an engineer and a fireman, employed as wanted through the supervisor of work equipment. Labor is employed by the division where the machine is in operation.

Locomotive crane: Includes a crane, a bunk car and a boom car. The crew comprises an engineer and a fireman, employed as wanted by the supervisor of work equipment.

Spreader: One operator, employed as wanted by the supervisor of work equipment.

Portable Rail Saw. (Industrial Iron Works, Bay City, Mich.)—Mounted on a car and moved over the system. Has no power of its own. Uses a locomotive to furnish steam. Takes a day to dismantle and three days to set up. The side rods are taken off the locomotive and it is then blocked to the track and is used as a stationary boiler. The crew includes a foreman, an engineer, a crane-man and a fireman, employed by the supervisor of work equipment and carried on the division payroll. Laborers, employed by the division, 2 drillers, 2 chippers, 2 on car old rail is on; 2 air hoists; 5 tablemen; 2 loaders; 3 on the ground at odd jobs. The largest output is 376 rails complete in 8 hours, drilled, chipped, and loaded on cars. Average daily run during the year, 366 rails.

System of Repairs.—Inspected. Repair parts ordered and sent to where repairs are to be made. Work list is made out showing what is to be done. Engineer of the machine is sent to the shop where the repairs are made and oversees the work done.

Distribution of Machines.—The distribution for the season is fixed by the supervisor of work equipment in conference with the chief engineer or chief engineer maintenance of way, or whoever decides for the whole system what the outline of the season's expenditures is going to be. Points to consider: Men who operate the machines should be so assigned as to be nearest their homes. New machines should be put on the hardest work. Sources of water and fuel for the machines come in for thorough consideration. The individuality of the men is better adapted to some locations than to others. A little powder work of blasting can be done by some men and not by others.

Division Repair Shops.—These are used for motor cars only, but they can also be used to repair track mowers and other small maintenance of way equipment.

Motor Cars.—District Inspector.—One to about 4,000 miles—700 cars. Reports to engineer maintenance of way of the district. Looks after motor cars and tie tampers.

Division Inspectors.—One or two motor car inspectors to each division, 30 to 40 cars to each inspector. Reports to division engineer.

Each has a standard list of parts, and keeps in stock one or two extra power plants, motor engines for the cars. He travels on a motor car of his own, and carries an outfit of tools, and small repair parts. He makes minor repairs and adjustments in the field and instructs the foremen in the care and operation of the cars. If he finds a bad power plant on a car, too bad to be repaired on the ground, he sends in for his extra engine and when it arrives installs it. Does not handle steam shovels or water service.

Reports on Motor Cars.—Each car the inspector inspects and repairs he reports on and the report is signed by the foreman, to whom car is assigned. This gives the supervisor information on what their foremen are doing to keep up their cars.

Discussion

The report was presented by W. C. Barrett, Chairman.)

Chairman Barrett: In taking up the work of promulgating rules for signal interlocking we discovered that the signal section of the American Railway Association had formulated rules covering the duties and work of signal maintenance employees, and these rules had been approved by the American Railway Association. The committee thought it would be proper for us to go over our rules already in the Manual covering signal maintenance, and make them agree with the rules already formulated by the signal section and approved by the American Railway Association. I move

you that the rules for signal maintenance be approved by this Association for printing in the Manual.

C. E. Lindsay (N. Y. C.): Did the committee consider these rules from a strictly maintenance standpoint, and are there any objections to them from that standpoint?

Chairman Barrett: The rules were really gotten up in the first place largely from that standpoint, and the only revision was in order to make them agree with the rules that the signal section had promulgated.

(Motion carried.)

Chairman Barrett: I move that the report of Appendix B covering signals and interlocking, be approved by this Association for printing in the Manual.

(Motion carried.)

(The balance of the information in Appendix B was then presented and accepted as information only, as well as Section 3 on the use of mechanical appliances and tools and the organization of labor, after which the committee was dismissed with the thanks of the Association.)

Closing Business of the Association

With the closing of the presentation of the committee reports E. A. Frink (S. A. L.) stated that a number of members of the Association regarding the American Engineering Standards Committee. This committee does no constructive work on the formation of standards—it is simply in effect a clearing house, an executive body that considers forms of standards submitted by interested bodies. He thought that it would not be necessary to get standards into finished form before submitting them to the Standards committee, thus saving time and labor by letting that committee do the work. C. A. Morse (C. R. I. & P.) took exception to this, stating that it was the duty of the Association in working with the Standards committee to see that the work of the committee did not interfere with good practice on the railroads. J. L. Campbell (E. P. & S. W.) moved that the relation of the A. R. E. A. to the A. E. S. C. be referred to the Board of Direction with power to act. Following this motion, the new President, Mr. Campbell, took the chair and after a short talk, declared the convention adjourned.



At the Albuquerque Timber Treating Plant of the Santa Fe

EDITORIAL

Railway Age

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Positive Public Regulations Work

THE PURPOSE of public relations work is to make the public understand the problems of the railroads, appreciate the benefits they confer, and comprehend why their managements cannot make lower rates or give better and more adequate service unless the public will permit the creation of conditions which will make these things possible.

Public relations work should be both positive and negative. In the past it has been too largely negative. It has been restricted too narrowly to remedying conditions which caused and justified complaints about service instead of preventing development of the conditions in the first place. It has consisted too largely of explaining transactions after they have been criticised instead of explaining them promptly in order to prevent misunderstanding and criticism of them. It has been devoted too much to disproving charges of mismanagement which never could have been effectively made if the good features in railroad management had been pointed out to the public before the misleading attacks upon it had occurred.

In 1920 the railways made the best record for safety in operation in their entire history. In spite of the great increase in their mileage, in the number of employes and in the amount of traffic handled they killed fewer people than in any year since 1899. This remarkable achievement should have been made known through advertising to all the people of the United States. Attention was called to it in an editorial in the *Railway Age* which was reprinted in many newspapers. It was not, however, given anywhere near the publicity it deserved, and consequently the railways did not get anywhere near the credit for it they deserved. In many cases a single accident has been given more publicity and has influenced the attitude toward the railways of more people than all the facts about the accident record of 1920, which reflected the results of ten years of effective "safety first" work. Adequate public relations work of the right kind would have brought this remarkable achievement to the attention of the people in every community.

Many passenger trains are late. Many people think most of them are late. The percentage of passenger trains on time on the leading railways of the country is, however, relatively high. The public ought to be given every good record of "on time" performance so that it may not base

its opinion of passenger train service on the relatively small number of cases where trains are late.

The average capitalization per mile of the railways of the United States is the smallest of any important system of railways in the world. The comparative statistics regarding railway capitalization in this and other countries should be presented to the public over and over again through advertising. This positive presentation of facts will, in the long run, produce more effect than all the refutations that can be made of charges that the railways are overcapitalized.

The rapid development, and the great increase of wealth and comfort in the United States have been mainly due to the rapid development of our railways and to the fact that they have been the leaders of the world in providing cheap transportation. Every railway has a history which, if skillfully and interestingly told through advertising as a part of the history of the territory and the communities it serves, would tend to make the public understand and appreciate it better.

Great pleasure can be derived from a trip by railroad under favorable conditions. The railroads have spent large amounts of money for advertising to tell the public about the attractions of Colorado, California and Florida. Why not spend some of this money to call the public's attention to the comfort and safety with which the railway trips may be made to these places and to the perfect organization, the fine equipment, the good roadbeds, the block signal systems, which have to be provided and are maintained at great expense to make these long trips by railroad in comfort and safety possible?

These are but a few examples of innumerable forms of public relations work besides arguments about valuation, wages and "states' rights" which could be and ought to be carried on with benefit to both the railroads and the public.

In order to sell anything permanently to the public at a profit the public must be convinced that it is a good thing and that those who sell it are entitled to make a profit on it. The railways must adapt to the conditions in their business the methods of salesmanship, publicity and advertising used by concerns of other kinds if they are ever to so sell their service to the public as to cause the public gladly to pay what it is reasonably worth.

If we contrast the price of goods to the producer with the cost to the consumer, as compared to the difference which existed seven years ago, we will find that the spread is now much greater. This distortion seriously affects the interests of one or both parties. It is particularly severe in the case of the former. The economic balance must be reestablished in the United States as soon as possible. A considerable part of the increased spread is due to taxation and there is very little likelihood of this being materially reduced for a long time. The other alternative is to restore the balance by increasing the efficiency of production, transportation and distribution. The last two phases are of special interest to the railroads. The last point—distribution—makes an especial appeal to railroaders from the standpoint of reducing the costs of handling freight at terminals and also through direct or store door delivery in large cities. While much consideration has been given to these questions in recent years, the economic urge at the present time is such as to force focusing greater attention upon them.

Short Time-Limit for Damage Claims

If you were to ride on a drover's pass on the Oregon Short Line, and were to be injured in a collision or derailment by the railroad's fault, you would need to be alert to present your claim for damages; for one of the conditions of the pass stipulates that claims must be presented to the general manager in writing within 30 days; a claim presented after that would have no standing in a court. This is the decision of the Supreme Court of the United States, as reported in our last issue, page 588. The fact that the railroad company's physician knew that the drover was injured and was confined to the hospital for about 30 days did not excuse the claimant for neglecting to write. We do not know how many other roads include such a time limit in the conditions on their passes, but it seems proper to call particular attention to this decision, because of the unusual circumstances, that so far as the lawyers could discover, this point concerning the time limit had never before been presented to any court. The fine distinctions between freight damage claims and bodily injury claims concerning which three of the judges of the Supreme Court differed with the other six, suggest that our courts are not likely ever to go out of business for lack of hairs to split.

The application of paint to railroad equipment by the spraying process may safely be said to have passed the experimental stage. In fact some roads have developed paint spraying to such an extent that a large proportion of all equipment, including both cars and locomotives, is painted in this way. The essential advantage of spraying is the greater speed with which surfaces can be covered, but it is often possible to utilize a lower priced operator than would be necessary with brush painting and the total reduction in labor cost is increased proportionately. Paint can readily be sprayed in corners and crevices which would be difficult, if not impossible, to reach with a brush; and with the proper precautions practically no paint is wasted. While more paint is required to cover a given surface with a spray as compared with a brush, one coat applied by the former method is said to be equal to two applied by the latter and there is a saving of material as well as labor. It has been found possible to spray varnish, in which case an enamel finish is secured and this fact has broadened the field of paint spraying to include passenger as well as freight cars. The possibilities of economy may be appreciated by consideration of a typical

example. A box car has been spray-painted by one 54-cent man in 15 minutes, whereas it would take a 72-cent man about four hours to apply the paint with a brush. The relative amounts of paint used are 9 and 11 gallons.

The exhibit committee of the Railway Supply Manufacturers' Association, which has charge of the exhibit at the Atlantic City conventions of the Mechanical Division and the Purchases and Stores Division of the American Railway Association in June, is facing an embarrassing situation. It has 95,000 square feet of exhibit space at its disposal, not including the space in the balconies in the main entrance hall. This was used two years ago, but did not prove entirely satisfactory. Over 90,000 square feet was allotted at a meeting of the exhibit committee held at Pittsburgh on March 10. Since that time a number of additional applications have been received, some by telegraph. It will be difficult, if not impossible, to provide additional space of a satisfactory sort, and the prospects are that many of those who want to exhibit will be turned away this year. It is not too early to look ahead to 1923 to determine what arrangements can be made to furnish more adequate exhibit quarters for the meeting in that year. The educational value of the exhibit has been more and more appreciated in recent years—the wise exhibitor, realizing this, has studied to make his exhibit as effective as possible from this standpoint. The number of subordinate officers and foremen who visit the conventions, largely to see and study the latest devices and best practices, has steadily increased from year to year, and will no doubt surpass previous records this year. With the success of the exhibit fully assured, it is to be hoped that the Mechanical Division will exercise more than usual care in the preparation of its technical program. Detailed reports on standards and recommended practices are good, as are also studies and research data as to devices and designs. There are, however, more important problems which in the past have not received the consideration which they deserved and which must be recognized in the future if this Division is to hold its own. These include problems relating to the human element, management and operating questions, as well as to a consideration of many of the larger and broader technical problems, including the selection of equipment, and its proper repair and maintenance. Many of these were referred to in special articles which were published in the *Railway Age* of June 10 and August 20, 1921. Will the Mechanical Division measure up to the opportunity which lies before it?

Discussions of contemplated railroad consolidations appear in the public prints in such a variety of interesting forms that it is difficult to avoid being facetious with reference to them. We are, in this note, going to succumb to the temptation. About two years ago there appeared in the *Atlantic Monthly* an interesting article purporting to be an interview with Dame Experience and a description of the work done in her well known School of Experience. Our memory of the article is hazy but as we remember, the theme was that Dame Experience had a large number of pupils who had been attending the school for many years with more or less uncertain results. There were also some comments about the tuition, the expensiveness of which, the interviewer quoted Dame Experience as saying, had not served as a deterrent on the size of the enrollment. This analogy we can apply to Dame Rumor. Apparently she also has a school, one of the most promising departments of which is the class which is specializing at present on the Consolidation of Railroads. Apparently this

The Class in Consolidations

class in Railroad Consolidations had its mid-year graduating exercises last week and some unusual graduation theses were presented. One dealt with the consolidation of the Missouri Pacific and the Texas & Pacific. Another with that of the Ann Arbor and Pere Marquette. A third with the joint control of the Nickel Plate and Clover Leaf. The scholar that presented the last named must have received a degree with distinction because he amplified the idea that probably this meant a new system consisting of the Lackawanna, the Nickel Plate and the Clover Leaf. Dame Rumor's scholars have one advantage that other college men do not have and that is the wide publicity given the ideas they present. This has been especially true of the members of the class in consolidations. Without intending any reference to the consolidations above mentioned, we often wonder how Dame Rumor's scholars must feel in case their ideas prove true after all—that is, in the few cases when they do prove true.

Managements may make rules governing safety requirements and employees may read them carefully, yet no rules of this sort can be 100 per cent effective at all times when, as prevails in the majority of cases, their enforcement depends largely upon the judgment and responsibility of the men concerned. A recent accident, although happening in England, where eight men out of a track gang of nine were killed while working on the line, is an example. In this case the foreman, a railroad man with 19 years' experience, depended upon hearing approaching trains when a train was passing the gang on an adjacent track. Although the rules stated that where danger might arise a lookout or whistle man should be used, the foreman, in his endeavor to get his work completed, evidently assumed this task himself, only to forget it in the performance of the work, such as a foreman may naturally do. As stated, the enforcement of any rule governing safety first, or, to be specific, the use of a whistle-man or the clearing of tracks by track forces, depends largely upon the foreman. If his judgment is sound and his understanding of the risks and hazards involved is complete, the responsibility is well placed, but it is by no means entirely his alone. The dividing line between a safe condition and a hazardous one is not clearly defined; rather it is an area wherein the actual safety or risk at any one point may be influenced or controlled largely by the attitude of the management. If in the matter of whistle-men, the management shows a coolness toward their free use because of financial or other reasons, foremen are going to assume the task themselves and the danger element has increased. Even though there is no coolness on the part of the management there is still a wide difference between passive encouragement and positive encouragement. To be effective, encouragement must be along positive lines, not only for the paramount factor of safety but for more material reasons as well. Men invariably work with greater freedom and perform better when assured of proper protection.

**Safety First
and Management
Responsibility**

The acquisition by the Van Sweringen interests of a controlling interest in the Toledo, St. Louis & Western, as announced by O. P. Van Sweringen last week, is the most interesting development of its kind that has taken place since Henry Ford acquired the D., T. & I. The step establishes a community of interest between the Nickel Plate and the Clover Leaf which should be of far-reaching importance. Benefit should result to both companies concerned and if things work out as one would naturally expect, there will be a considerable effect on traffic relationships in the highly competitive territory between

Buffalo and the Mississippi river. In spite of the Van Sweringen activity in the new terminal project at Cleveland the Nickel Plate has not been much in the public eye in recent months. The road has, however, been doing some exceedingly interesting work. Its success in moving fast freight trains promptly and efficiently has in a measure made it the envy of some of its competing and connecting lines and the road "stands in" extremely well with the shippers. The Nickel Plate operates 523 miles of line all constituted in the main line from Buffalo to Chicago. Its operating statistics would, of course, reflect the advantage of having no branch lines; they also seem to indicate that the road is taking full advantage of its being all main line. The Clover Leaf is similarly a line without branches. It extends from St. Louis to Toledo, 453 miles, and access to Detroit is given through joint control with the Grand Trunk Western of the Detroit & Toledo Shore Line. Connection with the Nickel Plate is made at Continental, Ohio. The Clover Leaf's position in the highly competitive territory it serves should be considerably improved by its being in the same hands as the Nickel Plate. The Nickel Plate will presumably be in a much better position insofar as concerns St. Louis business and it is to be expected that the Clover Leaf will have the advantage in a much greater degree than it now has of Nickel Plate traffic solicitation for the routing via Continental. If the expected happens the Nickel Plate-Clover Leaf route will become one of the leaders in St. Louis-Buffalo fast freight business.

The local agent is one of the chief points of contact between the railway and the public. He is, probably more often than not, a member of the local chamber of commerce or other business organization and upon his ability to represent the railroad adequately depends, to a considerable extent, its standing in the community. The agent should be able to interpret his company, and the railroads in general for that matter, to his fellow citizens. To do this he should be generally informed about the problems of his railroad and be in a position to meet with facts any misstatements or thoughtless criticism which might injure his company or tend to influence public opinion against the railroads in general. With this in mind it was with considerable pleasure that we learned that special meetings of agents with the division superintendents on several divisions of at least one important road had been called to better equip the agents concerning their opportunities in this direction. At one of these meetings each agent was asked to describe the railroad's public relations position in his city. It was found that criticism for the most part was directed at rates. Apparently the general public has a very inadequate conception of the reductions in rates which have already been made. Accordingly it was decided to ask the traffic department for a concise summary of the reductions that had been brought about, in order that the agents might easily give some figures to offset careless criticism whenever the opportunity should present itself. As a good, broad summary of present railroad conditions, Secretary Hoover's recent testimony at the Interstate Commerce Commission rate hearings was read and discussed and copies distributed for further study. Agents were urged to watch local papers carefully for criticism of the railways and to appeal to their superiors for means to meet criticisms which they found difficult to answer. Those in attendance at the meeting seemed thoroughly alive to their opportunities in this field and interested in helping with the work. Enlisting the agents as spokesmen appears to be one of the first steps which a railroad should take in securing public support. It should not, however, be the only effort put forth in that direction.

**Agents
as Railway
Spokesmen**

The agent should be able to interpret his company, and the railroads in general for that matter, to his fellow citizens. To do this he should be generally informed about the problems of his railroad and be in a position to meet with facts any misstatements or thoughtless criticism which might injure his company or tend to influence public opinion against the railroads in general. With this in mind it was with considerable pleasure that we learned that special meetings of agents with the division superintendents on several divisions of at least one important road had been called to better equip the agents concerning their opportunities in this direction. At one of these meetings each agent was asked to describe the railroad's public relations position in his city. It was found that criticism for the most part was directed at rates. Apparently the general public has a very inadequate conception of the reductions in rates which have already been made. Accordingly it was decided to ask the traffic department for a concise summary of the reductions that had been brought about, in order that the agents might easily give some figures to offset careless criticism whenever the opportunity should present itself. As a good, broad summary of present railroad conditions, Secretary Hoover's recent testimony at the Interstate Commerce Commission rate hearings was read and discussed and copies distributed for further study. Agents were urged to watch local papers carefully for criticism of the railways and to appeal to their superiors for means to meet criticisms which they found difficult to answer. Those in attendance at the meeting seemed thoroughly alive to their opportunities in this field and interested in helping with the work. Enlisting the agents as spokesmen appears to be one of the first steps which a railroad should take in securing public support. It should not, however, be the only effort put forth in that direction.

The acquisition by the Van Sweringen interests of a controlling interest in the Toledo, St. Louis & Western, as announced by O. P. Van Sweringen last week, is the most interesting development of its kind that has taken place since Henry Ford acquired the D., T. & I. The step establishes a community of interest between the Nickel Plate and the Clover Leaf which should be of far-reaching importance. Benefit should result to both companies concerned and if things work out as one would naturally expect, there will be a considerable effect on traffic relationships in the highly competitive territory between

So interwoven are all the economic factors which together bring about general prosperity or depression that anyone can well doubt a sweeping statement to the effect that improvement of conditions in agriculture, foreign trade or any other one field of activity is the key to the present situation. The fact is that, in most cases, prosperity in one will more likely parallel than follow prosperity in another industry. That a revival of foreign trade can be expected as financial conditions abroad gradually improve seems to be a safe assumption. There are doubtless ways and means by which this improvement could be expedited. To discuss these matters is the object of the Ninth National Foreign Trade Convention which will be held at Philadelphia on May 10, 11 and 12. These annual foreign trade conventions and the National Foreign Trade Council, under whose auspices they are held, have accomplished a great deal in educating American manufacturers regarding the importance of foreign trade and in the best methods of building up a foreign market. The ninth convention will carry on the good work of the former conventions. The program for this year, however, shows the same lack of appreciation of the importance of the railway transportation and the railway supply aspects of foreign trade that was shown in the preparation of the program for last year's convention, which was held at Cleveland. The American equipped railway abroad is a natural promoter of American trade in other commodities. In many of the foreign countries which are looked upon as the most promising markets for American goods the railways are now operated under European methods and with European equipment, in spite of the fact that under conditions of high tonnage of low grade freight and sparse population American methods have proved their superiority. Furthermore, American investments abroad, which play such an important part in creating a market for our products, go largely into railway construction and equipment. Railway men who appreciate the value of foreign trade as a builder of traffic and supply manufacturers who desire to increase their sales abroad will find much to interest them at this convention. It is unfortunate, however, that those in charge of these conventions are continuing to show such a slight appreciation of the railway and railway supply aspects of the foreign trade problem.

Railway Rates, Coal Prices and Miners' Wages

NO OTHER INDUSTRY is more interested in the present wage controversy between the coal operators and miners than the railroad industry. The railroads buy more coal than any other industry. The necessity for their present rates is due to their present operating expenses and their present operating expenses are due, in a substantial degree, to the prices they are paying for coal. The prices they are paying for coal in turn, are due largely to the present high wages of the miners. The prices the railways are paying for coal have declined substantially within the last year. The average paid by them reached its maximum in December, 1920, when it was \$4.80. It declined throughout the year 1921 until at the end of the year it was only \$3.65. These figures include the freight rates in all cases where railways pay freight on their coal. The average price paid in the entire year 1921 was \$4.14.

The average price paid by the railways in 1916 was \$1.76. Their locomotive fuel in that year cost them \$250,500,000. In 1920, it cost them \$673,000,000. In 1921, owing to reductions both in the prices paid and the amounts of coal consumed, the total cost of fuel was approximately \$557,000,000. While this represents a substantial reduction as compared with 1920, it represents an increase over 1916

of over \$300,000,000, or 133 per cent. Even at the end of 1921 the average cost per ton of railroad coal was more than twice as great as in 1916. The coal mine operators contend that the present freight rates are too high in proportion to the present prices of coal and should be reduced. But the rates are not as high in proportion as the present prices. The railways naturally take the view that as long as the prices are so high they, as the largest buyers of coal, should not be required to reduce the rates on it.

The fact is that the wages of the miners, the prices charged by the operators, and the freight rates of the railways ought all to be reduced in the order mentioned. The present wages of the miners were fixed two years ago when prices of commodities, cost of living, and wages of all classes of labor were at their peak. They are practically the only class of working men who since then have not had their wages reduced. The mine operators should have the support of every purchaser of coal and of railroad transportation in their efforts to secure reductions in miners' wages. Any interference by the Government which may tend in the slightest degree to prevent a prompt and adequate reduction of miners' wages should receive prompt condemnation from public sentiment.

Rolling Tie Plates from Rail Steel

IN SPITE OF ALL the attention which railway men and manufacturers have given the rail problem during the last ten years failures continue to occur in large numbers and the situation is far from reassuring. While progress has been made in eliminating certain types of defects, other and more dangerous ones have appeared in even greater numbers. Although the rails from certain mills appear to show a larger proportion of failures than those from other mills, no mill seems to be immune.

It is common knowledge that the poorer metal is found in the top of the ingot from which the rails are rolled. In recognition of this fact all specifications provide for this metal at the top to be discarded, the amount of this discard commonly being left indefinite under the provision that "sufficient metal shall be sheared from the top of the ingot to insure sound rails." It is to be expected that the manufacturers endeavor to reduce this discard to the minimum since this metal can be used elsewhere only at a loss. That this discard is not in general sufficient to eliminate all of the unsound metal is indicated by the fact that over one-half of all of the rail failures occur in the "A" or top rails of the ingot. In other words, if the "A" rails could be eliminated the failures would be cut in half. Surely this is an objective worth working for, but other uses must be found for this discard.

While this is a manufacturing rather than a railway problem, if the roads can assist in its solution they will aid their own cause. One recent entrant into the rail manufacturing field has agreed to discard all "A" rails and to find use for this metal for other purposes in its plant. The percentage of "A" rails to the total ranges from 15 to 20 according to the size of the ingot, or sufficient to provide a full complement of tie plates for the rails.

The use of tie plates of rail steel is not new, for a number of roads have, for several years, accepted plates which have been rolled from the off-heats or those which have failed to comply with the specifications and they have given satisfactory service in track. The use of high carbon steel-plates is increasing each year, although at the present time over 60 per cent of the plates rolled are still of low carbon content. If the roads which are now using these low carbon steel tie plates should agree to accept those of high carbon steel they would afford an outlet for a large part of the "A" rails and remove the most serious objection which the steel manufacturers could offer to an increased discard.



A 3,250-Ton Train on the Norfolk & Western Hauled by Two 11,000-Volt Alternating Current Locomotives

Effects of Electric Power Used for Traction

The Question of Inductive Interference and Electrolysis as Related to Railroad Electrification

By Professor Chas. F. Scott

THE STEAM RAILROADS of the United States are carefully studying improvements that will enable them to handle their traffic as soon as general business conditions reach a normal state. These investigations naturally bring the question of electrification into prominence and incidentally other problems related to electrical operation. In the past there has been considerable discussion of both inductive interference and electrolysis that may result from alternating current or direct current electrifications. It should be fully recognized that changes in the method of operating such extensive public utilities as the railroads are liable to cause disturbance in exposed circuits of communication companies, if no preventive measures are taken in the individual systems or their mutual relations. This has been the record of the past and the modifications introduced have generally resulted in the betterment of both services to the public. A review of the past and present conditions show that remarkable progress has been made in overcoming the difficulties encountered and that the conditions surrounding interference and electrolysis are now pretty well understood.

Telephone circuits are quite liable to induction from adjacent circuits unless suitable precautions or remedial measures are taken. A second telephone circuit causes cross-talk unless the wires are suitably transposed. Similarly, telephone circuits are liable to reproduce the clicks in nearby telegraph wires. The telephone has experienced some new trouble from each new kind of power circuit during the past 30 years; the direct current railway, arc lighting, alternating current transmission and alternating current railways have produced their own individual and particular problems. In a sense none of these problems have been solved as each condition constitutes a continuing problem; each new case as it arises may have special features calling for particular consideration.

A score of years ago the noise in telephone circuits having a single wire and ground return, which was caused by the ripples in the current to street cars, was taken to the courts for settlement. The telephone has changed its circuits, the

complete metallic circuit is less susceptible to disturbances; the ripples in trolley current have been reduced; and engineering conferences have replaced controversy in court. The improvements have been progressive. Telephone circuits are better insulated; they are better balanced and transposed and changes in apparatus have been made. Power generators have been improved and power circuits are planned in various ways to lessen the amount of induction in parallel circuits. In spite of all these things there remains the inherent sensitivity of telephone circuits to interference rendering each installation a problem for specific consideration.

Difficulty With Early Electrifications

In recounting experience with specific electrifications, it will be found that great progress has been made in reducing interference incident to both direct current and alternating current railways.

The New York, New Haven & Hartford was the first large alternating current electrification put into operation. A commercial telegraph line along the right-of-way requiring reconstruction in part on account of physical hazard was moved to a distance to avoid anticipated inductive interference. The induced voltages were very large but the railroad telegraph lines along the right-of-way continued in service by means of compensating transformers.

When the electrification was extended from Stamford to New Haven the three-wire power system was devised and installed. In the change to the three-wire system on the original electrification, the existing trolleys and feeders were simply reconnected to balancing transformers. A very great reduction in inductive interference resulted, which is satisfactory to the telephone company and enables the railroad to operate its telegraph and telephone service in a cable along the railroad with drainage coils and without compensating transformers.

On the New Canaan branch of the New Haven system, where the conditions were peculiarly difficult, changes were

made which reduced the very severe interference to the telephone when short circuits occurred on the railroad averaging a few times a month (at rare intervals occurring several times a day) to the point where there is little interference.

In the Paoli electrification of the Pennsylvania near Philadelphia modifications in the power system and various measures taken in the telephone plant have very greatly reduced the ringing of the telephone bells and the breaking down of protectors when short circuits occur. Short circuits are now comparatively infrequent.

Another installation, the Norfolk & Western, installed nearly 10 years ago, where the heaviest train service in the world (considering weight of trains, grades and speed) is handled, has not produced serious inductions.

The latest alternating electrification, the Chestnut Hill branch of the Pennsylvania near Philadelphia, profiting by past experience and embodying the latest engineering, has not produced interference.

Summarizing, on some of the single phase railways designed 15 years ago and 10 years ago, there were difficulties which have been greatly reduced or eliminated by changes in the power system and in the telephone apparatus; in the latest railway installed there has been no interference. This is a story of experience which gives good promise for the future.

It may be noted that the methods employed for obtaining this improved service are not revolutionary nor difficult of application but are adaptations of well known appliances or methods to secure the desired results. The early plants were the first in a new field of operation. The data obtained in tests made after installation and under operating conditions in these plants enable calculations to be made beforehand and as a result of the experience thus gained, the handling of future installations is on a very different basis from that which obtained in the past. It may be noted, however, that the conditions which determine the amount and effective position of the railway return current which diverges from the track and flows through the earth are important factors. These are variable elements whose value in a particular locality can be accurately determined only by test. Favorable earth conditions due to networks of underground pipes, may have been a contributing factor in the Chestnut Hill line.

Although it is known that too high induction under ordinary operating conditions may cause interference, a great many engineers have been surprised that the important problem in connection with alternating current railways is not avoidance of noise but that the serious disturbances to the telephone occur only for the instant that high voltage is induced under emergency conditions such as short circuits. It is, therefore, important to consider the matter of short circuits and the methods of minimizing their effects.

A significant comparison has been made between the voltage induced in the telephone circuits by short circuits in an alternating current railway and in power circuits with solidly grounded neutral for a number of corresponding conditions believed to be such as might arise in practice. The disturbance in the telephone circuits was in all cases greater when caused by a power circuit than by a railway, ranging from an increase of 30 per cent to several hundred per cent.

The obvious conclusion is that power transmission circuits with solidly grounded neutral may be expected to produce telephone disturbances of the same kind and even of greater intensity than those caused by electric railways. The latter, however, may occur more frequently as trolley lines supplying locomotives are more liable to accidental short circuit than transmission lines supplying substations.

Comparison Between Alternating and

Direct Current Railways

On the alternating current railroads referred to noise has not been a factor of any consequence but on the Chicago,

Milwaukee & St. Paul, the outstanding direct current electrification, the noise conditions under normal operation were such as to require a remedy which was found by a change in generator construction and the installation of resonant shunts.

Interference with grounded telegraph or other types of grounded signaling may occur due to difference of direct ground potential in d.c. railways. The difference in ground potentials incident to a 3,000-volt installation may far exceed those caused by a 600-volt system.

The greatest problem in telephone interference from alternating current railways occurs at the time of the momentary maximum current or short circuit. The principal effect is the breakdown of telephone protective devices which may result in acoustic shock. If the conditions are made such that the induced voltage caused by short circuit is within proper limits the conditions under normal operation will in general be quite satisfactory.

Under short circuit conditions on d.c. railroads tests have shown that telephone protectors may be grounded by the action of the momentary induced voltages and that light acoustic shocks may be experienced by persons listening on nearby parallel telephone circuits.

Comparison between the effects of a.c. and d.c. short circuits shows that the effects of short circuit surges will be less severe with a high voltage d.c. system than with an a.c. system. While there may not be large differences in the peak voltages induced in the two cases the amount of energy transferred to the communication circuits will be greater in the a.c. case due to the longer duration of the short circuit condition, since the initial transient is followed by several cycles of short circuit current. In the d.c. case, there is only the brief initial surge followed as a rule by a smaller voltage of still shorter duration in the reverse direction, and, as experience shows, the effect is comparatively small.

The remedy for serious inductive interference when short circuit occurs may, therefore, be anticipated in a quick-acting circuit breaker for alternating current. Such a breaker is now being designed and its successful completion will enable the effects of short circuits to be very greatly reduced.

In case of either a.c. or d.c. electrifications, there will be alternating current transmission lines for supplying power to the substations. The transmission lines of 60 cycles for supplying the direct current trolley system give rise to inductive interference which is greater than when caused by a.c. transmission lines of 25 cycles serving the a.c. trolley system. This fact made the use of loud speaking telephones necessary on the Chicago, Milwaukee & St. Paul dispatching telephone circuits.

The New Haven four-track electrification handles heavy traffic through a succession of towns and cities. The Paoli four-track and Chestnut Hill double-track branches of the Pennsylvania provide frequent service to the suburbs of Philadelphia. These alternating current railroads pass through highly congested districts where the effects of interference are liable to be much more serious than elsewhere.

The Chicago, Milwaukee & St. Paul direct current has occasional trains on a single track road extending many hundred miles through the mountains and a sparsely settled country.

The conditions are not comparable. If the initial direct current 3,000-volt electrifications had been called upon to meet the New Haven or Pennsylvania requirements, the experience with direct current operation would have been quite different from that recorded for the Chicago, Milwaukee & St. Paul or the experimental line at Erie, on which the maximum distance for which tests are recorded is 1.8 miles.

The Telephone Circuit

It has been customary to classify as incident to interference with communication system a long list of possibilities.

It does not appear that certain of these possibilities have rarely if ever been realized; for example, magnetization of loading coils, and the breakdown of the insulation of cables or of interior equipment, such as coils, condensers and associated wiring. Nor is there any statement that the overheating of apparatus or a fire hazard are other than apprehensions after many years of experience. They must all, however, be classed as possibilities, although they may never have occurred by induction from railways. Some of these phenomena have been caused by induction from power transmission circuits.

The purpose of the protector (which places short air gaps between each wire and ground) is to form a ready path for high voltages to pass to earth, thus protecting the telephone. The protection, however, is not ideally perfect as high voltages, such as may be caused by lightning or short circuits in parallel electric circuits, may cause acoustic shock. The conditions are delicate and exacting so that improvements are difficult. But an ideal protector would go far to reduce the affect of short circuits, just as an ideal line insulator would go far to prevent short circuits. Ideal perfection in each seems remote, but improvements are much to be desired.

It is generally recognized that precautions must be taken in the layout of both a.c. and d.c. electrifications to avoid interference that will affect the service given by telephone systems. On the whole, the d.c. has an advantage over the a.c. from the standpoint of interference but in planning either a d.c. or an a.c. electrification special precautions must be taken. The precautions may involve special features in the electrification plans.

In both systems of electrification supplementary measures must be taken in the layout of the communication circuits as well as every effort taken to maintain first class conditions in the telephone systems. Generally comparisons that have been made of the relative modifications necessary on electrifications have not been on systems having similar service conditions. While it is recognized that modifications are necessary, definite estimates should be the basis of decision rather than general indefinite assumptions as to complication and expense of some particular feature. Judgment as to the merit of a particular project should be left until the final plans and estimates are completed.

Electrolysis

The effects of corrosion by the alternating current under ordinary conditions of practice may be considered negligible. The well-known electrolytic action of 600-volt street railways occurs also with high voltage systems. The "high voltage," however, implies less current and hence less electrolysis for the same power delivered. Furthermore, much of the mileage of a high voltage railway is presumably in the country where underground pipes are few. These features obviously render the electrolytic problem less serious than it would be if the voltage were lower and there were pipes along the right-of-way.

On the other hand, the power and the current taken by heavy trains reach large figures, and the railways have city terminals and in some cities there is large mileage in the city districts. Chicago, for example, has several thousand miles. Precautions may be taken by arranging short feeding distances, but this implies additional substations and substations with 3,000-volt motor-generator sets and usually with expert attendance tend to increase cost. Substations will necessarily be needed near city passenger terminals and freight yards where heavy currents for starting trains are needed. The corrosion of pipes said to have occurred in the pipe near substations along the Milwaukee 3,000-volt railway indicate conditions which may have far more serious results when the substations are in large cities unless suitable precautionary measures are taken. These should be provided and their cost considered on the same basis as measures to obviate inductive interference in the a.c. system.

Summary

The following specific statements regarding inductive interference, and electrolysis by alternating current railways, supplement the preceding general discussion and the comparison between the effects caused by direct current and by alternating current railways:

1. *Inductive Interference.*—The problems involved are complex, but the conditions are pretty well understood so that provision can be made for mitigating disturbances. In alternating current electrification great progress has been made in handling inductive interference. Theory and the experience gained on several roads under different conditions have been continuously contributing to the solution of the problem. The latest installation has produced no interference. Certain changes in alternating current railway equipment and in telephone equipment will go far to avoid difficulties elsewhere.

In direct current high voltage electrification the experience is practically limited to one system. It is stated that the difficulties there encountered have been overcome by changes in generators and by the addition of the resonant shunts.

Although in both alternating and direct current electrification the general causes and conditions are known, it is important to determine what measures should be taken to meet the particular situation in each case. The problem is to determine the best solution. It may call for modifications in the railway system, or in the telephone system or in both. Determination of the course to be taken should as far as practicable be made before installation and should be such as to involve the least total cost for rendering both services.

2. *Electrolysis.*—The effects of corrosion by alternating currents under ordinary conditions of practice may be regarded as negligible.

Direct current railways, whether at high or low voltage, have the same inherent tendency to corrosion on underground metal by electrolysis. The same kind of remedial measures which are employed in connection with street railways are applicable to the high voltage systems. The cost should be included as a part of the cost of the electrification.

It is generally agreed that inductive interference and electrolysis are matters which should be taken into consideration when an electrification is being planned; that provision be made to prevent difficulties; that the plan should, on general principles, be that which is cheapest, whether this means special arrangements in the power system or in the telephone system, or separation of the two, the plan in a particular case being that which will involve minimum cost.



Photo by Keystone View Company

Students Helping During Strike in Germany

The Burlington Uses Creosoted Cypress Piling

By G. A. Haggander

Bridge Engineer, Chicago, Burlington & Quincy

FOR A NUMBER OF YEARS the Chicago, Burlington & Quincy has been using red oak piles treated with creosote for the larger part of its pile trestle bridges. The results obtained have been satisfactory, but the care required to get the piling properly cut, loaded and seasoned has been very great. At times the market has been such that this kind of timber has been hard to get.

In looking around for a possible substitute it was found that there was a large amount of cypress available close to its lines. This is known as white cypress and is found in south-eastern Missouri and north-eastern Arkansas. It has considerable sapwood and if used untreated would have a short life. Heart cypress resists decay well and it was thought that if the sapwood was thoroughly treated good results as to life would be obtained. After purchasing a small amount of this early in 1921 serious doubts were en-

This pressure was held until the end of the pressure period, at which time the pump did not take anything out of the measuring tank for one hour. A final vacuum was drawn for 30 min. The net absorption was 23.01 lb. of oil per cubic foot.

In treating piling of this kind for regular work it is proposed to leave in about 13 lb. of creosote oil per cu. ft. The piling will be steamed for two hours at a pressure of from 15 to 20 lb. per sq. in. A vacuum will then be drawn and held for at least 15 min. after the maximum has been reached. Before the creosote solution, heated to 180 deg. to 200 deg. F. is introduced, the vacuum will be broken to such an extent that the kick back will be large enough to leave about 13 lb. of creosote per cu. ft. in the pile. Forty-five minutes will be taken to bring the pressure up to the maximum of 150 lb. per sq. in., and it will be held until the refusal point is reached. A final vacuum will be drawn until the piling can be withdrawn from the retort without drip.

About 150 piling, 50 ft. in length, have been driven recently in a river bridge through coarse sand and gravel. The penetration obtained has been 40 ft., but the driving is so difficult that even with the aid of jet pipes an average time of nearly 1½ hours is required on each pile. The piling has

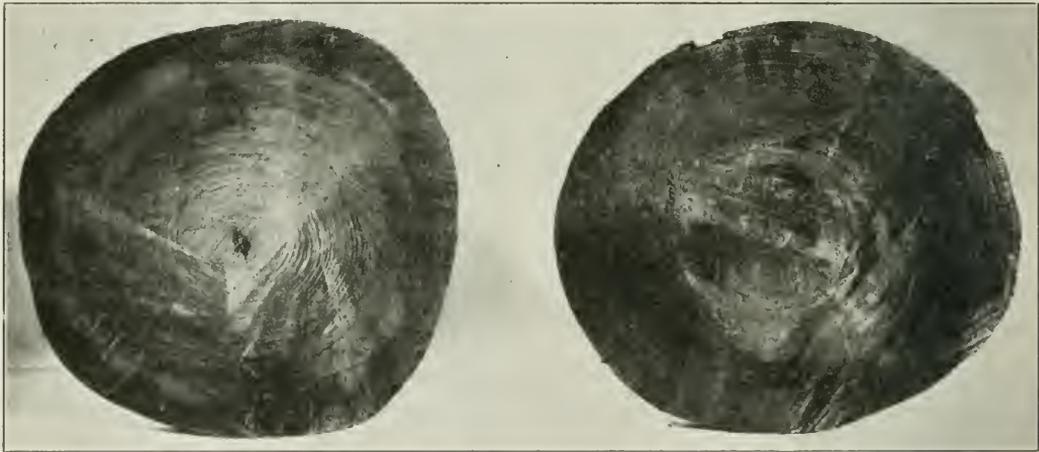


Fig. 1

Fig. 2

tertained as to whether it could be treated properly. Experiences of others were that it was highly resistant to the absorption of creosote and as far as known it had not been treated successfully.

J. H. Waterman, superintendent of timber preservation of this road, felt confident that this particular kind of cypress would take treatment and after the piling had been seasoned somewhat experiments began. The piling was still a little green and the creosote oil not first-class, but the treatment of the first charge was successful. The piling was steamed three hours and subjected to a vacuum for four hours, after which creosote to the extent of 28 per cent by volume was injected. A good penetration was found.

After the piling was seasoned thoroughly and some first-class creosote oil received other tests were made. Charges of piling 30 ft. long and 60 ft. long were treated to refusal, after which some piling was cut to obtain cross sections, and others were tested by means of an increment borer. The piling was first steamed for two hours at 20 lb. pressure. A vacuum was drawn for four hours with a maximum of 24 in. The solution pressure was then applied for 11 hrs. 20 min., working up to the maximum pressure of 175 lb. in one hour

stood up under this severe service in an excellent manner, driving fully as well as red oak and far superior to cedar. Most of these piling were cut 4 ft. from the butt end, and typical cross sections are shown in the illustrations. Penetration in practically all cases is very thorough.

From the data obtained, the treatment can be done satisfactorily; the piling will stand extremely hard driving and the life of the piling will be as great as that of any other kind obtainable on the territory through which the road passes; this, because of a lower cost for the timber, results in a substantial economy.

NO PASSENGER KILLED, or seriously injured, in 1921, is the record of the British (civilian) airplanes, according to a London paper. This record covers an extensive traffic. During the summer, between 400 and 500 people a week were crossing the channel by air, and well over 1,000 a week were being taken up for joy rides in England. Credit is given to the skill of the pilots and mechanics, the aeronautical inspection department and the controller of aerodromes and licenses. Only first class men and machines have been allowed to carry passengers.

Commission Brings Rate Hearings to a Close

Shippers Base Argument for Reductions Mainly on Claim That They Would Stimulate Traffic

WASHINGTON, D. C.

THE GENERAL RATE HEARING before the Interstate Commerce Commission which has been in progress since December 14 was concluded on March 13 after five days of oral argument. The direct argument on behalf of the railroads was presented on March 8, as reported last week. This was followed by arguments on behalf of the shippers and state commissioners, most of whom based their contentions on the theory that rate reductions would so stimulate traffic as to tend to increase revenues. Some did not directly ask for rate reductions but merely asked that if the commission found any reductions justified their commodities should be given early consideration or not be left out. Railroad rebuttal argument on behalf of the carriers was heard on March 11 and 13.

F. W. Putnam of the Minnesota commission devoted his argument mainly to urging a reduction of passenger fares. The present rates, he said, are keeping people from traveling except where it is necessary and are inducing them to ride in automobiles in many cases instead of by train. He urged it particularly, he said, from the standpoint of public relations, saying that whereas 18 months ago the carriers had the good will of the public, now they have the bad will of the public and this condition can be changed if they will go back to a three cent a mile rate. He claimed this would not result in a reduction of revenues.

When Mr. Putnam said that with a normal traffic the present rates would make more than six per cent, Commissioner Potter asked if it is not necessary for the commission to establish a rate basis that will make substantially more than six per cent part of the time in order that the average income shall be a fair return. John E. Benton also made an additional argument on behalf of state commissions.

N.I.T.L. Asks General Reduction If Any

John S. Burchmore, for the National Industrial Traffic League, urged a general reduction of rates as soon as the carriers can stand the reduction on the ground that the rates constitute a burdensome tax on industry. The thinking public, he said, has been in doubt as to the facts as to the ability of the carriers to stand a rate reduction, but the commission should now be in a position to decide as a result of this investigation, and the league took the position that any reduction should be general and horizontal, applied to all commodities, corresponding to the method by which the rates were advanced. He suggested that if the commission should not find a general reduction justified at this time it would have a stabilizing effect if the commission could issue a definite statement that rates will not be reduced for a certain period. He also suggested that the commission should give the railroads moral support by a public announcement that it is the high labor bill that makes high rates.

Commissioner McChord asked if the commission should deal in the same way with other expenses. Mr. Burchmore said the commission could properly do so, but that he did not think the facts were the same. Commissioner Daniels asked if the record before the commission is sufficient to justify it in making such a statement. Burchmore replied that at least the commission should go as far as the record would justify.

Referring to statements that any reduction that could now be made would be too small to be felt if made general, Mr. Burchmore recalled that the commission once took 19,000 pages of testimony on a five per cent advance in eastern territory.

R. C. Fulbright, on behalf of the Southwestern Industrial Traffic League, said that the operating costs during 1921 largely reflected the peak prices of materials and supplies purchased in 1920 and that large reductions have since been made. He also predicted an increase of traffic in 1922 and on this basis declared that under present rates the railroads would earn an excessive income.

S. H. Cowan, representing livestock interests, said that the requirement of the six per cent rule is impossible of fulfillment when taken in connection with the requirement that rates shall be reasonable and is, therefore, not obligatory upon the commission. The livestock industry, he said, cannot pay the rates and survive, while the railroads say they cannot reduce rates and survive; hence the only rule for the commission is to order reasonable rates under Section 1. That, he said, will meet the requirement "as nearly as may be."

Paul E. Blanchard for the National Fertilizer Association, asked a reduction of 25 per cent in rates on farm fertilizer and fertilizer materials. He said that every other factor in the industry except freight rates has been reduced to the 1913 basis, and that for every ton of fertilizer the railroads carry they will have from one to four tons of some other commodity to haul next year. He contended that a reduction in rates would be given to the consumer in the form of a reduction in price and would, therefore, increase buying power.

Thorne Asks That Rates Be Deflated

Clifford Thorne asked a reduction in rates on petroleum and products on the ground of the condition of the producers and the high percentage of freight rate to f. o. b. prices, which, he said, had been greatly deflated. He asked that the railroads be required to make a similar deflation of their rates. He said that the Ex Parte 74 advance had had a demoralizing effect on the industry and over 50 per cent of the refining plants in the mid-continent field are now idle.

Speaking for the American Farm Bureau Federation, Mr. Thorne said:

"We heartily commend the action of the commission in making the reductions on grain, hay and livestock. We appreciate what the carriers did in making the general reduction of 10 per cent on other agricultural products throughout the United States, the first reduction on any basic commodity nation-wide in its extent. But we desire the commission to notice that the general 10 per cent reduction was not proposed by the carriers until after the decisions in the grain and livestock cases had been entered, and not until after a petition had been filed with this commission requesting a general reduction of 10 to 20 per cent on basic commodities throughout the United States. Consequently the assistance and the action of this commission constituted a very potential factor in securing this result.

"We sincerely trust that this commission, or the carriers, will make such further reductions as the facts will justify. For that reason we are profoundly concerned in a fair accounting of the carriers' revenues and expenses and in the determination of that fundamental issue. What constitutes a reasonable rate of return? Specifically, as to agricultural products, at this time we have a few definite recommendations to make.

"First, we believe the reductions previously ordered by this commission as to grain, hay and livestock, should be extended throughout the balance of the United States. The

revenue involved in these further reductions would not be large in extent.

Our second recommendation is that those other farm products which have not received the 10 per cent reduction shall be granted the same. Ground phosphate rock was being produced in the spring of 1920 in large quantities and the plants were going to full capacity; but in the fall of that year, within two months of the effective date of the Ex Parte 74 rates resulting from that decision, half of these plants were closed down and one of the largest went into bankruptcy. We do not believe the railroads would make serious objection to a 25 per cent reduction in the freight rates on this commodity. The facts would seem to warrant such action." He also asked for reductions on seeds and agricultural limestone.

Mr. Thorne said that while the constructive year exhibits showed a net return of 4.8 per cent, or \$907,000,000, based on the traffic of last year, the net for the last half of 1921 was three times as great as that for the first half, and that assuming the increase in tonnage that may be expected, the railroads should earn over a billion dollars, or over 5 per cent for 1922. He said since the tentative valuation of \$18,900,000,000 and the return of 6 per cent were adopted in 1920, wholesale prices have dropped 50 per cent, and interest rates 25 per cent. He also attacked the statements that the showing of 1921 was made largely at the expense of maintenance. If the entire Ex Parte 74 advance cannot now be removed at least half of it should be removed, particularly on basic commodities. Mr. Thorne said, and the case should be kept open for further hearings from time to time as to particular commodities. It is not necessary at this time for the commission to announce a percentage which constitutes a fair return. This should be done only after a careful investigation, he said.

Reduction in Coal Rates Urged

Rush C. Butler, on behalf of the National Coal Association, said that material reductions in bituminous coal rates should be required and are necessary before there can be a revival of business and industry. The economic importance of coal, he said, is such that these rates deserve special consideration and lower rates on coal will reduce the unit operating expenses of the carriers. The rates, he said, should be cut "not by a mere 5 per cent or 10 per cent, but substantially, to the bottom."

C. B. Ellis, on behalf of the Southern Traffic League, took the "constructive year" exhibit filed by the Southern roads based on the traffic of 1921, and by assuming a normal yearly increase in traffic said it showed they would earn more than 6 per cent in 1922.

W. E. McCormack, representing interior Iowa packers, said that under existing rates they cannot compete in trunk line territory. Twenty per cent of their product is fresh meat, but the difference of 40 per cent in the rate on meat over that on hogs has made it impossible to ship the meat at a profit, and they cannot exist under this differential. He asked that the relationship which existed before General Order 28 be restored.

Edwin Brooker, for the National Association of Sand and Gravel Producers, urged a reduction on the ground that the present rates are so high as to produce only a minimum of revenue.

Francis B. James, on behalf of the lake furnace interests, objected because the railroads had reduced ex lake ore rates without similarly reducing the coal rates, in which his clients are interested. He said the railroads were trying to show they had made so many reductions on other commodities that they could not afford to reduce coal rates. He urged a reduction in coal rates as the one commodity that enters into every kind of industry and the one in which a reduction would have the greatest effect in stimulating other industries.

Wilbur La Roe, Jr., appeared for the Chicago Association

of Commerce in place of his partner, former Commissioner E. E. Clark, who had been retained by the association to support the position that any reduction in rates should be general and horizontal. Mr. Clark is ill. If any reduction should be made, he said, it should be a moderate horizontal reduction, with possibly a few special exceptions. The association does not ask for a reduction in freight rates and does not take the position that the decline in business was solely due to freight rates, but it believes that any reductions should be made on a horizontal basis in the way they were advanced.

Mr. La Roe opposed the suggestions made by Secretary Hoover that class rates be not reduced or possibly be advanced, pointing out that they include not only high-class merchandise but also many raw materials and others that are of the same character as articles that are given commodity rates. He also said that an advance in class rates would increase the disadvantage of the l. c. l. shipper. In view of the concentration of coal traffic on certain roads, he said he could not understand how any one who intends to be fair can argue for a reduction of 50 or 75 cents a ton on coal rather than a general reduction. A general reduction, he said, would narrow the increased differentials which are a burden to so many shippers.

Any substantial reductions, Mr. La Roe said, would not be warranted at this time, but the entire country needs help and a rate reduction would stimulate traffic slightly. He said he would not ask a reduction in passenger fares. He suggested that if a 10 per cent increase were made and failed to stimulate business the commission could put the rates back, but he agreed with Commissioner Hall that such action would have a most unfortunate effect.

Speaking for his own clients, Mr. La Roe said that if any general reduction is made, roofing slate should not be left out, on the ground that the present rates are most indefensible because they are higher than rates on prepared roofing. Commissioner Potter asked if it would not be better to stabilize industry on the present rates than to make small reductions now with the possibility of having to increase them later. Mr. La Roe said he could not see how the commission could take any very definite action with the Labor Board occupying the position it does.

R. W. Ropique argued for a reduction in coal rates on the ground that as a basic commodity a reduction would stimulate industry and thus lead to an increase in the tonnage of the coal-carrying roads. The only way to get back to normalcy, he said, is to cut every kind of cost to the bone.

F. L. Ballard asked for reductions on furnace materials and anthracite coal. He said it costs \$13 today merely to "fetch" the materials entering into a ton of pig iron which sells for \$20, leaving only \$7 to buy the materials. The market will not pay more than \$20 and unless there can be a radical reduction in freight rates it is impossible to sell it at cost. Speaking for the anthracite operators not affiliated with railroads, Mr. Ballard urged a reduction to enable a reduction in the price to the consumer.

J. Van Norman, representing the southern hardwood lumber interests, said it is admitted by all that rates are too high and that it is the commission's duty to exercise a business judgment in fixing rates in an attempt to produce a given return. He argued that the commission should reduce rates on raw materials which move long distances and as to which the rate bears a high proportion to the price. In his opinion the only real question before the commission is as to whether a reduction in rates would stimulate traffic so as to increase rather than reduce revenues. Naturally, this question is not susceptible of concrete proof, but he contended that all human experience is that a reduction in price induces consumption.

Asked by a commissioner as to the effect of the reductions ordered by the commission in the Southern hardwood lumber

case, Mr. Van Norman said the reduction were not sufficient to move a pound of lumber, but that they have not yet been put into effect. Mr. Van Norman said that the Illinois Central is pursuing a policy of adjusting its local rates to move the traffic, where it can be done without discrimination and without breaking with the other roads, and that last year it made 11 per cent on its invested capital. "If we had in this country 300 railroad executives like C. H. Markham, business would be on its feet in 90 days," he said.

F. B. Dow, representing petroleum interests, quoted from a speech by W. W. Atterbury, saying that if present rates are long continued the railroads will lose traffic by the relocation of industries to points nearer the markets. The petroleum traffic, he said, is getting away from the railroads to pipe lines and water transportation. The total loss of traffic in petroleum to the railroads in 1921 amounted to 21,000,000 barrels. The railroads handled only 6.9 per cent of the crude oil run by refineries. He said it is now possible to move oil from the mid-continent field to the Gulf, around to the Atlantic coast and inland as far as Cleveland by pipeline and water for the amount of the rail rate from Oklahoma to Ohio.

In reply to Commissioner Daniels Mr. Dow said it is unquestionably true that in general crude oil should be transported by pipe lines but there are many situations in which rail transportation should be cheaper. The railroads have recently removed the Ex Parte 74 advance on exports from Kansas, Oklahoma and Texas to the Gulf and, Mr. Dow said, it had resulted in a large increase in traffic and he insisted that further reductions would be beneficial to the railroads as well as to the industry.

Hoke Smith Asks Reduction on Watermelons

Former Senator Hoke Smith of Georgia appeared on behalf of Georgia watermelon growers to urge a reduction in their rates. He said the present rates will check, if they do not destroy, the watermelon business out of Georgia, but if they are lowered to a figure which will leave a profit for the watermelon growers, with the spread of the boll weevil in Georgia, it is probable that this business will largely increase; lowering these rates so as to encourage rather than destroy the business, will be profitable to the railroads as well as to the watermelon growers.

"The transportation charges averaged in the state \$55.56 in excess of the gross return per car to the growers," Mr. Smith said. It was shown that the average cost of producing a carload of melons, including the marketing, but not including freight, is \$109.75 per carload.

"With the present freight rates the watermelon grower must go out of business. His freight rate, with New York City as the terminal point, from South Georgia points and Middle Georgia points, is between 13½ and 14 mills per ton-mile. Prior to the increase in freight rates in 1918, it was between 8 and 8¾ mills per ton-mile. The rate on watermelons from South and Middle Georgia to New York City, estimated in mills per ton-mile, is more than 25 per cent higher than the rate on iron and steel products from Georgia points to New York City. It is approximately 20 per cent higher than building material to New York City from South Georgia. If permitted to remain, it will kill the business, and stop the freight. While the rate prior to June, 1918, was 8.8 mills per ton-mile, I believe they could stand a rate of 10 mills per ton-mile now. As melons begin to move the latter part of June, and largely move in July, the decreases to save this year's crop from being a loss must take place prior to that time."

Plumb Asks Commission to Avoid Wage Issue

Glenn E. Plumb filed a brief for the "standard" railway labor organizations asking the commission to disregard any evidence and not to enter any orders or findings in any way

relating to the justness or reasonableness of the wages. He also asked the commission to reduce its finding of the aggregate value of the railroad property and to reduce the rate of return to some figure below 6 per cent. In reducing the valuation he suggested that the commission use a figure based on the results of the valuation so far established and he presented a calculation based on the tentative valuations by which he arrived at a figure of \$13,627,589,375. This calculation was based on the relation of value found to capital account. By another method he reached a figure of \$10,806,000,000. The evidence clearly shows, he said, that the prices now charged for transportation act as an embargo upon transportation and the employees are interested in the restoration of a volume of traffic that will lead to a restoration of the former volume of labor employed.

Security Association Wants

Higher Percentage of Return

Forney Johnston, representing the National Association of Owners of Railroad Securities, said the carriers had been conservative in asking that the rate of return be fixed at not less than 6 per cent. He pointed out that the obligation of the commission to prescribe a definite rate of return was entirely distinct from the subsequent obligation of the commission to adjust rates from time to time in the bona fide effort to produce the declared rate of return. In determining the base rate, he urged the commission not to be influenced by the fact that for the time being the return to the carriers on the actual value of their investment is materially below 6 per cent. He stated that whatever ratio might be fixed by the commission as a result of the present inquiry would be likely to endure for several years, as it is beyond the physical capacity of the commission to have repeated prolonged hearings involving changes in the rate of return, and that 6 per cent should not be regarded as an adequate permanent base.

"If accordingly," said Mr. Johnston, "the commission were to feel that in establishing the rate of return its discretion should be influenced by existing adverse conditions, that result would not be accomplished which is clearly contemplated by the statute, that is, the ascertainment and making public of a rate of return which the railroads, regarded as a national system of transportation, are entitled to receive in order to survive on a wholesome basis.

"In like manner, the commission should not regard its obligation to establish this rate of return as if it were sitting as a court to determine the lowest rate of return which would avoid the charge of confiscation."

He also pointed out the difference between the conditions confronting the commission and the conditions which existed when Congress prescribed a rate of return of from 5½ to 6 per cent for the two years transition period, calling attention to the fact that the rate of return intended to prevail during the period immediately following federal control, when the relation of rates to cost of transportation had been entirely destroyed by the rate policy of the administration, was a very different proposition from the declaration of a fair rate of return necessary to sustain transportation in a sound condition after this transition period has passed.

Railway Rebuttal Arguments

Appearing for the Eastern carriers with respect to bituminous coal and coke, W. S. Bronson argued against any reduction being made in the freight rates on coal and asserted that such action would not stimulate traffic.

"Prices of coal, according to witnesses for the coal producers before the commission, have declined approximately \$1 a ton in the last year, but that has failed to stimulate buying," said Mr. Bronson. "Why should a smaller reduction in the freight rate on coal bring about a stimulation in the movement of that commodity?"

Mr. Bronson said that with the railroads using approxi-

mately 28 per cent of the coal output of the country, public utilities, 6 per cent, and householders 10 per cent, little stimulation in buying could be anticipated, as it has been shown that the demand from these sources is fairly constant. Substantially all the remainder of the soft coal produced in the United States, he said, is used by industrial concerns, largely manufacturing. The stimulation in traffic resulting from a reduction in the bituminous coal rates, if there should be any, must therefore come from an increased demand by purchasers of manufactured articles," said Mr. Bronson. "Unless the manufacturer elects to translate his reduction in coal rates into a reduction in the selling price of his manufactured articles, reductions in the coal rates cannot stimulate the movement of traffic.

"A large number of witnesses have said that a reduction in the coal freight rates would benefit industries and some have said that it would stimulate business, but not a single manufacturer, so far as the record discloses, has affirmatively stated that he would translate a reduction in his coal freight rates, thereby reducing his costs of manufacture, into a reduction of selling price of his manufactured articles. Neither has anyone explained how in the absence of a reduction in the selling price of the manufactured articles, stimulation in traffic could obtain."

Mr. Bronson said the fact is that the freight charges on bituminous coal represent so small a proportion of the total cost of all manufactured articles that any reasonable coal rate reduction would reduce the cost of manufactured articles too little to reasonably expect such a reduction to be reflected in the selling price of articles manufactured through the use of coal, while it would reduce the carriers' revenues in the Eastern district millions of dollars annually.

H. A. Taylor, of the Erie, replied to the argument of anthracite coal producers, and A. P. Humburg, of the Illinois Central, discussed the coal rates in the West and South. If the large reductions made in the prices of bituminous coal have had no effect in stimulating business, he asked how a reduction in freight rates can be expected to accomplish the same object. "Does a freight rate dollar contain more cents than a dollar of price?" he asked. Commissioner Campbell asked if the point was not that all kinds of business must be readjusted before conditions become normal rather than the direct effect of a reduction as to any commodity.

"But the transportation machine must be permitted to go," said Mr. Humburg.

"The business machine must be permitted to go, too, and the transportation machine cannot go unless the business machine goes," interjected Chairman McChord.

A 50 per cent per ton cut in coal rates would reduce the income of the Southern and Western districts by \$50,000,000, Mr. Humburg said, and a 75 per cent cut would reduce the revenues \$75,000,000. A reduction in coal rates, he said, would be felt particularly by the roads which handle a large percentage of coal traffic, and some of the same roads have been particularly hit by the reduction on agricultural rates. Chairman McChord asked if the commission should reach the conclusion that reductions can and should be made, what commodities should be selected. Mr. Humburg said he was not prepared to answer that question, but that possibly Mr. Thom would. Chairman McChord said the commission would like to have an answer.

Clyde Brown, of the New York Central, replied to arguments for a reduction of the Pullman surcharge or of passenger fares. He showed that the fluctuations in surcharge revenue have been much less than those in passenger revenue, indicating that this class of travel is less affected by business conditions and pointed out that a reduction of 16 2/3 per cent in passenger fares from 3.6 to 3 cents would amount to \$177,000,000. It would require an increase in business of 20 per cent to offset this, he said.

Fred H. Wessel replied to some of the criticism of the con-

structive year exhibits and pointed out that in January, 1922, the roads earned only about 2.6 per cent and the western roads only about 1.2 per cent.

Mr. Thom's Argument

Alfred P. Thom, counsel for the Association of Railway Executives, made the concluding argument for the carriers. He said that the shippers who want their rates reduced should go to the Labor Board, and he asked the commission to find that rates cannot be reduced until operating costs are reduced by a wage reduction.

Mr. Thom began by replying to Chairman McChord's question, but said there is difference of opinion among railway officers as to whether any reduction should be general or confined to specific commodities and it would not be proper for him, representing all the carriers, to state an opinion. Mr. Thom argued that the case should be considered not from the standpoint of private interest but that of public interest, in adequate transportation and in enabling the railroads to prepare themselves for a period of prosperity. He pointed out that what has been done for the carriers has not been prompted by a spirit of favoritism to them but because of the public interest involved, and that the Transportation Act was adopted as representing a new policy in an effort to provide an adequate transportation system. The question, therefore, is not whether the railroads should share in the public distress or contribute to other industries but whether the carriers shall be enabled to provide for an expansion of business.

The roads are not now in a condition to buy large quantities of new equipment, he said, but they are trying to reduce the percentage of bad order cars from 15 to 5, which would add 250,000 cars to the available equipment of the country. He said that the evidence before the commission is that a reduction in rates by any reasonable amount would not create the demand which is necessary for a restoration of normal business and that the country is not being held back from normality by the freight rates. The shippers who want lower rates should go to the forum where they could get relief by a reduction in the labor costs of transportation, which are the cause of the present freight rates, but, he said, there had been thinly veiled threats of political results if this case is not decided the way certain advocates would have it decided.

"They think the railroads are the line of least resistance," Mr. Thom said, "yet we know there can be no reduction of rates that will not injure these transportation facilities without a reduction in costs. Why can't this commission say so? Without passing on the level of wages you can say that the cost of producing transportation is the impediment in the way of reductions in rates. If you would do that you would get rid of all your perplexities."

On the other hand, Mr. Thom said, if the commission should reduce rates, and the Labor Board should not reduce wages, it would have a deadly effect on the efficiency of transportation.

In reply to a question by Clifford Thorne as to why we cannot "stop babying the railroads," Mr. Thom said the answer is because they haven't the freedom of other industries. He pointed out that the railroads were excluded from the prosperity felt by industry in general during the war and given no opportunity to set aside for the period of deflation to come, while their wages are fixed by one body and their rates by another. He also replied to Mr. Thorne's comparisons of the yield of railroad and industrial securities, saying that the problem of the railroads is how to raise new capital. "Mr. Thorne has been coming here filing his statistics and making his prophecies as to railroad credit for 10 years," he said. "He has been demonstrated to be an unsafe advisor and the commission has found it necessary to repudiate his advice."



Along the Government Lines in New Brunswick

Problem of Government Railways in Canada

Turning of National Lines Over to Canadian Pacific for
Operation Offered as a Solution

By W. T. Jackman,

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WHILE THOSE charged with the operation of the government system placed their main reliance upon a gradually increasing development of traffic over a period of years as the means of reducing and finally wiping out the deficit, the government seemed to lay much stress upon the need of taking over the Grand Trunk and adding it to the other lines if the deficit were to be extinguished. We have already referred to the supposed necessity of thus "rounding out" the government system if it were to be successful in operation, and we have said that this was probably the best reason why the government should take over the Grand Trunk. But when we consult the management of the government system we do not find them enthusiastic as to the good results that might be secured from this inclusion of the Grand Trunk and its co-ordination with the existing organization.

The results of the co-ordination of the Grand Trunk Pacific with the Canadian Northern for operating purposes were described by one of the officials in the following words:

" . . . It has been found possible to close a considerable number of stations, freight sheds, and a couple of engine terminals, besides abolishing numerous duplicate offices, the whole resulting in a substantial decrease in the combined cost of operation. . . . It does not seem possible to eliminate any large proportion of mileage in this way." When asked as to the effect of co-ordinating the Grand Trunk with the other government lines, he said: "Unquestionably co-ordination will result in improved service in some places. On the whole it will tend to increase the volume of traffic, lengthen the haul, and effect savings in certain localities."

These expressions from the man who has charge of operation and maintenance do not hold out very great hope that much economy will ensue from the unification of all these railways under a central management. The mere tendency to effect savings in certain places does not give much en-

couragement that these economies will contribute to any great extent towards the reduction of the \$70,000,000 deficit.

But there is one result which should come with the association of the Grand Trunk with the other lines in the government system; that is, there should be on the latter a larger amount than heretofore of the higher class freight from which greater revenue should be received. The Canadian Northern lines in the east touch but few of the manufacturing centres, where high-class traffic is found in abundance; and even at those centres which it did reach the Canadian Pacific and the Grand Trunk had already established themselves before the advent of the Canadian Northern, so that the latter was handicapped in securing a share of this business. But now that the Grand Trunk is linked with the Canadian Northern its better paying traffic will help to augment the revenue of the National System by having commodities carried all the way across the continent on these lines.

There is little reason to doubt, however, that the boasted advantages of Grand Trunk co-ordination, by which the government system was to be transformed from a financially unsuccessful to a financially successful enterprise, are foredoomed to defective, if even partial, realization. Those persons and places which are on the existing lines of railway will certainly oppose any effort on the part of the management to reduce the character of the service; on the contrary, people are keenly desirous of having the quality of the service improved, and any effort to take off certain trains or to curtail in any other way the facilities for shipment or travel would meet with immediate antagonism.

Had such co-ordination been carried out before the great series of lines were laid down it could have been effective; but when once the network has been completed and the service established on a certain scale, so that businesses located along the line expect the continuation of that service which induced them to establish their plants there in the first place, it would be highly derogatory in many instances to the welfare of the railway, as well as of the country, to permit any significant change in the character of that service. Of course, there

*This is the second of two articles on this subject, the first having appeared in the *Railway Age* of March 11, page 567.

could be, as in the United States during government wartime control of the railroads, the elimination of duplication in ticket offices, freight agents, terminal facilities in some cases, clerical staffs to some degree, and in other similar respects; but the economy effected in these ways, as was found in the United States in 1918, is an almost negligible fraction of the operating expenses of the railway system. It is certain that those who anticipate large savings through co-ordination of the Grand Trunk with the other parts of the national system will find the outcome not in accord with their exaggerated expectations.

Here, then, are the conditions as we have them today: There are included under the government the former Canadian Northern, the Intercolonial, the National Transcontinental and the Grand Trunk Pacific and its branches, amounting in all to about 17,000 miles of line, in the operation of which there was in 1920 a deficit of \$70,000,000 including fixed charges. The Grand Trunk Railway System of over 5,300 miles, which in 1920 paid its operating expenses but fell short of meeting its fixed charges by \$6,563,091.33, has now been added to those just mentioned, so that now there is well over 22,000 miles under government ownership. The different units of this aggregation show each a deficit, as follows:

Canadian Northern:		
Deficit in operation.....	\$16,258,579.80	
Fixed charges:		
Due the public.....	13,837,118.51	
Interest due government.....	10,318,869.97	\$40,414,568.28
Canadian Government Railways (including National Transcontinental, Intercolonial, Prince Edward Island, and a number of shorter railways):		
Deficit in operation.....		10,449,876.43
Grand Trunk Pacific:		
Deficit in operation.....	\$10,134,513.94	
Fixed charges:		
Due the public.....	6,048,950.60	
Interest due government.....	2,475,474.00	
Interest on receiver's certificates for 1920.....	808,351.63	19,467,290.17
		\$70,331,734.88
Grand Trunk Railway:		
Due on fixed charges.....		6,563,091.88

Under these conditions, it seems almost inevitable that when these properties are combined and operated under one management there should still be a deficit; in fact, it is anticipated that the deficit for the next year will be at least \$100,000,000. To continue to pile up such additions to the taxpayers' burdens year after year is nothing short of a crime. The government has persisted in saying that in nationalizing the railways it was carrying out the will of the people, although it never gave the people any opportunity of expressing their wish regarding this issue. Even when the parliamentary committee was appointed in the spring of the present year to inquire into the problem of the National Railways the scope of the inquiry was so circumscribed as to render the work of the committee practically useless.

What is the Remedy?

What is the best way to deal with these financially embarrassed railways, now that they have been grouped under government ownership? It seems as if the only conclusion reached by the government is to let them alone, in the hope that the progress of immigration and the upbuilding of the country may ultimately enable them to pay their way, and in the meantime let the people pay the mounting deficits. At the time of great prosperity, the people sanctioned the construction of railways for the opening up of the great west, and gave largely in the way of national assistance for this purpose. But because people could not foresee the war and the economic depression which has accompanied and followed it is no reason for saying, now, "Let the people pay the price of their undue optimism." Such a fatalistic method of dealing with the problem is not in accordance with the spirit of a progressive people.

The government has virtually acknowledged that it has no other than the existing policy, namely, to drift along and let

enormous amounts of the people's taxes go yearly to the payment of these railway deficits, concerning the accrual of which they have not been allowed to have an effective voice. It is not to be expected, of course, that the government, after pushing its nationalization policy to the present extreme, should acknowledge that this policy has been disastrous. It has reiterated that its railway policy was the only one that was possible under the circumstances, and we could not expect that it would now admit its error. Relief, therefore, must come, if at all, from some other source, for the present government shows no disposition to reconsider the scheme upon which it has embarked.

There are some who really believe in the principle of public ownership, and of these only one man in public life seems to have any suggestion for relief. His plan includes, first, a complete reorganization of the operating end so as to avoid duplication, and cease operating those lines which have no prospect of being profitable; second, to write down the assets to their proper value; and, third, to encourage a sound policy of immigration, which shall place men on the land and thus develop business for the railways. As to the first, there is no question that duplication of facilities has been a great waste. When the railway lines which were formerly in competition are brought under one control, many trains may be taken off which were formerly run unprofitably; there may be considerable saving of capital and expenditures in the matter of terminals; there may be the reduction of some of the expenses of maintenance of way and structures and the number of higher officials in the service may be reduced. In these and other ways there might be economies of operation and maintenance which would be important.

Yet even here there is likely to be exaggeration as to the amount which can be saved. On lines which have been in operation for many years people become accustomed to a certain quality of service and any curtailment of this would be, as in some cases it has been, strongly opposed. The amount spent for maintenance of way and structures will be almost as much whether one train or three or four trains per day pass along the line. The number of officials to take care of a large traffic is little, if any, more than the number required for a smaller traffic, because the work of each is specialized. It is very easy to overestimate the amount which can be saved through the avoidance of duplication. Moreover, to cease operating those lines which have no prospect of paying seems at first thought the part of wisdom. But we must remember that very few such lines have been constructed, especially by private capital; they may have had little traffic at first but the prospect of better things has been the inducement which led to the construction of railways into new territory, and the development of new areas. We venture to say that the mileage built that had no prospect of being profitable is very small.

As to the second measure of relief, namely, to write down the assets to a proper point, very little can be said in favor of this. It is true that when a merchant has goods on his shelves that he cannot sell, his bank will insist upon his writing down his assets below their book value in order to present a clear statement of where he stands. But this is not comparable at all with the railway for the latter does not sell its service according to cost. It charges what the traffic will bear. Moreover, it would be useless for the railway to write down the value of its assets, for its financial standing is not determined by this means, but rather by the amount and regularity of its income. There is not necessarily any direct connection between the amount of the assets and the amount of the income; for some roads with a small amount of rolling stock regularly employed have a larger and more uniform income than other roads with a much larger amount of physical assets.

The contention, then, that the assets of these railways under government ownership should be reduced to a proper

point has absolutely no bearing upon the problem of the railway deficits. What is needed is, not the writing down of the value of the assets, but the reduction of the fixed charges and operating expenses to the lowest minimum and the increase of the earnings to the greatest possible extent.

As to the third phase of this proposed change, namely, the pursuit of a wise policy of immigration and the proper distribution of the immigrants so as to augment the amount of farm produce available for carriage by the railways, nothing in the way of criticism can be directed against this significant suggestion. Far too much of the immigrant tide has flowed into the cities and towns of this country and has engaged in occupations which furnish but little traffic to the railways. The country development has been delayed by not attracting to the land those whose interests in their former homes have been mainly agricultural; and a more enlightened policy should be pursued for the opening up of the great areas in the west and north that are capable of yielding, not only good homes to the settlers, but abundance of produce for rail shipments. Even if the government were to pursue this plan, it would be a long time before there could be much increase of traffic as a result of its adoption, and during that time there would be the expenditure of many hundreds of millions of dollars of the people's money to pay the vast deficits which are accumulating at such an alarming rate. This policy, therefore, does not seem to offer the best solution of the railway entanglement.

One Possible Solution

In what direction may we most hopefully look for relief? In ordinary business, if a large concern faces insolvency, there are two courses open by which its affairs may be adjusted. If it is a new corporation, which is just seeking to establish its place in the business world, it is usually allowed to go into bankruptcy and then its affairs are closed up. But if it is an old-established firm, which has worked its way into the public esteem and which, if it were to go into bankruptcy, would cause a shattering of public confidence, it is frequently saved by a stronger firm coming to its rescue. This is recognized as a good principle in the case of banks, and the example of the Ontario Bank, which was taken over by the Bank of Montreal, is within the memory of many today. Many instances of the same kind could be cited in the history of the United States. The combination movement in industry shows a great variety of illustrations of the same procedure, by which concerns which were almost "on the rocks" have been taken over and their managements merged with those of stronger businesses. This would seem to point the way to the most appropriate solution of the railway problem, which I now desire to present.

Briefly, if we desire operating efficiency for the government-owned roads, the best way by which to secure it would be to link them with the Canadian Pacific. The interests of all are identical; the private road is subject to the same conditions as to rates, service and regulation as the government roads, but the private road has obtained an enviable position as the largest and most successful corporation in the railway world. It would, therefore, be a tower of strength to those roads which are now in such desperate financial need.

Fortunately, Lord Shaughnessy, the chairman of the Canadian Pacific directorate, has already presented a personal memorandum to the government upon this subject, and has shown that by having the government roads operated under the Canadian Pacific management the deficit of the national lines would be reduced at once to eleven or twelve millions per annum. By this country, which has an enormous debt and faces a deficit of perhaps a hundred millions in the operation of its railways during the present year, such a safe proposal, which would reduce this railway deficit to one-eighth of its great aggregate, should be welcomed eagerly.

The removal of this railway incubus from the country and

the freeing of the people from the burden of such vast anticipated annual contributions for no productive purpose is a consummation which should be effected as speedily as possible. Of course, it is not in the interests of the Canadian Pacific stockholders that their company should align itself along with a combination of decrepit railways such as those owned by the government, for the resources of the Canadian Pacific and the company's great future under its present management are clearly indicative of still better things for the stockholders. By undertaking to carry along the government roads, the Canadian Pacific would really be sacrificing its own best interest in order to assist in a great work of national rehabilitation by gradually placing these almost derelict railways upon a sound basis, through bringing its own financial resources and its unparalleled organization to contribute to their restoration.

As was suggested by Lord Shaughnessy, if as a result of negotiations between the government and the Canadian Pacific some plan were finally drawn up by which the latter would operate the national lines in conjunction with its own, the government becoming responsible for the amount of the deficit which still remained in the operation of its roads, but which would decrease from year to year, the arrangement would have to assume much of the aspect of permanence. The railway business is one which cannot prosper except under a policy which has all the elements of continuity. Its expenditures, many of them, must be made a long time in advance, so as to prepare for the increasing volume of traffic which frequently comes with unexpected suddenness. A hand-to-mouth existence is impossible for a railway which would serve the country effectively.

So that if the Canadian Pacific were to undertake the operation of the public railways the contract would have to be drawn up in such a way as to permit policies once inaugurated to be carried into effect over a protracted period. Of course it would not be necessary to have an absolutely perpetual arrangement, but one which would have such a degree of perpetuity as would assure the Canadian Pacific that when it embarked upon a policy of building up the assets and the earning power of the other roads it would be enabled to secure some reasonable compensation for this service.

A contract entered into for a period of, say, 99 years would have all the elements of continuity which would be requisite. But, instead of having one fixed financial arrangement for that entire period, there should be the possibility of some measure of elasticity. It is recognized now by those who know best the operating conditions of the government roads that it would take at least 15 to 20 of the most prosperous years that Canada has known before the national lines will be in a position to meet all their expenses.

If, therefore, an agreement were entered into now upon terms that would be satisfactory to both parties, it would be advisable to have the contract such that if at the end of, say, 20 years the earnings of the national lines should exceed a certain amount, due partly to the general development of the country and partly to the efficient management of the Canadian Pacific, there might be a new financial adjustment, so that while the company was allowed adequate compensation for its risk and management the public would also secure a fair share of the results which accrued from the growth of population and the expansion of the country's business. These periods of reconsideration of the finances of the combined systems should take place thereafter at regular intervals of perhaps 10, 15 or 20 years, so that the entire arrangement might have some of the spirit of a partnership for the public welfare.

Under these conditions, where monopoly would be substituted for partial competition, our regulative system would have to be adjusted accordingly. Some of the sources of trouble which now exist would even then call for the exercise of the same authority by the Board of Railway Commis-

sioners; and, on the other hand, not a few of the cases which now come before the board would disappear from the docket of that body. In certain respects the regulation of a monopoly of railway transportation would be more easily effected than when there are several railways operating in the same territory, and among other things there would have to be greater publicity of accounts so as to acquaint the public with the facts.

By securing the assistance of the best men in railway economics, railway law and railway management, the government would soon be able to devise a system of regulation which would be equitable and would safeguard the public interests; and as a result of this new system of control there would be the infusion of a new life into the entire railway organization. It would be highly desirable, since the Canadian Pacific would have the management of not only its own property but that of the people of Canada, that a majority of its stock should be held in this country; otherwise we might have the possibility of groups of foreign shareholders getting an undue share in the election of directors of the company and in this way we should have foreign control of the property belonging to the Canadian people.

There are still some people who cling to the hope that as the country grows up to the measure of its transportation facilities the railways owned by the government will prove a profitable enterprise. To cherish such a hope is to live in a world of delusion. A director of the National System recently declared that if the "right men" were chosen to manage this system they would do it "just as well as if they were looking after their own business." To make such a statement as this is to display great ignorance of human nature or else to confess that the "right men" are seldom found.

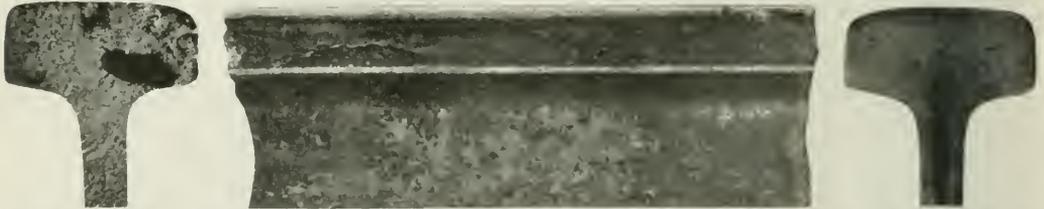
The facts of experience of state railways in other countries are irrefutable and human nature and human motives are no different in Canada from what they are elsewhere. At the risk of repetition, I venture to give the words of Mr. Acworth before a committee in Washington in 1917: ". . . that it is impossible to procure, under any system of state management in a democratic state that has yet existed, an author-

stage has been reached when stagnation of enterprise must materialize? Or, will they seek the best means by which these government-owned railways may be transferred to private control and individual initiative under conditions which will make for the continuous rebuilding of a transportation mechanism responsive to the requirements of a young and progressive country? The demands during the recent (1921) session of the House for information regarding the government railways is but a forecast that in future more complete information will have to be given to the public, and it is evident that the people's representatives in parliament will secure greater and greater control over these railways when they must vote such large amounts to pay for the present deficits.

These circumstances clearly indicate that if the roads are retained by the government there will be a more direct interference by parliament in their management. This would lead to the same unfortunate conditions as in the case of the Intercolonial. We are firmly convinced that the present distressing system of management cannot long be endured, nor is it capable of much, if any, improvement so long as the policy of government ownership is continued.

A Peculiar Rail Failure

SOMETIME ago trackmen on a western road noticed a peculiar mark on the gage side of the head of a rail in service, indicative of the presence of a horizontal or perhaps a compound internal fissure. The rail was removed from track and broken to see what internal condition existed. Not only was a compound internal fissure definitely located but in addition the rail was found to be badly piped and the fracture also showed signs of its being badly segregated. The rail was sent to Robert W. Hunt & Co., Chicago, for examination, to whom we are indebted for the photographs and the following data. One of these pictures shows a side view of a piece of the rail about 8 in. long as it was broken after having been removed from the track, while another



Sections Showing (at Left) Compound Fissure in Head and Fine Grained Structure, Indicating Segregation; (in Center) Crack Indicating Compound Fissure and (at Right) a Pipe

ity that is left to consider impartially, undisturbed by political influences, the interests of the whole public as distinguished from the particular or local interest of certain places or certain trades. I think that is really the sum of the evidence . . . all the evidence is that in a democratic state the interference with the impartiality of management in the interest of the whole community, the intrusion of unjustifiable demands on behalf of certain favored individuals or favored localities or favored trade interests has never been prevented.

These are the conclusions of one who today stands without a peer in regard to his knowledge of the results of railway operation both under government and private ownership, and he states without any equivocation that government ownership invariably means favoritism rather than impartiality of operation in the public interest.

Will the people of Canada learn the lesson before that

picture shows the left-hand view of the cross section of this piece and reveals a compound internal fissure, which it will also be seen extends horizontally in the head. Another picture shows the results of a strong acid etching of the right-hand end section about 8 in. from the fissure, revealing the pipe plainly as well as evidences of unsoundness.

The chemical composition of drillings taken from a location adjacent to the above etching was as follows, the mill analysis of the heat also being shown for comparison.

	Specife-I	Mill Ladle Test Analysis	Analysis of Sample	
			Corner of head	Junction of head and web
Carbon	.63 - 75	.72	.74	.87
Manganese	.60 - 90	.71	.73	.75
Phosphorus	Not over .01	.029	.024	.034
Sulphur	Not over .01	.038	.033	.043
Silicon	Not less than .10	.25	.27	.27

It will be noticed that the silicon content of the heat is fairly high, which fact is confirmed by the analysis of the

broken rail. This fact alone, however, did not prevent the rail from being badly segregated, a condition which may have contributed to the formation of the internal fissure, though to what extent is, of course, problematical. This was an "A" or top rail of an ingot and had been in service approximately three years.

The drop test pieces cut from the top end of three "A" rails were all satisfactory. Two of them successfully withstood one blow of the top falling from a height of 17 ft., and gave an elongation of seven per cent and five per cent in two inches, when tested base up. The fractures of the three pieces were satisfactory and all rails were accepted.

Employees Question Legality of Wage Conferences

B. M. Jewell Charges Roads Are Not Properly Before Labor Board
—Burlington Clerks Agree to Cut

BEFORE ENTERING into the discussion of what constitutes just and reasonable wage scales under present conditions, representatives of the various organizations now before the Railroad Labor Board to fight proposed reductions in wages will attempt to prove that many of the carriers involved in this controversy are not properly before the Board because the negotiations preceding the submission of the various disputes to the Board were not brought about in compliance with the provisions of the Transportation Act and the orders of the Labor Board. This offensive defense was disclosed when hearings in the controversy were resumed on March 13, following a recess of two days. B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, in opening his presentation on behalf of the Federated Shop Crafts, gave notice of his intention to attempt to prove by correspondence and the testimony of general chairmen on various carriers, that the manner in which the joint conferences required by the Transportation Act were announced and held was not in compliance with the law and that therefore disputes over wage reductions are not at the present time properly before the Railroad Labor Board.

The case of the Wabash was first taken up, Mr. Jewell reading correspondence between representatives of the Federated Shop Crafts on that road and the management. He drew from this correspondence the inference that proper notice of the conferences required by the law was not given to the employees involved and that in fact bona-fide conferences on the subject of just and reasonable wages, taking into consideration the seven relevant factors enumerated in the Transportation Act, were not held. Representatives of the carriers told of the progress of the wage reduction movement, the negotiations on this subject, the manner and time in which they were held, the testimony indicating that all of the procedure prior to the submission of the dispute to the Labor Board was in compliance with the Transportation Act.

J. W. Higgins, executive secretary of the Association of Western Railways, in defending the manner in which the Wabash had called and handled conferences with the representatives of the Federated Shop Crafts, characterized the delay brought about by representatives of the employees as the only irregularity in the procedure. "Delay" he characterized as the "strategy" of the employees in this case.

The objections of the labor leaders voiced at this session seemed to be based largely on technical grounds; maintaining that the failure of the carrier to go into detail as to their proposals, the arguments therefor and the arrangements for conferences constituted a violation of the procedure outlined in the Act.

Representatives of the carriers, in reply, contended that these charges were groundless, the result being a large amount of quibbling as to duties and responsibilities of both carriers and employees in initiating wage in-

crease or decrease movements. A similar discussion involving the Missouri Pacific, the Chicago, Milwaukee & St. Paul, and the Pere Marquette followed, with practically the same result in each case.

Mr. Jewell Requests Analysis of Railroad Propaganda

Before going into this phase of the controversy, Mr. Jewell requested that the Board and the members thereof, make the necessary arrangements to examine their own and the Board's files "to determine the amount of communication, publications, pamphlets, etc., that have been received by the Board and members" to "ascertain the amount of propaganda, the amount of publications or 'yellow sheets' that have been received from the Association of Railway Executives, giving the number and date of the first one, and the number of the last pamphlet and the date it was received; the general contents and make-up of these." He also requested a similar investigation of material received from "interests or parties or organizations other than either railroad managements or organizations or railroad employees' organizations." This information was desired, he said, to ascertain whether these organizations "are familiar with or interested in or affected by or clearly understand, except as somebody indicates to them, railroad labor and management problems." At the same time he also asked that an investigation be made of similar material received from labor organizations other than those of railroad employees.

Board Rules Out Testimony on Contract Work

The second attempt by the labor leaders to bar a number of railroads from the wage hearing failed when B. W. Hooper, vice-chairman of the Board, ruled against the introduction of evidence by representatives of the employees purporting to show that the roads in question have violated the law by contracting shop work to outside firms. Mr. Hooper's ruling developed the fact that the Board will soon render its decisions in cases of this character involving the Erie, the Indiana Harbor Belt and the New York Central, who have been charged with violation of the Transportation Act by contracting shop work to outside firms and whose cases are now pending before the Board. The ruling against evidence on this subject was predicated on the fact that the whole question is now before the Board and therefor should not be argued in connection with wage reduction pleas. The question at issue, Mr. Hooper said, was one of the most important the Board has faced and added that if such contract work was declared legal "the ground would be cut out from under this Board and the vitals of the Transportation Act would be killed."

The ruling was made over the vigorous protest of Mr. Jewell, who asserted that if railroad shops were to be closed one day and opened by a contractor at lower wages the next, the railroads were setting an example which might convince the employees that "the very small number we have termed

radicals were right and the great majority of sane-minded employees is 100 per cent wrong."

Estimates of Savings Requested by Board

The Labor Board, through representatives of the western, eastern, and southeastern carriers, has requested that a compilation be made showing what the annual saving would be if the present requests of the carriers for wage decreases were granted by the Board. This request is the outgrowth of a previous discussion between A. O. Wharton, labor member on the Board, and Mr. Higgins, as to the savings which might be passed on to the public in the form of lower freight and passenger rates.

Additional Testimony Presented by Several Carriers

The Board's session on March 8 was taken up with the presentation of evidence by various railroad officers in western territory who had acted as chairmen of state or city committees which gathered information as to the rates of pay, overtime provisions and hours of service of employees in other industries performing work comparable to that performed by railway shop employees. In addition, L. W. Baldwin, vice-president of the Illinois Central, G. S. Waad, vice-president and general manager of the Southern Pacific, Lines in Texas and Louisiana, and W. E. Williams, assistant to the chief operating officer of the Missouri, Kansas & Texas, presented short statements on behalf of their roads, pointing out conditions peculiar to the carriers in question and amplifying the testimony already presented on behalf of all western railroads by Mr. Higgins.

The "ability of the carrier to pay" again bobbed up before the Board at this session when B. W. Proctor, assistant general manager of the International & Great Northern, E. E. Nash, vice-president and general manager of the Minneapolis & St. Louis, W. H. Gemmill, president of the Minnesota & International, S. M. Russell, receiver of the Toledo, Peoria & Western, and B. A. Worthington, president of the Cincinnati, Indianapolis & Western, in separate presentations called attention to the financial condition of their roads and the necessity for consideration of their wage problems with this particular phase in mind.

W. A. Northcutt Appears on Behalf

of Southeastern Roads

W. A. Northcutt, general solicitor of the Louisville & Nashville, appeared before the Board on March 10, on behalf of the southeastern carriers filing exhibits dealing with revenues, expenses and railway operating income, employees and their compensation and the wage proposals of the southeastern roads. Mr. Northcutt briefly outlined the financial condition of the southeastern roads in general and cited the increases in labor costs on various carriers which he characterized as "the main cause for the deplorable condition" of those carriers to whom Herbert Hoover recently referred in his testimony before the Interstate Commerce Commission when he said, "in surveying the situation by districts we find that the whole of Class 1, southern roads, barely earned enough money to cover the interest on their bonds * * in spite of the fact that maintenance of the property had been held during that period to a low level."

After analyzing the increases in wage rates and the relation of these wage increases to increases in the cost of living, Mr. Northcutt added, "while the rate for machinists is now 77 cents per hour and we are proposing a split rate of 66 and 63 cents, outside industries in the territory served by the Atlantic Coast Line are paying a weighted average rate of 62.2 cents per hour; the Chesapeake & Ohio, 60.4 cents per hour, the Louisville & Nashville, 58.6 cents per hour, the Nashville, Chattanooga & St. Louis, 66.2 cents per hour, the Seaboard Air Line, 62.3 cents per hour and the Norfolk & Western, 39 cents per hour. Similarly

Mr. Northcutt showed that whereas the southeastern roads are paying boiler makers, blacksmiths, sheet metal and electrical workers, 77 cents per hour, the rate for employees performing analogous work in other industries along the southeastern lines are receiving rates ranging from 48 to 67½ cents per hour.

The testimony presented by Mr. Jewell during the remainder of the week was devoted wholly to an attempt to prove that the negotiations preceding the submission of this controversy to the Board were perfunctory and not in compliance with the terms of the Transportation Act. A great deal of time was taken up with the reading of transcripts of conferences held between representatives of the carriers and their employees and upon being questioned by the Board as to how much longer the presentation of testimony of this character would take Mr. Jewell indicated that it was his desire to offer proof of similar charges against practically all carriers parties to the dispute.

Clerical Forces on C. B. & Q. Agree to Wage Cut

Clerical employees of the Chicago, Burlington & Quincy have agreed to wage decreases averaging about six or seven per cent, according to a recent announcement. The lower rates of pay were effective on February 1 and are to remain in effect for at least one year. Although the agreement was reached in the latter part of January, it was not announced until recently. Its provisions may be summarized as follows:

The rates of pay for clerks and clerical supervisory forces are reduced to "a rate equal to \$39.28 over the rate received in December, 1917, for all those who were receiving \$62.50 or less in that month, except (a) that station baggagemen and mail handlers * * will not be reduced below \$67.50 per month, and (b) that baggage and mail truckers at Lincoln, Omaha, Union Pacific Transfer, Quincy and Galesburg who received less than \$62.50 per month in December, 1917, will not be reduced below \$93.62." For the group of employees designated as "train and engine crew callers, assistant station masters, train announcers, gatemen, and baggage and parcel room employees" the same ruling applies except that the new rate is equal to \$31.12 over the rate received in December, 1917, etc. Furthermore an adjustment "equivalent to a saving of one per cent per hour is made on all of the positions enumerated above such adjustment to be distributed by mutual agreement; piece work rates to be adjusted in proportion."

A reduction of seven cents per hour is provided for employees listed as "janitors, elevator and telephone switchboard operators, office, station and warehouse watchmen and employees engaged in assorting way bills and tickets, operating appliances or machines for perforating, addressing envelopes, numbering claims and other papers, gathering or distributing mail, adjusting cylinders and other similar work, * * office boys, messengers, chore boys and other employees, under 18 years of age, filling similar positions and station attendants."

Freight handlers and truckers and others similarly employed, upon entering the service, are to be started at "a minimum of 35 cents per hour and increased two cents per hour after each six months of continuous service until they receive rates of pay five cents per hour less than those now existing, except where reduction of five cents per hour would make them less than 35, the 35 cent rate shall obtain continuously. Piece work rates are to be adjusted in proportion."

The differential of one cent per hour between rates of pay of sealers, scalers and fruit and perishable inspectors and of two cents per hour between the rates of pay of stowers or stevedores, callers and loaders, locators and coopers and the rates of pay of truckers are continued "provided that those hereafter entering such positions will receive the respective differentials over the present truckers' rate reduced by five cents, except that if a trucker now in service and

not affected by such five cent decrease be promoted to a position (such as sealer, etc.) the differential over his present rate will be applied."

The employees named in the last two paragraphs "will be considered in service and not affected by the rate change, who have been laid off in reduction of forces * * ."

The rates of pay of all common laborers in and around stations, storehouses and warehouses are adjusted to conform to the "going rate" in the locality employed with a minimum rate of 30 cents per hour. The piece work rates of these employes are adjusted in proportion.

"New positions since December, 1917 or positions not now filled but which may be refilled when forces are enlarged as business picks up will be rated in conformity with the adjusted rates for positions of similar scope and responsibility. The foregoing contemplates the abandonment of the rates established for certain years of experience; and hereafter fixing rates for positions."

The Burlington did not apply to the Labor Board for decreases in the wages of clerical forces. Other western carriers have asked for reductions running from 10 to 15 per cent and for a reduction of the war time minimum from \$87.50 to \$73.22.

Insofar as the carrier is concerned the effect of this decision will be to permit of savings immediately instead of after extended hearings and a ruling by the Labor Board. Insofar as the employees involved are concerned it will eliminate the chances of a heavier cut by the Board.

Buffalo & Susquehanna Cited to Appear Before Board

A. M. Darlow, general manager of the Buffalo & Susquehanna, was cited by the Board to appear on March 14 to answer charges made by E. J. Manion, president of the Order of Railroad Telegraphers, to the effect that the Board's wage decisions have been violated by that carrier. The Buffalo & Susquehanna, Mr. Manion charged, defied the Board and cut the wages of operators and station agents, threatening the men with the loss of their positions unless they signed agreements to the reductions. Most of the men, Mr. Manion said, signed and later repudiated the agreements and refused to accept the reductions.

Commission Sustains Short Line Interpretation of "Deficit"

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued a decision construing the word "deficit" as used in paragraph a of Section 204 of the Transportation Act, which provides for the reimbursement of the short lines for losses sustained during that part of the federal control period after they were relinquished by the Railroad Administration and were privately operated, to mean, "a deficiency or decrease in a carrier's railway operating income for that portion of the control period during which it operated its own railroad as compared with its average railway operating income for the corresponding portions of the test period."

Commissioners Meyer, Hall, Aitchison and Eastman dissented, on the ground that the word "deficit" has a very definite meaning which does not support the finding of the majority decision.

Paragraph c of Section 204 provided that as soon as practicable after March 1, 1920, the Commission should ascertain for every carrier, for every month of the federal control period during which its railroad was not under federal operation, its railway operating deficit, or its railway operating income and the average of its railway operating deficit or of its railway operating income for the three corresponding months of the test period; it being further provided that these "control returns" and "test returns" should be used as

bases for computing the amounts payable to the carriers. Pursuant to this requirement the Commission issued, on March 4, 1920, an order requiring the carriers to report the data deemed necessary in ascertaining these "returns." In this order it announced, in effect, that carriers which did not sustain a railway operating deficit for that portion of the federal control period during which they were privately operated were not covered by Section 204.

This announcement, the Commission now says, was made out of abundant caution at a time when it had had no opportunity to give to the section, especially to paragraph a thereof, the critical and mature consideration essential to its correct interpretation. Notwithstanding this announcement, various carriers whose railway properties were privately operated during a portion of the federal control period, and which, for such period of private operation as a whole, had railway operating incomes, but smaller incomes than their average incomes for corresponding portions of the test period, presented to it requests for certification of payments under Section 204. As it was still in doubt as to the proper construction of this section, these requests were informally denied. Thereupon these carriers asked for a hearing, which was held on November 4, 1921.

The Commission says in its report:

In paragraph a the term "carrier" is declared to mean a carrier which, among other things, "sustained a deficit in its railway operating income for that portion (as a whole) of the period of federal control during which it operated its own railroad or system of transportation." The phrase "deficit in its railway operating income," in that definition, is not employed by accountants. In the system of accounts prescribed by us, the phrase "railway operating deficit" is employed in a sense antithetical to "railway operating income," and, thus used, means an excess of operating expenses and taxes over operating revenues. It is apparent that the phrase, if employed to express the same idea, is an inaccurate use of words, which are self-contradictory. There is no doubt, however, that this phrase, "deficit in railway operating income," is used in paragraphs b, c and f to express an excess of railway operating expenses over railway operating revenues in one period without reference to another period, just as in paragraphs d and e the word "deficit" is used in the same sense. If this meaning be given to the phrase "deficit in railway operating income," as used in paragraph a the effect is to limit the benefits of Section 204 to those carriers which sustained railway operating deficits for that portion of the federal control period during which they were privately operated. The protestants contend that this construction results in injustice and unfair discrimination, in that it excludes from the benefits of the section those carriers which had a net income for that portion of the federal control period during which they were privately operated, although they may have suffered substantial decreases in income as compared with their incomes in the test period. They insist that Congress could not have intended such an inequitable result. And they point out that paragraph a may be harmonized with the remainder of the section by construing the phrase "deficit in railway operating income" to mean a deficiency or decrease in railway operating income, as compared with the average income for the corresponding portions of the test period.

The basic principle which underlies all rules of statutory construction is that the purpose, the intent of the lawmaker constitutes the law.

If the word "deficit" is construed as a deficiency or decrease in income under private operation in the federal control period as compared with the income during the test period, the definition of "carrier" is completely harmonized with both the letter and spirit of the remaining paragraphs of the section. If, however, this word is given its technical meaning as used by accountants, the effect is to make the right to reimbursement contingent upon the carrier's having sustained a technical or absolute deficit while privately operated in the federal control period, a result which is in direct conflict with the plan of reimbursement set forth in detail in the section. The rule is thoroughly established that if a word or phrase is susceptible of two constructions, one of which will effectuate the evident purpose of the statute and one of which is inconsistent or in conflict with that purpose, the former must control. We are, therefore, unable to resist the conclusion that, in the definition of "carrier" in paragraph a, Congress meant those carriers which sustained losses in income under private operation in the federal control period as compared with the test period.

The idea that Congress, in the definition of "carrier," intended

those carriers only which sustained actual deficits under private operation in the federal control period, is not only in direct conflict with the plan of reimbursement detailed in the remaining paragraphs of the section but it is negated by the fact that such a classification of carriers would be purely arbitrary and wholly unsupported by any sound reason. The purpose of the section is to reimburse carriers for losses sustained because of federal control. It is obvious that a carrier which had a net income under private operation in the federal control period may have sustained a loss by reason of federal control equal to or greater than that of a carrier which sustained a deficit during such period of private operation. And there is nothing in the circumstances surrounding these carriers which raises any presumption that those which sustained actual deficits were more necessitous than those which had net incomes. Moreover, such a classification leads to results which are so inequitable as to be absurd.

Commissioner Meyer, in his dissenting opinion, said that the holding of the majority, in his opinion, contemplates the payment of a large sum to the short line railroads without warrant of law, through the disregard of what was intended to be an important condition limiting the benefits of that section to carriers of a particular class. The effect of the majority opinion, he said, is to treat that portion of the definition of "carrier" under discussion as surplusage; for the process of computation detailed in paragraphs c, d, e, culminating in paragraph f, would in itself result in reimbursing all of the short lines in the amount of their decrease in income as compared with the test period income.

The word "deficit," he said, is one of frequent use in accounting, and when used in connection with railway earn-

our function to administer the law, not to make it. If Congress had intended to extend the terms of Section 204 to all short line roads, rather than to the more necessitous of such roads, appropriate language would have been used. If our former interpretation is incorrect, the courts could have rectified our error in an appropriate case; and, if correct, the remedy of the carriers, if any, is an appeal to Congress for an amendment of the law."

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended March 4 exceeded the 800,000 mark for the first time since the first part of November and showed a large increase as compared with the corresponding week of last year while nearly reaching the figure for 1920. The total was 803,255, as compared with 711,367 in 1921 and 811,106 in 1920. This was also 68,000 more than for the previous week which included a holiday. Gains as compared with last year were shown in the loading of all classes of commodities except livestock, forest products and ore, and in all districts except the southwestern. While much of the increase was in coal, large increases were also shown in grain, merchandise and miscellaneous. The summary follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 4, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	10,154	2,560	51,565	2,048	4,984	780	65,666	65,900	203,615	.....	.....
	1921	6,566	2,617	32,117	918	7,422	668	52,244	55,957	.....	168,509	192,061
Allegheny	1922	3,159	2,571	55,302	3,959	3,227	1,399	50,032	50,560	171,209	.....	.....
	1921	2,093	2,578	43,307	4,446	2,397	1,918	38,053	45,054	.....	139,846	168,226
Pocahontas	1922	266	60	25,579	241	1,100	9	5,954	3,553	.....	36,762	.....
	1921	180	90	13,995	199	1,352	36	4,773	2,884	.....	23,509	25,540
Southern	1922	4,319	2,320	26,046	493	15,261	463	37,484	38,003	124,389	.....	.....
	1921	3,679	2,236	18,180	566	13,306	864	36,739	35,988	.....	111,578	127,421
Northwestern	1922	13,008	8,678	9,933	1,199	13,247	501	26,34	27,605	100,405	.....	.....
	1921	11,294	8,853	5,310	1,272	16,043	1,145	25,544	29,428	.....	98,889	107,771
Central Western	1922	13,382	9,689	25,595	3,959	3,327	1,399	50,032	50,560	113,360	.....	.....
	1921	11,000	10,216	15,217	212	4,193	2,360	30,066	34,112	.....	109,396	118,126
Southwestern	1922	5,232	2,451	4,619	152	6,374	655	15,528	18,558	53,569	.....	.....
	1921	5,073	1,814	3,623	73	6,567	413	16,993	25,075	.....	59,460	61,961
Total all roads	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	.....	.....
	1921	41,885	28,424	117,748	7,686	51,480	714	204,212	228,498	.....	711,367	.....
	1920	33,314	27,951	182,272	10,104	61,956	13,615	152,972	338,922	.....	.....	811,106
Increase compared...	1921	7,635	.....	54,891	571	.....	.....	27,221	8,264	91,888	.....	.....
Decrease compared...	1921	.....	95	.....	.....	3,816	.....	2,783	.....	.....	.....	.....
Increase compared...	1920	16,206	378	14,867	.....	.....	.....	78,461	.....	.....	.....	.....
Decrease compared...	1920	.....	.....	.....	1,847	14,292	8,964	.....	92,160	.....	7,851	.....
March 4	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	711,367	811,106
February 25	1922	46,729	27,740	187,447	8,073	47,704	4,330	190,157	214,107	735,286	659,642	731,295
February 18	1922	46,729	27,740	190,700	2,666	50,976	4,034	219,050	224,142	780,924	692,007	722,102
February 11	1922	\$4,704	30,274	\$93,377	7,823	52,638	4,015	222,908	222,673	788,412	687,867	786,643
February 4	1922	48,969	27,998	185,151	7,844	50,204	4,015	218,571	211,134	753,886	699,718	762,680

* Revised March 14, 1922.

ings has become so common as to have passed from the class of technical accounting terms. It occurs many times in the reports of the proceedings in Congress and before its committees prior to the passage of the transportation act. The word "deficit" is used 13 additional times in Section 204, and is also used in Section 209, and in all of these instances it is admitted that it has no reference to a comparison of the income for one period with that of another. It thus appears, he said, that the application of the word in paragraph (a) of Section 204, as contended for by the short lines and accepted by the majority, is without precedent or parallel.

"The majority report," Commissioner Meyer said, "appears to be animated by a belief that hardship will be suffered by certain short lines if we adhere to the interpretation twice placed by us upon this section. But, if true, this would not justify us in extending the benefits conferred by Section 204 beyond the limits placed upon them by Congress. It is

The freight car surplus showed another reduction during the week ended February 28 to 245,100, of which 95,361 were box cars and 97,634 were coal cars while 19,955 were stock cars.

THE TRANS-CANADA LIMITED, the Canadian Pacific train which is run daily during the summer months between Montreal and Vancouver, in addition to the all-year-round train known as the Imperial, will be put in service on May 21. The equipment involved in the running of this train is valued at about \$600,000 as the daily run involves the operation of 59 sleeping cars, 15 dining cars, 12 observation cars, 5 compartment cars, 12 baggage cars, and 24 locomotives. The through trains between Vancouver, Minneapolis, St. Paul and Chicago, known as No. 13 and No. 14, will be put in service in connection with the Soo Line on June 24

Can We Look to the Tropics for Our Tie Supply?

Two Writers Point Out the Impossibility of Drawing On
These Regions for Relief in the Near Future

WITH EACH recurring agitation concerning the depletion of the forest resources of North America, the attention of railway men is directed towards the large forests in the tropical areas of South America and elsewhere. This has led to considerable study of the timbers in these areas with particular reference to their suitability for use as ties under the climatic and service conditions existing in this country. The results of two such investigations are abstracted below.

The Feasibility of Introducing Tropical Ties in the United States*

By Nelson Courtlandt Brown

The question of our future tie supply in the United States has long been an important one and is growing more serious each year. This problem will some day be acute and it must be solved (1) by growing a sufficient tie supply in our native American forests by an improved system of forestry, (2) by making both our present and future native supplies last longer by preservative treatment and proper tie protective devices, or (3) by the introduction of ties from foreign sources of supply.

A study of the world's timber supply and the interdependence of various nations upon each other for their wood supplies has demonstrated that the tropics are the only regions of large timber supply left and that comparatively little exact scientific knowledge is available regarding them. By the tropics we must consider not only those nearby such as the West Indies, Central America, and northern South America, but also the Philippines, Africa, the Far East and the Pacific islands included in the tropical zone. The nearby regions such as the West Indies and Central and South America are, of course, of greatest interest.

Ties have been brought here from Cuba, Columbia, Brazil, Argentine and Africa, as well as Venezuela. Generally speaking, the atmosphere and soil conditions are much more severe, as affecting the life and utility of ties, in those countries than in this country. Moisture, warm air, etc., induce the growth of fungi which cause decay and in addition they commonly have white ants, etc., which are exceedingly destructive to these woods.

About 25,000 ties were imported from the Amazon district of Brazil and placed in the tracks of about five eastern railways in 1915, 1916 and 1917. One railway placed 5,000 ties, including 15 to 20 different varieties of hard, heavy



woods from Brazil. They were presumably well-seasoned when put into service. It is reported that all have failed and have been removed from the track during the past year except one species locally known as *Masaranadauba*. The failure was reported due principally to "brooming" and to some extent to decay. All of these ties were 7 in. by 9 in. by 8½ ft. Among the 5,000 ties tried out by the one railroad, many had to be removed during the second summer and a large percentage had to be removed during the fourth summer of service on account of severe checking and "brooming." All of these ties had been adzed and bored at a treating plant but were used untreated.

In British Guiana tests were made by a local railway on 13 varieties of treated native wood and Baltic pine. The native woods were all of hardwood, measuring 4½ in. by 9 in. by 9 ft. long. The ties were grooved ½ in. in depth to receive the rails and bored with ⅞ in. holes for nail spikes. After eight years all varieties except

three were sound and in good condition. These three were Kautaballi, untreated Mora and treated Baltic pine which was badly decayed throughout. The latter wood is the one chiefly used by European railways and lasts about 25 years in England when treated. The tests showed that: (1) The native woods, after treatment, were far superior to the treated Baltic pine; (2) mora and wallaba (*Eperua falcata*), when treated, resist decay under extremely adverse conditions of climate, precipitation and poor ballast.

Both mora and wallaba are abundantly available and can be produced fairly cheaply. There are three varieties of mora of which the red mora (*Dimorphandra mora*) is by far the best. When properly seasoned it makes an excellent tie timber. This experiment would seem to bear out the contention that tropical ties should be used only when treated. If this is so, it is unlikely that we shall look to the tropics to supply any considerable portion of our cross tie supply for a long time to come.

One large American railway carried on a test covering 30 varieties of tropical ties, chiefly of South American origin. Most of these failed in seven years due to both splitting and decay. Some only lasted two to five years while a few such as mora, cacaque, roble pellin and quebracho remained for 10 to 12 years except the mora, which varied in service from 4 to 12 years.

Another railway in the east used several thousand Brazilian ties in recent years. Of 2,647 ties examined closely, 827 were removed from the track on account of splitting and

*Abstracted from a paper presented before the annual convention of the American Wood Preservers' Association at Chicago on January 25.

"brooming" and decay after a service of 2½ to 3½ years. The engineer of tests stated that many more will have to be removed after slightly longer service.

To sum up the situation:

1—No definite conclusions can be established regarding the feasibility of introducing tropical ties on account of lack of definite experimental tests on a sufficient scale.

2—Great confusion exists in nomenclature and classification.

3—Too little is known of the relative merits, such as durability, etc., of these woods, even in their native habitat.

4—Very little is known of the seasoning qualities, with particular reference to the effect of changes of climate and temperature on their usefulness.

The Tropical Hardwood Tie Question

C. D. Meil.

People who like to talk in millions should revel in discussing the propositions pertaining to tropical hardwood ties for the American markets. There are few subjects about which there is so much idle speculation as the tie question. When a promoter of tropical woods hears that the railroads in the United States use about 110,000,000 ties annually, that the forests producing them are being rapidly depleted, and that the prices are high, he concludes at once that there must be a sure outlet for his wood in the form of ties for use in the United States.

He soon discovers that there are more than 70 different kinds of woods in this country which are being accepted by railroads here for ties, and that the demand has never exceeded the supply. Moreover, he soon learns that the prices paid for ties of native-grown timbers are much less than he had anticipated and also that railroads will not become interested in foreign woods for ties about which there are no data as to their fitness. It is safe to predict that another 20 years will pass before American capital will become interested in so speculative a venture as a tropical tie operation.

Entirely aside from the doubt whether the woods are hard and durable enough for tie purposes in the United States, the promoter or the timber owner himself is invariably uninformed as to what the railroads here require in the way of specifications. It is, of course, a relatively easy matter to teach the men in the forest to reduce the logs to a specified dimension so that the ties will pass inspection as far as their sizes are concerned, but there are other requirements that ties must meet and there are many kinds of defects which may render them unavailable. Trees in the tropical forests do not grow according to prescribed rules; the struggle for light and growing space is far keener in the dense forests of the tropical regions than it is in most parts of the temperate zone. It is hardly an exaggeration to say that 90 per cent of the trees large enough to yield ties of the required sizes are too defective to make them available for making ties. Of the remaining 10 per cent fully half are too valuable for other purposes and could not be turned into ties except at a distinct loss. This means, then, that only 5 per cent of the trees in the average tropical forest are available for use as ties, provided, of course, that they are not rendered unfit by improper felling.

Few promoters are considering carefully the question of inspection. Whether this is done at the point of origin or at the port of entry in the States there will doubtless be a good many rejections or at least degrading if the contract should call for more than one class. As already stated the logs or trunks of trees in the average tropical forest are as a rule very defective, which invariably will show in one form or another in the finished ties. These defects, minor as many of them might appear, will nevertheless constitute the most serious drawback to the tropical tie business. This was illus-

trated by a small parcel of about two dozen sample ties from South America that arrived in New York about two years ago. These ties were selected especially to meet the approval of probable buyers of a half million ties that were offered, but a cursory examination of the lot revealed the fact that there was not a single tie among them that would have answered the specifications under the most lax inspection. In another instance over 60 per cent of a lot of about 200,000 ties cut some years ago in Colombia for use in Panama were rejected by the inspectors, which was more than sufficient to wipe out all possible profits in the transaction.

In considering this problem one must bear in mind that there is a demand locally in all the tropical American countries for logs and lumber from the native forests. The very best timbers are the kinds in common use, and in almost every instance these are the very woods that would be available for ties. The market price for such wood is based on what the native labor is willing to get the material out of the forest and deliver it to the market for. The cheapest way, and, at present the only practical way, to get these logs out is that followed by the native woodsmen, whose wages are calculated on their native monetary basis. The price set by local operators for logs delivered to market will be more advantageous to American operators than that which their logs of similar quality and sizes would bring, if they were reduced to ties and delivered to the United States.

In all tropical American countries there is a demand for ties and even in Brazil, where forests without end are said to occur, there is often a shortage of ties. The specifications there are less rigid than in the United States. Crooked ties will do as well as perfectly straight ones. Knotty, split, grooved and inbarky with sap are usually included among ties used in the tropics. Even logwood logs are used and as a rule they are very irregular. Thus, all things considered, the prospects for selling ties from the tropical woods are better in the tropics than in the United States. So long as there is no shortage of ties produced in the United States, it would seem highly inadvisable to attempt to bring untried woods here when the ocean freight alone may be equal to the cost of the untreated ties of known lasting qualities laid down alongside the tracks of the consuming lines.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has announced its intention to transport free of charge all supplies given by the citizens of Wisconsin for the American Committee of Russian Famine Relief.



Photo by Keast and View Company, Inc.

In the Canadian Rockies



What Shop Equipment Means To a Railroad*

Central Railway Club Discusses Relation of Maintenance and
Repair Facilities to Equipment Owned

By V. Z. Caracristi
Consulting Engineer, New York

RAILROAD MOTIVE POWER departments are continually being pressed for reasons why they demand from the higher officials appropriations to cover machine tools and shop facilities, and the repetition of statements that these facilities are required to take care of current work is usually countered by explaining that the need for such facilities will have disappeared by the time the equipment and facilities can be received and installed. Operating revenue, having so many mouths to feed, must be largely conserved for purposes which cannot be deferred, and in the face of the large demands, the weak voice of the motive power department is drowned by the clamor of what at the moment appear to be more important demands.

Starting out on the basis that there can be no question as to the necessity for providing facilities of some nature to take care of each unit of power or equipment acquired, I am endeavoring to crystallize the tangible requirements and to point out the reasons why such requirements exist. Eliminating the equally important necessity for yard and terminal facilities, I would like to offer a chart (Fig. 1) showing the expenditures which experience has led me to believe necessary to take care of the locomotives and cars coming immediately under the jurisdiction of the motive power department.

To summarize, the object of this paper is to point out briefly the reason why equipment is compelled to stand idle when it should be at its best condition to meet operating demands, as well as to endeavor to create as a basis for further discussion the actual capital requirements in terms of equipment owned or in future to be purchased.

Available Hauling Capacity Not Utilized

As a matter of interest the data (Tables 1 and 2) on actual locomotive operation are submitted, locomotives being selected for the reason that they offer a well-defined measuring stick

to compare relatively what is being accomplished by them in repayment for the labor, material, and money which have gone toward their creation. This measuring stick can best be expressed by their hauling capacity. The relation between weight, hauling capacity, and cost is practically constant. A definite amount of weight is necessary for each pound of hauling capacity available, and the locomotives are themselves purchased indirectly on a weight basis.

The purchase of additional hauling capacity immediately entails an obligation on the part of the purchaser to utilize such facilities, and to secure revenue therefrom through the handling of freight or passengers.

The uniform system of accounting used by railroads, based on regulations of the Interstate Commerce Commission makes available as a whole the total tractive power and ton-miles of freight hauled.

In order to make a division line between the freight and passenger service, it is necessary to convert passenger earnings into ton-miles. In my opinion this conversion can best be made on a basis of earning capacity, for which purpose the equated ton-miles on passenger basis can be obtained by multiplying the ton-miles of freight by the total passenger revenue and dividing this figure by the total freight revenue, the underlying thought being that the decreased tonnage will be offset by the increased rate. Such figures, although perhaps of no other value, will result in a ton-mile basis which is comparative from year to year. A comparison made on this basis, using Interstate Commerce Commission statistics of Class I railroads for the years 1902 to 1919 inclusive, brings out startlingly the fact that in spite of advanced facilities in design during the 18-year period the amount of work performed by the locomotive was seriously decreased, as is evidenced by the fact that the increase in tonnage available was 233 per cent; the increase in the number of locomotives was 173 per cent, with an increase in the hauling capacity of 299 per cent. The efficiency of the 1902 locomotive being used as a basis, the railroads during the year 1917 could have

*Abstract of a paper read before the March 9, 1922, meeting of the Central Railway Club at the Hotel Iroquois, Buffalo, N. Y.

handled \$6,000,000,000 more revenue ton-miles than they did; in 1918, 76,000,000,000 more revenue ton-miles, and in 1919, 139,000,000,000 more revenue ton-miles.

In other words, had each pound of tractive power been utilized at the same efficiency as in 1902 there would have been a large surplus of locomotives during these peak periods.

These analyses cover totals for the 12 months of each year, and it may be claimed that peak traffic demands during individual months produced conditions not reflected by the yearly average. However, it should be remembered that the

power delays brought about by inadequacy of repair shop facilities. Power of sizes and weights out of line with shop equipment result not only in increased repair expense but what is more serious, in great delay in getting power back into service.

Adequate provisions in the way of machine tools will have a great influence on recovering, if not passing established records previously made in ton-miles per pound of tractive power available.

Capital account expenditures cannot be made to better

TABLE I—COMPARATIVE ANNUAL STATISTICS OF LOCOMOTIVE OPERATION ON CLASS I ROADS

Year	No. locomotives, total	Tractive power total pounds	Revenue ton miles	Total passenger revenue, dollars	Freight train revenue, dollars	Equated ton miles passenger	Equated ton miles, to all freight and passenger
1902	37,516	768,502,279	157,289,370,000	\$392,963,243	\$1,207,228,000	51,109,045,250	208,398,415,250
1903	43,290	941,915,540	173,221,278,000	421,704,592	1,338,020,026	56,296,915,450	229,518,193,450
1904	46,116	1,052,307,260	174,522,089,000	444,374,991	1,379,005,009	56,196,126,558	230,717,236,545
1905	47,696	1,123,771,032	186,463,109,000	472,674,332	1,430,772,333	62,438,276,164	248,498,385,164
1906	50,954	1,260,633,673	215,877,551,000	510,032,583	1,640,386,655	67,116,330,600	282,993,881,600
1907	54,563	1,409,076,658	236,601,390,000	564,606,344	1,823,651,998	73,133,489,649	309,734,879,649
1908	56,867	1,498,793,551	218,381,554,000	566,832,746	1,655,419,108	74,795,683,245	293,177,236,245
1909	58,468	1,593,971,444	*218,802,985,000	563,609,182	1,677,614,867	73,496,922,997	292,299,908,997
1910	58,240	1,588,894,480	*255,016,910,000	628,992,000	1,925,553,036	83,298,522,706	338,515,432,706
1911	60,162	1,681,495,905	*253,783,701,839	657,638,291	1,925,951,867	86,743,271,288	347,526,973,127
1912	61,010	1,746,964,128	*264,880,745,058	660,371,176	1,968,598,630	85,919,493,672	350,000,238,672
1913	62,211	1,847,798,393	*281,398,752,000	695,987,817	2,198,930,565	96,748,999,392	398,147,999,392
1914	61,442	1,886,519,588	*288,319,890,000	700,403,353	2,114,697,629	92,752,508,613	381,872,398,613
1915	61,882	1,970,295,306	*273,913,000,000	629,237,464	1,977,933,275	87,121,727,208	361,034,733,208
1916	60,790	1,989,132,700	*339,870,323,000	673,806,175	2,402,210,993	95,153,690,440	435,024,013,440
1917	60,990	2,024,487,000	*362,444,397,000	722,357,371	2,631,091,937	99,489,886,876	461,934,283,876
1918	61,533	2,087,949,700	*394,465,400,493	825,211,593	2,819,965,215	115,420,566,166	509,885,966,659
1919	63,531	2,223,246,296	*405,379,284,206	1,000,964,999	3,440,792,218	121,492,271,414	526,772,555,414
1919	64,983	2,301,602,581	*364,293,063,017	1,175,035,413	3,543,329,921	120,799,579,684	485,092,642,701

* Does not include returns from terminal and switching companies.
† Excluding mail, express, milk, parlor cars, switch and special train income.
‡ Equated ton miles = passenger = ton miles (freight) X passenger revenue.

Freight revenue

relative peaks which existed during 1902 also existed in 1919. In other words, seasonal demands will not startlingly increase without reflection in the traffic during those months of lesser traffic movement.

Lack of Repair Facilities Decreases Net Returns

The reasons for the decrease in economic returns are a little complex, but they can be roughly analyzed as follows:
(a) The increased ratio of the power available does not appear to be serious.

(b) The lack of corresponding increases in terminal facilities in the way of increased length of receiving tracks, etc., as well as lack of expenditures for increased passenger facilities, are serious.

(c) The dominating influence affecting the decrease in work performed per unit of power available lies in the lack of capital expenditures for maintenance of equipment purposes. Individual road performance and increase in tonnage per locomotive mile run has been more than offset by motive

advantage at this time in any direction by the railroads than through provisions for modern repair shops and equipment.

The selection of machine tools, traveling cranes, small tools, jigs and fixtures can easily be made to meet any motive power requirements. The principal danger in the selection of machine tools is in giving undue weight to maximum performance of individual items.

The purchase and installation of special high-powered individual-purpose tools should be made only after the most minute analysis of the actual immediate and prospective requirements. Each expenditure in the way of machine tool facilities should be made so as to give the maximum return in the way of plant output and not considered on the basis of the output of the individual unit. Over-equipment of individual departments does not assist either the time or cost element of a locomotive which has to be passed through all the departments of the repair terminal.

Equipment Maintenance in Slack Periods

It is well to point out the fact that the railroads of this country have been, and now are, compelled to operate under serious handicaps in order to meet the current financial requirements necessary to keep them out of the hands of receivers.

A more specific explanation for the reasons resulting in this condition is readily found in either one or a combination of the following facts, all of which are subject to correction either by the railroads or the Interstate Commerce Commission.

First. The railroad companies appear to have purchased power at a higher ratio than the normal increase in tonnage available justified, causing power to remain idle.

Second. In the efforts of railroad officials to maintain a uniform ratio between income and expense, it is customary to reduce the maintenance of equipment appropriations during the slack months, thus causing the power in many cases, to be unavailable to take care of the peak load transportation in the fall and winter months without the assistance of the locomotive builders.

TABLE II—SUPPLEMENTARY DATA ON CLASS I ROADS' LOCOMOTIVE OPERATION

Year	Ton miles per lb. tractive power	Ratio of passenger to freight earnings	Capacity at 1902 efficiency	Surplus capacity, ton miles		Per cent	Earnings per lb. tractive power available
				9	10		
1902	271.2	1.15	208,198,415,250			13	\$2.08
1901	213.7	1.152	255,447,494,148	47,049,079,198		20.9	1.87
1913	219.1	1.1732	285,375,228,912	54,667,572,254		23.2	1.73
1915	211.1	1.137	304,706,217,418	56,998,332,078		22.5	1.80
1908	215	1.109	311,843,852,117	57,889,970,712		21.3	1.78
1907	216.1	1.091	382,132,606,649	72,387,272,000		23.4	1.69
1908	191.8	1.475	436,172,811,103	113,395,674,786		38.6	1.48
1909	184.4	1.315	469,806,056,613	115,677,047,635		39.1	1.49
1910	118.8	1.166	411,198,189,076	94,768,709,070		37.4	1.4
1911	114	1.418	456,021,679,046	115,494,716,109		31.9	1.51
1912	114.4	1.105	475,777,611,511	115,276,411,841		35.7	1.50
1913	114	1.11	501,106,172,881	103,871,177,989		36.0	1.56
1914	114	1.117	511,615,148,765	94,768,709,070		31.3	1.49
1915	113.4	1.111	544,194,081,660	1,130,451,157		48.0	1.32
1916	114.7	1.090	539,498,888,100	101,116,774,800		34.0	1.54
1917	228.0	1.315	589,806,091,440	103,871,177,989		38.8	1.65
1918	211.2	1.36	566,151,958,610	87,066,091,081		31.1	1.74
1919	169	1.37	6,394,195,475	26,118,814,161		14.4	1.8
1919	167	1.116	6,419,619,967	19,111,177,666		38.6	2.05

Third. Unfortunately, it has been the custom of motive power and transportation officials when purchasing new power, to endeavor to "keep up with the Joneses" by purchasing power in large sizes, and in a number of cases the tonnage available, yard facilities, bridge, and right-of-way limitations, and other local causes have prevented the full utilization of all of the extra drawbar pull available.

Fourth. Labor conditions, both in the transportation and motive power departments, have tended to decrease power and operating efficiencies.

Fifth. The amount of money expended by the railroads for logical repair shop facilities has been lamentably out of proportion with the amount of money expended for motive power and cars, resulting in inadequate facilities for needed repair and modernizing work. The reason for this is probably due somewhat to the fact that it is easier to secure financial assistance through car or locomotive trust certificates than it is to secure money on blanket or other mortgages to be used for the purpose of shop extensions or construction.

Sixth. The analysis of data from individual railroads shows that the purchase of power has in some cases been

power just out of the builder's shop, the enormous size of the economic loss to the railroads can be visualized.

I am not an advocate of the attachment on the locomotive of every piece of apparatus that presents itself which theoretically might affect savings in operation, and I do not belittle the value of cold-blooded analysis of what the over-all economic results of each individual application will mean to the railroad organization as a whole. There are so many conditions of local operation which affect and govern, that each proposal can only be made the subject matter of intelligent decision by those intimately familiar with the governing factors.

A locomotive, when out of service for the most trivial cause, is just as expensive to the property as a whole as one legitimately tied up waiting for periodical over-hauling, and too much attention cannot be devoted to the necessity for adequate facilities. Each railroad should have every locomotive surveyed to determine if its useful life is actually finished through use or inadequacy, and if there is not the possibility of placing this engine on an equal basis with an engine just received from the builder, through application in its own shops of such modern improvements as superheaters, feed water heaters, cut-off indicators, brick arches, power reverse gears, valve gears, etc.

Trust Certificates Suggested for Betterment Work

Full capital account credit should be given for all betterment work and additions made to old power, and a new value placed on the entire locomotive after the completion of such betterments, in line with its ability to compete with a new unit of equal capacity, irrespective of its old arbitrary or book value. A market might be created for equipment betterment trust certificates to cover a proportion of the capital account betterment cost. Such certificates would have more equity behind them than if applied against new units, and would make available the necessary capital to rehabilitate railroad property with the advantage of utilizing in full capital previously expended.

Repair work should be equalized over the 12-months' period by arbitrary charges against income in the months of great business for credit and use during periods of revenue depressions.

Each purchase of new locomotive equipment should be made the subject of special study by the accounting, motive power and transportation officials assisted by outside advice if necessary, to determine: (a) Actual necessity, (b) size and capacity which will give the greatest net returns to the company, (c) type.

Locomotive purchases are in nearly all cases made at a time when erecting shop space is at a premium. This condition could be obviated by cold-blooded expenditures for repair facilities in combination with the scrapping of all papers relative to monthly budget allowance for maintenance of equipment work.

The railroad repair shops are usually operated at their peak during those months in which the cost of doing the work is at its highest, and what little organization remains in the spring time is engaged in hoeing the grass between the stones of the shop highways. The fluctuations in the pay-roll of both the classified and running repair shops are appalling, and these fluctuations are largely brought about by the month-to-month method of accounting and record-keeping in vogue by the transportation systems. Expending freely for maintenance account when earnings are temporarily good, at the expense of a starvation policy when earnings fall off due to natural seasonal conditions, is not a good business policy.

Explanation of Chart

This chart (Fig. 1) represents the amount of capital necessary for repair facilities, including yard, track, and

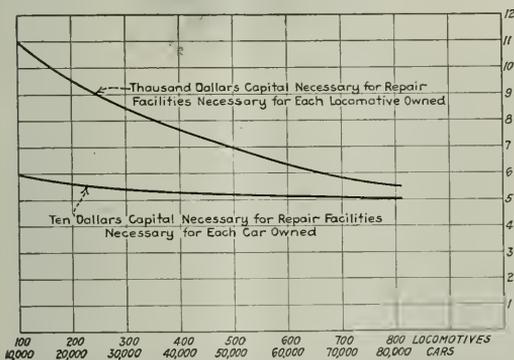


Fig. 1—Chart Showing Desirable Relation of Repair Facilities to Equipment Owned

justified and that the tons hauled per pound of available tractive power show decreases not out of line with changes in operating and labor conditions.

Taken as a whole, however, the figures clearly indicate a tendency to purchase power in advance of traffic requirements and further show inadequate provision for the round-house and general repair work necessary to keep the investment for power active.

Lack of Shop Facilities Delays Improvement Programs

The lack of adequate shop facilities is the greatest factor obstructing the purchase and application of modern fuel saving or other devices which would permit the increase of revenue ton-miles per pound of tractive power available. Lack of facilities to take care of such equipment when installed, and the fact of additional engine failures and delays has naturally resulted in the motive power department's being averse to take on additional obligations for maintenance with the fore-knowledge of inability properly to care for the same. As a matter of self-defense this tendency is a natural one, and as long as reasonably adequate supplies of tools and facilities are not available the position is well justified.

When the fact is taken into consideration that progress in locomotive development in the past few years has been almost entirely in the direction of devices which can be applied to existing power, and that the application of such equipment will make any existing locomotive as efficient as one of equal

other work, for every locomotive added to the property.

For instance, a property having 500 locomotives should have, in the way of facilities for the repair and upkeep of these locomotives, property having a value of \$3,500,000, and if 50 additional locomotives were purchased, the amount of money which should be expended for addition to the repair facilities is \$6,700 for each locomotive, or \$325,000 for 50, thus making the amount of money expended in facilities for the repair and upkeep of 550 locomotives \$3,825,000.

Fig. 1 also shows the amount of money which should be expended for capital account purchases in the way of repairs, tracks, and facilities for the running and heavy repairs of freight cars. It will be evident that a property having 20,000 cars should have an investment of this nature having a value of \$1,140,000 and in the event of the addition of 2,000 cars, \$56.00 represents the amount of investment necessary to take care of each car, or a total of \$112,000, thus making the total investment to take care of 22,000 cars \$1,252,000.

Freight Transportation de Luxe

THE PICTURE shown below represents the special hundred-car freight train, filled with Durant automobiles (described in the *Railway Age* of February 4, pages 339 and 340), as it passed around the Horse Shoe Curve on the Pennsylvania Railroad, about eight miles west of Altoona, Pa., on January 6, last. In this unique photograph it is possible to distinguish more than 90 of the 100 cars in the train; and by the exercise of a little imagination it is possible to do so in the reduced-size engraving here shown.

An officer of the Pennsylvania informs us that the train of 100 cars was kept intact from Greenville (Jersey City) to Ogden, Utah, 2,387 miles. At the time this picture was taken there were four locomotives, two at the front and two at the rear.

The train started from Greenville on Monday, January 2;



Train of 100 Cars, Ascending Grade at Horse Shoe Curve on the Pennsylvania

The leading locomotives, seen at the extreme upper left hand corner of this picture, are about seventy-five feet higher than the caboose, which appears in the foreground.

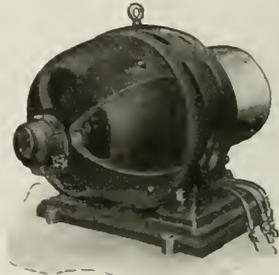
it was stopped over night at Harrisburg, Pa., and over two days at Altoona.

At Ogden it was divided into two trains of 50 cars each, and these trains left there on Tuesday, January 17, arriving at Sacramento, Cal., 3,080 miles from the starting point, on Thursday morning, January 19. As noted in our former article, the train was routed through various cities for advertising purposes and the time through, 17 days, includes many stops.

Self-Starting Induction Motors

THREE-PHASE induction motors with a centrifugal switch and a resistance mounted in the rotor have been developed by the Triumph Electric Company, Cincinnati, Ohio, which are called self-starting motors. All 3-phase induction motors are self-starting, but the feature of this particular type is that high torque is provided automatically at the time of starting.

The more common types of induction motors which are



A 50 h p. Motor May Be Started with a Single Throw Switch

provided with a wound rotor and resistance for the purpose of obtaining high starting torque, are equipped with an external resistance starting control or with a resistance mounted in the rotor. This resistance affords the desired starting torque and it is cut out by a hand operation when the motor attains full speed so that high power factor and high efficiency may be obtained when the motor is working under load. The fundamental difference of the Triumph motors is that this resistance, mounted in the rotor, is cut out by an automatic switch when the motor reaches normal speed.

The centrifugal governor is mounted on the shaft inside the end bracket and is entirely automatic and independent of the operator. The stator frame is made of close grained soft iron and is bolted to a cast iron base. The bearings are made of bronze and are provided with pressure release grooves drained to the oil well. The "TR" automatic induction motors, as they are called, are made in sizes ranging from 3 hp. to 50 hp., and are designed for operation on 220, 440, or 550-volt, two or three-phase, 60-cycle circuits.

Gasoline Motor Cars with Four-Wheel Drive

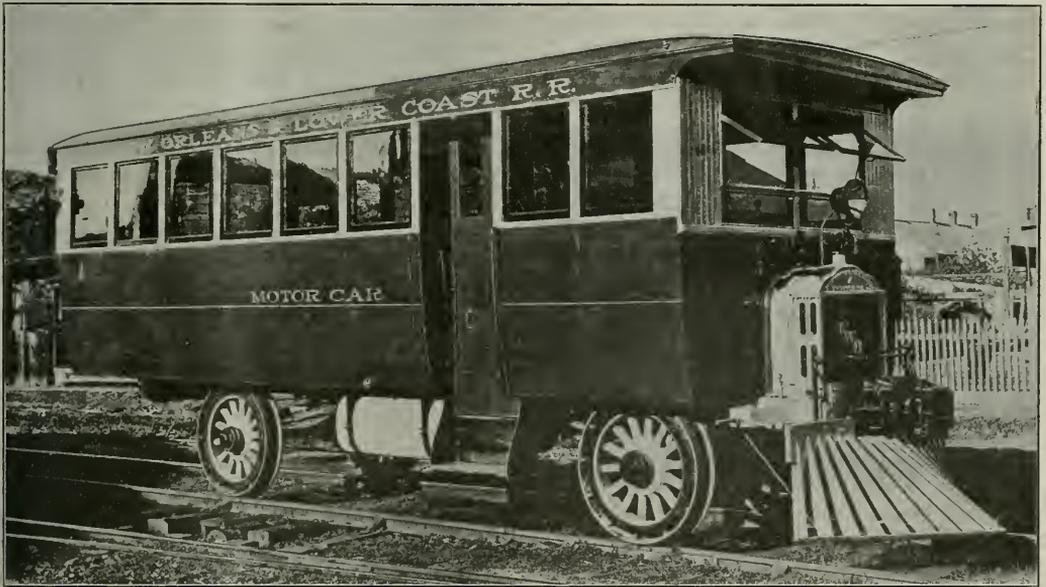
For Passenger, Freight and Light Switching; Increased Tractive Effort by Using All Wheels as Drivers

INCLUDED among the rail motor cars now in service are a number manufactured by the Four-Wheel Drive Auto Company of Clintonville, Wis. As the driving power on these cars is applied to all four wheels they have a number of advantages over cars which are driven by only one pair of wheels. Making every wheel a driving wheel and equally distributing the load over the wheels gives the car the greatest possible adhesion and permits the use of high tractive effort. This is important on roads which have numerous steep grades or are located in sections where winter weather is severe and the rails often are covered with snow and ice. In actual operation the cars have travelled over rails covered with

manufacturer, anticipating its use for such purposes, has applied standard M. C. B. couplers on the front and rear of the car. This enables owners to attach trailers and increase the carrying capacity to meet traffic demands.

Details of Design

The standard rail motor car chassis weighs 8,400 lb. and has a 13-ft. wheelbase. The frame is 16 ft. 8 in. long and 3 ft. wide. The wheels are 36 in. diameter with rolled steel rims of M. C. B. contour. Both axles are of the rigid type, full floating. The engine has four cylinders, each 5.1 in. diameter by 5.5 in. stroke, and a power rating of 42 hp.,



Four-Wheel Drive Rail Car Used on a Sixty-Mile Run Between New Orleans and Buras

snow to a depth of approximately one foot and in places drifted to a depth of two feet. This was done with little difficulty and without falling behind the regular schedule.

Another advantage gained through the application of power to each of the four wheels is that it eliminates the necessity of a pony truck. When rounding a curve, the differentials in the front and rear axles take care of the difference in speeds of the wheels on the inside and outside tracks and do away with the rail climbing action which has given trouble on rear driven rail equipment. At Clintonville, where numerous demonstrations in freight and passenger service have been given, there is a 16 deg. curve at one place in the track. Train operators are warned not to exceed a speed of 15 m.p.h. on this curve, yet during these demonstrations the motor cars have rounded it with ease at a speed of 23 m.p.h.

The increased available adhesion resulting from the four-wheel drive principle peculiarly adapts this type of car to use with trailers or for light hauling and switching. The

S. A. E. rules, but actually develops 68 hp. on a brake test. The transmission provides for three speeds. There is a choice of five gear ratios ranging between 5 to 1 and 12.05 to 1, which are suitable for speeds in high of 35, 30, 25, 20 or 14 m. p. h. With a gear ratio of 5 to 1 the maximum drawbar pull is 1,968 lb. at 8.7 m.p.h. and 492 lb. at 35 m.p.h. while with a gear ratio of 12.05 to 1 the drawbar pull is 4,755 lb. at 3.5 m.p.h. and 1,189 lb. at 14 m.p.h.

The car is equipped with a high-speed reverse gear which enables it to travel at the same speed in reverse as it does forward. This reverse mechanism is composed of a nest of bevel gears on the order of the conventional bevel gear differential, only much larger and of superior design and construction.

There is a service foot brake and an emergency hand brake, both of the external band type. In addition, Westinghouse air brakes can be applied if desired. Sanders are located at both ends.

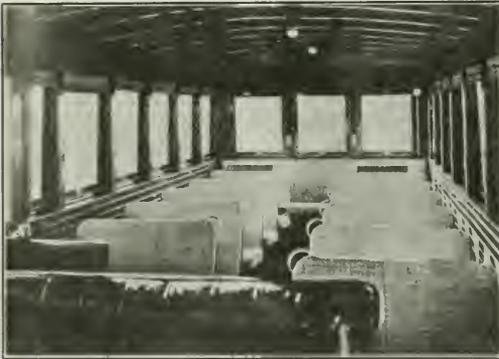
An outstanding feature of the FWD design is the readi-

ness and cheapness with which it can be converted from a highway truck to an efficient car for railway service. This fact is borne out by the continual increase in the number operated by the government at various arsenals and proving grounds throughout the country. There is now a total of 28 FWD cars in government service operating on rails, all of which were formerly used on highways and were converted at only the expense necessary to change from rubber tires to flanged steel rims, mount standard M. C. B. couplers front and rear, and install a high-speed reverse gear and a sanding device. Where cars are to be used for passenger service the expense of conversion must include body equipment and is, of course, somewhat greater.

Cars Now in Service

The first truck of this type put into operation on rails was a standard three-ton truck converted by the Northwestern Pacific at San Francisco, Cal., into a car suitable for light switching. A tunnel was being constructed and it was found that a steam locomotive filled the tunnel with smoke and made it impossible for the men to see or breathe after the engine had been inside. After investigation, the FWD truck was decided upon and with little expense one of them was converted into a car which filled the requirements so well that it is still being operated in light switching service.

At New Orleans, La., an FWD rail passenger car seating



Interior of Passenger Car on New Orleans & Lower Coast

32 persons, operates on a 60-mile run between that city and Buras over the New Orleans & Lower Coast. This car makes one round trip, or a total of 120 miles per day. Latest reports show that the car, during a period of 13 months, operated at an average cost of 15 cents per mile as compared to 90 cents per mile with a steam train. These figures include operator's wages, fuel, lubrication, supplies, maintenance and insurance but do not include anything for depreciation. The motor car averaged $7\frac{1}{2}$ miles per gallon of gasoline. This short line formerly operated a steam train at a loss and was obliged to discontinue service during the war. After the war it purchased a gasoline rail car and resumed operations. It was then found that not only was this car cheaper to operate but, with its weight of $6\frac{1}{4}$ tons, the depreciation of the track was much less than with the 25-ton locomotive hauling one or two 15-ton coaches.

The New Orleans & Lower Coast Railroad has, with this rail car, operated at a comfortable profit and has since the inauguration of this service enjoyed such a substantial increase in patronage that it has become necessary to increase the capacity by the purchase of a trailer coach, which will seat 40 passengers. This installation is a good illustration of what the rail car can accomplish for short line rail roads and on short runs on main line tracks.

The Oil Fields Short Line, which operates from Dilworth, Okla., in the oil fields to Clifford, where it connects with the St. Louis & San Francisco, is at present installing an FWD rail car. This line is only about six miles in length and the traffic is too light to warrant the operation of a steam train. This is typical of numerous short lines throughout the country, which might operate more successfully with a light rail car than with a heavy steam train.

The Ashley Lumber Company of Hamburg, Ark., uses one of these cars for hauling logs from the woods to their mill. The car operates satisfactorily with trailers and gives a cheap and efficient service.

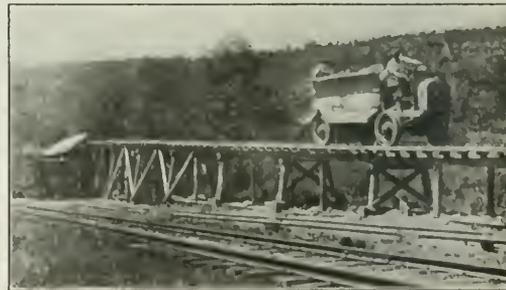
At Rockland, Mich., the Michigan Copper Mining Company operates a rail car which is equipped with a steel side dump body and is used for hauling ore from the mine to



The Ashley Lumber Company Employs a Motor Car to Haul Logs from Woods to Mill

railroad cars, a distance of about one mile. In 1919 when the mine was operating at full capacity this car operated continuously and hauled on an average of 219 tons of ore per day.

The Cripple Creek Consolidated Gold Mining & Milling Company of Cripple Creek, Colo., is operating a motor car on rails between their mines and the city of Cripple Creek. This car was formerly a standard three-ton truck used for road service, but was converted into a rail car and equipped with a passenger body which has a seating capacity of ap-



A Rail Motor Car with Dump Body Hauls Copper Ore from Mine to Main Line Connection

proximately 30 persons. It is used for hauling miners to and from the mines.

Including those operated by the government, there are now over 60 four-wheel drive rail motor cars in freight and passenger service in the United States and foreign countries.

THE PROVINCE OF ALBERTA announces that 93 miles of new railway was constructed in the province last year, bringing the total mileage up to 4,789, as compared with 1,782 in 1910, and 1,060 in 1905.

General News Department

The Shops of the Pennsylvania at Olean, N. Y., were damaged by fire on March 5; estimated total loss including some damage to 25 locomotives, \$100,000. The number of men at work in these shops was about 300.

Sleeping Car Conductors Meet in Chicago

The national convention of the Order of Sleeping Car Conductors was held at Chicago during the first three days of this week. This organization has negotiated a working agreement with the Pullman Company and is one of the labor groups not before the Railroad Labor Board in the present wage hearing.

Disastrous Fire Wrecks Burlington's

General Office Building

The 15-story general office building of the Chicago, Burlington & Quincy at Chicago was badly damaged by fire on March 15. The fire started at one o'clock in the morning in a neighboring building and soon spread throughout the Union Station business district, destroying several large structures. The upper seven floors of the Burlington building were seriously damaged, nothing but the main partition walls remaining. Many important papers, valuation records and engineering plans were lost.

Legislates Against Branch Line Abandonments

By a vote of 18 to 17, the Kentucky State Senate defeated the Perry bill on March 8, providing for the abandonment of branch lines in that State. The bill was originally intended to permit the abandonment of a nine-mile branch line of the Southern between Burgin, Ky., and Harrodsburg.

Santa Fe's Solicitation Campaign

For the past two months the Atchison, Topeka & Santa Fe has been conducting a campaign for the solicitation of business by employees. Post cards bearing well-worded "traffic tips" have been distributed widely among employees and their co-operation requested. An employee filling out a card puts upon it the names and addresses of business prospects, and sends it to the proper division superintendent, who, in turn, places it in the hands of a local agent. The enthusiasm with which the employees have entered into the work has accomplished results, and the campaign is to be continued.

Derailment at Union City, Ga.

Seven passengers (two of them employees of the road) were killed and 16 injured in the derailment of the rear car of a passenger train on the Atlanta, Birmingham & Atlantic, near Union City, Ga., on March 13. The car was derailed by the breaking of a wheel while on a trestle, or just before entering on the trestle, and broke away from the car ahead of it and fell 50 ft. to the stream below. The occupants of the car numbered about 30 altogether, and a number of the injured were not expected to live. The Receiver of the road issued a statement saying that the wheel that broke was a new one.

Power Brake Investigation

The Interstate Commerce Commission, in connection with its investigation of power brakes and appliances, has ordered that upon application of Clark & La Roe, attorneys for the Automatic Straight Air Brake Company, the deposition of F. K. Vial of Chicago, with respect to the authorship and the subject matter stated in a certain communication addressed by him to H. I. Miller, president, Automatic Straight Air Brake Company, New York, N. Y., under date of September 20, 1918; and also with respect to the authorship of and the subject matter in a paper

read before the Richmond Railroad Club, April, 1915, "The Chilled Iron Wheel," be taken before Examiner John T. Money, at the offices of said Vial, in Chicago, on March 20.

I. C. C. Proposes Conference With State Commissions

The Interstate Commerce Commission has addressed a letter to President Jackson of the National Association of Railway and Utilities Commissioners suggesting a conference to be arranged in the near future between a committee representing the association and a committee representing the commission. The commission wishes particularly to consider what can appropriately be done in view of the declarations made by the Supreme Court in its decision in the Wisconsin intrastate rate case, in which it was stated that although the commission had authority to order increases in the state rates to prevent discrimination, conference between the Interstate Commerce Commission and the state commissioners may dispense with the necessity for any rigid federal order as to the intrastate rates, and leave to the state commissions power to deal with them and increase or reduce them at their discretion. The commission says it could participate in such a conference if it were held in Washington at any time during the latter part of this month after the 14th.

Labor Board to Investigate Erie's

Contract with Meadville Company

The Labor Board has ordered a thorough investigation of a contract for shop work which the Erie has made since the subject of contract work came before the Board and has authorized a member of the Board to make an investigation and "invoke the aid and counsel of the Department of Justice." The resolution ordering this investigation specifically mentions the contract made recently with the Meadville Machinery Company for the operation of the Erie's shops at Meadville, Pa., and says in part:

"Since the hearing (of the contract cases, reported recently in the *Railway Age*) information has come to the Board that the Erie without awaiting the decision of the Board upon said contract cases has entered into a further contract by virtue of which all the shops of the entire Erie system, including those involved in the above cases, have been contracted to a newly incorporated company called the Meadville Machinery Company. Public announcement has been made of the fact that the officers of the Meadville Machinery Company are the recent officers of the Erie.

"The principal question involved in the above cases is whether or not the employees of the companies to which certain shops had been contracted are in law and in fact the employees of the Erie and therefore still subject to the rules, working conditions and wages established by the order of this Board.

"Said employees having now been shifted a second time before the Board had rendered its decision in said pending cases and said contract system having been extended so as to embrace all other shops on the road it becomes the duty of the road upon its own motion to investigate the facts surrounding this alleged contract of the carrier with the Meadville Machinery Company.

"The Board therefore orders: 1—That the contract cases be reopened for the purpose of taking additional proof as to the issues involved in said cases; 2—That a thorough investigation be made of all the facts and circumstances surrounding said alleged contract and the operations being conducted thereunder; 3—That a member of this Board accompanied by such expert and stenographic assistance as may be deemed necessary be authorized and directed to go on the property of said carrier to conduct said investigation and to institute such legal proceedings as may be deemed necessary to effectuate this order after having first secured all the information possible here in Chicago; 4—That the member of the Board conducting said investigation be and is hereby authorized to invoke the aid and counsel of the Department of Justice at Washington if he deems advisable."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1922—Continued

Table with columns: Name of road, Average mileage operated per period, Operating revenues (Total, Freight, Passenger, Inc. misc.), Maintenance of Way and Equip. (structures, ment.), Traffic, Trans. portation, Total, Net from Operations, Operating income (or loss), Net after rentals, and Net after rentals 1921.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1922.—CONTINUED

Table with columns: Name of road, Average mileage during period, Operating revenues (Freight, Passenger, etc.), Maintenance of way and equipment, Operating expenses (Traffic, Transportation, etc.), Total, Operating ratio, Net railway operating income (or loss), Net after rental 1921, Net after rental 1922.

*This is the first month that this road has filed.

Management and Transportation Unions

Fail to Reach Agreement

The Eastern railroads and the leaders of the engineers' and firemen's brotherhoods announce that the regional conferences came to an end last week because of disagreement over the fundamental demands. All disputes concerning adjustments of wages and rules and working conditions will now be taken before the United States Railroad Labor Board. John G. Walber, secretary of the committee of managers, said that after it was apparent that a mutually satisfactory agreement could not be arrived at it was decided, as previously agreed, that all propositions made by either side in the hope of a settlement should be considered as though they had not been proposed. The leaders of these two brotherhoods have intimated that further negotiations may be had with some individual roads.

Wage Statistics for November

The Interstate Commerce Commission's summary of railroad wage statistics for November, 1921, shows a decrease of 21,783 in the number of employes as of the middle of the month compared with October. The total compensation decreased \$12,298,953. For the maintenance of way and structures group the October report showed an increase of 6,171 employes over September, but in November there was a reduction of 31,140, or 7½ per cent. For the maintenance of equipment and stores group there was an increase in October compared with September of 18,823 employes and in November the number was further decreased by 11,594 employes, or 2.3 per cent. The total number of employes for November for Class I roads was 1,732,353 and the total compensation was \$225,304,006.

Railway Returns for January

Reports of railway revenues and expenses filed with the Interstate Commerce Commission for the month of January make a very unsatisfactory showing in spite of the reductions in expenses that have been made. A preliminary compilation covering 199 Class I roads shows a net railway operating income of \$29,560,210, which is at an annual rate of return of 2.6 per cent on the tentative valuation. For January, 1921, however, these same roads had a deficit of \$1,525,500. The operating revenues of these roads, \$394,786,058, showed a decrease of 16.1 per cent. Freight revenues decreased 15 per cent and passenger revenues 20 per cent. Preliminary reports show a decrease of about 9 per cent in net ton miles as compared with January, 1920, and the passenger traffic showed an even greater falling off. For the Western district the decrease in revenues was 17.3 per cent. Operating expenses of the 199 roads, however, \$337,053,161, were 23.8 per cent less than for January, 1920. The Eastern district roads show a decrease of 25.3 per cent. It is estimated that the Eastern roads show a net return at the rate of approximately 4 per cent, the Southern roads 2½ per cent and the Western roads 1¼ per cent.

Hayden and Bell Required to

Give Up Interlocking Directorates

The Interstate Commerce Commission has issued an order holding that Charles Hayden and M. L. Bell cannot continue to hold their offices with the Chicago, Rock Island & Pacific and at the same time similar offices with the Minneapolis & St. Louis. The commission had previously issued the order authorizing them to hold their positions temporarily pending a hearing on a protest filed by Newman Erb. Mr. Bell is authorized to hold the position of vice-president, director and general counsel of the Rock Island, and offices with subsidiary companies, or the positions of director and general counsel of the Minneapolis & St. Louis and director, member of executive committee and vice-president of the Chicago & Alton. Mr. Hayden is authorized to hold his positions as director of the Pere Marquette, director and treasurer of the Ray & Gila Valley, and director and vice-president of the Bingham & Garfield and the Nevada Northern; and either the positions of director, chairman of board, chairman of finance committee and member of executive committee of the Chicago, Rock Island & Pacific and of director of the Choctaw, Oklahoma & Gulf, or the positions of director, chairman of board of di-

rectors and chairman of executive committee of the Minneapolis & St. Louis, of director of the Railway Transfer Company of Minneapolis and of director and member of executive committee of the Chicago & Alton.

Mr. Hayden's application to hold the position of director of the American Railway Express Company is dismissed as unnecessary within the meaning of paragraph 12 of Section 20-a of the interstate commerce act. L. C. Fritch has withdrawn his request for authority to hold the position of vice-president of the Minneapolis & St. Louis.

Commission to Begin Hearings on Consolidation Plan

The Interstate Commerce Commission has announced the first of a series of public hearings on its tentative plan for the consolidation of the railroads into a limited number of systems which was adopted by the commission on August 3. The first hearing is to be held at Washington beginning on April 24 before Commissioner Hall. Evidence at this hearing will be confined to that part of the proceeding which affects the Southeastern region as described and referred to in Chapter 4 of the appendix to the commission's tentative plan. The appendix consists of Prof. Ripley's report on the subject. Respondents and other parties desiring to be heard should promptly advise the secretary of the commission, stating the interests they represent and their best estimate of the time they will require so that a schedule for the hearing may be prepared.

Convention of International Railway Fuel Association

The International Railway Fuel Association was organized to bring together railroad men interested in the use of fuel or its purchase and the mine operators or oil producers who supply railroad fuel. The program for the annual meeting of the association to be held at the Auditorium Hotel, Chicago, on May 22 to 25, embraces topics of interest to all these groups and in fact to everyone who is in any way concerned with the railroad fuel problem. A list of the papers and addresses which have been secured up to the present time is given below.

Opening Address—L. W. Baldwin, vice-president, Illinois Central.

Fuel Conservation from the Standpoint of

(a) Division Superintendent—Sidney U. Hooper, division superintendent, Baltimore & Ohio.

(b) Representative of Department Operating—Coaling Stations—W. S. Burnett, district engineer, Cleveland, Cincinnati, Chicago & St. Louis.

(c) Locomotive Engineer—C. J. Barnett, Illinois Central. The Economic Considerations Governing the Use of Oil as a Locomotive Fuel—M. C. M. Hatch, mechanical engineer, Missouri Kansas & Texas.

Colloidal Fuel—Lindon W. Bates.

Mechanical Mining of Bituminous Coal—George T. Peart. Standard Grading of Coal or Stabilization of Bituminous Coal—George H. Cushing, managing director, American Wholesale Coal Association.

Assigned Cars for Railroad Fuel—C. G. Hall.

The Relation of Overdevelopment of the Bituminous Coal Industry to Transportation—C. F. Leshner, editor, Coal Age.

The Government and the Coal Industry—T. H. Watkins. Considering the Locomotive as a Big Investment, How Can We Get More Service Out of It?—G. M. Basford, president, G. M. Basford Company.

The Various Items of Saving by Using a Better Quality of Coal—Earl Cobb, president, Southwestern Coal Company.

The Effect of Tonnage Rating and Speed on Fuel Consumption—J. E. Davenport, engineer dynamometer tests, New York Central.

Educational Work Along Fuel Economy Lines—D. G. Buell, director, Railway Educational Bureau.

Standard Railroad Coal Contract—W. J. Tapp, fuel supervisor, Denver & Rio Grande.

Incentives for Promoting Fuel Economy—A Survey of Existing and Proposed Practices—O. S. Beyer, Jr.

In addition, papers will be presented by Professor E. J. Babcock, Harrington Emerson and F. S. Peabody.

Traffic News

R. C. Dearborn has been appointed chairman of the National Perishable Freight Committee, headquarters at Chicago, succeeding E. S. Briggs, resigned.

C. H. Easum, traffic manager for the Mississippi Lime & Material Company, and formerly associated with the Illinois Central, died at his home in Alton, Ill., on March 3.

E. W. Owen has been appointed traffic manager for the Southern Cypress Manufacturers' Association, at New Orleans, La., succeeding E. W. McKay, who has been elected secretary-manager.

The Southern Pacific has installed dining cars on its lines in Mexico between Nogales and Mazatlan. Combination cafe-parlor cars with a seating capacity in the dining room of 12 persons are used.

J. K. More, formerly associated with the Corporation Commission of Oklahoma, has been elected secretary-manager of the Oklahoma Traffic Association, Oklahoma City, succeeding H. D. Driscoll, who has resigned to practice law in that city.

The House committee on interstate and foreign commerce has decided to begin hearings on March 21 on the bill recently passed by the Senate authorizing the Interstate Commerce Commission to require the railroads to issue an interchangeable mileage book at a reduced rate.

The Transportation Club of Peoria, Ill., at its annual meeting held on February 28, elected G. I. Sweny, president; N. M. Love and O. F. Becker, vice-presidents; O. B. Eddy, secretary-treasurer; G. A. Smith, B. C. Fitton, E. M. Jones, F. B. Martin, and J. F. Hobbin, directors.

The Southern Pacific was authorized by the Railroad Commission of California to put into effect on one day's notice round trip excursion fares from San Francisco to Calistoga, Napa, North Vallejo, St. Helena and Yountville. The tickets will be sold daily with a return limit of 25 days.

The Union Pacific has announced its intention to reduce trans-continental freight rates from 10 to 50 per cent on building materials and accessories (asbestos, cement, sheetings, roofings and bath tubs); eggs, nuts, insecticides, poultry, fish food, ammunition, glycerin, soda-fountain supplies, furniture parts, pole-line construction material, auto chassis and rotary blowers. The Southern Pacific has made a similar announcement.

The Traffic Club of Memphis, Tenn., has given its sanction to the proposed plan for a national association of traffic clubs. Preliminary plans for such an organization were made by a number of traffic club presidents at a meeting recently held in New York. It is expected that invitations will soon be sent to all traffic clubs asking that they join the Association and send two delegates to a first national convention.

Deep snow, with many drifts delayed all traffic between the Pacific Coast and points east during the last half of last week. The Western Pacific's trains between Salt Lake City and San Francisco were more than 18 hours late in some instances. The Chicago, Rock Island & Pacific's trains arrived in Kansas City 12 hours behind. The heavy snow and high wind storm visited practically the entire area of Kansas, Missouri, Oklahoma, Northern Arkansas, and the Texas Panhandle.

The presidents of seven of the leading traffic clubs of the country and representatives of a number of other traffic clubs met and formed a temporary organization in New York city on February 20 to further a movement to establish a nationwide organization of traffic clubs. W. J. L. Banham, chairman of the public affairs committee of the traffic club of New York and traffic manager for the Otis Elevator Com-

pany, was appointed chairman of the temporary organization and N. G. Campbell, president of the Newark Traffic Club, was appointed secretary.

Frank T. Riley, freight agent of the Michigan Central at Jackson, Mich., has been elected president of the newly organized Jackson Transportation Club. Other officers are: Vice-president, J. J. Lynch, traffic manager of the Hayes Wheel Company; secretary, J. C. Graham, traffic manager of the Chamber of Commerce; treasurer, W. R. Klien, chief clerk, Michigan Central; directors, G. B. Hunt, general freight and passenger agent, Michigan United Railways Company; Warren Zerby, traffic manager of the Earl Motors, Inc., and M. S. Hatch, ticket agent, Michigan Central. The club has 75 members.

The Wisconsin Traffic League held its annual meeting at Milwaukee, on February 25, and elected the following officers: President, C. M. Starks, traffic manager, Oshkosh Chamber of Commerce; vice-president, A. Murawsky, Milwaukee; secretary-treasurer, H. Dehrcke, Milwaukee; directors, Max Bloch, Racine; C. R. Jeffrey, Waukesha; E. E. Meadley, Ashland; O. A. Kroos, Kohler; F. M. Elkinton, Milwaukee; George Mergener, Milwaukee; W. H. Reynolds, LaCrosse; W. W. West, LaCrosse; A. C. Uecke, Milwaukee; L. A. Zimmerman, Beaver Dam; L. B. Maxfield, Milwaukee; W. J. Lahl, Chicago, Ill.; J. C. Chandler, Sheboygan; and C. J. Landuskey, Milwaukee.

Coal Production

Production of soft coal continues to increase slightly, according to the weekly bulletin of the Geological Survey. The output for the week ended March 4 is estimated at 10,536,000 net tons, an increase of 1.6 per cent over the week preceding. Production is still some 2,600,000 tons short of the maximum reached just before the mine strike of 1919.

Anthracite Shipments in February

Shipments of anthracite for February, as reported to the Anthracite Bureau of Information, Philadelphia, show a substantial increase over the two preceding winter months; 5,239,014 gross tons as compared with 4,848,053 tons in January, and 4,635,922 in December.

Shipments by originating carriers were as follows:

	February 1922	February 1921	January 1922
P. & R.	1,160,685	1,170,753	1,052,852
L. V.	857,579	1,063,508	766,602
C. of N. J.	537,214	515,551	542,558
D., L. & W.	755,923	926,788	743,768
D. & H.	670,323	813,191	619,762
Penna.	402,762	426,350	311,871
Eric.	492,262	633,706	466,495
N. Y., O. & W.	141,929	153,017	101,779
L. & N. E.	220,337	269,237	221,346
	5,239,014	5,966,101	4,848,053



Elwell-Parker Electric Station Truck in Use on Government Railway, Japan

Commission and Court News

Interstate Commerce Commission

The Commission has issued an order in accordance with Section 441 of the transportation act designating points on railroads at which information shall be available concerning the handling of export shipments by common carriers by water in foreign commerce, and at which through bills of lading to foreign destinations in connection with ocean carriers, whose vessels are registered under the laws of the United States, to points in non-adjacent foreign countries, shall be issued.

State Commissions

The Louisiana Public Service Commission has imposed on the Louisiana Railway & Navigation Company a fine of \$2,000 for violation of the terms of an order issued by the Railroad Commission in March, 1919, which required the road to repair and place in satisfactory condition its entire roadway, which was in very bad condition. On January 26, 1921, representatives of the railroad appeared before the Commission and stated that they had made every effort within their means to comply with the order and wished extended time to further carry out the betterment programs, which request was granted. The Commission now concludes, however, that little or nothing has been done to comply with that agreement. Service continues poor and derailments, congestions and other inconveniences are common. The present order calls for a further payment of \$200 for each day hereafter that the railroad fails or refuses to comply with the original order.

Court News

Employee's Assumption of Risk—Irregular Trains

The Missouri Supreme Court holds that a man who had been in the railroad's service 25 years as engineman and knew there were no rules prescribing signals to employees when a train running west was using an eastbound track, and knew trains were run irregularly, assumed the risk of injury in stepping on the track, under the federal rule that a servant assumes extraordinary risks incident to his employment, or risks caused by the master's negligence, obvious or fully known and appreciated by him.—*Quigley v. Hines* (Mo.), 235 S. W. 1050.

United States Supreme Court

Intrastate Fares in New York

The State of New York sought by bill in equity to enjoin the enforcement of an order of the Interstate Commerce Commission requiring interstate railroads to charge 3.6 cents a mile for all intrastate passengers, to increase excess baggage rates to intrastate passengers, 20 per cent, to make a surcharge on sleeping-car passengers, and a 20 per cent increase in intrastate rates on milk, all for the purpose of bringing the intrastate rates to the level of the interstate rates previously fixed by the commission. The federal district court dismissed the complaint. The railroads appealed to the Supreme Court of the United States. That court has affirmed the judgment of the district court, saying in part: "The main objections to the order are the same as those presented, considered and overruled in the Wisconsin Rate case just decided (*Railway Age*, March 4, page 519). The evidence in this case shows that if the passenger and other rates here in controversy were to continue in force as ruled by the Public Service Commission of New York, the annual gross revenues of the interstate railroads operating in the State of New York from both interstate and intrastate passenger and milk business would be less by nearly \$12,000,000 than those revenues if the intrastate rates were on the same level as the interstate rates. If the lower level of intrastate fares and rates is to be maintained, it will discriminate against interstate commerce, and will require higher fares and rates in interstate commerce. . . ."—Opinion by Mr. Chief Justice Taft. Decided February 27, 1922.

Foreign Railway News

Proposed Increase in Indian Railway Fares

LONDON. In the budget recently introduced to the Legislative assembly at Delhi, there is a proposal to increase railway fares in India by 25 per cent.

German Locomotives on Russian Railways

LONDON. It is reported that the locomotives ordered by Russia from Germany are too heavy for the Russian railways and have caused the collapse of some of the railway bridges.

France May Lease State Railway

According to press dispatches to the New York Times, the French government is preparing definite plans for leasing the State Railway to a corporation. This system is one of the largest in France and for a number of years it has been the most unsuccessful from a financial standpoint, having piled up millions of francs in deficits.

French Railway Bonds on Sale in New York

New York investment houses are offering for sale 25,000,000 francs of bonds of the Midi Railway, France. These bonds bear 6 per cent interest and, since they are payable principal and interest in Paris, will increase in value as the exchange value of the franc returns to normal. The bonds are guaranteed principal and interest by the French government.

Big British Locomotive Company Closes Plant

LONDON. Sir W. G. Armstrong, Whitworth & Co., Ltd., has decided to suspend operations at its Elswick steel works and its forge and stamping departments, owing to the high costs of production. No new contracts can be obtained on the basis of the selling prices which must be charged, and as it would be impossible to keep the shops open except at a loss, there is no alternative to the closing of them down.

British Roads Pay Dividends from Surplus

The Great Northern (England) earned a corporate net of £1,949,172 in 1921, a decrease of £300,968 compared with 1920, according to the *Railway Gazette* (London). In order to pay the 4½ per cent dividends on its ordinary shares, it is proposed to withdraw £207,261 from reserve funds. The company's business fell off tremendously in 1921 as compared with the previous year. Passengers (exclusive of season ticket-holders) fell off from 36,576,771 to 27,828,130. Season ticket-holders dropped from 60,275 to 55,725. Merchandise tonnage (long tons) dropped from 2,838,223 to 2,344,619 and fuel traffic from 6,731,018 to 3,272,984.

By the transfer of £205,000 from reserve funds the London, Brighton & South Coast proposes to maintain the regular dividend rate on its ordinary shares.

New Line from Tampico to Matamoros Proposed

The A. P. Turner Construction Company has applied to the Department of Communications and Public Works of Mexico for a concession to construct a railroad between Matamoros and Tampico, about 315 miles, according to advices from Matamoros. The company proposes that the government issue 6 per cent bonds to cover the cost of construction, the sale of the bonds to be undertaken by the company. The construction of this proposed line of railway has been under consideration from time to time for the last 30 years. When B. F. Yoakum and associates built the St. Louis, Brownsville & Mexico down the lower Gulf coast of Texas to Brownsville, situated just across the Rio Grande from

Matamoros, they had in view the extending of the road down the Mexican coast to Tampico. Inability to finance the project caused its abandonment. The Mexican Government took up the matter of constructing the line and work on it was about to be started when the revolutionary period began and put an end to these plans. The territory through which the road would pass is rich in natural resources but is wholly undeveloped. It would shorten the rail distance between the Rio Grande and Tampico by nearly 200 miles.

Government Railways in Australia Lose Heavily

Taxpayers pay heavily for government control of Australian railways, according to the Wall Street Journal. Accounts for year ended June 30, 1921, show an aggregate loss for the commonwealth and five state governments of £3,793,365 after costs of operation and the interest charges.

The loss quota of the commonwealth government was £166,551. The Trans-Australian line earned 8s. 9d. a train mile, and cost 12s. 7½d.; loss, exclusive of interest, amounting to £91,339. The Onadada line lost £60,460, and the Northern Territory line £15,337. Loss on the Trans-Australian line was greater than in the previous year; freight receipts were £53,160 less than 1920, although passenger traffic gave increased revenue.

Reports of five state railroad administrations follow:

State	Earnings		Deficit	
	1920-21	1920-21	1920-21	1920-21
New South Wales	£14,267,205	£577,032		
Victoria	9,795,763	651,635		
Queensland	5,279,412	1,418,473		
South Australia	2,942,028	561,304		
Western Australia	2,270,032	418,370		
Total	£34,554,440	£3,626,814		

Store-Door Delivery in England

Cartage is one of the functions of the British railways, as a supplement to rail transport. The following description of the system appeared in Commerce Reports:

"Motor trucks have a well-defined and growing place in British transportation, for not only do they compete for traffic with the railways, but they are used by the carriers themselves in carrying on their business. The growth of motor transport during the past five years may be realized when it is stated that in 1916 there were but 600 road transport undertakings in England, while in 1921 this number had grown to 3,000 with a capital of £117,000,000, exclusive of business men who use their own fleets of motor trucks. A recent press estimate of merchandise hauled by road transport in the United Kingdom in 1921 was 6,000,000 tons.

"In Great Britain, railway freight traffic is divided into eight classes: A, B, C, 1, 2, 3, 4, 5. The rates for these classes graduate upward from class A. Goods embraced in the lettered classes include heavy basic commodities, such as coal, iron, cement, etc., charged at station-to-station rates, and are trucked by consignor at origin and by consignee at destination. The numbered classes are charged at what are known as 'collection and delivery' rates, which cover cartage from consignor's premises, the rail haul, and delivery at consignee's premises within a reasonable radius, which in London is about 4 miles and in rural districts 1 mile.

"At big railway centers, the trucking is usually done by the railways; but at rural stations, and even in some important towns, the companies occasionally contract with an agent to do the trucking for them. Under the regulations, a trader may elect to do his own trucking of freight in the numbered classes, in which event reduction from the rail rates is made as follows:

Class of freight	In Lon- don.		In rural districts.	
	£	d.	£	d.
Class 1	9	0	4	3
Class 2	9	10	4	10
Class 3	11	6	5	6
Class 4	11	5	6	6
Class 5	14	10	8	2

"There are certain modifications of these allowances in some rural districts, but the above is a fair average and is representative.

"In addition to this freight traffic, the railways handle 'parcel traffic'—a business similar to that conducted by express companies in America. The British railways collect and

deliver these goods from the shipper's door to the consignee's door at destination, the charges including collection, rail haul, and delivery.

"An important factor in British transportation is the cartage agent or forwarder. These firms maintain large fleets of vehicles, both horse-drawn and motor, and collect and deliver freight in London and most other large cities and towns. They charge the shipper the package rate, consolidate shipments for various destinations, turn them over to the railway companies in bulk, and are charged by the latter the lower rates which are applicable to large shipments after the fashion of the 'consolidated car' companies of the United States. The cartage agent thus makes the difference between the door-to-door railway package rates and the wholesale railway rates, while the railways are saved the expense of collection and have the advantage of handling one large shipment instead of a number of smaller ones. It is estimated that the railway companies receive and deliver about 70 per cent of their parcels business, the rest being handled by the forwarders."

Mexican (Vera Cruz) Railway to Build New Line

Following close upon the recent announcement of a modification by the Mexican government of the concession for the construction of the Pachuca & Tampico Railroad comes the authorized statement that the Mexican (Vera Cruz) Railway Company, a British corporation, has purchased a controlling interest in the Pachuca & Tampico from the heirs of the late Richard Honey and will finish building the line as fast as the work can be done. The Mexican (Vera Cruz) Railway runs between the port of Vera Cruz and Mexico City. It was one of the first railroads to be built in Mexico.

The taking over of this project by the strong British interests that own the Mexican (Vera Cruz) Railway is regarded as an assurance that it will be pushed to fulfillment as rapidly as possible. It is one of the most important transportation projects ever undertaken in Mexico for the reason that it will give direct connection between Mexico City and Tampico, shortening the rail distance between the two points by about 200 miles, and opening to agricultural development a big scope of rich lands. The fact that the road will have to mount from sea level to an altitude of more than 6,000 feet within a distance of 30 miles in order to reach the plateau region makes the engineering features of the project unusual interest. It is explained, however, that a feasible route for this part of the line has been found and that the grade will not be excessive.

Approximately 45 miles of the Pachuca & Tampico already has been constructed. This part of the line runs from Pachuca to Ixmiquilpan. At Pachuca the new line connects with the branch road of the Mexican (Vera Cruz) Railway that runs to Ometusco where connection is made with the Mexico City-Vera Cruz line. The branch road will be made a part of the trunk line between Mexico City and Tampico, it is stated.

Announcement of the purchase of the majority stock of the Pachuca & Tampico Railroad comes from B. E. Holloway, general manager of the Mexican (Vera Cruz) Railway with headquarters at Mexico City. The chairman of the board of the latter road is Vincent M. Yorke, of London, England. Mr. Holloway in speaking of the new transaction said in part:

"It is the intention of the Mexican (Vera Cruz) Railway to carry out the construction of the line to Tampico but its progress will greatly depend on how quickly funds can be obtained for carrying out the project.

"We have acquired very little rolling stock, an engine or two in need of repairs, and a few cars of various descriptions, so it will be necessary to restock the line with new material bought in the United States. The road will be single track, standard gage."

The route of the proposed extension of the Pachuca & Tampico Railroad, so far as surveyed and tentatively located, passes through the heart of the gulf coast oil fields. It will run just to the west of the interoceanic canal that connects the Panuco and the Tuxpam rivers. It will connect with the Tampico-San Luis Potosi division of the National Railways of Mexico at or near Tamos, about 30 miles from Tampico. The construction of a railroad between Tampico and Mexico City was started about 11 years ago by the National Railways of Mexico. More than 100 miles of grade was built and about 50 miles of track laid. The project was abandoned on account of the revolutionary disturbances.

Equipment and Supplies

Locomotives

THE CHICAGO & EASTERN ILLINOIS, is inquiring for 10 Pacific type locomotives.

THE KENTUCKY & TENNESSEE has ordered 1 Mikado type locomotive from the American Locomotive Company.

THE U. S. GYFSUM COMPANY, Chicago, has ordered from the American Locomotive Company 1, 0-6-0 type locomotive. This locomotive will have 20 x 26 in cylinders and a total weight in working order of 130,000 lb.

CASTNER, CURRAN & BULLITT, Inc., Boston, Mass., has ordered from the American Locomotive Company 1, 0-4-0 type tank locomotive. This locomotive will have 14 by 22 in. cylinders and a total weight in working order of 79,000 lb.

JOHN B. SMITH & SON, LTD., Toronto, Ontario, has ordered from the American Locomotive Company 1, 0-4-0 type tank locomotive. This locomotive will have 13 by 20 in. cylinders and a total weight in working order of 65,000 lb.

THE ST. LAWRENCE BRICK COMPANY, Montreal, Quebec, has ordered from the American Locomotive Company 1, 0-4-0 type tank locomotive. This locomotive will have 9 by 14 in. cylinders and a total weight in working order of 29,000 lb.

THE AMERICAN BRAKE SHOE & FOUNDRY CO., New York City, has ordered from the American Locomotive Company, 1, 0-4-0 type tank locomotive. This locomotive will have 16 by 24 in. cylinders and a total weight in working order of 99,000 lb.

THE CALDAS RAILWAY, Columbia, South America, has ordered from the American Locomotive Company, 1 Mikado type locomotive. This locomotive will have 16 by 22 in. cylinders, a total weight in working order of 105,000 lb. and will be equipped with a superheater.

Freight Cars

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 50 underframes.

THE GRAND TRUNK is asking for bids for the repair of from 250 to 500 box cars.

THE STANDARD OIL COMPANY of New Jersey is inquiring for 10 coal cars, of 50 tons' capacity.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for 100 sets of underframes and superstructures for gondola cars.

THE UNITED FRUIT COMPANY, New York, has ordered 25 ballast cars of 30 tons capacity from the Magor Car Company for export to Honduras.

THE GULF, MOBILE & NORTHERN is having repairs made to 100 steel underframe box cars, at the shops of the Anniston Electric Steel Corporation, Anniston, Ala.

DAVIS EQUIPMENT COMPANY, 50 Church street, New York City, is asking for prices on 40 gondola cars of 40 tons' capacity and 30 steel gondola cars of 30 tons' capacity for export to China.

THE TENNESSEE COAL, IRON & RAILROAD COMPANY, reported in the *Railway Age* of March 11, as inquiring for 150 ore dump cars has ordered this equipment from the Chickasaw Shipbuilding Company.

THE CHICAGO & NORTH WESTERN, noted in the *Railway Age* of March 11 as inquiring for 2,700 freight cars is inquiring for 1,250 40-ton box cars; 500 40-ton stock cars; 250 40-ton refrigerator cars; 250 50-ton gondola cars, and 500 50-ton flat cars.

THE DELAWARE, LACKAWANNA & WESTERN reported in the *Railway Age* of February 18, as asking for prices on the repair

of about 900 cars has given an order to the American Car & Foundry Company for the repair of 985 steel hopper cars, of 40 tons capacity.

THE NEW YORK CENTRAL has ordered 250 steel underframe, double sheathed box cars of 40 tons capacity from the American Car & Foundry Company and has equally divided an order for 750 steel hopper cars of 55 tons capacity between the Pressed Steel Car Company, the Standard Steel Car Company and the Pullman Company.

Passenger Cars

THE FLORIDA EAST COAST is inquiring for 10 baggage cars.

THE CENTRAL OF BRAZIL is inquiring through the car builders for 50 first class coaches and 58 pairs of motor trucks.

THE LOUISVILLE & NASHVILLE is inquiring for 5 baggage cars, 5 combination baggage and horse cars, 6 coaches, 4 combination passenger and smoking cars and 5 combination passenger and baggage cars.

Iron and Steel

THE SOUTHERN RAILWAY is asking for bids until 12 o'clock noon, March 20, on 26,600 tons of 85 lb. A. S. C. E. section rail for delivery in approximately equal monthly installments from June to December 1, 1922.

THE GREAT NORTHERN is inquiring for 10,400 tons of structural steel for a 350 pocket ore dock; and 1,450 tons of structural steel for ore spouts, including bails and pins, at Superior, Wis.; and also for 750 tons of structural steel for reinforcement including stringers and shoes for four truss spans.

Miscellaneous

THE DIERKS LUMBER & COAL COMPANY, DeQueen, Ark., is inquiring for 40 arch bar trucks.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, March 22, covering its requirements of track bolts, track spikes, fence wire, angle bars, offset splice bars, blank splice bars, frogs, switch points, track switches, crossings, bridge warning poles, structural steel, castings and rollers for repairs to bridges, lead covered cable, copper wire, repair parts for turntables, black galvanized and blue annealed sheets, driving and truck tires for locomotive service, seamless steel tubes, axles for car and locomotive repairs, wire nails and staples, steel bars, steel shapes, steel plates and steel billets.

Signaling

MITSUI & COMPANY, New York City, have ordered 62 sets of three color light signals from the Union Switch & Signal Company. These signals are for use on the Osaka Electric Railway, Japan.

THE UNITED STATES RAILROAD LABOR BOARD was created by an act of Congress on April 16, 1920, and was given an appropriation of \$50,000 to cover all necessary expenditures up to and including June 30 of that year. This was known as the fiscal year of 1920 and the entire sum authorized was expended during that three months' period. The fiscal year of 1921 began July 1, 1920, and \$450,000 was appropriated for this period of which amount \$50,000 was available for either the fiscal year of 1920 or 1921. The sum of \$17,604.18 was spent from this \$50,000 in 1920, leaving a balance of \$32,395.82. From the remaining \$400,000, \$399,821.23 was spent in the next year, leaving a balance of \$178.77. The appropriation for the present fiscal year which will end on June 30 next, amounted to \$370,000 of which sum \$243,046.92, has already been expended. This leaves \$126,953.08 available for use during the next four months. The expenditures of the labor board are said to average approximately \$30,000 a month.

Supply Trade News

Ross E. Willis, formerly sales engineer of the Lakewood Engineering Company, Cleveland, Ohio, in the southern Michigan territory, has become associated with Wm. F. V. Newmann & Sons, Detroit, Mich., representing the Baker R. & L. Company in the Detroit territory.

William D. Pence, for eight years a member of the Engineering Board, Bureau of Valuation, Interstate Commerce Commission, and prior to that time engineer for the Wisconsin Railroad and Tax Commissions for seven years, has returned to practice as a consulting engineer with office at 608 South Dearborn street, Chicago.

The Imperial Appliance Company and the Pressed Steel Manufacturing Company have been merged with the Union Metal Products Company. The business of the three firms will be continued under the name of the Union Metal Products Company, with headquarters at Chicago, and no change will be made in the location of the various offices or in the personnel.

E. S. Fitzsimmons has been appointed manager of sales of the Flannery Bolt Company, Pittsburgh, Pa. He was born on April 12, 1876, at Columbus, Ohio. He served his apprenticeship with the Chicago, Rock Island & Pacific at Horton, Kan., leaving that company in 1899 to become foreman boilermaker with the Delaware, Lackawanna & Western at Scranton, Pa. In 1904 he served as general boiler inspector of the New York, New Haven & Hartford and from 1905 to 1907 as general foreman boilermaker of the Erie. He was then promoted to master mechanic at Galion, Ohio, and in 1908 was transferred as master mechanic to Hornell, N. Y., which position he held until 1912, when he was promoted to mechanical superintendent Erie, Lines West. In 1914 he was transferred to New York as mechanical superintendent of the Erie, Lines East, resigning in 1918 to become works manager for the McCord Manufacturing Company, Detroit, Mich. Mr. Fitzsimmons entered the service of the Flannery Bolt Company at Pittsburgh as salesman in December, 1920, and now becomes manager of sales of the same company.



E. S. Fitzsimmons

Bucyrus Company

The annual report of the Bucyrus Company for the year ended December 31, 1921, shows earnings of approximately \$4 a share on common stock aggregating \$445,905, a decrease of \$365,079. The balance after dividends was \$115,905, a decrease of \$425,079. The ratio of current assets to liabilities was nearly 6 to 1, as there were current assets of \$4,636,737, not including \$163,530 in securities and current liabilities of \$728,059, including \$352,126 of accrued taxes and miscellaneous reserves. The statement follows:

	1921	1920
Net earnings	\$445,905	\$1,010,984
Dividends	3,000,000	480,000
Profits	11,005	530,984
Reserves, a. c. r.	1,111,608	2,587,671
Total current assets	3,589,511	3,116,067

RESOURCES

Cash	268,139	567,083
Securities	714,524	163,903
Accounts and bills receivable	1,159,450	1,764,076
Inventories	2,638,152	3,179,007
Property account	7,187,303	7,126,091
Total	\$11,987,571	\$12,800,163
LIABILITIES		
Accounts payable	142,954	624,673
Advance payments received	162,978	296,367
Preferred dividends payable	70,000	210,000
Accrued taxes and reserves	352,126	555,816
Preferred stock	4,000,000	4,000,000
Common stock	4,000,000	4,000,000
Surplus	3,259,511	3,113,606
Total	\$11,987,571	\$12,800,163

Chicago Railway Equipment Company

The financial statement of the Chicago Railway Equipment Company, for the year ended December 31, 1921, reveals a ratio of total current assets to total current liabilities of 23 to 1. Current assets at the end of the year amounted to \$3,311,254 and current liabilities \$148,317. Details follow:

	1921	1920
Net earnings	\$350,699	\$859,961
Depreciation	150,000	162,510
Dividends	239,744	299,370
Surplus	\$39,045	398,081

*Deficit.

Lima Locomotive Works, Incorporated

The net income of the Lima Locomotive Works for the year ended December 31, 1921, was \$1,136,592. After deducting the regular seven per cent dividend on the preferred stock amounting to \$200,550, and a seven per cent dividend on the common stock amounting to \$304,500, the amount credited to surplus was \$631,542, making the total surplus on December 31, 1921, \$2,470,994. Balance sheet details follow:

ASSETS	
<i>Current Assets:</i>	
Cash on hand and in banks	\$ 873,644.00
United States Treasury Certificates (at par)	2,000,000.00
Bills receivable	59,073.00
Accounts receivable	1,236,321.00
Inventories—Materials and supplies and work in progress	1,189,683.00
Interest accrued	30,677.00
Employees' preferred stock subscription account	74,664.00
Accident insurance fund (cash and government securities)	72,022.61
Miscellaneous deferred charges to operations	74,139.00
	\$5,610,223.61
Property account—Land, buildings and equipment (less reserve for depreciation)	3,499,069.00
Drawings, patterns, dies, etc.	1.00
Sundry assets at nominal values	3.00
Sinking Fund—First mortgage 6 per cent gold bonds, Lima Locomotive Corporation, due May 1, 1932 (\$57.00 par value)	555,384.00
Goodwill	3,450,742.00
	\$13,115,423.00
LIABILITIES	
<i>Current Liabilities:</i>	
Accounts payable	\$ 703,385.00
Miscellaneous accrued liabilities	100,934.00
Preferred stock dividend payable (paid Feb. 1, 1922)	80,137.00
Common stock dividend payable (during 1922)	28,375.00
Reserve for federal income taxes and contingencies	774,676.00
Accident insurance reserve	73,023.00
	\$1,479,430.00
<i>Bonded Debt:</i>	
First mortgage 6 per cent gold bonds, Lima Locomotive Corporation, due May 1, 1931 (\$57.00 in sinking fund)	2,000,000.00
Capital Stock	
Preferred	\$3,200,000
Common	4,450,000
Surplus December 31, 1921	7,255,000.00
	\$13,115,423.00

Midvale Steel & Ordnance Company

The annual report of the Midvale Steel & Ordnance Company and subsidiary companies for the year ended December 31, 1921, shows a net loss after all charges of \$5,313,513, as compared with a net income in the previous year of \$12,424,920. After payment of dividends, the deficit was \$6,313,513, against a surplus of \$4,424,920 in 1920.

The company's balance sheet shows inventories valued at \$36,319,212. Current assets amounted to \$64,452,883 against current liabilities of \$6,479,533. Of the assets, \$4,336,120 consisted of cash and \$13,222,718 government securities.

Obituary

Webb C. Ball, pioneer jeweler and general time inspector of the Official Bureau of Railroad Time Service, died on March 7, after several weeks of illness at his home in Cleveland, Ohio.

Mr. Ball was born on a farm in Ohio in 1847. His first position was that of an apprentice to a watchmaker. After ten years' experience in that line of work he came to Cleveland and entered the retail jewelry business at which occupation he has been actively engaged for a period of over 50 years, his equipment gradually increasing from the original work bench and two show cases to an entire building and its furnishings. It was a railroad tragedy that gave Mr. Ball his greatest opportunity of



W. C. Ball

service. On April 19, 1891, a collision occurred at Tipton, Ohio, between a fast mail and an accommodation train, and from the inquiry which followed, it was found that the accident was due to defective watches in the hands of the train crews. Mr. Ball testified at the trial and was afterwards asked to further investigate the existing conditions and plan a reform. As the immediate result of his recommendation, he was authorized to inaugurate a standard system of time service and watch inspection for the Lake Shore & Michigan Southern, which system has since come in use on many large trunk lines. In August, 1913, he established a wholesale watch and jewelry business in Chicago, known as the Norris-Alister-Ball Company. Five years later he organized and chartered the Official Bureau of Railroad Time Service in both the United States and Canada and was made general time inspector of this organization, in which capacity he was serving at the time of his death. He is the originator of the "Ball" Watch.

Otis H. Cutler

Otis H. Cutler, chairman of the board of directors of the American Brake Shoe & Foundry Company, New York, who died at Miami, Florida, on March 4, as was noted in the

Railway Age of March 11, has been a well known figure in the railway supply field for many years.

Mr. Cutler was born in New York city and educated at the Rockland Military Academy, Nyack, N. Y., and the Washington Law University. He served as private secretary to Senator William P. Frye, of Maine, from 1884 to 1895 and for the following three years was a member of the New York State Assembly from Rockland county. He started his business career as secretary of the North



Otis H. Cutler

River Bridge Company and later became manager of the Ramapo Iron Works. He was instrumental in forming the American Brake Shoe & Foundry Company, serving as its

vice-president and general manager in 1902, and from 1903 to 1916 as president, when he resigned and became chairman of the board of directors, the position he held at the time of his death.

During the recent war Mr. Cutler volunteered his services to the American Red Cross and organized and was the first manager of its Insular and Foreign Division. For his work in this direction he was made a major. After the armistice he spent considerable time in Europe assisting in the organizing of the League of Red Cross Societies, headquarters of which are at Geneva, Switzerland.

Mr. Cutler was identified with large and important enterprises in the industrial and financial world, being associated with many of the J. P. Morgan undertakings and he was director in numerous corporations, including: The Railway Steel Spring Company; American Arch Company; Bronze Metal Company; American Manganese Steel Company; Manganese Steel Rail Company; Southern Wheel Company; American Malleables Company; Dominion Brake Shoe Company, Ltd., and New York Telephone Company. He was also a member of many clubs and societies.

Trade Publications

LOCOMOTIVE BOOSTERS.—The Franklin Railway Supply Company, New York, has issued a new bulletin, No. 976, describing the locomotive booster and showing how it helps in railroad operation. The possibilities of increased tonnage and greater revenue earning capacity from locomotives equipped with a booster are pointed out and diagrams are given which graphically show the increased tractive power in starting and at slow speeds.

CUTTING TORCH.—A leaflet fully describing the various features of design and construction of the Airco "D" cutting torch has been issued by the Air Reduction Sales Company, New York. Sectional views of the torch are shown and tables given showing the thicknesses of metals that can be cut, the pressures of oxygen and acetylene necessary, and the gas consumption in cubic feet per hour when using tips adapted to the cutting of steel, cast iron or rivets.

THE SHEPARD ELECTRIC LIFTABOUT.—The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has recently issued a small illustrated folder descriptive of a new and smaller type of electric hoist, manufactured by that company. The text and illustrations show a wide number of purposes for which this hoist can be utilized to advantage such as the loading and unloading of freight, the shifting or storing away of material in storehouses, etc.



Photo by International

Dining Compartment in Private Train Which Carried Princess Mary and Viscount Lascelles from London After Their Wedding

Railway Construction

ALBERTA & GREAT WATERWAYS.—This company contemplates the construction of a boat landing at Waterway, Alta.

ATCHISON, TOPEKA & SANTA FE.—This company is accepting bids until March 20 for the construction of two one-story brick lavatory buildings in Chicago, one 24 ft. by 132 ft. and the other 216 ft. by 42 ft.

CANADIAN NATIONAL.—This company will extend its Vancouver, B. C., line for a distance of about 10 miles, the grading for which has already been completed and it is expected that the work will be undertaken by company forces as soon as weather conditions are favorable. The same company will also construct a line 3.5 miles in length connecting the Grand Trunk Pacific's Riverhurst, Sask., subdivision, and the Canadian National's, Craik, Sask., subdivision. The Saskatchewan Legislature Assembly recently adopted a resolution authorizing petitions to the Dominion Government asking immediate appropriations of money for the completion of the Canadian National branch lines projected into that province; and for the continuance of the construction of such lines until finished. Figures show that 342 miles of branch lines in this province have been graded, but only 231 miles of track laid thereon.

CANADIAN PACIFIC.—This company will construct coaling plants at Swift Current, Sask., and Medicine Hat, Alta., of 280 tons capacity, and like plants at La Riviere, Man., and Eagle River, Ont., of 100-tons capacity. An old trestle chute at Estevan, Sask., will be replaced by a more modern plant. The same company will also install automatic signals at Sidney, Man., and Ruler Creek, B. C.

CHICAGO, OTTAWA & PEORIA.—This company has been petitioned by the city of Ottawa, Ill., through the Illinois Commerce Commission, to rebuild its bridge across the Fox river at Main street in that city.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has been petitioned by the city of Trenton, Mo., through the Missouri Public Service Commission, to construct a viaduct over its tracks at 12th or 13th streets, in that city.

GULF & SHIP ISLAND.—This company is constructing a new engine house 105 ft. by 220 ft., and a new machine shop of steel frame and brick construction, 75 ft. by 200 ft., to replace property destroyed by fire on February 25, of which a loss was estimated at \$75,000.

ESQUIMALT & NANAIMO.—This company, in conjunction with the city of Victoria, B. C., is constructing a general traffic bridge over the harbor at Johnson street, in that city. A contract for the construction of the bascule span was awarded to the Canadian Bridge Company, Walkerville, Ont.

GREAT NORTHERN.—This company closed bids on March 15 for the construction of a 30-stall roundhouse, shop buildings, storehouses and other terminal facilities at Minneapolis Junction, Minnesota.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of March 4 (page 549), as accepting bids for the construction of a third track from Tucker, Ill., to Kankakee, a distance of approximately 5 miles, has awarded a contract for the work to M. I. Windham, Centralia, Ill.

MISSOURI PACIFIC.—This company, which was noted in the *Railway Age* of March 11, page 592, as accepting bids for the construction of a frame and stucco combination freight and passenger station, 23 ft. by 74 ft., at Jerome, Ark., has awarded a contract for this work to Jerome Moss, Chicago.

NEW YORK, NEW HAVEN & HARTFORD.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of an 800-ton capacity reinforced concrete and steel coaling plant at Providence, R. I.

NORTH SHORE CONNECTING RAILROAD.—This company has applied to the Illinois Commerce Commission for authority to construct an electric railway system to extend through Evanston, Ill., and the village of Wilmette.

OKLAHOMA-SOUTHWESTERN.—This company contemplates the construction of extensions to its lines which will total approximately 33 miles.

PHILADELPHIA & READING.—This company has announced its intention to begin work on its ferry and railway passenger terminal at Camden, N. J., at a comparatively early date in order to complete the structure before the summer tourist season of 1923. The work will involve the expenditure of approximately \$3,000,000.

PITTSBURGH & SHAWMUT.—This company has awarded a contract to the Concrete Steel Bridge Company, Clarksburg, W. Va., for the construction of a reinforced concrete highway bridge over Colwell Cut, Colwell, Pa. The structure will be 220 ft. long with a span of 180 ft., 24 ft. wide, 110 ft. high and 24 ft. wide. The company has also awarded a contract to the Dwight P. Robinson Company, New York, for lining the remainder of its Mauk tunnel with concrete. Of this tunnel 1,200 ft. have already been so lined, with 900 feet yet remaining. The company has recently placed in service a new storehouse, oilhouse and car repair shed at its Brookville shops.

SALT LAKE & DENVER.—This company has been granted a two-year extension of time by the Public Utilities Commission of Utah in which to begin the construction of a railroad which will tap and develop the Uinta Basin, Utah. This corrects the item in the *Railway Age* of February 25 (page 502), which stated that this company was authorized to construct an extension to its lines from Springville Utah, to the Uinta Basin.

ST. LOUIS-SAN FRANCISCO.—This company contemplates the construction of an extension from Vinita, Okla., to the mines of the Central Coal & Coke Company, a distance of about 5 miles. While surveys for this extension have been made, no definite decision has been reached as to the undertaking of the work.

YAZOO & MISSISSIPPI VALLEY.—This company is accepting bids for the construction of a passenger station at Webb, Miss.

FIVE CARLOADS OF ROSE BUSHES. a single shipment, were recently moved by freight across the continent from Los Angeles, California, to Riverton, N. J., 3,323 miles, in 12 days, or at the rate of about 276 miles per day. The movement was over the Southern Pacific, the Southern and the Pennsylvania. The shipment weighed 129,360 pounds.



Efficiency on the Missouri, Kansas & Texas

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—Bondholders Start Foreclosure Proceedings.—Foreclosure bills against this railroad were filed in the United States District Court at Atlanta, Ga., on March 11 by the Old Colony Trust Company of Boston, which holds \$4,022,000 of bonds secured by a first mortgage on the line between Tifton and Montezuma, and by the Columbia Trust Company, of New York, which holds \$5,161,000 of bonds secured by income mortgage bonds on the whole property except the physical property covered by the Old Colony Trust Company's mortgage. By consent of attorneys for these companies their bills were consolidated with the foreclosure bill brought a year ago by the Birmingham Trust & Savings Company. Judge Sibley ordered that Col. B. L. Bugg, the receiver in charge under the Birmingham Trust & Savings Company's foreclosure brought a year ago, should continue in charge and continue operation of the road pending the final determination of the foreclosure.

CENTRAL OF GEORGIA.—Asks Authority for Equipment Trust.—This company has applied to the Interstate Commerce Commission for authority to create an equipment trust under the Philadelphia plan for the purchase of 500 ventilated box cars at a cost of \$825,000. It is proposed to pay 20 per cent of the cost from current funds and to issue \$660,000 of 5½ per cent certificates which it is proposed to sell through Kuhn, Loeb & Co., or other bankers at 98.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—New Directors.—Evans Woolen, Walter J. Riley, Philip A. Carroll and Lewis Iselin have been elected directors to succeed Fairfax Harrison, Adrian Iselin, Guy Cary and F. S. Wynn, who resigned last year.

CISCO & NORTHEASTERN.—Granted Loan from Revolving Fund.—The Interstate Commerce Commission has certified a loan of \$31,000 to this company to assist it in acquiring two locomotives.

DENVER & SALT LAKE.—Application for a Loan Denied.—The Interstate Commerce Commission has denied the application of the receivers for a loan of \$6,500,000 to enable the company to construct the tunnel through James Peak. The denial was based on the ground that the loan is not necessary to enable the company properly to perform the public service and that it is not justified by the prospective earning power of the road.

DETROIT & Ironton.—Proceedings Dismissed.—The Interstate Commerce Commission has dismissed the proceedings relating to the application of this company for authority to acquire control of the Detroit, Toledo & Ironton by lease and for authority to assume obligations and liabilities in respect of certain securities of the lessor. The commission had previously granted the first application of this company for authority to construct an extension and a second application for authority to issue \$1,000,000 of capital stock, but consideration of the application for authority to lease the road and to assume obligations and liabilities was deferred. The applicant does not desire to press the matter to a conclusion at this time and in order to close the record both applications, in so far as they relate to matters not already passed on, will be dismissed. The lease was opposed by certain minority stockholders who claimed that Ford was trying to "freeze" them out.

ESCANABA & LAKE SUPERIOR.—Asks Authority to Abandon Line.—This company has asked the Interstate Commerce Commission for authority to abandon a portion of its Northland branch from Northland to Camp Ten, 14 miles.

GREAT NORTHERN.—Dividends on Semi-Annual Basis.—The directors on Wednesday unexpectedly changed the dividend payments from a quarterly to a semi-annual basis making the payments February 1 and August 1 of each year.

A statement by Louis W. Hill, chairman of the board, says: It is hoped that the regular 7 per cent basis will be continued, and that the 3½ per cent semi-annual dividend will be paid on August 1. By June conditions should be more settled and the directors will be able to appraise the business year of 1922. The Great Northern's earnings are always relatively low and expenses high during the winter months. At so early a date as the middle of March, when May 1 dividend must be acted upon, agricul-

tural conditions and the season's probable results are unknown. These have been among the controlling factors in our changing to a semi-annual dividend basis. It is particularly advantageous this year for us to defer action until June.

LOUISVILLE & NASHVILLE.—Authority to Abandon Line Denied.—The Interstate Commerce Commission has denied the application for authority to abandon a portion of a branch line from West Point to Pinkney, Tenn., 1.76 miles, as not justified in the public interest.

LOUISIANA & NORTHWEST.—Purchased by Oil Company.—Charles N. Haskell, former governor of Oklahoma and chairman of the board of the Middle States Oil Corporation, has purchased this road. It runs between McNeil, Ark., and Chestnut, La., through the Haynesville and Homer oil fields.

The Louisiana & Northwest has been in the hands of receivers since August 23, 1913. In June, 1919, the road was advertised for sale at an upset price of \$600,000, but there were no bidders.

The new board of directors consists of J. T. Monahan, vice-president of the Metropolitan Trust Company of New York; W. M. Cannon, general counsel of Middle States Oil Company; Adam H. Davidson, of Dallas, Tex.; W. F. Carter, general counsel of the Boatmen's Bank, of St. Louis, and J. Sherry O'Brien, of New York.

Asks Authority to Issue Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of 7 per cent. promissory notes.

MIDLAND RAILWAY.—Receivership Sought.—Upon petition of T. R. Bennett, state superintendent of banks of Georgia, W. J. Donaldson, W. J. Oliver and H. B. Lindsay, Judge Meldrim in the Superior Court at Savannah, Ga., on March 7, issued an order for the Midland Railway to show cause on March 16 why a receivership should not be granted.

The petition alleges that the railroad is insolvent and is indebted to the Oglethorpe Savings & Trust Company to the extent of \$275,000.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Dividends Reduced.—This company has declared semi-annual dividends of 2 per cent on the common and preferred stocks, payable April 15 to stock of record March 22. Previously the company paid 3½ per cent. semi-annually on both classes of stock.

MORENCI SOUTHERN.—Asks Authority to Abandon Line.—This company has asked the Interstate Commerce Commission for authority to abandon its line from Guthrie to Morenci, Ariz., 18.41 miles.

NEW YORK, CHICAGO & ST. LOUIS.—Asks Authority for Equipment Trust.—This company has applied to the Interstate Commerce Commission for authority to enter into an equipment trust agreement for an issue of \$360,000 of 10-year equipment trust certificates at 5½ per cent for the purchase of 300 composite stock cars. The certificates are to be issued by the Union Trust Company and sold at 96¼.

NEW YORK, CHICAGO & ST. LOUIS.—Control of Clover Leaf.—See editorial in this issue entitled "Clover Leaf Acquired."

NEW YORK, NEW HAVEN & HARTFORD.—Authorized to Extend European Debentures.—The Interstate Commerce Commission has authorized this company to enter into agreements with the holders of \$14,118,000 of dollar debentures and 69,762,500 francs of franc debentures of its European loan of 1907 for the extension of the maturity thereof from April 1, 1922, to April 1, 1925, and to increase the rate of interest from 4 per cent to 7 per cent. The agreement provides for the payment in cash of 10 per cent of the principal of the debentures to be extended and the commission has approved a loan of \$2,758,000 to the company for this purpose. The company originally applied for a loan of \$31,000,000 to pay off the loan and to provide additions and betterments to the amount of \$3,000,000, but the plan of extension was later arranged. The commission has deferred consideration of the balance of the application.

Decree of 1914 Amended.—Judge Learned Hand in the United States District Court on March 10 signed an order extending until July 1, 1923, the time allowed the New Haven Railroad, by the dissolution decree of Oct. 17, 1914, to dispose of certain holdings in various New England trolley lines.

PENNSYLVANIA RAILROAD.—*Net after Rentals in 1921.*—For the 12 months ended December 31, 1921, this company's "Net after rentals" was \$41,104,031, instead of \$1,104,031 as was incorrectly given in the tables of Revenues and Expenses of Railways in the *Railway Age* of February 25, 1922.

TOLEDO, ST. LOUIS & WESTERN.—*Van Sweringen Company Acquires Control.*—The Van Sweringen Company of Cleveland, Ohio, has purchased the controlling interest in this road. O. P. Van Sweringen, vice-president of the Van Sweringen Company, is chairman of the board of the New York, Chicago & St. Louis, and, with associates controls it.

See editorial in this issue entitled "Clover Leaf Acquired."

TOLEDO TERMINAL.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of first mortgage 4½ per cent gold bonds to reimburse the treasury for expenditures and to make additions and betterments. It is proposed subsequently to sell these bonds and \$214,000 of similar bonds now in the treasury but no arrangements for the sale have been made and the commission is asked to fix the price at which they shall be marketed.

UNION PACIFIC.—*Equipment Trust Agreement Authorized.*—This company has been authorized by the Interstate Commerce Commission to assume obligation and liability in respect of \$6,800,000 of Union Pacific equipment trust certificates to be issued by the Commercial Trust Company of Philadelphia.

ZWOLLE & EASTERN.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its line amounting to about 10 miles in Sabine Parish, La.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Louisville & Nashville.....	\$7,000,000
Alabama & Vicksburg.....	275,000
Minneapolis, St. Paul & Sault Ste. Marie.....	525,000
Narragansett Pier.....	7,500
Winona Bridge.....	47,000
SHORT LINES	
Spokane & British Columbia Railway Company.....	7,500

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the Railroad Companies and the administration during the 26 months of federal control.

Dividends Declared

Minneapolis, St. Paul & Sault Ste. Marie.—Common, 2 per cent, semi-annually; preferred, 2 per cent, semi-annually; both payable April 15 to holders of record March 22. Leased lines, \$2, semi-annually, payable April 1.

Pittsburgh, Bessemer & Lake Erie.—Common, \$0.75, payable April 1 to holders of record March 15.

Trend of Railway Stock and Bond Prices

	March 14	Last week	Last year
Average price of 10 representative railway stocks, close of business.....	61.45	59.66	54.11
Average price of 10 representative railway bonds, close of business.....	82.50	82.31	73.61

THE NUMBER OF PERSONS employed by the Interstate Commerce Commission on December 31, 1921, was 512 less than it was at the beginning of the year, according to a statement covering the various departments of the government furnished to the Senate by the United States Bureau of Efficiency. The decrease is mainly accounted for by the reduction in the valuation forces. On January 1, 1921, the commission had, according to this statement, 2,192 employees, of whom 975 were in the District of Columbia and 1,217 in the field. Most of these in the field were in the valuation bureau. At the end of the year the total was 1,680, of whom 1,416 were in the District of Columbia and only 264 in the field. A large number of the valuation employees were transferred to Washington as the district offices were discontinued.

Railway Officers

Operating

C. F. Urbutt, trainmaster of the Chicago, Milwaukee & St. Paul, with headquarters at Perry, Iowa, has been transferred to Savanna, Ill., succeeding F. H. Allard, who has been transferred to Ottumwa, Iowa. Mr. Allard succeeds **T. P. Horton**, who has been transferred to Portage, Wis., to succeed **W. G. Bowen**, who has been transferred to Perry, succeeding Mr. Urbutt.

Engineering, Maintenance of Way and Signaling

G. H. Nickerson, superintendent of construction in the county engineer's office, Merced County, Cal., has been appointed chief engineer of the Yosemite Valley Railroad, with headquarters at Merced.

Traffic

J. R. Hundley, traveling freight agent of the Wabash at St. Louis, Mo., has been promoted to district freight agent with headquarters at East St. Louis, Ill., succeeding **J. H. Wack**, transferred.

Purchasing and Stores

C. C. Kyle, acting general storekeeper of the Northern Pacific, with headquarters at St. Paul, Minn., has been promoted to general storekeeper with the same headquarters, succeeding **O. C. Wakefield**, deceased.

Special

A. K. Ragsdale, traveling passenger agent of the San Antonio & Aransas Pass, with headquarters at San Antonio, Tex., has been promoted to general inspector, with the same headquarters. He will have supervision over safety, service and efficiency on the system.

Obituary

W. J. Jackson, division engineer of the Chicago & North Western, with headquarters at Winona, Minn., died on March 13, from pneumonia.

James S. Mackie, formerly treasurer of the Chesapeake & Ohio, the Hocking Valley, the Chicago & Alton and the Toledo, St. Louis & Western, died at Hackettstown, N. J., on March 11, at the age of 67.

Albert A. Polhamus, general agent, passenger department, of the Canadian Pacific, with headquarters at Los Angeles, Cal., died at his home in Pasadena, Cal., on March 10, from the results of internal injuries sustained in a fall.

John Wynn, assistant to the general manager of the Northern Pacific, with headquarters at St. Paul, Minn., died at his home there on March 9. Mr. Wynn was 58 years of age and had been connected with the Northern Pacific since 1889.

George K. Caldwell, chairman of the Southern Freight Rate Committee, with headquarters at Atlanta, Ga., died at Montclair, N. J., on March 8. Up to the time of his appointment on this committee, Mr. Caldwell was assistant traffic manager of the Southern Railway, with the service of which road he had been connected 26 years.

C. H. Niemeyer, acting engineer maintenance of way of the Pennsylvania, with headquarters at Williamsport, Pa., died on March 4 at Philadelphia. Mr. Niemeyer was born in 1869 and was graduated from Cornell University in 1891. The following year he entered the service of the engineering department of the Pennsylvania and served continuously in that department until the time of his death.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

A perusal of the reports of the Telegraph and Telephone Section, A. R. A., presented at the March stated meeting held in Richmond, Va., this week gives evidence that this association is doing a great deal to increase the efficiency of the railroad communication systems.

Activities of the T. & T. Section

One report of 92 pages, describing in detail various telegraph and telephone circuits, could well serve as a text book for any one desiring a general knowledge of railroad communication circuits. Standard minimum clearances between wires of crossarms and the running rail have been established by the association, and the committee on wire crossings has fixed the minimum clearance between power wires and communication circuits. Of special interest to operating officers is the finding of this association that the interchange of traingrams between railroads as an overnight feature would not meet the requirements for such communications, and that because of the postal laws and the added expense of extra messengers at transfer points the introduction of such a practice is considered to be impracticable. In another report the association offers suggestions to the users of telephones that will materially increase the efficiency of transmission. By rendering such practical service the Telegraph and Telephone Section is serving the railroads in a commendable way and should receive the co-operation of the other units of the A. R. A. in order that the efficiency of railroad communication may be increased to meet the growing demand for this important service.

To what extent are the railroads aware of the advantages to be derived from a definite organization for water supply service? How many roads have established and now maintain such organizations? These are questions which arose prominently upon the reading of certain communications presented by the Committee on Water Service during the convention of the American Railway Engineering Association on March 16.

An Organization for Water Service

Following an introductory statement to the effect that a water supply of ample quantity and of satisfactory quality is one of the essential requirements for the successful operation of a steam railroad (a truth which in itself does not always appear to receive the general recognition it deserves), this communication brought to light certain significant facts concerning this phase of railway operation. The annual water consumption on American railways, the communication showed, is approximately 900,000,000,000 gal., with nearly \$40,000,000 expended annually in merely operating and maintaining the 14,000 stations which supply this water. This expenditure assumes special significance when one considers the using as well as the obtaining of much of this water. It is not surprising that students of this subject should advance the plea made by the Water Service Committee for a definite water supply organization on each road. Those departments of water service which hold out the greatest promise for economies and improved service deal with phases of work which demand special study and close application as distinguished from the superficial attention of

those who are either not especially trained or by reason of their other responsibilities are unable to give the subject the thought it requires. No better proof of this is to be found than the fact that those roads which maintain special organizations have secured the most satisfactory results. A specialized organization thus not only appears to be desirable in water service as in other departments of railway work, but has definitely proved itself so and those roads that do not maintain such organizations now might well direct close attention to this phase of the railway problem.

The matter of New England divisions has been carried into the courts. A considerable list of trunk line and C. F. A.

New England Divisions

carriers have filed in the federal court at New York a bill in equity asking for an injunction to restrain the enforcement of the Interstate Commerce Commission's order for increased divisions of the through rates. The New York Central is not included in the list of carriers mentioned because, it is understood, that carrier will carry on an independent action related more particularly to the Boston & Albany, leased by the New York Central which, although almost entirely in New England, was not a party with the New England carriers. The Pennsylvania and Baltimore & Ohio also are not parties. This New England division's affair has become one of the most complicated matters of its kind which has been offered for solution in a long time. The present divisions in themselves are complicated. The scope of the authority of the Interstate Commerce Commission, insofar as concerned its power to order a general blanket increase in divisions, was in question as is shown by the fact that the increase which has been ordered and which is now still in question was made only after a rehearing and supplementary decision. The question has also arisen as to whether other carriers may not also be entitled to treatment similar to that given the New England lines. Insofar as concerns the New England carriers it must be admitted that they are meeting almost unsurmountable difficulties in overcoming the handicaps which confront them as a result of federal control. The *Railway Age* believes it unfortunate, however, that the two sides are so far from agreement that the matter must be taken into the courts.

There is an impression which prevails among many railroad officers that the Air Brake Association is composed of a body of inspectors whose efforts are

The Air Brake and Train Operation

largely devoted to matters relating to the maintenance of the various air brake devices and that consequently they belong solely to the mechanical department. While it is true that maintenance matters do demand a large amount of attention from the men who make up this association, the fact that much of their work is vitally connected with matters that concern train operation should not be overlooked. The air brake has become such a common thing that one is apt to overlook the fact that its development has made possible the handling of long, heavy

freight trains and has brought about the modern freight locomotive of high tractive effort. Moreover, if it were not for reliance upon the air brake, it would be impossible to handle passenger traffic with reasonable safety even at greatly reduced speeds. It is not too much to say that our present practices in train operation have largely been built up on the foundation of the air brake. The men composing the Air Brake Association have assisted materially in bringing the brake to its present high state of development and with proper support undoubtedly will assist in meeting the needs of future requirements. This is possible because the men are in the field so much of the time riding locomotives and helping enginemen and trainmen obtain the best results from the brake. Even maintenance and yard inspection work has to do so directly with train movements that the work of the association should interest transportation officers even more than it does those in the mechanical department. A broader appreciation of the valuable work of the association on the part of higher railroad officers and their support in making the annual meetings a success would make the association of increasing usefulness.

The railway problem, aside from its financial aspects, of India, South America, Australia, China, Africa or, in fact, almost every part of the world except Western Europe, is essentially the same as that of the United States. In other words, most countries need railways so constructed and equipped that they can

operate profitably and efficiently with rather light traffic, made up in large proportion of low grade commodities. Under such conditions heavy train loading—which entails heavier cars, heavier power, stronger draw gear and air brakes—is necessary for efficiency. Also, under such conditions, it will be found that double track cannot, generally speaking, be profitably utilized and that a single track only can be provided. Railway development to meet such conditions as these has unquestionably advanced further in this country than anywhere else in the world. Why is it, then, that in most of the countries we have named we find the railways built and equipped upon lines suggested by the practice of Western Europe, where intense traffic is the rule? The answer is that capital from Western Europe built these railways and naturally patterned them after their own carriers. Until recent years this country was in no position to build foreign railways but lately we have advanced millions of dollars for railway development abroad and the field for profitable investment in this direction is practically unlimited. The mere sending of dollars, however, is not enough. With money for development should go American equipment and American railway men. Otherwise the countries where extensive railway development is contemplated will be unable to secure the full advantage which our experience with problems, identical with theirs, can give them.

The Great Northern directors, at their meeting in New York on March 15, deferred action on the usual quarterly dividend on the seven per cent preferred stock.

The hope was expressed that it would be possible to maintain the present seven per cent rate, but that the procedure in the future would be to put the dividends on a semi-annual instead of on a quarterly basis. This announcement, which is given in greater detail in the financial columns of this issue, was received with mixed emotion in Wall Street. The Street showed itself skeptical, in particular, as to whether the hope of the semi-annual dividend would be realized. Great Northern stock which

had been quoted between a high of 80 $\frac{3}{4}$ and a low of 70 $\frac{1}{4}$ in the first two and one-half months of 1922 and which on March 14 closed at 80 $\frac{3}{4}$, broke sharply on March 15 (the day of the directors' meeting) and closed at 77 $\frac{3}{4}$. On Thursday it closed at 76; on Monday of the present week it closed at 75. The Great Northern has only one issue of stock, the preferred. This stock has paid dividends regularly for an indefinite period. The seven per cent rate was established in 1900 and has been maintained since that time. The railroad man as a rule is not inclined to agree in many cases with Wall Street's opinion of railroad operations. In the case of the Great Northern, the railroad man will have to admit, however, that Wall Street was correct. Wall Street has been dealing in Great Northern stock at about 75. This is a low price for a seven per cent stock. It evidences that Wall Street has known that Great Northern has been confronted with many difficulties and that the Street has, on the whole, diagnosed the situation correctly. The Great Northern is at present showing signs of improvement, but because of the manner in which the larger part of the road's traffic moves in the latter part of the year, not much value can be placed on the January and February returns. It will be interesting, therefore, to watch the course of quotations on Great Northern stock during the coming months.

It is human nature to be fascinated by the spectacular, deeply interested in the unusual, but often neglectful of common things of much greater aggregate importance.

The Neglected Engine Lathe

In the railroad mechanical world attention is focused on large shops and terminals, which as a rule benefit by new machinery and equipment purchased. This occurs in spite of the fact that three-quarters of the locomotive shops in the country are relatively small, having an output of 10 heavy classified repairs per month or less. Two-thirds of the enginehouses also are small with not more than 10 stalls per house. It is obvious that the use of large capacity, highly specialized machines would not be justified in these small shops and enginehouses which sorely need an adequate amount of the more commonly used machinery, as efficient in operation and power consumption as possible. The importance of turret lathes, automatics and other production machines in the larger shops is rightly emphasized, but the more common engine lathe should not be forgotten. Aside from drills, the engine lathe is the only turning machine in many small shops, and even in large shops it outnumbers any other type of machine three to one. On the basis of the actual number of machine tools in operation in railroad shops and enginehouses the lathe is easily of first importance. It should not be forgotten in requisitions for new tools because much money can be saved or lost depending upon the condition of lathe equipment. The modern product, of which manufacturers are justly proud, combines adequate power with high production, accurate work and ease of control. These features, together with efficient tools and jigs for each particular job, greatly conserve the operator's time, increase output and decrease costs.

The Chicago, Burlington & Quincy office building fire has been studied with great interest by structural engineers because it has served as a practical demonstration of the behavior of the modern protected steel frame building in the face of a great fire.

Protecting Records From Fire

Investigation indicates that the building is structurally intact and there is reason to believe that it served effectively as a barrier to the progress of a great fire which

otherwise might have wiped out a large part of the city of Chicago. Speculation along that line gives but scant consolation for the loss of valuable records suffered by the Burlington as the result of fire which came in through the windows and destroyed the combustible contents of seven floors of the office building except where locked in vaults. In the case of a great fire such as occurred in the highly combustible buildings in the block adjacent to the Burlington structure, the window is the vulnerable detail and it is doubtful if any form of window construction would have prevented the ignition of the woodwork inside of the Burlington offices. In the face of such a hazard, therefore, no scrap of paper is safe unless it is enclosed in a fireproof vault of approved construction, for in the Burlington building filing cases afforded no protection whatever for their contents. These facts having been presented, the reader must be left to apply his conclusions with respect to his own files for in no two cases will the hazard be exactly the same. In general, it may be said that a record is not safe unless it is stored in a fireproof vault and that it would be well to keep within the walls of the vault all papers not required for current work. Working files cannot be kept there at all times, nor is it practical to store them all in vaults over night, but a large part of the records and files can be so protected. In the interest of security, therefore, it is important to study the actual hazard to which they are imposed under normal working conditions.

The Automatic Train Control Hearing

THREE POINTS STAND out in the hearing before the Interstate Commerce Commission on its automatic train control order. These are: That in the proposed order the specifications have been so amended that a simple automatic stop device would appear to be ruled out; that additional data had been collected by the American Railway Association without the co-operation of the Bureau of Safety, and that it is the view of the carriers, after 15 or 20 years' investigation and test, that train control devices are still in the experimental stage.

Referring to the specifications in the proposed order: A year ago general requisites for automatic stops and automatic speed control were adopted by the A.R.A. Committee on Automatic Train Control and by the Bureau of Safety of the Interstate Commerce Commission. When the tentative order was issued by the Interstate Commerce Commission on January 10 last, paragraph b, under Automatic Stop, reading "under control of enginemen, who may, if alert, forestall an automatic brake application and proceed" had, for some reason, been eliminated. This apparently would tend to prevent the use of devices having that feature. At the same time, reference is made by the commission to the service records of the three roads having devices in use (C. & O.; C. & E. I.; C. R. I. & P.), which apparently do not qualify under the requisites. In this connection it was the feeling of the committee representing the railroads (the "Denney Committee") that this paragraph should be restored, for reasons well set forth by A. M. Burt.

Certain defects which might cause objectionable or dangerous failures of the three devices in service, collected during the last 15 months, were pointed out by the railroads' committee and were concurred in by representatives of the Bureau of Safety. At the hearing it developed that the Denney committee had recently placed sub-committees on the different roads, without the co-operation of the Bureau of Safety, in order to observe conditions during winter weather, as a result of which some additional data were presented at the hearing. In these later records the Bureau of Safety stated that it did not concur, and so wished to go on record, as none of its representatives were

present. It was on the basis of defects found to exist on these three installations and the desire to try out other types, that the carriers made their plea to have the order withheld. However, it is well to point out that with the exception of some 12 additional defects found by the sub-committee, information on this subject was in possession of the commission some time before the tentative order was issued and it is to be presumed that this was considered carefully before it was drawn up.

Another argument advanced by the railroads why the order should not be entered was that because of the defects found in these inspections, and the fact that changes in design were being made and improvements added, the art was in the experimental stage. The fact that the feasibility of the inductive type of apparatus has not as yet been demonstrated and that it shows promise, was dwelt upon as an additional reason why the order should not now be issued. Several roads, in their separate pleas, pointed out the desirability of installing automatic block signals throughout their principal lines before being required to install train control.

It would appear that any order issued by the commission should be amended as regards the present requisites, in line with the request of the carriers. One railroad system ought not to be required to make double installations, as is required in two instances; and there is force in the contention that much more good may be accomplished if certain carriers are permitted to make installations of automatic block signals in many places where they are badly needed, before such an order is made applicable to them. The one constructive result of the hearing is the proposal embodied in paragraph 3 of Mr. Denney's memorandum, wherein the railroads promise, both jointly and individually, to continue all reasonable assistance in the work of development, as the commission may direct. The only result expected from this hearing was the establishment of a basis for modifying the commission's drastic proposal of January 10; and this paragraph 3 constitutes a definite step in that direction.

The Railway Wage Situation

THE TESTIMONY introduced by the witnesses for the railroads in the wage hearings now going on before the Railroad Labor Board has proved at least three very important facts of great pertinency in relation to the question whether railway wages should be readjusted downward. These are:

First, that the present wages of most classes of railway employees are higher in proportion to the cost of living than when the Labor Board awarded a reduction last year, and much higher in proportion to the cost of living than at the beginning of the World War. This is not true, however, as to all classes of employees, especially certain classes in train service.

Second, that the wages paid in outside industries for labor doing similar kinds of work vary widely in different territories and even in different communities in the same territory.

Third, that in almost every part of the United States the railroads are paying higher wages than outside industries to labor doing comparable work.

The two principal standards established by the Transportation Act for the measurement of the reasonableness of railway wages are the cost of living and wages paid in other industries. The reduction in the cost of living which has occurred within the last two years is under the law a valid argument for greater reductions in wages than have been made. Measured by the standard of wages paid in other industries, there is under the law justification not only for substantial reductions in the wages of many classes of railway employees, but for very extensive readjustments in them. If wages in the railroad industry are to be measured at all

by wages in other industries, there can be no defense for the Labor Board maintaining throughout the country wages, such as those for common labor, which are much higher than those paid for similar labor in any other industry. When railway wages are kept higher than those in other industries and railway rates are maintained to pay these higher wages, railway labor becomes a privileged class which is subsidized largely at the expense of the large majority of the population which has smaller incomes than railway labor has.

Two of the most significant features of the statistics concerning the wages being paid in other industries are, first, as already indicated, that wages in outside industries vary widely in different territories and communities; and secondly, that the differentials between the wages of skilled and unskilled labor are much greater in other industries than they are at present on the railroads. The former condemns the present system under which railway wages are standardized throughout the country. How, in strict accordance with the provisions of the Transportation Act, can the Labor Board require the railroads to pay virtually the same amount for common labor in the southwest and in the northwest, when in other industries common labor is paid only 10 to 25 cents an hour in the southwest and from 31 to 45 cents in the northwest?

Perhaps, however, the most indefensible feature of the present railway wage scales is that they force the payment to unskilled labor of wages which are relatively much too high in comparison with those paid to skilled labor. This is contrary to every sound principle, whether the matter be regarded from the standpoint of labor, of the railroads, or of the public. It destroys the incentive of the unskilled man to become skilled, and the incentive of the skilled man to maintain and try to increase his skill. They thus tend directly to reduce the efficiency of all classes of labor. The wage scales proposed by the railroads are sound in proposing to widen the differentials between the pay of the unskilled and the skilled.

The leaders of the shop crafts unions have intimated that they will not only resist reductions, but even seek increases in wages. As in previous hearings they will doubtless suggest that the railroads pay excessive prices for coal, equipment and materials; that the concerns from which they buy these things are under the same financial control as the railroads and make large profits, and that if the railroads would pay lower prices for the other things they buy they could pay higher wages to labor. In the first place, however, it is simply not true that these concerns are under the same financial control as the railroads. In the second place, it can easily be shown that at the present time these concerns are not paying as high wages as the railroads. Therefore it may occur to the representatives of the employees of the equipment companies and the steel and other material companies to suggest that if any of the alleged huge profits and surpluses of these companies are to be used to pay labor higher wages, these higher wages should be paid to the employees of these companies, and not to the employees of the railroads.

It is a very ungrateful task to advocate reductions in the wages of any class of workmen, but no industry can pay out for labor, coal, material and taxes more than it can earn. Furthermore, no industry can live, much less prosper, without earning a reasonable net return on the investment in it. The railroads are confronted with a practically universal demand for reductions in rates. If substantial reductions in rates are to be made, they must be made either at the cost of some reduction in wages, or at the cost of the bankruptcy of the railroad industry.

There is only one way in which labor, as a class, can hope to secure a large and permanent increase in its real wages, and that is through a large increase of production. Unless railway employees, by more efficient work, will contribute their share toward this increase in production, they cannot

get their share of the increase in real wages which it would make possible. Unfortunately, the very labor leaders who demand the highest wages for labor are the most active and effective in securing reduction of hours, and restrictive working conditions, which place the greatest obstacles in the way of securing the needed increases in production.

Well, Where Are We Now?

"WHEN THE MARINER has been tossed for many days on an unknown sea he naturally avails himself of the first pause in the storm, the earliest glance at the sun, to take his latitude and ascertain how far the elements have driven him from his true course." So much for the mariner. Back in November, 1921, there appeared in the columns of this paper an article entitled "The Interior Treatment of Boiler Waters," and in the same issue a brief editorial comment by way of ushering, as it were, the subject matter involved to the forum of thought, of consideration and discussion. That was four months ago.

Since then, what vicissitudes have not been the lot of this well-meaning article, even the editorial comment not escaping the storm. Expressions of approval have run counter with condemnation—for the original article one moment and subsequent contributions the next. "Mules" have joined company with passages from Latin, "surface tension" and "parts per million" have sat at the same table, and the "last three grains per gallon" have talked the matter over with "sand filters." Truly, even one versed in the technique of such a subject could scarcely avoid floundering, so involved and diversified at this date have things become. Small wonder then if the others, taking their cue from the mariner of Daniel Webster's creation, should stick their periscopes above the turbulent sea of comment and in good old Anglo-Saxon express themselves, "Well, where are we now?"

Consider then the initial article. "Specifically," it was said in the previous editorial, "the article concerns itself with boiler compounds and points out the possibilities of this much applauded and berated and withal too little understood method of improving the locomotive performance in bad water areas." This statement was applicable then and may be reiterated now. And what of the discussion since? Has it made out a case against treating plants as one writer was evidently under the impression the initial article would? Has it dispelled the suspicions concerning boiler compounds as others have apparently entertained fears that it might? It must be confessed that the reflections made against treating plants, considered at least with reference to specific installations, have not been entirely without foundation and it cannot be refuted that boiler compounds have not been divested of all their shortcomings.

But, relieving the voluminous discussion of its many digressions and occasional personalities, does it not give emphasis to the observations made heretofore that there is both merit in boiler compounds and justification for treating plants; and giving due consideration to the very appropriate distinction made in the discussion between anti-scale compounds and anti-boiler compounds and the caution held out against crediting the results obtained by the one upon the ledger of the other, is not the fundamental conclusion to be drawn, still the one previously made that "the problem of improving boiler waters in short is no longer one of arbitrarily installing a treating plant or of prescribing a preparation for locomotive boiler or tender treatment, but rather that of choosing that method which is best adapted to solve the particular problem, whether it be a particular kind of interior treatment alone, a special kind of exterior treatment alone, or a combination of the two." If the discussion has established this impression, the query, where are we now, has been advanced to good purpose.

Fundamental Considerations in Locomotive Operation

IN CONSIDERING the features to be included in new motive power railroad men are generally confronted with conflicting viewpoints. One person may claim that efficiency consists solely in getting heavy train loading and therefore the tractive effort should be made just as great as possible. Another may lay the greatest stress on fuel costs and advocate a design in which fuel economy is given first consideration. Still a third may be most concerned with getting locomotives that will be easy to maintain and make a high mileage on a monthly basis and between shoppings.

All three of the viewpoints mentioned are based on important factors in locomotive operation. No one alone is a safe guide for the selection of economical locomotives but all must be considered jointly to attain the object for which railroad men are striving—minimum over-all cost. The principal difficulty is in giving each its proper importance. Probably the best procedure is to work out estimates of the cost of operation for different designs. This is not always satisfactory because accurate figures cannot be obtained in advance. The whole problem is so complex that it requires careful study. However, a few general principles can be pointed out as a guide toward the desired end.

The cost of operating a modern locomotive of the Mikado type, for example, is about \$4.00 to \$4.55 an hour for the wages of the enginemen and trainmen and from \$9.50 to \$19.70 an hour for fuel, or an average for the country of about \$11.40 based on a consumption of 6,000 lb. The fixed charges on the train-hour basis will vary with the first cost and the proportion of time in service to total time and will range from \$.90 to as much as \$5.00 an hour. Repairs will show considerable variation depending on the class of service, water supply and design of the locomotive. An average value would be approximately \$5.60 per hour of service.

These figures show that the largest item of expense in the operation of modern locomotives is fuel. Because it is the greatest, it should have first consideration. The boiler and machinery should be designed to get the maximum practicable efficiency. Any device that will save in fuel an appreciable amount over the cost of maintenance and the fixed charges is a money-earner. There is a tendency to hold the dime spent for maintenance so close to the eye that it completely hides the dollar saved in fuel. If every road made out debits and credits for each appliance, there would be more fuel-saving devices applied.

Coming now to maintenance expense, there are three primary items to consider in deciding on the design; repair cost, operating cost and first cost. Reliability is a necessary characteristic of a locomotive and railroad men generally associate reliability with simplicity. The two qualities do not necessarily go together. Perhaps there is room for improvement in mechanical details by refined design that will add to the life of such vital factors as tires, driving boxes and rods.

The greater first cost would not be a serious factor if improved design could either increase the percentage of time the locomotive spent in actual service or reduce the cost of repairs.

The question of wages, which most operating men would probably place first, is only in third place in the items of expense. The reason is that wages no longer afford the major opportunities for saving. A net train load of 500 tons would represent a wage cost of about \$0.0008 per ton-mile. With a train load of 1,000 tons, which is conservative for a Mikado locomotive, the cost would be only \$0.0004 per ton-mile. Assume that the rated tractive effort can be increased one-fourth. This would decrease the wage cost per ton one-fifth, provided the full tractive effort could be developed and

utilized. There would almost necessarily be an increase in maintenance costs for both the locomotive and the cars which would tend to offset this economy. Furthermore, the same gross saving could be effected by an eight per cent decrease in fuel costs as by a 20 per cent decrease in wage costs. This should not be interpreted to mean that possible savings in wages are negligible, but the question goes deeper than mere rated tractive effort. Wages can be saved by speeding up operation as well as by increasing train loads and the minimum-wage cost can only be obtained by combining high tractive effort with other features that make it possible to speed up trains and cut down overtime.

The last of the items to be considered is that of fixed charges. Probably many will be surprised to find that in some cases it may amount to more than wages. Perhaps the relative importance of this item can best be illustrated by a comparison with electric operation. The electric locomotive costs probably two and one-half times as much as a steam locomotive of equal power and, furthermore, it requires expensive overhead construction and power stations. In spite of these facts electrification can show savings under favorable conditions because electric locomotives save fuel, reduce maintenance costs and speed up train service. It will pay likewise to spend more money for steam locomotives and related facilities that will accomplish similar results. Railroads have learned to buy coal not on price, but on the basis of heat units or ton-miles per dollar. In purchasing locomotives the measure of value is the same. To be sure, the problem is more complicated, but it is also more important and well worth the attention that is necessary to find the right answer.

New Books

Traffic Management. By George A. Denfield, President and Professor of Traffic Management, Western University of Commerce and Law, Portland, Oregon. 367 pages. 6 in. x 9½ in. Bound in cloth. Published by the author.

The author of this book has taught traffic management in Georgia, Montana and Oregon and he has packed into this book, we should say, every fact bearing on this subject that he was able to gather in all of these states; over 300 pages, with no room wasted. He has posted himself fully and in every detail concerning the operation of freight houses, local and general freight offices, the making of rates and the solicitation of freight; and, as in the case of Goldsmith's schoolmaster, the reader wonders that one head can carry all that he knows.

He has divided the work into five parts and 12 chapters, as noted below; but each chapter contains such a bewildering mass of facts that the only discernible rule for selection or classification of material seems to have been to set the reader to thinking, throughout the whole traffic field, in each chapter.

The introductory chapter treats of transportation, from the dawn of civilization; and the geographical study of the United States, occupying 12 pages, is so detailed as to remind one of the celebrated English geologist, who could find his way in a strange county on a dark night by picking up and tasting a lump of earth. The principal traffic routes of the United States are traced from A. D. 1815, down to 1921, and evidence of up-to-dateness is seen in a reference to the anxieties felt by the shippers of hops in the Western states because of the passage of the 18th amendment to the constitution.

The matter in the book is voluminous; overwhelming; not thoroughly digested; a judicious selection would have been more useful. The professor's students are not likely, however, to find in this condition any excuse for neglecting to

give their lessons thorough study for, following the last chapter, there are 75 pages filled with questions; concrete, abstract and mixed. Five hundred and ninety-six of these questions are labeled "Practical Problems." Evidently Professor Denfield has read every one of the freight rate decisions issued during the past dozen years by the Interstate Commerce Commission and has committed them to memory; and the hundreds of knotty problems with which those decisions are sprinkled are here set forth for the perusal of the unsophisticated reader who aspires to fill one of the "thousands" of traffic managerships which large mercantile and manufacturing establishments are now waiting to confer on competent young men at "promising salaries."

Following the "practical problems" there are 825 questions written in the ordinary style, many of them filling but a single line, by which the student can test the degree of success with which he has absorbed the contents of the book. On the subject of freight classification alone there are 300 of these questions; and so far as can be judged by the make-up of the list, or of the chapter to which it refers, the student is expected to answer the whole of them at one sitting!

The only rational conclusion that we are able to reach concerning the scheme of this book is that it is a transcript or revision of all the notes that have been made by the author in an extended experience as teacher or lecturer; made without sufficient attention to the needs of the student, and leaving a considerable task for the teacher who would use the book as a guide. Traffic management is a pretty difficult subject to systematize, and we are not blaming the author of this book for not doing it; but it is only fair to readers to tell them that this mine of useful information contains a large percentage of highly refractory ores.

The author has done well to make himself intimately acquainted with numerous competent railroad traffic officers and he gives the reader the full benefit of their wisdom on a thousand different points; but he too readily follows some of their careless habits in the use of words. Also there are occasional infelicities of language on the part of the author himself, indicating that some of the work was done too hurriedly.

The five parts of the book are entitled; (1) tonnage and rate construction territories; (2) classification; (3) tariffs; (4) transportation services and (5) traffic administration. The first part is divided into (1) introduction, commerce, industry and transportation; (2) physical and productive regions of the United States; (3) channels of traffic and (4) geographical relationship of traffic territories and rate construction points. Part 5, which is chapter 12, deals with administration of both railroad and industrial traffic departments.

Some of the "practical problems" referred to above are notable for their oddity. Others seem to be designed to stump the young student in various ways. Problem No. 13, of part 1, reads: "The southern mountaineer, who is able to grow corn on the mountain slopes claims that lack of transportation is the reason for his moonshining operations and illicit stills; that transportation will not allow him a profit on taking his goods to market. Therefore, he must have a product of high value and low bulk. Do you agree with the claims that are set forth? Will the government's aid and development of dairying and cheese making improve conditions?"

Under the head of classifications we find, for example: "Classify all athletic, gymnastic and sporting goods for the A. G. Spaulding Company, who desire to open a new store in Pittsburgh, and are planning to ship the goods from either New York or Chicago. Try and show them which would give them the better rating."

Problem No. 147, on page 284, reads: "The speaker on the Socialist program remarked that freight rates on cotton and woolen goods was discriminative, such as ratings on over-

alls and woolen suits. Show his line of argument and your opinion."

Were it not for limitations of space we could go on indefinitely with illuminating questions and comments concerning race-horses, planographs, garages, nitroleum, Oklahoma basing points, skirt forms with standards detached, proper location of tanneries, rates on human hair, C. L., and proper allowance for outage in tank cars; rates on kitchens, K. D., best place to make crude balsam, how to get a monopoly on the bottle business, how to ship a circus without being troubled by "cooties" and such like—and so on for pages and pages.

One thing that we have not found in the book, but which is of the first importance to the young student of traffic problems, is a warning that very frequently he will find the science of his business not only too complicated and confusing to be kept clearly in mind when soliciting a shipment from an ugly customer, but also too dim and remote to be satisfactorily defined; too much like a radio message from Australia. At the risk of being cited for contempt of the traffic court we will remind the student that, in difficult cases such as are here suggested, a knowledge of what your competitor is doing, or can do, or hopes to do, will often take the place of a great lot of scientific knowledge. Many of the most successful traffic men have had but scant knowledge of traffic science; but they have been adept in the art of guessing the other fellow's thoughts.

Moody's Analyses of Investments, Steam Railroads. By John Moody. 9 in. by 11 in. 1,314 pages. Bound in cloth. Published by Moody's Investors' Service, 35 Nassau Street, New York. Price \$20.

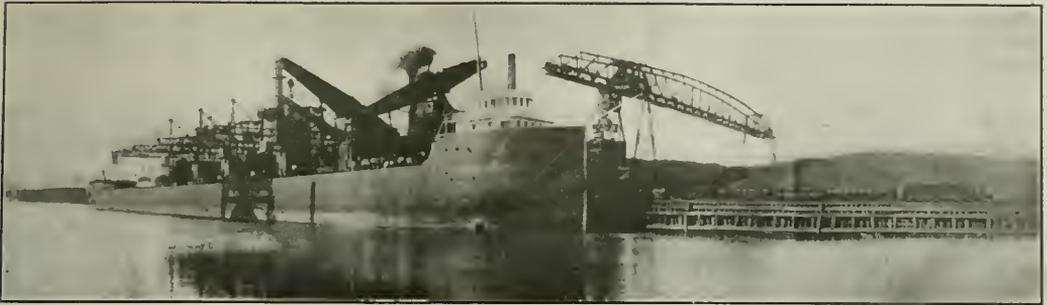
This is a new edition of Moody's Rating Book or Analyses of Railroads. The book combines the features of a manual on railroads with those of a rating book, performing the same function in respect to the investment standing of securities, as the credit agency rating books do on credits. The work, however, goes farther in that it presents the data upon which the ratings are based together with the full descriptions of properties and information regarding earnings, traffic statistics, officers and directors, price range of securities for years and other details of this nature.

All of the financial statements and earnings reports are analyzed. The percentage earned on different classes of stocks is shown, as well as the margin of safety for bond interest, average income available for fixed charges or dividends, with the amount required for such purposes. Comments are given on the equity of security issues and their market ability and other deductions are presented in concise, easily-understood tables.

Their system of investment ratings is simple, yet specific. Securities of the highest investment character, issues strongly protected by assets and earning power, whose position is secure beyond the shadow of doubt are rated Aaa—the next rating Aa, then A, Baa, Ba, B, etc. Atchison Topeka & Santa Fe General Mortgage 4s of 1995 are rated Aaa; Chicago Great Western First Mortgage 4s of 1959 are assigned a Baa rating; Norfolk & Western Common stock is rated A—Seaboard Air Line, preferred, carries the rating C.

The book covers all railroads in the United States and Canada and prominent South American systems.

For many years Moody's Rating Books have been part of the regular equipment of banks and financial institutions but recently, due to the general interest in railroad securities and railroad operations, the Railroad Rating Book especially has come into greater use upon the part of the public. This book will be found instructive and valuable to anyone who is interested in any phase of the transportation industry. The purchase price of \$20, includes also Monthly Bulletins of New and Revised Ratings and Monthly Earnings Reports.



The Ore Dock at Huron

Wheeling & Lake Erie Watches Cost Factors Closely

Coal and Ore Traffic Predominate—Road in Much Better Physical Condition Than Formerly

By Charles W. Foss

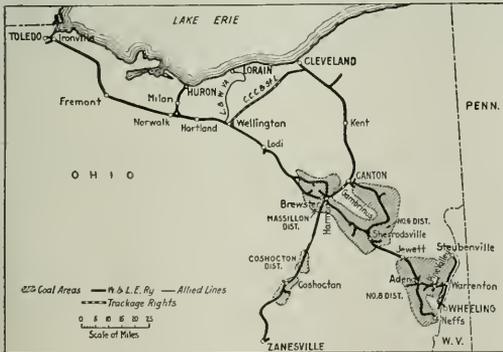
PART I

THE WHEELING & LAKE ERIE'S net after rentals for the year 1921 was \$1,755,356. For 1920 the road had a net railway operating deficit of \$401,694. In 1919 and 1918—during the federal control period—there was a net railway operating income of approximately \$1,000,000 in each year. The 1921 increase in net was in spite of a sharp falling off in traffic. For the year the net ton-miles, revenue and non-revenue, totaled 1,097,087,936, as compared with 1,580,700,825 in 1920.

The operating ratio for the year was 79.55 per cent, the

better shape than the average. For instance, the per cent of bad order cars on February 15 was 8.1; for all the roads on that date, the percentage was 14.5.

A number of factors are responsible for the operating economies which have been brought about. One is the careful supervision given to cost factors, particularly, perhaps, with reference to the effort made to keep down overtime. Another is the manner in which the co-operation of the men has been secured by prizes to yardmasters and train en-



The Wheeling & Lake Erie

TABLE I—REVENUES AND EXPENSES OF OPERATION, 1912 TO 1921

Years ending June 30	Coal rev. in cents	Per cent of total freight	Total coal rev.	Pas-senger revenues	Total revenues	Total expenses	Net operating revenue
1912	3,157,650	41.92	6,434,094	603,763	7,332,483	5,071,446	2,461,037
1913	3,145,853	40.01	6,767,830	624,376	7,863,676	5,917,942	1,945,734
1914	2,690,441	35.13	6,544,900	624,034	7,638,424	5,296,660	2,361,764
1915	684,550	12.61	4,385,421	553,630	5,428,069	4,039,740	1,388,329
1916	2,447,143	26.65	7,853,269	627,476	9,184,516	5,960,229	3,224,287
Years ending Dec. 31							
1916	2,600,243	25.99	8,520,202	668,642	10,003,608	6,811,735	3,191,872
1917	3,361,086	30.48	9,438,249	630,606	11,028,904	7,378,213	3,650,692
1918	5,395,337	39.72	15,492,264	485,488	13,592,172	11,290,779	2,301,393
1919	4,011,821	31.84	10,687,086	677,876	12,600,840	10,925,716	1,675,124
1920	6,975,411	38.86	11,970,360	895,241	17,952,257	16,125,999	1,826,258
1921	6,561,349	44.36	12,729,201	952,305	14,791,993	11,767,602	3,024,991

gine crews for good records in operation. Frequent conferences are held for the purpose of bringing about co-operation among the different departments. The practice is to give subordinate officers both information and authority. The terminal trainmasters are especially given real authority, which they use not only in giving service but in securing business from the industries with which they deal.

The Wheeling & Lake Erie is a comparatively small road in highly competitive territory. It has fallen upon adversity in former years and has been in receivership on a couple of occasions. It was operated by a receiver from 1908 to the end of 1916; it came out of the hands of receivers in considerably better shape physically than it went in, large expenditures having been made from income and from the proceeds of receivers' certificates for grade revision, new yards, engine terminals, shop facilities, etc. When it was reorganized, the new capitalization included, in addition to the

transportation ratio 38.70. For several months during the middle of the year, the operating ratio averaged nearer 70 per cent and the transportation ratio around 32. These averages indicate economies of a drastic sort. The road in 1921 sharply reduced its expenses for maintenance of way and equipment. It succeeded during 1921, nevertheless, in making substantial improvements to its roadbed. The index to equipment maintenance—the percentage of bad order cars—shows that throughout the year the road's cars were in

funded debt, 7 per cent cumulative prior lien stock, 3 per cent non-cumulative preferred and common stock. Fixed charges have been earned since with a margin to spare, but no dividends have been paid on the prior lien stock to date.

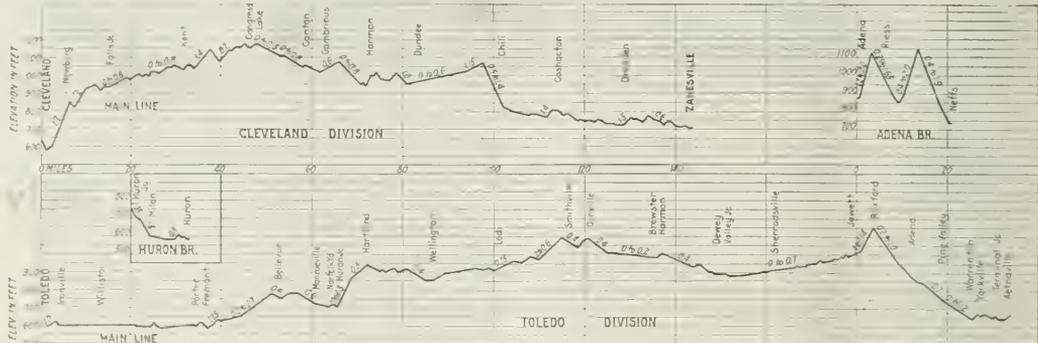
Physical Characteristics—Maintenance

The Wheeling & Lake Erie's mileage totals 512. Its main lines extend from the Ohio river to Toledo and from Cleveland to Zanesville, the two lines crossing each other approximately at right angles. The line from the Ohio to Toledo is the road's main stem. The line to Cleveland is also im-

quantity of new rail is needed; even on the Toledo division there are some rather rough spots due to old rail, although this latter factor is slated for early improvement. Crossing signs, stations, etc., need paint badly.

Equipment

The equipment seems to be in rather better shape than track as is indicated by the percentage of bad order cars on February 15 of 8.1. The road owns 10,126 freight cars, including a large proportion of comparatively new cars. This last is a factor of more than passing interest because it



Condensed Profiles of the Toledo and Cleveland Divisions and the Huron and Adena Branches

portant, but it is a question if the section extending southward to Zanesville is an important asset of the system. There are various branch lines, as will be seen from the map and the road's strategic position at Toledo, Cleveland and Canton is considerably strengthened by so-called belt lines. The Lorain & West Virginia, Lake Junction to South Lorain, 25 miles, is operated by the Wheeling & Lake Erie and controlled by ownership of practically all the capital stock.

The W. & L. E. is single track practically throughout. The larger part of the line is ballasted with rock or prepared slag. The rail on the main lines is 90-lb. White oak or treated ties are used, the former predominating. Tie-plates are used on all curves and on all treated ties in tangent track. The roadbed at present is in fair condition but not in as good condition as the officers would like to have it. The company contends that the lines were undermaintained during the federal control period. Although the reduction in maintenance expenses which were made during 1921 would hardly indicate it, considerable progress was made in maintenance during the year. Particular attention was given to improving the track foundation and to ballasting in general. The end of the year found the road in much better shape in this respect than it was at the beginning. Illustrations are given of some of the Wheeling & Lake Erie's best stretches of track. The track shown is ballasted with prepared slag. For 1922 the program includes a large amount of tie renewals, the ties for this purpose having already been obtained. A large

was not so many years ago that W. & L. E. conditions were quite the opposite. The locomotives total 221, including 25 passenger, 33 switching and 163 road freight locomotives. In rating its locomotives, the W. & L. E. has a method whereby locomotives of 40,000-lb. tractive effort are designated 40 per cent engines; of 60,000-lb. tractive effort, 60 per cent, etc., and similarly the locomotives are numbered accordingly. Thus there are 31 Consolidations of 41,360-lb. tractive effort. These are designated 41.3 per cent locomotives and are numbered from 4101 on. Speaking more generally, the freight locomotives include 10 Mallet locomotives of 80,000 tractive effort (80 per cent), 20 Mikados of 84,000-lb. tractive effort (84 per cent), 20 Consolidations of 60,000 tractive effort (60 per cent), and various other Consolidations of 30,000; 35,000; 41,360, and 43,000-lb. tractive effort and a number of older Tea-wheel locomotives.

The Mikado and Mallet locomotives are, like a fair proportion of the cars, comparatively recent acquisitions. The Wheeling & Lake Erie was assigned by the Railroad Administration 20 heavy Mikado, 10 light Mallet and 5 Eight-wheel switching locomotives and 1,000 50-ton composite gondola cars, all of which equipment was financed in the general equipment trust covering the standard equipment. During 1920, the road placed orders for 1,000 box and 2,000 50-ton gondola cars, which equipment was financed through the assistance of the National Railway Service Corporation.

TABLE II—DETAILS OF EXPENSES AND PER CENT OF EACH TO TOTAL OPERATING REVENUES, 1911 TO 1921

Year ending	Maint. equip.	Per cent	Traffic	Per cent	Transportation	Per cent	Total	Per cent
1910	\$ 898,871	11.63	\$1,416,139	18.80	\$3,486,731	33.02	\$5,071,446	67.33
1911	1,126,292	16.81	1,743,362	24.77	3,602,830	33.10	5,917,942	78.26
1912	1,061,643	15.06	1,285,186	16.81	3,063,369	29.17	5,366,660	69.16
1913	664,191	11.11	1,043,248	19.33	2,088,758	38.48	4,019,240	74.42
1914	1,131,882	12.62	1,572,244	19.14	3,711,217	29.84	5,960,229	64.89
Year ending								
Dec. 31								
1911	1,130,136	13.30	1,987,668	19.87	3,159,960	31.58	6,811,735	68.09
1912	7,079,911	19.66	1,677,581	15.31	3,904,938	35.41	7,378,313	66.90
1913	7,002,834	15.40	3,201,985	23.56	5,555,555	40.87	11,960,779	83.07
1914	2,571,663	18.71	2,449,711	23.81	5,100,792	40.48	10,951,716	86.71
1915	1,729,643	17.15	4,581,902	25.57	7,826,311	43.60	16,125,999	89.83
1916	1,934,185	13.08	3,439,667	23.19	5,724,884	38.70	11,767,060	79.55

The road in 1920 had a debit per diem balance of \$1,255,633. The acquisition of this last 3,000 cars put a different aspect on the per diem situation during 1921, the debit that year being \$259,643 or nearly \$1,000,000 less than in 1920.

The engine houses as a rule are adequate. Repair shop facilities are located at Brewster and Toledo (Ironville).

ore and of various iron and steel products. The road serves four coal fields—the No. 8 Eastern Ohio or Pittsburgh district, the No. 6 district, the Masillon district and the Coshoc-ton district. These four districts are shown on the map. The No. 8 field is much the more important of the four. Coal from it is moved to the various industrial centers served by

TABLE III—TRAFFIC AND OPERATING STATISTICS

Years ending June 30	Bituminous coal tons	Coke tons	Ore tons	Total rev. frt. tons	Rev. ton mileage	Average haul	Ton miles per mile of line	Net tons per train mile	Net tons per locu. mile	Average tons per loaded car	Miles per car per day
1912	4,877,102	691,947	846,001	10,641,187	1,175,463,368	110.5	2,706,844	733	688	33.25	16.85
1913	5,180,320	941,952	976,758	11,667,187	1,255,099,127	107.6	2,876,338	783	714	34.35	17.89
1914	4,855,663	1,292,903	1,356,706	12,076,785	1,192,862,166	98.8	2,538,701	794	734	35.37	14.52
1915	1,778,129	1,063,690	846,236	8,290,069	651,739,754	78.6	1,352,834	609	569	29.74	10.14
1916	4,443,680	1,117,196	1,834,416	13,877,353	1,302,625,501	93.9	2,635,154	825	757	34.78	18.35
Years ending Dec. 31											
1916	4,647,795	1,062,326	2,059,302	14,856,829	1,428,469,558	96.1	2,880,581	855	777	34.97	17.02
1917	5,984,667	259,933	2,116,767	14,218,970	1,514,181,458	106.5	3,065,956	1,066	940	39.36	13.40
1918	6,281,381	117,083	2,104,624	14,261,519	1,510,350,013	105.9	3,048,095	1,114	969	41.25	12.89
1919	4,270,903	131,828	1,791,399	11,555,433	1,186,471,192	102.7	2,407,970	953	916	40.59	10.36
1920	6,596,663	440,446	2,118,309	14,840,524	1,522,921,850	102.6	3,089,720	1,030	997	42.86	11.76
1921	5,066,712	124,960	993,784	10,269,231	1,045,778,410	101.8	2,144,425	914	868	42.70	13.71

Locomotives are shopped at Brewster and cars receive heavy repairs at Ironville. Both shops are modern and of a good standard. Insofar as concerns the shops at Ironville, however, the criticism might be made that they might be better located if they were at Brewster in the center of things rather than at the extreme end of the line.

The road in recent years has been devoting considerable

the road, including Steubenville, Canton, Cleveland, Toledo, etc. There is a sizable quantity used for railroad fuel. Mines on the Wheeling & Lake Erie in the No. 8 district supply coal to such roads as the Nickel Plate, the Erie, the Lackawanna, the Pere Marquette, etc. The larger part of the coal tonnage, however, is moved to the lakes and is dumped into lake vessels at Huron. From Huron there is a sizeable



Some of the Wheeling & Lake Erie's Best Stretches of Track

attention to yards, notably at Canton or Gambirinus and at Jewett. The road is not equipped with block signals nor has it many interlocking plants. Operations are governed entirely by time-table and train orders.

Serves Pittsburgh No. 8 Field

Of the Wheeling & Lake Erie's traffic, about 45 per cent is bituminous coal. There is also a substantial tonnage of iron

back haul on iron ore—primarily to steel mills along the Ohio river. Some 400,000 or 500,000 tons are supplied yearly to the Canton district. Inasmuch as the No. 8 coal district is at the east end of the line and the larger part of the coal moves to Huron, whereas the ore moves from Huron back to the Ohio river points, the road secures a haul on a large portion of its traffic of nearly the entire length of the line. The road handles but a relatively small quantity of mani-

TABLE IV—CORPORATE INCOME ACCOUNT, 1912 TO 1921

Years ending June 30	Net operating revenue	Taxes accrued	Operating income	Other income	Gross income	Hire of equipment	Rentals	Interest	Net income
1912	2,461,037	367,225	2,093,812	24,705	2,118,520	268,353	90,574	1,041,126	718,117
1913	1,945,734	362,426	1,583,308	31,102	1,614,410	325,928	83,571	1,091,905	113,005
1914	2,361,764	396,831	1,964,933	63,369	2,028,301	303,985	57,734	1,196,602	469,981
1915	1,388,329	385,907	1,002,422	20,275	1,022,695	187,665	54,065	1,129,105	def. 347,140
1916	3,224,287	452,393	2,771,894	36,947	2,808,841	372,829	104,556	1,130,359	1,201,097
Years ending Dec. 31									
1916	3,191,872	561,118	2,630,754	57,296	2,688,050	402,552	117,146	1,128,218	1,040,134
1917	3,650,692	612,587	3,038,305	171,625	3,209,930	929,678	66,862	1,099,496	1,113,895
1918	2,301,393	694,017	1,606,736	161,983	1,768,719	577,119	37,961	1,187,754	def. 34,115
1919	1,675,124	748,692	924,145	186,094	1,110,239	44,794	31,099	1,205,163	def. 170,817
1920	1,826,258	939,144	885,451	155,097	1,040,548	1,355,633	31,512	1,470,146	def. 1,716,743
1921	3,024,991	1,064,972	1,960,019	136,684	2,096,703	259,643	23,521	1,448,103	365,435

Figures for 1918, 1919 and 1920 represent consolidated corporate and federal accounts with inter-account items eliminated. The Wheeling & Lake Erie's standard return for operations under federal control was \$1,586,037. Corporate income account for 1918 shows a net corporate income of \$300,295; for 1919, \$306,636, and for 1920, \$56,725. The 1920 corporate accounts include tentative figures of \$264,340 for compensation for January and February, and \$1,458,622 for guaranty

fest freight. A small road in highly competitive territory has both its advantages and its disadvantages. One of the advantages is the better supervision permitted. This is a real asset when it comes to service and is of value as concerns ordinary freight service as it would also be in the case of manifest service. The Wheeling & Lake Erie is not a rich road, and it is far from being extravagantly provided with terminal facilities at the competitive centers, although its several belt lines do help it measurably. The road's ability to give service and the supervision which brings about this ability are outstanding factors in the work which the road is doing in these competitive centers, both as applies to coal and ore traffic and to traffic in manufactured products.

Back Haul on Iron Ore from Huron

The total tonnage handled by the Wheeling & Lake Erie approximates 14,000,000 tons annually. The bituminous coal tonnage fluctuates considerably and runs from 4,000,000 to 6,000,000 tons. Ore totals about 2,000,000 tons. The road formerly handled a heavy coke tonnage, sometimes over 1,000,000 tons annually, but in recent years this traffic has become of less importance. In 1920, in which year the road handled more ton-miles than in any previous year, the total tonnage of all commodities was 14,840,524. Of this, coal made up 6,596,663 tons; ore (including ore concentrates) 2,118,309 tons; coke, 440,446; products of mines, as a whole, 9,988,200, and manufactures, 4,114,402 tons.

The relationship between the tons of coal carried and the tons of iron ore is an important factor. The road as has been noted, carries the larger portion of its coal to Huron where it is dumped into lake vessels. From Huron there is a back haul on ore, which movement utilizes equipment which otherwise would return empty. The facilities at Huron include for handling coal, two car dumping machines and for handling ore, four of the so-called rapid unloading machines and two Hulett unloaders. An illustration shows the ore dock in operation. There is, of course, also a large storage space and facilities for handling ore which is to be stored, as will also be seen from the illustration. The pier is of wooden construction and the road is now replacing it with concrete, one-third to be finished by the opening of the lake season.

The coal dumped into vessels at Huron during the 1921 season held up fairly well as compared with 1920 or 1919 as was the case at most of the other lake piers. In 1921, the coal dumped by the Wheeling & Lake Erie at Huron totaled 1,622,968 tons; in 1920, it was 1,958,446, and in 1919, 1,488,516 tons. By the way of comparison, it might be noted that several piers on Lake Erie dumped over 2,000,000 tons in this period, notably the Baltimore & Ohio at Toledo and Lorain; the Pennsylvania at Cleveland and Ashtabula. The Hocking Valley at Toledo dumped over 4,500,000 tons.

The ore received at Huron during 1921 totaled 624,744 net tons; the road shipped from Huron 625,768 tons and on January 1, 1922, it had on its dock 758,676 tons. The ore business was at a low ebb in 1921 because of idleness in the steel industry. This is evidenced by the fact that the shipments of 625,768 tons from Huron in 1921 compared with 1,060,602 net tons in 1920. The W. & L. E. also handles ore from South Lorain and Toledo, although not over its own piers. Shipments from the three ports, Huron, South Lorain and Toledo in 1921 totaled 986,475 tons as compared with 2,074,208 tons in 1920. The figures showing ore shipped and those relating to coal dumped will give a ready comparison of the relative importance the ore traffic plays from the standpoint of supplying a back haul from the lake.

THE CONSUMPTION OF FUEL OIL in 1921 by locomotives of the railroads in the United States amounted to 38,824,000 barrels as compared with 45,847,000 barrels in 1920. Of the total now reported, 27,615,000 barrels were domestic oil and 11,209,000 barrels were Mexican.

B. M. Jewell Attacks Legality of Wage Conferences

WHETHER OR NOT PROPER conferences preceded the submission of the present wage controversy to the Railroad Labor Board has, during the past week, been made the issue in this controversy rather than the justness and reasonableness of the wages proposed by the carriers. For several days B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, has been reading extracts from the stenographic reports of the conferences held on various railroads, drawing from this testimony the inference that the procedure outlined in the Transportation Act and ordered by the Labor Board has not been followed, and that practically all of the railroads, parties to this dispute, are not properly before the Board.

On March 20 Mr. Jewell completed the presentation of evidence of this character and called upon the Board to render an immediate decision as to the legality of the conferences and to remand the whole controversy over wages to further negotiation between the carriers and the employees involved. In closing his arguments, he said in part:

"We are firm in the conviction that I have presented a picture of what efforts were made by the railroads to confer with representatives of their employees; that we have justified and proven conclusively that Section 301 of the Transportation Act has not been complied with; that there are no disputes, so far as the shop craft employees are concerned, the merits of which this Board can lawfully pass upon in these hearings."

The answer of the railroads to Mr. Jewell's testimony on the question of the legality of these conferences was started on the same day when J. L. Coleman, general attorney of the Atchison, Topeka & Santa Fe, read some correspondence between Mr. Jewell and the members of the Federated Shop Crafts containing specific instructions as to how and when negotiations should be conducted with representatives of the carriers. He drew from this correspondence and from other material the inference that "there is no possibility that those men (representatives of the Shop Crafts) could sit down and negotiate questions with the management."

Regarding the excerpt from the stenographic report of the conferences held between employees and the representatives of various railroads, Mr. Coleman developed the fact that Mr. Jewell had read only portions of these reports and produced as the first witness for the carriers, H. T. Dick, general solicitor of the Chicago & Eastern Illinois, who immediately proceeded to read the many portions of the stenographic report of the conference on that road which had been omitted by Mr. Jewell, and which showed that the questions of cost of living and wages in other industries and similar relevant factors had been discussed at these conferences.

Similar testimony was presented by J. L. Coleman, general attorney of the Atchison, Topeka & Santa Fe, and J. A. Cochrane, assistant to the vice-president of the Great Northern, appearing on behalf of the Spokane, Portland & Seattle, in defence of the conferences held between these roads and representatives of their shop employees. It was shown by the reading of omitted portions of the stenographic report of these conferences that there had been a bona fide effort to discuss present and proposed wage scales.

In response to a request of Mr. Jewell, Mr. Higgins read a list of 19 roads in Western territory which are pleading financial inability to pay the present wage scales as part of their presentation on behalf of lower rates of pay. These carriers include the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the International & Great Northern, the Minneapolis & St. Louis, the Minneapolis, St. Paul & Saulte Ste. Marie, the Missouri Pacific, the Texas & Pacific, the Toledo, Peoria & Western and the Western Pacific.

Telegraph and Telephone Section March Meeting

Reports Set Limits on Clearance at Wire Crossings and Explain the Proper Use of a Transmitter

THE FIFTH SESSION of the Telegraph and Telephone Section, American Railway Association, was opened at the Hotel Jefferson, Richmond, Va., on March 21 by an address of welcome by George Ainslie, Mayor of Richmond. The committee of direction, in its report, told what action had been taken regarding the specifications and recommendations presented to the section. The standing committees appointed last September for handling the work for this year were announced and a memorial in memory of E. A. Chenery of the Missouri Pacific was presented. Additional reports on creosoted poles, reinforced concrete poles and permanent pole lines and tools and equipment were presented at the first day's session. The report on wire line crossings brought out considerable discussion before its adoption.

Construction and Maintenance—Outside Plant

Committee 1, of which G. A. Cellar, general superintendent of telegraph, Pennsylvania System, is chairman, presented new specifications on pole line construction in which it was recommended poles shall be set so that the minimum horizontal clearance of any wire, guy or other attachment will be 8 ft. from the outer edge of the nearest main track rail. Under normal conditions with poles carrying ten-pin cross arms, this minimum clearance will be obtained by setting the poles 13 ft. from the rail. The lowest crossarm should be not less than 25 ft. above the rail.

At sidings, poles may be set with a minimum horizontal clearance of 7 ft. from the outer edge of the nearest track rail. At railroad crossings clear headroom between the lowest wire or cable and the top of the rail shall be not less than 27 ft., except where the wires for cables are paralleled on the same highway by a trolley contact conductor on a lower level, in which case the clearance between such wires at the top of the rail may be reduced to 25 ft. Lines along highways or city streets shall have a minimum clearance above the ground of 18 ft. If telegraph and telephone lines, parallel supply lines (electric light or power) a minimum separation equal to the height of the taller lines should be the minimum between the two systems. A clearance of at least 4 ft. from trees and other brush should, where practical, be provided.

The sub-committee on "Wire Crossings" has co-operated with the public utilities companies and the state commissions in the production of specifications which will be satisfactory to all concerned. As a result of their deliberations it has been agreed that where the sum of the distances from the point of intersection to the nearest supporting structure of each span does not exceed 100 ft. the minimum clearance at the point of intersection or between communication lines and power supply lines, carrying from zero to 750 volts, must be not less than 2 ft. However, if the power lines carry over 750 volts the clearance must be 4 ft. or more. At wire crossings a 50 ft. pole must be set 7 ft. in the earth or $4\frac{1}{2}$ ft. in solid rock. Poles of other lengths are set to corresponding depths. The minimum sag for No. 6, A.W.G. bare hard-drawn copper wire is set at 4 in. for a 100 ft. span at 40 deg. F. and the sag for other lengths of span and different degrees is given in a table in the report. According to the report of the sub-committee on "Transposition" the locations of the poles on which the transpositions are made are to be marked with letters 2 in. high and 2 in. wide, painted on the poles at a height of 5 ft. from the ground. The sub-committee on "Underground Construction" offers detailed drawings and specifications for a mandrel for underground conduit testing and construction.

Construction and Maintenance—Inside Plant

This committee with W. Rogers, telegraph and telephone engineer of the Missouri Pacific, as chairman, presented a report including a specification for lead sheathed office cable, non-quadded, with a twisted pair of cotton or silk and cotton covered enameled No. 18 A.W.G. conductors. Drawings and specifications for cross connecting rings, porcelain fuse blocks with fittings and porcelain terminal blocks are also included in this report. The report of sub-committee "H," included diagrams showing the location and layout for the operator's table, wall panel and test connections in telegraph and telephone way offices, station buildings and interlocking towers. In this work the committee co-operated with the Signal Section to provide space for interlocking apparatus.

The installation and maintenance of caustic soda cells and storage batteries was explained in detail, by chemical equations, diagrams and photographs in the report of sub-committee "K." This report also included a table record form for recording the assignment of wire in cables. The reports of sub-committee "J"—Circuits and Current Supply—included a complete revision of the specification for wire chief's equipment and the routine in railroad offices which was submitted for discussion at the September, 1921, meeting and now incorporates suggested revisions made at that time.

Message Traffic

G. H. Hood, superintendent of telegraph of the Chicago, Rock Island & Pacific, presented the report of this committee. The committee does not recommend the interchange of traingrams between railroads as a general practice because of the fact that the postal laws do not permit intermediate handling of railroad mail; also that traingram service, in order to be dependable, must have close supervision at transfer points and that an additional messenger would have to be employed. As traingram service is primarily an over-night proposition, it is doubtful if the interchange service would meet these ends. Exhibit "E" of this report offered the recommended routine for handling telegrams by telephone. In transmitting numbers each figure shall be given separately by name; for example, \$345 in the original copy will be passed over the wire as ("Figures") "dollar sign, three-four-five, three hundred and forty-five dollars." Words having similarity of sound must be spelled and each word pronounced after it is spelled. Guard words are found to be of advantage in identifying the letters of the alphabet. For example, A for Adams, B for Boston, O for Ocean, etc.

Telegraph and Telephone Transmission

This committee, of which Stanley Rhoads, telegraph and telephone engineer of the New York Central Lines, is chairman, presented interesting information on telephone transmission, including the effect of resistance, inductance, electrostatic capacity, leakage, cross talk, and noise. The incorrect use of the telephone, especially the failure to have the speech actuate the diaphragm to the best efficiency, can be corrected by educating the users. Losses in transmission equivalent to $3\frac{1}{2}$ miles of cable are caused by the lips being placed $\frac{1}{2}$ in. from the mouthpiece and of $5\frac{1}{2}$ miles by a distance of $1\frac{1}{2}$ in. from the transmitter.

Telegraph and Telephone Development

This committee reports that an automatic electric lighting outfit for camp cars has been developed which greatly reduces the fire risk from oil and gas lamps for isolated quar-

ters and camp cars. This outfit consists of a small gasoline engine connected to a motor which develops 110 volts and current to light twenty-four 25-watt lamps. Interesting information is also given on the reclamation of exhausted dry batteries. It is found that salt, and also salammoniac, if dissolved in the water in which the cells are placed, will cause the cells to recuperate and last a day or two longer.

One trunk line railroad has made use of a frequency doubling coil arrangement to increase a 110-volt, 60-cycle, a. c., single-phase power to 120-cycle for use with composite ringers. This arrangement is considered to be a desirable improvement over the composite ringer operating with the interrupter unit as a means of eliminating battery units with its moving parts.

Reports of Other Committees

An organization chart is presented and explained in detail in the report of the committee on Rules and Organization, describing the various employees and the duties of each man necessary to the proper handling of telephone and telegraph equipment on the modern railroad. The duties of the superintendent of telegraph, the telegraph and telephone engineer, chief dispatcher, supervisor, chief inspector, chief lineman, etc., are each explained in detail in order that there will be no overlap in the carrying out of their several duties.

The report of the committee on Radio and Wired Carrier System gives the details of the test made last November on the New York Central at which time the carrier-current apparatus was tested successfully on a 600-volt trolley wire system. Buzzer signals were sent out from the sub-stations and were received by loud speakers in the waiting rooms or on moving trains and could be heard some distance away.

The committee on Education and Training of Telegraph and Telephone Employees has outlined a definite course of instruction. While it will generally be necessary to employ the correspondence method, due to the character of the work and the location of the employee, better and more immediate results will be obtained where the courses can be administered under the direct supervision of an instructor. It is the intention of the committee to suggest to engineering schools subjects that might be well taught in order to prepare trained men to enter the telegraph and telephone field after graduation. Among the problems with which the department has to deal are transmission, design of circuits, specifications and tests for construction and maintenance material, electrolysis, etc.

Warfield Warns Against Attacks on Transportation Act

WASHINGTON, D. C.

THE NATIONAL ASSOCIATION OF OWNERS of Railroad Securities has issued a pamphlet analysis of the Supreme Court's decision in the Wisconsin rate case, by S. Davies Warfield, its president, which views with alarm (although it is stated that no criticism is intended) current reports "that railroads are preparing to attempt to enjoin the commission from putting into effect the division of the excess revenue provision of section 15-a of the Transportation Act." "The fatal consequences that must attend the mutilation of section 15-a," he says, "have been shown and made clear by the Supreme Court's decision," and "it cannot be supposed that the excess earnings provision of section 15-a can be shot to pieces by opposition of individual railroads affected and that the carriers will still be left in unlimited possession of the benefits of section 15-a. This section, which formed the basis for the Supreme Court's decision, cannot survive unless the railroads themselves show a proper conception of the national public interest on which it is based."

Important as the decision is in defining the relation of the Interstate Commerce commission and of the state commis-

sions to the adjustment of railroad rates, Mr. Warfield says, even more important is the basis upon which the court reached a unanimous conclusion fully sustaining the broad purposes of the revenue provisions of the Transportation Act as embodied in section 15-a. After calling attention to the fact that this section represents the rate-making principle advocated by the association, which included provision for the disposition of the excess revenue to be produced, Mr. Warfield says that the association's counsel, in the brief submitted to the Supreme Court in this case, had attached fundamental importance to the percentage rule of rate-making in 15-a as justifying the commission's action in advancing state rates. He intimates that counsel for the railroads had rested in the contention that the commission had ample authority for its orders under the so-called Shreveport power to deal with discrimination, without reference to 15-a, and points out that the court held that the "sweep of the order" could not be sustained on the showing of discrimination against persons or places alone and had based its decision on the necessity for adequate revenues to sustain the national transportation system.

"It was plain to counsel for the association of security owners," he says, "that the commission's orders relating to interstate fares in Wisconsin could not be sustained on the sole theory of discrimination as against individuals and localities, familiarly known as the doctrine of the Shreveport case. It was considered that not only would the case be lost, but that the broad principle of carrier revenue and the group or national consideration underlying section 15-a would be jeopardized unless the case were decided on broader grounds.

"The court recognized that section 15-a brought into the regulation of transportation for the first time in any effective way the element of revenue consideration. The court refers to this new element as the 'most important purpose of the legislation.' The chief purpose was to provide sufficient revenue to conduct transportation as a whole, in the public interest, and to prevent interference with this result on the part of either a state or a railroad.

"This problem of rates to sustain a national railway system without yielding to certain minority carriers in the system more revenue than the public and public authority will stand for, was the problem of the Transportation Act, solved by section 15-a. It is based on the division of that surplus revenue produced by rates adjusted to the necessities of the majority carriers which, for convenience, was designated 'excess earnings'—as a matter of fact, a misnomer. It is not earnings. It is a by-product arising from revenue necessities. If the state cannot obstruct the authority of Congress to sustain the national character of an interstate system of transportation, it is obvious that no railroad forming a part of this system can obstruct that result by contending that rates must be allowed to each carrier in its sole right and free from adjustment of revenue in excess of its individual right.

"The full revenue produced would not have been allowed the minority carriers if rates had been made for them alone, and the excess is subject to such disposition as Congress may make of it in the general public interest in transportation—provided a reasonable return is allowed on the property of the particular carrier affected by the administration of the act. If it were practically possible for the commission to make rates for each of these minority carriers alone, there is no reason to assume that the rates thus made would yield a return greater—perhaps not as much—as these same carriers may be expected to receive as a reasonable return on their property devoted to the public use under the provision of section 15-a of the act, with a division of excess allowed.

The court's decision places railroad policy in a new and significant position. It means that private ownership of railroads can only survive if the carriers are willing to acknowledge themselves as part of a national railway system. But if aid is lent to assaults on section 15-a through repudia-

tion of the national aspects of the subject established by unanimous action of the Supreme Court, that section will go out of existence and private ownership will go with it.

"The question now is whether the railroads will themselves attempt to nullify the first and only constructive and remedial legislation adopted by Congress in their interest and for their protection since 1884, by disrupting the basis on which that relief has been granted; a national system of transportation of which all essential carriers are parts.

"Should it come to pass that the necessities of transportation would force the government to take over a number of railroads, the position of the remaining carriers would be precarious. In the contingency of government operation, arising out of the necessity to maintain essential systems, it is a grave question whether it would be possible for the remaining railroads, in competition with the government, to meet operating conditions that might be forced upon them."

The second part of the pamphlet also refers to the car pooling plan proposed by the association's board of economics and engineering, and says that after the recent appearance before the commission of the representatives of the association, statements were immediately made that the existing railroad agencies have been bringing or can bring about the freight car economies that were suggested, without pooling. "It was pointed out in the statements," Mr. Warfield says, "that these agencies were co-operating with the commission and through the powers given the commission by the Transportation Act to re-allocate freight cars in emergencies, the service and economies which the suggestions contemplate could be obtained."

Mr. Warfield also says that the association had requested certain information for its study of the question of consolidations in September last from all Class I roads, but that while 70 important carriers, constituting about 40 per cent of the mileage, have been very prompt in their responses and have furnished important data, 67 declined to give the information and the remaining 68 have not been heard from, "leaving the supposition that the information asked will not be forthcoming." He says that in recent appearances before the commission, the association's representatives stated that it was believed that more effective and immediate results can be obtained by consolidating or extending the joint use of railroad facilities rather than by attempting to consolidate their corporate organizations at present. The board will shortly make a report in respect to joint terminal uses.

Mr. Warfield also refers to reports that railroads would attempt to enjoin the commission from putting into effect the division of rates between the eastern and New England carriers recently ordered by the commission. He says that without entering into the merits of these cases it seems plain that suits of this nature would be contrary to the spirit and purpose of the Transportation Act and contrary to the Supreme Court's clear recognition of the relation under Section 15-a of each railroad to the transportation systems as a whole. He says the right of any railroad to test the reasonableness or application in detail by the commission of the basic principles of the Transportation Act is not questioned. What is questioned is the propriety or expediency of the attack upon those principles which in themselves are vital to the welfare of the railroads.

Maine Central Shows Deficit of \$2,165,362

State of Maine Excise Tax Big Factor. Lower Wages and Fuel Costs Indicate 1922 Improvement

THE MAINE CENTRAL is the first Class I carrier to make public its annual report for the year ended December 31, 1921. The report is further of interest because the road is the first of the New England carriers to make public its figures for the period in question.

The Maine Central did not succeed in 1921 in overcoming—to put it in its broadest terms—the fact that it is a New England carrier. The road had a deficit, after a payment of interest, of \$2,165,362. In 1920, when it was able to rely upon its standard return for two months and its guaranty for six, it showed a net of \$304,433, out of which and from surplus, it paid dividends of five per cent on its preferred stock and six per cent on its common, which dividends totaled \$653,166. In 1921 no dividends were paid.

One of the Maine Central's handicaps is, as has been pointed out in these columns before, that it has to serve more or less in the role of Atlas for the financial structure of the state of Maine. Whereas Atlas had the task of supporting the world on his shoulders, the Maine Central has to help support on its shoulders the state's finances. This is due to the excise tax. In 1920 the road's total of taxes, including federal taxes, was \$1,163,289. In 1921 it had to pay \$1,263,982. Of the 1920 taxes the state of Maine's excise tax constituted \$795,907. The excise tax in 1921 totaled \$972,863. The total tax increased \$100,694, but the excise tax increased \$176,956. It has been stated on more than one occasion that relief for the railroads of New England should come from the people of New England. The *Railway Age* does not necessarily agree with this view, but it is to be feared that the people who express it may find considerable material for their suggestion in this excise tax situation.

The question that naturally arises in reviewing an annual

report of a railroad like the Maine Central is its prospects for the coming year and whether it is going to succeed in overcoming the disadvantages which now confront it. One would naturally expect that the recent decision in the New England's division case should permit the road to make a better showing for 1922 than for 1921, although the threatened litigation still leaves that uncertain. Other factors that will have an effect are the decrease in wages and the lessening cost of fuel.

The operating expenses for the railroad in 1921 showed a decrease from 1920 of \$3,141,771 of which \$114,553 was maintenance of way; \$347,284 maintenance of equipment and \$2,571,823 transportation. Insofar as concerns the decrease in transportation expenses, one notices particularly the decrease in wages and a decrease of \$1,136,075 in fuel for train locomotives. Of course, part of this decrease in fuel expenses is due to the smaller amount used because of the lesser traffic, but the principal reason is the lower unit cost. The expenses for maintenance of way indicate that the railroad in 1921 paid considerable attention to maintenance. Increases are shown for the items of cross ties and rails particularly. In 1921 the road laid 6,923 tons of new 85-lb. rail and put in track 537,123 ties. These figures represent a considerable increase over those for the other years for which figures are available, as is shown by the following tabulation:

Year	Rail Tons	Ties Number
1916	6,173	395,965
1917	2,669	137,790
1920	4,689	355,020
1921	6,923	537,123

The year 1921 also evidenced considerable progress in the matter of shop facilities. The new machinery was installed

in the car repair shop at Bangor, greatly improving the facilities at that point. Several new machine tools were added at Waterville and a new 85-ft. turntable was installed at Rockland. During the year the car repair shop at Rumford and the enginehouse and shop at Calais were destroyed by fire. The facilities at Calais were replaced by an 8-stall enginehouse and a modern repair shop of brick construction which were completed and put in service late in the year. Plans have been made for a new shop building at Rumford but its construction has been deferred for the present.

The freight revenues of the Maine Central in 1921 totaled \$14,275,951, as compared with \$14,331,295 in 1920. In 1921 the total revenue tons of freight carried were 7,027,505 as compared with 8,753,065 in 1920 and the revenue tons one mile were 787,141,374 in 1921 as against 948,186,188 in 1920. Thus there was a decrease of 20 per cent in revenue tons and 17 per cent in tons one mile. The reduction was primarily due to the small amount of traffic in the paper and lumber industries. There was also a considerable decrease in tonnage of products of mines but a considerable improvement is noted in the traffic in the products of agriculture although not sufficient to balance the decrease in other respects. The passenger revenue for 1921 totaled \$4,909,998 as compared with \$5,394,285. There was a decrease in passengers carried and passengers carried one mile of 20 per cent.

The Maine Central has many branch lines and is in a position where it is not able to secure a heavy train load or a heavy traffic density. Its net tons per train, including both revenue and non-revenue, were only 375. Its net tons per loaded car were 22.2 and its net ton-miles per train hour, only 4,206. Its car miles per day were 16.5. According to the December monthly statement to the Interstate Commerce Commission the road had a deficit after rentals of \$466,962 in 1921 as compared with a deficit of \$2,573,706 in 1920. This indicates that there was improvement in 1921 but unfortunately this improvement is not reflected in the corporate net after interest charges, because the 1920 corporate income account as above noted included standard return for two months and guaranty for the guaranty period.

Electric Switching Service on the New Haven

By F. W. Carter

Westinghouse Electric & Manufacturing Company

ELECTRIC SWITCHING LOCOMOTIVES are used in four freight yards on the New York, New Haven & Hartford. When the yards were electrified, every three electric locomotives replaced five steam locomotives which had been used for switching service.

The sixteen 80-ton electric switching locomotives are of the single-phase, 25-cycle, 11,000-volt, alternating-current type, having two articulated trucks. The over-all length of these locomotives is approximately 37½ ft. They have a tractive effort of about 23,200 lb. with a horsepower rating of 752, and a maximum speed of 25 miles per hour. Each locomotive has four motors geared to the axles. The diameter of the drivers is 63 in.

Five of these locomotives are located at the Oak Point yard, two at the Westchester yards, two at the Stamford yards, three at the Harlem river yards, one used for transfer of freight on the New York, Westchester & Boston Railway, and the remaining three held at the shops for inspection or use at whatever point the service demands.

The three main electrically equipped yards on the New Haven are the Oak Point yard, having a length of about 37 miles, with a total of 35.5 miles of electrified track, the Harlem river yard, having a length of about 23 miles; and

the Westchester yard, with about the same trackage as the Harlem river yard.

The number of electric switching locomotives assigned to the Oak Point yard varies at times from five to seven, according to the amount of traffic to be handled. The locomotives in this yard are used in two different classes of service, four of them being assigned to what is known as "float yard" service, to unload eastbound cars from the floats and to load westbound cars on floats, and also to do whatever switching is necessary with the westbound cars. The New Haven has approximately 16 tug boats with from 350 to 1,200 horsepower each for transporting the freight cars between the terminals by floats, the floats having a carrying capacity of from 12 to 22 cars each. The fifth locomotive used in these yards takes the eastbound cars from the float yard to the classification yard and makes up the eastbound trains. In looking over the records one month was selected as a representative month, which showed an average of 43 floats handled daily at the Oak Point yards. With an average tonnage of 900 for the eastbound float loads, and 600 for the westbound, the four locomotives assigned to the float yards handle approximately 16,000 tons each in a 24-hour service. The locomotive working in the classification yards handles about 75 per cent of the eastbound cars received, the other 25 per cent being taken to the Westchester yards by the transfer engines. This makes the average daily tonnage for these locomotives approximately 18,000. In addition to loading and unloading the floats the four locomotives in the float yard do a certain amount of switching of westbound cars and various miscellaneous work in the yards. The figure of 18,000 tons, therefore, seems to be a very fair average tonnage for the locomotives working in this yard.

The following is the monthly mileage made by some of these locomotives in switching service:

Locomotive No. 0202	— 4,356 miles per month
Locomotive No. 0203	— 4,446 miles per month
Locomotive No. 0204	— 4,392 miles per month
Locomotive No. 0208	— 4,320 miles per month
Locomotive No. 0211	— 4,404 miles per month

The locomotives are kept in service 24 hours a day by using three 8-hour crew shifts, and after the completion of 2,500 miles they are sent to the Van Nest shops for a light inspection. A day force working eight hours is employed for locomotive inspection and the work is usually done at the rate of two locomotives per day.

A number of these electric locomotives have made records of 24 hours a day for 30 days without any interruption.

The principal advantages ascribed to electric locomotives in switching service are that they conserve the fuel supply, affect car-mile economies, expedite the operation of trains and reduce the number of locomotives required to do the work.



Passenger Station at Genoa, Italy

A Means of Determining the Average Life of Ties

An Explanation of the Fluctuations in Requirements on New Lines and a Method of Anticipating Them

By V. K. Hendricks

ONE OF THE VEXING problems that is ever with the railroads is the determination of the average life which is being obtained from cross-ties. Because of the many factors which affect the question, this determination is frequently not susceptible to exact solution, and at best the results will often be an approximation. Records are not always available covering tie renewals over a sufficient period; the tie renewals are frequently affected by the financial situation of the railroad at times, thus making an ab-

lines to the establishment of test sections of track, with careful records of each original tie installation and reliable inspection and records of all renewals within each section. This method will probably give more reliable results than the dating of all ties in track, but it will require time to secure results and a very large number of each of the kinds of ties must be included in the test sections in order to determine accurately their average life.

A comprehensive study of the cross tie situation on a

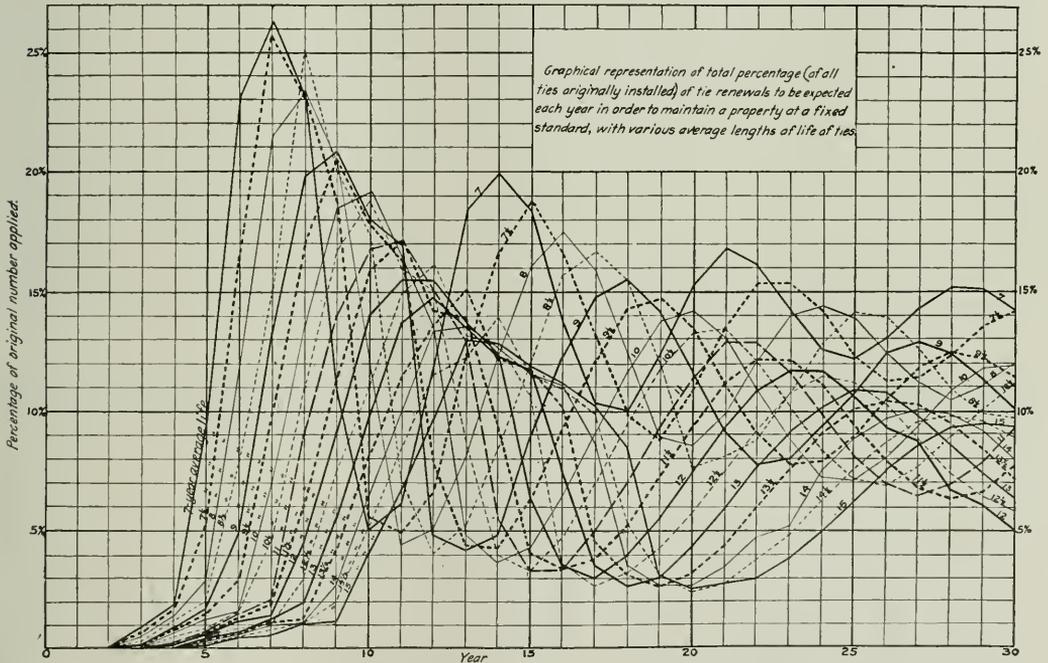


Plate 1. A Chart of Annual Renewals in Per Cents of Ties Originally Installed

normally light renewal in some years which must be made up in others; the mileage does not always remain uniform; a change in the standard of maintenance sometimes occurs, due to a change in supervision or in traffic conditions; and a change is sometimes made in the kind of ties used—all of which complicates the problem. In all such cases the best that can be done is to see that the method used in the determination will give the closest approximation possible to the true average life at the time of the investigation.

Some years ago considerable expenditures were made by many lines for the purchase and application of dating nails so that accurate records of tie life could be procured. This practice, however, was generally abandoned after a few years' trial, partly because of the expense but mainly due to the fact that, for various reasons, the results obtained were not dependable. Recourse was then taken on a number of

railroad necessitates the closest practicable determination of the average life of ties; without this information their relative economy as compared with other kinds of ties cannot be ascertained. Anything which will aid in securing a reliable average or a closer approximation to the true average life, is, therefore, of material value.

Some four years ago Mabel E. Thorne, statistician of the U. S. Forest Products Laboratory, made a study of the "Relation between Average Life of Ties and Percentage of Renewals," and in January, 1918, presented the results in a paper before the American Wood-Preservers' Association. It was based on records, collected over several years by the Forest Products Laboratory, of tie replacements and removals, covering 12,185 untreated and 30,751 treated ties, or a total of 42,936 ties, and is the best information available on that subject. Her results then indicated that the

renewals in proportion to the average life are the same for untreated ties as they are for treated ties, and reliable records on some 43,000 ties should afford a very close determination of the law governing the rate of tie failures.

To make this valuable data readily available for the de-

failures each year during the life of all of the original ties—that is, it does not provide for renewals of any ties. Table II shows the total percentage of all failures in the original ties to date each year. Table III shows the percentage of renewals each year in order to maintain a property at a given stand-

Years Installed	AVERAGE LENGTH OF LIFE IN YEARS															Years Installed				
	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14		14½	15		
1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.	
2.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.	
3.	0.9	0.7	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.	
4.	1.9	1.7	1.5	1.2	0.9	0.7	0.7	0.5	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.	
5.	9.4	5.2	2.9	2.0	1.7	1.5	1.3	0.8	0.7	0.7	0.7	0.6	0.5	0.4	0.2	0.2	0.1	0.1	5.	
6.	25.1	16.5	11.9	7.9	4.9	2.9	1.6	1.5	1.6	1.3	1.2	0.9	0.7	0.6	0.7	0.6	0.6	0.6	6.	
7.	26.3	25.7	21.5	15.1	13.3	10.0	7.0	4.6	2.1	1.9	1.5	1.1	1.2	1.2	1.0	0.8	0.6	0.6	7.	
8.	22.9	22.9	23.3	25.1	19.6	17.1	13.5	11.0	9.0	6.1	4.4	2.9	2.0	1.2	1.1	1.0	1.1	1.1	8.	
9.	10.0	16.3	20.1	19.9	20.6	20.5	18.4	16.7	14.0	11.4	9.1	7.5	5.4	4.2	2.7	2.0	1.2	0.9	9.	
10.	3.0	4.3	11.5	17.1	17.9	17.8	19.1	18.7	16.8	15.9	14.0	11.0	9.8	8.1	6.4	5.1	4.1	3.1	10.	
11.	1.4	2.0	3.0	6.3	12.3	16.0	16.2	15.9	17.1	17.1	15.4	15.0	13.7	11.4	10.2	8.4	6.7	5.7	11.	
12.	0.6	1.2	1.5	2.1	3.7	7.2	12.2	14.8	14.9	14.2	15.4	16.1	14.8	13.5	15.2	11.6	9.7	7.7	12.	
13.	0.3	0.6	1.0	1.3	1.6	2.9	4.0	4.0	12.6	13.7	13.6	13.1	13.5	15.0	15.6	12.3	12.9	15.1	13.	
14.	0.2	0.5	0.7	0.9	1.0	1.4	2.0	3.0	9.0	12.7	12.6	12.6	12.3	12.2	12.7	13.9	12.8	14.1	14.	
15.		0.2	0.4	0.5	0.7	0.9	1.1	1.4	4.0	7.2	5.6	10.2	11.5	11.7	11.6	11.6	11.6	15.1	15.	
16.			0.2	0.3	0.5	0.5	0.8	1.0	1.1	3.2	5.6	7.0	7.0	9.9	10.9	10.8	11.1	16.1	16.	
17.				0.2	0.3	0.3	0.5	0.8	0.9	1.8	2.5	3.0	2.8	4.1	7.2	9.7	10.1	17.1	17.	
18.					0.1	0.2	0.3	0.5	0.7	1.1	1.2	1.5	1.2	1.3	2.2	2.9	4.6	8.1	18.	
19.						0.1	0.2	0.3	0.3	0.5	0.5	0.7	1.0	0.8	1.1	1.7	2.4	2.6	19.	
20.							0.1	0.2	0.3	0.6	0.7	0.7	0.7	0.7	0.7	1.0	1.2	1.7	20.	
21.								0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.8	0.8	1.4	2.1	21.	
22.									0.1	0.2	0.3	0.4	0.5	0.5	0.7	0.7	0.8	22.	22.	
23.										0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.6	23.	23.	
24.											0.1	0.2	0.3	0.4	0.4	0.5	0.5	24.	24.	
25.												0.1	0.2	0.2	0.3	0.3	0.4	25.	25.	
26.													0.1	0.2	0.2	0.3	0.4	26.	26.	
27.														0.1	0.2	0.2	0.3	27.	27.	
28.															0.1	0.1	0.2	28.	28.	
29.																0.1	0.1	0.1	29.	29.
30.																	0.1	0.1	30.	30.

Table I.—Percentage (of All Ties Installed) of Failures to Be Expected Each Year from Ties Having Various Assumed Average Lengths of Life, and No Renewals Being Made

termination of the average life of ties on roads not over 30 years old, Tables I, II, III and IV have been prepared, covering average tie lives of from 7 to 15 years inclusive, and varying by one-half years. Table I shows the percentage of

ard—that is, it includes the renewals of renewed ties. Table IV shows the total percentage of all renewals to date to maintain a property. In all cases all percentages are percentages of the number of ties originally installed.

Years Installed	AVERAGE LENGTH OF LIFE IN YEARS															Years Installed				
	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14		14½	15		
1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.	
2.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.	
3.	0.9	0.7	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.	
4.	1.9	1.7	1.5	1.4	1.0	0.8	0.7	0.5	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.	
5.	9.4	5.2	2.9	2.0	1.7	1.5	1.3	0.8	0.7	0.7	0.7	0.6	0.5	0.4	0.2	0.2	0.1	0.1	5.	
6.	25.1	16.5	11.9	7.9	4.9	2.9	1.6	1.5	1.6	1.3	1.2	0.9	0.7	0.6	0.7	0.6	0.6	0.6	6.	
7.	26.3	25.7	21.5	15.1	13.3	10.0	7.0	4.6	2.1	1.9	1.5	1.1	1.2	1.2	1.0	0.8	0.6	0.6	7.	
8.	22.9	22.9	23.3	25.1	19.6	17.1	13.5	11.0	9.0	6.1	4.4	2.9	2.0	1.2	1.1	1.0	1.1	1.1	8.	
9.	10.0	16.3	20.1	19.9	20.6	20.5	18.4	16.7	14.0	11.4	9.1	7.5	5.4	4.2	2.7	2.0	1.2	0.9	9.	
10.	3.0	4.3	11.5	17.1	17.9	17.8	19.1	18.7	16.8	15.9	14.0	11.0	9.8	8.1	6.4	5.1	4.1	3.1	10.	
11.	1.4	2.0	3.0	6.3	12.3	16.0	16.2	15.9	17.1	17.1	15.4	15.0	13.7	11.4	10.2	8.4	6.7	5.7	11.	
12.	0.6	1.2	1.5	2.1	3.7	7.2	12.2	14.8	14.9	14.2	15.4	16.1	14.8	13.5	15.2	11.6	9.7	7.7	12.	
13.	0.3	0.6	1.0	1.3	1.6	2.9	4.0	4.0	12.6	13.7	13.6	13.1	13.5	15.0	15.6	12.3	12.9	15.1	13.	
14.	0.2	0.5	0.7	0.9	1.0	1.4	2.0	3.0	9.0	12.7	12.6	12.6	12.3	12.2	12.7	13.9	12.8	14.1	14.	
15.		0.2	0.4	0.5	0.7	0.9	1.1	1.4	4.0	7.2	5.6	10.2	11.5	11.7	11.6	11.6	11.6	15.1	15.	
16.			0.2	0.3	0.5	0.5	0.8	1.0	1.1	3.2	5.6	7.0	7.0	9.9	10.9	10.8	11.1	16.1	16.	
17.				0.2	0.3	0.3	0.5	0.8	0.9	1.8	2.5	3.0	2.8	4.1	7.2	9.7	10.1	17.1	17.	
18.					0.1	0.2	0.3	0.5	0.7	1.1	1.2	1.5	1.2	1.3	2.2	2.9	4.6	8.1	18.	
19.						0.1	0.2	0.3	0.3	0.5	0.5	0.7	1.0	0.8	1.1	1.7	2.4	2.6	19.	
20.							0.1	0.2	0.3	0.6	0.7	0.7	0.7	0.7	0.7	1.0	1.2	1.7	20.	
21.								0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.8	0.8	1.4	2.1	21.	
22.									0.1	0.2	0.3	0.4	0.5	0.5	0.7	0.7	0.8	22.	22.	
23.										0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.6	23.	23.	
24.											0.1	0.2	0.3	0.4	0.4	0.5	0.5	24.	24.	
25.												0.1	0.2	0.2	0.3	0.3	0.4	25.	25.	
26.													0.1	0.2	0.2	0.3	0.4	26.	26.	
27.														0.1	0.2	0.2	0.3	27.	27.	
28.															0.1	0.1	0.2	28.	28.	
29.																0.1	0.1	0.1	29.	29.
30.																	0.1	0.1	30.	30.

Table II.—Cumulative Percentage (of All Ties Installed) to Date, of Failures to Be Expected Each Year from Ties Having Various Assumed Average Lengths of Life, and No Renewals Being Made

These tables are based on the actual record of renewals instead of on the theoretical curve, except that 100 per cent instead of 99.9 per cent has been taken as removed at 200 per cent of the average life, and some slight adjustments have been made to avoid self-evident inconsistencies. If

hereafter will not make any radical changes in the tables, this being especially true of Tables II and IV, covering total renewals to date.

Plates 1 and 2 are the graphical representations of Tables III and IV, respectively. A study of Plate 1 (showing the

Years Installed	AVERAGE LIFE IN YEARS															Years Installed					
	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14		14½	15			
1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.
2.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.
3.	0.9	0.7	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.
4.	1.9	1.7	1.5	1.2	0.9	0.7	0.7	0.5	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.
5.	3.4	3.2	2.9	2.0	1.7	1.5	1.3	0.8	0.7	0.7	0.7	0.6	0.5	0.4	0.2	0.2	0.2	0.1	0.1	0.1	5.
6.	23.11	16.50	11.9	7.90	4.90	2.90	1.6	1.5	1.6	1.3	1.2	0.9	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.6	6.
7.	26.33	25.77	21.52	15.10	13.30	10.00	7.0	4.6	2.1	1.9	1.3	1.1	1.2	1.2	1.0	0.8	0.6	0.7	0.7	0.7	7.
8.	23.11	23.00	23.55	25.12	19.81	17.11	13.5	11.00	9.00	6.10	4.30	2.90	2.0	1.2	1.1	1.0	1.1	1.0	1.1	1.0	8.
9.	10.77	18.71	20.31	19.98	20.84	20.55	18.42	16.71	14.00	11.90	9.10	7.50	5.4	4.2	2.7	2.0	1.2	1.2	1.2	1.2	9.
10.	5.00	5.43	11.16	17.38	18.04	17.78	19.13	16.72	16.61	15.41	14.01	11.01	9.60	8.10	6.40	5.10	4.1	4.0	4.1	4.0	10.
11.	6.16	4.91	4.45	7.08	12.95	16.26	16.34	15.97	17.14	17.17	15.42	15.01	13.71	11.40	10.00	8.40	6.7	11.	11.	11.	11.
12.	11.71	6.64	6.06	4.01	4.84	7.86	13.60	15.01	14.27	15.44	16.13	14.82	13.51	13.21	13.21	11.61	9.7	12.	12.	12.	12.
13.	18.04	12.37	8.20	5.24	4.19	4.32	4.83	6.68	12.68	13.71	13.17	13.53	15.02	13.62	12.31	12.9	13.	13.	13.	13.	13.
14.	19.92	16.37	12.40	8.29	4.77	4.29	3.67	4.90	5.57	9.42	12.46	12.78	12.40	12.26	12.74	13.93	12.82	14.	14.	14.	14.
15.	18.72	14.75	10.55	12.10	6.66	6.28	4.30	3.37	3.76	4.04	6.56	10.55	11.72	11.64	11.69	11.66	11.84	15.	15.	15.	15.
16.	13.71	16.68	17.49	15.70	12.24	9.15	6.42	4.71	3.77	5.35	3.67	7.44	10.20	11.10	10.94	11.19	12.	16.	16.	16.	16.
17.	10.32	13.10	16.78	16.70	14.78	12.05	9.05	7.00	4.96	3.61	2.98	3.95	2.67	3.59	4.64	7.58	9.97	10.26	17.	17.	17.
18.	10.02	9.85	12.52	14.40	15.52	14.30	11.70	9.49	7.11	5.28	3.95	2.67	3.59	4.64	7.58	9.97	10.26	17.	17.	17.	17.
19.	12.59	8.61	8.89	15.04	14.15	14.78	13.77	11.77	9.41	5.65	5.52	4.28	3.77	3.15	3.55	5.26	6.43	18.	18.	18.	18.
20.	15.28	10.69	8.60	7.62	11.58	13.41	14.20	15.25	11.56	9.39	7.37	5.78	4.35	3.24	2.74	3.16	3.14	19.	19.	19.	19.
21.	16.79	13.48	9.92	8.10	9.12	11.07	12.99	13.38	12.79	11.16	9.24	7.49	5.96	4.46	3.55	3.77	2.78	21.	21.	21.	21.
22.	16.17	15.35	12.14	6.81	7.60	9.08	10.87	12.12	12.82	12.18	10.83	9.21	7.65	5.98	4.62	3.72	2.93	22.	22.	22.	22.
23.	14.27	15.35	13.98	10.79	8.03	7.76	3.61	10.12	11.64	12.12	11.73	10.71	9.13	7.54	5.16	4.81	3.80	23.	23.	23.	23.
24.	12.56	14.14	14.52	12.85	9.39	7.65	7.22	6.34	9.88	11.06	11.68	11.41	10.18	9.11	7.57	6.24	4.98	24.	24.	24.	24.
25.	12.12	12.32	13.88	14.12	10.67	6.99	7.06	7.15	8.13	9.41	10.55	11.19	10.87	10.10	8.79	7.53	6.25	25.	25.	25.	25.
26.	12.98	11.22	12.37	13.95	12.49	10.53	8.03	6.91	6.93	7.69	9.23	10.23	10.72	10.49	9.70	8.67	7.57	26.	26.	26.	26.
27.	14.35	11.33	11.19	12.64	12.69	11.82	9.36	7.63	6.47	6.75	7.78	8.62	9.82	10.32	10.09	9.47	8.54	27.	27.	27.	27.
28.	15.20	12.38	10.51	10.98	12.41	12.42	10.85	8.89	6.91	6.37	6.70	7.35	8.56	9.51	9.93	9.60	9.26	28.	28.	28.	28.
29.	15.10	13.57	10.99	9.95	11.30	12.22	11.73	10.17	7.64	6.68	6.10	6.42	7.37	8.38	9.10	9.61	9.48	29.	29.	29.	29.
30.	14.30	14.16	12.02	9.78	10.17	11.40	11.92	11.05	9.26	7.67	5.01	5.85	6.37	7.13	8.00	8.83	9.30	30.	30.	30.	30.

Table III.—Total Percentage (of All Ties Originally Installed) of Tie Renewals to Be Expected Each Year in Order to Maintain a Property (Including Renewal of Renewed Ties) with Various Assumed Average Lengths of Life of Ties

these tables were platted, therefore, the curves would not be perfectly true curves, but their irregularities would be of slight moment. It is probable that additional data secured

percentage of tie renewals each year) indicates that the irregularities or inconsistencies in the basic data will gradually become "ironed out" as the age of the road increases, so that

Years Installed	AVERAGE LIFE IN YEARS															Years Installed					
	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14		14½	15			
1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.
2.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.
3.	0.9	0.7	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.
4.	2.8	2.4	2.0	1.4	1.0	0.8	0.7	0.6	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.
5.	12.2	7.6	4.9	3.4	2.7	2.3	2.0	1.3	1.0	0.9	0.8	0.7	0.5	0.4	0.2	0.2	0.2	0.2	0.2	0.2	5.
6.	35.5	34.1	16.8	11.3	7.6	5.9	2.8	2.8	2.6	2.2	2.0	1.6	1.6	1.0	0.9	0.8	0.7	0.6	0.7	0.6	6.
7.	61.6	49.8	36.3	26.4	20.9	15.2	10.6	7.4	4.7	4.1	3.3	2.7	2.4	2.2	1.9	1.6	1.3	1.3	1.3	1.3	7.
8.	84.7	72.8	61.7	51.5	40.7	32.3	24.1	16.4	13.7	10.2	7.7	5.6	4.4	3.4	3.0	2.6	2.4	2.4	2.4	2.4	8.
9.	95.5	91.5	82.0	71.5	61.5	52.8	42.5	35.1	27.7	21.6	16.8	13.1	9.8	7.6	5.7	4.6	3.6	3.6	3.6	3.6	9.
10.	109.5	97.0	94.1	83.9	79.6	70.6	61.6	53.8	44.5	37.5	30.8	24.1	19.6	15.7	12.1	9.7	7.7	7.7	7.7	7.7	10.
11.	136.7	101.9	91.5	80.9	72.5	66.9	59.6	52.6	45.2	39.1	33.3	27.1	21.1	16.1	12.4	11.1	10.4	11.1	11.1	11.1	11.
12.	118.4	108.6	103.6	100.0	97.4	94.7	91.9	84.8	76.7	69.9	61.7	55.2	49.1	40.6	35.3	29.7	24.1	15.	12.	12.	12.
13.	136.4	120.9	111.8	105.2	101.6	99.1	96.4	93.5	89.5	82.8	75.4	68.4	61.7	55.6	48.9	42.0	37.0	13.	13.	13.	13.
14.	156.3	137.6	124.3	113.5	106.3	103.3	100.1	97.5	95.1	92.2	87.9	81.2	74.1	67.9	61.7	56.9	49.8	14.	14.	14.	14.
15.	174.7	156.4	140.3	125.6	115.2	109.6	104.4	100.9	98.4	96.2	94.2	91.8	85.8	79.7	75.4	67.6	61.7	15.	15.	15.	15.
16.	168.4	173.1	157.8	141.3	127.4	118.1	110.8	105.6	101.8	99.6	97.7	95.4	92.2	89.9	84.5	78.5	72.3	16.	16.	16.	16.
17.	198.7	166.2	172.6	159.0	145.2	130.9	119.9	112.6	106.6	103.4	100.7	98.1	95.8	94.6	92.0	86.8	85.1	17.	17.	17.	17.
18.	208.7	196.0	186.0	176.4	167.7	145.2	131.6	122.1	113.9	108.7	104.7	101.3	99.5	97.7	95.6	93.8	91.6	18.	18.	18.	18.
19.	221.1	204.8	194.9	185.4	171.9	159.9	145.3	133.8	123.3	116.0	110.2	105.6	102.5	100.4	96.4	96.9	94.7	19.	19.	19.	19.
20.	236.4	215.7	208.5	191.1	163.5	173.3	159.5	147.1	134.6	125.4	117.5	111.3	106.6	101.1	99.4	97.3	20.	20.	20.	20.	20.
21.	252.2	239.2	212.4	201.2	192.6	184.4	172.5	160.5	147.4	136.6	126.8	118.6	112.8	108.1	104.6	102.1	100.0	21.	21.	21.	21.
22.	259.3	244.6	225.5	215.0	200.4	193.4	185.4	172.6	160.2	148.8	137.6	128.0	120.5	114.1	109.5	106.5	103.0	22.	22.	22.	22.
23.	282.6	259.9	235.5	220.8	208.4	201.2	192.2	182.7	171.9	160.9	149.3	139.7	129.6	121.6	114.6	110.7	106.8	23.	23.	23.	23.
24.	296.2	274.0	254.0	233.6	217.8	204.0	194.4	191.0	181.8	171.9	161.0	150.1	139.8	130.7	122.2	116.9	111.8	24.	24.	24.	24.
25.	308.3	286.4	267.9	247.7	228.5	218.0	206.5	196.2	189.9	181.3	171.7	161.3	150.7	140.8	131.0	124.4	118.0	25.	25.	25.	25.
26.	321.3	297.6	280.3	261.7	241.0	228.6	214.5	205.1	196.8	189.2	180.9	171.6	161.4	151.3	140.7	135.1	128.6	26.	26.	26.	26.
27.	335.6	308.9	291.5	274.3	255.9	240.4	225.9	212.7	203.5	196.0	187.7	180.4	171.2	161.6	150.8	145.6	138.1	27.	27.	27.	27.
28.	350.8	321.3	302.0	285.3	266.3	252.8	234.7	221.6	210.2	202.0	194.5	186.6	179.2	171.1	161.7</						

the renewal curves become more regular, while it will be seen from Plate 2 that the slight irregularities in the curves showing the total renewals to date are practically insignificant from the start. Even in Plate 1 there should be little difficulty in determining which curve most nearly fits renewals which have actually been made on a railroad. When sufficient additional basic data have been secured the results can be tabulated and platted into consistently smooth curves which will show the true average rates of failures, to the same extent as has been the case in preparing mortality tables for insurance purposes.

If complete records of tie renewals on a railroad are available from the time of original construction, the total to date renewals each year in terms of the percentage of all ties in track (assuming the entire original installation to have been made in one year) can be plotted and the average life of the ties can be closely approximated at once by finding which curve on Plate 2 most nearly corresponds with the result. Even the determination of only one point on the curve (the percentage to date for the last year for which records are available) might give reliable results, but it would be best to plot the complete curve to make sure that there has been no change in the average life of the ties during the life of the railroad. If the renewals for the first few years are not available, the renewals for each year available can be plotted in terms of the percentage of all ties installed, and by comparison with Plate 1 (bearing in mind the relation between the time of original installation and the time covered by the available records) the average life obtained can be closely approximated. While there are two checks on this method, provided there has been no change in the average life (one being the actual percentages and the other the direction or course of the curve at that stage of the life of the road) the method of using Plate 2 will be more reliable, and should be used wherever practicable.

It should always be borne in mind, in order that comparisons of the kind mentioned above may be dependable in their results, that the investigation should cover a large number of ties; if only a small number of ties is involved the irregularities in the lines of individual ties may cause incorrect conclusions or obscure results. Also a change in the kind of ties used, or a change in the standard of maintenance will have its effect on renewals. Without realizing the natural cause which makes necessary a material variation in the annual renewals during each cycle of the average life of ties, there is a natural tendency on the part of a railroad management towards uniform annual renewals before the road is old enough to have reached that stage itself; furthermore the financial situation of the road may cause unusual retrenchments at times. These causes will affect the renewal curves, so that they will not fit the theoretical curves as closely as desirable. All these objections, however, pertain to any method whatever of determining the average life, and due allowance must be made for them in the best manner possible. The situation can be better studied and understood by graphical representation than otherwise.

There will be many cases where this method of determination can be used to advantage on small roads or on the different portions of a large system, or it can be applied to a system as a whole by combining the results obtained by working up separately the renewals of ties for each year's original installation. Tables III and IV and Plates 1 and 2 should also be extended through a greater number of years, and it might be possible to develop a practicable means of recognizing in renewal curves a change in average life due to a change in standard of maintenance or change in kind of ties. Any change in average life would be noticeable in the plotting and it a ready means of recognizing the full meaning of the change could be developed it would be of value.

It is not claimed that this method will wholly solve the question of average life, for there will be cases where lack

of records, changes in the cross tie situation, and other difficulties will make a very close approximation impossible. However, the basic data are such that the tables and plates presented in this discussion closely represent the true average conditions, and much closer approximations to the actual average life can be made in this way, where this method can be applied, than in any other manner.

A method which has been used to some extent heretofore is to consider that the number of years after the construction of a line, until the total to date of renewals is the same as the total number of ties originally installed, represents the average life of the ties. By reference to Table IV it will be found

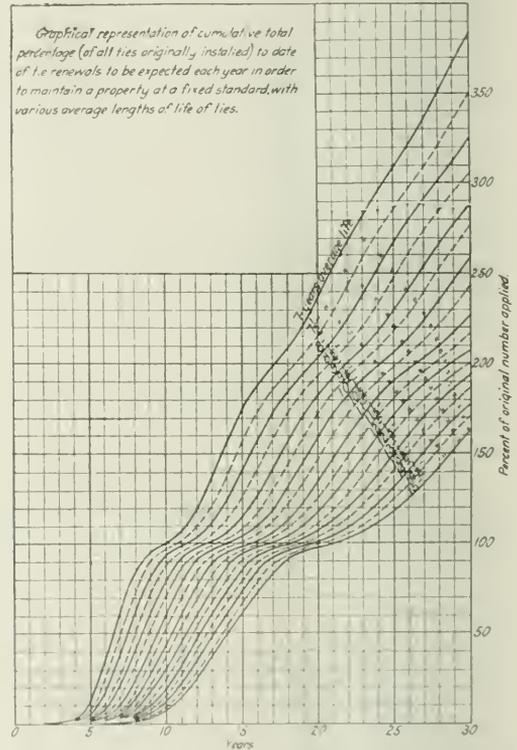


Plate 2. A Chart of Cumulative Renewals in Per Cent of Ties Originally Installed

that this is incorrect according to the best information now available, as a total of 100 per cent renewals is not obtained for from three (for 7-year ties) to six years (for 15-year ties) after the road has been constructed for that length of time. At the age of the average life of the ties, only slightly more than 60 per cent of the ties have been removed.

The use of the data submitted by Miss Thorne for the purpose covered by this discussion involves a large amount of calculation. Tables I to IV place her data in convenient form for ready use for that purpose, as well as for other purposes. By the use of these data it will no doubt be found that the average life of ties can be determined with reasonable accuracy in many cases where it has seemed impracticable to obtain any reliable result by other methods.

The preceding discussion has dealt mainly with roads, or portions of roads, which are comparatively young. If a road is, say, 50 years old, it would hardly be of much value to

plat the renewals to date from the time of construction, for such a road would surely have had many changes in its mileage during its life, as well as changes in its kinds of ties, standards of maintenance, etc. In such cases the usual method of averaging renewals over a considerable period of years is necessary, but if the renewals have been made just as physically needed, the plating of the renewals will give a wavy line, with the length of the waves just equal to the average life of the ties. This wave length will afford a check on the result obtained by averaging the renewals. If the waves vary much above and below the average line, the number of years averaged should be some multiple of the average life determined by measuring the wave length, so that the average may not include too many of the years either above or below the line.

It is probable that the plating of the renewals may not, in many cases, show any reasonably pronounced wave lengths in practicable application, but bearing this feature in mind may, in some cases, be an aid in indicating the probable reliability of the conclusions. The failure to show waves, assuming a constant mileage, would indicate either that the

age of the road is such that renewal requirements have become practically uniform (which, under normal conditions, would be at an age of some 40 years for 7-year ties, some 65 years for 9-year ties, etc.—see articles by S. S. Roberts and Lowry Smith in the *Railway Maintenance Engineer* for June, 1920) or some change in the average life, or that, from some cause or other, tie replacements have been forced towards uniform renewals without full regard to the actual physical requirements.

It is to be hoped that the railroads will secure additional data as may be practicable, covering the relation between average life and percentage of renewals, and see that all are collected at some one source, so that information on that subject may in time reach the same degree of reliability as do mortality tables. The renewal of ties constitutes a very large item in maintenance expenses, and would justify a more thorough scientific investigation than has frequently been customary heretofore. In many cases such a consideration of the subject might far more than pay for itself by affording the most intelligent method possible for regulating tie renewals from year to year.

Four Objections to Installing Automatic Stops

Abstract of Memorandum Presented at Washington, March 20, by

A. R. A. Committee, C. E. Denney, Chairman

THE COMMITTEE appointed by the railroads affected by the Interstate Commerce Commission's order of January 10, 1922, calling for the installation of automatic train control devices, presented a memorandum at the hearing before the Commission in Washington on Monday last, rehearsing the objections to the issuance of a positive order by the Commission at the present time and classifying them under four heads, as set forth below; and also presented other statements, prepared by Messrs. Burt and Peabody, containing the results of investigations made by the committee. This committee consists of C. E. Denney, B. R. Pollock, A. M. Burt, W. P. Wiltsee, E. B. Katte, R. W. Bell, C. F. Giles, W. J. Eck and C. H. Morrison.

This abstract is in the nature of a supplement to our report of the Washington hearing, which is printed elsewhere, and some details of the memorandum which have already been covered in the larger report are omitted here.

1. No automatic train stop or train control device has been sufficiently developed to justify the issuance of the proposed order. That the state of the art as it existed up to the beginning of the year 1920 did not warrant any extended use of the devices in question is, we submit, not open to debate. The Committee of the United States Railroad Administration (1919) summarized the situation thus:

"Generally speaking, it may be said that the tests which have thus far been conducted have demonstrated that the functions of automatic train control devices are possible of accomplishment under actual service conditions. But while these functions may be accomplished at comparatively isolated locations with the high degree of maintenance ordinarily given to test installations of this character, it is an entirely different problem, and a far more complex one, to apply these devices to the various operating conditions encountered in railroad service * * * on several hundred miles of a busy railroad. * * * Automatic train control devices are still in the development stage, and many problems in connection with their practical application remain to be solved."

These views are consonant with those of the Block Signal and Train Control Board (June 29, 1912), also with the reports of the Commission's Bureau of Safety. While progress has been made during the past two years, it is still true that *many problems in connection with practical operation remain to be solved.*

The only systems which have been in service under actual operating conditions and dependable and continuous observation for any considerable length of time, are those of the Regan, the

Miller and the American, now in service to a limited extent on the Rock Island, the C. & E. I., and the C. & O. These three are the only installations of which specific mention is made in the Commission's report of January 10, 1922, which, we submit, warrants the inference that the Commission had them in mind when it said that "14 years of investigation have demonstrated the practicability of and the necessity for automatic train control." In any event, the failure of the Commission, in its report, to direct attention to any other particular installation, must lead to the conclusion that in the judgment of the Commission no other system of train stop or train control has been sufficiently tried out to warrant even the suggestion that it be generally adopted.

The three installations above referred to have been the subject of special investigations conducted by a subcommittee of the Joint Committee on Automatic Train Control of the American Railway Association. The report of such committee shows, among other things, with respect to each of the devices in question:

(a) Numerous objectionable mechanical and engineering features remaining to be corrected;

(b) Many operating difficulties which have not yet been satisfactorily taken care of;

(c) A relatively large number of failures.

In short, this report conclusively establishes not only that the devices in question have not yet been brought up to the point where it can be said that they show a "high degree of efficiency" under general service conditions, but also that they, like all other kindred devices, are still in the experimental or development stage and that many problems remain to be solved before they can be considered as practicable and reliable for the purposes of the Commission's proposed order.

We are dealing with a very different proposition from that of the automatic coupler, the air brake or the block signal.

The Commission's observation to the effect that the automatic coupler, the air brake and the automatic block signal were not perfected to as high a degree as the automatic train control before they were either ordered installed or were voluntarily adopted, appears to be at variance with the facts.

The records of the Master Car Builders' Association show that the automatic freight car coupler was a subject of discussion and experimentation from 1870 to 1887, a period of 17 years, before it was adopted by the association as recommended practice. It was six years later than this before its use was required by law. Prior to its requirement by law it was a well recognized safety device.

The air brake was a subject of discussion and experimentation from 1870 to 1888, a period of 18 years, before it was adopted as recommended practice, and it was 23 years before it was required

by law; then it was a safety device recognized by all of the more progressive railroads of the country.

Automatic block signals had reached a much higher degree of development than train control devices have at present before any such extensive installations were made as is contemplated in the proposed order, and the installation of automatic block systems was a much smaller matter than the installation of automatic train control devices. With an automatic train control system no engines can be operated under it except those equipped with a device that will function in conjunction with the system installed upon the roadway. The adoption of the automatic coupler and air brake did not affect the capacity of a railroad; their practicality had been demonstrated beyond a reasonable doubt before their use was required by law.

2. The order would be premature if issued at this time because the carriers have not had opportunity to make adequate service tests of devices designed to function on different principles from the devices specifically mentioned in the Commission's report. Each of the three systems specifically mentioned in the Commission's report is so designed as to require the use of a ramp located alongside or between the rails.

Efforts are now being made to develop automatic train control devices designed to function on the induction principle, and it is the opinion of the engineering and operating officers of numerous carriers that such type gives promise of overcoming many of the objectionable features inherent in the ramp type. Train control systems designed to operate on the induction principle have lately been installed or are contemplated in the immediate future, viz.: the Sprague, the Postwick and the Union Switch & Signal devices. These appear to possess merit and the result of the tests may warrant their extension. No order, therefore, should be issued until such time as the carriers have had ample opportunity to ascertain whether or not some one or more of such systems is practicable and reliable for the purposes of the Commission's order.

3. The carriers are making every reasonable effort to co-operate with the Commission in testing all meritorious devices and will continue such efforts as the Commission may direct.

In view of the activities of this committee since its appointment in November, 1920, as disclosed by this report, it would appear that the issuance of the proposed order, which cannot now be applied with, will tend to retard rather than promote the development of a proper system. The committee as well as the individual carriers will continue to render all reasonable assistance in the proper testing and development of these devices.

The proposed order requires a much greater number of and more expensive installations than are warranted at the present time. The carriers named in the order of January 10 except Pennsylvania, the Pittsburgh, Cincinnati, Chicago & St. Louis and the West Jersey & Seashore companies, to a questionnaire submitted by this committee, indicate that compliance with the proposed order by the carriers answering the questionnaire (43 in number) will require the installation of the devices in question on approximately 6,126 miles of railroad, 10,285 miles of track and 3,225 locomotives, the cost of which will aggregate many millions.

It is manifest that such systems as recommended themselves to the Commission have been just as thoroughly tried out by continued operation between the Commission and the American Railway Association along the lines heretofore followed, as can be done by the extensive installation contemplated by the proposed order, which would require the expenditure of vast sums of money unreasonably.



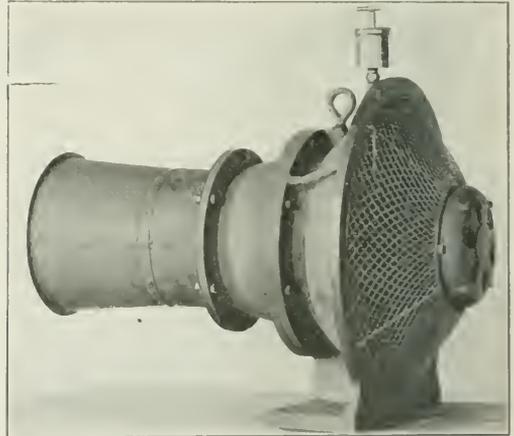
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Russians Crowding Trains to American Relief Food Stations

Increased Efficiency in Propeller Blower

AN INTERESTING TYPE of propeller blower manufactured by the Coppus Engineering & Equipment Co., Worcester, Mass., is a screw blade unit which delivers air at higher pressures than usual and with good efficiency. The blowers are of the class which delivers the air parallel to the axis and operates against pressures up to 8 in. of water at efficiencies up to 80 per cent. Another factor of interest is that the power consumption at constant speed is practically unaffected by variations in air delivery or pressure. The blowers are high-speed machines requiring comparatively small driving units.

The principal feature of the blower is a stationary guide vane located beyond the propeller in the direction of the flow. The air current leaving the propeller is radially subdivided by the individual guide vane blades which have a curvature, increasing in the direction of the propeller. These guide vane blades concentrate the air current and give it a further acceleration inside of the stationary guide vane so that a



The New Coppus Propeller Blower

considerable part of the pressure is produced in the latter. A large part of the end thrust is thus taken up by the stationary guide vane casing. The air streams, into which the flow of air has been subdivided, leave the guide vane casing, on account of the kinetic energy, slightly rotating and converging toward the axis so that the smallest section of the air flow is reached beyond the guide vane casing.

The blowers are of such a design that they can be installed readily in pipe lines, working at the same efficiency when installed at the inlet or outlet of the line as a blower or an exhaustor, respectively.

OVERLOADED AUTOMOBILES are very common on the highways, according to reports from the inspectors of the Department of Agriculture. On the road from Hartford, Conn., to Springfield, Mass., and on the Boston Post road in Connecticut every third truck was found to be loaded beyond the capacity of the truck and the tires, according to a record covering two weeks of investigation on each roadway. Overloading was most common on trucks of 3 to 5 tons capacity. It was found that 89 per cent of the trucks on regular trucking lines had a total weight of truck and load in excess of 12½ tons, the maximum weight allowed by State law.

Burlington Offices at Chicago Suffer Fire Damage

Contents of Seven Floors Destroyed But Structural Steel Frame
Escapes Serious Injury

AS NOTED BRIEFLY in the *Daily Railway Age* of March 16, the 15-story office building of the Chicago, Burlington & Quincy at Clinton street and Jackson boulevard, Chicago, was visited by a disastrous fire early on the morning of March 15. The contents of the upper seven floors of the building were entirely destroyed and considerable damage was done on the lower floors by water. Owing to the fact that this is a modern fireproof building, completed in 1912, the cause of the fire, the extent of the damage and

keep the fire out, but the heat was so intense on the upper floors that the men were compelled to retreat and from the ninth to the fifteenth floors, inclusive, the fire practically destroyed the combustible contents. This included all papers and records except such as were stored in fireproof vaults. Below the ninth floor the loss was limited entirely to water damage.

A preliminary investigation of the building would indicate that the steel frame is entirely uninjured. The fireproofing on the interior consists of hollow tile including flat tile arches for the floors. Barring the flaking off of practically all of the plaster and some minor spalling the tile appears to be in excellent condition. The exterior of the building on the street fronts is faced with a cream colored glazed terra cotta and on the Clinton street side, which faced the great fire and flying embers, the terra cotta has spalled to a considerable extent, especially around the window openings, but this spalling has not served to uncover the steel work at any point. The window construction in the Burlington building comprises wire glass in hollow metal frames in the court and alley frontage, but with plate glass and wood frames on the



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The Burlington Office Building After the Fire

the effects, if any, on the building frame, are of interest to engineers and architects. The following facts are based on a preliminary inspection in advance of a detailed study and report by officers of the railroad and the Chicago building department.

The fire was of outside origin. It started in one of a group of buildings occupying the block immediately east of the Burlington offices. These were a miscellaneous block of old buildings of varied types of construction, although all of them proved to be of a highly combustible nature. One of them was an eight-story building covering a considerable ground area. The initial blaze spread rapidly to the entire block and, owing to the height of some of these buildings, produced a fire of unusual intensity. The wind was blowing toward the west and southwest and soon caused fires in a number of buildings in adjacent blocks and for a time there was great danger of a general conflagration.

The Burlington building was almost directly in the path of the great flame blast from this seething furnace of burning buildings, being separated from them only by the width of Clinton street, 80 ft. The building is equipped with stand-pipes having four hose outlets on each floor and supplied with water by independent fire pumps in the basement of the building which draw water from the city supply. As soon as it was seen that the railroad office building was in danger, First Assistant Fire Marshal E. J. Buckley sent his men into the building and did everything possible to



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The Lower Floors Were Not Damaged by Fire But Were
Bombarded by Flying Missiles from the Fire
Across the Street

street frontage except opposite fire escapes, this being strictly in accordance with the building ordinance requirements of the city. The fire passed over the building from the east to the west and destroyed a large part of the windows. A few of the wire glass windows on the rear of the building are intact but in many cases the window construction is entirely gone.

Fortunately for the records, nearly all of the accounting

offices were located below the ninth floor. These included the offices of the auditors of expenditure and of freight and ticket accounts, the car accountant and the freight claim and employment departments. The portion of the building swept by the fire housed the executive offices; the operating, traffic, purchasing, transportation, engineering, real estate and land, industrial, and valuation departments; and the offices and record files of the Central Western region, United States Railroad Administration. In these offices the loss included practically all current correspondence files of the various departments, the records of the United States Railroad Administration, the valuation files and records, the drawings of the building department, and the tariff files. Although the vaults on the seven upper floors had not all been opened at the time of writing, there is every reason to believe that all of their contents were saved. These include such records as the bridge engineer's drawings, track standards, maps, and real estate records.

The value of enclosed elevator shafts and stairways is emphatically demonstrated in the building. These were not injured in any way other than the warping of some of the elevator doors and the melting of some of the wire glass.



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View of the Upper Seven Floors from the Couri

The evidence is conclusive that the fire was not communicated from floor to floor in this building. In other words, there was an independent fire on each of the seven floors, communicated from the outside. The most positive evidence of this fact is to be found in the attic above the fifteenth floor. This attic space has no window exposure other than skylights and suffered in no way from the fire. Elevator machinery, blue print apparatus and storage files in this attic are entirely uninjured and the elevators were restored to operation very shortly after the fire.

ACCORDING to the Canadian Engineer, Toronto, water power developed and utilized in Canada in 1920 averaged 280 hp. per 1,000 of population whereas in the United States only 93 hp. had been developed per 1,000 inhabitants.

THE SOUTHERN PACIFIC, to cope with the flagrant carelessness of motorists who run into crossing gates, or into the sides of trains, has adopted the policy of seeking damages from the owners of such machines. During 1921, on the Pacific System, 186 automobiles were driven into the sides of trains; 85 crossing gates were broken down, often resulting in injuries to crossing flagmen; and 46 cars skidded into the sides of trains.

Increased Divisions Ordered for Missouri & North Arkansas

WASHINGTON, D. C.

AS A FURTHER STEP to enable the Missouri & North Arkansas to resume and continue operation, the Interstate Commerce Commission has issued an order providing that, effective as of March 1, the divisions of joint interstate rates received by its connecting lines on freight traffic interchanged with the Missouri & North Arkansas shall be reduced by from 10 to 25 per cent of the divisions in effect on January 1, the difference to accrue to the M. & N. A. in addition to the divisions it has received. Divisions on traffic as to which the M. & N. A. is an intermediate carrier are not, however, to be affected.

Although certain of its connecting lines had suggested that the southern portion of the line be abandoned, the commission holds that the road is a public necessity in its entirety and that its operation should be resumed and continued. To this end the commission on January 16 had approved an increase in its freight rates, estimated to amount to approximately \$208,000 a year, and the Railroad Labor Board had authorized a 25 per cent reduction in the wages of its employees, estimated at \$310,000, on condition that the owners of the property should receive no return on their investment until wages are returned to the standard scale. The road runs from Joplin, Mo., to Helena, Ark., 359 miles, and has branches making its total mileage 364.5 miles. Its investment in road and equipment is stated as \$18,160,186. The company was organized in 1906 and has never been profitable. It was placed in a receivership in 1912 and suspended operation last July. In the complaint filed against its connecting roads, the Atchison, Topeka & Santa Fe; Chicago, Rock Island & Pacific; Kansas City Southern; Missouri, Kansas & Texas; Missouri Pacific; St. Louis-San Francisco, and Yazoo & Mississippi Valley, it asked for an increase in its divisions of 25 per cent, stating that an increase in rates alone would not alter its situation. The road admitted that, judged by mileage alone, it has received its full measure of divisions, but it contended that under the standards prescribed by the present law its divisions are unreasonable and unjust because insufficient to pay operating expenses, taxes and a fair return on its investment.

As the result of a conference with the commission a committee of traffic managers of connecting lines was appointed to study the traffic situation. This committee considered three plans, the first of which contemplated a diversion of tonnage to the road, the second an increase of the divisions, and the third an increase in rates. The first plan was discarded because of the lack of sufficient tonnage unrouted by shippers which could be diverted. An increase in divisions was not recommended but the committee recommended an increase in rates, estimated to amount to \$208,673, the entire amount to accrue to the M. & N. A., and a reduction in wages. On petition of the receivers the Labor Board agreed to a reduction on the condition named and the commission approved a rate increase substantially as recommended but on complaint it also took up consideration of the divisions.

The report, after a discussion of the intent of the new provisions relating to divisions inserted in the law by the transportation act, says that the general increase in rates authorized in Ex Parte 74 was intended to permit a return of six per cent within the rate districts, under normal traffic conditions, but that it appears that the M. & N. A. could not, if operated, derive a share of the revenues thus provided fairly proportioned to the amount and character of its service.

In its conclusion the commission says in its report that it has taken into consideration the relation between the earnings realized by the carriers involved and the earnings contemplated by section 15-a; also the value of the property of each carrier.

"Notwithstanding the fact," the commission says, "that the record raises a strong presumption that most of the respondent's connecting lines are not now earning a return as great as is contemplated by section 15-a, we believe we are not precluded from making such adjustment of divisions as we find just and reasonable. It is necessary that all essential transportation facilities of the country be kept in operation. It is clear that in order to resume and continue operation, the Missouri & North Arkansas must have additional revenues, and irrespective of its nature, it is entitled to divisions which are just, reasonable and equitable under the standards prescribed in paragraph 6 of Section 15 of the interstate commerce act. We are convinced that, having fair regard for the necessities of all the carriers and considering all proper circumstances of the traffic, the divisions of interstate rates now accorded the Missouri & North Arkansas by its connections are unjust, unreasonable and inequitable. . . ." Commissioner Daniels dissented.

In order that it may keep in touch with the situation and if necessary make further adjustments, the commission's order requires that the Missouri & North Arkansas and its connecting lines shall jointly report to the commission on or before May 15 the divisions established under the order, together with the number of tons and ton-miles of freight for the year ending December 31, 1917, and the revenues, to include all increases of rates effective since 1917, of each carrier as to traffic moving under interstate joint rates between each of the stations or groups of stations for which divisions are determined. They are also to report jointly thereafter the tons, ton-mile and revenues with respect to such traffic actually interchanged for the period from January 1 to June 30, 1922, and from July 1 to December 31, 1922.

In addition to this W. A. Colston, director of the Bureau of Finance of the commission, has written a letter to R. E.

Cave and Festus J. Wade, president of the Mercantile Trust Company of St. Louis, by authority of Division 4 of the commission, stating that the commission will approve a loan of \$3,500,000 recently applied for, to the Missouri & North Arkansas or its approved successor, of which \$3,000,000 would be for the purpose of meeting maturing indebtedness reduced to a judgment in receivership proceedings and foreclosure suits in the United States district court for the eastern district of Arkansas, and \$500,000 for additions and betterments, on certain conditions. The conditions are that there shall be such sale or other disposition of the property as will release it entirely from all existing claims and obligations so that the government loan may be secured by an absolute first lien on the property, and before the loan is made such proceedings shall be taken as may be necessary to cancel all stocks, bonds and other securities of the Missouri & North Arkansas or of others in any way resting on the property and the new property shall be covered by two issues of securities only: \$5,000,000 of first mortgage bonds to be given as security for the government loan and \$3,000,000 of stock to be turned over to such representative or committee as may be organized or authorized to receive same for those who will pay or secure the payment of \$500,000 of additional working capital. It is to be understood that this working capital is in addition to any current assets which may be obtained in the purchase of the railway property, rights and franchises. Also conveyance will be made to the reorganized company or to the new company to be formed of all current assets and equipment, materials and supplies in addition to roadway and appurtenances. The committees, owners, or representatives of the property shall secure the undertaking of the Mercantile Trust Company of St. Louis to supervise the distribution of the proceeds of the loan and shall provide \$60,000 to be used in connection with payments to secure competent supervision and operation.

Railroads' Arguments Against Automatic Stops

Carriers Claim Devices Are in Development Stage and That Proposed I. C. C. Order is Too Drastic

CLAIMING that no automatic train stop or train control device has been sufficiently developed to warrant installation on such an extensive scale as is outlined in the proposed order of the Interstate Commerce Commission and that the American Railway Association is diligently working for the development of a practical device which will meet the Commission's order and serve the purpose of the railroads, Alfred P. Thom, counsel for the Association of Railway Executives, speaking at the hearing in Washington on March 20, urged that the Commission refrain from issuing such an order. A committee of the American Railway Association, representing 40 of the 49 railroads included in the proposed order, presented supporting evidence. This evidence was presented by R. H. Aishton, president of the American Railway Association; C. E. Denney, vice-president and general manager of the New York, Chicago & St. Louis, and chairman of the railroads' committee; A. M. Burt, assistant to the vice-president of the Northern Pacific, and J. A. Peabody, signal engineer of the Chicago & North-Western. The hearing was held before Commissioners McChord, Esch and Lewis. After the carriers' committee had finished presenting its data the individual roads submitted additional statements as to why the order should not be entered against them, or should be modified.

Mr. Aishton outlined the formation of the joint committee and the co-operation of the American Railway Association

with representatives of the Bureau of Safety of the Interstate Commerce Commission and said that in connection with the work the association in the last 15 months has spent \$20,000. Mr. Aishton said that the carriers' committee does not represent the Chicago & Eastern Illinois, the Chicago, Rock Island & Pacific, the Long Island, the Norfolk & Western, the Pennsylvania, the Philadelphia & Reading, the Pittsburgh, Cincinnati, Chicago & St. Louis, the West Jersey & Seashore and the Chesapeake & Ohio. Continuing, he said:

"The following questions naturally presented themselves for answer:

"(1) Has automatic train control reached a point of development reasonably justifying an order requiring its extensive installation at this time? The committee's answer to this is, No. * * *

"(2) If installation for further tests is advisable, is duplication of tests necessary? The committee expresses the opinion that such duplication will not serve any practical purpose.

"(3) Are further developments probable; or other principles than those now being advocated and under development? The committee is of the opinion that induction methods of train control are being rapidly developed and that tests now being arranged for will give valuable information and promise progress.

"(4) Are the proposed requirements such as best cover

the situation? The committee will propose amendments.

"(5) The committee has not entered into the financial side of the question in any manner, but it is a serious question for this Commission whether automatic train control will provide greater additional safety for a given expense than the same expenditure will produce through the installation of automatic signals, extensions of double track, etc., * * * and other improvements which not only increase safety, but increase the capacity of the railroad and produce large economies in operation. It is an open question, whether any of the devices so far tested do not have a tendency to decrease the capacity of a railroad.

"The policy of the railroads is now, as it has been in the past, that within their financial ability they are continually seeking to find better methods for promoting safety as well as economy and the production of better service. Applications to the Commission for authority for financing disclose that a large part of the money for which authority is now asked is to be devoted to purchases which tend toward better operation, greater safety and better service. Under present financial conditions expenditures should be confined as largely as possible to known and demonstrated channels * * *."

Commissioner Esch then asked if, in the opinion of Mr. Aishton, carriers had properly co-operated in the development of automatic train control; the matter had been brought up over 14 years ago. Mr. Aishton replied that he could not say, except for the last 15 months, in which period he felt that progress had been made. Prior to that time and during the war and under Federal control little could be done except to keep trains moving. Commissioner Esch called attention to the final report of the Block Signal & Train Control Board, made in 1912, in which it was stated that ten or fifteen devices had sufficient merit to justify further test, and asked if since 1912, up to the war, whether the financial status of the railroads was such as to prevent them acting on development of such devices. Mr. Aishton, in reply, called attention to the fact that during that period legislation on electric headlights and steel cars was passed, which required large expenditures by the railroads, and that this may have diverted the railroads from the automatic train control question.

Brief Submitted by Mr. Denney

The brief of the carriers, submitted by Mr. Denney, will be found under another head. In connection with it he said that the American Railway Association was co-operating with the Interstate Commerce Commission. Two additional installations of train control apparatus have been arranged for, one on the Southern Pacific, and one on the New York Central; and he referred to the experimental installations of the General Railway Signal Company's device on the Buffalo, Rochester & Pittsburgh; the International Signal Company's device on the Erie, and the Shadle device on the Cincinnati, Indian Wells & Western. He also referred to the Union Switch & Signal Company's plan for making an installation on the Pennsylvania Railroad. Mr. Denney emphasized the fact that it has been and will be the aim of the American Railway Association to co-operate with the Commission.

Commissioner Esch asked as to the powers given the A. R. A. committee on automatic control to secure the co-operation of the railroads. Mr. Denney replied that the committee was not authorized to spend any money. As to whether automatic stops would increase the capacity of a railroad, Mr. Esch quoted a statement made in March, 1920, by J. M. Waldron, signal engineer of the Interboro Rapid Transit Company, New York, that automatic train control had increased the capacity of these lines 43 per cent. Mr. Denney replied that conditions on the Interboro were in no way comparable to those on steam operated railroads in the open. Mr. Esch asked about the A. R. A. inspections on the Chicago, Rock Island & Pacific, the Chicago & Eastern Illinois, and

the Chesapeake & Ohio by the American Railway Association in February. Mr. Denney stated that the main purpose was to have these men watch operation during severe winter weather.

A. M. Burt's Report

Mr. Burt presented a report on the views of the railroads' committee with respect to differences between the specifications (a) as adopted by the committee of the American Railway Association and representatives of the Bureau of Safety of the Interstate Commerce Commission and (b) the specifications included in the Commission's proposed order. There is one difference which is felt to be important. In this connection he said in part:

"Under 'Automatic Train Stop,' the Commission in its proposed order has eliminated entirely the following paragraph in the requirements of the A. R. A. committee:

"(b) Under control of engineer, who may, if alert, forestall automatic brake application and proceed."

"The omission of this paragraph will make the use of a simple automatic train stop so restrictive that it will practically eliminate such devices from consideration. It is fundamental that trains should be stopped only when necessary in connection with their service or when necessary in the interest of safety. There are many times when it is proper for a train to pass an automatic signal in the stop position without coming to a full stop. Signals are now very generally located only a short distance from a siding switch and it is often desirable for a train to be admitted to a siding by a man on the ground, either a switch-tender or a trainman of another train. If no permissive device is allowed on the engine, it will be impossible for the engineer of the approaching train to pass the signal and enter the siding without having his train brought to a stop unnecessarily by the automatic device.

"* * * If an order is entered by the Commission it should be so flexible as to permit the installation of the simpler devices. The most that can now be expected from any automatic device is to have it operate when the human element fails to do so through inadvertence or physical inability. An engineer must be relied upon a great many times to exercise judgment and caution and it is entirely illogical to take from him, in one particular, his right to use his intelligence and discretion and at the same time rely on such intelligence and discretion at many other points. * * *"

The question of interchangeability was also raised by Mr. Burt. In order to get full protection from an automatic train control device upon engines, it must be so designed that it will function with the roadside apparatus on any of the railroads over which these engines operate. * * * In considering the necessity for interchangeability it should be remembered that the railroads would have to carry a stock of repair parts at various points on their lines. Before making large installations it is of the greatest importance that, so far as possible, there should be standardization. It will readily be conceded that the need for absolute interchangeability is not the same as the need for interchangeability in freight car couplers or air brake apparatus. There is, however, a very real need and this need of interchangeability will increase as time goes on rather than lessen. The major problems in connection with it should be brought much nearer to solution before extended installations of train control devices are undertaken."

Mr. Peabody Reports on Three Devices

J. A. Peabody presented reports on the American Train Control Company's installation on the Chesapeake & Ohio, the Miller Train Control Corporation's device on the Chicago & Eastern Illinois and the Regan device on the Chicago, Rock Island & Pacific. A brief description of the device was first given and the objections raised by the chief inspectors

were stated, after which was set forth the action taken by the companies to meet criticisms. He presented in each case a comparison showing how the device met the requirements laid down in the Commission's proposed order. Data sheets were presented showing the number of operations per failure, etc., and conclusions were drawn as to the effect of these devices upon train operation.

On the Chesapeake & Ohio, 32 specific points were brought up for correction; on the Chicago & Eastern Illinois, 13, and on the Chicago, Rock Island & Pacific, 29.

After the presentation of this information, in which all failures were noted, W. P. Borland, Chief of the Bureau of Safety, Interstate Commerce Commission, stated that he did not concur in this report, inasmuch as his inspectors did not co-operate with the special American Railway Association committee in the preparation of the document presented by Mr. Peabody and that a number of objections were raised which had not been concurred in by inspectors from his department. Mr. Peabody replied that he did not say the Bureau of Safety had co-operated, but that it did concur in pointing out certain undesirable features. Commissioner Esch then asked if the additional undesirable features (which had not been concurred in by the Bureau) had been called to the attention of the owners of the devices, and Mr. Peabody stated that they had not, so far as he knew; the report had only been finished during the last week. Its main purpose was to show that the train control question was in the development stage. Commissioner Esch asked Mr. Peabody if it was the primary purpose of the committee to find defects and Mr. Peabody said that it was; this in order to determine what is necessary to get reliability.

Pleas of Individual Roads

After the conclusion of the joint presentation, the Southern Pacific and the Southern Railway presented additional briefs pertaining to their particular roads. The Southern Pacific desired to adopt the responses made by the carriers' committee and further asked to be exempted from making a double installation, the Southern Pacific and the Galveston, Harrisburg & San Antonio being parts of the same system. It was the feeling of this company that the order should not apply to it, inasmuch as it is now co-operating in the development of an induction type near San Francisco.

The Southern Railway also supported the carriers' committee report and asked that it be not required to make duplicate installations which would be necessary if the order were to be entered, as the C. N. O. & T. P. was part of the Southern system. Automatic train control devices should not be required on these lines until additional automatic signals have been installed. W. J. Eck, signal superintendent, said that "the Southern Railway and the C. N. O. & T. P. have not been rerriss in the installation of safety devices of all kinds; they have been among the first in this regard. They expect to continue the policy in the future; and when the principal main lines of the system are provided with other safety devices now recognized as desirable for a well regulated railroad, your honorable commission may be assured that this system will not hesitate to install automatic train control. The management is interested in the subject, has assisted in its development and will doubtless some day have it installed on many miles. It does not believe, however, that it should be installed now upon an entire engine division so long as there are hundreds of miles of important main lines without the very great safety afforded by the automatic block system. * * *

A Plea for Signals

B. H. Mann, signal engineer of the Missouri Pacific, said that an order as to his road would be premature. It should be permitted to expend its available funds in providing interlocking for its unprotected crossings and automatic block

signals for its main lines before paying for a device to compel obedience to signals. He estimated the cost of equipping the line from St. Louis to Kansas City with an automatic train control system at \$911,950, for 276 miles, and said the company should spend \$19,251,000 for automatic signals and interlocking. The estimate for automatic train control, he said, was \$1,500 per mile and \$750 per locomotive, and was based on information from other roads that have made installations. He thought the 49 roads should not be required to spend money for the installation of a device which would be scrapped when a more satisfactory type is developed. The Missouri Pacific feels that its important problem is to reduce the unproductive time of freight trains, which can be done by signals, and it trusts that the Commission will not compel it to disrupt its present plans. It hopes that it may be relieved of the order entirely and allowed to devote its available revenues to other safety devices. Mr. Mann referred to the installation of signals as preparatory to automatic train control.

Chairman McChord asked how long it would take to complete the signal program. Mr. Mann replied that it would take several years. W. P. Borland, director of the Bureau of Safety, then brought out that the Missouri Pacific has installed automatic block signals on 365 miles since 1904, and 154 miles since 1912, and said that at that rate it would take over 100 years to "prepare for automatic train control." In reply to questions, Mr. Mann said that passenger engines run through from St. Louis to Kansas City and that passenger crews run through to Sedalia. He was asked the cost of installing train control between St. Louis and Jefferson City and said \$316,200, but that that is not a crew run. He said his company has been looking into the Bostwick device and the three ramp types investigated by the committee.

Means Installation on Entire Line

When W. D. Duke, general manager of the Richmond, Fredericksburg & Potomac, said he desired to adopt the testimony presented on behalf of the committee, Chairman McChord reminded him that he was under oath. Mr. Duke said the proposed order covers his entire main line from Washington to Richmond, over which locomotives of six foreign lines are operated. He said that in the present state of the art, his company should not be required to install a safety device not thoroughly approved in actual practice. Proprietors of three or four devices have been permitted to use the company's tracks and locomotives for experiments during the past six or eight years, but the experience has not justified adopting any of them; he thought further time should be allowed for development of the induction type. He suggested 12 to 18 months as possibly sufficient time. Mr. McChord asked if the road is taking any steps itself to make tests on its own line. Mr. Duke replied that it expected to profit by the experience of others. Mr. McChord said that it seems to be the policy of Congress that something should be done, and that he understood that many good devices have never been tested. "We think we have done our share in proportion to our mileage," said Mr. Duke.

L. W. Baldwin, vice-president of the Illinois Central, asked that an order be not issued as to his road, saying that more time should be allowed. Commissioner Lewis asked how much time should be allowed. Mr. Baldwin said that would depend on the period required for development beyond the experimental stage. He said he had based his conclusions on what he had read and on reports of his officers; he had not personally studied automatic train control on the ground. Mr. Borland asked Mr. Baldwin what difference there was in operating conditions on the C. & E. I., the Rock Island or the Chesapeake & Ohio (which have reported that the train control devices used by them had met their operating conditions satisfactorily) and those on the Illinois Central. Mr. Baldwin said there is a difference of opinion

on that subject. While he was not familiar in detail with the operating conditions on the other roads, he did not see how it could be said that operating conditions were being satisfactorily met until those roads should be fully equipped. The Illinois Central has looked into the Sprague device and that of the Union Switch & Signal Co., to some extent, but is not testing any device.

Severe Winters

B. R. Pollock, vice-president and general manager of the Boston & Maine, asked that his road be exempted from any order, on the ground that it operates in a district of severe winter weather in which the practicability of automatic train control has not yet been demonstrated; and that the portion of its line designated was one of very heavy passenger traffic which would be adversely affected by any device which should cause additional stops. He said the locomotives of three other divisions also are run over this division so that the order would require the equipment of many additional engines.

C. C. Hine, general solicitor of the Chicago, Indianapolis & Louisville, said that his operating officers know very little about train control devices, but he wished to file an objection on the ground that an order as to his road would not be justified because its operating conditions are such that the additional protection is not required. Of the 475 miles of main line, 360 are equipped with automatic signals and on the lines where there are no signals there are long intervals between trains. No passenger has been killed in a train accident since 1897, except a mail clerk, in 1912, and the company feels that the money could be spent to better advantage for additional protection at highway crossings.

C. H. Stein, general manager of the Central of New Jersey, said his company is not opposed to automatic train control but is in sympathy with the proposition; but it has investigated 46 devices and feels that none of them has reached such a state of perfection that would warrant the expense of an installation. He believed that new possibilities are just coming to the surface and that a wireless device may be developed. Pointing out that in recent years only from 252 to 271 passengers have been killed per annum, and that only a part of these could have been saved by automatic train control, Mr. Stein said that the train control device itself might easily be the cause of accidents. Those now in service are under special scrutiny. He thought the capital required might be more profitably invested in other directions. In reply to Chairman McChord's question as to what his company is doing to help bring train control to a stage of perfection, Mr. Stein said it was keeping in touch with the experiments being carried on but does not feel like duplicating the work being done on other roads until it finds a device it considers worth trying.

"Suppose all the roads took the same position," said Mr. McChord.

"Then maybe we would take it up," replied Mr. Stein.

Mr. Borland asked Mr. Stein if he saw any insuperable difficulties in the way of standardizing the equipment to overcome the objections made on the ground of lack of interchangeability. Mr. Stein said that would be a question for the mechanical department. When he concluded, Chairman McChord asked Mr. Stein to file with the Commission the reports of the investigations of the 46 devices referred to.

Offered Prize for Device

The New York, New Haven & Hartford gave a long list of reasons why the order should not be issued on its line. No device had been found practical for use on the lines covered in the Commission's order and the company has been trying to find a device since 1912, having offered a reward of \$10,000 for such a one. Over 1,400 patent papers have been examined and innumerable inventors

and proprietors of devices had been dealt with. Inspections have been made of practically all installations on other roads, and since 1918 the company had employed a special engineer who devoted all his time to this subject; and in addition a special committee was at work. The company showed that it had made a trial installation of the Union Switch & Signal Company's device in 1913 and of the International Signal Company's device from 1915 to 1917, but the tests were found unsatisfactory. Another objection raised to the issuance of the order was that in the operating of its trains over the Pennsylvania and the New York Central in electrified territory no automatic stop shoe could be used that would come within the allowable clearance.

During the presentation of the New York, Chicago & St. Louis road's brief, by Mr. Denney, Commissioner McChord asked about the work of the subcommittee, operating under Mr. Denney's direction, saying that Mr. Borland had no record of what occurred in connection with its inspection of the Regan and the Miller devices; while the inspector of the Bureau of Safety on the C. & O. had no knowledge of what these men were doing; and that the records of this subcommittee do not check up with the Commission's records. Mr. McChord also wished to know the conditions under which this subcommittee conducted the surprise tests.

The Burden of Two Installations

W. M. Jeffers, general manager of the Union Pacific, asked that that system be relieved of the burden of making two installations, as would be required by the proposed order, one on the Union Pacific and one on the Oregon & Washington Railroad & Navigation Company, and expressed the opinion that the test on an entire engine district is not essential, but said that the road desires to co-operate in a helpful way with the commission and offered to co-operate with the Bureau of Safety in making a test of any proper device which is not being tested. Chairman McChord said it was not the policy of the Bureau of Safety to say what devices should be installed. Mr. Jeffers said he thought the Union Pacific had spent more money per mile in safety work than any other road and that 85 per cent of its main line is equipped with block signals, but it feels that train control is still in its infancy and he knew of no device that he would want to put on extensively. There are many problems to be worked out, particularly in connection with heavy tonnage trains on grades.

He also made a point of the fact that train control would tend to take control of the train away from the engineer and said it is a question whether this remedy would not be worse than the disease. Mr. Borland asked if he had any idea that it was proposed to take the responsibility away from the engineer. Mr. Jeffers replied that he did not know that it was specifically proposed but any time responsibility is divided between the engineer and a device there is liability to trouble. When Mr. Borland cited two accidents on the Union Pacific caused by the failure of the engineer to see signals, Mr. Jeffers agreed that those accidents might have been prevented by an automatic train control device, but he said the device might have caused an accident on some of the hundreds of thousands of movements made since. Mr. Jeffers said that the ramp adds an unnecessary element of danger and that it would leave insufficient clearance for the rotary snow plow. He also thought the tendency would be to reduce the air pressure in descending heavy grades, saying that it takes years of experience for an **engineer** to learn how to handle his train under such conditions. Commissioner Esch asked whether he thought there was any objection on the part of those interested in wayside signals for fear that automatic train control would supplant them. Mr. Jeffers replied that he thought not because automatic train control should be used in conjunction with signals.

A. W. Trenholm, vice-president of the Chicago, St. Paul, Minneapolis & Omaha, said that the division of his road mentioned in the order has been proposed for double tracking, which would necessitate changing the apparatus if it were installed at this time, and he also said that it would be necessary to install automatic block signals at the same time. He submitted an estimate of the cost, saying he did not know whether it could be relied on and that probably an order of the commission would result in increase in the price of automatic train control. He discussed the financial condition of his road to show that it would be difficult to sell securities to meet the expense and said that the money could be used to better advantage for additional double tracking or signalling. He pointed out that crossing accidents had resulted in more casualties than collisions.

When Mr. Trenholm referred to the proposed order as arbitrary, Commissioner Esch said that Congress had passed the law two years ago and that the commission had waited this length of time before issuing an order. Mr. Trenholm replied that the law had left the matter in the discretion of the commission and he thought the burden should be on the patentees to perfect their systems until they are safe to put on a railroad. Mr. Esch said that in view of the stagnation in the development of train control in recent years Congress evidently expected some action on the part of the commission.

A. M. Burt was recalled to speak for the Northern Pacific. He described the expenditures made by this road for safety appliances and the proposed extensions of its automatic block signals. He said that the installation would not be warranted by the density of traffic on the divisions proposed in the order and that the ramp would introduce complications in a country exposed to snow drifts, because it would promote the formation of drifts and would also be an obstruction to the snow plows.

Five Installations Required on One System

W. E. Elliott, signal engineer of the New York Central, described the work which that company has done for many years in investigating train control, after C. C. Paulding, as counsel for the road, had pointed out that the proposed order would require five installations on the New York Central System, on the Pittsburgh & Lake Erie, Boston & Albany, Michigan Central, Chicago, Cincinnati, Cleveland & St. Louis, and the New York Central itself. Mr. Elliott said he had had experience in investigating train control since 1893 when the Chicago, Milwaukee & St. Paul, of which he was then signal engineer, made an experimental installation of the Kinsman device. He said that the special committee organized by the New York Central had adopted a train control device several years ago for use in the Detroit tunnel, but had not yet been convinced of the practicability of any device for general installation. He referred to negotiations with the Sprague Company since 1914 and said that under arrangements made during the winter its device has been installed on one track $6\frac{1}{2}$ miles long, including five blocks, and on one passenger engine and preliminary tests were begun on February 20. Specific tests under the direction of the joint committee and the Bureau of Safety are to be made next week. If the tests turn out satisfactorily it is the intention to equip a double track section of the New York Central and Michigan Central between Toledo and Detroit, 54 miles, with automatic signals and an automatic train control device for a service test. He said the ramp type would not be suited to the New York Central because of interference with the third rail and because of the snow and ice conditions during the winter.

Mr. Peabody, appearing for the Chicago & North Western, said that the installation would cost \$1,657,700 and the company felt that this money could be spent more profitably for block signals. George J. Ray, chief engineer of the Dela-

ware, Lackawanna & Western, said his company had devoted much attention to tests of automatic train control devices for many years, and it does not ask for postponement of the order because of its financial condition or because of a belief that signals should be installed first, because the greater part of its line is already equipped with automatic signals and it is ready to install a train control device whenever it is convinced that one is suitable for its operation and would be a help rather than a hindrance, but if this order is made permanent it would have to install a ramp type device and it believes that in a year or two some other type will have been developed more satisfactorily. Meantime, it believes it ought to be allowed to continue experiments.

Objects to Ramp

H. T. Douglas, chief engineer of the Chicago & Alton, said he believed that the ramp type is most undesirable and that the induction type will produce better results. He said that according to the best information he could obtain the installation on his road would cost over a million dollars and he thought it would be most unfortunate for the commission to require this expenditure for an experiment when there are so many other ways in which the money could be more profitably used, if it had the million dollars, which it has not. As various witnesses gave estimates of the cost, Chairman McChord asked for an itemized statement showing how the estimate was made up. Mr. Douglas said he had consulted men who had experience on other roads, but that the proprietors, he understood, were not in a position to give prices because they have no contracts for the manufacture. J. Beaumont stated that the manufacturers would be in a position to state prices and that such information has been available for some time.

F. P. Patenall, signal engineer of the Baltimore & Ohio, described the work his company has done in the way of investigating automatic train control devices and said that 75 per cent of them are "not worth the paper they are written on." Chairman McChord asked why the railroads have not done more to develop the other 25 per cent. Mr. Patenall said that no good purpose could be served by duplicating tests and that he felt his company had been of assistance in helping to ascertain changes that should be made in those that have been installed. He estimated the cost at from \$2,000 to \$6,000 a mile and said that greater benefit would be derived from the expenditure of this money for signals. He asked that the commission modify its order and permit an installation of 10 or 15 miles in connection with a proposed installation of signals. A number of the roads were asked by Chairman McChord to file statements of the cost involved in some of the principal accidents that have occurred in recent years, and also any other accidents which could have been prevented by train control.

Following the railroad testimony the representatives of train control companies were to be heard.

SOUTHERN PACIFIC SAFETY RECORD.—The total number of injuries sustained by employees of the Southern Pacific's Pacific System was approximately 20 per cent less in 1921 than in any other year since 1906.

STOP, LOOK AND LIVE.—With the first warm days of spring, automobiles will again take to the highways. The death rate at grade crossing is growing year by year. The evil may only be met by education. The Buffalo, Rochester & Pittsburgh Railway will issue warning bulletins from time to time during the summer, and these cards will be distributed to automobile clubs, gas stations and other suitable localities. In educational work the automobile clubs have accomplished wonders; we ask them to double their efforts. Our aim in this educational work is entirely unselfish and is entirely human. * * *—*B. R. & P. Circular.*

Freight Car Loading

Washington, D. C.

THE NUMBER of cars loaded with revenue freight showed another increase during the week ended March 11, according to the weekly report of the Car Service Division of the American Railway Association, to 829,128, as compared with 700,440 during the corresponding week of 1921 and 819,329 in 1920. The increase as compared with the previous week was 26,000 cars. The principal increase as compared with last year was in coal loading, 68,000 cars, but there was also an increase of 21,000 cars in miscellaneous freight and of 29,000 in merchandise. Decreases as compared with last year were shown only as to forest products and ore. Increases as compared with 1920 were shown as to grain and grain products, livestock, coal and merchandise. All districts showed increases as compared with last year. The summary for the week is given in the table below and the trend is shown in the chart.

The freight car surplus for the week ending March 8 was 223,846, a reduction of 21,254 as compared with February 28. Of the total 88,974 were box cars and 86,464 were coal cars.

The percentage of bad order freight cars on March 1 was 14.7 as compared with 14.5 per cent on February 15.

Announcement Regarding Consolidation Hearings

WASHINGTON, D. C.

FOR THE GUIDANCE of respondents and others to be represented at the hearing on the Interstate Commerce Commission's consolidation plan on April 24, at Washington, the commission has issued an announcement as to certain phases of the subject to be borne in mind.

The evidence received at the hearing beginning on that date will be confined to railway properties in the southeastern region as that region is described and referred to in Chapter IV of the appendix to the tentative plan of the commission, adopted August 3, 1921.

It was there found for the purposes of this tentative plan that the railway properties in that region may be consolidated under the statute into the following systems:

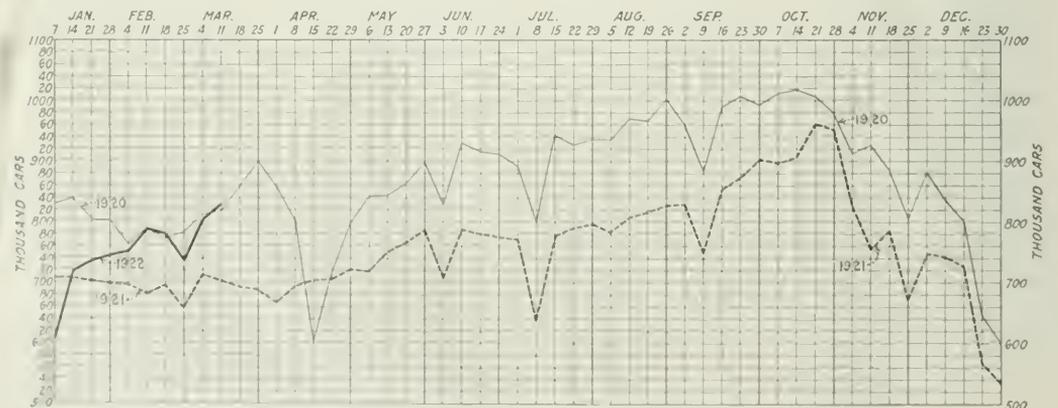
SYSTEM NO. 10. - SOUTHERN

- Southern
 - Alabama Great Southern
 - Georgia, Southern & Florida
 - Mobile & Ohio
 - Southern Railway in Mississippi
 - Northern Alabama
 - Cincinnati, New Orleans & Texas Pacific
 - New Orleans Great Northern
 - Alabama & Viecksburg
- Note.—Prof. Ripley recommends inclusion of the Georgia Southern & Florida Branch from Valdosta, Ga., to Palatka, Fla., in Seaboard system.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 11, 1922.

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Misc. L. C. L.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	8,512	2,882	54,551	1,908	4,898	919	67,734	67,726	209,130	166,228	192,685
	1921	6,066	2,439	41,172	915	6,612	948	52,549	55,527	173,578	141,430	176,801
	1920	2,645	2,525	57,552	4,128	2,408	1,386	50,147	52,787	173,578	141,430	176,801
Allegheny	1922	2,645	2,525	57,552	4,128	2,408	1,386	50,147	52,787	173,578	141,430	176,801
	1921	1,939	2,605	42,235	4,178	2,555	1,574	40,437	45,907	141,430	141,430	176,801
	1920	225	74	26,417	2,332	1,100	15	5,931	3,555	37,549	23,173	33,611
Poehantons	1922	156	75	13,234	169	1,339	10	4,973	3,217	209,130	166,228	192,685
	1921	3,727	3,341	26,109	520	15,711	552	37,979	41,270	128,209	112,090	126,302
	1920	3,229	1,982	17,134	563	13,813	925	36,267	38,177	112,090	112,090	126,302
Southern	1922	12,706	9,308	10,623	1,249	15,460	617	27,206	29,812	106,981	96,410	112,773
	1921	10,464	8,513	5,021	1,010	16,542	866	25,327	28,667	96,410	96,410	112,773
	1920	11,763	10,354	23,521	314	4,359	952	31,237	31,402	113,502	103,606	115,029
Northwestern	1922	11,505	10,032	13,646	158	4,352	2,248	30,327	31,338	103,606	103,606	115,029
	1921	5,582	2,446	5,295	179	7,184	666	16,010	21,917	59,779	57,503	62,128
	1920	4,869	1,726	3,477	99	6,053	426	16,831	24,022	57,503	57,503	62,128
Central Western	1922	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	829,128	700,440	819,329
	1921	38,228	27,372	135,919	7,092	51,266	6,997	206,711	226,855	700,440	700,440	819,329
	1920	32,721	28,109	184,808	9,797	63,273	14,604	157,690	328,327	700,440	700,440	819,329
Southwestern	1922	6,932	2,558	68,649	1,438	146	1,890	29,533	21,614	128,688	128,688	128,688
	1921	12,439	1,821	19,760	1,267	11,153	9,497	78,554	79,858	9,799	9,799	9,799
	1920	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	829,128	700,440	819,329
Total, all roads	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	711,367	811,106
	1921	46,729	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295
	1920	54,704	30,274	193,377	7,823	52,638	4,015	222,908	222,673	788,412	687,867	772,102



Revenue Freight Car Loadings to March 11, 1922

SYSTEM No. 11.—ATLANTIC COAST LINE—LOUISVILLE & NASHVILLE

Atlantic Coast Line
 Atlanta and West Point
 Charleston & Western Carolina
 Louisville & Nashville
 Nashville, Chattanooga & St. Louis
 Louisville, Henderson & St. Louis
 Western Railway of Alabama
 Richmond, Fredericksburg & Potomac
 Norfolk Southern
 Atlanta, Birmingham & Atlantic
 Winston-Salem Southbound
 Roanoke to Winston-Salem branch of Norfolk & Western
 Florida East Coast
 Carolina, Clinchfield & Ohio
 Georgia & Florida
 Gulf, Mobile & Northern
 Mississippi Central
 Notes.—Prof. Ripley recommends that the Richmond, Fredericksburg & Potomac and Florida East Coast retain their present status without inclusion in any system.
 The Carolina, Clinchfield & Ohio may be included in system No. 12, Illinois Central-Seaboard. Prof. Ripley recommends inclusion in system No. 10 Southern.
 The Gulf, Mobile & Northern and Mississippi Central are not specifically included in any system under Prof. Ripley's report.

SYSTEM No. 12.—ILLINOIS CENTRAL-SEABOARD

Illinois Central
 Yazoo & Mississippi Valley
 Central of Georgia
 Seaboard Air Line
 Lynnhire, Va., to Durham, N. C., branch of Norfolk & Western
 Gulf & Ship Island
 Tennessee Central
 Carolina, Clinchfield & Ohio
 Notes.—Prof. Ripley recommends that a separate system be built around the Seaboard Air Line.
 The Gulf & Ship Island is not included in any system by Prof. Ripley.
 The Carolina, Clinchfield & Ohio may be included in system No. 11, Atlantic Coast Line-Louisville & Nashville.

In so far as practicable, the commission says, evidence should be presented in respect of these railway properties in the order in which they are listed in each system, and all evidence with respect to one system, e. g., System No. 10.—Southern, should be completed before passing to the next system.

Evidence as to the carriers not included in the tentative plan, such as industrial and terminal carriers should be presented in connection with that as to the system in which it is believed that they should be included.

In order that the evidence may be confined to relevant matters attention is also directed to paragraph (4) of section 5 of the Interstate Commerce Act.

Summarized, the requirements with which the commission must comply in preparing a plan for consolidating the railway properties into a limited number of systems, are:

- (1) Competition must be preserved as fully as possible;
- (2) Existing routes and channels of trade and commerce must be maintained;
- (3) Subject to (1) and (2) the several systems must be so arranged that the cost of transportation as between competitive systems and as related to the values of the properties through which the service is rendered shall be the same, so far as practicable, so that these systems can employ uniform rates in the movement of competitive-traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.

Attention is also directed to paragraph (6) of the same section, which reads as follows:

(6) It shall be lawful for two or more carriers by railroad, subject to this act, to consolidate their properties or any part thereof, into one corporation for the ownership, management, and operation of the properties theretofore in separate ownership, management, and operation, under the following conditions:

- (a) The proposed consolidation must be in harmony with and in furtherance of the complete plan of consolidation mentioned in paragraph (5) and must be approved by the commission;
- (b) The bonds at par of the corporation which is to become the owner of the consolidated properties, together with the outstanding capital stock at par of such corporation, shall not exceed the value of the consolidation properties as determined by the commission. The value of the properties sought to be consolidated shall be ascertained by the com-

mission under section 19-a of this act, and it shall be the duty of the commission to proceed immediately, to the ascertainment of such value for the properties involved in a proposed consolidation upon the filing of the application for such consolidation.

"It will be seen," the commission says, "that stress is laid throughout upon the value of the properties to be consolidated, but that value will not be a controlling factor until application is made for the consolidation of two or more railway properties after the complete plan shall have been adopted. It would seem, therefore, that evidence as to value will not be helpful, if indeed material, at the present stage of the inquiry, and certainly not evidence as to the financial structure of the respective carriers. This has particular reference to the contention that the credit of the so-called strong roads will be impaired by consolidation with so-called weak roads, weak in many instances in the sense that they have not had the benefit of conservative financial policies.

"The statute contemplates consolidation into one corporation for the ownership, management and operation of the properties theretofore in separate ownership, management and operation. This would seem to exclude from consideration general projects or proposals based in whole or in substantial part on contemplated running rights, track-age agreements, and the like, or on new construction.

"As stated in 63 I. C. C., 455, the tentative plan was put forward in order to elicit a full record upon which the plan to be ultimately adopted can rest, and without prejudgment of any matter which may be presented upon that record. This announcement should not be construed as indicating in detail what evidence should be adduced. The purpose is to again call attention to the broad general grounds of the statute on which the complete plan must rest. It is understood, of course, that alternative or modified plans may be submitted in lieu of any system proposed in the tentative plan."

THE STATE OF MINNESOTA received from its 40 railroads for 1921, on account of the five-per-cent gross earnings tax, \$1,762,651 less than in 1920, the aggregate gross earnings reported by the roads being only \$146,011,564, or \$35,241,457 less than the year before. No major road reported an increase in earnings from its Minnesota operations during 1921. The railroads which suffered most were the ore-carriers.

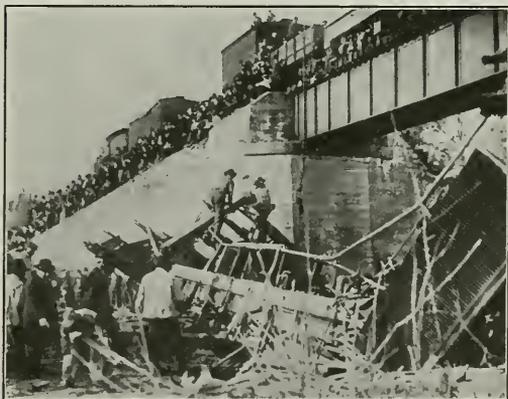


Photo by Underwood & Underwood

Accident Near Union City, Georgia, March 13, Thought to Have Been Caused by a Broken Wheel

Treated Water Improves Locomotive Performance

Six Years' Use of Soda Ash Demonstrates Value in Avoiding Failures, Reducing Repairs and Saving Fuel

By W. A. Pownall
Mechanical Engineer, Wabash Railway

THE ARTICLE on Interior Treatment of Boiler Water by C. R. Knowles of the Illinois Central, published in the *Railway Age* of November 12, 1921, deals with a very important subject and seems to have inspired considerable comment from railroad and supply men actively interested in this question. The writer has always taken great interest in the matter of scale prevention in boilers because of the large financial returns possible and would like to present for the information of those interested the results of systematic methods of boiler water treatment as in effect on the Wabash for the past 10 years.

Tests of Soda Ash Treatment

During the period 1902 to 1906, extensive service tests of soda ash treatment and observations of results were made on one of the large railroads. These tests showed conclusively that the treatment of all waters with enough soda ash to neutralize the sulphate hardness and provide enough excess always to show an excess of sodium carbonate in water drawn from the boiler, in connection with the systematic blowing off of the boiler through a blowoff cock properly located would accomplish the following principal results:

- (1) Keep heating surfaces comparatively free from scale.
- (2) Cause the scale forming solids, instead of crystallizing on the heating surface, to be deposited as a soft sludge and be carried back to the point of least circulation, the back mud ring, where it could be removed through means of a perforated pipe connected to the blow-off cock in the back corner.
- (3) Practically eliminate engine failures due to leaking flues, fire boxes, stay bolts, mud rings, etc.
- (4) Reduce stay bolt breakage and fire box renewals to a very low figure.
- (5) Decrease the cost of boiler repairs from 30 to 65 percent.
- (6) Increase mileage between boiler washings to any desired amount. The tests also established the fact that the boiler would foam when the total dissolved solids were about 240 parts per 100,000 and that enough blowing off must be done always to keep below that point.

With full knowledge that these results were being obtained and that all methods were based not on any theorizing as to effects, but on actual observations of results, the Wabash started this method of treating water in roadside supply tanks with soda ash only and at every station where water contained any sulphates of lime and magnesia. Waters containing natural sodium carbonate, even though having a hardness of 20 to 40 parts per 100,000 are used in stationary boilers at several of our plants and do not form scale, the boilers being free from scale after having been in service for many years. Observations of boilers using this type of water ought to be evidence enough to any thoughtful investigator that similar results can be obtained on other waters containing sulphate hardness if enough soda ash is added to neutralize this hardness, or in other words to make it like the natural non-scaling water.

Let me emphasize, before discussing results, the fact that this method demands that all sulphate hardness waters over an operating district must be treated in order to obtain results. Treatment here and there by soda ash only will give practically no good results, and it is probable that experience with this sort of partial treatment has condemned this method in many cases.

Water treatment was started on the Wabash in 1912, and

gradually extended until complete in 1916, when the total number of waters treated was 109. On one division this company operates over another road, and has not therefore been in a position to treat the water at roadside tanks. However, treatment has just been started on this division by placing enough soda ash in the tank at the terminal to treat all water used over the division, and although this is a crude method and one needing careful supervision, the results at the present writing are encouraging.

Engine Failures Due to Leaky Flues, Staybolts, Fireboxes, Etc.

A failure due to boiler leaking is an expensive failure since it usually involves giving up the train and having another engine and crew come out after the train and failed engine. Aside from the expense, leaking boiler failures are an absolute indication, particularly in cold weather, as to whether or not heating surfaces have scale on them, and are also evidence of all the other incidental troubles that go with scale. The following table shows the improvement in reducing failures due to leaking for the year 1921, as compared with the year 1911, the year before treatment was started.

ENGINE FAILURES DUE TO LEAKING FLUES, FIREBOXES, ETC.

Division	No. of failures		Per cent Decrease	Miles per failure	
	1911	1921		1911	1921
Detroit	141	0	100.0	21,653	No failures
Peru	236	2	99.1	12,811	1,160,425
Decatur	232	4	98.3	20,878	989,068
Springfield	57	0	100.0	33,303	No failures
Moberly	265	23	91.3	25,596	248,035
Total	931	29	96.9	20,770	541,748

It will be noted that on two divisions the failures were entirely eliminated, and on two other divisions they were practically eliminated and for all divisions the percentage of decrease was 96.9. The mileage per failure increased from 20,700 in 1911 to 541,748 in 1921. This improvement has not been made through the welding of flues into sheets, as this has been done on only a few engines and only on the superheater flues on divisions where the erratic water conditions and necessity for occasional use of very bad water made it seem advisable to weld in some of the superheater flues after they have been in service a year or two.

A good example of what has been accomplished is shown by the performance of 25 2-10-2 engines placed in service in July, 1917, on what was before treatment considered the hardest water division. These engines have flues 23 ft. long. During the 4½ years of service there have been seven failures due to leaking flues. The average time to first resetting of flues was 39 months, thirteen of the engines making from 40 to 48 months actual service. The average flue mileage on the ten highest engines (and one has not yet had the flues reset) is 116,477. Each engine has 3,047 staybolts including 2,320 rigid stays, 639 American flexible stays and 88 Tate flexible staybolts. There have been only 14 staybolts broken on the entire 25 engines. There are passenger engines running on this same division with nearly 300,000 miles between flue resetting.

Fire Box and Staybolt Renewals

Up to 1915 the firebox work on the Wabash was rather heavy, and the road did not begin to really feel the effect of water treatment in decreased firebox renewals until after 1915. However, from that time on there was a steady decrease in the number of new fireboxes applied each year, the

records for the last three years showing a reduction in firebox renewals of 93 per cent over 1915. At the same time there have not been many renewals of side sheets or part side sheets. It is to be expected that there will be certain cycles of firebox life and that there may be in the future a few years with heavier firebox renewal, but generally speaking the indications are that obsolescence will overtake renewal.

The records of staybolt renewals per locomotive per year show that on the best treated division about one bolt per locomotive per year is renewed, whereas on the one division that has not had treated water, and which is not a really bad water division, the broken bolts per locomotive per year are 52. The broken bolts on the heaviest power on the Wabash consisting of Pacific, Consolidation, Mikado and Santa Fe type locomotives, all of which operate under treated water conditions, was from June, 1920, to July, 1921, only 0.77 bolts per locomotive per year. These locomotives are equipped with flexible staybolts in the breaking zones only.

Fuel Performance

Keeping heating surface free from scale results in considerable fuel saving. As a rough method of showing the fuel saving the total tons of coal used in locomotive service each year have been divided by total equivalent ton miles, obtained by assigning an increased ton mile value to passenger car ton miles and assuming that switch engine ton miles is a function of freight ton miles. The omission of a separate figure for switching service ton miles explains what may appear to be a high value for "lb. of coal per ton mile." This figure was kept up to 1919 and shows the following:

	1912	1913	1914	1915	1916	1919
Year ending June 30,						(Dec. 31)
Lb. coal equivalent per 100 ton miles	32.7	31.65	30.93	29.2	27.0	25.75
Per cent decrease over 1912	0	3.21	5.41	10.69	17.41	21.25

The decrease in fuel consumption from the year previous to water treatment to 1919 was 21.25 per cent, part of which can be attributed to extended use of superheater engines and brick arch, and the formation of a competent fuel organization.

Cost of Water Treatment

Considerable has been said in articles in the *Railway Age* about the heavy cost of blowing out. The officers of the Wabash realize that considering the waste of fuel and water, the cost of blowing off is possibly the major part of the cost of water treatment, but there is no guess work as to this expense. On an ordinary division where the treatment will average 0.6 lb. of soda ash per 1,000 gallons of water, after the engine has made several hundred miles since the boiler was washed, it will then be necessary to blow out about 4 per cent of the water to keep below the foaming point. This will entail a fuel waste of approximately 1.1 per cent of the coal used, and the total cost of the coal and water wasted would be about \$0.026 per 1,000 gallons. The average cost between washouts will be less than this, since very little blowing is done after washout until the concentration has reached the foaming point. This cost should always be considered as a part of the cost of water treatment. Under ordinary conditions it is usually cheaper to blow out a boiler than to wash it out at the terminal, but this cost of blowing out should never deter one from treating water, as it is much more than offset by fuel saving from clean heating surfaces and by other attendant benefits.

One thing that is very essential to the successful use of treated water is the support of the enginemen. It is their intelligent use of the blow-off cock that makes it possible to use this method of treatment. Blowing off a glass of water when the engine reaches its terminal relieves the engineman of part of the burden, but in freight service it is still necessary for considerable blowing off to be done between terminals.

I have read carefully the various articles brought about by Mr. Knowles' paper, and I do not feel like criticising any of the statements made but simply wish to present results

that speak for themselves, and which will always be open to investigation by anybody interested. As regards the use of boiler compound, I agree with Mr. Bardwell—there is no mystery. It is a clean-cut proposition in which one knows what is used for treatment, and knowing what is in the water, and the amount of treatment applied, should know what to expect in the way of results. The use of anti-foaming compound reduces the amount of blowing off necessary, and where the alkali salts in the treated water are not very high and it is not desired to make large mileage between washouts or water changes, the use of the anti-foaming compound should make it possible to get along without blowing off. On districts where the natural alkali salts are high, the anti-foaming compound is a necessity for practical operation.

The statement made by Mr. Coyle of the Great Northern, that a foaming point of 200 grains per gallon had been settled on because it happened to be the foaming point in a boiler where a lot of sludge and fine scale was set loose, does not agree with our experience. We have found through analyses of many thousands of waters taken from locomotive boilers which have been free from scale for years, that the water will foam when the concentration of dissolved solids is about 240 parts per 100,000. This varies somewhat; it will be a little lower if there is any unusual amount of mud in the water or decayed vegetable matter, and will run a little higher when all waters are clear.

Wabash boiler waters are in general not high in sulphate hardness, although rather high in total hardness, so that when untreated they form heavy scale. We appreciate that waters on railroads further west and in the Southwest are in many cases very high in sulphates as well as in foaming solids, and that treatment presents a much more serious and difficult problem than we have had to deal with.

Any steam user who does not use some method of treatment to prevent scale formation in his boilers is over-looking an opportunity to save much money. Whether scale prevention is to be accomplished by the use of boiler compound, by soda ash, or by water softeners is governed by financial conditions—any method pays; but any one of these methods in order to be successful must be accompanied by proper and intelligent supervision. The greatest argument against the treatment with soda ash alone is the foaming tendency of the treated water or the cost of blowing off to overcome this foaming tendency. If all waters were treated through the softener the low amount of lime solids in the treated water would make it possible to run with higher concentration before foaming took place, and consequently with a lower cost for blowing off. Information as to how high concentration can be carried in the boiler water before foaming takes place when all waters are treated through softeners could possibly be furnished by a few roads that have a complete division or divisions equipped with softeners. This figure may be rather high where anti-foaming compound is used in connection with the completely softened water. On the other hand, there is the possibility of some one, or several plants not operating properly at all times which would mean an increase in lime solids with resultant foaming concentration not much greater than with other methods of treatment.

The saving due to reducing blowing off can be figured at a definite value per 1,000 gallons of water and set against the interest, depreciation and operating charges for the softeners. Similarly, costs can be figured in determining whether the use of anti-foaming compound to reduce the amount of blowing off would be profitable. Some value should be attached to the psychological effect on enginemen of not having to do so much blowing off.

Nothing in the foregoing should be construed as in opposition to any method of treatment. Each method, if properly supervised, may accomplish from partial to complete results in scale prevention, and I have merely tried to show results which have been obtained on the Wabash through the use of soda ash, and are possible on any other railroad.

General News Department

The Post Office Appropriation Bill as passed by the Senate on March 20 carries an item of \$93,000,000 for inland transportation by railroad routes.

The Railway Accounting Officers' Association will hold its annual meeting at the Hotel Cleveland, Cleveland, Ohio, beginning Wednesday, June 7. It was previously announced that the meeting would be held beginning June 14.

Representative Beck has introduced in the House of Representatives a bill authorizing the Interstate Commerce Commission to approve or disapprove contracts involving the construction or repair of locomotive engines, cars and maintenance work for railroads engaged in interstate commerce.

The freight transfer station of the Delaware, Lackawanna & Western at Scranton, Pa., employing about 100 men, is to be operated under contract by Downey Brothers, of Binghamton, N. Y. According to local reports the pay of the men will be only about six per cent lower than they have received from the railroad company.

The Chicago, Rock Island & Pacific is consulting with radio-phone experts with a view of determining if it is practicable to install complete radio-phone and radiograph outfits on its Rocky Mountain Limited and Golden State Limited trains, to provide passengers with news bulletins during the day and with musical concerts during the evening.

The Interstate Commerce Commission has issued an order giving additional regulations for the recovery and payment of excess railway operating income for the year ended December 31, 1921, under the provisions of Section 15-a of the interstate commerce act. The commission had previously issued a similar order covering the income in 1920. Reports for 1921 are to be submitted on or before May 1, 1922.

Rock Island to Issue Historical Booklet

The Chicago, Rock Island & Pacific, in connection with the observance of the 70th anniversary of the road, next October, will distribute a booklet giving interesting historical facts regarding the development of the road since the first passenger train was run from Chicago to Joliet, Ill., on October 10, 1852. This was the same year that the first railroad train reached Chicago from the east.

Repeal of New Jersey Full-Crew Law

The legislature of New Jersey has repealed the full-crew law of that state, passed in 1913, and amended in 1917, and has enacted a new law, under which employees may apply to the State Utilities Commission if they have complaints to make concerning the number of men employed in the crews of trains on the railroads of the state. The action of the legislature was vetoed by the governor, but was at once passed over the veto.

Thirty-four Indicted for Theft at Buffalo

Employees of the New York Central indicted in court at Buffalo, N. Y., on March 16, in connection with thefts of freight, are charged with their accomplices, thirty-four. This includes a number of the company's police force, and some former policemen who were dismissed about three months ago. It is said that the indictments are based on evidence, given before the grand jury, to the effect that the railway plans were in operation, covering large trunks, yards, to handle, and at other places, and that employees of the road were found to be in collusion with burglars. It is said that the thieving has not been in existence for three years and that during the past 12 months it has carried off large quantities of whiskey and alcohol.

Pacific Railway Club

At the annual meeting of the Pacific Railway Club held at Oakland, Cal., on March 9, the following officers were chosen for the ensuing year: President, F. S. Foote, professor of railroad engineering, University of California; first vice-president, J. N. Clark, chief, fuel bureau, Southern Pacific; treasurer, R. G. Harmon, chief clerk, traffic department, Western Pacific and Denver & Rio Grande railroads. William S. Wollner (N. W. P.), who has been secretary of the club since its organization, was reelected for another year.

New Haven to Speed Up Settlement of Freight Claims

Freight claim agents, to deal directly with shippers and consignees, have been appointed on the New York, New Haven & Hartford for each of the nine divisions of the road; and, as a rule, these agents will adjust loss and damage claims for not more than \$300 on their own authority, obviating the delay incident to correspondence with the general office. This road also, some months ago, adopted a rule under which the local freight agents at 43 stations are at liberty, when, in their judgment, it is wise to do so, to settle freight claims not exceeding \$50.

Lackawanna Agrees Not to Reduce

Wages of Enginemen

The Delaware, Lackawanna & Western and its enginemen and firemen, represented by the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen, have agreed upon wages and working conditions affecting these employees. The contract, which runs to April 1, 1923, and thereafter unless cancelled, calls for the maintenance of present wage rates and working conditions during the life of the contract, excepting that if changes are made in the basis of overtime payment on other Eastern railroads as a result of agreement between management and employees or by a decision of the Labor Board, such changes will also be made effective on the Lackawanna insofar only as they apply to payment for overtime work.

Unit Costs of Train Operation

The average cost per freight train mile, for the selected accounts which the Interstate Commerce Commission uses to indicate unit costs of train service, for the year 1921 was \$1,799, according to the commission's monthly bulletin for December and 12 months, as compared with \$2,054 in 1920, a reduction of 12 per cent. Reductions were shown for each of the accounts used. The cost of coal per net ton, including freight, was \$4.10 as compared with \$4.20 in 1920. The total of these selected accounts per 1,000 gross ton miles was \$1,253 as compared with \$1,424 in 1920, a reduction of 11 per cent, and the cost per passenger train mile was \$993, as compared with \$1,098, a reduction of about 10 per cent. The selected accounts are locomotive repairs, engine house expenses, enginemen, trainmen, fuel and other locomotive and train supplies.

National Engineer Standards

The movement to develop national engineering standards sponsored by the American Engineering Standards Committee has made considerable progress during the past year. Among the standards approved during 1921 are method of sampling coal, a safety code for the protection of the heads and eyes of industrial workers, specifications for steel automatic screw stock and specifications and tests for Portland cement. Standards before the committee at the close of the year included a national

electrical safety code, specifications for car and locomotive forgings and a safety code for abrasive wheels. Numerous other projects of direct interest to railroads are now in the hands of the committee. The activities of the American Engineering Standards Committee have developed to such an extent that there is now work under way on a total of 79 distinct projects in which 160 bodies of national importance are co-operating.

Seek Grade Elimination Work

Various city councils have been actively engaged during the past few weeks in pressing their demands on certain railroads for an explanation of tardiness in carrying out state commission orders for grade elimination work in the localities in question. The city council of Milwaukee, Wis., has requested a reason for the delay of the Chicago & North Western in separating certain grades on its line through the southwest side of that city. It is expected that similar requests will be made of the Chicago, Milwaukee & St. Paul for like work in the northwest side of Milwaukee. The city council of Akron, Ohio, has also prepared extensive plans for grade elimination work in that city, and states that several years ago the railroads had promised to undertake the work in conjunction with the city, just as soon as their finances warranted.

Demand for Copies of Testimony

Before Senate Committee

The Senate has ordered printed as a Senate document 2,500 copies of Volume 4 of the testimony before the committee on interstate commerce in its general investigation of the railroad situation. This is the part including the testimony of Walker D. Hines and W. G. McAdoo. This action was proposed by Senator Kendrick of Wyoming, who originally asked that Volume 3 be also included, but withdrew the request because the cost of the two exceeded the limit (\$500) beyond which the Senate may not authorize printing without the concurrence of the House. Senator Cummins stated that the request would undoubtedly be followed by requests for other parts of the testimony, as there has been a very widespread demand for it, and the copies which the committee was authorized to have printed have been exhausted. He said that of Volume 3, covering 450 or 500 pages of the testimony of Frank J. Warne, the witness

for the labor unions, 15,000 or 20,000 had been ordered by certain unions, who had paid for them; but the printing had worn out the type so that if the entire testimony is to be reprinted that part would have to be reset.

Purdue University's Experimental Locomotive

The Purdue testing locomotive, Schenectady No. 3, will soon be placed in the shops of the Monon railway at Lafayette, Indiana, to undergo a general overhauling and receive the application of several new parts and economy devices. The placing of this locomotive in 1897 in the locomotive laboratory at Purdue was primarily the result of the efforts of W. F. M. Goss, then Dean of the Schools of Engineering. Co-ordinating with Dean Goss in his efforts was the generous interest manifested by the Schenectady Locomotive Works and various other manufacturers, chief among which were the following: Bethlehem Steel Company, American Steel Casting Company, Ashton Valve Mfg. Company, Detroit Lubricator Company, and the Keasby and Mattison Company. The product, known as Schenectady No. 2, was a saturated steam locomotive with a boiler designed to carry a pressure of 250 lb. per sq. in.

In 1910, certain modifications including new flue sheets, were made to provide for the application of a Schmidt superheater by the American Locomotive Company. The designation of the locomotive was then changed to Schenectady No. 3, the locomotive as it stands today in the locomotive laboratory.

The new work contemplates chiefly the application of new cylinders and outside valve gears. Donations towards this work have either been received or promised as follows: Baldwin Locomotive Works, new cylinders and piston valves, outside steampipes, pistons, crossheads and guides, main crank pins, and Walschaert valve gear complete; Locomotive Fire-box Company, thermic syphon; Sunbeam Electric Company, complete headlight and cab lighting equipment; Nathan Mfg. Company, injectors, boiler checks and water glass; Locomotive Fuel Economizer Company, Boyce fuel economizer, and Southern Valve Gear Company, complete valve gear.

A. R. A. Acts on Power Brake Investigation

In the matter of the Interstate Commerce Commission's order relating to the investigation of power brakes and calling for certain information to be supplied by April 1, 1922, and further advising of hearing on the subject set for April 6, 1922, at Washington, the General Committee of the Mechanical Division of the American Railway Association at its meeting in Chicago, Tuesday, March 14, reached the following conclusions:

(a) That the time was not sufficient to assemble the data required; (b) that for the hearing on April 6 it is suggested each carrier send its representative to Washington with whatever information can be obtained by that date; (c) that the Committee on Safety Appliances of the Mechanical Division, consisting of C. E. Chambers (chairman), superintendent motive power and equipment, Central Railroad of New Jersey; C. E. Fuller, superintendent motive power and machinery, Union Pacific; W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific; J. T. Wallis, chief of motive power, Pennsylvania System; C. F. Giles, superintendent machinery, Louisville & Nashville, and T. H. Goodnow, superintendent car department, Chicago & North Western, be delegated to handle the matter for the association and that it be given any assistance necessary by the Train Brake and Signal Equipment Committee; (d) further, that the Committee on Safety Appliances be directed to advocate that present brake arrangements are satisfactory and that the percentage of mileage on grades is too small in proportion to total mileage to warrant any greater investment in brake appliances.

Subsequent to the meeting, it was requested that all information developed by each of the carriers and supplied to the Interstate Commerce Commission be forwarded to C. E. Chambers, superintendent of motive power and equipment, Central Railroad of New Jersey. If possible, a supplementary order will be obtained extending the time for supplying information and the date of the hearing.

RAILWAY REVENUES FOR JANUARY, 1922, AND LAST YEAR

	1922	1921
Average number of miles operated.....	235,388.82	234,888.55
Revenues:		
Freight	\$276,473,266	\$324,934,826
Passenger	83,720,061	105,243,307
Mail	7,375,700	8,220,831
Express	6,519,221	7,441,230
All other transportation.....	12,025,806	13,433,588
Incidental	8,392,282	10,596,054
Joint facility, Cr.	607,740	704,211
Joint facility—Dr.	173,287	185,071
Railway operating revenues.....	394,940,789	470,388,976
Expenses:		
Maintenance of way and structures..	48,666,568	60,756,654
Maintenance of equipment.....	93,506,246	124,077,708
Traffic	7,170,601	7,342,614
Transportation	171,137,867	230,812,638
Miscellaneous operations	3,689,267	4,522,229
General	13,514,767	15,262,423
Transportation for investment—Cr. ..	416,194	577,938
Railway operating expenses.....	337,269,122	442,196,328
Net revenue from railway operations...	57,671,667	28,192,648
Railway tax accruals.....	22,557,530	22,143,225
Uncollectible railway revenues.....	89,352	69,489
Railway operating income.....	35,024,785	5,979,934
Equipment rents—Dr. balance.....	4,050,053	3,130,334
Joint facility rent—Dr. balance.....	1,498,310	1,323,970
Net railway operating income.....	29,476,422	1,525,630
Ratio of expenses to revenues (per cent)	85.40	95.01

Note—Excludes Detroit, Toledo & Iron Mountain report not having been filed at date of compilation.

¹Includes \$2,251,981, sleeping and parlor car surcharge.

²Includes \$2,445,079, sleeping and parlor car surcharge.

Traffic News

R. A. Davis has been elected secretary of the Railway Traffic Club of Springfield, Ill., succeeding M. C. Lauterbach.

The Interstate Commerce Commission has reopened the various intrastate express rate cases for such oral argument or reargument as the commission may hereafter direct.

The "Pittsburgh Plus" hearings being conducted by John W. Bennett, examiner of the Federal Trade Commission, were resumed at Chicago on March 20. The principal witnesses heard the first day were George E. Lasker, managing partner of the Lasker Iron Works, Chicago, and Eugene H. Heller, president of the Hill Pump Valve Company, Chicago. Both witnesses maintained that Chicago and the West are discriminated against and that their industries suffer because of the practice.

Walker D. Hines Retained by I. C. C.

The Interstate Commerce Commission has retained the services of former Director General of Railroads, Walker D. Hines, to represent the commission in the court proceedings growing out of its order in the New England divisions case.

N. E. Freight Rates; Injunction Asked For

The Trunk lines, including all of the principal roads in Eastern territory, west of the Hudson river, except the Pennsylvania and the Baltimore & Ohio, joined in petitions to the United States District Court, at New York city, on March 20, asking for an injunction against the enforcement of the recent order of the Interstate Commerce Commission requiring the revision of the divisions, as between the Trunk lines and the New England lines, on through freight to and from New England points; which order would increase by 15 per cent the share allotted to the New England lines, and decrease the share accruing to the lines west of the Hudson river by a sum equal to the increase allotted to the New England lines. Plaintiffs allege that the order is arbitrary and is not within the lawful power of the Interstate Commerce Commission.

The New York Central, because of its lease of the Boston & Albany, filed a separate petition.

It is estimated that the amount which would be added to the receipts of the New England roads by the carrying out of the Commission's order would be \$7,500,000 annually. It is understood that the Pennsylvania and the Baltimore & Ohio hope to induce the New Haven road to join in a comprehensive revision of all through freight rates. One objection to the action of the Commission is that it is a blanket order, not based on the actual conditions of any one rate or any class of traffic; or upon any suitable record of freight movement.

Arguments will be presented on March 30.

Rate Decision First Week of April

That the Interstate Commerce Commission hopes to be able to announce its decision in the general rate advance case about the first week in April was stated by Commissioner Esch at a hearing before the House committee on interstate and foreign commerce on March 21. The hearing was called to consider various bills to require the railroads or authorize the Interstate Commerce Commission to require the railroads to issue interchangeable mileage book tickets at reduced rates. Mr. Esch opposed the bill recently passed by the Senate, giving authority to the commission to require the issuance of mileage tickets at a rate to be determined by the commission, saying that a majority of the commission, including its legal division, believe it to be unconstitutional. He said the question whether a reduced rate mileage book should be required is one of policy for Congress to determine. The commission will enforce any law that Congress may

pass, leaving its interpretation to the courts, but he raised the question whether a reduction on mileage books would not interfere with reductions in rates which would be open to the entire public and not limited to a class. He also said the effect of a reduction in the revenues of the carriers should be considered in view of the fact that the roads are earning less than 6 per cent.

Representative Kahn of California, advocated his bill providing for a rate of 2½ cents a mile and Senator Poindexter advocated the Senate bill.

Former Senator Hoke Smith of Georgia also appeared before the committee to advocate a reduced rate mileage book, on behalf of a number of commercial travelers' organizations.

Coal Production

Production of soft coal passed the 11,000,000 ton mark during the week ended March 11. The output is placed by the Geological Survey at 11,058,000 net tons, an increase of 505,000 tons over the week preceding. The bulletin calls attention to the fact that the present course of production is strangely like that in late September and October when consumers were purchasing in anticipation of a possible railroad strike. However, a further increase of 2,000,000 tons a week would be necessary to raise the current output to the level attained just before the mine strike of 1919.

I. C. C. and State Commissioners Confer

Relations between federal and state regulation of rates were discussed at a conference between members of the Interstate Commerce Commission and a committee of state railroad commissioners at Washington on March 17, called at the invitation of the Interstate Commerce Commission following suggestions made by Chief Justice Taft in the decision in the Wisconsin rate case that a plan of co-operation between state and federal authorities may obviate the necessity for rigid orders of the Interstate Commerce Commission affecting state rates.

No announcement was made of any results of the conference and it was stated that no arrangements had been made for another meeting. It is understood that the attitude of the state commissioners is such that no agreement could be reached until they have definitely ascertained whether they have a chance of success in their efforts to have Congress change the provisions of the transportation act from which the commission derived its authority to order statewide increases in intrastate rates. This attitude was indicated shortly before the conference by John E. Benton, general solicitor of the National Association of Railway & Utilities Commissioners, in a statement at a hearing before the House committee on interstate and foreign commerce on the bills to amend the law to meet the views of the state commissioners. He said: "It cannot be possible that anything which will cure the situation which has been laid before your committee can come out of agreements. The law is in such shape that the carriers are under no obligation to present applications for increases to the state authorities."

The Interstate Commerce Commission was represented at the conference by chairman McChord and Commissioners Hall, Esch, Lewis and Eastman, while the state commissions were represented by Carl D. Jackson, of the Wisconsin commission, president of the National Association of Railway and Utilities Commissioners; Clyde M. Reed, chairman of the Kansas commission; W. D. B. Ainey, of the Pennsylvania commission; Alexander Forward, of the Virginia commission; H. G. Taylor, of the Nebraska commission, and Henry G. Wells, of the Massachusetts commission.

EXPORTS OF FLOUR from Canada in the five months ending January aggregated 3,255,400 barrels, as compared with 2,935,789 barrels for the corresponding period of the previous year.

JOBS FOR TRAVELING PASSENGER AGENTS. The province of British Columbia has decided to have a "British Columbia Invitation Week" from April 3 to April 8, inclusive, when every man, woman and child in British Columbia is expected to write a letter to a family or friend inviting them to come and visit the Pacific Coast during the summer.

Commission and Court News

Interstate Commerce Commission

The commission has modified its order in the Texas intrastate rate case so as to exclude from its provisions rates on refined sugar in carloads from Sugarland, Tex., to Texas common points.

The commission has reopened the Oklahoma intrastate rate case for argument at Washington on March 30 on a motion to dismiss the proceeding made by the Oklahoma commission, and a motion for further hearing filed by the respondent carriers.

Coal Rate Division to Be Investigated

The commission has ordered an investigation concerning the propriety and reasonableness of the divisions accorded to the Baltimore & Ohio, the Norfolk & Western and the Chesapeake & Ohio out of the joint rates on bituminous coal to and from points on those lines and points in Michigan, Ohio, Indiana, Illinois and Michigan. The commission, in Ex Parte 74, had stated that divisions stated in specific amounts should be increased in the same percentages as the through rates; but the three roads mentioned filed a petition with the commission stating that their connecting lines had refused to accord them divisions as contemplated by the commission's report.

State Commissions

The Oregon Public Service Commission and the Arizona Corporation Commission have issued orders requiring that commercial auto buses and trucks operating over the highways of those states be brought to a full stop before crossing railroad tracks. The orders are similar to those issued recently in California and Nevada.

Railroad Crossing for School Children

The Illinois Commerce Commission denied an application by the directors of a school district for the establishment of a grade crossing near a schoolhouse for the use of pupils, the power of the Commission in a matter of this kind being limited to granting its permission to establish a grade crossing of a highway over railroad tracks.

United States Supreme Court

Abandonment of Intrastate Road Is a Local Question

The United States Supreme Court in an opinion handed down on March 14 denied the authority of the Interstate Commerce Commission to authorize the abandonment of the Eastern Texas Railroad under the provisions of the Transportation act, 1920, on the ground that the railroad lies entirely within a single state, is owned and operated by a corporation of that state, is not a part of another line, and its continued operation cannot be a more than local concern. The case was brought by the state of Texas on appeal from the federal district courts, which had sustained the commission, the plea being that the commission's order was an encroachment upon the jurisdiction of the state. The court held that in this case interstate and foreign commerce will not be burdened or affected by any shortage in the earnings, nor will any carrier in such commerce have to bear or make good any shortage. The court said it was the intention of Congress to enact a law to regulate interstate and foreign commerce and to affect intrastate commerce only as may be incidental to the effective regulation and protection of interstate.

Opinion by Justice Van Devanter. The court decided not to pass upon the question whether the railroad company was entitled to abandon its line, because that question was not presented in this case. The opinion was unanimous.

Foreign Railway News

New Line from Chile to Argentina Authorized

The expenditure of some \$16,000,000 has been authorized for the construction of a railway line connecting the Chilean coal fields in the south with the Buenos Aires Great Southern Railway at Zapata, Argentina, according to the Wall Street Journal. Financing will be arranged by taxes on fuel.

New Railway in Bolivia

The present session of the Bolivian Congress will, according to the Wall Street Journal, be asked to authorize financing to allow the construction of a railway from Potosi to Sucre, a distance of 121 miles. In 1918, 29 miles of this line was completed but nothing more was done because of the inability of the government to secure capital. It is believed that the government now has a definite proposal of financial backing and that the work can be undertaken if the congress gives the necessary authority.

All-Highway Freight Traffic in England

Motor truck competition presents a serious problem to the British railways. They use motor trucks themselves in carrying on their "store-door" delivery services, but few of the companies are privileged to engage in all-highway transportation. The following is from Commerce Reports: "Railway companies in Great Britain are being offered serious competition by motor highway transport, which is making great headway and is viewed with considerable alarm by railway officials. High railway rates, an excellent system of highways, and the release of large numbers of motor vehicles formerly used for military purposes, together with the men who drove them, all combined with a winter climate not unduly severe, serve to advance this competition. However, in some quarters its importance is thought to be over-estimated, because motor traffic will ultimately be compelled to bear its proportion of taxes for maintenance of the highways; furthermore, doubts exist as to whether any of the motor transport companies are setting aside the proper sums for repair and renewal of vehicles.

"Within certain limits road motor transport companies are considered common carriers and are subject to the provisions of the Transport Act of 1919, under which any person considering rates charged to be excessive may apply to justices of the peace; but this is rarely done in the case of motor transport companies. Aside from this, there is no legal limitation to the charges which they may impose.

"A comparison of the road transport companies' charges with those of railways is given in the following table of average rates per ton:

	Road charges.		Rail charges.	
	s.	d.	s.	d.
London to—				
Bristol	43	9	59	4
Birmingham	45	0	56	10
Brighton	31	0	39	7
Leicester	44	0	52	6
Southampton	39	6	51	8

"Approximate haulage rate for an average distance of 12 miles by motor truck, including collection and delivery, is 7d. per ton-mile. For longer distances the rate is somewhat less, and for shorter distances the rate is relatively higher.

"In the report of a committee appointed by the Ministry of Transport to inquire into the question of railways engaging in road motor transport, it is pointed out that a considerable bulk of paying traffic is being diverted from the railways by road transport companies. It is the desire of the railways to recover this traffic for their own lines by means of road traction if necessary.

"The North Staffordshire and the Great Northern of Scotland railways have already obtained statutory powers to carry goods upon the highways, while the Lancashire & Yorkshire operates 13 services. The London & Northwestern

maintains a motor-car freight service between Manchester and Macclesfield and Buxton, and between Coventry and Nuneaton. The Midland has a similar service between Derby and Matlock districts; the London & Southwestern between London and Putney, Mortlake, Barnes, East Sheen, and Roschampton; the South-eastern & Chatham provides service between London and Nunhead, Lewisham, Catford, Brockley, Blackheath, Lee, Herne Hill, and Penge. The carriers deliver to distances as far as 50 or 60 miles from their centers.

"The committee was not certain that railway companies should be permitted to proceed without limit in the development of road transport; but it was of the opinion that for developing districts in which no transport by independent road carriers existed railway companies might, with the consent of the Ministry of Transport, establish and operate such service for a limited period, even if conducted at a loss. Serious opposition has developed to the railways engaging in highway motor transportation, chamber of commerce, and agricultural and other associations feeling that it would result in a complete monopoly and nullification of the present competition.

"One of the largest transport concerns has developed the use of demountable truck bodies to a large extent, having over 400 in service in conjunction with 200 motor trucks. It is the opinion that for efficient operation there should be at least three bodies to each chassis, thus permitting one body to be left at starting point, one to be carried, and one waiting at destination. The loaded bodies are handled by a mechanical device, delays in loading and unloading are eliminated, and a wider use of the motor itself is made possible."

Czecho-Slovak Railways

The railway mileage of Czecho-Slovakia is 8,488, of which private companies operate about 610 miles. Of the government operated lines 590 miles are double tracked, according to Commerce Reports. A definite program of extension has been adopted by the government which calls for double tracking to bring the percentage of line mileage so equipped up to 16 per cent of the total; and for new lines totaling 346 miles.

There are 4,280 locomotives in the country and 106,250 cars, of which about 10,000 are for passenger train service. Equipment has been so far restored to normal that unserviceable locomotives represent but 14 per cent and bad order cars 8 per cent of the total.

Railway Car Builders Strike in Great Britain

London

Over 10,000 members of the Amalgamated Society of Railway Vehicle Builders, Wheelwrights, Carpenters and Mechanics are on strike against wage reductions proposed by the employers which it is stated would represent such heavy decreases as 40s. 9d. (approximately \$9.90 at the normal rate of exchange) per week per man for piece work and 33s. (\$8.02) per week per man for time work. Railway car builders and kindred workers all over the country are affected by the strike. Approximately 90 per cent of the members of the society are on piece work. In the year 1919 a production payment of 25 per cent was added to the wages earned above £3 (\$14.58) per week on piece work.

The employers demand that wages should be reduced by 15 per cent on basic rates and that the 26s. 6d. (\$6.44) weekly bonus should be eliminated. Nationally the employers are concentrating on piece work reductions, but in certain districts the employers are also asking that time workers should accept a reduction of 6s. 3d. (\$1.52) per week, which is equal to a reduction of 10 per cent, in addition to the surrender of the weekly bonus of 26s. 6d. (\$6.44).

The wages are now 110 per cent above the pre-war rates, but the employees contend that the pre-war standard was too low and that the present wage rates in view of the circumstances of the time and the altered conditions should remain operative. In January this year, the men accepted wage reductions of 10 per cent on piece work and 6s. (\$1.46) per week on time work, in addition to having surrendered 7½ per cent of the 12½ per cent "Churchill" bonus.

Equipment and Supplies

Locomotives

THE NEW YORK CENTRAL is inquiring for 50, 0-8-0 type switching locomotives.

THE CHICAGO & NORTH WESTERN will probably buy 50 locomotives in the near future.

THE LOUISVILLE & NASHVILLE is inquiring for 6 Mikado type locomotives and 4, 0-8-0 switching locomotives.

THE STUDEBAKER CORPORATION, South Bend, Ind., has ordered 2, 0-6-0 type locomotives from the American Locomotive Company.

Freight Cars

THE SOUTHERN PACIFIC is inquiring for 2000 automobile box cars, of 55 tons capacity.

THE LOUISVILLE & NASHVILLE is inquiring for 500 all steel hopper cars, of 55 tons capacity; also for from 500 to 1,000 composite gondola cars, of 50 tons capacity.

THE CHICAGO & NORTH WESTERN noted in the *Railway Age* of March 11 as inquiring for 2750 freight cars, has put out an additional inquiry for 300 ballast cars and 50 tank cars.

THE NORFOLK & WESTERN, reported in *The Railway Age* of March 11 as inquiring for 4000 steel hopper cars, has ordered 1000 from the Standard Steel Car Company, 1000 from the American Car and Foundry Co., and 2000 from the Pressed Steel Car Company.

THE NEW YORK CENTRAL may place orders for several thousand new freight cars. As noted in the *Railway Age* of March 18, contracts have already been let for 1000 new cars. The company is also placing contracts for the repair of a large number of freight cars, including 300 cars to the Ryan Car Co.; and a number to the Streater Car Company, the Buffalo Steel Car Company and the Euclid Steel Car Company, for the Michigan Central; also 500 to the Ralston Steel Car Company, for the Toledo & Ohio Central. All the cars for repair are steel gondola and hopper cars.

Passenger Cars

THE MISSOURI, KANSAS & TEXAS has renewed its inquiry for 30 passenger cars.

THE CHESAPEAKE & OHIO is asking for bids on 30 all steel passenger coaches, 8 all steel combination passenger and baggage cars and 25 all steel express cars.

Iron and Steel

THE GREAT NORTHERN is inquiring for 380 tons of fabricated "I" beam spans for 59 steel bridges.

THE CHESAPEAKE & OHIO reported in the *Railway Age* of February 25 as inquiring for 21,000 tons of rail including 3,000 tons for the Hocking Valley, has placed orders as follows: Inland Steel Company, 9,000 tons, Illinois Steel Company 7,000 tons, Bethlehem Steel Company, 1,000 tons, and 3,000 tons with another company for the Hocking Valley.

Machinery and Tools

THE GREAT NORTHERN is inquiring for a 1,400-ton full hydro-pneumatic 52 in. car wheel press including a 7½ h. p. 3 phase, 60 cycle, 440-volt motor complete with starter; 1, 24 in. vertical turret boring mill, including a 15 h. p. 3 phase, 60

cycle, 440-volt motor and starter with 1 set of standard tool equipment; 1, 36 in. heavy duty upright common drill press, including motor and starter; 1, 30 in. high duty lathe connected to suitable motor and starter; 1, 600-ton full hydro-pneumatic slanting head driving wheel press with 13 in. throat, with motor and starter; 1 throatless shear with suitable motor; 2 pneumatic riveting hammers for driving ½ in. rivets; 1, ½ in. double headbolt cutter with motor and full set of dies; 1 pipe threading machine for cutting ¼ in. to 2 in. pipe, with motor and dies; 1 crank pin turning tool. 1, No. 5, cylinder grinding machine for cylinders from 3 in. to 8 in.; 1, 15 h. p. 3 phase 60 cycle, 440-volt squirrel cage induction motor with starter; and 1, 30 in. selective head lathe 7 ft. between centers with motor and starter.

Miscellaneous

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for its gasoline, kerosene and long time burner oil requirements for the period from April 1, 1922, to December 31, bids to be submitted before noon of March 27 at Chicago.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon March 31 for its requirements until July 1, 1922, for the Line Buffalo and East of fuel oil (paraffine base), gasoline, kerosene, long time burning semaphore oil, turpentine substitute coach candles, mineral seal oil, common black oil, West Virginia black oil and gas oil also for its requirements until May 1, 1922, for the Line Buffalo and East of asphaltum base fuel oil.

Signaling

THE MISSOURI PACIFIC has ordered a 12-lever Saxby & Farmer interlocking machine from the General Railway Signal Company, for installation at Columbia, La.; and also the same type of machine for a second installation at Alexandria, La. The construction work will be done by the railroad company's forces.

THE NORTHERN PACIFIC has let the contract for its automatic block signals to the General Railway Signal Company, Rochester, N. Y. These signals, as noted in our issue of March 15, page 625, are to equip the line from Fargo, N. D., to Mandan, 204 miles, of which 151 miles is single track and 53 miles double. Three-position upper-quadrant semaphores will be used.

THE GREAT NORTHERN has ordered from the General Railway Signal Company "A. P. B." automatic block signals system, for installation on single track between Newport, Wash., and Bonner's Ferry, Idaho; between Troy, and Rexford and between Whitefish and Strykers, Mont., an aggregate distance of 165 miles. Installation will be made by the signal company's forces.

Supply Trade News

J. Ross Bates, formerly with Vonhan Bates & Goode Trading Corporation, New York City and Boston, Mass., will in the future represent the Orton & Steinbrenner Company, Chicago. Mr. Bates has offices at 136 Liberty street, New York City, and 128 School street, Watertown, Mass.

George H. Green, who has been elected vice-president and secretary of the Universal Packing and Service Company, was born on December 19, 1886, at Chicago. He entered business in the testing department of the Chicago, Rock Island & Pacific in 1906 and during the succeeding eight years served as inspector and chief inspector of materials. In 1914, he was appointed railroad representative of the Garlock Packing Company, and two years later he entered the service of the National Waste Company as sales representative. During the war Mr. Green served as a lieutenant in the field artillery branch of the service and upon his return to this country entered the service of the National



G. H. Green

Waste Company. In 1919, he was elected vice-president of the company, which position he still retains in addition to his new duties with the Universal Packing and Service Company.

John P. Landreth, who has been elected president and treasurer of the Universal Packing and Service Company, Chicago, was born at Beloit, Kan., on August 11, 1883, and attended the public schools and a business college at Joplin, Mo., and later the Missouri Military Academy at Mexico, Mo. He entered business with the Joplin Water Works Company, Joplin, Mo., as a collector and inspector of accounts. Later he served as a car clerk on the Denver & Rio Grande at Salida, Colo., and, in 1902, became associated with the English Iron Works at Kansas City, later entering the railway specialty sales department of this company at St. Louis. In 1904 he became associated



J. P. Landreth

with the Garlock Packing Company as traveling salesman, and on January 1, 1905, was transferred to St. Louis as city salesman. One year later he was placed in charge of the Kansas City office of the company and in May, 1908, was made Chicago manager, which position he held until July, 1916. On the latter date he was appointed western sales manager of the Anchor Packing Company of Philadelphia, Pa., with headquarters at Chicago, which position he still retains in addition to his duties as president and treasurer of the Universal Packing and Service Company.



On the Gothard Tunnel Line, Switzerland

C. E. Skinner, manager of the research department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed assistant director of engineering. His duties will cover research, standards and other work along these lines. Mr. Skinner was born near Redfield, Ohio, on May 30, 1865, and was graduated in 1890 from Ohio State University. The same year he joined the Westinghouse organization in the controller department, and supervised the construction of the first controller turned out by that company. Soon afterward he was placed in charge of the testing of insulation, and in 1892 he was transferred to the research laboratory. In 1895 he was placed in charge of insulation design in the engineering department, taking charge, in 1902, of the insulation division of that department, together with the chemical and physical laboratories. Four years later he organized the research division, of which he has been in charge until his present promotion. In 1915 he was a special representative of the American Institute of Electrical Engineers, of which he is a fellow, at the international conference on electrical standards held in London, and he is now a member of the committee representing the Institute of the International Electrotechnical Commission. He was chairman of the American delegates to the Brussels meeting in 1920.

Merger of Machine Tool Manufacturers

Negotiations to merge a number of machine tool manufacturers are said to have been completed, according to recent announcement. The name of the new corporation has not yet been decided upon. The companies included in the merger are the Lodge & Shipley Machine Tool Company, Carlton Machine Tool Company, Newton Machine Tool Works, Inc., Betts Machine Company, Colburn Machine Tool Company, Hilles & Jones Company, Modern Tool Company, and the Dale Machinery Company.

Obituary

William Boughton, district representative at Detroit, Mich., of the Superheater Company, New York city, died at his home in Detroit on March 8, of heart disease. Mr. Boughton was born in Ontario county, New York, in 1861. He went to Saginaw, Mich., in 1876, and a year later began his railroad career with the Pere Marquette as a machinist's apprentice. Two years later he was advanced to brakeman, later to fireman, and in 1882 to engine man. In 1898, Mr. Boughton was promoted to road foreman of engines, and seven years later he was appointed master mechanic of the Saginaw division. In 1909 he became general master mechanic of the entire system and later was promoted to superintendent of motive power. He resigned from the service of the Pere Marquette in 1912 to become district representative at Detroit of the Superheater Company, New York city, which position he held at the time of his death.

Trade Publications

AUTOMATIC DRIVING BOX WEDGES.—The Franklin Railway Supply Company, New York, has issued a phantom view of the Franklin automatic adjustable driving box wedge showing the construction of the wedge and related parts and giving instructions for proper methods of lubrication.

GLASS TILE.—The Federal Cement Tile Company, Chicago, has issued a leaflet describing and illustrating a form of tile which it manufactures which contains wire glass panels for lighting purposes. The leaflet includes a view of an installation of this tile in roof construction and a list of other installations of these products.

CROSS TIES.—The Century Wood Preserving Company, Pittsburgh, Pa., has issued a 16-page booklet on the storing and seasoning of cross ties. The bulletin is chiefly reading matter directed to the end of discussing the various factors influencing air seasoning, tie deterioration, etc., and shows the proper methods of storing ties under various conditions. Aside from the reading matter, several illustrations are included to show actual views of ties in storage.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of February 18 (page 453), as contemplating the construction of an extension to its lines from Owen, Okla., to Pawhuska, a distance of approximately 40 miles, has awarded a contract for this work to Maney Bros., Oklahoma City, Okla.

ATCHISON, TOPEKA & SANTA FE.—This company has been granted authority by the Kansas State Charter Board to construct a cut-off extending from Eldorado, Kans., to Ellinor, a distance of about 43 miles, to further include a four-mile belt line just east of Eldorado. This line will be known as the Eldorado & Santa Fe.

CANADIAN PACIFIC.—This company is now receiving bids for the construction of a freight terminal building at Windsor, Ont., to include a one-story office building 40 ft. by 60 ft., and a shed 40 ft. by 300 ft.

CANADIAN PACIFIC.—This company is asking for bids for the construction of a new bridge across the Coquitlam River, Vancouver, B. C., to replace the old one washed away during the heavy floods of November. The new structure, which will be built of steel, is to be about 300 feet long with concrete piers. The concrete abutments will be placed farther apart than in the former structure to make more allowance for another possible swelling of the river.

CHESAPEAKE & OHIO.—This company closed bids on March 22, for the construction of a 500-ton reinforced concrete coaling station at Peach Creek, W. Va., and one at Thurmond.

CHICAGO & ALTON.—This company, in conjunction with the residents of Greene and Jersey counties, Illinois, will construct an extension to its lines from Titus, Ill., to Reddish Road, a distance of about 3.77 miles, and a further extension from a point approximately half-way on this line, to Hardin, Ill., a distance of about 1.8 miles. Farmers in this vicinity will furnish the right-of-way and ties, and do the grading. The Illinois Commerce Commission has authorized this extension and a petition for permission to do this work is now on file with the Interstate Commerce Commission.

CHICAGO & EASTERN ILLINOIS.—This company, and the Pittsburgh, Cincinnati, Chicago & St. Louis, have been petitioned by Arthur, Ill., through the Illinois Commerce Commission, to construct a suitable station at that point.

CHICAGO & WESTERN INDIANA.—This company, which was noted in the *Railway Age* of March 4 (page 548), as having closed bids on February 28, for the remodeling of its passenger station at 63rd and Wallace streets, Chicago, has awarded a contract for this work to Rowley Bros., in that city.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to John Griffiths & Sons, Chicago, for the remodeling of its 15-story office building in that city which was badly damaged by fire on March 15.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to John Griffiths & Son for the construction of a four-story reinforced concrete and steel inbound freight house, 300 ft. by 700 ft., at Chicago, the foundation for which was completed some time ago. The same company contemplates the construction of a brick passenger station at Westmont (near Hinsdale), Ill., and one at Franklin, Neb.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company and the Lake Erie & Western have been petitioned by the city of Bloomington, Ill., through the Illinois Commerce Commission, to separate their grades at South Main street in that city.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has applied to the Interstate Commerce Commission for authority to construct a 3.5 mile cut-off in Delaware county, Ohio.

DENVER & RIO GRANDE WESTERN.—This company contemplates the construction of a subway under its tracks near Overland Park, a suburb of Denver, Colo., although no definite plans have as yet been made for this project.

GREAT NORTHERN.—This company, which was noted in the *Railway Age* of February 11 (page 401), as contemplating the construction of a second main track between Williston, N. D., and Spring Brook, a distance of about 8 miles, has awarded a contract for the grading to A. Guthrie & Co., St. Paul, Minn., and for the bridge and culvert work, to W. F. Hill, Superior, Wis.

GREAT NORTHERN.—This company will soon receive bids for the construction of terminal facilities at Wenatchee, Wash., to include a 24-stall roundhouse, storehouse, coaling station, water supply equipment, boiler washing plant and other necessary buildings. As much material and equipment as possible will be reclaimed from the recently abandoned terminal at Bowdoin, Mont.

GREAT NORTHERN.—This company contemplates the construction of a one-story car repair shop 40 ft by 300 ft., at Minot, N. D., estimated to cost \$85,000.

KANSAS, OKLAHOMA & GULF.—This company has petitioned the Kansas Public Utilities Commission for authority to construct an extension from Baxter Springs, Kan., to Military, a distance of about 6.5 miles, where a connection will be made with the Missouri, Kansas & Texas. It is expected that the hearing on this petition will be held the latter part of this month.

LEAVENWORTH & TOPEKA.—This company contemplates the construction of a new bridge across the Delaware river at Osawkie, Kan. An application for a loan has been made to the Interstate Commerce Commission, part of which is needed to finance this construction.

LOS ANGELES & SALT LAKE.—This company has petitioned the railroad commission of California for authority to construct a railroad from Fullerton, Cal., to Anaheim, in Orange county. This proposed road is an extension of a branch line, the work of which was commenced in 1916, and discontinued under federal control.

MICHIGAN CENTRAL.—This company closed bids on March 21, for the construction of a brick passenger station, 33 ft. by 94 ft., with slate roof, estimated to cost about \$25,000, at Hastings, Mich.

MIDLAND VALLEY.—This company has awarded a contract to the Ogle Construction Company, Chicago, for the construction of a 100-ton frame coaling station at Panama, Okla., and a similar one at Lefebvre.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company, in conjunction with the Chicago & North Western and the City of Ironwood, Mich., noted in the *Railway Age* of February 4, page 353, as receiving bids for the construction of a reinforced concrete viaduct 1,500 ft. in length over 23 tracks at Mansfield street, Ironwood, has awarded a contract for this work to the Albinston Construction Company, Minneapolis, Minn. The work will cost \$92,700 and will be commenced at once.

NORTHERN PACIFIC.—This company contemplates the construction of a three-story combination brick passenger station and office building at Glendive, Mont., estimated to cost \$150,000.

SOUTHERN.—This company will construct a second main track between Morrystown, Tenn., and New Line, a distance of about 1.5 miles.

WARASH.—This company has been petitioned by Decatur, Ill., through the Illinois Commerce Commission to separate grades and construct a subway under its tracks at an intersection with a public highway, east of that city.

WASHINGTON, BRANDYWINE & POINT LOOKOUT.—This company has applied to the Interstate Commerce Commission for authority to increase its capital stock from \$100,000 to \$500,000 for the purpose of constructing an extension from Mechanicsville to Point Lookout, Md., with branches to Drum Harbor and St. Mary's City.

Railway Financial News

AKRON, CANTON & YOUNGSTOWN.—Equipment Trust Certificates Authorized.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$270,000 of equipment trust certificates to be issued under the Akron, Canton & Youngstown engine trust of 1921 in connection with the procurement of nine locomotives.

ALABAMA GREAT SOUTHERN.—Income Statement.—The income statement for the year ended December 31, 1921, shows the following results:

Gross operating revenues	\$9,542,225
Total operating expenses	8,196,320
Net revenue from operation	\$1,345,905
Taxes and uncollectible railway revenue	328,427
Equipment and joint facility rents (Debit)	3,303
Railway operating income	\$1,020,786
Other income	427,697
Total gross income	\$1,448,483
Deductions from gross income	402,606
Total available income	\$1,045,877
Interest on mortgaged, bonded and secured debt	510,787
Balance of income over charges	\$535,090

APACHE.—Application to Issue Securities Denied.—The Interstate Commerce Commission has denied this company's application for authority to issue 550 shares of its capital stock and a promissory note for \$455,000 to be secured by a second mortgage as not found compatible with the public interest and reasonably necessary for the proper performance of service to the public as a common carrier.

ASHLAND, ODANAH & MARENGO.—Asks Authority to Abandon Line.—This company has applied to the Interstate Commerce Commission for certificate authorizing the abandonment of its tracks which consist of about 20 miles running from Odanah, Wis., to certain lumber tracts on which the lumber has been cut.

ATLANTA & ST. ANDREWS BAY.—Abandonment of Branch Line.—The Interstate Commerce Commission has made public a proposed report of Attorney Examiner Clarke recommending that a certificate be issued, authorizing the abandonment of the operation of a branch line between Panama City and St. Andrews Bay, Fla. This line was previously permitted to be abandoned for an experimental period, since which there has been a re-hearing of the case.

ALTON & SOUTHERN.—Guaranty Certified.—The Interstate Commerce Commission has issued a certificate for \$100,000 as due this company on account of its six months guaranty.

BUFFALO, ROCHESTER & PITTSBURGH.—Guaranty Certified.—The Interstate Commerce Commission has issued a certificate for \$61,093 as representing the amount now due this company to make good its guaranty for the six months period of 1920.

CHICAGO & ALTON.—Directors Resign.—Charles Hayden and M. L. Bell have resigned as members of the board and of the executive committee.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—Income Statement.—The income statement for the year ending December 31, 1921 shows the following results:

Gross operating revenues	\$17,170,446
Total operating expenses	14,789,237
Net revenue from operation	\$2,381,209
Taxes and uncollectible railway revenue	631,633
Equipment and joint facility rents (Debit)	212,869
Railway operating income	\$1,942,444
Other income	276,869
Total gross income	\$2,219,313
Deductions from gross income	1,362,133
Total available income	\$857,180
Interest on equipment obligations	153,645
Balance of income over charges	\$703,535

DENVER & RIO GRANDE.—Guaranty Certified.—The Interstate Commerce Commission has issued a certificate placing the amount

necessary to make good this company's guaranty for the six months period of 1920 as \$1,415,453 of which \$477,953 is still due.

DULUTH & NORTHERN MINNESOTA.—Abandonment of Line.—The Interstate Commerce Commission has made public a proposed report of Attorney Examiner Clarke recommending that the commission affirm its former conclusion in authorizing a certificate for the abandonment of this company's line from Knife River to Cascade, Minn., 99.25 miles.

EL PASO & SOUTHWESTERN.—Partial Payment on Guaranty.—The Interstate Commerce Commission has certified to the treasury a partial payment of \$500,000 on account of this company's guaranty for 1920.

ERIE.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$5,000,000 of consolidated mortgage 7 per cent extended bonds at such price as to make the average cost to the applicant not to exceed 7.30 per cent per annum to maturity, including all costs of negotiation and sale. The company is also authorized to pledge \$2,500,000 of bonds pending their sale as security for short term notes and to pledge certain other bonds as security for a one-year, 6 per cent note for \$10,000,000 to the War Finance Corporation.

GREAT NORTHERN.—New Dividend Policy.—In a letter to the stockholders (Chairman Louis W. Hill explains the change in dividend payments from a quarterly to a semi-annual basis as follows:

Present cash situation of the company is satisfactory and funds are available from which the customary quarterly dividend could be paid, together with such other payments as are apt to arise in the near future. It is of greatest importance, however, that this strong cash position should not be impaired and the directors believe it to be in the best interest of shareholders to ascertain more accurately the probable results of the present year before determining finally upon the dividend policy.

Even in normal times the directors could act on dividends with much more confidence in June than in March. Crop prospects always are an important factor; they are unknown in March of any year. Likewise the season's iron ore traffic, as well as the general business, is measurably determined by June 20.

Another important consideration is that the Chicago, Burlington & Quincy pays its dividends semi-annually in June and December, so that available funds from that source will be known in acting upon Great Northern dividends prior to August and February, respectively.

It is confidently hoped there will be such an improvement in business, and that such substantial additional reductions in wages and other costs shall be realized in advance of further rate reductions that by about June 20, when consideration must be given to the August 1 dividend, the directors will be justified in declaring a 3/4 per cent semi-annual dividend.

The company has been fortunate in being able to continue its regular 7 per cent basis throughout the war and post-war period. In 1921, the most difficult year the railroads have ever experienced, the net income from railroad operations available for dividends was only 3 1/2 per cent on its capital stock; but it received an extra dividend from the Chicago, Burlington & Quincy stock (of which it owns nearly 49 per cent) and by this means was able to pay the 7 per cent dividend out of 1921 income.

Two of the principal commodities handled by the Great Northern are products of agriculture and products of mines. The present unsatisfactory state of the agricultural industry generally is only too well known. In 1921 crops along the Great Northern lines were almost average in yield, but the prices received by the farmers were so low that the result of the season's farm operations showed little, if any, profit. It is impossible at this time to forecast agricultural results for the coming season. Iron ore traffic, which for a period of years has averaged 11,000,000 tons, in 1921 was only 4,300,000 tons, and it is not yet possible to forecast what it will be for the current year.

Operating expenses have been abnormally high. In 1921 they totaled nearly 80 per cent of gross revenues, compared with approximately 60 per cent in 1916, the last pre-war year. Cost of coal in 1921 was \$13,000,000, or 2.4 times as much per ton as in 1916. The payroll, which is the largest single item of expense, being 58 per cent of the total, was in 1921 \$47,000,000. The average pay per man per hour in 1921 was two and one-seventh times as much as in 1916. Officials of the Great Northern have endeavored to reach an agreement with employees on lower wages, but have failed. The dispute has been referred to the Labor Board, which is the only method of procedure under the law.

The present uncertainty is augmented by threatened trouble in the coal mining industry by wage controversies pending before the Labor Board, and by agitation for immediate further rate reductions.

In order to have even moderately successful results, we must have a larger volume of traffic and lower operating costs before any general reduction is made in freight rates.

The company is entitled to a reasonable return on the value of its property used for transportation purposes. Pending the determination of such value by the Interstate Commerce Commission, the book investment in road and equipment is being used as a basis of value. This basis, assuming that the Interstate Commerce Commission should decide 6 per cent is a fair return, will entitle the company to retain over \$20,000,000 from railway operations after paying operating expenses. The actual value when fixed, should substantially increase this amount. Should it earn more than what is considered a fair return by the commission the company must pay to the government one-half of such excess earnings, but net earnings of \$29,000,000, which we are chiefly entitled to, are ample to pay all fixed charges and leave a safe margin after paying 7 per cent dividend. This, of course, comes about largely from the fact that earnings have been put back into the property and have been capitalized in any way.

See editorial in this issue entitled "The Great Northern Dividend."

JACKSONVILLE TERMINAL.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$3,100,000 of refunding and extension mortgage bonds of which \$2,000,000 are to be exchanged for a like amount of first and general mortgage bonds and \$1,100,000 are to be sold at not less than 95 and accrued interest and the proceeds used for capital purposes. The Atlantic Coast Line, Florida East Coast, Seaboard Air Line and Southern were authorized to guarantee the bonds.

MAINE CENTRAL.—Annual Report.—The corporate income account for the year ended December 31, 1921, compares as follows:

Operating revenues:	1921	1920
Freight	\$14,275,951	\$12,645,031
Passenger	4,909,997	4,817,085
Total, including other.....	\$20,590,064	\$18,737,811
Operating expenses:		
Maintenance of way and structures.....	\$3,926,106	\$3,444,946
Maintenance of equipment.....	4,704,186	4,186,040
Traffic.....	1,741	149,474
Transportation.....	1,857,089	10,882,653
General.....	555,820	540,000
Total operating expenses.....	\$19,533,352	\$19,248,820
Net revenues from railway operations.....	1,056,712	Def. 511,009
Railway tax accruals.....	1,263,982	996,722
Railway operating income.....	Def. 210,180	Def. 1,509,611
Total non-operating income.....	623,037	4,276,535
Gross income.....	412,857	2,766,924
Total deductions.....	2,578,219	2,462,491
Net income.....	Def. 2,165,362	304,433
Dividends (5 per cent on preferred; 6 per cent on common).....	653,166	19,138
Sinking fund.....	15,691	19,138
Income balance.....	Def. 2,181,053	Def. 367,871

*Revenues and expenses are for the ten months, March to December. Includes two months' proportion of standard return due from United States Railroad Administration, and amount charged against the United States account of guaranty under the Transportation Act, for the six months, March to August, inclusive.

The annual report of the Maine Central is reviewed in an article on another page of this issue entitled "Maine Central Shows Deficit of \$2,181,053."

MAXTON, ALMA & SOUTHBOND.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$84,290 on the ground that the public necessity for the line is small and its prospective earning power does not indicate sufficient security.

MIDLAND RAILWAY.—Receivership.—George M. Brinson, president of this company, has been appointed receiver. The road operates between Savannah and Stevens Crossing, Ga., 88 miles.

MINNEAPOLIS & ST. LOUIS.—Directors Resign.—Charles Hayden has resigned as a director and chairman and M. L. Bell has resigned as a director in accordance with the recent ruling of the Interstate Commerce Commission that they could not hold offices with the Chicago, Rock Island & Pacific and at the same time similar offices with the Minneapolis & St. Louis. Jules S. Baché has been elected chairman of the board. L. W. Baldwin and P. V. Davis have been elected to fill the vacancies on the board.

MISSOURI PACIFIC.—Bonds Sold.—Kuhn, Loeb & Co. have sold \$18,000,000 first and refunding mortgage 6 per cent gold bonds, series "D," due February 1, 1949, at 98 3/4 per cent and accrued interest to yield about 6.10 per cent to maturity. The bonds are issued to provide funds for the retirement of \$13,641,000 bonds maturing January 1, 1923, and to reimburse the company for other capital expenditures. The sale of these bonds is subject to the approval of the Interstate Commerce Commission.

NEW ORLEANS & NORTHEASTERN.—Income Statement.—The income statement for the year ended December 31, 1921, shows the following results:

Gross operating revenues.....	\$6,329,586
Total operating expenses.....	5,854,466
Net revenue from operation.....	\$475,120
Taxes and uncollectible railway revenue.....	583,017
Equipment and joint facility rents.....	151,693
Railway operating income.....	Def. 629,591
Other income.....	\$61,484
Total gross income.....	\$401,893
Deductions from gross income.....	103,134
Total available income.....	\$298,759
Interest on mortgaged, bonded and secured debt.....	408,637
Deficit for year.....	\$106,878

NEW YORK CENTRAL.—Separate Suit in New England Rate Case.—This company will begin an independent suit in the New England rate case based upon the fact that it is the only trunk line system operating or controlling a line into New England. Under the Interstate Commerce Commission's order, which is now held up by a temporary injunction returnable March 30, the Boston & Albany, operated by the New York Central under lease, was excluded from the benefits of the 15 per cent increase in the New England share of the through rates, although the Boston & Albany operates wholly in New England. The New York Central will show that it has made expenditures of more than \$36,000,000 on the Boston & Albany since it took over operation of the line in 1900.

NORFOLK & WESTERN.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$666,000 of first consolidated mortgage 4 per cent bonds to be sold at not less than 90 per cent of par and accrued interest and the proceeds to be used for reimbursement of the treasury for the payment of \$600,000 of underlying bonds.

NORTHERN PACIFIC.—Reduces Dividends.—The directors have declared a quarterly dividend of 1¼ per cent, payable May 1 to stock of record April 12. This is a reduction of the rate from 7 per cent to 5 per cent annually.

Following the directors' meeting, Howard Elliott, chairman of the board, made the following statement:

"In declaring a dividend of 1¼ per cent payable May 1 to stockholders of record April 12, the directors feel they are best serving the interests of the stockholders and are hopeful that conditions will warrant the resumption of the rate of 1¾ per cent quarterly in the future."

Dividends at the rate of 7 per cent had been paid since 1903, with an extra of 11.26 per cent in 1908 from accumulated surplus of the Northwestern Improvement Company. In 1902 dividends were 5½ per cent, in 1900, 4 per cent, and initial payment 2 per cent in 1899.

PARIS-LYONS-MEDITERRANEAN.—Bonds Sold.—Kuhn, Loeb & Co., and the National City Company have sold \$30,000,000 6 per cent external fund gold bonds, due August 15, 1958, at 83, and interest to yield about 7.35 per cent to maturity. In case of earlier redemption of the entire issue at 103 per cent, the yield gradually increases to a maximum of 8.78 per cent, if called on February 15, 1932, the earliest date on which the entire issue may be redeemed, and in case of any bonds redeemed at 100 per cent by the sinking fund to a maximum of 9.22 per cent as to any bonds redeemed on August 15, 1929.

An issue of £5,000,000 in bonds of the same type as the dollar issue was sold recently in London at 86—now quoted at 90½. The proceeds of the American issue are to be utilized for the purchase of additional rolling stock, electrification of some lines and other improvements.

RICHMOND, FREDERICKSBURG & POTOMAC.—Sues City.—This company has brought suit against the city of Richmond, Va., for \$346,950. This suit is the outcome of the arrangements entered into in 1915 between the company and the city for the lowering of the railroad tracks along the James River branch of the railroad, running from Acca to James River, and the construction of bridges over Broad Street, Monument, Patterson and Grove Avenues. This work was completed on September 23, 1920. The company alleges the city promised to defray half the expenses of the work, but that it has not done so.

SOUTHERN RAILWAY.—Income Statement.—The income statement for the year ended December 31, 1921, shows the following results:

Gross operating revenue	\$128,715,150
Total operating expenses	105,829,007
Net revenue from operation	\$22,886,143
Taxes and uncollectible railway revenue	4,667,336
Equipment and joint facility rents	4,247,025
Railway operating income	\$13,971,782
Other income	4,239,193
Total gross income	\$18,210,975
Deductions from gross income	4,207,802
Total available income	\$14,003,173
Interest on mortgaged, bonded and secured debt	11,976,550
Balance of income over charges	\$2,026,623

TENNESSEE, ALABAMA & GEORGIA.—Sale Postponed.—There were no bids received when this road was offered for sale at Chattanooga, Tenn., on March 18, so the sale was postponed for the sixth time to April 1.

WISCONSIN CENTRAL.—Stockholders' Committee Formed.—Minority common stockholders of this road have formed a committee to inquire into the affairs and accounts of the company to determine whether it is receiving the full return to which it is entitled from the Minneapolis, St. Paul & Sault Ste. Marie Railway, as lessee. The committee consists of W. J. Wollman, chairman; John E. Fritsche, William Hamm, Harry E. Kohn and William P. Tuttle.

In a circular letter asking for the deposit of the common stock of the Wisconsin Central, the committee states that much stock was purchased when the Minneapolis, St. Paul & Sault Ste. Marie, controlled by the Canadian Pacific, made the lease, it being assumed that a large increase in the Wisconsin Central's gross and net earnings would result. While the expected increase in gross receipts occurred, the committee says, there has been no corresponding benefit to the common shareholders.

Sales of Equipment Trust Certificates

Director General Davis of the Railroad Administration has announced additional sales at par plus accrued interest, of railroad equipment trust certificates held by the government, to:

Messrs. Lamport, Barker & Jennings, New York.....	
Northwestern Pacific, 1923 to 1935, incl.....	\$156,000
Alfred Burden, New York.....	
Chicago Junction Railway, 1923 to 1935, incl.....	276,900
Detroit & Toledo Shore Lines, 1923 to 1935, incl.....	289,900
	\$722,800

The sales comprise approximately two-thirds of all the maturities of these equipment trust issues. The balance of one-third of all maturities will be stamped as subordinated, in accordance with the agreement as amended under the plan recently announced. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$221,080,900.

Tentative Valuations

The Interstate Commerce Commission has issued tentative valuation reports in which it places the final value of the property of the Arizona Eastern as of 1915 at \$10,681,198 for the property owned and \$13,392,214 for the property used. The final value of the property of the Delray Terminal as of 1918 is placed at \$154,264 and of the Duluth Terminal Railway as of 1916 at \$515,000.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Central New York Southern.....	\$42,500.00
Maxton, Alma & Southbound.....	13,500.00
Augusta Union Station.....	400.00
Tampa Union Station.....	11,500.00
Birmingham Terminal.....	1,824.78

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Dividends Declared

Cleveland, Cincinnati, Chicago & St. Louis.—1¼ per cent, quarterly, payable April 20 to holders of record March 31.
 Kansas City Southern.—Preferred, 1 per cent, quarterly, payable April 15 to holders of record March 31.
 Philadelphia & Trenton.—2½ per cent, quarterly, payable April 10 to holders of record April 1 to April 11.
 Philadelphia & Western.—Preferred, 1½ per cent, quarterly, payable April 15 to holders of record March 31.

Trend of Railway Stock and Bond Prices

	March 21	Last week	Last year
Average price of 20 representative railway stocks, close of business	61.18	61.45	54.14
Average price of 20 representative railway bonds, close of business.....	83.41	82.50	73.83

Railway Officers

Executive

J. B. Finley, general superintendent of the Southern Pacific of Mexico, with headquarters at Empalme, Sonora, Mex., has been promoted to vice-president and general manager, with the same headquarters, succeeding **L. H. Long**, retired.

Louis H. Long, vice-president of the Southern Pacific of Mexico, with headquarters at Tucson, Ariz., and of the Arizona Eastern, with the same headquarters, with supervision over both operating and engineering departments, retired from railroad service on March 1. Mr. Long was born in Solano county, Cal., and educated at the University of California. He began railroad work on September 20, 1885, in the service of the Southern Pacific on railroad location projects. Since that time he has been assistant engineer on location and construction; engineer in charge of construction; since February 1, 1909, chief engineer of the Southern Pacific of Mexico; and since July 15, 1913, vice-president of that road and the Arizona Eastern, which positions he has held up to the time of his recent retirement.

C. M. Scott, general manager of the Arizona Eastern, with headquarters at Phoenix, Ariz., has been elected vice-president and general manager, with the same headquarters, succeeding **L. H. Long**, retired.

Mr. Scott was born in Hamilton county, Ohio, on April 10, 1872. He entered railroad service in 1890, as chief clerk in a trainmaster's office of the Baltimore & Ohio Southwestern, and was subsequently chief clerk in a superintendent's office, and train dispatcher. In 1896 he entered the service of the Chicago, Burlington & Quincy, as chief operator in the dispatcher's office at St. Joseph, Mo., and he later became secretary to the general superintendent. He left in 1900 to enter the service

of the Atchison, Topoka & Santa Fe, in the general freight and passenger agent's office at Prescott, Ariz. The following year he was employed in the chief engineer's office, and later in the general manager's office of the same road, at Prescott. In 1905 he left to become secretary to the president of the Arizona Eastern and the Southern Pacific of Mexico at Tucson, Ariz. Later he became chief clerk to the president and in 1907 he was promoted to superintendent of the Phoenix division of the Arizona Eastern, with headquarters at Phoenix, which position he held until August, 1918, when he was promoted to general manager with the same headquarters. He was holding that position at the time of his recent election.

Operating

B. S. Barker, vice-president and general manager of the Gainesville & Northwestern, has resigned to become secretary of the Atlanta Chamber of Commerce, Atlanta, Ga.

J. H. Lambert, general freight and passenger agent and trainmaster of the Gainesville & Northwestern, has been appointed superintendent of this company, with headquarters at Gainesville, Ga.

E. A. Wheeler has been appointed chief dispatcher of the Medicine Hat division of the Canadian Pacific, with headquarters at Medicine Hat, Alta., succeeding **G. A. Davidson**, transferred.

Mechanical

F. S. Brown, mechanical engineer of the Erie, with headquarters at Meadville, Pa., has been appointed chief mechanical engineer with headquarters at New York and **G. T. Dupue** has been appointed mechanical superintendent of the Ohio and Chicago regions, with headquarters at Youngstown, Ohio, to succeed **Charles James**. **Winfield S. Haynes**, formerly master mechanic, with headquarters at Dunmore, Pa., has been appointed superintendent of shop operation with headquarters at New York. He will report directly to the general manager.

Engineering, Maintenance of Way and Signaling

C. K. Bowen, special engineer of the Southern Pacific of Mexico, with headquarters at Puga Nayarit, Mex., has been promoted to chief engineer, with headquarters at Empalme, Sonora, Mex., succeeding **L. H. Long**, retired.

J. C. McClure, assistant to the president of the Arizona Eastern, with headquarters at Tucson, Ariz., has been appointed chief engineer in addition to his present duties, with the same headquarters, succeeding **L. H. Long**, retired.

T. J. Irving, assistant engineer of the Iowa division of the Chicago & North Western, with headquarters at Boone, Iowa, has been promoted to division engineer of the Minnesota division, with headquarters at Winona, Minn., succeeding **W. J. Jackson**, deceased. Mr. Irving will be succeeded at Boone by **C. H. Wells**.

Purchasing and Stores

A. J. Mello has been appointed purchasing agent of the San Diego & Arizona, with headquarters at San Diego, Cal., succeeding **S. P. Howard** resigned.

Obituary

F. H. Drake, vice-president of the Louisiana & Arkansas, with headquarters at Minden, La., died at his home in that city on March 11.

Charles Whipple Case, formerly general manager of the Great Northern, with headquarters at St. Paul, Minn., died at his home in Minneapolis, Minn., on March 18. Mr. Case was born on October 22, 1834, at Buffalo, N. Y. He entered railroad service on August 31, 1851, as a brakeman on the Milwaukee & Mississippi. He was promoted to fireman in November of that year, and in November, two years later, he left to become locomotive engineer on the Milwaukee & Watertown. From September, 1855 to December, 1861, he was a locomotive engineer on the LaCrosse & Milwaukee, and from September, 1865 to May 31, 1867, he was an agent on the Winona & St. Peter (Chicago & North Western), successively at Rochester, Minn., Kasson, Owatonna, and Winona. From June, 1867, to November of that year, he was agent of the Chicago, Milwaukee & St. Paul at Cresco, Iowa, and from November 15, 1867, until November 1, 1876, he was freight and ticket agent of the same road at Minneapolis, Minn. From November, 1876, until January, 1882, he was successively assistant superintendent of the Iowa & Minnesota, River and Hastings & Dakota divisions. He was promoted to superintendent of the Hastings & Dakota division on January 1, 1882, which position he held until February 20, 1883, when he was transferred to the River and Duquoc divisions. On September 15, 1886, he was made assistant general superintendent. He left on October 1, 1888, to become general superintendent of the St. Paul, Minneapolis & Manitoba (Great Northern), with headquarters at Minneapolis. He was promoted to general manager on December 1, 1893, which position he held until August, 1894, when he retired from railroad service.



C. M. Scott

EDITORIAL

Railway Age

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Which is more effective, a written story or one enacted before our eyes as in moving pictures, for example? Doubtless the latter, for conditions or events actually seen make a much stronger impression than those we only read of or hear about. In a general way railroad men admit that the present lack of adequate,

**Show
the
Boss**

modern machinery and labor-saving devices in most repair shops and enginehouses limits output and increases unit repair costs. The men who most fully realize the needs, however, are the shop or roundhouse foremen on the job who must get results with limited equipment. These men can see with their own eyes how worn-out machines are increasing shop costs and when possible they should get the higher mechanical department and executive officers out into the shops so that they too can see and better visualize the needs. If this impression is backed up by accurate, comprehensive figures proving that new machinery will make a net return of over 12 per cent (as it often does) on the investment, the necessary capital will be forthcoming. Present inadequate facilities in the way of shop machinery and equipment are taken too much for granted. It is a serious question if the lack of capital for necessary improvements is not also taken too much for granted. The mechanical department in its request for better shop and enginehouse facilities has a good case which should be presented forcefully and continuously to the highest authority. Show the boss.

The criticism is sometimes made and, we fear, with more or less truth, that motive power officers are not keen in the search after improvements in details of locomotive equipment and at times even oppose the application of devices of proved value. This attitude appears at first to be somewhat difficult to explain as these are the very men from whom new and advanced ideas should normally be expected. Natural conservatism, developed from constant contact with mechanism that is at least doing the work, does not offer a sufficient explanation. The real reason will, we think, be found in the character of the railroad organization and the relationship of responsibility and credit between the mechanical and the operating departments. Motive power officers are too prone to note that any savings which result from the adoption of improved attachments are reflected in reduced costs of operation and that the credit for such gains goes to the operating department. At the same time every motive power officer knows that each added device increases somewhat the cost of inspection and maintenance which is entered on the books as a charge against his department without any offsetting credit. The majority of locomotive shops and terminals are already taxed to so near their maximum capacity that it is not surprising that every little additional burden is feared lest it prove to be the last straw to break the camel's back. There is unquestionably a pressing need for increased shop facilities to enable railroads to obtain a fuller degree of service from the locomotives which they already have. However, neither lack of shop facilities nor the fact that a saving obtained is credited on the accounts to some

**A Broad View
of Locomotive
Improvements**

other department should blind the eyes of an officer to the benefits that can be obtained from various improvements. In such matters the outlook must be a broad one and reach beyond departmental lines.

From now on, we are informed, it will be a matter of but slight difficulty to strike up an acquaintanceship with the passenger train engineers on the St. Louis-San Francisco. This opportunity has been brought about by the recent decision of the Frisco management to feature the name of each passenger engineer who has a regular run, in gold leaf on a black enameled glass plate background, which will be located prominently on the cab of his engine; the name plate to be a sliding device which may be removed from its holder at the end of a run. In the main, this novel idea is conceived as a means of establishing closer personal relations between the road in question and the general public. It should have practically the same effect, we believe, as the numbering of athletic contestants in college games for the benefit of the spectators. In both cases this gives the public a chance to come in more intimate contact with those who are "playing the game." Besides, there is a certain pleasing and psychological aspect to an arrangement of this kind which is particularly attractive to human nature. It is said that the 130 engineers, who are to have their names thus emblazoned to the world, have expressed keen gratification at the announcement, and there is no doubt but that the plan will be welcomed by the public. This is a step towards "Positive Public Relations Works," along lines advocated in an editorial by that title in the March 18 issue of the *Railway Age*.

**Let's
Get
Acquainted**

**Foreign Jobs
for American
Railway Men**

If a young British railway man tires of his country and seeks foreign service for a change, he has every opportunity for gratifying his desires. Especially if he has a technical education and is otherwise fitted it is possible for him to secure some kind of official position on a British colonial railway or a British owned road in some foreign country. This is only one of the advantages accruing to the people of Britain out of their ownership and operation of colonial and foreign railways. When American money goes into foreign railway construction it generally goes in the form of a loan to an established line already operated by foreigners. When British money goes into foreign railways, generally speaking, British railway men go with it to build the roads and operate them. American railway men are interested in foreign railways. The many inquiring letters which come to the *Railway Age* prove that to us. We have pointed out previously in these columns that most foreign countries could learn more from American railway practices than from those of western Europe. One of the best ways to give these countries the benefit of our experience is to send Americans to help them operate their railways. When we lend money to foreign countries for railway expansion, it is unfair to our manufacturers of rail-

way equipment and supplies and to our railway men who seek foreign experience that such loans should not be conditioned upon the purchase of some of the needed equipment in this country and the employment of American railway men.

The National Foreign Trade Council is planning to hold a convention called the Ninth National Foreign Trade Convention at Philadelphia on May 10, 11 and 12. One looks in vain in the program of the convention for any reference to railroads and their relation to foreign trade either as regards the interest that railroads in the United States may take in encouraging export trade or as regards the importance of our enormous exports in railroad supplies. The *Railway Age* believes that the relation of railroads to foreign trade should be given further attention. One bears in mind, for instance, that the railroads of this country are greatly interested in any traffic that they may be able to secure for carriage to the ports. This matter has been given special consideration because of President Harding's recent address to Congress with reference to ship subsidies. Reference may also be made to the report prepared under the direction of the United States Shipping Board in which it was said:

The railroad systems of the United States feel the need of definite import and export working agreements with steamships engaged in foreign trade. It would seem expedient and wise to permit reasonable working agreements to exist between the railroads and steamships. The problem is fully and completely ordinating our rail and water transportation and is acute and important.

This report and President Harding's address have already borne fruit because the ship subsidy bill recently introduced proposes an amendment to the Panama Canal Act which will allow railroads to own vessels engaged in other than coastwise traffic or traffic through the Panama Canal or across the Great Lakes. The President and the Shipping Board have thus evidenced their interest in the relationships of the railroads with our foreign trade. Does it not appear strange that the Foreign Trade Convention, which is supposed to be held in the interests of the leaders in our country's export trade, should have failed to do likewise?

Two Ways of Attacking the Rail Problem

ALTHOUGH THE RAIL PROBLEM has been prominently before railway men and steel manufacturers for more than 10 years and although it has received continuous attention from both groups during this time, the progress which has been made has fallen far short of the objective. Work on behalf of the railroads has centered in the Rail Committee of the American Railway Association, under whose direction a metallurgist has given his full time to research for several years.

In planning its line of action, the committee has had open to it two courses. On the one hand, as the representative of the consumers it could prepare specifications independently of the producers which, according to the best information available, would eliminate those influences in mill practice which have proven detrimental to the rails, with only secondary consideration to the manufacturing problems involved and submit these specifications to the steel companies for adoption. The alternative would contemplate the co-operation of the representatives of the roads and the manufacturers in the development of a specification which would involve certain concessions from the ideal conditions sought by the railroads but which would be acceptable to the producers. Until recently the committee has chosen the first plan and has concentrated its attention on the preparation of

specifications which represented the best obtainable practice in the opinion of the committee. These specifications have been accepted by the mills only with the payment of a premium so high as to be prohibitive. The result has been that the specifications have been non-existent as far as the rollings of rails is concerned.

More recently certain influences on the committee have advocated the other course, as a result of which a revised specification has been prepared which, while not yet approved by the Rail Committee, has been accepted by the manufacturers who have agreed to roll some rails under it this year without additional charge. While this specification falls short of some of the objectives of the committee, it represents a step in advance of existing specifications in others. As such it offers the possibility of a step forward in the solution of the rail problem in that it makes possible the production of rails in which certain objectionable characteristics now existing are expected to be eliminated.

The rail which will be rolled under this specification will be subjected to intensive scrutiny both in the mills and in the track to determine the effect of the changes in the specifications upon the service rendered with a view to determining upon such further revisions in the specifications as may be necessary before issuing them finally.

Are the Roads Ready for a Car Pool?

THE NATIONAL Association of Owners of Railroad Securities has proposed a comprehensive plan for the pooling of freight cars which includes not only the central control of the distribution of equipment but proposes to relieve the railroads of individual responsibility for the design of new equipment as well as for all maintenance except running repairs. In a communication appearing in this issue a transportation officer, in discussing some phases of this plan, takes exception to our comment which appeared on page 508 of the March 4 issue, on the ground that it did not discuss the feasibility of the plan itself but was confined to its incidental features.

It is true that in that editorial no attempt was made to discuss the practicability of the plan in detail. But an analysis of the estimated savings set forth by the sponsors of the plan indicates a lack of conservatism which, although not conclusive, does cast some suspicion on the claims of the sponsors to speak with authority on other phases of the subject. Probably no one will question the need for reform in many of the elements affecting the character and cost of car service. It is doubtful, however, whether all will agree that a revolutionary change such as is implied in a complete car pool is likely to produce better or quicker results than may be effected by placing the present system on an economically sound basis. It may be accepted as fundamental that the willing acceptance of a sweeping equipment pool, such as that proposed by the Security Owners' Association, by all the parties affected, including railway executives as well as transportation and mechanical department officers, must be preceded by a thorough understanding of all of the possibilities of such a plan as well as the reasons why satisfactory results are not now obtained.

With a general understanding of these facts it is quite possible that by far the greater part of the results to be obtained from the car pool might be effected with no change in the system of car ownership or distribution. At the present time, however, it is of less moment by what means the best results ultimately may be obtained than it is that a thorough appreciation of all of the factors which enter into the cost and character of car service may be obtained by everyone who exercises control over any of these factors. To that end the *Railway Age* will welcome the comments of its readers on this much discussed but still controversial question.

Mr. Jewell Starts a Revolution

B. M. JEWELL, in opening the case of the railway shop crafts in the wage hearings before the Labor Board this week, practically abandoned the case and started trying to revolutionize the entire industry of the United States.

Representatives of the railways have introduced statements and exhibits showing that employees in railroad shops are being paid wages much higher in proportion to the cost of living than before the war, and also higher than those of men doing comparable work in other industries. Mr. Jewell made a general denial; but, tacitly admitting that shopmen's wages are higher than those of men in other industries, he attacked the entire existing industrial system and the wages of all workers. "We come here," he said, "to challenge the justice of the wage rates of all productive labor; to challenge the very principle (cost of living and comparison with wages in other industries) upon which the railroads propose that rates of pay be adjusted. We propose to show how the entire purpose for which industry is operated can and must be changed."

Mr. Jewell contended that an industry which cannot pay an employee a wage sufficient to maintain an "average family of five" according to a "healthful standard of living" is as truly bankrupt as if it could not pay its fixed charges. He introduced a budget to show that to thus maintain a family of five requires \$2,637 a year. "To secure what this budget provides," he said, "the railway mechanics must earn 40 per cent more than they are now being paid by the railroads." Other shop employees, especially helpers, would have to be given still greater increases. Labor leaders in other arbitrations have contended that the minimum income required properly to maintain a "family of five" is \$2,260. Mr. Jewell is more advanced.

His conclusion as to the wage that should be paid is based not upon the productive efficiency of the average railway shop employee, but upon the needs of a family of five. But one family of five has needs as great as another. Therefore, on his theory, each railway employee of every class should be paid an average of \$2,637. There are at present about 1,700,000 railway employees. An average wage of \$2,637 for all would make the railway payroll over four billion five hundred million dollars a year, or about one billion seven hundred million dollars more than in 1921. If the railroads had had this payroll in 1921, and all other expenses had been the same, their expenses and taxes would have exceeded their earnings by about one billion dollars—they would not have had a cent for fixed charges. Under normal business conditions the railways have about two million employees. The average wage advocated by Mr. Jewell would make the normal payroll about five billion two hundred seventy-five million dollars, or almost equal to their total earnings in 1921.

The net operating income of the railways in 1921 was only six hundred and fifteen million dollars. Where, then, does Mr. Jewell expect the railways to get the additional money with which to pay these higher wages? He intimates where he thinks part of it could be gotten. It has recently become the practice of railway labor leaders to charge that the railways and the concerns from which they buy coal, equipment and supplies are under the same financial control; that in consequence the railways pay excessive prices for these things, with the result that the concerns from which they buy them make excessive profits. They urge that if the railways would pay lower prices they could pay higher wages.

Mr. Jewell evidently intends to use this theory in the present case. He calls the "steel corporations, equipment and other supply companies" the "profit making part of the railroad industry" and says that these concerns, including the coal and coke companies, "piled up" surpluses during

the years 1916 to 1920 aggregating about one billion three hundred million dollars.

In the first place, however, a large part of these surpluses has been wiped out by losses in the present business depression. In the second place, is it not possible the employees of the coal, equipment and supply companies may say that pluses of these companies, their own employees, and not if any group of workers has claims upon the profits or surpluses of these companies, their own employees, and not those of the railways, have these claims? Most of their employees are not being paid as much as railway employees. The wages of railway employees have within recent years absorbed most of the profits formerly made by the railroads. On what ground does Mr. Jewell base his theory that railway wages should in the future absorb also the profits of the coal mining, and equipment and supply industries?

However, Mr. Jewell generously constitutes himself the spokesman of all productive labor, and proposes an average wage for all of \$2,637 a year. We look forward with great interest to whatever exposition he may make of the source from which this large average wage is to be derived. We should be most glad to see every worker in the United States receive even more than the wage Mr. Jewell mentions. But the industry of the country cannot meet the payroll that would result without a vast increase of production. The statistics of the census show that there are about forty-two million persons "gainfully employed" in this country. To provide them the average income, Mr. Jewell suggests would require an aggregate annual production of one hundred and eleven billion dollars.

The most complete and authoritative investigation of the production and income of the people of the United States ever made is that recently conducted under the auspices of the National Bureau of Economic Research, the results of which have been published in a book entitled "The Income in the United States." This shows that the total production and income of our people reached its maximum in 1919 when it was sixty-six billion dollars. This was measured in the high prices prevalent at that time. Equated on the basis of the prices of 1913, the production and income of the country reached their maximum in 1917 when they were forty-one billion dollars. Therefore, on the basis of the prices of 1919, Mr. Jewell proposes a payroll for industry exceeding by forty-five billion dollars, the largest total production ever attained, and on the basis of the prices of 1913 a payroll exceeding by seventy billion dollars, or 170 per cent, the largest production ever attained.

It is hardly necessary to say that the adoption of Mr. Jewell's wage scale would speedily result in the profits of all industry being absorbed by the payroll. But this does not daunt him. He says his plan of industrial revolution "frankly contemplates a situation in which temporarily they (profits) may have to cease." He adds: "Until that situation has been accepted, the conflict between capital and labor will continue."

Mr. Jewell and other labor leaders who assume the same general attitude, jauntily ignore vital facts. First, they ignore the fact that an enormous increase in production would have to be secured before any such average wage as they suggest could be paid. At the same time, they use all the power of their organizations to secure the adoption and perpetuation of hours of work and working rules and methods which help prevent the very increases in production which are essential to make possible the payment of the high wages they demand. Second, they disregard the fact that the "average family" in this country is not a family of five. The records of the census show that the average family contains 4.3 persons. Third, they usually disregard the fact that the average family is not supported by the earnings of one person. The number of families in the country is about 24,200,000. Since the number of persons "gainfully em-

played" is forty-two millions, it follows that the average family enjoys the income of one and three-fourths persons, and not of one person. Therefore, if each person gainfully employed had an income of \$2,637, the income of the average family would be \$4,600 a year, not \$2,637, and would therefore be much larger than Mr. Jewell says it needs! It would require an average income per worker of only \$1,510 to give the average family an income of \$2,637.

Mr. Jewell may answer, his figures show the average railway shop employee's family has five members and only one person earning income. If that is true, then the average shop employee's family is larger than, and has only a little over one-half as many income producers as, the average American family. But if railway shop employees choose to have larger families than the average, and fewer of the members of their families elect to work, is that any reason why they should be paid higher wages than other workers?

Mr. Jewell's argument might be listened to with respect in a socialist convention where neither law, facts nor logic are admitted. It has no bearing on any question pending before the Railroad Labor Board. The Board is required to fix reasonable wages for railway employees, measured by certain standards specifically mentioned in the Transportation Act. The most important of these standards are the cost of living and the wages paid for comparable work in other industries. The law takes no account of the fact that a railway mechanic's family may be larger or contain fewer workers than the family of a mechanic employed in a factory. It does not contemplate that the Railway Labor Board shall award wages exceeding on the average those which any industry ever did pay or could pay under present conditions.

Mr. Jewell's presentation will do his followers no good in the present case. It will help to disseminate false ideas and aggravate unrest among working people. It will also, let us hope, make clear to the farmers and business men of the United States that the attacks of radical railroad labor leaders are not directed merely against reasonable profits and private management in the railroad business, but against reasonable profits and private management in every business. The adoption of Mr. Jewell's program would wipe out profits in every business and leave all private property valueless in the hands of its owners.

The Battle of the Brakes

FOR THE OLDER railroad man the expression "the battle of the brakes" will at once arouse memories of the epoch making Burlington brake tests of 1886 and 1887, the intensely interesting reports and discussions at the Master Car Builders' conventions of that period and the air brake developments which took place soon after. The 1886 tests sounded the death knell of all forms of brakes except those of the compressed air or vacuum types. The tests made during the following year were marked by the advent of electrical control of both compressed air and vacuum brakes and conclusively demonstrated that the use of power brakes for controlling long freight trains would be feasible only when such brakes were caused to apply instantaneously by electricity or by a very rapid serial action. At the close of the tests it appeared that the aid of electricity would be necessary and the committee in charge of the tests so reported. Before many months had elapsed, however, improvements in the quick-action triple valve caused electrical brake control to be abandoned for the time being. Another matter that should not be overlooked is the fact that these tests demonstrated the advantages of close coupling and were more responsible than anything else for the introduction of the M.C.B. coupler.

The significance of these events may not at first be so

apparent to the younger railroad men of today, but it is well to stop a moment and think of the far-reaching effects which the battle of the brakes has had upon transportation development.

The vacuum brake made its appearance in this country almost as soon as the air brake. In its plain form it was used on all elevated cars in New York, controlled the cable cars on the Brooklyn Bridge for years and was more or less extensively used on many railroads. In its automatic form it was not as widely applied but the fight between the advocates of the compressed air and the vacuum brakes was a long and bitter one.

It was at once apparent that the two systems could not exist side by side. To equip freight cars with both types of brakes so that they could be interchanged and a road could use whichever one it deemed best was far too great an economic waste to be considered seriously. No one recognized these facts any better than did the brake manufacturers themselves. By 1890 the air brake had conquered and the vacuum brake manufacturers had turned their attention to the development of an air brake. Since that time there have been a number of changes in air brake devices, but with all the progress the new devices have been obliged to work in harmony with those already in service. This country was saved the confusion of an extensive application of two radically different brake systems. It thus seems strange to us to note the conditions which prevail in England and in some other countries today. Railroads are just beginning to equip freight train cars with power brakes and with two types of brakes in use on passenger trains the battle of the brakes which was fought to a finish in this country more than 30 years ago is now being waged again over there. The situation will seem stranger still after one reads the results of some recent vacuum brake tests described in an article in this week's issue and after one notes that the stops are considerably longer than we are accustomed to consider necessary for safe train operation.

New Books

Kidder's Architects' and Builders' Handbook. Thomas Nolan, editor-in-chief, professor of architectural construction, University of Pennsylvania, Philadelphia, Pa. Illustrated. 4½ in. by 7 in. 1,907 pages. Bound in flexible leather. Published by John Wiley & Sons, Inc., New York.

This is the seventeenth edition, revised and enlarged, of the handbook originally published by the late Frank E. Kidder in 1884. The general form of this book has not changed from the previous issues—a voluminous compilation of engineering data for the design and construction of all types of buildings. Thus, Part I deals with practical mathematics, Part II with strength of materials and structural design, and Part III with useful information for architects, builders and superintendents on supplementary matter relating to buildings. The revisions made in this edition are largely in the nature of alterations and additions required because of the advancement of the art. This is particularly the case with Part II in which two new chapters have been added on specifications for structural steel work and on domical and vaulted structures. The chapters on fireproofing of buildings and reinforced concrete have been re-written so as to cover new types of construction. In Section III the chapters on heating and ventilating have been re-written and a new section of chimneys and chimney design has been added. Additions have also been made in Part III under the head of registration of architects and standard documents of the American Institute of Architects. This edition is well up to the standard set and maintained for many years by the preceding editions.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

An Answer to Sir William Acworth

CHICAGO

TO THE EDITOR:

The answer to Sir William Acworth's citation of the New Haven as an example of a situation where the state (New England) might assume some portion of the railway's burden of providing transportation for the community is that the traffic of its territory was ample to furnish the necessary service at about half the cost 15 years ago, before union labor succeeded in imposing nationalization of wages and working conditions on a section of the country of limited earning capacity.

Let me specify. In 1907 the operating revenues of the New Haven were \$55,601,000; in 1920, \$123,512,000, an increase of 122 per cent, largely due to increased rates and fares now as high as the traffic will bear. In the meantime freight tonnage increased only 30 per cent and passengers carried only 57 per cent. Between 1907 and 1920 the average number of employees increased from 36,481 to 40,612, or a little over 11 per cent. Prior to the introduction of the eight-hour day there was an actual decrease in the number of days worked. But the real death's head at the New Haven board, banishing all prospects of dividends and surplus, and actually jacking operating expenses to over 100 per cent of operating revenues in 1920 (91 per cent in 1921) was the increase in the payroll from \$24,052,644 in 1907 to \$78,939,151 in 1920, or 228 per cent.

Let Sir William study these figures and ask himself if any system of railway operation on earth, private, national or hybrid, can survive such treatment. The pre-eminence of New England as an economical summer resort for the rest of the Union has been imperiled by its railway wage scale reacting on every other industry in the territory.

SLASON THOMPSON,

Director Bureau of Railway News and Statistics.

A Word for the Security Owners' Car Pooling Plan

HOUSTON, TEXAS

TO THE EDITOR:

I have been awaiting the comment of your journal on the proposal recently made by the National Association of Owners of Railroad Securities to the Interstate Commerce Commission with respect to reforms in car handling. Your editorial on page 508 of the March 4 issue is rather disappointing, at least to those of us who had looked upon the Association's suggestion as a possible realization of the long deferred hope of a freight car pool. As a matter of fact you have said very little about the pooling of cars, your remarks being confined to criticisms of the incidental features of the car pool, such as car construction, capitalization and repairs. (In considering these features as incidental I am guided less by the relative importance of the concrete monetary savings involved than by the fact that the primary object being sought is the maximum freight car utilization.)

A car pool has been advocated by progressive transportation men for a generation. The Association's plan, it is true,

includes the car repair pool feature, but this is merely the logical complement of the distribution pool, the lack of which in previous pool proposals has been the main basis of attack by the opponents of pooling. The Association has, however, gone a step farther and undertakes to provide for an eventual standardization of equipment, thereby removing another of the arguments frequently urged against the freight car pool.

It is to be expected that any proposal of this kind will be general in its nature and that the various details will have to be worked out in "careful and detailed analysis by competent railroad officers," as suggested in the concluding paragraph of your editorial. Would it not have been better to leave all of these technical and detailed objections to those who are opposed to a pool per se?

The need for a car pool is self-evident. There is hardly a transportation man of any prominence in the country today who will not admit this. There is no doubt in my mind that when the principle of common control of freight cars is approved by railroad executives, the necessary machinery will be found to put the principle into effect. The experience of the railroads during federal control demonstrated conclusively that a transportation car pool cannot be successfully worked without a reform in the methods of handling car repairs. In my opinion the one big mistake of the Railroad Administration in its car handling policy was the virtual abandonment of the pool early in 1919 and the inauguration of a plan looking to the return of cars to the lines of their original owners. If the efforts of the Administration at that time had been directed toward a rational program of car repairs, an opportunity would have been afforded during the continuation of federal control to demonstrate or disprove the practicability of a general car repair pool. This experiment would have involved considerable expense but the expense would have followed the responsibility for the condition of the equipment at that time rather than being carried over and eventually saddled on the carriers.

In your criticism of the estimates made by the Association you entirely ignore the possible saving through reduction of empty car mileage as a result of adoption of a pooling plan. Possibly this is because that item forms but a small proportion of the \$300,000,000 which the Association expects to save. As a matter of fact the Association's estimate of the possible saving in this particular field is entirely too low. Excess empty car mileage is a rather intangible item, but it is perfectly susceptible of demonstration that the excess empty hauls which result from an unnecessary home movement of cars place an enormous burden of expense on the carriers, generally at a time when they are least in position to stand it. The figures used in the Association's estimate cover a period of years and the natural tendency is to smooth out peaks during periods when such wasteful handling was most marked. Figures which were prepared by a number of transportation officers covering the latter part of 1920 and early part of 1921 indicated that the expense of relocating equipment at that time approximated \$40 per car. In the month of December, 1920, alone there were over 200,000 cars relocated, the expense of this movement being about \$8,000,000. The excess movement was not confined to December but continued in a greater or less degree for several months. It is, of course, true that this wild scramble to get cars home does not occur every year, but there are always periods of the year when cars are being moved unnecessarily in certain territories. These movements would be minimized under a general pooling plan.

While I share your apparent regret that this proposition has been brought into the limelight by an association outside the family of railroad operating officers, I do not agree with your apparent feeling that this should condemn the plan. It is a well known fact that transportation officers have for years endeavored to work out a practical pooling plan that would appeal to their superior officers. The Securities Own-

ers have been wise enough to adopt the best features of other plans which have been put forth in the past.

It is perfectly true, as you state, that the railroads cannot afford to let the proposal pass without subjecting it to critical analysis, but in my opinion the proposition should be approached from the standpoint of a desire to adopt the most progressive methods available, rather than with a view to finding technical defects which would condemn the plan.

O. C. CASTLE,
Superintendent, Transportation Southern Pacific Lines

"The Veterans of the Railroad Service"

WASHINGTON, D. C.

TO THE EDITOR:

At a recent memorial service it was said that "the boys in blue saved the country, but the railroad boys *made* the country." It was to perpetuate the memory of these "railroad boys" that the Veteran Associations were organized.

The movement originated about 20 years ago on the Pennsylvania. The initial branch was known as the Philadelphia Division, with headquarters in Philadelphia. Others soon spread over the four regions of that system. The original idea was purely social. It was quite patent to the laymen that the man who has spent half his life in the service of the railroads has acquired a spirit of railroad morale which means much to the public in the way of efficient service. To solidify and preserve the "family tie," these men came together voluntarily. By this close association they learned that it was not to their advantage to injure the business in which they were engaged and on whose prosperity and ability to function they, as a part of the public, were entirely dependent.

The railroad veteran movement spread slowly to other roads in the middle and western states. In 1912 the New England Association of Railroad Veterans was organized through the efforts of Earl H. Morton, then president of the Order of Railroad Station Agents. E. F. Brooks was elected president; F. H. Sidney, secretary, and E. H. Morton, chairman of the executive committee.

The main object of the New England Association was to build up a strong organization of all branches of the service, from track walker to president, so that a more complete understanding of each other's problems might be obtained with a view to their satisfactory solution. It sought to re-establish the old days when superintendents and even general officers could call their men by name, a custom which almost entirely disappeared with the expansion of the roads.

The movement in New England has prospered. From a nucleus of 77 charter members it extended rapidly over every railroad in that section, until today it has a total membership of about 7,500. It includes the presidents and general officers, men in all branches of train service, shopmen, maintenance of way employees, all classes of employees in station service and clerks in the general offices. Through its committees it handles all pension matters. All discussions on the subject of wages and working conditions are excluded. Careful watch is kept, however, on all legislative matters which affect the interests of the roads. Such legislation is endorsed or condemned, as the case may be, because these men realize that any bill that would adversely affect the employer could not fail to affect the employee vitally.

The New England Association recently endorsed the Winslow bill. What other body of railroad employees took similar action? Many railroad organizations not only passed resolutions condemning the bill but engaged in an active campaign to defeat it.

In 1914 resolutions were adopted by this association condemning the plan of dissolving the New England lines; favoring a fall five per cent increase in rates and calling for a square deal for the railroads. As early as February, 1915,

the veterans went on record as favoring "greater compensation to the railroads for the handling and storing of mail." It has been instrumental in bringing about the adoption of the second Sunday in May as an International Memorial Day for all railroad men.

The prime motive of a Veterans' Association is, of course, the establishment of a uniform system of pensions that are adequate but not burdensome. To this end it favors the adoption by the railroads of a uniform system of co-operative pensions for all railroad employees. Briefly outlined this system provides: that all men who are in the service at the time of its adoption be given the opportunity of entering into a general health, accident, retirement (pension) and life insurance plan to which they would contribute in monthly installments a small per cent of their monthly or weekly wage, the money to be deducted by the paymaster at each pay-period and turned over by him to the treasurer of the association, who would be properly bonded. The fund thus obtained would be known as the Annuity and Health Fund. From it would be paid sick benefits of not less than \$5 per week, accident insurance of stated amounts according to extent of injury; monthly pensions (upon retirement) based upon a plan, i.e., one per cent of yearly wage to be multiplied by total number of years in service. To this amount the railroads would contribute a like amount, handled in similar manner either through one central organization or separately. This plan would necessarily be sanctioned by a proper law passed by Congress by which both parties would be obliged to carry out its letter and spirit.

This system provides further that all employees entering the service 30 days after such a law is passed must agree in writing to enter the insurance and pension plan. Those now in service shall be given the privilege of voting on the plan. After 90 days' consideration, their decision shall be final. Thus the constitutionality of any such law would be established. One important and incalculable effect of the adoption of the co-operative pension plan would be the impossibility of any general railroad strike. At a time when threats of strikes are two-edged swords held over the heads of the public, any preventative that is also a cure would be welcome to all the parties concerned. E. H. MORTON.

An Example of Reciprocity?

NORTH CAROLINA

TO THE EDITOR:

In the *Railway Age* of February 25, page 459, you suggest reciprocity on the part of railroads in the maintenance of railroad crossings. This subject comes home to me in very painful form. Ours is a junior road crossing another at two points. We maintain the crossing and the towers and the approaches on both of the lines. As suggested in your editorial, we were compelled three years ago to install anti-creeper on the tracks of the other road in order to hold the crossing in place. But our principal grievance relates to the loading of our maintenance expenditures by alleged co-operation or supervision on the part of forces of the other railroad. When we have made repairs at these crossings, the other road has insisted on having its own section forces work with ours, the "co-operation" consisting mainly in seeing that our forces do most of the work. When possible they have had two gangs and two foremen in attendance.

Until recently the other road has had two signal supervisors, each of whom visited the plant at least twice a month. Usually they spent about 30 minutes at the crossing, but invariably we received a bill of about \$15 for each visit. I submit this as the character of reciprocity received by the junior lines at railroad crossings, particularly where the junior line is a short line not able to retaliate at some other point.

GENERAL MANAGER.



The Difficult Loop Section of the Alaska Railroad

Completing the Government Railroad in Alaska

Passengers and Freight Now Transported Between Seward
and Fairbanks—A Distance of 467 Miles

AS CONCERNS operation between the ends of its line, the Government Railroad in Alaska, now officially called the Alaska Railroad, is completed, the actual opening of the line between Seward on Resurrection Bay and Fairbanks in the interior, occurring on February 5, 1922. Pre-

proaches, forms the main item in the budget for the fiscal year 1922-23. Other items of interest are a steel bridge at Spencer Glacier to replace a wooden structure now in use, the ballasting of about 50 miles of line in Broad Pass laid in the fall of 1921, and the widening to standard gage of about 56 miles of the narrow-gage Tanana Valley Railroad to Fairbanks. When this is carried out, the Alaska Railroad will have a through, 467-mile standard-gage line, with a total mileage, branches included, of about 539. Built



The Docks at Nenana on the Tanana River

vious to this time, trains had been operated over sections of the line as completed, and although transfer of passengers and freight is now effected through to Fairbanks, it is not carried out as yet by through rail connection except in the winter season. Actually Nenana on the Tanana river is the northern terminal of the road, passengers and freight being transferred at this point, ferried across the river and then carried to Fairbanks over a narrow-gage line. In the winter the narrow-gage tracks are laid on the ice in the river and the transfer from standard to narrow-gage made at Nenana. Bids now being received by the government call for the construction and completion of a 700-ft. span structure across the Tanana river on or before March 1, 1923.

The completion of this structure with the necessary ap-



A Sight No Longer As Familiar As It Was Some Twenty Years Ago

through practically a wilderness, under trying conditions of weather and surroundings, aggravated numerous times by difficult physical obstacles, the railroad is an undertaking the completion of which is a credit to all concerned. Its construction recalls some of the more difficult of the pioneer railway building of the West with the addition further that it was carried on more than 2,000 miles from its base of sup-

plies and in a country where there were few trails and roads.

The authorization of the project was through an act of Congress passed on March 12, 1914, the cost being fixed at \$35,000,000. Increasing prices for labor and materials during 1918 and 1919 soon developed the fact that the road could not be completed for that sum, and an additional authorization of \$17,000,000 was made in 1919, making \$52,000,000. This was still insufficient to complete the road and \$4,000,000 more was requested. Based on a total expenditure of about \$56,000,000, the Alaska Railroad will have cost, exclusive of equipment, etc., an average of about \$78,000 per mile of line. With all facilities included, the cost is about \$120,000 per mile of line. Articles descriptive of the progress of the railroad since its inception have appeared regularly in the *Railway Age* and are suggested as references in connection with this article.

Government Road Includes Two Existing Railroads

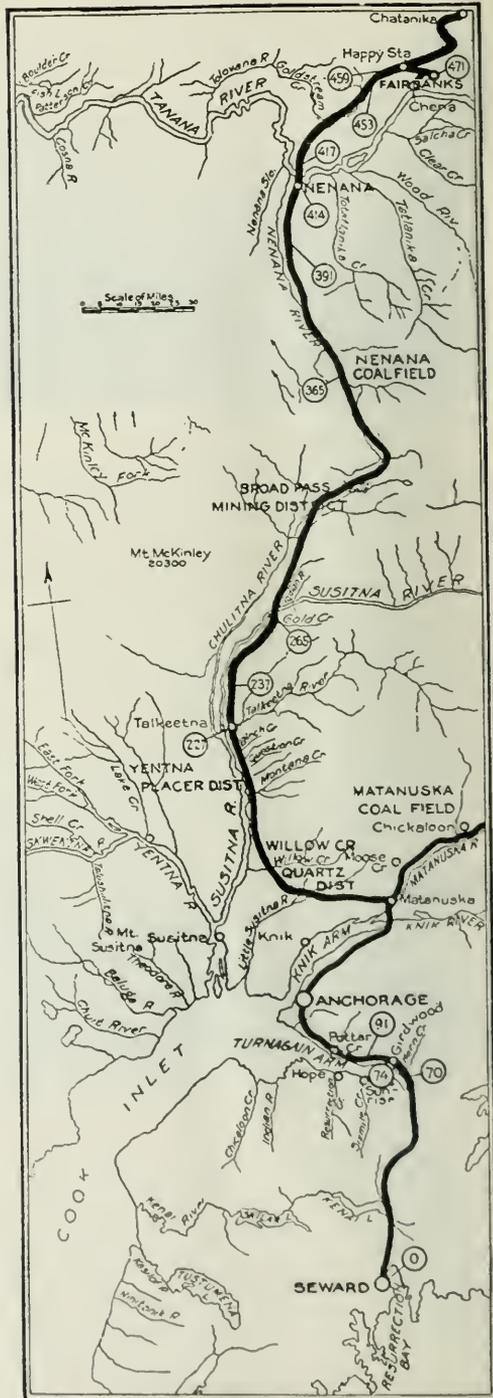
The line chosen for the government road includes two railroads initiated by private enterprise. It runs generally northward from Seward, a port open all the year, across the Kenai peninsula to Anchorage at the head of Cook Inlet,



Completing One of the Trestles Along Turnagain Arm

thence north along the general line of the Susitna river until reaching the main part of the Alaskan range. In this section Mt. McKinley is but a short distance to the west, the boundaries of the reservation extending to the line of the railroad. The railroad passes over the Alaskan range through a section known as Broad Pass and emerges on the north onto the cañon lands of the Nenana river, and the valley lands of the Tanana river into the town of Nenana, 411 miles from Seward. From the bank of the river opposite Nenana, the line swings to the east, reaching Fairbanks at mile post 467. This is considered the northern terminus although the old Tanana Valley Railroad, of which more mention will be made later, extends on to Chatanika, a distance of 39 miles.

One of the several primary purposes of the government railroad was to tap and thus develop some of the great coal fields of Alaska as a source of fuel not only for the navy but for other shipping and mining facilities as well. It is interesting to know that Alaska contains practically the only satisfactory steaming coal on the Pacific coast as far south as Chile in South America. Another purpose was to transport inland the equipment and supplies needed to develop the mining and agricultural possibilities of the territory and to move out their raw and finished products. Coal, for instance, which formerly cost \$18 a ton at Seward, was re-



The Line of the Alaska Railroad

duced to \$9 to \$10 a ton as soon as the line had reached the Matanuska coal fields, about 190 miles from Seward, and the first objective. The price of other products and supplies has been reduced since the completion of the line in a like or greater proportion with positive year-around deliveries in contrast to the old closed season of about four to six months when nothing could be moved in or out.

The backbone of the southern end of the line was furnished through the acquisition by the government of the Alaska Northern Railway, formerly the Alaska Central. The original intention behind this road had been to tap the Matanuska coal fields but because of financial difficulties the work had never been completed. Seward was its deep water terminus and the old wharves of that road were rehabilitated by the government for use with the federal line. These wharves form the only berthage for vessels coming into this port. Resurrection Bay, although indented 20 miles and an excellent harbor so far as navigation is concerned, has the draw-

established at Nenana and construction started south from this point toward the lignite coal fields in that section of the country. The narrow-gauge Tanana Valley Railroad was acquired at about the same time and its rehabilitation commenced.

Leaving Seward the road crosses two divides, reaching the summit of the first at Mile 12 with an elevation of 700 ft., after which the general grade descends, slightly rising again to the second summit at about Mile 45, elevation 1100 ft. The maximum grades in this section are 2.2 per cent compensated for curvature, with curves as sharp as 14 deg., of which, however, there are, in proportion, only a few. Descending from the summit the line follows the drainage of the Placer river and then enters the section where the heaviest construction of the line occurred. This is the loop section of the railroad. It contains numerous tunnels and a large amount of trestle work built of Douglas fir. Indicative of the class of work in this section is one trestle with a maximum



The Coal Town of Chickaloon in the Matanuska Fields

back of having from 50 to 150 fathoms of water, making it practically impossible for ships to lie at anchor.

Rehabilitating the Old Alaska Northern

Leaving Seward, the Alaska Northern had completed about 71 miles, over which it operated intermittently. Owing to financial troubles, it later reduced the mileage in operation to 35, using a light gasoline car to which a trailer was sometimes attached. During this period the roadbed was allowed to deteriorate and one of the first things which was done when the government took hold was to rebuild this line. New trestles and bridges, ties and rails were installed, while curves were straightened or eliminated and grades reduced and standardized. Approximately four and one-half million dollars were expended in this work, which, up to Mile 71, formed the first undertaking of the Alaskan Engineering Commission. At about the same time a base was established on Ship Creek at the head of Cook Inlet. This was named Anchorage and became the headquarters from which all construction was controlled. All equipment, such as steam shovels, dredges, barges, locomotives, cars, etc., was landed at this base and much of it consisted of equipment brought up from Panama, where it was no longer needed. Work was started from this point toward the Matanuska coal fields and south toward Seward. About one year later a base was

height of 106 ft. on a 14 deg. curve. From Mile 49 on to about Mile 61 is the glacier section of the road, the line passing at varying distances from Bartlett Glacier, Spencer Glacier and Portage Glacier. It is also the section in which most of the trouble from snow slides has occurred, practically all of the snow sheds being located at points between roughly Mile 43 to 80, the latter point being 9 miles beyond the end of the old Alaska Northern.

It was necessary to enlarge the tunnels of the old road and to rebuild practically all of the trestles. The grade reduction and other work also required some heavy construction in the form of cuts and fills most of which was carried out in hard rock that was difficult to handle. Being in the glacier section considerable trouble has been encountered in the tunnels through seepage of water under pressure, which, as soon as it strikes the air, freezes on the tunnel roof and rapidly forms large heavy icicles causing some danger to train operation. It is hoped to remedy this later by the installation of some kind of a heating system.

The Problem of Snow Slides At Turnagain Arm

The waters of Cook Inlet branch out at their head to the south and north forming two bodies known respectively as Turnagain Arm and Knik Arm. This forms a small point of land, upon about the western point of which is located

Anchorage at Mile 114. The head of Turnagain Arm strikes the railroad at about Mile 67, the line of the road following the shore line of Turnagain Arm into Anchorage, thence around the shore of Knik Arm on easy grades to about the head of the lhere where it turns north a short distance reaching Matanuska on the river of the same name at Mile 152. In order to avoid several bad snow slides along Turnagain Arm, the railroad is carried out about $\frac{1}{4}$ mile from the side hills on a trestle about one mile in length. A series of spur dikes were installed partly as a protective measure against ice and partly with the idea that the tidal action might eventually make a fill at this point. The tide in Turnagain Arm averages about 38 ft. from high to low and one can walk nine miles across the arm at low tide as far as from 18 to 20 miles from its head.

The coal fields are located approximately 40 miles from the main line of the railroad and are reached by a branch following the Matanuska river. This river overflows in certain sections, often cutting new channels and causing considerable trouble. In addition much of it runs between shale bluffs from 150 ft. to 250 ft. high and from 1,000 to 6,000 ft. apart. These are, for the most part, a partially disintegrated shale with a nearly vertical dip and are badly shattered. Through these points the line has been diverted away from the bluffs, since it was found that if they were cut into, immense quantities of this shale would have to be moved and even then there would always be danger of slides. As a consequence, the line has been thrown out into the stream in various places and in order to protect it from the action of the ice and water, sheer dams about 60 ft. long and filled with rock were built at various points during construction to deflect the river away from the track but later hard rock

miles. The construction in places is heavy, the topography of the country requiring a large number of 100 and 120-ft. span bridges with approach trestles and considerable heavy cutting and filling. The construction of this section along the Susitna river was attacked at various points, the materials being moved in by water and by wagon road. From about Mile 233 the line leaves the flat lands adjacent to the river and follows the toe of the slope along the hills, holding very closely to the river edge. In one or two places the road passes over sections of the river bed. The grades are comparatively light with a maximum of one per cent in the heavy construction section.

At Mile 264 the river swings to the east, the railroad crossing it and continuing north into the Alaskan Range on a



Freighting in Supplies Over Trails Built by the Railroad Forces



The Snow Sheds Are Built Primarily for Protection from Slides

rip rip was found sufficient to protect the roadbed. The maximum grades used in the Matanuska coal field extension are 0.4 per cent against outbound loaded movement and 1.0 per cent against inbound empty movement. Thus for seven months of the year at least, it is possible to move out large quantities of coal in heavy tonnage trains to Anchorage for shipment out of Alaska.

Building North Along the Susitna River

Leaving Mile Post 152 where the Matanuska branch connects, the main line swings to the west and with a gradual curve to the north approaches the Susitna river and follows the river, more or less closely, for a distance of about 75

1.75 per cent grade compensated for curves. The Susitna bridge was described in detail in the *Railway Age* of July 16, 1921, page 103. It consists of one main span of a 504-ft. steel truss, spanning the entire river from bank to bank to avoid the menace to channel piers from the rush of the ice in the spring break-up.

The Crossing at Hurricane Gulch

From Mile 264 the line ascends Indian river, a tributary of the Susitna, with increasingly heavy construction running into a section about 18 miles long, beginning at about Mile 284 and on which the cost of bridging was exceptionally heavy. The glacial streams in this section had eroded deep valleys which extend for many miles above the line crossing. The more spectacular of these crossings, known as Hurricane Gulch, is at Mile 284 where a deep gorge in the mountain side crosses the line, with a difference of elevation between the grade of the road and the bottom of the gorge of about 300 ft. The bridge used consists of a 384-ft. deck spandrel arch together with a number of steel girder approach spans carrying a total length of about 920 ft. Construction was carried on entirely from the south end. A cable tramway of large capacity was first installed to serve the dual purpose of transporting bridge materials across to the bridge gangs and food and other supplies to a large grading camp on the north side. A large derrick was installed on the north side and as soon as construction had reached a point where it was practical, it was put into service. Materials including the steel bridge members were brought out upon the completed part of the structure where a locomotive crane picked them up and lowered them over the end of the cantilevered

end of the partly completed bridge. The derrick on the north side then made fast and working together, the two cranes swung the heavy material to the far side where the derrick was able to place it in position.

Ascending to Broad Pass the construction was much lighter. Broad Pass is an opening through the Alaskan Range of unusual topography. It is 6 to 8 miles wide and from 20 to 25 miles long and dotted with numerous lakes. From Broad Pass the road drops down to the line of the Nenana river which it follows generally. This river flows in more or less of a canyon and is very crooked with cut banks nearly the entire distance. Through this section the tracks were kept away, as far as possible, from the action of the river. It was necessary to make a high level crossing of Riley Creek at Mile 347 on a steel viaduct. The crossing of the Nenana river at Mile 373 was made at an elevation providing only for a normal clearance over high water. In addition there were numerous other bridges and trestle work. Grades averaged between one per cent and 1.5 per cent as a maximum through this section which ran until the flat valley lands of Tanana river were reached, the line being comparatively level into Nenana.

The Reconstruction of the Tanana Valley Railroad

The Tanana Valley Railroad which forms the northern section of the line is a narrow-gage road 39.2 miles in length with termini at Chatanika and Fairbanks. A line 32 miles long extends to Chatanika in the mining district from a junction point 7 miles from Fairbanks. One of the first acts of the Commission was the reconstruction of the Tanana Valley and the construction of about 49 miles of new line to connect up Fairbanks with Nenana. This was done in conjunction with the work of building south from Nenana and was for the purpose of reaching the lignite coal fields as quickly as possible so that cheap fuel might be obtainable for the mining industries. A sidelight on the fuel question prior to the completion of this work is the fact that the timber in the vicinity of the mining district had been cut and burned as fuel for a distance of 16 miles back. The price had reached \$15 to \$20 a cord.

In constructing the line from Nenana to Fairbanks the new section was laid to narrow gage as a temporary expedient. Grading, ballasting, bridges, ties, etc., were carried out on the basis of standard-gage construction, the rail being laid to the gage required by the existing Tanana Valley equipment. The extension of the road running from the junction point to Chatanika was simply reconstructed as narrow gage

and will be left and operated that way. With the closing up of the Government Railroad by the completion of the bridge across the Tanana river, the narrow gage to Fairbanks will be widened to standard although the section of line between that terminal and the junction point will be operated both as narrow and standard gage. The bridge across the river will be of the same general design as that across the Susitna river although naturally of a much longer span, 700 ft. in the clear as against 504 ft. at the Susitna crossing. The estimated cost of the structure including several miles of approach grades and trestles is given as \$1,800,000 and one of the requirements of the construction is that it must be built between November 1, 1922, and March 1, 1923.

We are indebted to Col. Frederick Mears, chairman and chief engineer, and C. L. Mason, chief clerk, of the Alaskan Engineering Commission for the information contained in this article.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended March 18 showed a decrease of about 5,000 as compared with the week before, according to the weekly report compiled by the Car Service Division of the American Railway Association. The reduction was due to decreases in grain and grain products and also in coal in spite of the threatened strike, but the figures for the week show an increase of 132,000 as compared with the corresponding week of last year. The total was 823,369 as against 691,396 in 1921 and 855,060 in 1920. In basing estimates of traffic on the carloading figures, however, it is well to take into consideration the fact that the average loading per car this year is less than it was last year. For January the average carload was 27.6 tons as compared with 30.1 in 1921.

As compared with last year increases in loading were shown as to all classes of commodities except ore, and increases were shown in all districts except the Southwestern. There was a gain as compared with last year of 65,000 cars in coal and of 30,000 in miscellaneous.

The summary for the week is given in the table at the bottom of this page.

The number of surplus freight cars showed another reduction during the week ended March 15 to 216,661, of which 79,803 were coal cars and 89,356 were box cars.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 18, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Misc. L. C. L.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	7,519	3,726	52,444	1,928	4,968	917	67,729	69,358	207,589	165,011	207,831
	1921	5,718	2,553	36,891	867	6,406	875	54,466	57,235	174,799	137,449	183,137
	1920	2,466	2,594	36,220	4,093	2,743	1,436	49,721	55,498	137,449	137,449	183,137
Allegheny	1922	1,944	2,739	38,797	3,182	2,395	1,081	41,155	46,156	102,669	112,024	130,800
	1921	1,577	72	23,167	230	1,189	20	5,916	3,613	34,444	34,444	113,739
	1920	3,618	2,087	13,347	144	1,404	8	5,156	3,291	131,409	112,024	130,800
Poconahontas	1922	10,795	7,589	7,285	1,273	16,290	785	27,705	30,497	102,669	112,024	130,800
	1921	10,022	7,627	4,603	777	15,512	876	26,500	27,117	113,739	113,739	130,800
	1920	10,357	9,415	31,920	4,093	4,690	926	31,846	33,782	113,071	101,810	119,750
Pocahontas	1922	10,397	9,847	12,593	158	4,218	2,061	31,269	31,267	101,810	101,810	119,750
	1921	5,004	2,239	5,612	207	7,436	592	16,006	22,292	59,388	59,388	119,750
	1920	4,629	1,984	3,694	133	6,306	474	17,115	24,164	58,499	58,499	65,477
Southern	1922	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	691,396	855,060
	1921	35,919	29,494	125,968	5,806	49,558	6,091	211,391	230,169	691,396	691,396	855,060
	1920	32,777	26,466	181,955	11,743	66,268	15,980	168,630	348,341	691,396	691,396	855,060
Central Western	1922	3,977	228	64,715	2,696	5,041	.....	36,147	39,950	131,973	131,973	131,973
	1921	7,119	.....	8,728	.....	.....	781	.....	.....	.....	.....	.....
	1920	.....	.....	.....	.....	.....	.....	68,908	.....	.....	.....	.....
Southwestern	1922	.....	2,644	.....	3,241	11,669	10,670	.....	88,222	31,691	.....	.....
	1921	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	691,396	855,060
	1920	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	829,128	700,440	819,129
Total all roads	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	711,367	811,106
	1921	46,729	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295
	1920	54,209	30,327	190,760	7,666	50,796	4,034	219,050	224,142	780,924	692,007	772,102

Mileage Book Legislation Would Reduce Passenger Revenues

WASHINGTON, D. C.

TESTIMONY ON behalf of the railroads regarding bills to require the roads to issue interchangeable mileage books at a reduced rate was given at the hearing before the House committee on interstate and foreign commerce on March 28. Alfred P. Thom, general counsel of the Association of Railway Executives, said the carriers are opposed on principal to legislation of this nature and do not regard it as wise public policy but do not desire to be contentious. Therefore they would confine themselves to furnishing information as to the results of the study of men who have devoted their lives to the subject of passenger fares and submit it to the committee without argument. He read a letter from H. J. Hart, general counsel of the Bangor & Aroostook, who said that such legislation would be disastrous to his road, which operates its passenger service at a loss solely for the convenience of the public in its territory. Its fares are now on a basis of 4.5 cents a mile on main lines and 5.4 cents on branch lines, yet its operating ratio in passenger service runs from 108 to 110 and a reduced rate mileage book would still further reduce its revenues.

E. L. Bevington, chairman of the Transcontinental Passenger Association, gave estimates of the effect of a mileage book ticket on the passenger revenues of the roads, based on the experience of the past when mileage books have been used territorially or on single roads. He said the passenger revenues of the roads in 1920 were \$1,288,808,159 and in 1921 \$1,153,752,002, or an average of \$1,221,280,085, from which he deducted \$32,828,600 representing the Pullman surcharge, \$56,750,000 representing commutation revenue and \$131,701,485 representing revenue from special excursion traffic, leaving about \$1,000,000,000 which might be affected by a reduced mileage book rate. He estimated that a 1,000 mile ticket would affect about 25 per cent of that and a 20 per cent reduction to a rate of 2.88 cents per mile would amount to \$50,000,000, but if the rate were reduced from 3.6 to 2.5 cents per mile, or 30.5 per cent, a larger percentage would be affected and it would reduce the revenues by \$137,000,000. A 3,000 mile book would cause a loss of \$30,000,000 if sold at a reduction of 20 per cent or \$76,000,000 if the reduction were 30.5 per cent, while a 5,000 mile book would cause a loss of \$20,000,000 if sold at a 20 per cent reduction or of \$38,000,000 if sold at a 30.5 per cent reduction. The higher the denomination, the less would be the effect because fewer people would buy books.

Mr. Bevington said it is impossible to estimate exactly the effect of a mileage book good on all roads but that a few years ago when mileage books were used about 20 per cent of the traffic in the territory involved moved on mileage books and in some districts as high as 60 per cent. In 1917 a 2-cent a mile book was used in the Southeast when the basic rate was 2½ cents and it was used by a major part of the traffic between the principal commercial centers. A generally interchangeable ticket with a greater reduction in rate would affect a larger proportion of the traffic. He illustrated how a 1,000 mile book could be used to defeat regular rates by showing that at 2½ cents a mile the one-way passenger fare from Chicago to New York would be reduced from \$32.70 to \$22.70. Members of the committee asked the usual questions as to why a lower rate would not stimulate traffic enough to make up for the reduction in rate. Mr. Bevington said that a temporary excursion rate will stimulate traffic but a reduction in the basic rate, available at any time, has very little effect. He recalled that when passenger fares were reduced from 3 to 2 cents a mile in many states there was a stimulation of travel for only about three months and pointed out that an interchangeable mileage book would practically affect the basic rate. A large reduc-

tion in rates would undoubtedly stimulate traffic somewhat, he said, but this would be largely offset by the reduction in the revenue from the ordinary traffic and the increased traffic would cause an increase in expense. In reply to Representative Cooper, he said that a 43 per cent increase in traffic between New York and Chicago would be necessary to make up in total revenue for the loss of \$10 a ticket, to say nothing of the increased expense that would be caused.

Representative Johnson of Mississippi created a diversion by demanding that Mr. Bevington state the amount of his salary. This aroused a discussion among the members of the committee as to whether it was a proper question. Mr. Johnson insisted that "the railroads are guaranteed at the expense of the taxpayers and if they are paying fabulous salaries the public has a right to know it." Chairman Winslow finally ruled that a member of the committee had a right to ask such a question but that the witness might properly decline to answer it. Mr. Bevington then said he had no objection to stating that after 32 years of service he is receiving the munificent sum of \$9,000 a year." Representative Johnson then asked that the entire colloquy except the question and the answer be stricken from the record.

Continuing his testimony on March 29, Mr. Bevington showed that the average cost of passenger service per car mile is above 40 cents, which would be about the revenue received at a rate of 2½ cents a mile on the average of 16.54 passengers per car. If a concession were granted to purchasers of mileage books, the railroads would not only lose the amount of revenue represented by the reduction to commercial travelers, but also more, because a large percentage of general passengers would avail themselves of the reduction. He also pointed out that even if the books were made non-transferable it would be impossible to prevent their manipulation by scalpers and others; also they would lead to the practice of checking baggage between points between which the holders of the tickets themselves did not travel. In reply to the claim that the railroads would make money by the interest on the advance payments for mileage books, Mr. Bevington said that the average life of a thousand-mile book is only about two months and the carriers would have the use of the money in advance on the average only for one-half of that time. For this period the interest figures out at 14.4 cents. On the other hand, the cost of a mileage book is about 15 cents and reducing this to 13 cents by crediting the passenger with the cost of 20 single tickets at a cost of 2 cents, this leaves a margin of only 1.4 cents for the railroad to cover the additional cost of accounting.

Mr. Bevington also said that the Interstate Commerce Commission has always opposed the idea of reducing rates on the wholesale principle, and that while a carload rate is usually less than the l. c. l. rate the shipper of one car pays the same rate as the shipper of 5,000 cars. He pointed out that the carload rate would not be extended to a shipper who would pay in advance for a number of carloads and then ship in small quantities and that commercial travel does not represent the wholesale principle, but a large number of small retail transactions. Purchasers of one-way long distance tickets between thousands of points in the United States pay for more transportation at one time than the commercial traveler would pay for a mileage book and thousands of round trip tickets are sold that cost more than a 5,000 mile book.

When Mr. Bevington referred to reduced rate mileage book for commercial travelers as representing a discrimination, he was asked a number of questions as to why reduced fares for conventions, etc., are not discriminatory. He pointed out that such special fares are restricted to destinations and dates, that they stimulate traffic by inducing people to travel who otherwise would not, and that they fill the trains by concentrating the travel on given days, whereas the reduction in the basic rate or a reduced mileage book rate would

not be sufficient to fill the trains and would apply to a large portion of the ordinary travel for which trains are run on fixed schedules.

Representatives of a number of organizations of commercial travelers had previously testified before the committee

urging legislation to require a reduced rate mileage book, saying that the "policy" of the railroads is driving traffic away because the high rates are leading traveling salesmen to use automobiles. One witness said there are 650,000 commercial travelers in the United States.

Carriers Denounce Delay in Wage Reduction Case

Railroad Representatives Attempt to End Further Quibbling Before Labor Board

STRATEGY, COLDLY CALCULATED to interfere and delay" was the term given by J. W. Higgins, representing the western railroads before the Railroad Labor Board to the recent effort of the Railway Employees Department of the American Federation of Labor to obtain wage increases in the face of the railroads' requests for lower rates of pay. At the same time the charges of B. M. Jewell, president of the Railway Employees Department of the Federation, that the railroads are not legally before the board in the present wage reduction case were characterized by Mr. Higgins as "unfair and unsupported." These answers came on March 24 after a week of argument as to whether or not "proper conferences" as contemplated by the Transportation Act, had been held prior to the submission of the case to the board.

"As to Mr. Jewell's sweeping charge of bad faith and indifference in not even attempting to negotiate an agreement with the system organizations or employees," Mr. Higgins said, "the Railway Employees Department sent out a circular letter signed by Mr. Jewell instructing each system federation to request conferences immediately with the railroads for the purpose of negotiating a wage increase of five cents per hour above the rates established by Decision 2. This action was taken in the face of the fact that the board had, in its decision 147, recognized a downward trend, and named rates which it considered just and reasonable under the provisions of the Transportation Act, and also in spite of the further fact that there had been a continued downward trend since the issuance of Decision 147.

"Keeping in mind these conditions, and also the ability of the gentlemen directing the movement on the other side, there is no escape from the conclusion that the inauguration of this program for a wage increase was to checkmate the proposed decreases by requesting such abnormal increases as to make any sort of an agreement impossible. As such an increase as they requested, or in fact, any increase, could not be in justice obtained under existing conditions, then the movement must have had another purpose. I hold that we have proved that their plan was coldly calculated to interfere with and delay the decision in this case. From their viewpoint, it was good strategy, because so far as I know, no wage decrease has as yet been made retroactive."

In support of this position, Mr. Higgins quoted portions of Mr. Jewell's letter of instructions to the representatives of the shop men on the various railroads, and asked if these instructions were not given to delay meeting the railroads on the merits of the proposed decreases, and to inject into the wage conferences demands for abnormal increases, and to insist upon these increases being discussed, thereby showing the railroad proposition into the background, and forcing disagreements on the proposed increase only.

Referring to Mr. Jewell's allegation that railroad operating officers were without authority in the matter of wage rates because of an alleged arbitrary plan imposed upon them by higher authority, Mr. Higgins said: "No such plan

ever existed, and is therefore wholly imaginary." He then outlined in detail the manner in which the western railroads arrived at the proposed new rates of pay, adding:

"There was nothing mysterious or nothing arbitrary about the source of the rates proposed in western territory. The rates came from the knowledge, experience and judgment of operating officers of the western railroads. There was no consultation or conference with either of the other sections of the country. The rates named (by the operating officers) were recommendatory, and it was well understood that each western railroad could exercise its individual judgment with respect to such rates in order to reach a settlement satisfactory to it."

The agreement recently reached between the Chicago, Burlington & Quincy and its clerical forces was cited by Mr. Higgins as an example of what could have been accomplished. He added:

"I believe the shop men on that railroad or any other railroad could have settled, had the representatives shown the spirit of compromise shown by the clerical men on the Burlington.

Shop Employees Seek Irrelevant

Data In Wage Conferences

"One year ago," Mr. Higgins continued, "similar conferences were held in a general wage movement, which resulted in Decision 147. You may recall that in the hearing at that time protests were made by this organization against the early disposition of the question—they wanted it delayed, but not on account of the conferences. They claimed that until rules and working conditions then pending had been decided, the board was not in position to fix wage rates that could be considered just and reasonable. At the present time all rules have been decided by this board, and the means for gaining delay have been shifted to the attack upon the conferences held upon the individual railroads.

"Furthermore I ask you to note the character of the information each of the chairmen insisted upon having from managers, superintendents, mechanical superintendents, master mechanics or other local officers whose chief duty and concern is the safe movement of passenger and freight trains, or the safe maintenance of the equipment. They have, as a rule, no direct connection with, and are therefore unfamiliar with the larger financial, traffic and accounting features which the federated chairmen, for the first time, invariably wanted to talk about. These features included, for example, capital stock, bonded debt, gross and net earnings, traffic outlook, development and fluctuations, and ability to pay. These matters the federated chairmen insisted on knowing all about from the operating officers before they would discuss wages. Much of this information for which the chairmen seemed to hunger was seldom, if ever before, discussed even incidentally, much less used in local wage conferences, but this time the chairmen put questions on some or all of these subjects, but studiously avoided such things

as new facilities, new equipment and new wage rates.

"There was such a striking contrast in the uniformity of action on one side, and lack of it on the other in these conferences as to clearly point to the side that was thoroughly schooled, drilled and disciplined in the prearranged program. It did not matter whether the chairmen were nearby neighbors in the same city, or whether they were thousands of miles apart, they had an insatiable appetite for the same baffling information.

Charges of Bad Faith Unfair

"I submit it is most unfair to bring charges of bad faith against these men, alleging that they were unprepared in that they did not have or withheld proper information, and that they lacked authority merely because the federation chairmen called for a mass of irrelevant information. These conferences were held in good faith, they were of the same character as last year's conferences or any other conferences having to do with wage rates or working conditions. It does not follow that we held these conferences with less respect merely because federation chairmen, for some reason as yet unexplained, for the first time departed from long established custom and practice by calling for information of no practical use in solving the issue in the local conference—information of a character known only to men handling the financial, accounting or traffic work of these western roads.

Holds Conferences Proper

"We hold that proper conferences were held," Mr. Higgins said in closing. "We produced evidence from the individual railroads that established beyond a doubt that the railroads, in these conferences, were prepared to sustain, and did adequately sustain their proposed rates, with supporting data as to rates paid in outside industries, deflations in living costs, etc. We have shown that definite and distinct disputes resulted from these conferences. We have shown that the federation chairmen were not free agents. We showed that not one of them would even consider the rates established by Decision 147 as the basis for discussion or negotiation—that such freedom as they may have had was limited strictly to the range between 77 cents per hour (the present rate) and 90 cents per hour (the new rate proposed by Mr. Jewell) and we also showed that they would not join the railroad officers in a study of the rates in other industries.

"The railroad companies have, so far as the shop men are concerned, presented their argument for a decrease. We have not attempted to inject extraneous matter. It is our aim to be helpful in assisting the board to decide the question. It is not our desire to interfere in any manner with the presentation of evidence germane to these disputes, nor is it our wish to criticize the strategy or attack of the other side in any respect, but we have the right, and we do earnestly protest against the unfair and unsupported charges of bad faith made by Mr. Jewell and against his attempt at this late date to obstruct and further delay the hearings."

J. G. Walber Points Out Fallacy

of Shop Crafts' Position

Mr. Jewell's efforts to have the wage reduction controversy remanded for further conferences are based wholly on a misinterpretation of the Transportation Act, according to J. G. Walber, representing the eastern carriers, who followed Mr. Higgins.

"It is obvious," Mr. Walber said, "that Mr. Jewell is laboring under a misconception as to the meaning of words. He seems to think that the word 'conference' is synonymous with 'imposition' and that because the managements on the several roads were unwilling to compromise, therefore, they were not conferring and, further, as the managements did not accept suggestions from the employees of splitting the difference between the increases they proposed and the

decreases which the management proposed, which would have resulted in increases over the existing rates of pay, it was evidence to Mr. Jewell's mind that bona fide conferences did not take place.

"It is apparent that Mr. Jewell has confused the requirements of Section 301 of the Transportation Act with the obligations imposed upon the board by the provisions of Section 307. It is necessary under the requirements of Section 307 for the board in considering disputes which have been submitted to it, to give consideration among other relevant circumstances to the seven specific elements therein mentioned, while no such obligation is cast upon the parties to the conference by the requirements of Section 301, and if in the conference held under Section 301, by inadvertence or otherwise, some of the elements mentioned in Section 307 were not referred to and discussed, it does not in the slightest vitiate said conferences.

Joint Submissions

"Even aside from all that has thus far been said there is another reason which in and of itself should be accepted as sufficient cause for the dismissal of Mr. Jewell's contention that the conferences were not proper in the case of the eastern railroads. The submissions of disputes between carriers and the shop craft employees in a number of instances are joint: as a matter of fact on some 14 railroads in the eastern territory both parties have jointly certified to this board that they have conferred and having disagreed, invoke the jurisdiction of the board. This condition absolutely estops either party from now urging that the certificate which is signed in the joint submission was fictitious. On practically all of the other eastern roads Mr. Jewell himself has certified to this board ex-parte submissions of disputes in the matter of proposals for increases in pay. Having in mind that in practically every case joint conferences dealt both with the proposal for increases and the proposal for decreases, it is impossible to understand on what theory it can be contended that the conferences were proper as to the application for increases and improper as to the application for decreases.

"Considering all the phases of the situation, i.e., the conviction on the part of the managements that decreases were justified and the corresponding conviction on the part of the employees that increases were justified; the difference between the requirements of Sections 301 and 307; and the bona fide conferences held under the requirements of the act—we submit that these cases should not be remanded by the board for further conferences. To decide otherwise would open the way for either side to prevent local settlements of disputes and at the same time make it impossible to submit unsettled questions to the board."

New Rules for Stationary Engineers

A new code of rules to govern the working conditions of railway employees, members of the International Union of Steam and Operating Engineers, on the Baltimore & Ohio Chicago Terminal, the Chicago & Alton, the Kanawha & Michigan and the New York Central was announced by the Labor Board on March 27. The new rules, which are effective April 1, govern the hours of service and working conditions of stationary engineers on these roads, except those covered by the provisions of the Board's Decision No. 222, reported in the *Railway Age* of August 27, 1921, page 419. Included in the new code are provisions for the working of these employees on "split tricks," 8 hours within a spread of 12 hours; where service is intermittent and for the payment of time and one-half for overtime after the tenth hour of continuous service. The rules relative to payments for work not continuous with the regular work period and for Sunday and holiday work are similar to those announced by the Labor Board to apply to other groups of railway employees and described in previous issues of the *Railway Age*.

B. M. Jewell Attacks Nation's Industrial System

Justice of Rates of Pay of All Productive Labor Challenged —
Asks "Living Wage" of \$2,636

THE JUSTICE of the wage rates of all productive labor in this country and the principle upon which the railroads have proposed that rates of pay of railway employees be adjusted were attacked by B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, in taking up, on behalf of the Federated Shop Crafts, the defense of the present rates of pay of railway shop employees before the Railroad Labor Board on March 27.

"We propose to show how the entire purpose for which industry is operated can and must be changed. The so-called law of supply and demand will never afford a living wage in a system organized according to modern business principles," Mr. Jewell said. Declaring that the existing wage scales are insufficient to enable wage earners to maintain a "minimum of decent living" Mr. Jewell declared that an investigation conducted by economists in the employ of the Shop Crafts indicated that "low standards of living are due largely to an unfair division of the country's products."

"The railroads are saying to their employees, 'we cannot afford to pay a living wage,' while we say that the railroad industry must pay at least that," Mr. Jewell added. "This issue is not confined to railroad workers; the country must pay all productive workers a living wage."

After analyzing the necessity for the railroad industry paying its way, Mr. Jewell declared that this is an unwarranted distinction between the transportation system and the whole industry of the country. "Surely the whole industry of the country must pay its way if the country is not to go bankrupt," he said. "But to argue that each separate industry, run without co-ordination to the whole, must pay its way is as contrary to the facts as to argue that a given railroad siding or spur track must pay its way independently. If an industry can afford only a starvation wage it stands self-condemned. But our study has convinced us that taken as a whole industry can pay a living wage, and we are going to outline for the board the basis of this conclusion."

"We feel that mere adjustment of wage rates to minute variations in the cost of living would be a purely statistical problem for the board's force, requiring no hearing or elaborate preparation on either side. If the board should interpret its function to be merely to determine the level of wage rates established in the outside labor market, it would thereby become a mere game and so defeat the purpose for which it was established."

The Shop Crafts' argument will take the following form, Mr. Jewell said: (1) an examination of the connection between wages being paid on the railroads and in industry as a whole and the cost of the necessities of healthy family life; (2) an exposition of the forces operating to determine wages in the labor market; (3) a study of the national income with a view to ascertaining whether industry can afford to pay a living wage; (4) a forecast of the effect upon the country's general prosperity which would result from the payment of a living wage.

Mr. Jewell Presents Detailed Food Budgets

In support of his charge that "the railroad industry is not today paying a living wage to the mechanics employed in its shops," Mr. Jewell presented a mass of cost of living data prepared by various members of the Federated Shop Crafts and including itemized monthly expense accounts, food budgets and other information of a similar character. These data disclosed, according to Mr. Jewell, that "the ex-

penditures made by railroad employees' families for food falls far short of the minimum requirements for bare subsistence, below which it is dangerous to go, according to Professor M. E. Jaffa of the University of California, a specialist in food budgets and dietetics." Mr. Jewell's data indicated that mechanics in railroad shops were able to purchase about 64 per cent of the meat, fish, milk and eggs necessary to maintain their actual families at the lowest level of safety; 77 per cent of the necessary cereal foods, 91 per cent of the necessary vegetables and fruits, and 71 per cent of the necessary butter and oils.

"The deficit in railroad wages does not appear in dollars and cents," Mr. Jewell added, "it appears in a shortage of food. This is as truly a deficit to railroad industry as would be a failure to meet interest on bonded indebtedness. The result of such a deficit in terms of the general physique of the country and also in terms of the efficient operation of the railroads are sufficiently obvious. If an industry cannot meet its first fixed charge, the payment of a healthful livelihood to its employees, it is indeed bankrupt.

"It is argued that the railroads must meet their fixed charges. The general rule in business is that a concern which cannot meet its fixed charges is bankrupt. It seems to us that a healthful standard of living for his family represents a man's fixed charge. Failure to meet this means the realest kind of bankruptcy. It will mean eventual physical and moral bankruptcy to the nation."

Mr. Jewell's budget for railway shop employees requires annual earnings averaging for the entire country of \$2,636.97 or \$300 more than the budget prepared by the Department of Labor.

"Some people will undoubtedly want to interject some comment upon the absurdity of a mere workers' expecting an income of this size," Mr. Jewell said. "If they are honest they will recognize that they are remarking on the absurdity of the workers of the country receiving as much goods as are enumerated in the budget. The mere dollars and cents mean nothing; it is what they purchase that counts. If such people are really honest they will then proceed to enumerate the articles or quantities which it is absurd that a worker's family should have and will further state clearly what, in their opinion, a worker may expect as a minimum allowance of good things in return for his service to society."

To secure what this budget provides, railroad mechanics would have to earn 40 per cent more than they now earn, according to Mr. Jewell.

Wage Deflation Opposed on Grounds That

Inflation Has Never Taken Place

Mr. Jewell's argument against the deflation of the wages of railway employees was based on the charge that the "rail and other workers of America never received 'inflated' wages." His economists disclosed, he said, that the only marked effect of inflation and deflation in wages is a weakening of the bargaining power of labor during the deflation period. Analysis of the financial history of the metal, chemical, cloth, clothing, food products, fuel, building material and house furnishing industries show, Mr. Jewell contended, that "throughout prosperity and depression, wages are tied close to the subsistence level."

"Corner Storekeeper" Defended by Mr. Jewell

"Wage earners are not the only victims of deflation," Mr. Jewell added. "The storekeeper suffers equally, because as

wage rates do not increase with wholesale prices, the consumer cannot sustain retail prices which keep pace with wholesale prices. The corner storekeeper must stand the difference and hope to recuperate slightly as wages and retail prices lag behind descending prices."

"But here is the rub," continued Mr. Jewell, "the increase in prices is slow, extending over several years, but the men who profit largely in the ascent and stand to lose in the period of decline have control of the situation and plunge the country into deflation so suddenly that the possible gains of the corner storekeeper and the wage earner are entirely swallowed up because unemployment and part time reduce the purchasing power.

"It was not a buyers' strike but a buyers' lock-out which precipitated the depression with its unemployment. With a monopoly control of credit and prices and with a monopoly control of jobs, they precipitated a lock-out which by its suddenness and completeness forced the small business man, the farmer and the wage earner to carry the whole burden of deflation."

Mr. Jewell's study of the relation between prices and wages is based on the wholesale price index numbers of the United States Department of Labor and the figures gathered by the New York State Industrial Commission.

Mr. Jewell Asks for Immediate Ruling on Question of Jurisdiction

Prior to the presentation of his case as abstracted above, Mr. Jewell requested that the Board adjourn the hearings and immediately pass upon the request to remand the whole wage controversy to further conferences between the carriers and employees involved, in order that "railroad shop craft employees shall at this time be definitely assured that this Board will not sanction or approve non-compliance or perfunctory compliance with the law." At the same time he questioned the Board as to a press report stating that "the Board has decided to over-rule the union's request that the carriers requests be thrown out." The Board's answer to Mr. Jewell's demand for an immediate ruling and for information as to its attitude on the subject of conferences as indicated in this press statement was given in the form of a resolution of the Board read by Chairman Barton. This resolution said:

"It is the order of the Board that when both the representatives of the railroads and employees have completed their presentation on the issue as to whether proper conferences have been held, the hearing at once proceed on other phases of the case and the Board reserves the right to pass on the question as to conferences after the entire case has been heard. This order shall apply to the shop craft hearings and all the other classes before the Board on this hearing."

Mr. Jewell protested against this ruling as representing a departure from his "understanding of the procedure of any similar, or generally speaking, so-called judicial tribunal wherein the merits of the case are required to be discussed before that Board or that tribunal prior to the time that Board or tribunal determines whether or not it has jurisdiction."

"We stand here expounding the gospel of regular and orderly procedure," Mr. Jewell added. "This action on the part of the Board does not, in our opinion, make for the preservation of these things; it does not make for the encouragement of them. The success of the railroad industry must depend on the continuation of that procedure in our opinion."

This allegation was denied by G. W. W. Hangar, acting chairman in the temporary absence of Judge Barton, by stating that this action "is in accordance with the methods of the Board in previous cases where questions of jurisdiction have been raised."

Employees Again Ask for

Investigation of Railroad Publicity

Mr. Jewell again asked the Board to investigate the publicity material put out in the name of the Association of Railway Executives and presented to the Board, as examples of this material, several bulletins issued under the authority of the Association and containing abstracts of the wage data recently submitted to the Board by Mr. Walber. The chairman of the Board stated that no action had been taken on the previous request of a similar nature but that the matter would be called to the attention of the Board in the near future.

St. Paul Clerks' Case Before Board

Clerical forces on the Chicago, Milwaukee & St. Paul could not agree with the management of the carrier regarding proposed wage decreases and the dispute has been submitted to the Labor Board. The carrier asked for a 10 per cent reduction and representatives of the clerks held out for a smaller reduction, citing the recent agreement on the Burlington as justification of their stand.

Albert Phillips, Labor Board Member, Resigns

Albert Phillips, formerly vice-president of the Brotherhood of Locomotive Firemen and Enginemen, and for the past two years a member of the labor group on the Labor Board, has tendered his resignation from that body to President Harding to become effective April 15. Mr. Phillips has been ill for some time and has not appeared at any of the Board's public hearings since last December. No information has been received at the Board so far as to Mr. Phillips' future plans, but it is understood that as soon as his health permits, he will resume his duties with the Brotherhood of Locomotive Firemen and Enginemen.

Labor Board to Move

The Labor Board will, after April 24, be located on the twenty-second floor of the Transportation Building, Harrison and Dearborn streets, Chicago, instead of the Kesner Building, its present location. The new quarters will enable all the Board's offices to be consolidated on one floor instead of three as is the case at present.

Hearings on Enginemen's Working Rules

The Board on March 29 adopted a resolution ordering hearings on disputes between the carriers and their engineers and firemen as to rules and working conditions, to begin immediately after the present wage reduction hearings are closed. No mention is made in the resolution regarding similar disputes between the carriers and their conductors and trainmen.



The Same Design on Rail and Road

The Manhattan City & Interurban Railway of Manhattan, Kan., has changed from electric trolley cars to gasoline rail cars of the FWD type, the new cars being much lighter and cheaper to operate. At the end of the line the rail car connects with a motor bus of similar design which operates to outlying points.

Vacuum Brake Tests on English Freight Trains

Results of Great Northern Trials Reported Before Institution of Civil Engineers

THE USE OF VACUUM brakes both in England and in the United States is almost as old as that of air brakes. In this country the vacuum brake many years ago practically passed out of existence except for a few industrial locomotives. In England the vacuum brake has been continued in service and is even now extensively employed, and the same is also true to a large extent of some other European countries, as well as India, Australia, Africa and South America.

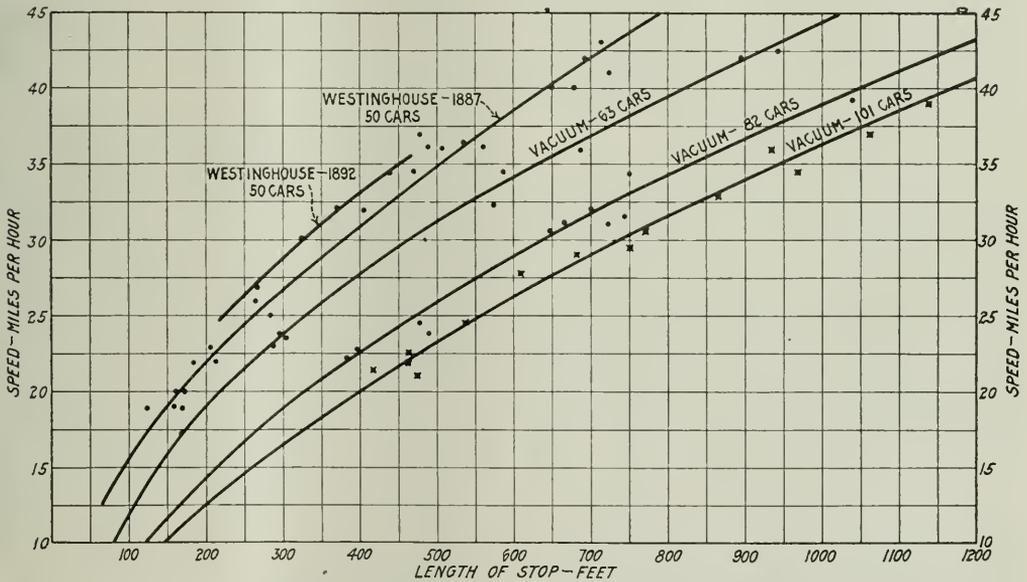
Evolution of the Vacuum Brake

In its evolution during the last 50 years the vacuum brake passed through changes paralleling those which took place

in England has been quite limited. The steadily increasing length and weight of passenger trains as well as a growing demand for power brakes on freight trains has, however, led to the development of accelerating or rapid action valves for the quicker application of the brakes on longer trains. These, however, have not yet been extensively applied.

Advantages and Disadvantages of the Vacuum Brake

To an American who has been accustomed to the air brake only, or who perhaps recalls the vacuum brake as largely an old experimental device, it is somewhat surprising to learn that the vacuum brake is even more common in England



Comparative Stops with English Vacuum Brakes and American Westinghouse Air Brakes

in the air brake. At first, a plain vacuum brake met the requirements. The brake pipe was normally open to the atmosphere and an ejector was used to create a vacuum in the brake pipe and diaphragm or cylinder on the various cars when it was desired to apply the brakes, the vacuum being destroyed to release the brakes. This system was long ago superseded by the automatic vacuum brake in which a vacuum is constantly maintained in the brake pipe and in the enlarged chamber or attached reservoir above the brake piston, the vacuum being partially or fully destroyed to apply the brakes and again restored to release the brakes. A combined ejector and brake valve is commonly employed to create the vacuum and to control the admission of air to the brake pipe. This ejector has two nozzles, a large one for creating the initial vacuum and for releasing the brakes and a small nozzle for maintaining the vacuum after the brakes have been released.

Thus far the application of power brakes to freight equip-

ment in England has been quite limited. This raises the question as to why the vacuum brake has been able to retain its position and what advantages it possesses. The outstanding reasons appear to be: the simplicity of the mechanism and its low expense of maintenance; the perfect control of braking due to the fact that the braking pressure can be increased or decreased at will without releasing the brakes; and the smoothness of the stops, this last feature being due partly to the use of lower rates of retardation than are demanded by American railroads. There is a distinct disadvantage in the relatively large size of the brake cylinders which is a result of the low cylinder pressure of less than 10 lb. per sq. in. This is only one-sixth of the pressure used in air brake cylinders.

Vacuum Brake Tests on the Great Northern

With a view to ascertaining the suitability of the vacuum brake for long freight trains, a series of trials was carried out during the summer of 1919 on the Great Northern Rail-

way. These tests were under the supervision of Sir Henry Fowler and H. N. Gresley who presented a paper before the Institution of Civil Engineers on January 10, 1922, giving the results of the runs. The facts given herewith are taken from this paper.

The main difference between braking freight trains and passenger trains are briefly as follows.—(a) The greater length of freight trains. (b) The necessity of running loaded and empty cars together in freight trains. (c) Even if screw couplings are used, the need of quickly coupling and uncoupling when switching will probably result in the couplings being screwed up less tightly than in passenger trains. This tendency to couple loosely enhances the need for a smooth and uniform action of the brake throughout the train.

For these tests the following conditions were laid down as a standard of satisfactory performances:

That trains of 100 cars, close coupled, must be stopped:

- (1) By emergency applications without shock and without any risk of parting the train.
- (2) By service applications without shock or risk of parting, and in such a manner that the train could be restarted immediately after coming to rest.
- (3) That the speed of the train could be reduced as required.

The tests were carried out on the Great Northern railway between Petersborough and Firsby, this portion of the line being practically free from grades and curves.

Trains and Equipment

The locomotive was of 2-6-0 type. The weight of the locomotive in working order and the tender two thirds loaded with coal and water was 213,920 lb. All wheels were braked with the exception of those of the front truck. The ejector was a Gresham and Craven combined 20 mm. and a 25 mm. Drednaught.

The train consisted of Great Northern railway eight-ton covered vans or box cars, having an average light weight of 16,150 lb and fitted with the G.N.R. standard vacuum brake, with the Westinghouse Brake Company's accelerators and reducing nipples. In addition to these the train included three Midland railway six-wheeled cars carrying the necessary recording instruments. One of these was placed at the front of the train, one in the middle, and one at the rear.

All the cars were unloaded and provided with screw couplings. The brakes were tested for leakage before the trials, and the travel of the brake pistons adjusted as required. The instruments comprised speed recorders and duplex vacuum recorders. The latter instruments (one of which was placed in the front, middle and rear vans) recorded the pressure in the train pipe and brake cylinder reservoir.

The average retarding force is the basis usually adopted for comparing brake stops. This force is convenient to express as a percentage of the weight of the train, and in the calculations, the weight of the train is taken as the gross weight of the train increased by the equivalent rotary inertia percentage, which was found from calculation to vary from 10.4 to 10.7 per cent of the weight of the train, being about 7.3 per cent for the locomotive and tender and 11.1 per cent for the cars. The forces concerned, inclusive of brake power, friction and gravity, are assumed to be acting uniformly throughout the stop.

The standard vacuum carried in the brake pipe was 20 in. and the average effective vacuum in the car brake cylinders with the brakes fully applied was 17 in. or 8.33 lb. per sq. in. The brake shoe pressure equalled 61 per cent of the weight of the locomotive and tender, 90 per cent for the cars and 86 per cent for the train complete with the locomotive.

Results on Trains of Various Lengths

The first tests were made with a 63-car train, each car being fitted with an accelerator and a standard reducing nipple between the brake pipe and the under side of the piston in the vacuum brake cylinder. The standard size of choke is 3/16 in. diameter for a 15-in. cylinder and 5/16 in. for an 18-in. cylinder. The weight of the 63 cars was 455.25 long tons or 1,019,760 lb. All emergency stops made under these conditions were satisfactory. It was found necessary, in making speed reductions or service stops, to apply the brake gradually, otherwise the accelerators operated, and unless the speed was high, say over 30 miles per hour, the train came to a stand before the brakes could be released.

The 80-car train was made up by attaching nine cars at the front of the previous 63-car train and eight cars at the rear; these cars had no accelerators or reducing nipples. Five emergency stops were made from speeds ranging between 22 and 42 miles per hour, but the shocks were so severe that in one case the train parted. The front nine cars were switched out and another emergency stop made, but the shock was so bad that the train again parted. The records of these stops were spoilt on account of the effect of the shocks on the instruments, and it was decided to abandon further trials with trains not completely fitted with accelerators.

The next tests were made with an 82-car train, fitted with accelerators and standard reducing nipples throughout. The total weight of the cars was 587.5 long tons or 1,316,000 lb. At speeds above 40 miles per hour the stops were fairly smooth, but between 30 and 40 miles per hour there was a rough jerk just before stopping, and for stops from 20 to 30 miles per hour the jerk was very severe just before coming to rest. The stopping distances of this train were almost identical with that of the 63-car train. Emergency stops were then tried with the working vacuum reduced to 16 in. These were fairly smooth except at the lower speeds, but the stopping distance was increased by about 20 per cent.

The next change was to reduce the size of the chokes in the nipples to 7/64 in. diameter for a 15-in. cylinder and to 1/8 in. for an 18-in. cylinder. The train consisted of the same 82 cars fitted with accelerators. The effect of the reduced nipples was to make the stops at all speeds quite satisfactory as regards being smooth, but increased the stopping distance by about 25 per cent.

Following these tests the length of the train was increased to 101 cars, the total weight of the cars being 719.5 long tons or 1,611,680 lb. All cars were fitted with accelerators as well as specially reduced nipples of the same size as those used on the preceding 82-car train. The emergency stops were quite satisfactory as regards being smooth, but compared with the standard of comparison—63-car train—the stopping distance was increased by about 35 per cent. Emergency stops were also made working with a 16-in. vacuum. In this case the stops were very smooth, but the stopping distance compared with the standard was increased approximately by 50 per cent.

General Conclusions

(1) The trials demonstrate that it is practicable with the vacuum brake to work long trains of up to 100 cars, provided that suitable accelerators and reducing nipples are used.

(2) Emergency stops can be made without shock with trains consisting of up to 100 cars.

(3) Service stops and speed reductions can be made and the train restarted promptly, provided that when running at speeds less than 30 miles per hour air is admitted slowly so as not to operate the accelerators. This necessitates the braking being spread over some distance, but allows time to have the brakes partly released when the desired reduced speed is reached, or just before stopping, and thereby en-

The Theory and Practice of Store Door Delivery

Seven Speakers Discuss Possibilities and Problems of the Subject
Before New York Railroad Club

AT THE MEETING of the New York Railroad Club on Friday, March 17, store door delivery was discussed as to its history, the practice in foreign countries, its advantages, the objections to it and actual experience with it in this country.

The speakers were Colonel Charles Hine, Robert E. Thayer, J. Shirley Eaton, W. J. L. Banham, T. C. Powell, W. C. Brinton and B. F. Fitch. Colonel Hine gave a brief sketch of the history of store door delivery in this country. Mr. Thayer, who is European editor of the *Railway Age* and but recently returned from England, told of the working of the plan in England, where it has been in operation since the early days of the railways. Mr. Eaton, who made an extensive study of the problem for the Federal Trade Commission, spoke upon the relation of store door delivery to markets. Mr. Banham, the general traffic manager of the Otis Elevator Company and who is one of the strongest advocates of the innovation, outlined its economic advantages to carrier and shipper alike. Mr. Brinton, consulting engineer and president of the Terminal Engineering Company, explained the operation of the system in Montreal and exhibited some lantern slides illustrating some practical suggestions for solving the problem. Mr. Fitch told of the advantages of the system and the methods of overcoming obstacles based upon his observations of the Cincinnati plan.

Address of T. C. Powell

T. C. Powell, vice-president of the Erie, described in detail that company's plan of store door delivery in New York. A brief description of this plan was published in the *Railway Age* of January 21, page 233. Mr. Powell's address was particularly informative and valuable in that it not only described a practical system of store door delivery which is in actual operation but because it touched upon the especially perplexing problem of distribution in New York, for which many and varied solutions have been proposed.

New York's problem arises from the fact that all but three of the important lines entering the metropolitan district terminate on the New Jersey or Staten Island side of the Hudson river. All these railroads maintain freight stations in piers on the New York side of the river and cars are floated to them from the Jersey side. The Erie plan is important, therefore, not only because it involves store door delivery, but because it contemplates the loading of motor trucks directly on the Jersey side and the movement of the trucks across the Hudson river to New York on ferries which radiate, fanlike, from the Jersey side to several points in New York. The New York pier freight stations can thus in large measure be abandoned and car floating reduced to a minimum.

Mr. Powell said in part:

The Erie Plan

"What the Erie has done in New York is the first move by a rail carrier of which I am advised, to deliver freight to an inland station and to make direct delivery to a consignee as the result of an investigation and of a decision that this was the thing to do, rather than as the result of competition of some other source of carriage or through a suggestion of a private individual who organizes a separate company.

"Before I describe in detail the Erie method I would like to revert a little bit to what has been growing in my mind for a number of years with respect to this kind of handling. I have only been with the Erie Railroad about two years.

When I came I found that Mr. Underwood, the president, was very much interested in this question of making delivery by means of trucks, and had made considerable progress toward the plan finally adopted as I will describe later.

"During the Federal Administration, the Interstate Commerce Commission, at the request of the administration, investigated the possibility of some such plan as we have since put into effect. At that time they found a great deal of opposition from the numerous trucking concerns, and from some others, and that scheme fell to the ground. The term of office of the particular commissioner in charge afterwards expired, and there was no one else on the commission who had taken a special interest in it.

Private Company Contracts to Do Trucking

"The United States Trucking Corporation (New York) which is the largest trucking corporation of the city, has been found to be large enough to assume the responsibilities that must be connected with this class of service.

"Something over 20 years ago there was in the little town of Gainesville, Georgia, an enterprising truckman who undertook to do exactly what we are doing today, and he was very successful in doing it, so successful that he finally persuaded all the merchants in town to sell to him their trucks and teams and wagons, so that he performed not only the service to and from the freight stations, but also all the delivery service in the town. That was successful, and it was broken up only by reason of another railroad coming in and jealously trying to change the arrangement, and finally breaking up the contract.

"Years ago, also, I appreciated that the ultimate result of the extraordinary values of terminal property would be a financial problem quite as much as a physical problem. It was clear to me that in the congested areas (in which areas the less than carload freight is largest in volume) the price of land and the cost of maintenance would become so high that there would be no way of solving the problem except by extension of the facilities by means of a truck or dray, and that was before the automobile was in active service. I also observed at different places in the south, such, for instance, as Birmingham, that where the railroad was able to assign a definite space in the freight station to a transfer company under contract, not owned by the railroad, but under bond to the railroad, and under contract with the consignees whereby that transfer company could immediately collect the freight at the station and deliver it, that a space of 25 feet square under that arrangement, filled and emptied time and time again during the day by prompt service, accomplished just as much in the delivery of the freight as the space in the station the size of this hall under the ordinary 48 hours free time, and with shipments frequently remaining over because of delay of consignees. . . .

"In St. Louis the condition was a little different from any of the cities that I have described. It is in geography the exact reverse of New York; in other words, you look from East St. Louis west across the Mississippi river to St. Louis, and here you look east from Jersey City across the Hudson river to New York.

"Now, originally the rates into St. Louis from all the eastern territory were made just as much higher than East St. Louis as the drayage charge; in other words, the drayage charge was commuted, and the rates were fixed on that basis, so that naturally a drayage service grew up from East St. Louis to the merchant warehouse without any regard to

whether the railroad running into East St. Louis wanted it or not. The shipper had the option of sending his team to East St. Louis and hauling his freight with his own team, or he had the option of making a contract with some transfer company, such as the St. Louis Transfer Company, and making the delivery in that way.

Advantages of the Ferry

"When I was living in St. Louis there was a great effort made by the real estate fraternity of St. Louis to force the railroads, such as the Southern, the Big Four, the Pennsylvania, the Alton, and the B. & O. principally, to purchase property in St. Louis, making out of course that that was for the benefit of St. Louis. It was the first time, and I trust the last, that I will ever be cartooned in a newspaper, because it so happened that I was very much in opposition to the plan of locating additional stations in St. Louis. I pointed out that the two cities were located in an ideal relation to each other to permit of what I called a fan-shaped distribution by railroad or by trucks from East St. Louis into St. Louis. At that time the Wiggins Ferry Company was operating its boats so that the teams could move to the ferry and be transported to a point opposite the center of the city, to a point opposite the lower part of the city, or to a point opposite the upper part of St. Louis, with a minimum of effort on the part of the horses and the quickest possible delivery without going through the congested streets of the city. In other words, where they did go through the thickly congested streets, they only teamed to the nearby points. Where they had to go to far points they went on the ferry to the nearest landing to those far points, so that always there was a minimum haul on land. . . .

With all those thoughts in my mind, and that is my only reason for making that review, I said to Mr. Underwood when he broached the subject here to me, and showed me the difficulties that had been experienced in New York, that this to my mind was just as ideal a place for trucking service as St. Louis was, and as I pointed out, it is merely the reverse geographically. The problem, then, was to reach an understanding with a trucking corporation, the only one large enough being the United States Trucking Corporation. As you know, the freight coming across the river is unloaded in the piers. We use principally for the congested districts, piers 20 and 21, North river, but our problem was more than merely the congestion of the merchandise. That happens to be the location to which a large part of the fruit from the west comes into the city, amounting last year to something like 30,000 carloads. In 1900 it was less than 5,000, and in that period it has gone up to 30,000.

"There is not room on these piers for merchandise and the fruit. It is imperative to handle the fruit, and therefore we saw our merchandise gradually shifting to other points. Sometimes we had to borrow the premises of another railroad, so that we were forced to consider this question as a practical means of relieving our piers, 20 and 21.

The Problem of the Trucking Contract

"It was not so simple to put this arrangement into effect as one might at first think. It seemed to be an easy thing to say to the United States Trucking Corporation, or any large company (because you must have a large company), 'We would like to have you take our freight at Jersey City and deliver it in New York, and we will pay you for doing so.'

"Immediately the question came up as to the competing lines. They naturally said, 'What are you going to pay the trucking corporation for doing that work? Are you going to pay them so much, even though you might save money by doing so, that they can make an absurdly low rate to a consignee and thereby deliver direct to the store door at a lower cost than the consignee will have to pay in a combination of rail charge and private trucking charge via other railroads?'

"Again, there was the question of responsibility as between the carrier on the one hand, the trucking corporation on the other, and also the responsibility of the shipper. So that while we started this negotiation in the latter part of 1920 and carried it pretty well along in 1921, it was not until the very last part of 1921 that we were able to put the arrangement into effect.

"One of the things that we were insistent upon from the beginning was that whatever contract we made with the trucking corporation should be so open and aboveboard, and so fair to the trucking corporation and to the shipper and to the railroad as to be a document that we could hand to any one of the competing roads, such as the Lackawanna, the Lehigh, the West Shore, or the Central Railroad of New Jersey, and say, 'Here is our contract. If you duplicate that we have no objection.' A provision in the contract is that the trucking corporation shall not deal with any other railroad without our consent, but we have already given our consent to their dealing with several that they have asked permission to deal with.

"You all know that West street (New York) constitutes an eastern line for the piers and that there are no business houses on the west side of West street. In other words, at West street you are right at the edge of the water, practically. Therefore, we drew the line at the west curbline of West street. I might say that in St. Louis they drew the line in the center of the Eads Bridge, at the west end of the Eads Bridge. Up to that point the railroad assumes responsibility.

"The truck backs up to the car, or the platform in Jersey City, unloads the freight from the car, or takes it from the platform and puts it in the truck, brings it across the river on the ferry, for which we give free ferriage, and then through the ferry house, and at the moment the truck enters West street, if the consignment is going direct to the shipper's warehouse, the trucking company becomes the shipper's agent. Our responsibility to the consignee stops as soon as the truck crosses the west line of West street, if it is going to the shipper's warehouse, but the trucking corporation is responsible to the Erie Railroad as soon as the trucking corporation accepts the freight from the car.

New Freight Stations

"In all arrangements for so-called store deliveries, one of the great troubles has been the lack of option on the part of the consignee. We anticipated that, and we installed, or rather, we opened several inland stations. Of course we could not afford, nor could any railroad afford to purchase sufficient property in New York City to put up warehouses, unless they also went into the warehousing business as an adjunct to the particular warehouse. Therefore, through the trucking corporation we contracted for space. That space is on the ground floor. We have nothing to do with what is above the ground floor. Now, if a shipper says, 'I have purchased a carload of stuff, but I have room for only one truckload at my house, and I want the carload delivered at the inland freight station until I can get time in the next 48 hours to have it hauled to my place of business,' he gives that order to the trucking corporation. We permit no freight to be handled by the trucking corporation direct to a shipper's warehouse without the consent of the shipper. He must sign a memorandum or an order calling for that service. We do not force it upon a shipper. Therefore, if he does not give such an order, if he refuses to give an order, or for any lack of knowledge of the immediate transaction he does not know of the shipment coming in, it is delivered to one of our inland stations, because we are gradually closing our river stations, that is, the piers. We have closed Duane street to merchandise, as such, reserving it for the perishable goods. And we have given notice of closing pier 39, North river, excepting the space that is occupied by 39 people who rent the pier, and we are proceeding along that line to close the piers

which we rent from the city, as we divert the business to the inland stations and to the direct service.

"An additional obligation in this contract is that the trucking corporation shall not make any extraordinary low rates from West street to the consignee's warehouse merely in consideration of our having already paid them for the service across the river. In other words, we have attempted to keep down the payment to the trucking corporation to what we believe is an amount that covers only their cost of service, and a reasonable return for the use of their equipment, including the risk on their equipment. . . .

Store Door Delivery an Ultimate Necessity

"In my opinion this kind of service is the ultimate necessity of this country, not because it has been practiced before, but simply because as an economic matter, as a matter of dollars and cents in the way of investing in terminal property it becomes a necessity. You can today, therefore, from St. Louis give your freight to the Columbia Transfer Company to be delivered in New York by the United States Trucking Corporation from door to door. You can in a sense do that same thing from Chicago because there are transfer companies there, but there is no local arrangement at Chicago such as there is at St. Louis, or as there is at New York. . . .

"My own conception of the thing is that ultimately all the stations in Jersey City, or on the west side of the Hudson river, whatever point is selected, it may be further back than Jersey City, will be combined into a large, comprehensive freight house into which all the freight trains will be discharged, and all the freight will be then brought over to New York. I do not mean by automatic tunnels necessarily, but through other tunnels or bridges and by ferry.

"There is one advantage that St. Louis has that we do not have here, and that is they have a bridge, and as yet there is no bridge here. The Jersey City-New York tunnel will be a great help in this arrangement. The tunnel will also be open to everybody else, just as it will be open to those who ship freight over the Erie.

Bills of Lading

"I should say something about the bills of lading. The United States Trucking Corporation handles all the documents at these terminal stations, and also where they handle the shipments direct to and from the shipper's warehouses.

"We use our Duane street station because that is known to everybody as our billing station, and the papers are delivered there to our agent as the truckman goes by, so that the billing is all in the hands of the railroad. The collection of money is made direct by the Erie from the trucking corporation; they collect it direct from the consignees.

"The trucking corporation is required by the contract (we have them under heavy bond) to observe every detail of the tariff and of the Interstate Commerce Commission Law, and they are under just the same regulations as to extending credit as any one of our own agents is under, and they are supervised just as strictly."

New Specification for Rails

THE RAIL COMMITTEE of the American Railway Engineering Association has given close attention to the manufacture of steel rails for more than 10 years. In this study it has had for its aim the improving of the quality of the steel entering into rails and the consequent reduction in the number of failures. The work of the committee has been directed largely towards the investigation of those influences which are detrimental to sound rail steel with the purpose of eliminating them in the specifications. This work led the committee to prepare specifications for rails which were adopted by the association in 1915 and revised in 1920. However, no rails have been rolled under these revised specifications because of the unwillingness of the manufacturers to accept them except with the payment of a premium so heavy as to be prohibitive.

During the past year the committee has been devoting considerable attention to the details of the rail manufacturing practices of the several rail mills of the country with reference particularly to the influence they have on the properties of the finished rail. Probably the most important item of manufacture that affects the quality of the finished rail is the condition of the steel as it is poured into the molds. A well-made steel thoroughly deoxidized with silicon or other deoxidizer sets quietly in the molds with a flat top on the ingot. A steel not fully deoxidized, however, effervesces in the mold and sets with a "horney" top on the ingot. The upper third of an ingot cast with effervescing steel is spongy inside with numerous small holes but with only a small central "pipe." Such steel also shows considerable interior segregation of carbon, phosphorus and sulphur, resulting in a brittleness in the interior of the head of the upper rail of the ingot. The quiet setting steel is free from interior sponginess, the segregation is much lower and the interior steel of the upper third of the ingot is denser and more ductile, but the ingot has a larger central pipe, which shows as a lamination in the web of the rail lower down from the top of the ingot than in rail made from effervescing steel.

As a result of this study a new specification has been prepared for dead-setting open-hearth carbon steel which has for its special purpose the elimination of segregation. While this specification was presented to the association at its recent annual meeting it was submitted as an experimental specification which had not, in fact, been passed on by the committee itself, but which the manufacturers have agreed to accept for rails rolled this year without additional charge.

The principal change in the specification as compared with the 1915 specification is in the raising of the silicon content from not less than 0.10 to a minimum of 0.20. Other chemical limits remain the same. The new specifications require that test specimens shall not fracture in the drop test, while tests for elongation and permanent set shall be conducted for information only. The height of drop is increased and option is afforded of two blows or of one blow with a higher drop. The specifications state that thoroughly deoxidized and quiet setting steel is desired, teemed into the molds at the lowest temperature consistent with the avoidance of stopper troubles and excessive ladle skull. Additions to the ladle shall be made in liquid form so far as practicable; if necessary to make cold additions, they shall be crushed to pass an inch and a half screen. The ladle should be held before teeming for the maximum time consistent with smooth operating conditions, so that the reactions may become complete, and their by-products properly vented. Ingots which have become cold shall be reheated in such a manner as to avoid injury. Sufficient discard shall be taken from the ingot to ensure freedom from injurious segregation and pipe. The supports for rails in the straightening presses shall have flat surfaces and be free from twists and shall be spaced not less than 60 in.

THE DELAWARE, LACKAWANNA & WESTERN announces that its experiments in the use of telephones for communicating to and from moving trains, which were suspended at the beginning of the war, in 1914, are to be resumed; and on Wednesday, April 7, a radiophone test will be made on a special train, which is to be run for Cornell students on that day, from Ithaca, N. Y., to New York City. It is expected to give the passengers the privilege of listening to concerts and other matter broadcasted on that day and also to try transmission of messages from the moving train to stations along the line, within short distances. L. B. Foley, superintendent of telegraph, New York City, has charge of the radio experiments.

Wheeling & Lake Erie Watches Cost Factors Closely

Heavy Car and Train Loading—Prizes for Good Service and Checking of Details Promote Efficiency

By Charles W. Foss

PART II

THE NO. 8 coal field, as has been noted, is the most important of the four coal districts served by the Wheeling & Lake Erie. This field is served also by the Pennsylvania, the Baltimore & Ohio and the New York Central. The mines from which the W. & L. E. secures tonnage lie along its main line from about east of Jewett to the Ohio river at Warrenton. There are also various branches, of which that to Neffs—the Adena branch—is the most important. The latter branch reaches a rich coal area



Freight Station at Canton

which is, if anything, in process of development. It contributes in normal times over 200 cars daily.

The procedure followed in moving coal from the No. 8 field is about as follows: Operation centers on Pine Valley, which is at the eastern end of the line. Mallet locomotives are operated from Pine Valley to Brewster, the district being 63 miles long. They are loaded from Pine Valley to Jewett (20 miles) at about 2,680 tons and are filled out at Jewett to 5,360 tons. Formerly the method was to load the locomotives at Adena and then to use a helper or pusher, but this method was abandoned about two years ago because of congestion at Adena. Work is now in progress to put more of the work at Jewett, the scheme being to make the yards at Jewett a central assembly point, to weigh the coal there, etc. The coal is classified at Brewster for north, south or west. In winter, some 50 per cent of the tonnage goes west over the Toledo division; in summer, when the lakes are open, a much greater proportion. The Toledo division has no heavy grades; heavy Mikado or Consolidation locomotives of 60,000-lb. tractive effort are used, the locomotives being rated at 3,650 or 3,850 tons. From Brewster to Ironville, the terminal point just outside of Toledo is 136 miles; from Brewster to Huron, 82 miles. The eastbound rating on these same locomotives to Brewster is 3,360 tons. Helpers are used for tonnage trains out of Huron from Milan on the Huron branch to Hartland on the main line.

Brewster is a classification yard of about 1,650 cars capacity and is for both coal and ore traffic. There is a considerable movement of both classes of traffic north towards Cleveland. The scheme of operation is to use Mallet locomotives from Brewster to Gambrinus (Canton), 12½ miles.

These Mallets make two round trips in eight hours. The reason for operating in this way is the necessity for taking proper care of the Canton district, notably with respect to the ore tonnage which is delivered to steel mills at that point. The Wheeling & Lake Erie serves about 100 industries at Canton. Gambrinus yard is a hump yard of about 1,000 cars capacity. Property has been secured and has now been held for some time sufficient to permit its enlargement to 5,000 cars capacity. From Gambrinus to Cleveland, 63 miles, is operated as a separate freight district. The so-called 60 per cent locomotives are used and are rated at 3,060 tons to Kent and from Kent to Cleveland at 3,650.

Spectacular Work in Heavy Car Loading

The Wheeling & Lake Erie in 1920 secured an average net tons per train of 1033. In other words, it was one of a few roads the average train load of which exceeded 1,000 tons. Its average net tons per car for the year were 42.9. This figure was exceeded by various roads handling coal to Lake Erie or ore away from it, but it is a fact, nevertheless, that the road has done some rather spectacular work in the matter of heavy car loading. Figures are available showing the



Station and Office Building at Brewster

number of tons, the number of cars and the average tons per car of coal dumped at the several Lake Erie piers during the 1921 season. The Wheeling & Lake Erie's average tons per car dumped at Huron was the highest figure for each of the several piers for every month but one from January to October. For the first four months of the year the W. & L. E. average at Huron was 63.02 tons; for May, it was 61.18; June, 61.54; July, 61.36; August, 57.77; September, 56.97 and for October, 59.12. The average for all the piers during these several months ranged between 52.31 and 53.89 tons.

The Wheeling & Lake Erie owns about 8,000 gondola and hopper cars of which about 2,600 are of 70-tons capacity and most of the remainder of 50-tons capacity. The heavy

Overtime Report

Another interesting form is the daily report of man hours or the report showing the amount of overtime. This report is compiled and placed on the desk of each operating officer within 48 hours after the occurrence. This enables the heads of the departments to be in absolute touch with the overtime made in their departments. They are held strictly accountable for such overtime and all overtime must be explained in detail. The information is of great value to the heads of such departments as it assists them in keeping overtime down to the minimum. Further than that, a detailed report relative to train service overtime is required from the chief dispatcher. The report shows the amount of overtime applying to different classes of service and in addition gives figures showing the number of orders issued by each dispatcher.

Report of Daily Expenses

Finally there is another form giving a report of daily expenses in the maintenance-of-way, bridge and building, transportation, and locomotive and car departments. This is prepared daily and telegraphed or telephoned to the heads of the various departments. The report shows wages only and is in the hands of the various departments within two days after the performance. With this information the heads of the different departments know just what amount of money is being expended for labor. It is of great assistance in the way of adding to or decreasing the forces so as to keep within the budget allowance for the various departments.

Use of the Several Reports

With reference to all these various forms, a Wheeling & Lake Erie officer said, "We have found that by supplying officers as well as subordinate officers with such information they will be continually on the alert and catch any increases that might develop. It also creates an incentive on the part of such officers or subordinates to feel that the money which is being expended should be just as judiciously expended as



Passenger Station at Zanesville on the W. & L. E.

if it was their own, all of which is, indeed, conducive to co-operation as well as economical operation."

This officer might also have drawn attention to the conferences which are held with the view of keeping the departments working together. There is another thing also that impresses one about the Wheeling & Lake Erie and that is the co-operation between the operating and traffic departments. This is secured on the one hand by the manner in which authority is given to such officers as terminal train masters who work closely with the shippers in their districts. This means that complaints are brought to the attention of the operating department before they become too serious for the best interests of the company and that accordingly they are promptly remedied.

Concentrating Pullman Reservations at San Francisco

THE SOUTHERN PACIFIC has recently installed a new telephone system for the handling of sleeping car ticket sales in its San Francisco offices which has greatly expedited the service. All train charts showing the Pullman space on every train are kept at one central office, reservations being made by telephone from the various ticket offices scattered about the city and surrounding territory. This system eliminates the possibility of duplicate sale of space while a close check can also be kept on the number of cars required on any train. This telephone exchange, built by the Western Electric Company, contains three 20-line switchboards and two cabinets for sleeping and



A Portion of the Pullman Checking Desk

parlor car reservations. Eight operators can use the board simultaneously, although during the absence of any of the operators, the remaining men can take care of incoming calls without changing their positions. When but one man is on duty, he can reach all the charts without leaving his seat.

The revolving cabinets above the desk, called "turrets," contain charts showing the reservations on each of the 22 trains running out of San Francisco daily. Each box in a turret contains charts for two trains, one face of the box having the charts for each day from the first to the fifteenth of the month and the next face having those for the sixteenth to the thirty-first. The two remaining faces of the box have similar charts for another train.

All of the city ticket offices have wires coming into this desk, as has each counter man in the consolidated ticket office. Ticket offices within a radius of 15 miles of San Francisco obtain their Pullman space in the same manner, and this has eliminated the necessity of assigning a certain amount of space to these outside offices. Trunk wires connect the checking desk with the main switchboard at the general offices of the road, through which communication may be established with any Southern Pacific station within a radius of 200 miles.

The central information desk is in the same room with the Pullman checking desk and telephone operators at the general office send here all telephone requests for information. Any of the clerks may answer the call.

Electrical Operation in Mountain Districts*

An Outline of What Is Being Done on the Chicago,
Milwaukee & St. Paul

FOLLOWING is an abstract of a paper read by Frank Rusch, superintendent of motive power, C. M. & St. P., Tacoma, Wash., at a traveling engineers' staff meeting held at Milwaukee, Wis., November 28, 1921:

We are operating electrically on the main line over five mountain ranges, formerly the most difficult parts of the system, the Cascade and Saddle mountains in Washington, and the Bitter Root, Rocky and Belt ranges in Montana. On a total of about 660 route miles we have two maximum gradients of 2 per cent to 2.2 per cent for about 20 miles; two grades of 1.6 per cent to 1.7 per cent, and several of 1 per cent.

In freight service on grades of less than one-half per cent we can handle as much tonnage as the operating conditions will permit with one electric locomotive at speeds which may vary up to 30 miles an hour. On 1 per cent grade ascending one electric locomotive will handle 3,500 tons; on 2 per cent grade, 1,250 tons; on 2.2 per cent grade, 1,100 tons; all at a speed of about 15 miles an hour. We ordinarily use a helper locomotive in freight service on mountain grades so that our average freight trains will run about as follows:

1 per cent grade.....	3,500 tons
1.6 per cent grade.....	3,200 tons
1.7 per cent grade.....	2,800 tons
2.0 per cent grade.....	2,500 tons
2.2 per cent grade.....	2,200 tons

These ratings are based on the continuous capacity of the locomotives which occurs at 15 miles an hour at full trolley pressure of 3,000 volts.

In making comparison with the steam locomotives that were used prior to the electrification the tonnage rating and what was actually hauled over the Rocky mountains is as follows and applies to freight trains only:

2 Mallets, Butte Yard to Donald.....	2,500 tons
2 L2 Engines, Butte Yard to Donald.....	1,600 tons
2 Electric, Butte Yard to Donald.....	3,200 tons
2 Mallets, Piedmont to Donald.....	1,800 tons
2 L2 Engines, Piedmont to Donald.....	1,400 tons
2 Electric, Piedmont to Donald.....	2,500 tons

The tonnage hauled over this mountain is greatly in favor of the electric motors. The mountain grade from Butte Yard to Donald is 1.6 per cent and from Piedmont to Donald on the east slope is 2 per cent.

On the 2 per cent grade over the Saddle mountains in Washington two electric motors haul 2,200 tons at a speed of 15 miles an hour, whereas two Mallet engines haul 1,600 tons at a speed of about eight or ten miles an hour.

In passenger service we are not using any helper power. These locomotives are built strong enough to handle 960 tons of passenger equipment over any portion of our track. They make good speed in ascending grades and their speed on level track is only limited by operating conditions.

In switching service we have electric locomotives at Butte, Deer Lodge and Othello. In special service we have used electric locomotives to push snow plows, on work trains and for wrecking outfits, and obtained efficient results.

Fuel and Water Stations Eliminated

One thing which seems of considerable importance to the steam man in first operating an electric locomotive and which is soon likely to be forgotten with other commonplace things, is that no stops are necessary for fuel or water.

*Milwaukee Employees' Magazine, March, 1922.

When you consider the delays, train troubles and extra work of watering engines, encountered in mountain traffic, you can see that the complete elimination of such is no small item in bettering train operation. When you consider that a large part of our mountain district is through comparatively dry territory the elimination of pumping plants to supply this water represents economy.

Another feature which applies to all kinds of service and of which we have good report is that although the electric locomotives weigh more on drivers than any steam power, they are easier on curved track, at least, than the steam engines. On tangent track the difference is not so apparent, but it may be stated that there have been no radical changes made in track construction since we electrified, nor has there been any apparent reason for making changes. Considering that mountain trackage has a high percentage of curvature, this advantage of electrical operation is appreciable.

But in order to deal specifically in bringing out advantages of electric motive power in the mountains, it will be better to go more into detail. I can perhaps do this best by considering different kinds of service separately and by giving examples of actual operation.

First in importance is the freight service in which we have reduced the number of engines required and the work of keeping them in service. We have practically reduced our running time between points by 40 per cent and have increased our tonnage in the worst districts by about the same amount. In spite of increased tonnage the drawbar reports show a decreased number of accidents of this nature after the men have become accustomed to electric operation. The fuel consumption or kilowatt hours at the locomotive shows marked economy and there is no doubt but that with a sufficient number of trains operating, marked economy for the whole system is possible over steam operation.

Regenerative Braking Does More Than

Return Power to Trolley

Freight trains can be handled over mountain grades without stopping and due to the regenerative feature may be handled without applying an air brake on the whole train, unless for some reason it is necessary to come to a dead stop. The regenerative braking not only saves the brake rigging but also returns energy to the trolley which may be utilized in helping move other trains. Whatever may be the return on this regenerated energy the saving made in ease of train handling with less number of break-in-twos with consequent damage and delays, is an important advantage.

The various tests on brake shoes in making a run from Avery to Harlowton show that about one-fourth of the brake shoe was worn away in controlling the speed of the trains on mountain grade, while in the westward movement between these two points it showed approximately one-fifth of the brake shoe worn away. A conservative figure on the value of the metal dissipated through brake shoe wear during a thirty-day month period would be \$6,000; this is not including the saving in the way of cracked wheels through overheating. Both of these items of expense have been practically eliminated through electric operation.

We expect at some future date to combine regenerative braking which sends the current back into the wire and which we have at present, with rheostatic braking which consumes the braking energy in the starting resistors, so that we can use electric braking at speeds down to prac-

tically a standstill. This will be a matter for experimentation.

Starting freight trains on ascending mountain grades is comparatively easy and not at all likely to result in drawbar damage. The helpers are placed in the middle of the train and the head locomotive can when starting let the slack back as far as the helper. The helper man then can advance his controller to give maximum tractive effort and is ready to follow with the slack when the head locomotive starts. With electric operation we have quit breaking drawbars almost entirely in the mountains.

We do not need engine watchmen with electric motive power and at any point where one of these machines is tied up it is only necessary for the enginemen to drop the pantographs and shut the doors and windows. This is particularly advantageous at helper tie-up points. At Butte and Piedmont when we first electrified we had as high as six to ten steam engines, mainly required for helper service. These were replaced with two electric locomotives, which have successfully done the freight helper work since. The passenger trains not requiring helpers have to some extent made this possible of course, but this itself is also another advantage of electrical operation.

Regenerative braking makes it a decided advantage to use a helper descending a grade as well as in going up on the other side. We have only one heavy grade on the Cascade mountains where this is not applicable. Otherwise our helpers ordinarily go clear over the summits. It is common for a helper to go in a train upgrade to Boylston and down to Beverly then back to Kittitas light with zero net consumption of kilowatt hours, or regeneration in this case, making it possible to operate helpers in eastward traffic from this point at no fuel expense whatever.

The increased safety in having two locomotives in trains of this sort on heavy grades can be appreciated.

In passenger service the delays and rough handling necessary to the operation with helpers is entirely eliminated. The same locomotive which may haul the train at 50 miles per hour can also handle it with ease and certainty on a 2.2 grade.

Here again the regenerative braking feature is important. One who has tried to sleep in a passenger train through mountain districts and has been kept awake by application of brakes at frequent intervals can readily appreciate the comfort of an electrically operated mountain trip in which it is impossible to tell from the way the train is handled as to whether a grade is being ascended or descended.

The smooth handling of passenger trains is a point of merit and occasions many favorable comments from passengers about our service.

The entire absence of cinders and a certain amount of grime from coal burning locomotives is appreciated by the passengers. Complaints of delays caused by poor fuel, engine not steaming and sundry things have become things of the past. We do have our troubles with electrical failures, it is true, but these are nearly all in a class not to be called serious and fortunately are of uncommon occurrence.

Electric Switching

In electric switching service we find that the energy or fuel expense at the locomotive has been more than cut in two over steam operation. The locomotives are quick in acceleration, easy to handle and because the engineer has little to look out for other than the operation of starting and stopping, he can lend his whole attention to the business at hand and thus gets as much work done as the yardman can attend to.

The maintenance of these machines is slight and because of taking but little energy the extra demand for power that they require is not very noticeable at the substations which furnish it.

Wherever the trolley wire goes the electric locomotive has given particularly good results. In re-railing cars or engines or pushing snow plows the uniform rate of speed for a given load and the ease with which the locomotives can be controlled make their use decidedly advantageous.

The rated tractive effort of an electric locomotive is usually given as that within the continuous or 24-hour capacity of the traction motors. This is 72,000 lb. for our freight locomotives, but does not mean very much as compared to the maximum tractive effort which the locomotive can exert. This is only limited on these machines by the slipping point of the wheels. With sand used on the rail they have been known to exert a tractive force of 160,000 lb., and this could be maintained for a period of time until the tractive motors are in danger of overheating due to the large flow of current through them. Such tractive effort makes these machines efficient in handling certain work under adverse conditions as mentioned above.

Each Locomotive Its Own Dynamometer Car

Because the tractive effort is nearly proportional to the current flowing through the motors regardless of the speed, it is very easy to judge train weights, proper ratings and other things. In fact, every electric locomotive is equipped with its own instruments so that it is a very good dynamometer itself, and in cases where the engineer runs into conditions of overloading, he can readily judge the amount and reduce as necessary. There is no argument as to whether one man can get more out of an engine of this kind than another—they are all placed on an even basis. Moreover, the normal running times are so uniform that the dispatchers, as a general rule, do not have to figure much on the personal element of the enginemen in supervising train operations.

There are possibly other benefits to be derived from electrification, but I have endeavored to stay within the limitations applying to the locomotives alone. There are disadvantages too, of course, and there is a need for improvements and developmental changes as is true of all electrical equipment. However, the field for experiment and such changes is large, and with the successful electric motive power we now have, we have made the start, and further improved features can be inaugurated if necessary.



An Illustration Typical of the Construction Conditions Encountered in Alaska



The Lachine Bridge at Montreal

C. P. R. Soon to Own Fleet Totaling 438,604 Tons

Operates Over 14,000 Miles of Railway, Several Hotels, Etc.—
Wide Margin for 10 Per Cent Dividends

LAST DECEMBER the Canadian Pacific sold in the New York market \$25,000,000 of its four per cent consolidated debenture stock. In his statement in the annual report for the year, President E. W. Beatty says that the stock was sold "at prices which under the prevailing market

among American investors, it received widespread and ready distribution." The C. P. R. stock is, of course, not a stock in the sense that that term is used in this country. It is, rather, a bond, differing from the bond issues of the United States railroads in that it has no definite term but is perpetual. There is a very good reason why the Canadian Pacific securities should have been well received in the New York market. The reason is, of course, the long dividend record of the Canadian Pacific and the respect which must be paid to its able management over an extended period of time.

There is no doubt that the New York market had fully in mind also the fact that the C. P. R. was not subjected to 26 months of federal control. Canada had its war problems and they extended over a longer period than our own. The Canadian Pacific naturally had to bear its burdens in as great degree as the country it served but it bore these burdens under its own management. It was not subjected to the fancies of a beneficent railroad administration or made the victim of a wide variety of more or less valuable ideas. Although it did have to contend with higher costs of fuel and material, and, although it did have to meet the same increases in wages as were made in the United States, it retained, on the other hand, its most important asset, its morale. One of the most difficult tasks which has confronted many American railroads since the end of federal control has been the restoration of this important factor. Some have had marked success. The point is, however, that the Canadian Pacific has had the advantage of not having to meet this particular and very serious problem.

Although it cannot be said that 1921 was a markedly prosperous year, the details concerning Canadian Pacific operations as given in the report for the year have an optimistic aspect. The system's revenues totaled \$193,021,854 as compared with \$216,641,349 in 1920, a decrease of \$23,619,494, this decrease reflecting the general business depression, a decrease in passenger fares in January and July and in freight rates in December and a partial crop failure



Connaught Tunnel—Western End

conditions were extremely favorable, reflecting the high credit which the company enjoys. The sale of this stock in New York was effected in an eminently satisfactory manner, and although the security was of a character practically unknown

in some parts of western Canada. The operating expenses, inclusive of taxes totaled \$158,820,114 as compared with \$183,488,305, a decrease of \$24,668,191. The result was a net of \$34,201,740 as compared with \$33,153,045 in 1920, an increase of \$1,048,695. The operating ratio in 1921 was 82.28 as against 84.70 in 1920.

Handled More Grain

The C. P. R. in 1921 handled 23,710,606 tons of freight as compared with 30,160,134 tons in 1920. The ton mileage was 10,811,087,106 as against 13,994,508,975. This indicates a greater decrease in business than is shown in revenues, the reason being that the earnings per ton-mile were 1.19 cents in 1921 and 1.04 cents in 1920. Decreased traffic was shown in lumber, livestock, manufactures, etc., but the grain and flour business showed marked increases. Whereas in 1920 9,144,410 barrels of flour were transported, in 1921 the total was 11,718,510 barrels. The increase in grain traffic was sufficient as to exceed even the record of 1920. In 1918 the system carried 137,000,000 bushels of grain; in 1919, 121,000,000 bushels; in 1920 it suddenly increased this total to 173,000,000 bushels but in 1921 the total exceeded 175,000,000 bushels. However, in view of what we have been hearing about how grain moved through Montreal last year, the increase does not appear so striking as might have been expected.

The optimistic aspect of the C. P. R.'s present situation comes in the ambitious program of improvements which the stockholders are to be asked to approve. It is proposed to make expenditures on capital account "as and when conditions warrant such expenditures" of \$10,622,137. The stock-

438,604 Tons of Shipping

A matter of special interest to the United States readers at the present time is the C. P. R. steamship services. It is of interest primarily in view of the pending ship subsidy bill which proposes an amendment to the Panama Canal Act so as to permit railroads to own and operate ocean-going vessels. As this bill receives increased attention there is no question but that one of the first things that will be brought up is the success the C. P. R. has been having with its ship services. The Canadian Pacific operates ships with Montreal to Liverpool and Southampton and from Halifax to Liverpool. On the Pacific it operates a line from Vancouver to Japan, Shanghai, Hongkong, and the Philippines and also a line from Vancouver to Australia and New Zealand via the Hawaiian Islands. These activities are expanding, as is evidenced by the additions which are planned for the extensive and up-to-date facilities at Vancouver and by the tonnage of the C. P. R. shipping. At the end of 1920 the total tonnage inclusive of coastwise services was 301,219; at the end of 1921 it had increased to 406,754 tons. New vessels building and the recent acquisition of four former German ships will shortly bring the total to 438,604 tons, a fleet which will be noted for its size and for its standard of excellence alike. When it is realized that the C. P. R. itself operates or has under construction 14,784 miles of line; that it also controls the Minneapolis, St. Paul & Sault Ste. Marie, 4,376 miles; the Duluth, South Shore & Atlantic, 621, and the Mineral Range, 101, and is about to bring its fleet to 438,604 gross tons, the real extensiveness of the C. P. R. system will perhaps be the more readily appreciated.

The net earnings of the C. P. R. from railway operations

CANADIAN PACIFIC OPERATING RESULTS 1912-1921

Year ended	Mileage	Freight revenue	Total Operating revenue	Operating expenses	Net operating revenue	Operating ratio	Revenue tons	Revenue ton miles	Revenue per mile of road	Revenue train load	Revenue car load
June 30	10,933	\$7,833,724	\$123,319,541	\$80,021,298	\$43,298,243	64.89	23,940,238	10,391,650,965	945,519	372	18.30
1913	11,002	89,655,223	139,305,700	93,149,826	46,245,874	66.82	29,471,814	11,470,001,821	989,081	381	19.34
1914	12,044	81,135,295	129,814,824	87,388,806	42,425,928	67.32	27,801,217	10,821,748,859	896,470	407	20.15
1915	12,917	60,737,737	98,865,210	65,290,582	33,574,628	66.04	21,490,596	7,640,151,342	625,338	411	19.13
1916	12,994	89,654,405	129,481,886	80,155,965	49,225,921	61.98	29,276,877	14,057,685,773	1,070,068	503	22.90
Year ended Dec 31											
1916	13,989	96,454,896	139,729,687	89,253,188	50,476,499	63.88	30,168,798	14,931,739,090	1,133,343	519	22.87
1917	13,859	103,635,795	152,389,335	95,843,317	46,546,018	69.46	31,198,685	14,882,991,224	1,129,908	539	23.77
1918	13,380	110,187,288	157,537,698	123,035,310	34,502,388	78.10	29,856,694	13,014,665,922	691,680	530	23.90
1919	13,389	111,064,442	176,929,060	143,996,074	32,933,036	81.39	25,102,821	11,121,322,012	840,938	498	22.08
1920	17,407	145,303,400	216,641,349	183,488,305	33,153,044	84.70	30,160,134	13,994,508,975	1,066,401	529	23.44
1921	13,444	128,849,446	193,021,854	158,820,114	34,201,740	82.28	23,710,606	10,811,087,106	818,743	519	24.21

holders were asked last year to approve a similar program totaling \$4,316,236. The increase to over \$10,000,000 this year may be regarded, one trusts, as the C. P. R.'s opinion that prosperity is about to return and as a hint to the present depression that it is about time to withdraw from the scene. The program includes such items as \$1,021,700 for "replacement and enlargement of structures in permanent form"; \$1,005,200 for "additional stations, round houses, freight sheds, shops, etc."; \$1,500,700 for heavier rail; \$1,550,000 for the new pier at Vancouver, \$1,454,500 for the Chateau Frontenac Hotel, Quebec, \$439,000 for machinery at various shops; \$218,400 for improvements to plant and machinery at Angus shops; \$755,600 for line diversions, etc. The first projects to be given attention are the new pier at Vancouver and the Chateau Frontenac Hotel, both of which are now under way. The road is also about to extend the mileage of its lines. The C. P. R. has entered into an agreement with the government of Alberta relative to the construction and the operation for 25 years of an extension of the Central Canada Railway for 25 miles west from Peace River Landing to Berwyn and has also made a similar agreement with the Province of Quebec for the construction by a Canadian Pacific subsidiary, the Interprovincial & James Bay Railway, of a line from Kipawa to the Des Quinze river, 77 miles.

in 1921 were, as above noted, \$34,201,740. Fixed charges totaled \$11,519,072 and there was \$500,000 contributed to the pension fund, leaving \$22,182,668 available for dividends. It is the C. P. R.'s practice to pay from its railroad net dividends of four per cent on its preferred stock and seven on its common. After the deduction of these dividends there was a net surplus for the year of \$755,392 as compared with \$450,359 in 1920. The other three per cent of the total of ten per cent paid on the common is derived from other income. This other income in 1921 totaled \$29,567,491, which compared with \$26,380,292 in 1920. The net earnings of the ocean and coastal steamship lines totaled \$2,785,615, or about the same as in 1920. There was \$4,053,386 derived as net earnings from the commercial telegraph and news department, hotels, etc.

THIRTEEN HUNDRED EMPLOYEES of the Chicago, Burlington & Quincy general offices at Chicago went to work on March 21, a little over five days after flames devastated the building. During the days following the fire, plasterers, bricklayers and carpenters worked incessantly to repair the damage caused by the flames and water. All offices in the building from the first to the eighth floor are now occupied and all departments are operating.

More Railroads Object to Train Control Order

Varied Reasons for Using Money Elsewhere—Pere Marquette
to Experiment with Clark's Wireless

THE INTERSTATE COMMERCE COMMISSION continued, at Washington, on Thursday, March 23, its hearing on the reasons for and against the issuance of its proposed order requiring the extensive installation of automatic train control apparatus, reported in the *Railway Age* last week, pages 783 and 787. Statements were presented by the St. Louis-San Francisco, the Pere Marquette, the Chesapeake & Ohio, the Chicago, Milwaukee & St. Paul and other roads; and by two manufacturers.

The hearing was continued on Friday, at the close of which it was announced that other proprietors of train control devices would be heard on April 12.

J. C. Mills, signal superintendent of the Chicago, Milwaukee & St. Paul, asked that the commission postpone any order as to his road. The company is now under orders of states and municipalities for grade crossing separation and other safety work to the amount of \$13,000,000. When Commissioner Esch asked if this would not be spread over a period of years, he said that the date for the completion of the work had already passed, as the authorities had allowed it to be deferred from time to time; and it was now necessary to finish the work as rapidly as possible. The company cannot get the capital for automatic train control apparatus in addition to the heavy expenditures now required.

H. R. Safford, vice-president of the Chicago, Burlington & Quincy, said his company desired to indicate its sympathetic interest in train control development and to express the hope that investigations may continue aggressively, but he did not believe the ramp type would prove satisfactory. The problem of getting an impulse from the roadside apparatus to the locomotive is a detail yet to be perfected. Chairman McChord asked him to file with the commission a statement of the costs in property damage and personal injury damages of train accidents on the Burlington during the last 10 years which might have been prevented by an automatic train control.

A. W. Smith, superintendent of the Hagerstown division of the Western Maryland, asked that his company be relieved of the order, on the ground that there is practically no passenger traffic over the division contemplated by the order, only one passenger train each way a day and a maximum of nine freight trains. He said that there had been no loss of life in this territory as the result of a train accident in six years or since the installation of automatic signals. If the money were available the company should extend its signal installation before spending the money for train control.

C. J. Kelloway, superintendent of signals of the Atlantic Coast Line, declared it impracticable to install train control with wayside signals. If a cab signal were used it would distract the attention of the engineman from the lookout. He submitted an estimate of the cost of equipping 120 miles of road with a "continuous control" apparatus, the type which the Pennsylvania proposes to install, based on estimates furnished by the Union Switch & Signal Company. This covered 242 miles of track and 251 blocks and the equipment of 12 passenger, 18 freight and 13 extra locomotives, a total of \$315,785. Mr. Borland asked why he had used estimates for the continuous control type when the intermittent induction type would be cheaper. Mr. Kelloway replied that he understood that the continuous control type was the only one that would meet the specifications of the commission. He understood that intermittent induction apparatus would not meet the specifications of the commission

on a number of points, but when Chairman McChord asked him to point them out, he hesitated; and finally said that he assumed that No. 5 calls for continuous control; but Mr. Borland said that it did not. Mr. Borland thought that an intermittent type, either ramp or induction, would meet the conditions of the Atlantic Coast Line, to which Mr. Kelloway replied that in the opinion of signal engineers the continuous control type is better and that if the road is going to make an installation the best is none too good.

The Erie's Uses for Its Money

R. S. Parsons, general manager of the Erie, said that the proposed order apparently requires two installations, one for the Erie and one for the Chicago & Erie. His signal engineer had given estimates that 125 miles on the Chicago & Erie would cost \$243,000 or \$345 per roadway indication and \$1,600 per locomotive; for the Delaware division the cost would be \$316,000. He said he did not know what device this estimate covered, but it is impossible to get accurate estimates because the devices are not yet in a marketable condition. It is difficult for the Erie to get money for any purpose. If it had the money it would prefer to complete its double track, which would cost \$3,000,000; and there are two divisions on the main line between Chicago and New York not yet equipped with automatic signals. The company is anxious to complete this work and it would cost about the same as the train control installation contemplated by the commission's order. The company would also like to buy some steel passenger cars and complete its stone ballasting; and it is continually embarrassed by state orders for the elimination of grade crossings. It is now under orders of courts and commissions to spend \$10,000,000 for this purpose, and some of the work is under contract. He thought the burden of experimenting with train control should be borne by others. Passenger traffic of the Erie is thin, with only two through passenger trains between Chicago and New York and about two local trains each way a day. The company has laid great stress on requiring obedience to signals on the part of its enginemen and every year conducts from 30,000 to 40,000 surprise tests. It is a very rare thing for an engineman to run past a signal except for a short distance. Mr. Parsons said he was not opposed to automatic stops, but the Erie has not for 20 years had a passenger train accident which would have been prevented by one. It has been experimenting with various devices. There is no question but that they stop trains, but many operating problems are involved. If a division were to be equipped now it would undoubtedly have to be changed in two or three years. He recommended that the commission arrange with the American Railway Association to pick one railroad to make a thorough test, the expense of which should be shared by all roads; the Erie would be glad to pay its share.

A. H. Rice, signal engineer of the Delaware & Hudson, asked that the order be not entered as to his road, on the ground that the only satisfactory type would be a continuous induction type, which he thought had not been sufficiently developed. He estimated the cost of the installation at \$927,500, for 301 locomotives and apparatus at 104 roadside points.

T. S. Stevens, signal engineer of the Atchison, Topeka & Santa Fe, filed a statement by A. G. Wells, vice-president. The Santa Fe has made no plans for installation, awaiting the commission's final order. The company is ready to stand

its share of the expense of testing any device which the commission or the A. R. A. committee thinks should be tested. Commissioner Lewis said that most of the roads take the position that other work should be done before automatic train control is installed, and asked if the road would make the same plea if automatic train control devices were in a higher stage of development. Mr. Stevens said that for himself he held that the most important thing is signalling.

Charles Stephens, signal engineer of the Chesapeake & Ohio was called to the stand and asked to comment on the report submitted by Mr. Peabody of inspections on the C. & O. He said certain defects referred to would be corrected; others are fundamental, but a way would be found to correct them. He said, however, that the report of the A. R. A. observers did not correspond with the records of the railroad; there are serious discrepancies. He filed a record which he said showed only two clear failures in two years out of 1,200,000 operations, but he admitted that there had been a great deal of difficulty with damaged shoes. This, however, was a question of clearance. The company should not be required to extend its installation at this time because it is necessary to change the location of the shoe on the engines. He believed this would eliminate the shoe trouble, but it would cost about \$30,000, which the company is not now in a position to spend.

"Is this a practicable device?" asked Commissioner Lewis.

"It has worked very satisfactorily," replied Mr. Stephens.

"Is it still in the experimental stage?" asked Mr. Lewis.

Mr. Stephens replied in the affirmative. "We are now engaged in re-designing the apparatus."

Commissioner Lewis asked if it unnecessarily slows up the traffic. Mr. Stephens replied in the affirmative, but this can be overcome by a permissive form of speed control. He said that the formation of ice on the shoe or the ramp causes no difficulty; but hard packed snow such as is found in the northwest would probably break off the shoe.

M. E. Miller, representing the Simplex Train Control Company, said that his device had been tested on the Buffalo, Rochester & Pittsburgh, and he asked that a representative of that road who was present be called to state the result of the test. E. W. Kolb, signal engineer of the Buffalo, Rochester & Pittsburgh, expressed reluctance to testify, saying he was present only to get information, but Commissioner McChord insisted that he state the result of the tests. He said the Simplex company had asked for an opportunity to make a test and the road had permitted this to be done on a branch line. Tests were made on two separate days during the last six months with an engine and one car; and the device did all that was claimed for it. It stopped the train. But there was nothing to show how it would work with a longer train. The officers of the road do not approve of the device for it includes insulated sections of track and it would leave part of the track unprotected by the automatic block system. Mr. Miller said the objections could easily be overcome and his company was anxious to get permission from any road to make an installation over several miles at its own expense.

Industrial Development Calls for Varied Expenditures

B. A. Hamilton vice president in charge of operation of the St. Louis San Francisco asked that that road be relieved of the proposed order in view of the present expenses confronting it in connection with proposed second main track and grade reduction work. In view of the commercial and industrial development now taking place throughout the southwest he would prefer to use the sum required for automatic train control for other purposes such as new cars and better highway crossing protection. To install train control over 2.5 miles would cost \$412,000. The territory named in the commission's order has an average of 18 trains each way daily. If the commission should not see fit to

relieve his road he requested permission to make a combined installation of automatic train control and automatic block signals over the territory from Monett, Mo., to Aston, Oklahoma, a distance of 72 miles, all single track except five miles.

The representative of the Pere Marquette endorsed and adopted the report of the railroads' committee, especially the conclusion. Plans have been made to test the wireless type of train control as developed by T. E. Clark of Detroit. Ten miles of track have been set aside for this purpose near Detroit. It is planned to begin work in 30 days and to equip three or four locomotives. An installation of this apparatus over 150 miles with 65 locomotives would cost probably \$260,000. This road made the plea that, in view of this proposed test, it be omitted from any orders. A. L. Grandy, chief engineer of the road, thought that a year to a year and a half would be necessary for satisfactory experiments. A 10-mile installation is sufficient; this road needs its money for automatic signals, interlocking, grade separation, etc. When asked how long it would take to complete these improvements he replied, "at least 10 years." Commissioner McChord asked whether it was the intention of the Pere Marquette to make an extensive installation if this test proved satisfactory, but Mr. Grandy could not say. The commissioners then called his attention to the present good financial showing of the Pere Marquette and asked why such an installation should not be made if the test proved satisfactory.

Cost of the Chesapeake & Ohio Experiments

H. B. Wickham, vice-president and general counsel of the Chesapeake & Ohio, asked that his line be not required to make an installation throughout the entire limit designated in the Commission's order, as with the completion of the installation through Staunton, Va., train control would be in service over 61 miles of road. It had been found necessary to redesign the apparatus and it was still in the experimental and development stage. With the completion of the installation through Staunton, the cost to the railroad company will have been \$372,742 with an annual charge of \$30,166. For the visual (light) signals the sum of \$74,326 was spent. The maintenance on this is estimated at \$13,604 a year, making a total installation cost of \$447,068 and total annual maintenance charge of \$43,770; and he felt that his road had complied with the spirit and intent of the Commission's order.

H. F. Haag, signal engineer of the Kansas City Southern, explained the situation on that road. It does not operate trains of such a character, number, or speed as would bring it properly within the class of the other roads named in the order. It has but four through passenger trains a day, two in each direction, and these are somewhat local in character, averaging approximately 25 miles an hour gross speed. During 1921 only 8.7 freight trains a day were run on the division from Kansas City to Pittsburg, 128 miles; the average train would have about seven meeting or passing points in 122 miles. Railroads running more trains have not been included in the proposed order. The number of collisions which might have been prevented by train control apparatus on the Kansas City Southern has been very small. In the last nine years between Kansas City and Texarkana, 487 miles, there have been only 24 collisions, which show a total property damage of \$59,792, and personal injury bills amounting to \$114,015, a total cost of \$173,807, or an average per year per mile of \$39.57. These figures do not include the portion of the cost borne by other roads involved. The trains are operated by the train order system entirely; there is no block system. From Kansas City to Pittsburg there have been only three accidents in the nine years, involving a total cost of between \$10,000 and \$11,000. The Kansas City Southern being a comparatively

new railroad, much work of a permanent character remains to be done of a more elementary character than a highly specialized device such as train control. Many improvements which it deems necessary would increase safety as well as economy and efficiency in operation. For instance there are still some timber trestles remaining in the main line, and some of the main track has not yet been ballasted. There are also still a few sags and bad curves which should be eliminated as soon as the company is financially able to do the work. The expenditure necessary to install an automatic train control system on a full passenger division Mr. Haag estimated at \$625,000, which he said is beyond the ability of the road to furnish. The estimate is based on equipping 30 locomotives at prices from \$400 to \$3,000 per locomotive, and from \$200 to \$1,000 a mile for roadside equipment. It also includes the cost of installing automatic block signals. In reply to questions by Chairman McChord the witness said his estimates were based on figures from five train control companies, from which he had made a weighted average. He was asked to file the detail figures for the record.

J. E. Muhlfield, consulting engineer, described the physical and operating conditions of the Kansas City Southern, explaining the improvements which should be made as soon as they can be financed, which improvements, in the opinion of the management, should take precedence over any expenditure for train control.

Data Furnished by Train Control Proprietors

In order that representatives of two train control companies on the Pacific Coast need not stay over for the hearing on April 12, the Commission heard them on Friday. F. F. Bostwick of the National Safety Appliance Company, San Francisco and R. L. Miller of the Otis Automatic Train Control Company, Spokane, Wash., presented brief statements and were followed by A. J. Brookins.

Mr. Bostwick emphasized the advantages of the magnetic system, not affected by weather, and said that the last four months' service on the Southern Pacific near Oakland, California, had demonstrated that maintenance cost would be low. His apparatus had been tested by Japanese engineers in Manchuria and Japan, where the weather conditions were satisfactorily met. During these tests the clearance between track element and the engine element was increased to 10 in. and the magnet of a track element had been set off the center 4 in. without harmful result. The track element was also surrounded with iron and the voltage of the track battery was lowered one-half but the device functioned satisfactorily. The engine equipment would have to be cleaned and oiled every three months. The track element had been under water for two weeks at one time but it worked all right. The maximum cost of the locomotive equipment would be \$350; and of the track appliances \$400 [per block]. The labor of installing the locomotive device would cost \$25 and the track installation \$175. The additional cost of installing the speed control feature at each magnet location would be probably \$150. These prices Mr. Bostwick gave as maximum.

Mr. Brookins said that his device had received the approval of the Bureau of Safety as to its mechanical features. He had attempted to get a trial on the Chicago & Alton and also on the Atchison, Topeka & Sante Fe but had been unable to make any progress.

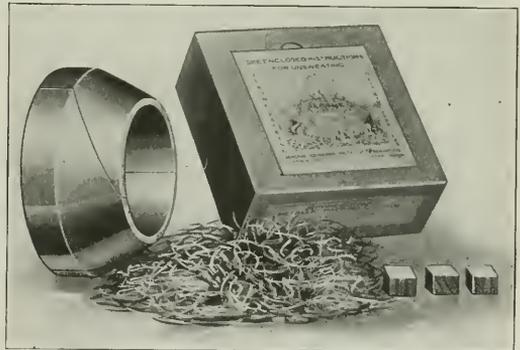
R. L. Miller said that tests had been made of his apparatus in June, 1920, and February, 1921, on the Canadian Pacific (Spokane International) at Spokane; and since then a number of changes had been made in the device.

M. B. Bulla, of the Bulla Train Control, El Paso, Texas, stated that his device had passed the experimental stage four years ago and that over 100,000 tests had been made over 124 miles of track on the El Paso & Southwestern. His

estimated cost was \$150 a mile and \$200 a locomotive, for blocks from 4,000 ft. to 8,000 ft. long. He further stated that this device had been in operation on one locomotive for six years. When asked why the railroad did not make an installation he said that the road did not want to spend the money at this time, but that he had a verbal agreement whereby his device was to be used if the road should be forced to make an installation.

Solid Packing Rings for King-Type Cups

ONE of the great difficulties encountered in the use of metallic packing rings for King type cups arises from the fact that the packing must be divided into two or three sections. Holding these sections together while boring out the packing is a matter requiring considerable care and there is also a heavy loss of material because of the ease with which the thin edges of the sections become bent or broken in handling between the manufacturer and the point of application. In order that these difficulties may be overcome and that each set of packing may reach the locomotive in perfect condition the Jerome-Edwards Metallic Packing Company, Chicago, has developed and patented a method of packing and delivering Jerome packing for King type cups whereby



Sweated Ring Packed in Carton with Waxed Excelsior

the packing reaches the shop in a solid ring. In the final process of manufacture before the packing is prepared for shipment the three sections of each ring are sweated together and are intended to remain in this condition until the ring has been bored out and is ready for application.

The box in which the ring is packed contains a small quantity of waxed excelsior and three small blocks which support the ring slightly above the bottom of the box. When the ring is ready to apply it is replaced in the box and a match touched to the excelsior, which in burning produces sufficient heat to melt out the solder in the joints without injuring the sections themselves. This requires from three to five minutes, after which the sections fall apart. They are then wiped clean of the fused solder and are ready for application to the rod in perfect condition.

REPRESENTATIVE BECK has introduced in Congress a bill "to provide for the inspection of railroad tracks which are alleged to be inadequately maintained and in unsafe condition and authorizing and requiring the Interstate Commerce Commission to make the necessary investigations and order the employment of additional men."

General News Department

The Full-Crew Law of Maryland has been repealed by the legislature.

The Directors of the Missouri Pacific are still considering a tentative budget of \$6,000,000, chargeable to capital account, for improvements to roadway and existing equipment.

The Interstate Commerce Commission has sent to the Senate committee on interstate commerce an unfavorable report on the bill, introduced by Senator Cummins, to require the railroads to run their trains on "summer" time.

A Mass Meeting will be held in Sweetwater, Texas, on April 10, under the auspices of the West Texas Chamber of Commerce, to discuss the means of saving the Kansas City, Mexico & Orient from being abandoned, as is now threatened.

The Superpower System will be the subject of a paper presented in two parts by Henry Flood, Jr., and L. E. Inlay, at the spring convention of the American Institute of Electrical Engineers, to be held at the Drake Hotel, Chicago, April 19-21, 1922.

The Interstate Commerce Commission has denied the application of the Norfolk Southern for authority for its officers and directors to hold positions with other carriers in so far as it relates to the holding by C. McD. Carr of the positions of director of the Durham & Southern and of the Norfolk Southern.

The Savannah Sectional Committee of the American Railway Association, Signal Section, will hold its fourth meeting at Ansley Hotel, Atlanta, Ga., on Thursday, April 6, beginning at 10 a. m. V. Pagett, of Mudge & Company, Chicago, will speak on railroad motor cars, their maintenance and operation; and there will be a general discussion of rail bonding. Informal reports are expected from members who visited Chicago on the occasion of the March meeting of the Signal Section in that city.

Big Four Reopens Shops Under Contract

The Beech Grove (Ind.) shops of the Cleveland, Cincinnati, Chicago & St. Louis, have been reopened for operation under contract by the Railway Service & Supply Corporation. The shops had been closed for more than a month.

Chicago Car Foreman's Association to Meet

The Car Foreman's Association of Chicago will meet on April 10 at the Great Northern Hotel in that city, at which time a paper entitled, "Transferring of Bad Order Cars" will be presented by J. A. Deppe, assistant to the master car builder of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis.

Power Brake Hearing Postponed

The Interstate Commerce Commission has postponed from April 6 to May 17 its hearing at Washington in connection with its investigation of power brakes and appliances, and the time limit of its order requiring the carriers to furnish certain information regarding power brakes and appliances has been extended from April 1 to May 1.

Contents of Burlington Vaults Saved from Fire

When the steel vaults in the office building of the Chicago, Burlington & Quincy in Chicago were opened on March 21, six days after the disastrous fire of March 15, it was found that the documents, maps and records in them were unharmed. While all of the maps and blueprints in the offices of the engineering and

mechanical departments other than those contained in the vaults were destroyed, marked progress has already been made in duplicating these records from prints received from outlying points.

"The Spirit of Transportation"

With the above title as the principal inspiration, the Clark Equipment Company, Buchanan, Mich., a concern which deals in automobile parts, offers a prize of \$1,000 for an ode on transportation and has appointed a committee to judge the manuscripts received. Last year the Clark company gathered twelve paintings by famous artists, each depicting the artist's own conception of "The Spirit of Transportation." It is now proposed to publish reproductions of the pictures, accompanied by a poem or ode on the same theme.

New York-New Jersey Tunnel

The tunnel from Canal street, Manhattan, New York City, to Henderson street, Jersey City, for highway traffic, is to begin in about six weeks. This tunnel is being built by the joint action of the states of New York and New Jersey. The New York Legislature has passed the principal appropriation bill for \$5,500,000; and on March 28 the commissions in charge of the work, at a joint session in New York City, awarded the contract for construction to the Booth & Flink Company, of New York and Pittsburgh, at \$19,330,000.

Conductor and Engineman Imprisoned

Charles L. Evans, conductor and Walter Yeakle, engineman, convicted in court at Norristown, Pa., in February, for responsibility for the disastrous collision on the Philadelphia & Reading near Woodmont, on December 5, were on March 20 sent to jail, Evans for nine months and Yeakle for six months; each also being fined \$500 and costs. A petition, said to have been signed by 5,000 persons, asked the court to suspend the sentences, but Judge Swartz after considering the petition for a half hour, said that to grant it would be a shirking of his duty.

Revenues and Expenses For February

A preliminary compilation of reports of revenues and expenses filed with the Interstate Commerce Commission for February by 137 Class 1 roads shows net operating income of \$37,647,000 as against a deficit of \$10,364,000 for those roads in February last year. The total operating revenues increased two-tenths of 1 per cent, while operating expenses show a reduction of 16.2 per cent. In the Eastern district there was an increase in revenues of 4 per cent, while in the Western district there was a decrease of 7.3 per cent and in the Southern of 2.5 per cent. On the basis of these returns, it is roughly estimated that the roads will show a return at the rate of approximately 4 per cent per annum for February.

Railway Development Association of the Southeast

This association held its third annual meeting at Atlanta, Ga., on February 22 and 23, with President Jesse M. Jones in the chair.

Most or all of the members of this association belong also to the American Railway Development Association and the discussions at the meetings were largely on topics which have been considered at recent meetings of the national association.

The members were unanimous in the opinion that the discontinuance of cotton raising should be resisted, while at the same time other cash crops, such as sweet potatoes, hogs, and dairy products ought to be encouraged. All agreed that carpet grass ought to be introduced extensively in the South, with a view to the promotion of the raising of live stock and the extension of pastures. A law to promote national

reclamation was favored. A number of instances were reported where two or more railroads in competitive territory have been working in unison to help the farmers.

The officers elected for the ensuing year were: President, J. F. Jackson (C. Ga.); senior vice-president, W. R. Tucker (A. B. & A.); agricultural vice-president, H. B. Holroyd (L. & N.); industrial vice-president, E. S. Center (A. & W. P.); immigration vice-president, E. D. Mays (S. A. L.); secretary, H. S. McLendon (F. E. C.), St. Augustine, Fla.

Railroad Meeting of Virginian Section A. S. M. E.

The Virginian Section of the American Society of Mechanical Engineers will hold a meeting at Newport News on April 7 and 8 at which engineering problems pertaining to locomotives and cars will be discussed. The subjects of the papers and the authors are as follows: Locomotive Operation, John A. Pilcher, mechanical engineer, Norfolk & Western; Car Design, L. E. Endsley, University of Pittsburgh; Truck Design, George A. Boyden. A paper on The Modern Trend of Locomotive Design will be presented, the name of the author not being available at this time.

Transportation Division of A. R. A.

to Meet in Chicago

The annual session of the Transportation division of the American Railway Association will meet at the Blackstone Hotel, Chicago, on Wednesday, April 19. The business before this meeting will be the consideration of, and action upon, the reports of the committees on car service; demurrage; storage, reconsignment and diversion; freight handling service; railroad business mail and records. In view of the importance of the reports to be considered, it is expected that there will be a full discussion on all of the subjects presented and members have been requested to come prepared for a possible two-day session. All car accounting and transportation officers are urged to be present.

Railway Business Association

President Alba B. Johnson, of the Railway Business Association announces that for three-year terms he has reappointed as members of the general executive committee W. E. Clow, Chicago, president James B. Clow & Sons; G. F. Downs, Buffalo, president Lackawanna Steel Co.; E. J. Kearney, Milwaukee, secretary Kearney Trecker Co.; E. B. Leigh, Chicago, president Chicago Railway Equipment Co.; Herbert I. Lord, Detroit, vice-president Detroit Lubricator Co.; William E. Sharp, Chicago, president Grip Nut Co.; and has appointed the following three new members: J. M. Davis, New York, president Manning, Maxwell & Moore; J. E. Galvin, Lima, Ohio, president Ohio Steel Foundry Co.; Samuel M. Hastings, Chicago, president Dayton Scale Co.

Administration Gives Up Efforts to Avert Coal Strike

The strike of coal miners called for April 1 was one of the principal subjects discussed at the cabinet meeting on Friday, March 24, but it was stated later at the White House that the administration had practically given up hope of averting a strike by its efforts to bring the labor leaders and the operators into a conference. It was pointed out in this connection that while recently the operators have refused to go into a general conference, last October when the administration, through Secretary Hoover, tried to take steps to forestall a strike, the union leaders were unwilling to confer. It was indicated that the administration expects to find some way to act to prevent a shortage of coal. President Harding is very much interested in seeing the cost of coal reduced by a lowering of the cost of production and also of the cost of transportation. He takes the position that because of the excess capacity of the mines the cost of production could be reduced by a development of coal exports which at present are out of the question because of the high level of wages and freight rates.

Operating officers of the eastern coal-carrying roads held a meeting at the office of the Car Service Division of the American Railway Association at Washington on March 28 to consider plans for diverting coal during the period of the strike.

The Bureau of the Census and the Geological Survey have

prepared jointly a report on stocks of coal as of March 1, which shows that on that date consumers had in storage approximately 52,500,000 tons of soft coal. By April 1, considering the rate at which coal has been leaving the mines recently, it is estimated that this reserve will have increased to at least 63,000,000 tons. At the rate of consumption prevailing in January and February, the reserve on March 1 was sufficient to last 43 days if evenly divided, which approximates the maximum stocks on hand at the end of the war. In addition, there were 5,160,000 tons on the upper lake docks and a further reserve of at least 674,000 tons was held in storage by the purchasers of coal either at the mines or intermediate points. The American Railway Association has supplied information as to the quantity of coal held by the carriers on March 1 for railroad use. The roads already heard from had a total of 14,850,000 tons and it was expected that complete reports would show over 16,000,000 tons. As the largest stocks on record in the past were 13,640,000 tons on January 1, 1919, it will be seen that the railroads have accumulated what is for them an enormous reserve of coal, sufficient to last on the average 42 days at the present rate of consumption. The stocks on the day of the armistice were sufficient for only 31 days, part of the difference being due to the greater requirements of the roads at that time.

Strike on Western Maryland

Shopmen and trackmen on the Western Maryland struck on Saturday, March 25, against the action of the railroad in dismissing them and leaving them to work for contractors. According to press dispatches, considerable numbers left their work at Baltimore, Hagerstown and Cumberland, Md.; Elkins, W. Va., and Connellsville, Pa. Most of the work in these departments on the Western Maryland is now in the hands of contractors, the Dickson Construction & Repair Company, of Youngstown, Ohio, and the strikers are nearly all employees of this concern. Representatives of the contractors said, at Baltimore, on the 27th, that there was difficulty in filling the places of the strikers and that they would not be taken back. On the evening of the 28th, reports from Hagerstown said that there had been some rioting in the yards there, when non-union men were set at work.

Shopmen on the Western Maryland have the full authority and sanction of their union to go on strike, according to B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor. The proper vote and compliance with union laws were fulfilled before the men walked out.

Meetings and Conventions

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

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next meeting, May 9-12, 1922, Hotel Washington, Washington, D. C. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.—J. F. Gettrust, The Ashton Valve Company, 318 W. Washington St., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago. Annual meeting, Oct. 17-20, San Francisco, Cal.
- AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Durcan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, Nov. 21-22, Pinehurst, N. C.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.

Division 1—Operating.

Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section. J. C. Cavistoa, 75 Church St., New York.

(Continued on Page 844)

Compared with January, 1921, for Roads with Annual Operating Revenue above \$25,000,000.

Region, road and year	Avg. No. of freight cars on line daily			Gross tons		Net tons per loaded car	Net tons per car-day	Net ton-miles per car-day	Car-miles per day	Net ton-miles 1,000,000		L. coal per ton-mile, including	Passenger Service		
	Home	Foreign	Total	per train, excluding	per train, including					per ton-mile	per ton-mile				
New England Region:															
Boston & Albany.....1922	3,930	4,018	7,948	5.9	1,620	872	331	192	321	24.9	6,477	244	308,959	1,966,074	
1921	2,046	5,342	7,988	6.8	960	889	365	23.9	417	29.0	8,463	238	317,570	2,016,895	
Boston & Maine.....1922	17,190	13,021	30,211	19.6	1,148	1,008	411	20.6	220	15.1	2,703	178	803,316	4,312,724	
1921	13,790	17,957	31,747	13.5	1,554	1,038	446	25.4	257	16.0	3,305	180	851,596	4,997,866	
N. Y., N. H. & H.....1922	14,271	12,471	26,742	13.0	829	1,438	467	20.3	160	11.6	3,165	196	1,108,617	6,175,373	
1921	19,738	19,508	39,246	13.0	3,052	1,108	473	24.6	170	11.2	3,401	207	1,082,636	6,570,190	
Great Lakes Region:															
Delaware & Hudson.....1922	11,295	4,952	16,547	8.5	537	1,498	735	32.7	484	24.1	9,031	222	190,522	962,655	
1921	7,852	8,906	17,488	4.0	.....	1,616	797	35.6	602	29.7	11,925	217	185,493	963,988
Del., Lack. & Western.....1922	19,084	5,865	24,949	13.5	.....	1,470	658	24.0	410	25.3	10,302	232	493,071	3,393,238
1921	14,407	8,880	23,287	7.4	2,481	1,549	719	27.5	501	28.4	11,721	212	491,293	3,506,317	
Erie (inc. Chic. & Erie).....1922	42,826	16,759	59,585	20.1	11,297	1,734	824	28.2	436	22.1	11,232	171	662,588	4,998,344	
1921	22,761	27,676	51,000	9.2	8,190	1,280	524	27.9	524	27.9	12,030	188	685,922	4,287,712	
Lehigh Valley.....1922	33,705	8,851	41,558	12.9	4,783	1,621	743	29.9	367	17.3	8,919	195	346,236	2,941,639	
1921	23,839	13,810	37,640	10.3	3,034	1,544	735	31.1	351	18.8	9,225	205	378,009	2,733,608	
Michigan Central.....1922	21,190	12,727	33,917	16.6	7,067	1,499	563	20.7	255	19.9	4,729	152	555,853	4,878,498	
1921	14,156	14,486	28,642	8.8	4,327	1,554	636	25.7	327	23.7	5,112	156	589,041	4,993,748	
New York Central.....1922	62,622	79,342	141,964	8.4	14,070	1,820	762	28.4	357	24.2	9,974	163	2,435,122	18,689,902	
1921	5,699	4,499	10,198	7.3	2,791	1,598	613	20.7	659	50.8	11,753	125	88,116	489,555	
N. Y., Chic. & St. L.....1922	4,238	6,124	10,362	10.0	520	1,398	545	23.7	677	51.6	12,264	13	788,143	5,073,653	
1921	12,001	17,475	19,774	17.8	1,500	1,383	523	23.8	173	38.8	14,844	278	1,243,184	4,287,712	
Pere Marquette.....1922	8,838	8,665	17,503	7.3	1,500	1,127	525	25.8	276	18.2	2,186	201	287,689	1,403,217	
1921	8,838	8,665	17,503	7.3	1,500	1,127	525	25.8	276	18.2	2,186	201	287,689	1,403,217	
Pitts. & Lake Erie.....1922	20,185	6,778	26,966	47.4	1,489	2,312	1,322	40.3	140	5.5	16,607	88	109,849	549,590	
1921	8,797	14,601	23,398	12.9	2,018	2,064	1,160	42.9	215	8.5	22,384	92	115,705	586,536	
Wabash.....1922	13,365	8,450	21,815	14.6	709	1,501	778	24.1	31	52.8	31	182	32	228,119	1,321,441
1921	10,860	13,633	24,493	10.8	636	1,319	585	25.8	441	28.3	4,768	201	552,806	2,782,520	
Ohio-Indiana-Allegheny Region:															
Baltimore & Ohio.....1922	74,452	25,171	99,623	14.3	12,369	1,482	728	30.6	371	19.1	7,069	212	1,394,158	4,437,024	
1921	55,241	51,376	106,617	6.8	4,516	1,518	748	30.6	405	22.9	5,266	173	1,387,735	8,992,466	
Central of N. J.....1922	2,613	6,632	9,245	1.2	855	1,326	642	33.8	207	10.9	8,523	201	324,338	1,533,427	
1921	12,741	13,533	26,274	18.9	1,840	1,321	656	35.8	234	11.7	9,072	223	315,930	1,380,005	
Chicago & Eastern Ill.....1922	16,830	2,823	19,653	13.6	3,660	1,466	738	31.7	307	13.6	5,473	195	220,446	1,562,292	
1921	10,263	5,363	15,626	14.8	.....	1,414	697	33.7	400	21.5	5,587	198	280,107	1,532,779
C., C. & St. L.....1922	19,443	14,175	33,618	12.0	3,320	1,655	828	25.7	428	28.8	11,378	154	685,922	4,287,712	
1921	12,800	21,626	34,426	11.1	6,861	1,624	715	31.4	483	29.5	6,937	174	769,609	4,453,237	
Elgin, Joliet & Eastern.....1922	10,744	2,647	13,391	9.9	1,178	2,119	1,126	40.2	271	10.3	4,315	165	()	()	
1921	9,271	7,126	16,397	8.8	438	2,115	1,171	44.2	345	12.2	6,751	150	.....	.....
Long Island.....1922	2,500	1,910	4,410	5.5	389	620	244	21.5	235	4.2	58	49	80	420	
1921	1,283	3,885	4,668	4.6	247	610	244	21.5	58	4.9	80	49	80	420	
Pennsylvania System.....1922	222,493	60,692	283,185	11.7	69,620	1,585	786	33.3	361	17.0	9,400	164	5,093,414	32,211,218	
1921	167,509	107,234	274,743	3.9	49,870	1,561	777	36.8	344	20.9	10,959	184	5,252,783	34,321,130	
Phila. & Reading.....1922	27,730	10,727	38,457	4.8	4,073	1,501	778	24.1	346	15.9	7,007	162	491,166	2,228,119	
1921	18,508	18,530	37,038	8.9	.....	1,603	838	38.5	449	20.7	14,850	225	521,589	2,358,648
Poconahs Region:															
Chesapeake & Ohio.....1922	38,953	9,712	48,665	12.1	4,123	2,129	1,155	42.5	550	22.3	10,511	148	440,511	2,423,867	
1921	26,977	22,048	49,025	6.9	11,500	2,009	1,443	42.5	527	24.0	8,016	163	446,963	2,501,203	
Norfolk & Western.....1922	34,898	5,203	40,108	6.1	819	1,313	433	34.3	643	28.9	10,899	189	463,509	2,323,597	
1921	27,751	14,479	42,230	6.3	4,715	2,030	1,096	45.2	682	27.5	13,027	188	404,277	2,609,470	
Southern Region:															
Atlantic Coast Line.....1922	24,448	7,791	31,939	13.2	.....	1,130	411	18.9	246	21.1	1,595	142	858,846	6,058,173
1921	23,241	11,987	34,211	10.3	.....	1,108	415	21.4	262	21.5	1,840	157	888,460	6,058,173
Central of Georgia.....1922	4,869	2,191	7,060	17.4	.....	1,073	467	21.7	393	25.1	1,483	162	320,806	1,720,455
1921	4,426	3,882	7,308	14.8	750	1,060	502	27.7	500	28.0	1,948	181	327,053	1,715,034	
I. C. (inc. Y. & M. V.).....1922	31,614	18,920	66,534	7.0	10,715	1,614	748	30.1	593	32.2	6,411	161	1,442,930	8,354,201	
1921	33,354	28,876	61,760	5.6	3,666	1,513	692	35.5	705	38.5	7,080	162	1,437,486	8,354,201	
Louisville & Nashville.....1922	40,557	10,294	50,851	14.6	9.9	1,129	535	31.1	468	25.2	4,739	185	1,032,441	5,855,888	
1921	29,930	23,817	53,747	16.7	112	1,024	488	32.1	455	24.2	4,870	210	960,785	5,855,888	
Seaboard Air Line.....1922	12,958	7,565	20,523	10.3	.....	1,109	415	19.9	251	19.2	1,455	201	641,385	4,032,352
1921	9,190	10,943	20,134	12.3	.....	1,094	430	21.8	301	22.4	1,715	204	622,652	3,690,522
Southern Ry.....1922	42,385	7,950	50,335	15.5	5,664	1,978	945	34.8	484	19.7	10,888	221	1,491,268	8,354,201	
1921	23,453	28,283	51,736	4.2	12,431	1,084	464	24.8	351	22.7	2,616	232	1,478,840	9,184,751	
Northwestern Region:															
C. & N. W.....1922	48,589	22,776	71,365	6.0	7,000	1,127	491	26.2	341	21.4	2,878	208	1,952,850	9,487,407	
1921	42,826	16,227	59,053	8.2	4,000	1,244	554	44.7	328	22.7	2,974	222	1,704,861	11,717,895	
C., M. & St. P.....1922	50,965	20,375	71,290	17.0	.....	1,244	584	26.4	407	23.1	2,631	193	1,463,689	8,614,238
1921	36,303	27,822	64,125	8.2	6,600	1,224	525	25.6	303	25.2	2,256	196	1,459,399	8,933,495	
C., St. D., M. & O.....1922	3,450	9,954	13,044	13.6	2,242	929	386	23.3	373	20.2	2,376	203	307,347	1,706,024	
1921	34,898	5,203	40,108	6.1	819	1,313	433	34.3	643	28.9	10,899	189	463,509	2,323,597	
Great Northern.....1922	47,244	5,358	52,602	10.7	.....	1,381	668	27.7	283	14.9	1,832	199	988,056	5,601,667
1921	39,449	16,273	55,722	9.5	1,331	580	27.5	222	12.2	1,515	214	1,001,927	5,974,081	
M., St. P. & St. Ste. M.....1922	19,779	4,003	23,782	11.4											

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- Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.
- Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents).—W. A. Fairbanks, 75 Church St., New York, N. Y. Annual meeting, September 20-22, 1922, Grand Brighton Hotel, New York, N. Y.
- Safety Section.—J. C. Caviston, 75 Church St., New York.
- Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III—Traffic, J. Gottschalk, 143 Liberty St., New York.
- Division IV—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Exhibit by National Railway Appliances Association.
- Construction and Maintenance Section.—E. H. Fritch.
- Electrical Section.—E. H. Fritch.
- Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 75 Church St., New York, N. Y. Next meeting, March 13 and 14, Drake Hotel, Chicago. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.
- Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
- Equipment Painting Section (including former activities of the Master Car Builders' Association and Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association).—P. Murphy, General Store Keeper, New York Central, Collingwood, Ohio. Annual meeting, June 19-21, 1922, Hotel Traymore, Atlantic City, N. J.
- Division VII—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—I. F. Jackson, C. of G. Ry., Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.)—E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C. Annual meeting, May 10, Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio. Sectional meeting, May 23-26, Bureau of Mines Auditorium, Pittsburgh, Pa. Annual convention, Oct. 2-7, 1922, General Motors Building, Detroit, Mich.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26-30, 1922, Chalfonte Haddon Hall, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—F. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 8-11, Atlanta, Ga.
- Railroad Division, A. F. Stuehlin, Managing Editor, Railway Mechanical Engineer, Woolworth Bldg., New York. Next meeting, May 16, 1922, 29 W. 39th St., New York.
- AMERICAN TRAIN DISPATCHERS ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill. Next convention, June 18, 1923, Chicago.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis. Next meeting, January 23, 1923, New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Merris, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucci, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next meeting, June 12, Dennis Hotel, Atlantic City, N. J. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Cleley, 1655 McCormick Bldg., Chicago, Ill. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 1.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Lumber Co., 332 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Assn.
- CANADIAN RAILWAY CLUB.—W. A. Broth, 53 Rushbrooke St., Montreal, Que.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Vernon Kline, 676 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Thomas B. Koeneke, 604 Federal Reserve Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the Amer. Inn Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Ironquins, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.
- CHIEF INSPECTORS OF CAR INSPECTORS AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 4th St. and Arden Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.
- CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.
- EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Radrod Club of New York.
- FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George J. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.
- INTERNATIONAL RAILWAY ASSOCIATION.—(President), V. Tondelier, President Belgian State Railway System, Brussels. Next congress, April 18-30, Fine Arts Exposition Palace, Rome, Italy.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 53rd St., Chicago. Next annual meeting, May 22-25, 1922, Auditorium Hotel, Chicago. Exhibit by International Railway Supply Men's Association.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.
- INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 126 W. Madison St., Chicago. Meeting with International Railway Fuel Association.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 23-26, 1923, Hotel Sherman, Chicago.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)
- MASTER CAR BUILDERS' ASSOCIATION.—(See A. R., Division V.)
- NATIONAL ASSOCIATION OF RAILWAY TOOL PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, September 26, 1922, Detroit, Mich.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 681 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Friday in month, except June, July and August, at 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 7, 1922, Hotel Cleveland, Cleveland, Ohio.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.
- RAILWAY CLUB OF PHILADELPHIA.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)
- RAILWAY ELECTRICAL MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelricht, 175 East 42nd St., New York. Meeting with Traveling Engineers' Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting, October 10-13, 1922, Pittsburgh, Pa.
- RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)
- RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R., Division IV, Division VI.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Philadelphia, Pa. Meeting with A. R. A., Division V.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.
- RAILWAY TRAVELING OFFICERS ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrew, C. & N. W. Ry., Sterling, Ill. Annual convention, September 19-21, 1922, Hotel Staller, Cleveland, Ohio. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Co., New York City. Meeting with American Railway Association, Signal Section.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.
- WESTPHALIA RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

C. B. Rader has been reappointed secretary and traffic commissioner of the Denver Grain Exchange Association of Denver, Colo.

The National Railways of Mexico announce that first class passenger fares have been increased 16 2/3 per cent, and second class fares 20 per cent.

The Pennsylvania has announced reduced round trip excursion tickets from Chicago to Washington, D. C., at \$38.90, to be on sale on April 24, May 29, and June 26. The tickets will be good for one week and will be honored on all trains with the exception of the Broadway Limited.

The Chicago, Burlington & Quincy recently announced a 25 per cent reduction in its dining car prices, and has in addition, inaugurated a new system of table d'hotel meals, offering six combination breakfasts, ranging in prices from 40 cents to one dollar; a dollar luncheon; and a dinner for \$1.25. A la carte service will be continued.

At a meeting of the Southeastern Passenger Association held in February, it was announced that the United Confederate Veterans would be given a one way rate for the round trip to their annual reunion at Richmond, Va. This brought such a storm of protests from the veterans that it has since been decided to place the old cent a mile rate in effect.

Coal Production

The demand for soft coal slackened perceptibly during the week of March 18, according to the weekly bulletin of the Geological Survey, and production declined from 11,115,000 to 10,784,000 net tons. It is estimated, however, that this so exceeded consumption as to provide nearly 2,500,000 tons to be added to consumers' stock piles. How much is in storage will not be accurately known until the forthcoming report on stocks is issued.

More States' Rights Bills

Senator Ladd has introduced in Congress a bill to define commerce and establish when an article or commodity is in interstate commerce and when subject to the laws of a state. It provides that "no article of commerce shall be deemed to be in interstate commerce or subject to the federal control or jurisdiction until the same shall have been loaded for shipment and the bill of lading provided for its transportation beyond the borders of the said state and until such time it shall remain subject to the laws of the state. Any article or product shipped from one state to another and billed to its destination shall cease to be treated as in interstate commerce when at the said destination it is unloaded or removed from the system or means of transportation employed in conveying said article or product and shall then be subject to the provisions of the state laws."

Representative McClintic has also introduced a bill to amend sections 402, 406 and 416 of the interstate commerce act "for the purpose of restoring to state commissions certain jurisdiction exercised over intrastate questions prior to the war with Germany."

Representative Bacharach of New Jersey has also introduced a bill by which federal courts would be prohibited from considering actions at law to suspend or restrain the enforcement of orders by state regulating authorities under state laws.

The House committee on interstate and foreign commerce is continuing its hearings on the Sweet bill, at which a number of state commissioners and John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, have been heard to advocate the amendment of provisions of the transportation act, recently sustained by the Supreme Court, under which orders of state commissions have been nullified because of discrimination against interstate commerce.

Freight Commodity Statistics for 1921

The Interstate Commerce Commission has issued a statement showing the freight tonnage transported by Class I steam railways for the year ended December 31, 1921. The figures in this statement will not agree with the corresponding totals of the four quarters already published; mainly for the reason that for the first quarter the report of the New York Central did not include the tonnage transported over the Boston & Albany, and also on account of corrections in the first three quarterly reports of the New York, New Haven & Hartford resulting from the transfer from "Tonnage originated" to "Tonnage received from connecting carriers" of certain shipments of cotton, anthracite coal, and bituminous coal received at tidewater.

The following is a comparison, by general classes of commodities, of the tonnage transported in 1920 with that transported in 1921:

Classes of Commodities	NUMBER OF TONS ORIGINATED		Percent decrease 1921 from 1920
	Year ended Dec. 31, 1920	Year ended Dec. 31, 1921	
Products of agriculture	110,839,554	114,016,652	*2.87
Animals and products	26,594,856	24,273,370	8.73
Products of mines	712,154,458	510,360,112	28.27
Products of forests	100,765,537	76,922,790	23.66
Manufactures and miscellaneous ..	251,864,290	172,176,614	31.64
Merchandise—All L. C. L. traffic.	53,202,296	42,079,815	20.91
Total	1,255,420,991	940,329,353	25.10

Classes of Commodities	TOTAL TONS CARRIED		Percent decrease 1921 from 1920
	Year ended Dec. 31, 1920	Year ended Dec. 31, 1921	
Products of agriculture	320,049,724	222,722,672	*31.21
Animals and products	44,853,503	41,794,508	6.82
Products of mines	1,209,097,673	876,645,798	27.33
Products of forests	195,579,878	148,138,456	24.26
Manufactures and miscellaneous ..	494,556,078	333,150,182	32.64
Merchandise—All L. C. L. traffic.	89,901,495	67,165,435	25.29
Total	(1) 2,259,983,278	1,691,617,051	25.15

* Increase.

(1) Includes 5,944,927 tons for which distribution by classes of commodities was not furnished.

New England Division Order Modified

The Interstate Commerce Commission has issued a modification of its order in the New England division's case, dealing with the rates of the Boston & Albany, which was a defendant. The order now provides that of the joint class rates and of the joint commodity rates which are divided on the same basis as are applied to joint class rates, between points on defendants' lines, other than the lines of the Boston & Albany of which the New York Central is lessee, and points on complainants' (New England) lines, other than the lines of complainant the Bangor & Aroostook, complainants shall receive, on and after April 1, 1922, divisions which shall be not less than 115 per cent of their present divisions, except in cases where their present divisions or their present divisions plus those of the Boston & Albany where it participates in the traffic as an intermediate carrier, are greater than the divisions now accruing to defendants, other than the Boston & Albany, in which cases complainants shall receive divisions which shall be not less than:

(1) Where the Boston & Albany does not so participate in the traffic, their present divisions plus 15 per cent of the present divisions accruing to defendants.

(2) Where the Boston & Albany does so participate in the traffic, their present divisions plus that proportion of such 15 per cent as their present divisions may be of the total of their present divisions and the division of the Boston & Albany.

The several carriers, other than the complainants and the Boston & Albany participating therein shall receive on and after April 1, the amounts remaining of said joint rates after deducting the divisions so to be received by complainants and the present divisions of the Boston & Albany where it participates in the traffic, such amounts so remaining to be divided among such other carriers in the same ratio as their present divisions respectively bear to each other, or otherwise as they may agree, or failing such agreement, as may be determined by the commission upon application therefor.

It is provided, however, that the first month for which the carriers will be required to state and make their current accounts and settlements in accordance with this order will be the month of June, 1922; the accounts and settlements for the months of April and May, 1922, in accordance with this order, may be stated and made at any time up to August 1, 1922.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has vacated its order of suspension of proposed proportional rates representing reductions from Chicago and related points to South Atlantic and Gulf ports for application on traffic consigned to the Pacific coast by steamship lines operating through the Panama Canal.

The Interstate Commerce Commission has reopened the case in which it reduced rates on grain, hay and grain products in the West, to the extent necessary for consideration of a petition filed by the carriers in which they allege that the order of November 21 includes a portion of Illinois territory not embraced within the issues in the proceeding and ask that the order be modified. The petition is assigned for hearing at Chicago on April 10 before Examiner Barclay.

The commission has suspended, July 23, the operation of certain schedules published in supplements to Agent F. A. Leland's tariffs which propose to establish proportional rates on grain from Sioux City, Iowa, to stations in Louisiana and Texas, uniformly five cents higher than the proportional rate on the same commodities from Omaha, Neb., to same destinations. At the present time there are no through proportional or reshipping rates on grain from Sioux City.

The commission has suspended from March 31 to July 29 the operation of schedules which propose the cancellation of the present provisions for the application of an estimated weight of 7.4 pounds per gallon and the substitution thereof of provisions of the application actual weight per gallon applicable on crude or fuel oil in tank cars from Kansas, Missouri, Oklahoma and Texas to Arizona and New Mexico, also to Cananea, Mexico.

Western Coal Rates

The commission has ordered an investigation to determine whether the rates on coal from producing points in the states of Montana, Wyoming, Colorado and New Mexico and all states west thereof, to destinations in the said states, or any of them, and to El Paso, Texas, are unjustly discriminatory or otherwise in violation of law.

State Commissions

The Southern Pacific and the San Diego & Arizona have petitioned the Railroad Commission of California to approve an agreement covering the joint use of locomotives and shop facilities of the Southern Pacific at Calexico, Cal., and the joint use of the Southern Pacific main line between El Centro and Calexico.

The Public Service Commission of Oregon recently examined the rules and practices under which the Oregon-Washington Railroad & Navigation Company operates trains through its Peninsula tunnel, near St. Johns Junction, Portland, Ore. This investigation was brought about by an accident in the tunnel on December 25, last, resulting in one death and the partial suffocation of other members of a train crew. The commission finds that the practices, service and facilities are unsafe and do not afford adequate protection to the health and safety of employees and passengers. It is held that the staff section, the limits of which include the track through the tunnel, should be extended so that trains will be manned a clear track of not less than 100 ft. In so doing, the blow down (deflector) must be placed on all engines operating regularly through the tunnel, and must be furnished to all men operating through the tunnel. The commission also found it either of the staff section, except by emergency, and an engineering study must be made with the commission detailing the feasibility of artificial ventilation by shafts, forced draft or other suitable means.

Labor Board Decisions

Clerk Receives Pay Benefit of Outside Experience

A case was presented to the Labor Board with respect to a woman who entered the service of the St. Louis-San Francisco on July 16, 1920, as a general clerk in the car accountant's office at Springfield, Mo. The employees contend that she had been employed previously in clerical work of a similar nature and was, therefore, entitled to the rate paid clerks of more than one year's experience. The carrier took the position that she did not have one or more year's experience in railroad clerical work or that of a similar nature and was not, therefore, entitled to the rate for clerks of one or more years' experience. The position of the employees was sustained.—*Decision No. 783.*

Dispatcher Permitted to Hold Seniority Rights While Working Extra on Another Division

A train dispatcher on the St. Louis division of the Chicago, Rock Island & Pacific was transferred temporarily to the Kansas division to relieve the chief dispatcher, assistant chief dispatcher and trick dispatcher while they were taking their vacations. It was the contention of the American Dispatchers' Association that this man, by accepting service on the Kansas division, lost his seniority rights as a dispatcher on the St. Louis division and that the action of the carrier in permitting him to return to the St. Louis division was in violation of rules. The carrier contended that at the time the transfer was made dispatchers were considered as officers and that this man was permitted to accept temporary promotion rather than to employ a dispatcher from the outside who was not familiar with the system of dispatching in vogue. The Labor Board denied the claim of the employees.—*Decision No. 781.*

Yard Checker Entitled to Exercise Seniority Rights for Call Boy's Position

A position as yard checker was abolished by the Lehigh Valley incident to a reduction in force. The employee holding this position sought to exercise his seniority rights to displace an employee holding the position of caller. The road declined his request on the ground that he did not possess sufficient fitness and ability to qualify for this position. The Labor Board decided that as he had filled the position of yard checker satisfactorily he had demonstrated his fitness and ability to justify his assignment as a call boy and ordered that he be given that position and reimbursed for all monetary loss incurred since the date he made application for the position, less any amount earned in other employment since that date.—*Decision No. 735.*

Differential Rates Allowed for Positions of Varying Importance

The express foreman at the Western Maryland station at Cumberland, Md., received \$10 a month less than the express foreman at the Baltimore & Ohio station at that place. The employees contended that the two men were performing the same class of work and that the disparity in wages constituted a discrimination which should be adjusted in accordance with Section 1, Article 1 of Supplement 19 to General Order No. 27, U. S. R. A., which provides for the equalization of rates of pay for the same work at the same agency or upon the same messenger run. The carrier contended that the equalization of wages of employees performing the same work at the same agency emphasized that the work must be the same and this, it maintained, was in this case not true, for the Western Maryland station at Cumberland was a comparatively unimportant station office whereas that of the Baltimore & Ohio was a large and important one. The Board upheld the carrier in its contention that the work was not the same and decided against the employees.—*Decision No. 698.*

Foreign Railway News

Chile Buys German Rails

The Chilean State Railways have contracted with Stinnes and Krupp interests for 13,000 tons of steel rail, according to the Wall Street Journal. Terms of payment have evidently not been decided, because it is said that Chile is seeking to pay in nitrates and that the Germans are resisting this.

Italy Cancels Order for German Locomotives

The Italian government has announced, according to dispatches to the New York Herald, that it is cancelling in part its orders for 300 locomotives to be built in Germany and charged to Germany's reparations accounts to Italy. It is understood that this cancellation was due largely to the dissatisfaction of Italian industries which felt that they were being discriminated against.

Argentina to Build Railway in Bolivia

The Argentine government has signed an agreement with the Bolivian government for the construction of a railway in Bolivia, on the understanding that Bolivia can purchase at any time she desires, according to Modern Transport (London). The road will cross the border at Yacuiba and will connect with the Argentine State Railways, and tap territory in eastern Bolivia, from which it is expected Argentina will be able to draw valuable raw materials. The development of petroleum fields in eastern Bolivia is expected to be one important result of the undertaking.

Exports of Car Wheels and Axles in December

Exports of car wheels and axles in December totaled \$102,880 in value. Totals by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Dollars	Countries	Dollars
Canada	9,754	China	37,200
Honduras	1,265	Japan	16,498
Mexico	10,706	British South Africa	4,228
Cuba	4,391	Other Countries	638
Dominican Republic	700		
Brazil	4,554	TOTAL	102,880
Colombia	13,126		

December Locomotive Exports

In December 65 locomotives, valued at \$2,178,620, were exported from this country. Of these 26 went to Mexico and 30 to Argentina. Totals by countries as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Number	Dollars
Mexico	26	556,900
Jamaica	1	3,000
Cuba	1	10,580
Argentina	30	1,168,000
Chile	5	225,000
Japan	2	15,140
Total	65	2,178,620

Military Control Cuts Chinese Road's Revenues

During the closing quarter of 1921 the earnings of the Peking-Hankow Railway were greatly reduced by the taking over of the lower end of the line by military officials, according to Commerce Reports. This greatly reduces the railway's capacity to meet its commitments, which have during the past year been increased considerably through purchases of additional equipment. It may also deter the awarding of the contract for the Yellow River bridge, designs and proposals for which were considered during the summer by a special board of foreign experts retained by the Chinese railways for the purpose.

Losses of New Zealand's Government Railways

The New Zealand Government Railways are losing £1,000,000 per annum, according to the Times (London) Trade Supplement. Rates have been reduced recently, but train service has been severely curtailed and employees reduced to the minimum. One cause of heavy expense is said to be the small sums spent recently

in carrying out needed improvements. Some £4,000,000 will be needed to bring about these improvements. It is pointed out that the government is not pledged to making its purchases in Britain, but that as a matter of practice it does so, even paying higher prices where necessary.

Electrification and New Equipment in Hungary

The Hungarian State railways are reported to have placed orders with a consortium of Hungarian car manufacturers for 2,000 cars, practically all for freight service, according to Commerce Reports. The state railway shops were given an order for 50 locomotives, while an order for 100 more is under consideration. The installation of a double track on the Budapest-Szabadka line is to be continued, and other lines will be double-tracked as soon as possible.

Present conditions seem to indicate the probability of electrification of some of the Hungarian railways. Although the government has not arrived at any decision regarding this matter, it is proposed ultimately to electrify all trunk lines radiating from Budapest—a total of about 1,400 kilometers, or 2,000 kilometers including double tracks. No decision has been reached as to the system of electrification, though a new split-phase system, somewhat similar to that of the Norfolk & Western Elkhorn grade, will be given a trial. An experimental run will be started about the end of April on a short line of about 15 kilometers, equipped with overhead construction. If the test proves satisfactory, a definite decision will be arrived at next year, and general electrification will be pushed as rapidly as financial and manufacturing conditions will permit.

Meter Gage Mallets for Burma

The accompanying photograph depicts a locomotive recently built by the North British Locomotive Company, Ltd., Glasgow, Scotland, for the Burma Railways (meter gage). This locomotive is a Mallet articulated compound and develops 22,170 lb. tractive effort at 50 per cent of its working pressure, which is 180 lb. The wheels are 3 ft. 3 in. in diameter. High pressure cylinders are 15½ in. in diameter and low pressure cylinders 24¼



Mallet With Tractive Effort of 22,170 Pounds

in. Saturated steam is used and is generated by a grate area of 33 sq. ft. The engine weighs 133,000 lb. and is equipped with a Pyle National electric headlight. These locomotives are the sixth lot of North British locomotives delivered to India and Burma. They were built in accordance with the instructions of Messrs. Rendel, Palmer and Tritton, consulting engineers for the Burma Railways. The photograph and the data presented here were taken from Modern Transport (London).

Americans Finance Railway in Australia

The government of the State of Queensland, Australia, has recently negotiated a loan from American bankers for the purpose of constructing a railroad to develop lands on the Upper Burnett, Callide Valley, upon which it is intended to locate settlers upon very favorable terms, according to Commerce Reports. The Bureau of Foreign and Domestic Commerce is endeavoring to arrange to have American manufacturers given an opportunity to bid upon the rails, equipment, construction machinery, and other materials needed for the project. The specifications have not yet been completed, but information on this subject can be obtained, as soon as it is received from Australia, from the Iron and Steel Division of the Bureau at Washington.

Equipment and Supplies

Locomotives

THE PEORIA & EASTERN is inquiring for repairs on 17 locomotives.

THE BOSTON & MAINE may ask for about 20 locomotives in the near future.

PHELPS, DODGE & Co. has ordered two locomotives from the H. K. Porter Company.

THE MIDLAND VALLEY has ordered 3 Mikado type locomotives from the Baldwin Locomotive Works.

THE MOBILE & OHIO is inquiring for 10 Mikado type locomotives. These locomotives will have 26 by 30 in. cylinders.

THE PHILADELPHIA & READING has ordered 25 Consolidation type locomotives from the Baldwin Locomotive Works.

THE CARNEGIE STEEL COMPANY has ordered from the American Locomotive Company one locomotive for its Youngstown plant.

LEONARD KENNEDY & Co., 67 Wall street, New York City, has ordered 4, 0-6-0 type locomotives from the Baldwin Locomotive Works. These locomotives are for export to Brazil.

THE LEHIGH & NEW ENGLAND, reported in the *Railway Age* of March 4 as inquiring for locomotives, has ordered 4 Consolidation type locomotives from the American Locomotive Company.

THE LEHIGH VALLEY is having repairs made and superheaters installed on 14 ten-wheel locomotives at the Dunkirk shops of the American Locomotive Company. This is the beginning of a well defined program for modernizing the small motive power on this road.

Freight Cars

THE NEWPORT NEWS SHIPBUILDING & DRY DOCK Co., is inquiring for 1 flat car of 120 tons capacity.

THE CHICAGO & NORTH WESTERN, noted in the *Railway Age* of March 11 and 25 as inquiring for 3,100 freight cars has opened bids for this equipment. It is expected that contracts will be awarded by the end of this week.

THE NORTHERN PACIFIC, reported in the *Railway Age* of February 11 as inquiring for 500 refrigerator cars has ordered 1,000 refrigerator cars from the American Car & Foundry Co. The company is now inquiring for 60 express refrigerator cars.

THE CHICAGO, MILWAUKEE & ST. PAUL, noted in the *Railway Age* of February 11 as inquiring for 1,000 or more 40-ton box cars, has ordered 4,000 cars distributed 1,000 each to the Pullman Company and the Western Steel Car & Foundry Company; 1,500 to the Bettendorf Company; and 500 to the General American Car Company.

THE NEW YORK CENTRAL is negotiating with car builders to place contracts for freight cars, reported to be about 16,000. The orders are expected to be divided about as follows: To the American Car & Foundry Company, 5,500; Standard Steel Car Company, 5,500; Ralston Steel Car Company, 500, and divided between the Pressed Steel Car Company and the Pullman Company, 4,500 cars.

Passenger Cars

THE BOSTON ELEVATED is inquiring for 100 cars.

THE WESTERN PACIFIC is inquiring for 5 dining cars.

THE WYOMING is inquiring for 8 coaches, 9 chair cars, 2 buffet cars, 2 cafe chair cars and 4 dining cars.

THE SOUTHERN PACIFIC has ordered 50 steel cars for service on its Pacific Electric division from the St. Louis Car Company, the electrical equipment to be furnished by the Westinghouse Electric & Manufacturing Company.

Iron and Steel

THE BOSTON ELEVATED has ordered 600 tons of structural steel for a shed from the McClintic-Marshall Company.

THE SEABOARD AIR LINE is inquiring for 300 tons of structural steel for a bridge over the Altamaha river in Alabama.

THE LOUISVILLE, HENDERSON & ST. LOUIS has ordered 3,000 tons of rails from the United States Steel Corporation.

THE SOUTH MANCHURIAN RAILWAY is inquiring through export houses in New York City for 8,000 tons of rail.

THE DELAWARE, LACKAWANNA & WESTERN has ordered from the American Bridge Company 1,800 tons of structural steel for bridge repairs at various places on the road.

THE CHICAGO, ROCK ISLAND & PACIFIC has awarded a contract to the Fort Pitt Bridge Company, Pittsburgh, Pa., for 1,662 tons of steel to be used in a bridge over Sylvan Slough, Rock Island, Ill.

THE LEHIGH & NEW ENGLAND has ordered about 500 tons of steel from the Bethlehem Steel Bridge Corporation for new bridges and about 300 tons of tie plates from the Bethlehem Steel Company.

THE GREAT NORTHERN has awarded a contract to the American Bridge Company, Chicago, for 997 tons of steel to be used for repairs to a bridge at St. Cloud, Minn., and for spans in connection with grade separation work at Minneapolis, Minn.

THE LEHIGH VALLEY is inquiring for 700 tons of structural steel for a number of bridges. A contract was given recently by this company to the Bethlehem Steel Company for 1,600 tons of structural steel for use at its Claremont, N. J., terminal.

THE PHILADELPHIA & READING has ordered from the Bethlehem Steel Company 10,000 tons of 100-pound rails and 3,000 tons of 130-pound rails; also from the Carnegie Steel Company 5,000 tons of 130-pound rails, and from the Midvale Steel Company 2,000 tons of 130-pound rails. All the rails are for delivery during the latter half of this year.

Machinery and Tools

THE SEWELL VALLEY has given orders for the following machinery: To the Niles-Bement-Pond Company, a 20-ton electric traveling crane with 5-ton auxiliary, 56-ft. 3-in. span, and a 36 in. by 36 in. by 10 ft., and three head motor driven Pond planers; to the Motch & Merryweather Company, Pittsburgh, Pa., a No. 4 plain Cincinnati milling machine, motor driven; to Manning, Maxwell & Moore, Inc., Philadelphia, Pa., a 400-ton Chambersburg wheel press, motor driven; and to Wilmarth & Norman, a No. O cutter, reamer and drill grinder, motor driven. The company also expects to place an order shortly for additional machinery.

Miscellaneous

THE ILLINOIS CENTRAL is inquiring for 2,000 tons of tie plates.

THE NORTHERN PACIFIC is inquiring for 5,000 tons of tie plates, and also contemplates purchasing spikes and bolts.

THE DEPARTMENT OF DOCKS, New York city, expects to come in the market soon for a large amount of equipment for the Staten Island docks at St. George. The inquiry will include railroad tracks, frogs and switches.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for its requirements of 32-34 gravity fuel oil in tank cars, for the period from April 1, 1922, to June 1, bids on which are to be in before 12 o'clock noon April 3.

Supply Trade News

William Ochse, for the past two years sales representative of Manning, Maxwell & Moore, Inc., at Chicago, has been appointed efficiency engineer of the Ohio Machine Tool Company, Kenton, Ohio.

E. H. Walker has resigned as president of the Standard Coupler Company, New York, effective March 15. Mr. Walker will enter business for himself, an announcement of which will be made later.

Joseph B. Turbell, president of the American Brake Shoe & Foundry Co., New York, has been elected also chairman of the board and **James S. Thompson**, vice-president, has been elected also a director to succeed Otis H. Cutler, deceased.

The **Reed Railway Supply Company** has leased for general headquarters a four-story building at 113 N. Second street, St. Louis, Mo. **Joseph Reed**, formerly president of the Southern Hardware & Supply Company, is president of the company.

Fred Mathews, formerly vice-president of the Union Metal Products Company, has been appointed general railway sales representative of the **A. O. Smith Corporation**, Milwaukee, Wis. Mr. Mathew's office is at 1306 Consumers building, Chicago, Ill.

W. F. Hayes has been appointed general time inspector of the **Official Bureau of Railroad Time Service**, to succeed **Webb C. Ball**, deceased. Since Mr. Ball's death, the service has been organized with

H. J. Cowell, in charge of the Cleveland office as assistant to Mr. Hayes, **Laurence L. Doty** at the Chicago office, **O. H. Pyper** at the Winnipeg office, **S. A. Pope** at San Francisco and **V. A. Corrigan** at the Houston office. Mr. Hayes was born on a farm near Palmyra, Wis. He served his apprenticeship as a watchmaker, at which trade he remained for 15 years. For several years he was in the jewelry business in Janesville, Wis., where he was local watch inspector for the Chicago & North Western and the Chicago, Milwaukee & St. Paul. In 1903 he became associated with Mr. Ball, having jurisdiction over the Chicago, San Francisco, Houston and Winnipeg offices.

Fred Mathews, formerly vice-president of the Union Metal Products Company, Chicago, has been appointed general railway sales representative of the A. O. Smith Corporation of Milwaukee, Wis. Mr. Smith's offices are at 1306 Consumers Building, Chicago.

Edward B. Craft, assistant chief engineer of the **Western Electric Company** has been appointed chief engineer with headquarters at New York; **Dr. F. B. Jewett**, vice-president of the company at New York, who preceded Mr. Craft as chief engineer, is now in charge of the telephone department, which includes the engineering department, the telephone sales department and the manufacturing department.

The **Black & Decker Manufacturing Company**, Baltimore, Md., has removed its Cleveland, Ohio, office from 6225 Carnegie avenue to 2030 East Twenty-second street. This office is in charge of **Dan Paul**, formerly manager of the company's

Pittsburgh, Pa., office. **W. C. Allen**, former manager of the Philadelphia branch, and subsequently special representative, has been made branch manager of the Chicago territory; Mr. Allen was formerly connected with the Manley Manufacturing Company, as assistant sales manager and has been associated with the Black & Decker Manufacturing Co. for about three years.

A. S. Duncan, storekeeper at the East Pittsburgh works of the **Westinghouse Electric & Manufacturing Company**, East Pittsburgh, Pa., has been appointed general storekeeper of finished stocks. **H. L. Jones**, assistant superintendent, has been appointed superintendent of the switchboard and detail department; **A. J. Bastian**, assistant superintendent, has been appointed superintendent of the insulating department; **W. H. Miller** has been appointed supervisor of tools and gages and **W. F. Ablauf** has been appointed supervisor of mica and mica processes in the inspection and testing department—all with headquarters at East Pittsburgh.

Air Reduction Sales Company Acquires Davis-Bournonville Company

The Air Reduction Sales Company, New York, on March 17, acquired all the assets, including the patents, trade marks and trade names, of the Davis-Bournonville Company of Jersey City, N. J. The consolidation brings together two large companies, whose histories have, to a great extent, been the history of the development of the oxyacetylene welding and cutting industry.

The Air Reduction Sales Company is a pioneer in the extraction of gases from the air for industrial use. Its principal product is oxygen, which is used to the greatest extent, in conjunction with acetylene, in producing the high-temperature oxyacetylene flame. The Air Reduction Company further produces nitrogen and argon for incandescent lamp manufacture, and neon for electrical devices, of which the new and highly useful Airco ignition gage is an example. Acetylene ranks second to oxygen in importance in the list of Airco products.

The Davis-Bournonville Company was organized in 1907 by **Augustine Davis**, **Eugene Bournonville** and **C. B. Wortham** and at once took up the manufacture of oxyacetylene torches. As success was attained in connection with the welding torch, the company's activities were directed to the development of oxyacetylene cutting torches, acetylene generators, and finally to machines for welding and cutting. It is the intention of the Air Reduction Sales Company to continue the manufacture of D-B torches, acetylene generators, special machines, etc., under the supervision of the men who developed them. The equipment will be marketed under the trade name of Airco-Davis-Bournonville.

American Steel Foundries

The American Steel Foundries reports earnings from operations for the year ending December 31, 1921, of \$1,428,188, as compared with \$6,915,734 in the previous year. After deducting depreciation and fixed charges and adding non-operating income, the net profits were \$675,009, as against \$4,496,442 in 1920. During the year \$5,150,000 of notes were paid, inventories were reduced one-third and accounts payable were cut in half. Current liabilities were reduced from approximately \$11,000,000 to \$3,700,000. Working capital was \$13,125,542 at the close of the year and current assets were more than 4 to 1 in relation to current liabilities.

The balance sheet, December 31, 1921, shows the following:

ASSETS	
Real estate equipment, etc., less depreciation reserve	\$33,276,843
Preferred stock sinking fund (in bank)	85,593
Current assets	16,888,503
Deferred charges to operations	123,809
	\$50,374,748
LIABILITIES	
Capital stock	\$28,782,300
Capital stock of subsidiary company	4,733,336
Four per cent debentures	340,800
Current liabilities	3,762,961
Sundry operating reserves	470,174
Appropriated surplus	3,314,144
Unappropriated surplus	8,971,033
	\$50,374,748

Bethlehem Steel Corporation

The annual report of the Bethlehem Steel Corporation for the year ended December 31, 1921, shows net incomes after charges of \$10,332,804, as compared with \$14,458,836 for 1920. The value of current assets as of December 31, 1921, was \$87,748,433 in excess of current liabilities, compared with \$77,473,917 excess at the end of 1920. Of the total current assets \$54,881,227 consisted of cash and marketable securities, largely obligations of the United States Treasury. The balance sheet showed further that inventories at the close of last year had been reduced to \$39,240,537, as compared with \$73,208,678 as of December 31, 1920. The unappropriated surplus at the close of 1921 was \$12,418,929.

The comparative income account for the years ended December 31, 1921 and 1920, is as follows:

	19 21	19 20
Gross sales and earnings	\$147,794,353	\$274,431,236
Less: Manufacturing cost, administrative, selling and general expense, and taxes	125,943,819	239,468,865
Net manufacturing profit	\$21,850,533	\$34,962,372
Interest, dividends and other miscellaneous income	3,904,144	1,389,182
Total net earnings	\$25,754,678	\$36,351,554
Less: Interest charges, including proportion of discount on and expense of bond and note issues	9,419,158	7,951,203
Balance	\$16,335,519	\$28,400,350
Provision for depreciation, obsolescence and depletion	6,002,715	13,941,515
Net income for the year	\$10,332,804	\$14,458,835

The Westinghouse Air Brake Company

The financial results of the Westinghouse Air Brake Company for the year ended December 31, 1921, shows net earnings of \$1,412,490. This compares with \$6,580,404 in the previous year. The balance, surplus, December 31, 1921, was \$12,931,103 as compared with \$16,140,580 at the close of 1920.

H. H. Westinghouse, chairman of the board, in his report to the stockholders, said:

"As outlined in our last annual report to the stockholders, we entered the year 1921 with a fair volume of unfilled orders on hand and as a consequence our shipments for the first quarter were fairly satisfactory; but on account of the general business depression and particularly the curtailing of purchases by the railroads of the country, our orders received during the year under review amounted to less than 50 per cent of normal, which resulted in plant operations and shipments for the year of approximately this same percentage. Under existing conditions it would be difficult and useless to endeavor to forecast the future. With a return, however, of better general conditions and railroad buying resumed, your company's business should rapidly return to normal."

The consolidated balance sheet for 1921 follows:

ASSETS	
Cash	\$3,109,607
Accounts and bills receivable	5,068,744
U. S. bonds and other U. S. obligations	1,784,188
Inventories	10,802,339
Investments	8,946,623
Equities	10,666,758
Real estate, other than for factories	2,152,153
Patent rights	4,437
Deferred charges	176,547
	\$47,648,902
LIABILITIES	
Bills payable	\$ 800,000
Accounts payable	1,112,491
Transients, accrued, not yet due	118,202
Reserve for Federal taxes (1920-1921)	629,400
Capital stock, at par, of subsidiary companies not held by the Westinghouse Air Brake company	19,608
Stocks, securities (including amount held against patent and trade mark)	2,893,807
Capital stock, issued	\$29,165,800
Long term treasury	21,600
	29,144,700
	12,931,103
	\$47,648,902

Obituary

Harvey E. Grace, vice president and treasurer of the William Gray Company, Chicago, railroad contractor, died suddenly on March 21, at his home in that city.

Railway Construction

ALASKA ENGINEERING COMMISSION.—This commission will receive bids until May 1, for the construction of a single track structural steel bridge on the Alaska Railroad.

ATLANTON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of March 18 (page 762), as receiving bids for the construction of two one-story brick lavatory buildings at Chicago, has awarded the contract for this work to Jerome Moss, of that city.

CENTRAL OF NEW JERSEY.—This company is contemplating some heavy grade crossing elimination at Perth Amboy, N. J., in conjunction with the Lehigh Valley and the Pennsylvania Railroad. A total of five highway or street grade crossings and one railroad crossing will be eliminated of which four of the street crossings will be done by the Jersey Central, and one by the Lehigh, the railroad crossing being a joint proposition.

CHATTANOOGA-CROSSVILLE PROJECT.—A survey is now being made for the construction of a railroad to extend from Chattanooga, Tenn., to Crossville, a distance of about 35 miles, at which latter point a connection will be made with the Tennessee Central. It is expected that the construction of this line will be completed by the end of the coming summer and that the road will traverse through the largest undeveloped coal fields in that state. C. E. James of Chattanooga is in charge of the project.

CHICAGO, BURLINGTON & QUINCY.—The statement which appeared in the *Railway Age* of March 25, page 803, to the effect that this company had awarded a contract to John Griffith and Sons for the construction of a four-story inbound freight house in Chicago was incorrect. Bids are still being received for this work.

GREAT NORTHERN.—This company, which was noted in the *Railway Age* of March 25 (page 803), as about to receive bids for the construction of terminal facilities at Wenatche, Wash., has let a contract to A. Guthrie & Co. for the grading and work has already been started in the preparation of the ground for the buildings. The total expenditure for this project will aggregate approximately \$1,500,000.

GREAT NORTHERN.—This company, noted in the *Railway Age* of March 18, as having closed bids on March 15 for the construction of a 30-stall roundhouse, shop buildings, storehouses and other terminal facilities at Minneapolis Junction, Minn., has awarded a contract for this work to A. Guthrie & Co., St. Paul.

LOUISVILLE, HENDERSON & ST. LOUIS.—This company has awarded a contract for the construction of a 100-ton reinforced concrete coaling and sanding plant at Owensboro, Ky., to the Howlett Construction Company, Mohne, Ill.

MISSOURI PACIFIC.—This company will receive bids until April 8, for the replacing of 10 wooden trestles near Aurora, Mo., with concrete structures and earth embankments.

NASHVILLE CHATTANOOGA & ST. LOUIS.—This company contemplates the reconstruction of its three-story brick office building at Nashville, Tenn., which was recently destroyed by fire. No definite plans have been made as yet.

NEW YORK & LONG BRANCH.—This company has awarded a contract to Charles Ward Hall, Inc., New York City, for the construction of a new brick and limestone passenger station, covered platforms and roadways, etc., at Asbury, N. J. Estimated cost is \$125,000.

WICHITA FALLS & OKLAHOMA.—This company has applied to the Interstate Commerce Commission for authority to construct a new line from the present terminus at the Texas-Oklahoma state line northeast to Waurika, Okla., 7½ miles, and a line from Byers, Texas, to the Oklahoma state line, 5.8 miles.

Railway Financial News

ANN ARBOR.—*Merger Plans Denied.*—See Pere Marquette.

ASHERTON & GULF.—*Application to Issue Bonds Denied.*—The Interstate Commerce Commission has denied this company's application for authority to issue \$436,000 of first mortgage bonds on the ground that a satisfactory showing of its ability to earn the interest has not been made.

BOSTON & MAINE.—*Granted Loan from Revolving Fund.*—The Interstate Commerce Commission has certified a loan of \$5,000,000 to this company to enable it to meet a previous loan from the revolving fund maturing June 1.

CANADIAN PACIFIC.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "C. P. R. Soon to Own Fleet Totaling 438,604 Tons." See also excerpts from annual report on adjacent pages.

CENTRAL OF GEORGIA.—*Equipment Trust Certificates Authorized.*—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability in respect of \$660,000 of equipment trust certificates.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Annual Report.*—The annual report issued this week shows a condensed income statement for the years ended December 31, 1921 and 1920 as follows:

	1921	1920
Gross operating revenues.....	\$15,162,870	\$13,611,131
Total operating expenses.....	12,181,950	13,210,542
Net operating revenues.....	2,980,920	400,588
Taxes, etc.....	738,000	492,431
Net operating income.....	2,242,919	Def. 91,842
Other income.....	249,905	133,907
Standard return.....	459,751	270,000
Guaranty U. S. government.....	459,751	815,249
Total other income.....	\$709,656	\$1,219,156
Total gross income.....	2,952,576	1,127,313
Deductions from total gross income for fixed charges including interest on funded debt.....	2,229,012	2,261,207
Balance of income over charges, carried to credit of profit and loss.....	723,564	.....
Balance of deficit carried to debit of profit and loss.....	.....	1,133,893
less.....	.....	370,223
Dividends declared.....	370,225	.....
Surplus (credit).....	\$353,339	.....
(debit).....	.....	\$1,504,117

CHICAGO, PEORIA & ST. LOUIS.—*Receivers' Certificates Authorized.*—The receivers have been authorized by the Interstate Commerce Commission to issue \$335,000 of receivers' certificates to be sold at not less than par and the proceeds used to pay indebtedness incurred in the operation of the property.

DELAWARE & HUDSON.—*Bonds Offered.*—Kuhn, Loeb & Co. and the First National Bank are offering at 98 and interest to yield 5.70 per cent of \$7,500,000 15-year 5½ per cent bonds, due May 1, 1937. The bonds, which are sold subject to approval of the Interstate Commerce Commission, are not redeemable for the first ten years. Thereafter they will be redeemable as a whole on May 1, 1932, at 105 and interest, or any subsequent interest date at 105, less ½ per cent for each six months from May 1, 1932, to redemption date upon sixty days' notice.

DELAWARE, LACKAWANNA & WESTERN.—*Financing Plan of Lessor Company.*—See New York, Lackawanna & Western.

DENVER & RIO GRANDE.—*Perkins Committee to Survey Property.*—The Perkins committee, headed by James Perkins, president of the Farmers Loan & Trust Company, has arranged with Coverdale & Colpitts, consulting engineers, for a survey and report on the property of this railroad. This committee represents Denver & Rio Grande refunding 5s and is opposed to the Western Pacific's plan of reorganization. It is expected that the work will take two or three months. The Perkins committee adopted this action so that it could have an independent report of the Denver's condition. It may lead to the announcement of a new reorganization plan by this committee.

The Hammond committee, representing the refunding 5s in favor of the Western Pacific plan, has asked for the deposit of

80 per cent of the bonds in the hands of the public for the consummation of that plan. Neither this committee nor the Perkins committee is understood to have 25 per cent of the \$31,616,000 outstanding bonds. With a deposit of 50 per cent either group thinks that it will be able to control the situation.

ERIE.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$10,000,000 of demand promissory notes for one year at 6 per cent and \$2,500,000 of 6 per cent demand notes to be delivered to the War Finance Corporation upon the cancellation of a like face amount of three-year 6 per cent gold notes maturing on April 1.

ERIE.—*Bonds Offered.*—White, Wells & Co., Cassatt & Co., and West & Co. are offering \$5,000,000 consolidated mortgage 7 per cent gold bonds of the Erie, due September 1, 1930, at 103¼, to yield more than 6.40 per cent.

GOLDEN BELT.—*Application for Certificate of Public Convenience Denied.*—The Interstate Commerce Commission, after a rehearing, has affirmed the conclusion reached in a former report that this company's application for a certificate authorizing the construction of a line from Great Bend to Hays, Kans., should be denied. The commission says the line would prove a convenience to a considerable number of people, but that fact alone cannot be relied upon to justify the addition to the transportation resources of the country of an enterprise which gives no promise of being self-sustaining.

ILLINOIS CENTRAL.—*Equipment Trusts Sold.*—The Commercial & Financial Chronicle states that the Kuhn, Loeb & Co. have sold privately \$3,255,000 5½ per cent equipment trust certificates, series "H."

MANISTIQUE & LAKE SUPERIOR.—*Authorized to Abandon Branch Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the McNeil branch in Schoolcraft County, Mich., 7½ miles.

MIDLAND.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied this company's application for a loan of \$200,000.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Asks Authority to Sell Bonds.*—This company has applied to the Interstate Commerce Commission for authority to sell \$2,500,000 of first refunding mortgage 6 per cent bonds now held in the treasury, the issue of which was previously authorized by the commission. It is proposed to sell the bonds to Dillon, Read & Co., at 101½.

MISSOURI PACIFIC.—*Asks Authority to Sell Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$18,096,500 of first and refunding mortgage 6 per cent gold bonds. The application is dated March 24, which was the date an advertisement appeared stating that the bonds had been sold. Of the total, \$13,641,000 is to discharge or refund first and refunding mortgage 5 per cent bonds and \$4,455,500 is to reimburse the treasury for expenditures.

NEW YORK CENTRAL.—*Proposed Acquisitions.*—This company's application for authority to purchase the stock of the Chicago River & Indiana and to lease the Chicago Junction with an option to purchase its stock has been assigned for oral argument before the full membership of the Interstate Commerce Commission at Washington on April 5.

NEW YORK, LACKAWANNA & WESTERN.—*Financing Plan.*—A special meeting of the stockholders will be held on April 25 to ratify a proposed increase in capital stock from \$10,000,000 to \$15,000,000 and a bond issue of \$30,000,000. If authorized, these issues will be used to pay or refund \$22,000,000 outstanding bonds, a \$1,640,000 note held by the Delaware, Lackawanna & Western; and for future capital expenditures.

The New York, Lackawanna & Western has \$12,000,000 first 6s which were taken up by the Delaware, Lackawanna & Western on maturity, January 1, 1921, and \$10,000,000 construction and improvement bonds, of which \$5,000,000 are due in May, 1923, and \$5,000,000 in August, 1923. These are guaranteed by the Delaware, Lackawanna & Western, which owns about \$2,000,000 of them. According to the plan, the Delaware, Lackawanna & Western is to be reimbursed for advances by means of the new issues.

NEW YORK, LACKAWANNA & WESTERN.—Financing Plan.—A special meeting of the stockholders will be held April 25 to ratify a proposed increase in capital stock from \$10,000,000 to \$15,000,000 and a bond issue of \$30,000,000. These issues if authorized will be used for payment or refunding of \$22,000,000 outstanding bonds and a \$1,040,000 note held by Delaware, Lackawanna & Western; also for future capital expenditures.

The company has \$12,000,000 first 6s, which were taken up by the Delaware, Lackawanna & Western on maturity January 1, 1921, and \$10,000,000 construction and improvement bonds due 1923, guaranteed by D. L. & W., of which the latter owns about \$2,000,000.

Plan is to reimburse D. L. & W. for advances by means of the new issues, but whether this will involve any public offering company officials have not yet determined.

NEW YORK, NEW HAVEN & HARTFORD.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$2,758,000 of the first and refunding mortgage bonds to be pledged with the Secretary of the Treasury as partial security for a loan. The commission has also authorized the sale of \$1,790,000 of equipment trust notes, the proceeds to be used toward payment of certain promissory notes.

Stockholders' Meeting.—The stockholders at their meeting in New Haven, Conn., on April 19 will pass on the acceptance of an extension of time for the European loan from April 1, 1922, to April 1, 1925. Besides considering proposed new bond issues there will also be the question of acceptance of the equipment agreement with the federal Railroad Administration as amended under date of January 22, 1922; the approval of a lease to the New York, Westchester & Boston Railway of that portion of this company's right of way between Mount Vernon, N. Y., and Larchmont, N. Y., on which the railway company's tracks are now constructed and operated.

NORFOLK & WESTERN.—Annual Report.—The corporate income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues:		
Freight	\$67,221,426	
Passenger	10,077,720	
Total, including other	\$80,718,802	
Operating expenses:		
Maintenance of way and structures	\$11,783,699	
Maintenance of equipment	19,841,345	
Traffic	843,161	
Transportation	29,849,436	
General	1,842,025	
Total operating expenses	\$64,346,857	
Net revenue from railway operations	16,371,945	
Railway tax accruals	4,730,940	
Railway operating income	11,643,964	
Net railway operating income	14,479,836	\$17,055,345*
Total non operating income	1,107,507	881,395
Gross income	15,587,343	17,936,740
Total deductions	5,544,162	5,439,951
Net income	10,043,181	12,496,788
Dividends on adjustment preferred stock	919,692	919,692
Income balance	9,123,489	11,577,096

*Operation during 1920 having been for two months under federal control for six months under the government's guaranty, and for four months without government relationship, no comparisons of items of railway operating income and expenses are shown in this statement. Balance federal control period—Jan. 1 to Feb. 29, 1920, \$3141,787. Estimated balance guaranty period—March 1, 1920, 10,405,436. Railway company's operations—Sept. 1, to Dec. 31, 1920, 1,281,122.

Dividends on the common stock in 1921 totaled 7 per cent amounting to \$2,961,189.

To Pay Notes. The Norfolk & Western has called for payment at 101, on May 1, 1922, its entire issue of \$2,500,000 four year 6 per cent notes due May 1, 1924.

NORTHERN RAILWAY (FRANCE).—Bonds Sold in London. An issue of Nord Railway £5,000,000 6 per cent bonds were sold in London, England, on March 23, at 90, according to a cable to the New York Journal of Commerce.

NORTHEASTERN OKLAHOMA.—Application for Loan Denied.—The company's application for a loan of \$500,000 has been denied by the Interstate Commerce Commission.

PIRE VALLEY SOUTHERN.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$150,000.

PERE MARQUETTE.—Merger with Ann Arbor Denied.—E. N. Brown, chairman of the board, has flatly denied any negotiations between this company and owners of the Ann Arbor to acquire the latter. Mr. Brown said his auditors went over the books of the Ann Arbor a few months ago in response to a request from Ann Arbor interests who were seeking to interest Pere Marquette in the matter. He said undoubtedly this was what caused the rumor of possible negotiations to be circulated. On the report of the auditors the Pere Marquette board decided that it would not be warranted in considering acquisition of the Ann Arbor.

SALINA NORTHERN.—Application for Loan Denied.—The Interstate Commerce Commission has denied the application of the receivers for a loan of \$308,630.

SHEARWOOD.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$9,500.

TENNESSEE RAILROAD.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$100,000 for additions and betterments.

WABASH.—Equipment Trusts Sold.—Speyer & Co. and the Equitable Trust Company have sold \$6,546,800 equipment trust 6 per cent gold notes at prices to yield 5.40 to 5.75 per cent according to maturity.

WYOMING.—Application for Loan Denied.—The Interstate Commerce Commission has denied this company's application for a loan of \$100,000.

Tentative Valuations

The Interstate Commerce Commission has issued a number of additional tentative valuation reports in which it finds the final value to be as follows:

	Property owned	Property used
Columbia Union Station Company	1919 \$162,331	\$175,671
Duluth & Superior Bridge	1916 640,000	
Livville River	1916 249,662	249,709
Louisiana Railway & Navigation Co.	1917 10,856,479	10,796,479
Northern Alabama	1916 3,189,429	
Raritan River	1916 1,215,416	1,216,646
Wildwood & Delaware Bay	1916 190,000	150,704

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Louisville, Henderson & St. Louis	\$660,000
Toledo Terminal	100,000
Erie and Lehigh Valley, as Joint Lessees of the Railroad of the Buffalo Creek Railroad Company	185,000

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the Railroad Administration and the railroad companies during the 26 months of federal control.

Dividends Declared

Northern Pacific—1 1/2 per cent, quarterly, payable May 1 to holders of record April 12.
Northern Railroad of New Hampshire—1 1/4 per cent, quarterly, payable April 1 to holders of record March 13.
Old Colony—1 1/2 per cent, quarterly, payable April 1 to holders of record March 11.

Trend of Railway Stock and Bond Prices

	Last Week	Last Year
Average price of 20 representative railway stocks, close of business	60.60	61.18
Average price of 20 representative railway bonds, close of business	83.19	83.41
		73.89

THE ARMS-YAGER RAILWAY CAR COMPANY has succeeded the Arms Palace Horse Car Company, the change of name having been announced by W. A. Yager, president, on March 1. For this company's cars the American Railway Association has assigned new reporting marks—"A. Y. R. X.", and the cars will be lettered as early as practicable.

Annual Report

Canadian Pacific Railway Company—Forty-First Annual Report

To the Shareholders:

The accounts of the Company for the year ended December 31st, 1921, show the following results:—

Gross Earnings	\$193,021,854.40
Working Expenses (including all taxes)	158,820,114.09
Net Earnings	\$34,201,740.31
Deduct Fixed Charges	11,519,071.97
Surplus	\$22,682,668.34
Contribution to Pension Fund	500,000.00
	\$22,182,668.34

From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid October 1st, 1921	\$1,613,638.42
And three quarterly dividends on Ordinary Stock of 1 3/4 per cent. each, paid June 30th, 1921, October 1st, 1921, and December 31st, 1921	13,650,000.00
	15,263,638.42
	\$6,919,029.92

From this there has been declared a second half-yearly dividend on Preference Stock of 2 per cent. payable April 1st, 1922	\$1,613,638.42
And a fourth quarterly dividend on Ordinary Stock of 1 3/4 per cent., payable April 1st, 1922	4,550,000.00
	6,163,638.42

Leaving net surplus for the year	\$755,391.50
In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.	

SPECIAL INCOME FOR YEAR ENDED DECEMBER 31st, 1921.

Balance at December 31st, 1920	\$20,530,292.08
Less: Dividend paid April 1st, 1921	1,950,000.00
Net Revenues from Investments and Available Resources, Exhibit "C"	2,307,332.06
Interest on Deposits, and Interest and Dividends on Other Securities less Exchange	1,840,866.51
Net Earnings Ocean and Coastal Steamship Lines	2,785,614.93
Net Earnings Commercial Telegraph and News Department, Hotels, Rentals and Miscellaneous	4,053,385.62
	\$29,567,491.20

Less: Payments to Shareholders in dividends: June 30th, 1921, October 1st, 1921, and December 31st, 1921	5,850,000.00
	\$23,717,491.20

From this a dividend has been declared payable April 1st, 1922 \$1,950,000.00

2. The working expenses for the year, including all taxes, amounted to 82.28 per cent. of the gross earnings, and the net earnings to 17.72 per cent., as compared with 84.70 per cent. and 15.30 per cent. respectively in 1920.

3. The gross earnings of your transportation system during the fiscal year under review were less than those of 1920 by \$23,619,494, but the net earnings increased by \$1,048,695. The large decrease in the gross earnings is attributed to the business depression which set in at the end of 1920 and continued practically without interruption during the fiscal year under review, to the decrease in passenger fares in January and July and in freight rates in December, and to partial crop failure in some portions of Western Canada in areas served by your lines of railway. Of the expenses of the year, 53.84 per cent. was disbursed on account of labor, 25.92 per cent. for material and miscellaneous supplies, 15.51 per cent. for fuel and other locomotive supplies and 3.49 per cent. for taxes. The balance, 1.24 per cent., was necessary to meet Loss and Damage claims. By the exercise of the strict economy and the deferring of work which could be postponed, especially during the early part of the year when traffic was particularly light, and by the savings effected through the reduction in wages secured in September, your Officers were able to reduce expenses to already mentioned. In the circumstances, the year's operations must be regarded as satisfactory, particularly having regard to the decrease in passenger and freight rates mentioned above. The operating ratio compares most favorably with that of other systems.

4. The sales of agricultural land in the year were 153,304 acres for \$2,872,999, being an average of \$18.74 per acre. Included in this area were 6,686 acres of irrigated land, which brought \$53.13 per acre, so that the average price for the balance was \$17.17 per acre. The sales of land in Western Canada were naturally very seriously affected by the economic conditions which prevailed during the year, resulting in a very large decrease in the acreage acquired by purchasers either from your Company or other landowners. Your Directors are in favor of the adoption of reasonable immigration laws designed to encourage the entry into Canada of immigrants of the right type, you may look forward to a distinct improvement in the volume of land sales during the next few years.

During the year your Directors disposed of London stock of \$4,800,000 (of which \$4,504,423 was delivered prior to December 31st), and in New York of \$25,000,000 of Five per cent. Consolidated Debenture Stock, the issuance and sale of which you had previously authorized, at prices which under the prevailing market conditions were extremely favorable, re-

flecting the high credit which the Company enjoys. The sales of this Stock in New York were effected in an eminently satisfactory manner, although the Security was of a character practically unknown among American investors it received widespread and ready distribution. In order to meet the requirements of the United States market the certificates of the Debenture Stock the issues were made in bearer form with interest coupons attached, under conditions which permit of the conversion into registered Stock at the option of the holder, and you will be asked to give your sanction to By-law No. 47, Sub-section D, enacted by the Directors providing for the issue of certificates in this form.

The market for the Company's Consolidated Debenture Stock being so favorable both in the United States and in England, it was not considered desirable or necessary to create and issue bonds, debentures or other securities secured by pledge of Consolidated Debenture Stock, which you authorized at the special general meeting held on the fourth day of May of last year.

6. During the year your Directors consented to the issue of \$2,671,000 Five per cent. Consolidated Bonds of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company for the purpose of making payment for the property of the Wisconsin and Northern Railway Company, the purchase of which had been arranged by the Board of the former Company. They also consented to the issue and sale of \$10,000,000 of the Minneapolis, St. Paul and Sault Ste. Marie 10-year Six and a half per cent. Notes to be secured collaterally by a portion of the \$15,000,000 First Refunding Mortgage Six per cent. Bonds which that Company had power to issue. Both issues were made after the approval of the Interstate Commerce Commission was obtained.

In common with other American railroads the revenues of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company and its subsidiaries fell off very materially during the past year and its operations were in particular seriously affected by the United States tariff against Canadian wheat and the practical shutting down of the iron ore mines in Michigan and Minnesota. Their revenues were also adversely affected through the depression in the Lumber and Livestock business. In these circumstances the Directors of that Company determined upon the reduction of the Preferred and Common Stock dividends to the basis of four per cent. per annum, and in their decision your Directors have concurred. A substantial improvement in traffic conditions on the railways of your United States subsidiaries is confidently looked forward to.

7. The four steamers under construction for the Atlantic and Pacific services will all be in commission for the present season. The S.S. "Kaiserin Auguste Victoria" has already been delivered and the "Empress of Canada" and "Empress of Canada" will be delivered in April and May. The S. S. "Princess Louise," constructed for the Pacific Coast Service, has been put into service and is in every respect satisfactory for the trade in which she is engaged. During the year the Company purchased the steamships "Kaiserin Auguste Victoria," "Prinz Friedrich Wilhelm" and "Fritz" for extremely low prices. The "Kaiserin Auguste Victoria" has been renamed the "Empress of Scotland," the "Prinz Friedrich Wilhelm" the "Empress of India" and the "Fritz" the "Empress of Australia." The two first named will be added to the Atlantic fleet and the "Empress of Australia" will be added to the Pacific fleet. The cost of the ships under construction will exceed the original estimates by a considerable sum, due to protracted labor troubles, increased cost of materials and difficulties in the ship yards during the construction period. With the addition of the new ships constructed and purchased the total tonnage of your fleet will be 438,674 tons—the largest in the history of the Company, and the fleet, in numbers and in the character of ships in service, is in the opinion of your Directors amply able to maintain the high reputation of the Company on Atlantic, Pacific and coastal routes.

8. In anticipation of your confirmation your Directors authorized capital appropriations, in addition to those approved at the last annual meeting, aggregating for the year 1921, \$1,743,444, and ask your approval to expenditures on capital account during the present year, as and when the conditions warrant such expenditures, of \$10,622,137. Of this amount the principal items are:—

Replacement and enlargement of structures in permanent form	\$1,021,700
Additional stations, round houses, freight sheds and shops, traffic control buildings, and other buildings, and extensions to existing buildings	1,008,200
Tie plates, rail anchors, ballasting, ditching and miscellaneous roadway betterments	243,200
Replacement of rail in main and branch line tracks with heavier section	1,500,700
Additional terminal and side track accommodation	431,500
New Pier "BC" at Vancouver	1,550,000
Extension work on Chateau Frontenac Hotel, Quebec	1,454,500
Additional lining, Connaught Tunnel	550,000
Mechanical Department, machinery at various points	439,000
Improvements to plant and machinery, Angus Shops	218,400
Improvements in connection with Telegraph service	291,400
Line Diversion at Port McNicoll	355,600
LaSalle Loop Line, South Bank Branch, Montreal	300,000
Line Diversion at Kingston Jct.	100,000

The balance of the amount is required for miscellaneous works to improve facilities and effect economies over the whole system.

Your Directors feel that expenditures, for the first part of the year at all events, should be made with exceptional care in view of the existing traffic conditions, and therefore only authorize expenditures to the amount of \$3,958,770, more than \$3,000,000 of which is for the continuance of the work on the Chateau Frontenac and the new pier at Vancouver which has already been commenced.

9. At the request of the Government of Alberta your Directors have entered into an agreement for the construction and operation of an extension of the Central Canada Railway for twenty-five miles westerly from Peace River Landing to Berwyn. The terms of the agreement for operation are similar to those entered into with the Government, the stockholders of the Edmonton, Duvevean and British Columbia and the Central Canada Railway Companies and the Union Bank of Canada, under which the properties of the two companies are operated by your Company. The cost of the construction of the extension is, of course, to be borne by the Province of Alberta.

10. As intimated in the last annual report your Directors entered into an agreement with the Province of Quebec for the construction by your subsidiary, the Interprovincial and James Bay Railway Company, of a railway

extending from Kipawa to the Des Quinze River, having a total mileage of approximately seventy-seven miles. The lease of the railways of that Company to your Company on the usual terms will be submitted for your approval.

11. Your Directors have authorized the preparation and erection of a bronze memorial statue to those in the Company's service who lost their lives in the Great War. The statue will be erected in the Windsor Station, Montreal, and replicas placed at Winnipeg and Vancouver. In addition, bronze plaques have been prepared for placing in the principal stations and offices of the Company from London to Hong Kong. Your Directors feel that the heroism, self sacrifice and high sense of duty which the Company's employees showed should be perpetuated in a prominent way throughout the system.

12. The death occurred on the 29th of November last at his home, Brocket Hall, Hatfield, Hertfordshire, of the Right Honorable Lord Mount Stephen, the first President of the Company in the ninety-third year of his age. Lord Mount Stephen was President from the incorporation of the Company in the year 1881 until August, 1888, and thereafter remained a director until May, 1893, when, finding himself unable to discharge the

duties of a director to his own satisfaction owing to his absence from Canada, he retired from the Board. Lord Mount Stephen had been the master spirit of the enterprise from its beginning, and his safe conduct through its earlier perils to the strong and proud position it occupied when he retired from the Presidency was almost entirely due to his great ability, courage, tenacity and inspiring integrity. Your Directors recorded their appreciation of his services by a resolution upon the occasion of his retirement and as a memorial of the lasting benefit to the Company of his invaluable services have also recorded upon their Minutes a renewed expression of the Board's appreciation of that service, together with an expression of their profound regret at his removal by death.

13. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:—

- Mr. J. K. L. ROSS,
- RIGHT HON. LORD SHAUGHNESSY, K.C.V.O.
- SIR THOMAS SKINNER, BART.
- For the Directors,

E. W. DEATY, *President*

MONTREAL, March 13th, 1922.

GENERAL BALANCE SHEET, DECEMBER 31ST, 1921

ASSETS	
PROPERTY INVESTMENT:	
Railway, Rolling Stock Equipment and Lake and River Steamers.....	\$597,206,336.77
OCEAN AND COASTAL STEAMSHIPS, Exhibit "A".....	56,470,503.16
ACQUIRED SECURITIES (COST):	
Exhibit "B".....	128,109,814.18
ADVANCES TO CONTROLLED PROPERTIES AND INSURANCE PREMIUMS.....	
	9,762,633.55
INVESTMENTS AND AVAILABLE RESOURCES: (Including amount held in trust for 6% Note Certificates, \$60,153,819.31)	
Deferred Payments on Lands and Townsites	\$69,296,736.90
Imperial and Dominion Government Securities.....	27,310,674.54
Provincial and Municipal Securities.....	2,016,721.29
Debtless Stock in Treasury.....	7,000,000.00
Miscellaneous Investments, Exhibit "C":	
Cost.....	38,356,459.66
Assets in Lands and Properties, Exhibit "D".....	91,562,630.15
Cash.....	3,222,968.14
	241,266,190.68
WORKING ASSETS:	
Material and Supplies in Hand.....	\$32,997,116.59
Agents' and Conductors' Balances.....	3,440,114.17
Net Traffic Balances.....	860,757.79
Imperial, Dominion and United States Governments, Accounts due for Transportation, etc.....	1,681,377.24
Miscellaneous Accounts Receivable.....	7,611,456.73
Cash in Hand.....	45,318,948.06
	91,909,770.58
	\$1,124,725,248.92

LIABILITIES	
CAPITAL STOCK:	
Ordinary Stock.....	\$260,000,000.00
Four Per cent. Preference Stock.....	80,681,921.12
	\$340,681,921.12
FOUR PER CENT. CONSOLIDATED DEBTLESS STOCK.....	
	238,206,431.68
MORTGAGE BONDS:	
Algoma Branch 1st Mortgage 5 per cent.....	3,650,000.00
NOTE CERTIFICATES 6 PER CENT.....	52,000,000.00
CURRENT:	
Audited Vouchers.....	9,406,442.66
Pay Rolls.....	3,419,137.53
Miscellaneous Accounts Payable.....	12,589,518.89
	25,415,099.08
ACCRUED:	
Rentals of Leased Lines and Coupons on Mortgage Bonds.....	690,882.43
EQUIPMENT OBLIGATIONS.....	16,610,600.00
RESERVES AND APPROPRIATIONS:	
Equipment Replacement.....	10,780,419.91
Steamship Replacement.....	19,185,401.96
Reserve Fund for Contingencies and for Contingent Taxes.....	46,638,047.51
	76,603,869.38
PREMIUM ON ORDINARY CAPITAL STOCK SOLD	45,000,000.00
NET PROCEEDS LANDS AND TOWNSITES.....	93,798,267.39
SURPLUS REVENUE FROM OPERATION.....	128,481,119.85
SPECIAL RESERVE TO MEET TAXES IMPOSED BY DOMINION GOVERNMENT.....	2,597,888.76
SURPLUS IN OTHER ASSETS.....	100,989,769.23
	\$1,124,725,248.92

J. LESLIE, *Comptroller*

AUDITORS' CERTIFICATE

We have examined the Books and Records of the Canadian Pacific Railway Co. for the year ending December 31st, 1921, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the true

financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,

Chartered Accountants (England)

Montreal, March 13th, 1922

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31st, 1921

From Passengers.....	\$41,565,884.99
" Freight.....	128,849,445.63
" Mails.....	2,939,258.56
" Sleeping Cars, Express and Miscellaneous.....	19,667,265.22
Total.....	\$193,011,854.40

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31st, 1921

Transportation Expenses.....	\$74,587,749.11
Maintenance of Way and Structures.....	29,038,641.43
Maintenance of Equipment.....	36,746,816.45
Traffic Expenses.....	6,289,621.86
Light and Heating Car Temperatures.....	2,271,391.04
Interest on Loans and River Steamers.....	1,458,443.13
General Expenses (including all taxes).....	9,160,681.07
Total.....	\$178,800,114.09

DESCRIPTION OF FREIGHT FORWARD

DESCRIPTION	YEAR ENDED DECEMBER 31st		
	1921	1920	1921
Total.....	1,777,932	9,944,410	11,718,510
Food.....	1,110,041	17,536,485	175,506,119
Coal.....	600,447	1,947,976	1,612,049
Iron.....	1,561,178,867	482,570,198	29,928,498
Flour.....	73,846	24,816	24,816
Machinery.....	1,004,189	9,190,111	6,853,857
All other.....	1,080,221	6,648,063	7,018,876

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED DECEMBER 31, 1921 AND 1920

EARNINGS OF LAKE AND RIVER STEAMERS AND OF KETTLE VALLEY RAILWAY NOT INCLUDED IN THIS STATEMENT

	Year ended December 31st, 1921	Year ended December 31st, 1920	Increase or Decrease	
			Amount or number	Per Cent
TRAIN MILEAGE				
Passenger trains.....	18,931,622	20,538,038	1,606,416	7.82
Freight trains.....	18,828,241	24,335,581	5,507,340	22.63
Mixed trains.....	1,647,391	1,846,046	198,755	10.77
Total trains.....	39,407,254	46,719,665	7,312,411	18.65
CAR MILEAGE				
Passenger.....				
Coches and P. D. 1st and 2nd class.....	94,803,210	105,591,004	10,787,794	10.2
Baggage, Mail and Express cars.....	2,551,439	2,416,844	134,595	5.57
Total Passenger cars.....	142,390,309	156,251,401	13,861,092	9.87
Freight.....				
Loaded.....	439,278,916	591,351,177	151,872,261	35.69
Empty.....	198,371,578	309,337,450	110,665,872	5.10
Malicious.....	207,799,855	37,948,171	6,965,316	2.32
Total Freight cars.....	638,610,349	828,133,793	189,503,444	30.47

	Year ended December 31st, 1921	Year ended December 31st, 1920	Increase or Decrease	
			Amount or number	Per Cent
Passenger cars per Traffic Train Mile	6.92	6.98	-.06	-.86
Freight cars per Traffic Train Mile	32.17	31.63	.54	1.71

PASSENGER TRAFFIC.

Passengers carried (earning revenue) ..	15,186,081	16,769,555	-1,583,474	-9.44
Passengers carried (earning revenue) one mile	1,361,767,543	1,718,084,609	-356,317,066	-20.74
Average journey per passenger	104.817	132.223	-27.406	-20.73
Average amount received per passenger \$	2.59	2.89	-.30	-10.38
Average number of passengers per train mile	2.89	2.82	.07	-2.48
Average number of passengers per car mile	66.17	76.75	-10.58	-13.79
Revenue from passengers per passenger car mile	13.99	15.91	-1.92	-12.07
Total passenger train earnings per train mile	40.46	44.88	-4.42	-9.85
Total passenger train earnings per mile of road	2.69	2.81	-.12	-4.27
	4,265.71	4,844.78	-579.07	-11.95

FREIGHT TRAFFIC.

Tons of revenue freight carried one mile	10,636,951,521	13,856,607,551	-3,219,656,030	-23.24
Tons of non-revenue freight carried one mile	1,487,724,058	1,830,407,240	-342,683,182	-18.72
Total tons (all classes) freight carried one mile	12,124,675,579	15,687,014,791	-3,562,339,212	-22.71
Average amount received per ton per mile of revenue freight	818,743	1,066,401	-247,658	-23.22
Total tons (all classes) freight carried one mile per mile of road	114,513	140,868	-26,355	-18.71
Average amount received per ton per mile of revenue freight	933,256	1,207,269	-274,013	-22.70
Average No. of tons of revenue freight per train mile	519.49	529.25	-9.76	-1.84
Average No. of tons of non-revenue freight per train mile	72.66	69.91	-2.75	-3.93
Average No. of tons of (all classes) freight per train mile	592.15	599.16	-7.01	-1.17
Average No. of tons of revenue freight per loaded car mile	24.21	23.44	.77	3.28
Average No. of tons of non-revenue freight per loaded car mile	3.39	3.10	.29	9.35
Average No. of tons of (all classes) freight per loaded car mile	27.60	26.54	1.06	3.99
Freight train earnings per loaded car mile cts.	28.95	24.34	4.61	18.94
Freight train earnings per train mile	6.21	5.50	.71	12.91
Freight train earnings per mile of road ..	9,789.44	11,072.83	-1,283.39	-11.59

[ADVERTISEMENT]

Railway Officers

Financial, Legal and Accounting

H. E. Jarvis, an employee of the Chicago, Burlington & Quincy, since 1882, and assistant secretary of the corporation for the last 13 years, resigned March 9, on account of ill-health.

James A. Minor, assistant general land and tax agent of the Erie, has been appointed general land and tax agent with headquarters at New York, succeeding H. M. Andrews, deceased. **Kenneth Mayo** succeeds Mr. Minor as assistant general land and tax agent.

Operating

W. J. Etter, assistant to the operating vice-president of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been appointed acting general manager of the Eastern lines, with headquarters at Topeka, Kan., effective April 1, to relieve F. C. Fox, on leave of absence.

D. F. Stevens, superintendent of the Baltimore & Ohio, with headquarters at New Castle Junction, Pa., has been appointed superintendent of the new Akron division with headquarters at Akron, Ohio, effective April 15. The Akron division is a consolidation of the Cleveland and New Castle divisions and will embrace 694 miles of line.

C. D. Baker, assistant general superintendent of the Long Island, with headquarters at Jamaica, Queensboro, New York City, has been appointed general superintendent, effective April 1, succeeding J. R. Savage, deceased. The positions occupied by **W. E. Canning**, superintendent in charge of freight transportation, and of **Ralph Peters, Jr.**, superintendent of passenger transportation, have been abolished. Mr. Canning has been appointed superintendent to perform the duties formerly assigned to the assistant general superintendent and Mr. Peters has been appointed assistant superintendent and his duties have been increased to include supervision over freight as well as passenger operations.

Mechanical

G. T. Depue, whose appointment as mechanical superintendent of the Ohio and Chicago regions of the Erie was announced in the *Railway Age* of March 25, page 806, was born December 2, 1872, at Hornell, N. Y., and was educated in the grammar schools of that city. On March 1, 1889, he entered the employ of the Erie as a machinist's apprentice. He afterwards worked as a machinist and extra gang foreman until March, 1901, when he was promoted to general foreman at Bradford, Pa. In August of the same year he became general foreman of the Hornell shops and in July, 1903, master mechanic at Hornell. In 1908 he was transferred in a similar capacity to Galion, Ohio.



G. T. Depue

In August, 1913, he became shop superintendent at Galion and in 1916 was transferred in similar capacity to Susquehanna, Pa. At the termination of federal control he was appointed mechanical superintendent of the Chicago region and was appointed master mechanic at Marion when the consolidation

of the mechanical departments of the Ohio and Chicago regions which took place in 1921.

J. R. Sexton will resume his former position as mechanical superintendent of the Northern District of the Atchafalaya, Topeka & Santa Fe, with headquarters at La Junta, Colo., succeeding **E. E. Machovec**, acting mechanical superintendent, who has been assigned to other duties.

Traffic

C. R. Hartshorn has been appointed commercial agent of the Delaware, Lackawanna & Western, at Toledo, Ohio.

G. D. Brophy, district passenger agent of the Canadian Pacific, with headquarters at Banff, Alta., has been transferred to Regina, Sask., to succeed **J. A. McDonald**, transferred.

Eugene M. Peck, city passenger agent of the Chicago Great Western, at Kansas City, Mo., has been promoted to district passenger agent with the same headquarters, succeeding **Frank E. Hurless**, deceased.

Robert McDowell, traveling freight agent of the Southern Pacific, at Cincinnati, Ohio, has been promoted to general agent, with headquarters at the newly reopened Cleveland, Ohio, traffic office, effective April 1.

Engineering, Maintenance of Way and Signaling

G. W. Rear, general bridge inspector of the Southern Pacific, has been given the newly created title of engineer of bridges.

Obituary

Wendell H. Stillwell, supervisor of Safety and Fire Prevention of the Chicago, Rock Island & Pacific and formerly general superintendent of the Lines East, died suddenly at Rock Island, Ill., on March 28, at the age of 63.

F. J. Angier, superintendent of timber preservation of the Baltimore & Ohio, with headquarters at Baltimore, Md., died on the morning of March 24, at Mercer Hospital, Baltimore, from the effects of an operation for appendicitis. Mr. Angier was born December 22, 1866, at Beardstown, Ill., and entered railway service at the age of 16 as a roundhouse helper on the Chicago, Burlington & Quincy, at Aurora, Ill. On January, 1883, he was made a clerk in the mechanical and supply department at Beardstown, and he was appointed a clerk in the mechanical department at Ottumwa, Iowa, in December, 1893. In July, 1897, he entered the laboratory at Aurora, Ill., as a clerk and later as a chemist where he remained until September, 1898, when he was promoted to superintendent of the tie plant at Edgemont, S. D. He held this position at Edgemont and later at Sheridan, Wyo., when the plant was moved to the latter point, until 1908, when he was promoted to superintendent of timber preservation with headquarters at Galesburg, Ill. He left the service of the Chicago, Burlington & Quincy on May 1, 1910, to enter the employ of the Kettle River Company at St. Louis, where he remained until 1911, when he became superintendent of tie preservation on the Baltimore & Ohio, the duties of which position together with additional duties of inspecting all ties purchased by that road, Mr. Angier assumed until his death. Mr. Angier was secretary of the American Wood Preservers' Association for 13 years, during which he was one of the most prominent factors in building



F. J. Angier

up this organization. He was elected president of this organization at its convention in Chicago last January.

William T. McCulloch, auditor of revenue of the New York Central, died suddenly in Cleveland, Ohio, on March 23. Mr. McCulloch was born in Kittanning, Pennsylvania, in 1859. He began his railroad career with the Pittsburgh, Titusville & Buffalo (now a part of the Pennsylvania) as clerk at Oil City, Pennsylvania; later, in 1882, becoming traveling auditor of the Western New York & Pennsylvania (also a part of the Pennsylvania) and, in 1887, traveling auditor for the New York Central. From 1890 to May, 1891, he was assistant superintendent of the Western division. In May, 1891, he returned to the accounting department as assistant auditor of freight accounts and in March, 1899, became auditor of freight accounts. In 1910 he was appointed auditor of revenue, which position he held at the time of his death. As a member of the Railway Accounting Officers' Association, he was active in committee work. Mr. McCulloch resided in Haworth, New Jersey.



W. T. McCulloch

L. M. Sullivan, purchasing agent of the Texas & Pacific, with headquarters at Dallas, Texas, who died recently, was born at Denison, Texas, on August 29, 1891, and attended school at the Christian Brothers College, St. Louis, Mo., until 1907, when he entered railway service on the Ohio river and Columbus at Ripley, O., as ticket agent. The same year he became bookkeeper for the American Coal Company at Ripley but re-entered railway service shortly thereafter as an index and bill clerk on the Chicago, Rock Island & Pacific at Argenta, Ark. From December, 1908, to May, 1910, he was a stenographer in the chief dispatcher's office at El Reno, Okla., and later held various positions in the superintendent's office until the latter part of 1910, when he entered the service of the Cincinnati, Hamilton & Dayton, as a correspondence clerk in the engineering department. He was later promoted to secretary to the general superintendent and was subsequently made secretary to the assistant to the president at Cincinnati, O., where he remained until April, 1911, when he became a trainmaster's clerk on the Missouri, Oklahoma & Gulf at Calvin, Okla. Later in the same year he entered the employ of the Missouri Pacific as a stenographer in the office of the superintendent of transportation, from which he was later transferred to the office of the first vice-president. From November, 1911, to March, 1915, he was secretary to the vice-president, resigning in 1915 to become secretary to the first vice-president of the Texas & Pacific. From 1915 to October, 1916, he was chief clerk to the first vice-president and on the latter date was transferred to chief clerk to the receiver and the president. He held this position until his promotion to purchasing agent in 1920.



L. M. Sullivan

EDITORIAL

Railway Age

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The Pennsylvania Railroad Company's total net expenditures for additions and betterments during 1921 totaled \$1,066,049. As is pointed out in the analysis of the company's 1921 operations, which appears on another page of this issue, the railroad should make each year expenditures for capital account of about \$50,000,000—the Pennsylvania System, as a whole, \$75,000,000. That is to say, the property investment should be expanded to that extent to keep up with the growth of the road's territory and traffic. The fact that the expenditures were \$1,000,000 instead of \$50,000,000 reflects the trying conditions in 1921 that we all hope have now been left behind us. The Pennsylvania, as fortune would have it, has this week supplied no less than 250 good and satisfactory reasons for feeling optimistic about the present situation. The 250 reasons are represented in the form of orders for 250 steel passenger train cars. This order, placed by a single system, is more than the number of passenger cars ordered by all roads during the year 1921. It is the largest order for passenger train equipment placed by a single system in several years.

250 Passenger Cars

The ship subsidy bill now before Congress provides that railroads may own and operate ships in other than coast-wise or Great Lakes trade or through the Panama Canal. Although even these prohibitions may well be thought ill-advised, still the authority to engage in overseas trade might prove of great importance. The Canadian Pacific has shown what a railway can do in this direction. If the ship subsidy bill is approved as introduced, ocean shipping may prove a lucrative business. If it should, there seems to be no good reason why some of our larger railroads should not enter the field as carriers of both passengers and freight. Such a move would certainly tend to bring about closer co-ordination of ship and rail lines to the benefit of the owners, as well as of shippers and passengers. This provision should make the ship subsidy bill a matter of great interest to railroad men and, if the bill becomes a law, inquiries should be made by the larger roads as to the advisability of their engaging in ocean shipping.

The Ship Subsidy and the Railroads

The railroad officer who aims to recommend his road to the public and increase its popularity has varied avenues in which to work. His task is not merely to show that passengers are carried safely and quickly, by courteous and efficient trainmen and station men; that freight is moved cheaply and promptly and losses are quickly repaired; that money received from the public will not be misspent. These are outstanding features. But the manifestations of a friendly and human spirit is likewise important. An example of this last, in which all railroad officers will be interested, is given on another page, a miniature reprint of an advertisement published in the newspapers of Georgia and Alabama by W. A. Winburn, president of the Central of Georgia Railway. To

Disarming Critics by Frankness

reduce the great and increasing number of grade crossing horrors is a troublesome problem, in which the general public ought to be interested as definitely as any railroad company; and Mr. Winburn's brief essay is notable as a skilful marshalling of facts in such a way as to show Mr. Average Citizen that the railroad is actuated only by the most helpful public spirit. The fireman who regretted killing people because it mused up his engine is a fiction; and so also is the railroad president who is coldly indifferent to the woes of people who are struck by trains. Mr. Winburn's advertisement tells little that is new, but it deserves special credit for its candor and comprehensiveness. He has succeeded in putting a new face on a hackneyed subject. The "crusade" which he proposes should be begun with legislators.

While most of the railroads have considerable stocks of coal on hand and non-union mines will take care of part of the demand, it is probable that the coal strike will cause the roads much inconvenience unless it is speedily settled. The operation of the check-off system has placed the miners' unions in a strong financial position and it is unlikely that they will give in soon. It is interesting in this connection to note to what extent the railroads have contributed to the war chest of the unions. According to Coal Age, the average check-off rate in Illinois mines during the last ten weeks of 1921 was 7.9 cents a ton. Illinois produced approximately 68,000,000 tons of bituminous coal and at that rate the miners' union received an income of \$5,372,000 in one year from Illinois alone. This is a high check-off rate; the average was probably about 6 cents a ton. The railroads' consumption of coal from union mines is estimated at about 80,000,000 tons. At this rate the union assessment increased the railroad fuel bill about \$4,800,000 a year. This is an item of expense which the economists for the labor unions have never given much publicity but it is an economic waste nevertheless and should be eliminated in the future.

Helping Finance
the
Coal Strike

In laying out a new railway line it has ordinarily been customary to seek a route that could be followed with a minimum of expenditure for construction. As time went on and traffic increased it frequently was found to be good management to relocate the line and thus secure a shorter and more direct route or reduce the grades despite the fact that the change involved large expenditures for tunnels, bridges or other construction work. Even the small boy quickly learns the advantage of cutting across lots and taking the most direct route. In laying out railroad shops, machine tools have frequently been placed where they could be conveniently driven by an old arrangement of line shafting or so that machines of the same general type would be grouped together. But little thought was given to the expense of moving the work back and forth through the machine shop as it passed from one operation to another. Common labor was abundant and as it was paid a low hourly rate it was

Take the Short Cut

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thought to be cheap. If there ever was a period when work could be economically moved back and forth, that age passed long ago and will no more return than will cheap labor. Even if crane and other labor saving devices are provided every unnecessary move adds to the expense of doing a job, to say nothing of the delay involved. In many a shop large economies in operation could be effected by relocating certain machine tools to permit of work being passed through the shop by a direct route and so as not to interfere with other work. By the use of group or individual motor drive far more satisfactory layouts are now obtainable. If those directly responsible for shop operation would take this opportunity of slackness to study the movements of the important jobs and calculate the savings that could be obtained by better machine locations, they would be able to present an argument that would command attention. Other things than roadbed should be relocated to meet present conditions.

In this day no one questions the validity of engineering as an important item of expense in any construction project.

Investigate the Foundations More Carefully

Yet there is still some difference of opinion as to the amount of money that may be spent legitimately for this purpose; one item of importance to be considered under this head is that of foundation investigations. Although a thorough knowledge of the foundation may effect a saving in the preparation of plans alone equal to the expense of the foundation investigation, the designer is often required to content himself with very meagre information on the assumption that the actual conditions will be learned as soon as the excavation is opened and that this will permit of necessary modifications in the design in ample time to carry out the work effectively. The difficulty with this plan is that the entire design selected may be found unsuitable for foundation conditions differing widely from those assumed, thereby resulting in practices which cannot be considered good engineering. Ordinarily, these comments do not apply to the procedure in the case of important structures, but in too many instances this is a just criticism of practices applying to the culverts and smaller bridges built in large numbers by the railroads, a perfunctory probing of the ground with an iron rod and the testimony of a local resident or an old employee being made to suffice as foundation data. How wide from the mark a superficial examination may be was indicated in recent work on a series of bridge piers. The examination indicated that a rock foundation would be available for these piers at a depth of 10 ft. below the ground level, yet it was necessary to carry one of these piers down 50 ft. before a secure foundation was obtained. One important item in the determination of foundation conditions is the record of past experience at the same site. In this respect the knowledge of the man in charge of the previous work is of great importance, but it is folly to depend upon memory for such information. The only safe way is to insist on a thorough record of foundation data so that they will be available in the future no matter what changes of personnel occur.

The report of the Interstate Commerce Commission regarding the contract for locomotive repairs is an important document. It deserves careful attention because the investigation itself represents a new field of activity for the commission and also because the intervention of the unions was largely responsible for the inquiry. At present the latter is the more important aspect of the matter. The charges of waste and graft made by the unions at the time the inquiry was started received

wide publicity in daily newspapers and the public now is interested in learning whether the charges made by the labor organizations have been substantiated. Anyone who reads the report will see that the unions' charges were disproved and while the commission finds the New York Central and Pennsylvania were not justified in making the repair contracts, it criticizes the roads only for what it feels was an error of judgment. Even on this question the commission was quite evenly divided. Six to five is a small majority and the forcefulness of the dissenting opinions shows there are excellent reasons for defending the course which the railroads pursued. But the railroads have lost the case nevertheless. They have lost because the daily press in most cases accepted the majority opinion as the decision of the entire commission and gave little attention to the dissenting opinions. Three Hundred Millions Wasted by the Railroads makes a startling headline and probably few readers were sufficiently interested to continue to the end of the article where in most cases a single sentence stated that five commissioners dissented. This is a striking example of how easily public sentiment unfavorable to the railroads can be formed. One cannot help wondering whether the commission considered this outcome of its decision and if it had whether it would have been so quick to censure the roads. The harm has now been done. The unions will no doubt make the commission's decision the basis for charges of mismanagement which will be revived at every rate and wage bearing. It is unfortunate that such an interpretation can be put on the report for it requires years of constructive work on the part of the railroads to efface the effect of misrepresentation of one such decision.

Ford's Railroad Reports in Red

HENRY FORD'S NEWSPAPER reputation as a railroad wizard was not sufficient to keep his Detroit, Toledo & Ironton railroad from relapsing in December into its old habit of earning a deficit. According to its report of earnings and expenses for that month, which has just been filed with the Interstate Commerce Commission, two months late, the Detroit, Toledo & Ironton during December failed to earn its expenses and taxes by \$331,240, thereby wiping out all the net operating income that it had accumulated since July 1. This compares with a deficit of \$226,246 in December, 1920, under the old management. For the year 1921, however, the net operating income was \$43,322, which is much better than the showing for the previous years but still far short of enough to pay bond interest, to say nothing of dividends.

For several months the Interstate Commerce Commission has been issuing its statistical summaries with a footnote showing that the returns of the D., T. & I. had not been filed and the report for December was not received until after the other roads had reported for January and most of them for February also, and after the report of the D., T. & I. itself for January had been filed. No explanation was given as to whether the delay was caused by a too drastic reduction in the accounting force of the road, because it had failed to keep up a supply of red ink, or because of modest reluctance to make the results public.

It is not probable that a deficit of \$331,000 is sufficient to cause Mr. Ford to lose much sleep, nor is a deficit a new experience for the D., T. & I., but this is its first experience of the kind since the Ford management took charge last March. Following the one big jump in earnings in April, the net operating income in each succeeding month of the year showed a decline as compared with the month before, although in January, 1922, the road again had a net of \$23,000. The December report, therefore, is of some interest in view of the fuss that was made when the road showed an increase of some \$200,000 in net in one month under Ford's new management last April and how Mr. Ford ex-

plained in interviews that "anybody could do it"; he had merely applied "common-sense principles" to railroading for the first time.

A railroad cannot be shut down when business is light as an automobile plant can and when business falls off many of the expenses are inclined to continue. For December the deficit is explained by a rather heavy decrease in revenues unaccompanied by a proportionate reduction in expenses. The operating revenues were \$337,380, a decrease of \$171,286 as compared with December, 1920, and less than half what they were in some earlier months, while the operating expenses were \$553,977, a decrease of \$129,759. There was also an increase in taxes and a large increase in rental of equipment, from \$54,953 to \$95,123, for the D., T. & I. traffic is handled largely in cars of other railroads for which it pays a per diem rate.

For the year as a whole the showing is more favorable, although the net result is less than had been shown in several single months. The net of \$43,322 represents an increase of \$1,572,628 as compared with 1920, when there was a deficit of \$1,529,306; for the ten years before there was a deficit each year except in 1916. Most roads earned some net in 1921 as compared with deficits in 1920, under the influence of higher rates and somewhat reduced expenses, in spite of decreased traffic, but the D., T. & I. showing for the year reflects the benefit of the increased earnings resulting from the diversion to it of Ford Motor Company tonnage.

The operating revenues were \$6,453,669, an increase of \$1,233,064 over 1920, while the operating expenses were \$5,406,761, a decrease of \$910,428. Taxes increased by \$48,748 to \$157,023 and the debit balance of equipment rentals increased from \$291,845 to \$795,063, or \$503,218. The report shows that the saving in expenses was effected largely in the maintenance accounts. For maintenance of way and structures \$1,431,675 was expended in 1921, or \$460,227 less than for 1920, while maintenance of equipment cost \$1,112,137, a reduction of \$276,995. Transportation expenses were \$2,545,042, a decrease of \$154,838; traffic expenses, \$85,357, an increase of \$953; general expenses, \$233,744, a decrease of \$21,219. The ratio of operating expenses to revenues was 83.8 as compared with 121 in 1920, a creditable showing, but the percentage of revenues expended for maintenance dropped from 62.8 in 1920 to 39.4 in 1921 and the percentage of maintenance to total dropped from 51.9 to 47.

For the month of December there was an especially heavy reduction in maintenance expenditures, amounting to more than the reduction in total expenses. Maintenance of way and structures expenses for the month were \$124,514, a decrease of \$60,840, while maintenance of equipment expenses were \$130,090, a reduction of \$114,586, with the transportation expenses, \$272,888, were \$48,705 greater than in December, 1920, when the earnings were greater. The ratio of expenses to revenues for December was 164.2 as against 134.4 for December, 1920.

For January, 1922, the D. T. & I. made a better showing than it has made since September, with a net operating income of \$23,000 as compared with a deficit in January, 1921. As illustrating the ups and downs of Mr. Ford's railroad venture, it may be recalled that the road had a deficit in January and February, 1921, in March a net operating income of \$77,985, and in April a net operating income of \$276,452. This represented the effect of the new traffic which came to the road after the Ford management took charge in March. For May, however, there was a slight drop in net to \$263,293, in June to \$261,259; in July to \$187,395; in August, to \$70,643; in September, to \$46,749; in October, to \$15,191; in November, to \$5,335, and in December five months' net was wiped out by the deficit.

Reports of the operating performance of the Ford road, which have also left the Interstate Commerce Commission statistics of Class I roads incomplete for several months,

are being awaited with interest in order that we may see how far Mr. Ford has fulfilled his promise to show up the bigger roads by speeding up the movement of cars.

Why Eliminate Permissive Feature From Automatic Stop?

IT IS NO DOUBT the purpose of the Interstate Commerce Commission in issuing its proposed order for the installation of automatic train control devices to promote more rapid experimentation with and development of equipment of this character with a view of determining which types will be most practical under varying conditions on different railroads. To this end certain specifications were made a part of the order. These specifications were based in large part on the requisites adopted by the Joint Committee on Automatic Train Control of the American Railway Association and the Bureau of Safety of the commission slightly over a year ago.

One of the most important departures from these requisites is the elimination of Paragraph *b* which would allow an automatic stop to be installed so that it is "under control of engineman," who may, if alert, forestall automatic brake applications and proceed. The reason for the elimination of this paragraph by the commission has been the cause of much conjecture among railroad men, and at the hearing at Washington two weeks ago they indicated their desire that it be reinstated. The importance of this suggestion arises from the fact that a wide difference of opinion prevails at present regarding the merits of the different types of train control, and the nature of the requirements desired, which difference increases the necessity for the widest possible variety of tests in order that the data which may be obtained therefrom and from which the commission will make such revisions in its requisites and specifications as appear necessary, shall be as comprehensive as possible. Therefore it is to be hoped that nothing will be done to hinder the widest possible development and experimentation.

While it was probably not the intention of the commission to prevent the use of a simple automatic stop the specification seems to be so drawn as to allow only for the installation of devices with speed control features. Such a condition, if allowed to remain, is unfair to the railroads, the train control companies and to the commission itself. The commission, for a number of years, has recommended in its accident reports that automatic train control be installed. These recommendations could only have been based on the performance records of automatic stop devices. Surely the specifications should be made broad enough to include those devices which have a number of years of practical operation behind them.

The one great trouble in the past has been that all requisites and specifications for train control were drawn largely upon an ideally theoretical basis. It must be realized that no device approaching the ideal can be obtained until it has gone through an extensive development period. For these reasons and those presented at the hearing by A. M. Burt, of the railroads' committee, it appears all the more desirable that Paragraph *b* should be reinserted in the specifications. Certainly it cannot be the commission's intention to rule out devices which have already demonstrated their usefulness, nor can it afford to, if it expects to make its order on train control effective. By making the specifications broad enough to give the railroads reasonable latitude in selecting their devices the art will be developed much more rapidly. Some roads may desire to install simple automatic stops while others may wish to use speed control and other adjuncts. In this way comparative data may be collected which will be of value to all roads.

A Refreshing Breeze From the West

IN THESE DAYS when the railways are being taxed so heavily for the construction of highways over which competing motor trucks may be operated while paying only nominal license fees, a decision which has just been rendered by the Public Utilities Commission of Colorado comes as a refreshing breeze from the west. The commission in this decision denied the application of a motor stage operator for a certificate of "public convenience and necessity" for a service over a highway paralleling the railway in Eagle and Garfield counties during the summer months. The commission held in this instance that "the railway service was adequate; that it would be unfair to permit the applicant to 'skim the cream' of the business in the summer months, leaving the railroad to meet public requirements in the winter months when operating conditions are difficult and traffic light; and that in view of the larger sums paid by the railroad in taxes, and especially in taxes for highways, it would be unjust to allow the applicant to compete over these highways paid for in large part by the railroad's money."

The commission further pointed out that the seven trucks registered in Eagle county paid \$54.24 and that the 61 in Garfield county paid \$765.02 into the state treasury in license fees or a total of \$819.27 for the use of the state and county highways, while the Denver & Rio Grande Western paid \$38,023.94, or more than 46 times as much for highways which it did not use at all. The commission further stated that "public convenience and necessity, by which must be understood the convenience and necessity of the people at large, as contra-distinguished from the convenience and necessity of a very small number of persons who seek to derive a profit from the farmers' and home owners' investment in roads, never contemplated that the truck driver should destroy that, to the cost of construction of which he contributed little or nothing, or that he should reap where he has not sown. When the taxing laws of this state are so amended that the truck driver operating over state highways shall contribute his due proportion of the cost of construction and maintenance of our highways, then, and not until then, can this commission regard his use, under proper conditions and restrictions, of a great and tremendously expensive public facility as of equal dignity and equal benefit to the people with the moderate use thereof by the ordinary taxpayer."

The commission is to be commended for the attitude which it has assumed in this case. It is to be hoped that other commissions, seeing the logic of its argument, will follow it in the regulation of this later form of "jitney" competition.

An Opportunity for the A. R. A.

THE GROWING REALIZATION by the public of its vital interest in adequate and inexpensive railroad transportation is tending toward the frequent development of proposals for the improvement of railroad service from groups or individuals not directly connected with railroad operation or management. Some of the suggestions that are thus likely to be placed before the public will not be constructive. Others may be fundamentally sound but impracticable of more than a very limited application. It is even possible that suggestions may appear which are worthy of unqualified approval. But whatever the nature of these proposals, in the existing state of public opinion, they will be received with more than an open mind. In this very fact lies an element of danger to the well being of the railroads, or an opportunity which may be turned to good account for the development of a sound public opinion based on real knowledge.

The possibility for improving the effectiveness and

economy with which the railroads function fall in two groups, i. e., those which can be effected by the individual roads and those which require the united action of groups of railroads or of the railroads as a whole. The outside proposals most likely to receive wide public attention belong to the second class and hence cannot be dealt with or answered effectively by individual roads. At the present time there are two such suggestions before the public mind. One is the question of car pooling recently revived by the proposal of the National Association of Owners of Railroad Securities and the other is the question of the unification of terminals which is receiving considerable attention nationally as well as in various localities.

The fact that such questions cannot be dealt with constructively or effectively by the railroads individually suggests the possibility for the organization of a commission or a group of committees, either by the Association of Railway Executives or the American Railway Association, to consider the practicability and the limitations of such suggestions and proposals and then, on the basis of the findings, make recommendations that can be used to clarify public opinion and relieve the railroads of the charge of neglect which silence with regard to these questions inevitably suggests. Such a body, properly organized, could go even further and anticipate outside suggestions by the constant considerations of the possibilities for improvements through concerted action and the development of practical means for carrying them into effect. Such an agency should not be representative in character in the sense that members of the American Railway Association are representative, but the members should be chosen rather for their thorough knowledge of railway operating conditions and their ability to consider the possibility for organized activities with strict impartiality.

New Books

Use of Southern Yellow Pine in Car Construction. By H. S. Sackett. 55 pages, 6 in. by 9 in., illustrated. Published by Southern Pine Association, New Orleans, La.

This booklet will be of interest to and should be in the hands of all those who have to do with the design, operation or maintenance of wooden or composite railway cars. It is well illustrated and is filled with much valuable information and many good suggestions. A considerable portion of the subject matter is applicable not only to yellow pine lumber but also to other woods.

The book is divided into four parts. Part I outlines railroad car development from the early beginning of a century ago. Particular attention is given to the use of wood in freight car construction and the advantages of the composite design. Box, gondola, stock and refrigerator cars are discussed separately. Part II treats of the methods for storing and handling, or the care and protection which should be given to prevent decay and guard against fires. Part III deals with preservative treatments, offers practical suggestions, and suggests an extension of the practice. Part IV is devoted to the properties of Southern yellow pine and contains a number of tables relative to mechanical properties, hardness, strength, weight, recommended working stresses, etc., which add to the value of the book for reference purposes.

INSURANCE ON PARCELS, left at stations, is now offered by the Pennsylvania Railroad to the extent of \$300. The rate on valises or packages left at the station parcel rooms to be called for, is ten cents for each \$100 over the railroad's present liability of \$25. Articles exceeding \$300 in value will not be accepted. Persons desiring to insure will be required to sign a paper showing the value, and excess value stamps will be affixed by the agent.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

A Locomotive Engineer Tells How to Improve Operation

CHICAGO.

TO THE EDITOR:

We railroad employees, and our employers, should feel encouraged in one thing at least. That is, there seems to be an appreciable reduction in the "small-boy-stuff" of calling each other names; this is being superseded by across-the-table conferences upon at least a semblance of mutual respect.

But there are still some officials who are persistently squawking against punitive overtime; the odd part of it, to me, is that those who are crying the loudest are really benefited by the present overtime rules. Right here on my job, if overtime at time-and-a-half were to be replaced by our former arbitraries, whereby we got terminal overtime, switching allowances, etc., I would draw a larger check each pay-day than I do now—for the same work. But I'd rather things stay as they are, for with penalty overtime hanging over them, the trainmasters, dispatchers and yardmasters are up on their toes more than they would be without it and get us over the road in less time than if nobody cared how long it took us to get in. Surely, any high operating officer who cannot see his advantage in this is penny-wise and pound-foolish. If he would only give as much attention to real operating as he does to wage-cutting, he could see where he has the best of the deal when the penalty overtime rules are in effect.

And there are so many ways he can "warm things up." First, the terminals and intermediate yards. I do not know how it is on all roads, but on ours we have many yardmasters who were made from yard-clerks. They never switched a car in their lives and wouldn't know how to start. They will send a yard engine off on a 30-minute job and be perfectly satisfied when the engine returns after two hours, not knowing how long it really should take to do the job. Or, on the other hand, a yard conductor who really has a two-hour job is severely "bawled out" because he does not finish it in 30 minutes. A yardmaster should *know* how long it takes to do a given job. But with a perversity beyond all understanding, railroads make a yardmaster's pay such that a yard conductor with the training and ability to handle a yard, turns up his nose when it is offered to him. Also, there seems to be a growing tendency to pile more "pencil-work" onto the yardmasters.

Which brings me to trainmasters. A few years ago, the trainmasters were out on the road most of the time, riding trains and overseeing things generally. But now they appear to have so much office work that we rarely see one out on the road. A trainmaster is the man who actually runs the railroad, but making a clerk out of him is keeping him away from his work and the very fact that he does not get out as he used to is reflected in train movements, which are not what they were a few years ago.

Dispatching is not up to former par either. A few years ago I worked on a western road during a "rush." They were moving about 75 trains daily in each direction over 95 miles of single track and we were never over nine hours covering the division, meeting one to five trains at each siding. Where I am now we have all double track and a few

stretches of three and four tracks. Can you imagine how those dispatchers would have gloried in having so many tracks? And yet, we frequently get into a "jam" now, when nobody seems to know what to do. Sometimes I think the road would make money if it tore up all but one main track and hired some real dispatchers.

In spite of all our battles, most of we American railroad men are loyal and want to see the operation at the highest possible standard. We wouldn't quit the game if we could. It's a he-man's job and we love it, with all of its dirt, long hours, poor grub, hard beds and grief, but we would like to see some of our operating officials get on the job—have less talking and more doing. Get some real yardmasters, who can run a yard. Cut out the office work and give the trainmasters a chance to run the railroad as it should be run. The superintendent's office could handle much of the correspondence that the trainmaster gets. And, last but not least, when friend wife's nephew comes out of college, don't make a train dispatcher of him with no actual preliminary experience. Make a brakeman or fireman of him first—unless you are afraid it will drive him away from a railroad for all time. But small loss if it does, for if he has not guts enough to stick and learn, he is no good anyhow.

LOCOMOTIVE ENGINEER.

The Chief Clerk Is Not Buried

WISNESPEE, MD.

TO THE EDITOR:

My attention has been drawn to the letter from "Operating Official" entitled "What Is Ahead of the Chief Clerk" published in your issue of February 25. I would like to take decided issue with the opinion of that gentleman, as to the capability of men trained in an office to successfully assume official positions of the rank of superintendent, or greater. As a matter of fact, he will not have to look far to find dozens of these men occupying positions ranging all the way from superintendent to president on roads all over the United States and Canada. I venture to say that in proportion to their numbers there are at least as many, if not more, such men occupying important official positions in great American railway organizations as of graduates from any other branch of railway service.

Quite true, outside experience or training is a very necessary part of an officer's equipment, but first of all should come the mental capacity necessary to enable him most intelligently to make use of and apply such training. I have seen operating officials whose experience was entirely in outside positions, who lacked that capacity to a much greater extent than the average chief clerk. The chief clerk is in a position where he can receive a more general training than he could in almost any other place, except that of an official position itself, and, admitting an equal mental capacity with an outside trained officer, his adaptability should enable him to pick up the outside knowledge much more quickly than the outside officer can familiarize himself with the workings of an office.

Particularly in an operating office the variety of subjects that a chief clerk is daily called upon to deal with is very great, and no other occupation in the ranks or among the semi-official positions calls for the display of greater adaptability or quicker or more accurate thinking.

Of course there are many fine examples of railway officers in the higher ranks who have come up through station service, train service, dispatching service, and the mechanical and engineering departments, and my letter is in no way intended to imply that chief clerks are in any class by themselves. I am firmly convinced, and I believe that an analysis of official positions will bear me out, that in proportion to their numbers, there are as many men occupying official positions who

were trained through the office as from any other class of railway employees, and that they are filling them just as acceptably.

Our great Canadian systems have several officers of outstanding ability who received their first railway training in offices, and were promoted therefrom directly to operating official positions. E. J. STONE.

The Consolidation of Freight Terminals

CHICAGO.

TO THE EDITOR:

I have read with great care the article by F. J. Lisman entitled "The Consolidation of Freight Terminals" which appeared in the *Railway Age* of February 25, 1922, page 477. This article treats of a subject of such vital importance that Congress has given the Interstate Commerce Commission specific authority to handle it. However, the article contains so much material of which we have heard before and so little suggestion as to remedies that I am venturing to write upon it.

Consolidation and joint operation are two entirely different measures. Joint operation, of which the article treats exclusively under the garb of consolidation, is neither an experiment nor a new method of terminal operation. Joint operation has some advantages, as well as some disadvantages over individual operation, some of which are pointed out in the article. However, an operating system of "consolidated terminals" is the real solution of the problem.

In the beginning, joint terminals were unknown but as traffic and traffic carriers increased congestion developed in the large centers, making some change necessary. Then came gradually the joint use of tracks which was an improvement and later as the business grew and carrier lines increased still further, joint operation of the terminal facilities of two or more trunk lines was resorted to. This plan was an improvement, but finally difficulties again increased until some other method of handling these terminals became imperative, resulting in the organization of corporations composed of the interested railroads for the purpose of distributing the local and through business of those lines. The new experiment worked out very satisfactorily to the public, to the owners and to those roads entering the terminal, not participants in the joint organization. But business still increased and the demands of the carriers (which really were the demands of the public) became more and more exacting until the present unsatisfactory condition developed.

What is the answer? It would seem that after all our past experiences there can be but one, viz.: "independent consolidation." Railway operation is a scientific profession and not a "catch as catch can" proposition requiring no training or experience. The professions and businesses—medicine, law, banking, merchandising, manufacturing, etc.—are divided into departments, the heads of which may have knowledge of the entire operation in a general way, but each department head is a specialist in his own line—so it should be in the operation of a railroad. Often a road officer is lost when called upon to take charge of the operation of a large terminal, and vice versa, notwithstanding the fact that each may rank among the oldest in his own particular specialty. This applies not only to the mere movement of trains and cars but to the location and arrangement of facilities in such a way as to produce facilities capable of rapid, economical and satisfactory handling of freight. To do this requires ability, experience, forward looking men of initiative who are in constant touch with the public and the operating forces.

Can the executives and directors (to whom in the last analysis all capital expenditures must be referred and by

them approved) located in New York, Philadelphia, Richmond, Cleveland, Chicago, St. Louis, Detroit, etc., do these things more ably than the executives and boards of directors of an entirely independent terminal corporation, the officers and directors of which have neither personal nor sentimental interest in any one of the main or trunk lines with which their property connects? Is not their job, first to serve the public and the stockholders in their corporation satisfactorily? In doing this have they not satisfactorily served each individual trunk line railroad connecting with their rails?

What are the functions of a trunk line? Are they not to serve satisfactorily the public and produce the greatest net revenue for its stockholders? What are the ambitions of its executives and subordinates? Are they not to perform this function by the adoption of the most up-to-date methods with the least possible expense that they may have the personal knowledge of duty well performed, that their efforts and accomplishments may appear to their stockholders and the public as of the very highest order? Are these incentives and ambitions not the identical and constant pressure that will force the independent terminal organization on to the same successful far-sighted management?

There is no argument against the fact that the independent terminal company is in a far better position to improve the facilities, decrease the operating cost, and develop the present facilities (tracks, warehouses and grounds) to a point where the returns will be on the credit rather than the debit side of the ledger, for the reason that they are constantly on the ground with no entangling alliances to distract their attention from the concentrated job. Under this plan the consolidated terminal would bear the same revenue relation to the connecting line as any other connecting line and its earnings on line traffic would be adjusted as a division of the rate just the same as the revenue on shipments from coast to coast is adjusted with any of the intermediate lines.

This can all be accomplished. Terminals would be a monetary asset instead of a liability as now. The public will be better served and have a more intimate interest in the operation of terminals than now. The chief argument against this plan will be objection to loss of identity and loss of business from industries located on the individual line's terminal rails. There is no foundation for this argument for the reason that as the bulk of the tonnage originating in Chicago, for example, goes to the trunk line from rails other than its own there is always the "goat" in the form of the intermediate switching line whose service, in the event of terminal delays, immediately forms the "alibi." The activity and personality of the traffic department plus the carriers through service, are the items that make for an increasing and growing business. WILLIS E. GRAY.

THE DENVER & RIO GRANDE WESTERN recently conducted an investigation in Colorado to determine how much higher the wages paid by the railroads operating in that state were over those paid for similar work in other industries. In the process of the investigation, which covered 140 industries in Colorado cities, towns and rural communities in which a total of 7,396 men were employed, it was found that only one out of five industrial employees received a rate of pay equal to or exceeding that paid by the carriers for like services. Of the 1,651 shop employees covered in this survey, 1,375 or 83.3 per cent were receiving lower wages than paid by the railroads, while 276 or 16.7 per cent were being paid the same or higher wages.

VICTORIA, BRITISH COLUMBIA, expecting a large number of tourists this year, is to establish a ferry service to Anacortes, Washington. The ferry will have a capacity of 30 automobiles and will run daily, beginning on May 1. Anacortes is about 35 miles east of Victoria, and is 88 miles north of Seattle by railroad.



Remarkable Improvement Shown by Pennsylvania

Operating Expenses Decreased \$190,000,000 in 1921. Only Small Amount of Additions and Betterments

THE PENNSYLVANIA RAILROAD'S report of the operations of the Pennsylvania System in 1921 offers an unusual study in contrasts. One of these is that shown between results in 1921 and those in 1920. The other is the contrast between what the system did in 1921 and what it should have been able to do had conditions not been so abnormal.

Insofar as concerns the comparison between 1921 and 1920, the outstanding feature is an improvement in operating efficiency of such character as to bring about a decrease in operating expenses of \$190,918,090 and an increase of \$103,336,579 in net railway operating income. In 1920 there was a deficit after rentals of \$62,622,483; in 1921, a net of \$40,714,096. Whereas one year ago the Pennsylvania's morale—that of officers and men alike—was conspicuous for what was lacking in connection with it, today that morale has been restored. Evidences of this change are apparent in many ways, but perhaps in no better way than that when the strike of the train service brotherhoods was threatened last November, the trainmen on the Pennsylvania Lines East and the conductors on both the Lines East and West were among the few who cast majority votes against going out on strike. A year ago shippers were chary about praising Pennsylvania service; their comments were to the effect that Pennsylvania service was discouragingly poor. Today, on the contrary, shippers are inclined rather to praise. Their testimony is, generally speaking, that Pennsylvania service is excellent. The fast freight service which a year ago was especially criticized is now especially well spoken of.

With reference to the contrast between what the Pennsylvania System did in 1921 and what it should have been

able to do had conditions been more nearly normal, one is first confronted by the fact that the traffic carried by the system, measured in net ton-miles, was in 1921, 23 per cent less than in 1920. It was 30 per cent less than the traffic of 1917, the system's peak year. It was actually less than in 1911. Another factor is the reduction in April, 1921, from a 6 per cent to a 4 per cent dividend rate. In spite of the fact that the net railway operating income of the system did represent an increase of \$103,000,000 over the 1920 figure, it gave a rate of return on the property investment of but 1.9 per cent.

Capital Expenditures \$1,000,000

The Pennsylvania Railroad—speaking of it now as a railroad of 7,406 miles rather than as a system of over 11,000—should, in keeping up with the growth of its territory and traffic, expend for capital improvement approximately \$50,000,000 annually. In 1921 the net charges—that is, after the deduction of retirements, transferred items, etc.—for capital account aggregated only slightly more than \$1,000,000.

In discussing the operating results of a system like the Pennsylvania, one must realize that he is dealing with a unit constituting about one-twentieth the total mileage of the country's Class 1 railroads, owning about one-ninth of the country's freight cars and carrying about one-tenth of the traffic which moves by rail. This system serves the larger part of that area lying east of the Mississippi and north of the Ohio and Potomac rivers. Naturally, therefore, its operations reflect the prosperity or depression of the country's industry and commerce. Serving as it does



the important ports of New York, Philadelphia, Baltimore and Norfolk, it feels the effects of a prosperous or stagnant export trade. Further than that, its operations must necessarily serve as a mirror of the country's success in solving the railway problem. What is true of the activities of the Pennsylvania System must, speaking generally, be true of the activities of the country's railroads as a whole.

Corporate Net Income \$24,307,669

For purposes of analysis it is advisable to distinguish between the Pennsylvania Railroad, the parent company, and the Pennsylvania System as a whole. The parent company operates 7,406 miles of line; the system, 11,714. In making a comparison between the operating results of 1921 and those of 1920, it must necessarily be remembered that the 1920 figures include standard return for the first two months and the guaranty for the following six. For this reason in discussing the corporate income we shall deal with the Pennsylvania Railroad and in discussing the actual operations of the property with the Pennsylvania System. The annual report is prepared in such a manner as to make this the natural step to take and it would be difficult to get an adequate picture in any other way.

The corporate income account of the Pennsylvania Railroad Company shows for 1921 a gross income, including the net railway operating income, dividend income of the subsidiary lines, etc., of \$79,258,435, or \$8,639,542 less than in 1920. There was a decrease of \$21,881,900 in net railway operating income; in other words the company in 1921 did not earn as much as the standard return and guaranty gave it in 1920. There was an increase of over \$13,000,000 in non-operating income. The net income for 1921 was \$24,307,669, a reduction of \$8,494,004 from 1920. This net was equivalent to 4.87 per cent on the company's

is not hard to understand. The reduction was made last April, at a time when Pennsylvania conditions looked very bad and very serious. The reduction disturbed a record which had lasted for 22 years, for in not a single year since 1899, prior to which 5 per cent dividends were paid, had the rate been below 6 per cent; in fact, in 1906 and 1907 it was more. This feeling on the part of the Pennsylvania organization is important. Every effort is being directed towards restoring the 6 per cent rate at the earliest possible time. That is the standard towards which every responsible officer on the road is working.

Reduction of \$190,000,000 in Operating Expenses

Referring now to the actual operating results for 1921 and therefore to the results of the Pennsylvania System as

THE 1921 OPERATING RESULTS—PENNSYLVANIA SYSTEM			
	1921	Increase	Decrease
Railway operating revenues:			
Freight	\$420,081,057		\$67,916,416
Passenger	183,484,099		4,099,760
Total	\$662,756,803		\$82,092,183
Railway operating expenses:			
Maintenance of way and structures	\$87,648,038		\$33,423,479
Maintenance of equipment	174,048,714		55,940,394
Traffic	7,488,238	317,947	
Transportation	288,274,205		98,565,764
General	18,178,387		1,401,958
Total	\$580,310,839		\$190,918,090
Net revenue from railway operations	\$82,445,964	\$108,825,907	
Railway tax accruals	29,616,299	2,980,798	
Railway operating income	52,674,467	105,759,448	
Net hire of equipment—dr. balance	11,048,284	3,223,287	
Net railway operating income	\$40,714,096	\$103,336,579	

a whole, the first question that arises is as to the manner in which the reduction of \$190,000,000 in operating expenses and the increase in net after rentals of \$103,000,000 were made. One of the questions that arises is as to whether the reduction in operating expenses was proportionately as great as was made on the railways of the country as a whole. Another is: Were the reductions in operating expenses at the expense of maintenance?

In 1921 the Pennsylvania System carried 34,589,953,448 net ton-miles of revenue freight as compared with 44,863,566,384 in 1920, a reduction, as above noted, of 23 per cent. The passenger miles in 1921 totaled 6,323,414,240, or 14 per cent less than in 1920. The freight revenues totaled \$420,081,057, a reduction of \$67,916,416 or 13.92 per cent; the total revenues were \$662,756,803, 11.02 per cent or \$82,092,183 less than in 1920.

The total operating expenses for the system were \$580,310,839—this being the figure in which there was the \$190,918,090 reduction. The reduction in operating revenues, as noted, was 11.02 per cent—the reduction in operating expenses amounting to 24.75 per cent. A comparison with the figures for all the Class I railroads of the country will show that the Pennsylvania suffered a greater proportionate loss of revenue than the total Class I average but that it also succeeded in reducing its operating expenses in greater proportion than the average. Whereas the total operating revenues of the Class I carriers were 10.6 per cent less in 1921 than in 1920, the Pennsylvania suffered a loss of 11.02 per cent. Whereas the operating expenses of all the Class I carriers were reduced 21.1 per cent in 1921 as compared with 1920, the Pennsylvania's reduction was 24.75 per cent.

Reductions Proportionately Greater

Than Those of All Class I Roads

The Pennsylvania's reduction in maintenance of way expenses was 38.8 per cent; for all Class I railroads it was 25.9 per cent. In maintenance of equipment, the Pennsylvania's figure was 24.32 per cent as compared with 21.3 for all Class I railroads. In transportation expenses, the

SOME COMPARISONS BETWEEN 1911 AND 1921 PENNSYLVANIA SYSTEM

	Years ended December 31		Per cent increase over 1911
	1921	1911	
Miles of first main track operated (including 79 miles of canals and ferries)	11,713	11,419	2.6
Miles of all tracks operated	27,341	25,024	9.3
Gross investment in road and equipment	\$2,102,582,603	\$1,568,863,769	34.0
Other investments (book value)	163,461,228	161,657,846	1.1
Total investment	2,266,043,831	1,730,521,615	30.9
Total capital stock and funded debt (par value)	1,957,791,501	1,695,217,545	15.5
Total capital stock and funded debt owned by companies in the System	537,016,221	465,628,195	15.3
Total capital stock and funded debt held by the public (par value)	1,420,775,280	1,229,589,350	15.5
Ratio of capital stock to total stock and funded debt held by the public	42.2	46.0	D. 10.0
Operating revenues	\$662,756,803	\$333,888,963	98.5
Operating expenses (including taxes, equipment, joint facilities, rents, etc.)	61,830,519	350,868,782	139.3
Net railway operating income	40,926,284	74,020,181	D. 44.7
Per cent of return on property investment	1.9	4.7	D. 59.6
Ton miles	34,589,953,448	35,477,637,865	D. 2.5
Average revenue per ton per mile (cents)	1.208	0.600	94.8
Average train load (tons)	717	568	4.5
Average car load (tons)	38.8	35.6	12.5
Passenger miles (per passenger mile)	6,323,414,240	4,433,884,913	49.0
Average revenue (per passenger mile) (cents)	0.875	1.824	57.6
D—Signifies decrease			

THE PENNSYLVANIA RAILROAD COMPANY

Number of shares	148,000	73,165	93.7
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\$499,173,400 outstanding capital stock. The dividends paid totaled \$19,966,936, or \$9,983,468 less than in 1920, and the net balance carried to profit and loss was \$433,107 or \$178,372 less than in 1920.

The stockholders actually received during the year dividends amounting to 4 1/2 per cent, this being due to the fact that the first quarterly dividend each year is charged against the earnings of the last quarter of the preceding year. The Pennsylvania organization has acute feelings about the reduction from 6 to 4 per cent in the dividend rate. This

Pennsylvania System made a reduction of 24.48 per cent; the Class I railroads, as a whole, of 21.2 per cent.

These greater proportionate reductions may mean several things, but there is no question but that they mean that the Pennsylvania was able to secure a very decided grip on its operating expenses. They indicate that there was some operating efficiency of a high order—of a very different order from that which was in evidence a year ago.

Railroad officers the country over have been much interested in the success of the new Pennsylvania regional system which was put in effect at the end of federal control. This is not the place to enter into a detailed discussion of the regional organization, but one cannot but express the opinion that if the regional system enabled the Pennsylvania to get control of its operating expenses in the manner in which this was done in 1921 the new method of organization must have the necessary elements of success.

Maintenance

The next question is as to whether the savings in operating expenses may not have been the result of too severe savings in maintenance. Insofar as refers to equipment, this appears to be the case since the Pennsylvania System's percentage of bad order cars on January 1, 1922, was 12.2 per cent. The normal bad order car percentage should be from 4 to 7 per cent. However, on the date given, the Pennsylvania's percentage was slightly less than that of the railroads as a whole. In the case of unserviceable locomotives the Pennsylvania's per cent on January 1, namely 22.7 per cent, compared with the country's average of 18.7 per cent.

Insofar as concerns maintenance of way, it is apparent that the Pennsylvania, despite a reduction in expenses of maintenance of way and structures of 28.8 per cent, actually improved its maintenance condition as compared with 1920. This is evident to anyone who has traveled on the Pennsylvania in recent months. It is further shown by the figures. The Pennsylvania System put in track in 1921, 149,765 tons of new rail, or 42,507 tons more than in 1920. It put in 6,027,879 ties, an increase of 732,342. These totals are not up to the averages of former years. It would be too optimistic to say that the Pennsylvania is entirely restored to its old time standard. During federal control the deficiency in applying track material, it is estimated, amounted on the Pennsylvania System to 5,500,000 ties, 160,000 tons of new rail and 530,000 cubic yards of stone ballast. This presumably represents the ground that the system must cover to restore its former high standards.

Of the reduction of \$190,000,000 in operating expenses, \$98,000,000 was in transportation expenses. This was partly due to the reduction in service and to lower costs of fuel, but when all is said and done, in the case of transportation expenses and in maintenance expenses alike, the real reason for much of the savings in operating expenses was due to decreased labor costs and the increased efficiency of the organization and the employees as a whole. The reduction in the number of employees was drastic—the payroll for December, 1920, carried 280,733 names; that for December, 1921, 218,859, a decrease of 22 per cent. In addition, there were the wage reductions of 12 per cent in July and modifications of the rules and working conditions. Similarly there was increased efficiency of the personnel and a reduction in overtime. Savings in the closing down of the shops, restrictions in the use of materials and supplies and certain eliminations of service also counted heavily. The reductions were drastic and their extent, if nothing else, shows how severe was the task confronting the system under the 1921 conditions.

The Question of Labor

In speaking further of the labor problem one prefers to quote from the annual report itself, the subject having been

covered so adequately in President Rea's remarks. On this subject he says:

"It is appropriate to refer to the labor situation, as it is of vital interest to the stockholders, as well as to the general public, that right relations should exist between the employees and the company. Fortunately, the strikes, or threatened disruptions of railroad service to the public, in the last two years have signally failed, because they were strongly condemned by public opinion. The controversy with the shop crafts' union has already been explained to the stockholders, and the question of the jurisdiction of the Labor Board as to details of management is now before the federal court. It is hoped that when this question is settled, the relations with our employees will pass entirely out of the controversial stage, and that the spirit of co-operation, already so much in evidence, will result in the full development of a permanent and mutually satisfactory plan. Experience plainly indicates that, in order to maintain these mutually satisfactory relations, it is necessary for the owners and users of the railroad, as well as the employees, the management and the public authorities, to be kept advised of the true facts as they affect their respective interests, so that each may know that what is being done is fair to all.

"It is due to the employees of the Pennsylvania System to say that they have already evidenced a keen appreciation of this necessity, and it is a pleasure to commend their patience and co-operation during this adjustment period, through which the country is passing.

"Certain wages and working conditions are yet much out of line with those in effect prior to the war, and further adjustments are essential to reduce the cost of transportation, adequately maintain the property, and enable the company to pay a fair return to the stockholders. The employees shared in the high wages of the war period, but the stockholders' dividends were not increased in that period. Since the war their dividends have been reduced, and your directors feel that an obligation rests on the management to restore the 6 per cent dividend rate as soon as it can be done without detriment to the maintenance of the property. Capital is just as much entitled to a fair return as labor is to receive fair wages, and no more salutary step could be taken to restore public confidence, and improve existing conditions, than for your company to be able to resume its 6 per cent dividends, and reduce traffic rates as the result of increasing economical operation—secured largely through adjustments in wages and working conditions."

Not Much Progress Made With Leases

The Pennsylvania Railroad last year worked out a plan whereby the parent company proposed to lease 16 subsidiary companies which were already controlled by ownership of all or nearly all the capital stock. One of the important reasons for the plan was the desire to eliminate, insofar as possible, the accounting expense incident to keeping separate accounts for subsidiary lines already operated as parts of the Pennsylvania System. These economies were not realized because the plans could not be carried out as expected. Five leases were submitted to the Interstate Commerce Commission for approval, but final approval has not yet been granted owing, the annual report says, to certain conditions formulated by the commission in connection therewith, which could not be accepted by the lessee.

The matter is still under consideration and the applications to the I. C. C. for approval of the remaining leases have been withheld. The proposed lease of the Pan Handle has been further delayed by the opposition of two minority stockholders. The Pennsylvania System, it will be borne in mind, originally consisted of over 600 constituent transportation companies. At present it consists of a total of 107 active companies including 16 railroad operating companies, 49 companies whose roads are operated under lease or contract and various bridge, canal companies, etc. The total active and inactive companies, including those jointly owned, is 178.

THE TOTAL EXPENDITURES on government railroads in the province of Alberta, Canada, during 1921 was \$4,334,811. The greater part of this sum was spent in the reconditioning of the lines north of Edmonton, although a heavy expense was also involved in the laying of 93 miles of new track. The amount spent was slightly under that authorized in the 1921 budget, which was \$4,700,000.

Proposed Acquisition of Chicago Junction

WASHINGTON, D. C.

ORAL ARGUMENTS were heard by the full membership of the Interstate Commerce Commission on April 5 in the long-drawn-out proceedings on the application of the New York Central for approval for the acquisition of the Chicago Junction and the Chicago River & Indiana, which was recently recommended in a revised tentative report of an examiner containing a large number of conditions regarding the future operation of the property. R. J. Cary, representing the New York Central, said that the company had objected only in principle to the 17 conditions attached to the original tentative report of the examiner, except that it would like to suggest certain changes of language, but he characterized the plan proposed in the revised report as "the biggest outrage in the world." He said these conditions create special duties relating to details of operation for the future to be performed by the railroads and make the commission a "super-manager" to supervise the performance of those duties which he called a "very far departure from the act."

Mr. Cary declared that it would be an "outrageous proposition" to prejudice operation in advance in this way and declared that the conditions proposed are contrary to the spirit of the transportation act, which intends to leave railroads great freedom in the operation of their properties. He also said that conditions would be discriminatory because competing roads in Chicago would be left free.

Commissioner Eastman remarked that the conditions are intended to preserve the present situation, to which Mr. Cary replied that the original 17 conditions do that, but that the revised conditions go much further. Commissioner Potter asked if it would not be just as reprehensible to impose the conditions as it would be to impose them on the Chicago Junction today, to which Mr. Cary replied in the affirmative, saying the company is entitled to operate its property in any way that is lawful and that the commission should not impose precautionary conditions to insure operation in accordance with the law. Condition 18, which provided that the commission's order authorizing the transaction may at any time be cancelled for good cause shown, whereupon the lease of the junction properties shall automatically cease, Mr. Cary said, would not be within the power of the commission and it would mean that the property would be only tentatively sold; it would be impossible to borrow money, and any improvements would be subject to forfeit. If this condition were held void the entire transaction would be nullified because of a further condition that if any clause, sentence, paragraph, condition or part of the order shall for any reason be adjudged to be invalid the entire order and the authorizations shall be void. He said it was absurd in view of the fact that the new provisions of the law have not yet been construed by the courts to impose such conditions, particularly as Paragraph 3 of Section 5 of the act would keep the case open so that the commission could issue supplemental orders at any time.

Luther M. Walter, representing the other Chicago railroads that have intervened in opposition to the granting of the application, said that the Chicago Junction property was built up out of earnings contributed by the various trunk lines in the form of switching charges and that the New York Central is trying to acquire the right to get the line haul revenue, amounting to \$150 to \$250 per month on the valuable traffic originated by this road. Commissioner Potter asked if the intervening carriers are not putting themselves in a similar position when they ask to be allowed to run the traffic, to which Mr. Walter replied that they want to maintain the present situation, under which all are treated on equal terms, and that it is in the public interest

to maintain the present condition of equality instead of giving the traffic to a richer road.

He pointed out that 77 per cent of the traffic of the Chicago Junction is livestock and its products and that 65 per cent of it is controlled by four packers, so that it would be easy to control it in the interest of a single trunk line.

The intervenors asked the commission, first, to deny the application, but if it is not denied they ask that conditions be imposed to put it beyond the power of the New York Central to "wreck the present system of equality." These roads are willing to join with the New York Central in acquiring the property jointly under conditions to be fixed by the commission and he argued that this road in the heart of the greatest railroad center in the country could well be treated as the nucleus of something on which to build a joint terminal. Commissioner Potter asked how the Chicago Junction could now be prevented from giving advantages to the New York Central if it so desired. Mr. Walter said that the law prohibits one carrier preferring one connection over another, but if the New York Central owned the property discriminations could not be policed. Moreover, he said, under present conditions, there is no incentive for such preference.

Shippers Asked to Co-operate in Car Handling

WASHINGTON, D. C.

M. J. GORMLEY, chairman of the Car Service Division of the American Railway Association has addressed a circular to the shipping public in response to a general demand for a brief yet clear statement of what may reasonably be expected of shippers toward observing the Car Service Rules adopted by all railroads.

It is suggested that where practical this circular be given to shippers by trainmasters and other officers and agents who are familiar with and competent to explain the rules in detail. The circular is as follows:

Car Service Rules which govern the movement and interchange of freight cars between railroads serve also the self interest of the shippers since compliance with them enables the roads to furnish the type of car required as well as to insure a more adequate supply. This because:

1. The primary purpose of such rules is to keep cars on the lines of the owning railroad.
2. Each railroad customarily purchases equipment to meet the need of its own shippers which are thereby furnished with the particular class and type of equipment which best suits their individual needs.
3. Cars can best be maintained for service in the shops of the owning railroad; cars at home are kept in better physical condition than when scattered throughout the country.

Shippers will therefore best conserve their own interests by adhering to the underlying principles governing car service between railroads. These are:

1. HOME CARS, which are cars owned by the railroad on which located, should not be loaded off the home road when other suitable cars are or can reasonably be made available for use.
2. FOREIGN CARS, which are cars owned by railroads other than that on which car is located, should be loaded
 - (a) to a point on the owning railroad, or
 - (b) to a point reached via the owning railroad, or
 - (c) in the direction of the owning railroad.

These basic principles of the Car Service Rules are subscribed to by all railroads with agreement as to uniform adherence. Shippers can render material assistance in confining cars to the proper channels of traffic by loading in accordance with these rules.

Shippers can also assist in rule compliance by ordering cars for shipments as much in advance as possible, specifying full routing and by not reloading cars more empty at plants contrary to above principles.

Railroad representatives will gladly give any additional information which may be necessary to insure proper compliance with the rules in the handling of individual cars.

YOUR CO-OPERATION IN CAR HANDLING IS EARNESTLY SOLICITED.

I. C. C. Reports on Outside Locomotive Repairs

Six Commissioners Think N. Y. C. and P. R. R. Incurred Excessive Costs But Find No Ulterior Motives

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on March 31 made public reports on its investigation of the contracts for the repair of locomotives in the shops of locomotive builders entered into by the Atlantic Coast Line, New York Central and Pennsylvania railroads early in 1920 in their efforts to prepare for a record-breaking traffic. In the case of the Atlantic Coast Line the commission reports that although based on excessive costs the contracts were not found, in the circumstances, to have been unwarranted. In the cases of the New York Central and the Pennsylvania the commission reports by a majority of 6 to 5 that the cost to each railroad was approximately \$3,000,000 in excess of the cost at which the work might have been done in its own shops and that the work could have been done in the railroad shops within a reasonable time or within the time in which the contract work was done. Five commissioners, Potter, Lewis, Hall, Daniels and Campbell vigorously dissented from this finding in both cases on the ground that it is beyond the province of the commission and the majority reports find no support in the record for the imputation of the American Federation of Labor and affiliated railroad labor organizations, who intervened in the proceeding, of an ulterior or dishonest motive on the part of the railroad officials.

The investigation was instituted on the commission's own motion on charges made publicly and in a petition filed with the commission by railroad labor organizations that the contracts with outside shops were in disregard of efficient and economical management, resulting in unreasonable expenditures, and otherwise contrary to law. It was also charged that the railroads had made such contracts with the expectation of charging the cost against the government guaranty for the six months following the termination of federal control and that those in control of the railroads were interested in the profits of the outside companies. Abstracts of the majority and dissenting opinions, omitting most of the discussion of the details of the evidence, are given herewith. In the Pennsylvania case the commission says in part:

Majority Report in Pennsylvania Case

March 10, 1920, respondent entered into a contract with the Baldwin Locomotive Works for the repair of 200 locomotives and that contract and its incidents are reviewed at length in the evidence. The questions for consideration present themselves as follows: (1) The justification for having the work done in outside shops; (2) the cost of repairs so made as compared with the cost had the work been done in respondent's shops; and (3) the providence or improvidence of the particular contract and of settlements thereunder.

Prior to the hearing, and pursuant to our order which initiated the proceeding, one of our locomotive inspectors, together with one of our examiners of accounts, made a preliminary investigation, in the course of which respondent's shop records and the records of the United States Railroad Administration and of this commission were examined, and the results were duly introduced in evidence. Some evidence also was submitted by representatives of the Railroad Administration and by the interveners. The evidence in respondent's behalf was adduced by its chief of motive power.

As a general outline of the situation, respondent's witness submitted, in substance, the following: Early in March, 1920, he found on the system a shortage of locomotives and cars to meet the demands of shippers, and, having already accepted all contracts holding over from the Railroad Administration, let two other car contracts and the locomotive contract in question. The locomotives in and awaiting shop for classified repairs and for running repairs requiring 24 hours or over during 1920 are exhibited by weeks from January 3 to December 25. For the week ended February 28, practically the end of federal control, 240 locomotives are shown as then receiving and 300 as awaiting classified repairs, and 383 then under and 368 awaiting the heavy run-

ning repairs, a total of 1,291. A further exhibit, by months during 1920 and the first quarter of 1921, shows, as of February 28, 1920, 261 locomotives under and 340 awaiting class repairs, a total of 601, or 61 more than shown for that date on the exhibit before mentioned. The later exhibit also tabulates, as of the end of each month of the period covered, the estimated further available service of the motive power before class repairs should become necessary. As of February 28, 1920, it shows 724 locomotives good for 1 month's service, 399 for 2 months, 446 for 3 months, and so forth, up to 12 months or over. For the first five months of 1920 the locomotives successively indicated as good for 1 month's additional service range from 75 to 224 in excess of 500, stated by the witness in that connection to approximate the normal capacity of respondent's shops.

The contract was on a cost-plus basis, that is, the cost of materials, at stipulated prices, and of direct labor, plus 90 per cent of the distributed labor cost to cover all overhead expense, plus 15 per cent of the whole for profit. All scrap material resulting from the work was to become the property of the Baldwin plant, and respondent was to bear in all freight charges on materials and on the completed locomotives. Deliveries were to be made within three to four months after receipt of the first locomotive at the Baldwin plant, barring certain contingencies; and in fact commenced in April and ended in September.

Cost of Repairs

The aggregate cost of the repairs under the contract, upon final audit, is stated by the witness to have been \$4,496,820. This figure, however, does not include the cost of inspection in that connection, represented by a force of 32 inspectors kept by respondent at the Baldwin shops for that purpose during the contract period and whose maintenance was chargeable wholly to the repair work. Taking types of locomotives so repaired, the contrasted cost per H-9-s (freight) locomotive for class-3 repairs in respondent's Altoona, Pa., shops is given as \$9,453, as against \$25,799 for each of the 13 repaired by Baldwin. For like repairs per L-1-s, a somewhat heavier type of locomotive, the cost at Altoona is given as \$9,989, as against \$21,692 for each of 15 at Baldwin's. The figures for Altoona, however, include allocations to overhead on the Baldwin basis as far as respondent has corresponding items; on respondent's own basis of accounting, including items directly entering into the work, the respective costs are shown as \$8,452 and \$8,892. Even at the higher figures, the exhibited excess costs, exclusive of the supervision, approximate \$16,000 and \$11,000, respectively, per locomotive.

Briefly, respondent bases the claimed necessity for invoking the aid of the Baldwin plant upon the condition of its motive power at the end of federal control, the inadequate capacity of its own shops for making the requisite class repairs, and the then existing and prospectively increasing volume of traffic. Of the array of figures and other data introduced by the several witnesses, apart from some irreconcilable conflicts in the evidence, much is without probative value in respect of the real questions. The only practicable means of determining the issues seem to lie in comparisons of conditions, performances, and results, using such factors as the record affords; and as but portions of the available material go back of the period of federal control, the years 1919 and 1920 will be taken for the purpose.

At the outset the matter of ascertaining whether the 200 locomotives could have been repaired in respondent's own shops, giving consideration to conditions which obtained at the date of the Baldwin contract, is complicated by respondent's widely varying statements of the capacities of its shops for class repairs and by the testimony of its witness that those indicated capacities depend materially upon the heavy running repairs the shops are called upon to make. While testifying that such running repairs are more or less frequently made in the shops, and that in some degree class repairs are made in the roundhouses, he could give no estimate of the extent of these interchanges.

A further contention is that the invocation of outside aid was justified by the event, in which connection respondent cites its inability to furnish cars during the summer of 1920 and to illustrate which it exhibits the cars requisitioned and furnished and the layover of cars in yards for the last 10 months of the year. But nothing is offered to attribute the situation to motive-power conditions, without regard for the many other matters that might affect that situation, such as the "outlaw strike" which aided in bringing the April lay-over up to 91.9 per cent, the highest shown. The lay-over for March approximated that for the entire year;

and, whereas it was stated that "anything over 50 per cent represents abnormal condition," it is of interest that from July to December, inclusive, the lay-over exceeded that percentage and that during each of those months respondent made reductions in his shop and roundhouse forces, in all a very considerable number. At the same time, fully conceding the necessity for maintaining the motive power then and at all times, the real question is, whether respondent could have done the repair work in its own shops.

It is not questioned that the cost of the contract work exceeded that for which the work could have been done in respondent's shops, assuming the adequate capacity of the latter. The investigators compute the excess cost, including the pay of the 32 inspectors, deducting additions and betterments made at the Baldwin plant, and making certain other appropriate adjustments, including an allowance for overhead expense, to have been \$3,173,982.33, a little less than the total indicated by respondent's figures. Respondent secured no other bids for the work, and the possibility of obtaining the repairs at other contract shops at a lower cost can not be determined.

Respondent's records indicated that, of the 200 locomotives in question, 5 received class-2 repairs, 153 received class-3 repairs, 3 received class-4 repairs, and 39 received class-5 repairs. A check of the repairs actually made, however, disclosed that 44 locomotives shown as having had class-3 repairs in fact received class-4 or class-5 repairs, although this does not mean that respondent paid class-3 prices therefor. The check also indicated that the Baldwin repairs and those currently made in respondent's shops were comparable in character.

To a criticism that respondent paid twice for some of the repair work defectively done in the Baldwin shops in the first instance and then replaced or corrected, respondent answers on brief that the payments were in strict conformity with the contract, and adds the comment that it would be interesting to know if the representatives of the commission think that in like circumstances the railroad should make a deduction from the wages of its employees. The comment is wholly beside the question, especially as the payments to Baldwin were not in fact in accordance with the terms of the contract. That instrument provided, as before stated, for the addition of 90 per cent of distributed labor to cover all overhead expenses, including "rentals, * * * errors or defects," etc.

Company's Action Called "Precipitate"

Weighing one thing with another, the record indicates to us that at best respondent was precipitate in resorting to outside shops, at an added expense of more than \$3,000,000, almost immediately upon its resumption of its property. It is obvious that every consideration of good management dictated the restoration of the locomotives, with earning capacities ranging upward of \$12,000 to \$17,000 monthly, to a serviceable condition without undue delay, but the same considerations also dictated the accomplishment of that end without unnecessary expenditures. Upon a careful review of the record we conclude that a more thorough survey of respondent's facilities in the light of past demands and performances would have disclosed a capacity to do the work itself within a reasonable time by an appropriate coordination of efforts and by such added exertions as relieved the situation in the preceding year. The interveners' imputation to respondent of an ulterior or dishonest motive has no support in the record.

Potter Finds Criticism Not Warranted

Commissioner Potter in a lengthy dissenting opinion said in part:

Faced with the serious consequences of a shortage of power, the respondent, in order to make repairs more rapidly than they could be made in its own shops, contracted to have 200 of its 7,300 locomotives repaired in the best outside shops available. The majority report finds that later this decision was found to be a mistake. This alleged mistake of judgment is the sole basis for the criticism. The good faith of the officials of the respondent is not questioned, and they are completely exonerated by the majority report from every improper motive.

As there is no imputation of bad faith the promulgation of our report raises very serious questions as to the function and power of the commission. I deplore the taking on of work which I believe is not intended for us. The duty of this commission to consider the burden upon its authority is of such vital importance to the public that our system or regulation is to endure, that I think we can well afford to discuss it in the form of our reports.

It is not our duty to do the thing which his judgment, based on his knowledge and experience, at the time he is called upon to act, would think to be, should do. For him, that decision is right and free from criticism for all time which seems right when made, no matter how it turns out later. What would we have done if we had been in his place, with his perplexities, doubts, and forebodings, only fair and proper question for us to consider. If the inquiry were not thus limited, as obviously it should be

there is not in the record any basis for criticism. In fact, the majority report seems to admit this, for the main reliance of the majority report is upon testimony, not as to the conditions which actually confronted the officials when they made their decision, but as to conditions and happenings later. If later it had turned out (which it is shown it did not) that the work could have been done at home, it by no means would follow that the March decision was not the correct decision for March.

In working toward a conclusion we are bound to accept the facts that the chosen representatives of the stockholders and directors of the respondent, brought up in its management, recognized throughout the transportation world as men of high skill, charged with the responsibility of managing its affairs, acting in good faith in accordance with their judgment, decided it was best to send this work out. I can not see that we are charged with any duty or responsibility which requires us to review their judgment, or that we have any authority to do so. We are not competent to review it. These officials understood the needs of their company as we can not. They understood the territory they served, and its commercial and industrial conditions, and the probabilities of tonnage as they existed when it was decided to send the work out. They understood their shops and forces and knew, far better than we could, how to handle their labor. No one knew what might happen at almost any minute, and the best preparation was required at every point. If they felt it was necessary to make their company independent and strong in the face of what threatened, or that it was good policy to build independent resources, free from outside interference, we have no right to say that, from the standpoint of company policy or of public interest, their conclusion was wrong. The responsibility was theirs. We should not reverse their judgment upon a record made at this late date, which, in the nature of things, can not possibly give us even an outline sketch of the picture which confronted them.

We must remember that the steam locomotive is the heart of American industry, without which railways can not operate and industry, in a broad sense, can not be carried on. Almost it might be said that upon each one of these locomotives depends one seventy-thousandth part of the prosperity of the nation and the protection of the nation's property, peace, and order. The value to the nation of one month's service of a locomotive in busy times, is worth far more than the cost of locomotive itself. There is never an excuse for any carrier to run any risk with respect to its motive power. Chance may be taken with cars, and all other things, but never with locomotives. The one thing that never should be excused in a manager is avoidable risk regarding the effectiveness of his motive power. Particularly in times of stress he should not stop to make close estimates or draw fine distinctions as to how or where repairs should be made or as to relative cost. He should consider first how to be absolutely certain under every possible contingency to have his power ready.

Commission Not Equipped for Management

We are equipped for regulation within the law, regarding rates and other matters clearly within our proper function and with which continually we are called upon to deal. We are not equipped for problems of management and operation. These are beyond the lines that define our field. The idea that we, a commission of 11 men, brought from different walks, none of whom was selected because he had any knowledge regarding practical railway operation, can, in spite of our inexperience, two years after the fact, on an incomplete record of conditions, put ourselves in the chair of the general manager or master mechanic of the largest system of railroads in the United States, and say how, in perilous times, he should have handled a very difficult operating problem, and justly criticize him for error, does not find favor with me.

We have been given no roving commission to investigate and criticize. Federal control ended at midnight, February 29, 1920, and under the law in effect since then the carriers are to be managed by the chosen representatives of their owners and not by us.

We are not making any order upon our report and are giving no direction and we have no authority to do either. Our report is only criticism of management where responsibility for management is not on us. No complaint of violation of the law has been made, and we have found no violation. In such a situation I see no right to interfere with criticism and disturb and irritate with expressions of our opinions. If the officers of the respondent have not exercised good judgment, they are accountable to its stockholders, and not to us.

The procedure we have adopted in making this inquiry can not be supported by the provisions of the transportation act under which honesty, efficiency, and economy of management are to influence the determination of rate scales. We have not proceeded as in a rate inquiry for rate-making purposes. Our report can be of no service for rate-making purposes. It determines nothing respecting the honesty, efficiency, or economy of respondent's management. It deals only with one transaction that occurred two years ago in one branch of carrier operation. A mistake might have been made in this matter and yet the respondent might be

the most efficiently operated carrier in the country. There might be warrant in conducting a general inquiry as to carrier efficiency shown by the respondent's operations generally, but the discussion of an isolated transaction under unusual conditions can not be helpful to us on any question we have jurisdiction to determine.

This is one of several investigations we are carrying on of a similar nature and under similar circumstances regarding different carriers throughout the country. They are taking an enormous amount of precious time and are costing many thousands of dollars—without accomplishing any result of the slightest value to anyone.

Criticism of a transaction in a particular situation can do no good. It may do harm. No helpful lesson is to be learned from our action. If in the future the officials again should be confronted with what seems to them an emergency situation and they recall our criticism in the present case, they would do one of two things—either disregard our criticism and boldly go ahead and do what they thought they ought to do, as they should, or they would say: "We did what we thought was best before and were reprimanded. Now we will play safe. We will try to repair the locomotives ourselves. If we fail, only the public will suffer. The responsibility will be on the Interstate Commerce Commission and our failure will never be known." To encourage such an attitude and to so dissipate ambition and resolution, as it seems to me might be the effect of adopting the policy of our report, would be unwise. We should stimulate initiative, courage, and prompt action and a willingness to take on and quickly solve big problems. If railway operating officials, responsible for furnishing transportation for the public needs, are to stop before acting and wonder whether we are going to criticize them or not, the result, as far as the country is concerned, will be far worse than the occasional losses which may occur through the courageous and prompt exercise of judgment.

There has been a full hearing. Our own attorney conducted the proceeding—certainly with all the zeal that impartial investigation permitted. The intervening labor organizations had vigorous representation before us. After an investigation so made, no suspicion beyond the facts found by us can be entertained. If the record is not complete, our finding stands condemned. The presumption of innocence until proven guilty prevails before us. The greater the official power the greater the duty to respect and guard the private right.

In the foregoing I have dealt with this case without regard to the testimony as to what happened after March 10, 1920. To exclude such testimony seems to me our obvious duty. If it were proper to consider such testimony my study of it convinces me that the majority view involves a misunderstanding of the record, which, to my mind, demonstrates by subsequent events that the contract in question was justified.

Under the circumstances it was certainly incumbent upon the management to do everything possible to bring the Pennsylvania system to the utmost of operating efficiency, and if the condition of motive power interfered or was likely to interfere in any respect with the movement of traffic offered, it was the duty of the management to rectify that condition at once.

Railroad Shops Worked to Full Capacity

Although the respondent's chief of motive power testified at the hearing that in his opinion the average capacity of the shops for classified repairs was 500 per month, it would seem from the evidence that the respondent would have been justified on the 1st of March, 1920, in assuming that under favorable conditions an average capacity of 525 classified repairs per month could be obtained during the ensuing few months and at the same time heavy running repairs be maintained. It is argued in the majority report that assuming a shop capacity of 525, the average monthly output for the year under respondent's figures was but 483, and therefore 42 below the desired minimum. It is then reasoned that by using its shops to the full capacity of 525, the respondent could have cared for the 200 locomotives sent to Baldwin's in five months, or in seven months under the investigators' figures as to output, the former figure being well within the time consumed by the Baldwin plant. This certainly is close figuring to the point of danger, but it is impossible to apply this argument to the facts shown. I have already pointed out that the average monthly output for the six months immediately following federal control was approximately 525 and it, therefore, equaled the estimated capacity. This is the only period that can be considered with any justice to the respondent, for the whole purpose of sending the locomotives in question to the outside shop was to restore them to use in time for the expected summer and fall business. The contract called for their delivery in from three to four months from the delivery of the first engine, and the last of them was in fact delivered on September 19, 1920. The question is not whether these locomotives could have been repaired in the Pennsylvania shops some time within the ensuing year, but whether they could have been repaired very early in the year. The testimony is conclusive that they could not, for without them

the shops were worked to their full capacity of 525 for the six months following the making of the contract. There is nothing in the evidence to indicate that the shop capacity of the respondent could have been increased materially beyond the output shown during the six months in question. Much less is there anything to indicate that respondent's officials had any reason to expect as of the 10th of March, 1920, that a greater output could be obtained.

The concurring opinions evince a point of view which helps to account for the error into which I think the majority has fallen. They urge that the fact of chief public interest "is the discrepancy between the cost of the contract work done by the Baldwin shops, and the cost of precisely similar work done in respondent's shops." The comparison "between system shop repairs at approximately \$9,000 per locomotive and contract shop repairs at approximately \$25,000 per locomotive" is made all persuasive. In this case, as everywhere, failure to utilize the available material of important basic facts is to build conclusion without sound foundation. Obviously, the helpful comparison in this case is not between \$9,000 and \$25,000, but between \$9,000 and that figure less than \$25,000 which would remain after deducting the earnings of the locomotives which the company was able to enjoy as the result of making the repairs outside. The majority opinion, while recognizing that the earning capacity of a locomotive ranged upward from \$12,000 to \$17,000 monthly, ignores as an element in the determination of the net cost of the repairs, the additional earnings which the locomotives made because they were sent out.

Any theoretical or abstract objection to the contract because it was not entered into after competitive bidding, or because of any of the terms which it contained, or of the manner in which the work was to be done or paid for under it, is out of place when coming from us, because we, who made the record, have failed to show that any better terms were available. The burden of the attack was upon us, and it was incumbent upon us to show, by affirmative testimony, that this particular contract was not justified by the conditions under which it was made. We do not know whether any better terms could have been obtained and therefore can not find against what was done. This inquiry respecting the outside repairs made for the respondent is in a proceeding which involves outside repairs arranged for by other carriers. A comparison of the respondent's contract with the other contracts before us does not indicate in the respondent's contract exceptional characteristics justifying criticism. We may not apply abstract theory to such situations. Nor may we indulge in assumptions, implications, suppositions and presumptions.

Whatever the actual net cost of these repairs to respondent may have been, if in fact the earnings of locomotives restored to service were not greater than the repair expenditure, the expenditures were justified from the point of view of the management in March, 1920, when it faced the uncertainties of the coming year. It was not time to hesitate when the public service depended on the amount of available motive power. The evidence all goes to show that the decision made had ample warrant in the facts before those who made it and was justified by subsequent events. We have not been erected into a supreme directorate of all the railways of the country, and I conceive that it would be beyond our province and unwise to criticize those who are responsible, even if in the exercise of their judgment we thought an error had been made.

Lewis Calls Policy of Condemnation Dangerous

Commissioner Lewis in his dissenting opinion said:

I am not in accord with the majority. The cost of repairs undoubtedly was higher than had the work been done in the Pennsylvania's shops. As it transpired, the Pennsylvania could have made the repairs later in the year. These, however, are not the controlling factors. If judgment is to be passed it must be on the question of whether, in March, 1920, the company was justified in sending the work out.

At that time the carriers were facing the return of their properties from government operation. There was general recognition that private operation was then put on final trial. Traffic was heavy. Complaints were general. There were repeated warnings that service must be improved. There was every reason to anticipate the still greater demands which came in the spring, summer, and early fall of 1920. Under all these conditions the company was under obligation to make every effort not only to maintain but to improve its facilities for transportation. Locomotives in repair had an earning power in excess of \$12,000 a month. More important, however, was that on an adequate supply of motive power depended both the success or failure of private operation and the high industrial and commercial activity of the country.

The decline in traffic in the latter months of 1920 could not be foreseen. This commission in authorizing rates to yield a definite return upon the values of the carriers' properties was unable several months later and after a series of hearings of national

scope, to predict the collapse of traffic then only a few weeks distant. I can not, therefore, concur in a condemnation that, in light of a specific finding that no ulterior or dishonest motives were shown, must rest on conditions which arose subsequent to sending the needed locomotives to outside shops.

The government has decided against government management of the railroads. It has set up regulation and has definitely adopted a policy of protection. The record does not give warrant for condemnation on the ground of dishonesty or inefficiency. The pressing consideration in March, 1920, was service, and whatever might be said in criticism on the ground of uneconomical management disappears when there is taken into consideration the earning power of locomotives in service.

The adoption of a policy of condemnation is dangerous. The prosperity of the country is dependent on exercise of broadest vision and boldest initiative by those in charge of the railroad facility. Responsibility should not be impaired by intimidation and menace of public censure except in instances of most extreme provocation. Management having been placed, as a national policy, in the hands of the railroad executives, the government should not condemn actions that appear when taken to be to the best interest of all concerned, except upon a conclusive showing of improper motives or public injury.

Commissioners Hall, Daniels, and Campbell also dissented.

Chairman McChord Defends Majority Report

Chairman McChord wrote a concurring opinion in defense of the majority report "to correct any possible misapprehension which may result from the dissenting interpretations of that report."

The majority distinctly recognize, that the award of the contract is to be considered in the light of the contemporaneous circumstances, and the conclusion reached is in no sense or degree based upon subsequent developments. The necessity for the contract, at admittedly and serious increased costs for the work performed, is considered by contrasting the motive-power demands that faced respondent upon the resumption of private control with the like demands in 1919 and the accomplishments in rehabilitation of the power in that year as affording the best criterion of what might reasonably have been expected in respondent's own shops to meet the prospective requirements with the advent of private control. In the survey of the situation the majority report also takes due account of the respectively available power and of the contemporaneously increasing traffic. With an even greater burden of class repair work impending on March 1, 1919, and a concurrently mounting volume of traffic, respondent met the demands in its own shops and within a brief period during that year brought its bad-order power within safe limits.

The record denotes that the contract, made almost immediately upon the resumption of private control, was entered upon without that precautionary survey of respondent's own facilities and equipment and of their capacity which mere good judgment and a fit sense of obligation should have dictated.

The investigation was entered upon by unanimous vote of the commission, and I think it rather late in the day now to question that action. Indeed, by the interstate commerce act itself we are expressly authorized to inquire into the management of the business of all common carriers subject to the act, and directed to keep ourselves informed as to the manner and method in which the same is conducted, and empowered to obtain from the carriers full and complete information necessary to enable us to perform the duties and carry out the objects for which this commission was created. The authority to inquire is not limited to specific matter. Improvident operating costs are always of concern to us, and to the public which ultimately pays the bills, as in the end they have a very material bearing upon the carriers' revenue needs, which must be met by increased rates, security issues, or loans from the general railroad contingent fund. For a number of years the carriers of the country have repeatedly and sharply brought to our attention the matter of high operating costs as cutting them to increased rates or other relief, and I do not understand that we exceed our charter when at any time we undertake to ascertain if money in large amounts has been, or is being, needlessly expended.

The matter of honest, efficient, and economical management is the basic consideration upon which the rate of return and the necessity of enlarging the transportation facilities of the country are dependent, but even under that provision, I do not understand that we may lawfully investigate the question of management only when it has the purpose of the carriers to file applications for increased rates or when a specific question of enlarging transportation facilities is presented.

I note the criticism that we are assuming to set up our judgment upon a matter peculiarly within the competency of experienced operating officials and upon which they were called upon to exercise their best judgment in an emergency which de-

manded prompt action. It seems to me to require no expert judgment to determine, as between system shop repairs at approximately \$9,000 per locomotive and contract shop repairs at approximately \$25,000 per locomotive, the necessity for a reasonably definite ascertainment, before entering into such a contract, that past demands and performances were inconsistent with the prospect of doing the work in season in respondent's own shops.

While the statement in the majority report with reference to ulterior motives is made in response to an unsupported charge made by the interveners, I think it wholly immaterial. That question has not been inquired into by us, our purpose being to ascertain whether the 200 locomotives could seasonably have been repaired in respondent's shops and whether the amount paid the Baldwin Locomotive Works was excessive by comparison.

Commissioner Eastman, concurring in the majority report, said:

But this discrepancy in cost is not the only startling thing about the Baldwin contract, for the contract itself and the manner in which it was interpreted are startling. It appears that no competitive bids were sought and that the contract was made on what has come to be known as the "cost-plus" basis. It further appears that the 90 per cent of the labor cost to be added for overhead was to include "errors and defects." Notwithstanding this provision, in hundreds of cases where, because of errors or defects, it became necessary to do the work a second time, respondent paid for the work entailed in remedying the error or defect, and this labor cost was included in computing the 90 per cent for overhead and the 15 per cent for profit.

In other words, as I understand it, it is conceded, not only that respondent let the contract without competitive bids, but also that it agreed to an interpretation of the contract which made it possible for the Baldwin company actually to profit by negligent or inefficient work.

I submit that these are important facts for the public to know. If our great railroad companies are at such a disadvantage in dealing with outside supply companies that they must agree to arrangements of this nature, it lends force, among other things, to the suggestion recently made by the National Association of Owners of Railroad Securities that much expense could be saved if the railroad equipment of the country were pooled and all repair and construction work handled through centralized agencies. The facts so disclosed also make me unwilling to subscribe to the statement of the majority with respect to respondent's motives in the premises. I do not understand that motives were under investigation and no finding, therefore, upon this matter is appropriate. But if it were our duty to make such a finding, I confess that the evidence has not left me free from doubt as to what the finding should be.

Report in New York Central Case

In the report in the New York Central case the commission said in part:

In addition to such repairs as were made in its shops during 1920, respondent contracted in that year for the repair of a number of its locomotives by the American Locomotive Company, the Lima Locomotive Works, the Rome Manufacturing Company, and the Baldwin Locomotive Works. Most, if not all, of the locomotives sent to the contract shops had been built by the American Locomotive Company.

The contracts were not uniform. In all cases test locomotives were first sent to the contract shops for inspection, jointly by representatives of respondent and of the shops, as bases for bids for the required repairs, and contracts at flat prices thereafter were closed with all except the Baldwin plant. The Baldwin contract was made on a cost-plus basis, that is, the cost of materials used, at stipulated prices, and of direct labor, plus 120 per cent of distributed labor to cover all overhead expenses, plus 15 per cent of the whole for profit; respondent having deemed that basis more favorable than the flat prices quoted. The Rome contract provided for the repair of 50 locomotives, with the option on respondent's part, after 40 had been repaired, of extending the contract to cover an additional 50. The contracts with the Lima and American shops were not for specified numbers. The Baldwin contract provided for the repair of 100 locomotives. In all, 112 locomotives were repaired and returned under the contracts in 1920.

According to respondent's principal witness, the contracts were the result of a depreciated condition of motive power toward the end of federal control. This condition first developed on the lines west of Buffalo, and the American and Lima contracts, negotiated in January, and the Rome contract, entered into in March, had in contemplation motive power of the lines west only. It was not until the latter part of June that the power situation on the lines east reached a stage which necessitated the repair of locomotives

from that region in contract shops. The preceding two winters had been the severest in respondent's experience; a congested car situation developed in the Toledo, Ohio, territory in January, which effectually blockaded the Toledo terminal and necessitated embargoes against traffic movements through it; and respondent was asked to furnish locomotives to assist the Pere Marquette in relieving the blockade, some of which were supplied by the lines west, and to compensate which region locomotives were transferred thereto from the lines east. The general power condition then being extremely bad and the weather severe, with a prospective heavy traffic, the witness was asked by the federal manager of respondent's lines, now vice-president in charge of company operations, to get into touch with the Rome plant to obtain relief from that source. The witness did so and also opened negotiations with the American and Lima shops for the same purpose. Contract arrangements with those concerns having been made in January and March, as stated, and the prosecution of repair work in respondent's and the contract shops failing to keep the motive power abreast of the traffic demands, negotiations with the Baldwin plant were begun in June and completed in August, although the formal contract was not signed until October 1. Almost all of the repair work under the several contracts was performed after federal control ended.

While the data pertaining to the state of the motive power are not satisfactory and the record affords no certain means of ascertaining respondent's maximum shop capacity, there is abundant reason to question the necessity for the repair of at least the major portion of the locomotives in the contract shops. Similar contracts in earlier years had made known the enhanced cost of class repairs in such shops, admittedly not properly equipped for such work; and, while the maintenance of motive power at all times is of prime importance, recourse to the costlier outside means should be had only in compelling circumstances and in any case limited to its necessities. Even conceding that reasonably anticipated traffic demands so early in 1920 and the limitations of shop facilities and forces justified the invocation of some outside assistance, it quite clearly appears that this was carried considerably further than the exigencies required. It is disclosed that, although reductions in respondent's shop forces were considered in September and begun in October, 23 locomotives were sent to the American shops, under a contract for no particular number, in the face of that program of reduction. As before noted, also, there is evidence of record reasonably leading to the conclusion that the scope of the Rome contract, if not its real inception, was primarily in the interest of that plant, albeit with some immediate assistance in mind and with a view to the future availability of the plant as an accessory in case of need. This and other considerations included in the foregoing review tend to impeach in turn the award of the Baldwin contract for so large a number of locomotives. It further appears, as stated, that of the stipulated numbers respondent eventually withheld 21 locomotives from Baldwin and 5 from Rome on the ground of insufficient funds, also assigned as the moving cause of the shop-force reductions. Contract obligations are not to be lightly regarded, of course, but the financial situation that began with the business depression in September or October nevertheless led successively to reductions in shop forces and to the arbitrary withholding of locomotives from those plants; and the same self-interest that prompted the latter action, apparently without evoking protest from either plant, might well have induced respondent to attempt to obtain assent to an earlier cessation of the contract work and the longer retention of its own less expensive organization.

We conclude that the record does not establish a seriously depreciated condition of motive power at the end of federal control, and that, even conceding that with the advent of 1920 or upon respondent's resumption of its property its shops were not fully able to cope promptly with all current demands, nevertheless, by an energetic effort at least the larger number of the locomotives in question could have been repaired in those shops within the time in which the contract work was done and at a materially lower cost.

The foregoing review and comment are not intended to suggest, and the evidence does not indicate, that any sinister disregard of respondent's interests or otherwise dishonest motive entered into the award or execution of the contracts.

Dissenting Opinions

Commissioners Potter and Lewis also filed brief dissenting opinions in this case and Commissioners Hall and Daniels also registered their dissent.

Commissioner Campbell in a dissenting opinion said:

We find no proof of improper motive and no willful act of wrong, but the record does suggest that the officials in charge may have acted largely upon intuition rather than upon thorough investigation. If they had had before them the facts that subsequent events disclosed they might have done differently. But

human nature must be recognized. The railroads had just been returned to their owners and private ownership and operation were on trial. The possibility of public criticism that was likely to follow failure to handle traffic expeditiously had to be reckoned with. This contract was made at a time when most everyone connected with the operation of a railroad was acting under pressure, traffic was heavy, and heavier traffic was in prospect. Naturally there must have been more or less feeling of nervous haste. Under all the circumstances, while the record does not warrant unqualified approval of the action taken by the officials in charge, it is perfectly clear to me that we should not condemn them.

Atlantic Coast Line Contract

In the Atlantic Coast Line case the commission said:

About the middle of 1919, in anticipation of a heavy citrus-fruit movement and a heavy tourist travel in the following winter months, respondent's present executive vice-president, then federal manager of the system, took up with the regional director the question of having 30 locomotives, needing class-2 repairs or heavier, repaired in outside shops. Nothing was accomplished at that time, and in August a shopmen's strike, which suspended repair work for about 18 days, aggravated the motive-power situation. After some delay, and on November 25, the federal manager wired the regional director that the system had over 100 locomotives awaiting shop, which, because of scarcity of mechanics and for other reasons, could not be put in serviceable condition to meet the approaching winter's demands, and asked if the assistance of other shops could be had. On the following day the regional director replied that he was uncertain of the attitude of other railroads at the time, it having then been supposed that federal control would end with the calendar year, and recommended communication with the American Locomotive Company or Baldwin Locomotive Works to ascertain if relief could be had from one or both. Later, the matter was taken up with the Railroad Administration at Washington. By wire of January 8, 1920, the regional director asked the administration if arrangements could be made for the repair of 50 of respondent's Pacific-type locomotives in other railroad shops, preferably Norfolk & Western. The administration replied that there was no available space in railroad shops, but mentioned as available for prompt handling the Richmond, Va., shops of the American Locomotive Company, and suggested that the respondent corporation, as the director general's successor, effect a contract with that company with a view to prompt action.

It appearing, upon opening negotiations with the Baldwin and American plants, that neither then desired to take 30 locomotives at once, surveys of the engines were made and successive bids were secured for the repair work in three lots of 10 locomotives each. The Baldwin bid of \$230,000 having been the lower, a contract with that concern at that figure for the first 10 was signed January 10, 1920. A second contract of like tenor was made April 17, 1920. Because the Baldwin bid of \$267,000 for the third lot was deemed too high, a contract was entered into with that plant on a cost-plus basis, maximum \$230,000, November 29, 1920.

In the circumstances disclosed by the record much of the detailed evidence may be disregarded. The evidence concerning respondent's handicap in the matter of fire-box work is not disputed, and otherwise the shops and roundhouses appear to have had constantly more than their capacity quota of average class and running repair work during the period in question. Some new locomotives were added during the year, but the added tractive power did not offset the bad-order power.

It appears of record that in April, 1919, the superintendent of the Waycross shop suggested that the boilers of the locomotives then needing new fire boxes be removed from the running gear and stripped and sent to the American or Baldwin plant for application of fire boxes and flues, the balance of the repair work to be done in respondent's shops. The suggestion seems not to have been favorably considered, and, while the greater portion of the cost of the contract work is represented by the repair of the machinery of the locomotives, the record is devoid of evidence which would indicate the feasibility or economy of such a division of the work during the period in question.

While the record indicates that the contract costs were excessive, nevertheless they appear to have been the lowest offered to respondent; and, considering the character of the necessary work to be done, the limitation of the contracts to locomotives requiring that class of repairs, and respondent's shop situation which necessitated the contracts for reasonable relief, the record does not afford grounds for condemnation of the action taken.

Commissioner Hall filed a dissenting opinion in this case, saying:

"Honest, efficient and economical management" was the due of every corporation, railroad or other, before those words were written into the interstate commerce act. The duty rests upon

Officers and directors of railroads, but not by virtue of that act. Failure in that duty violates no provision of the act which we administer, and we hold no roving commission as public monitor or critic. In the plenitude of our powers it should not be forgotten that they do not include those of general manager. We have gone beyond our province in this investigation and, whatever our findings, can enter no valid order. The results of our comparative and other studies could doubtless be made helpful, in a less obtrusive way, to those who bear responsibility for railroad operation, and constructive suggestions would doubtless be welcomed for what they are worth. With such a course I would be and am in full accord. But I dissent from all reports in this investigation. It should be discontinued.

Commissioner Potter also dissented from the finding of the report that the contract costs of the work in question were excessive.

New York Central and Pennsylvania Issue Statements

Samuel Rea, president of the Pennsylvania, and the executive offices of the New York Central, have issued statements commenting upon the commission's findings in this case. The burden of these statements is that traffic conditions were such at the time that outside contracts were let that every possible effort had to be exerted to prevent further congestion. Unfortunately traffic slumped after the contracts were awarded, but the railway managements could not foresee that. They were faced with an acute situation which demanded prompt action. Mr. Rea commented upon

the number of commissioners who dissented from the majority opinion, saying that their opinions gave ground for expecting that the commission "is not reverting to its former policy of railroad criticism instead of railroad regulation."

Freight Car Loading

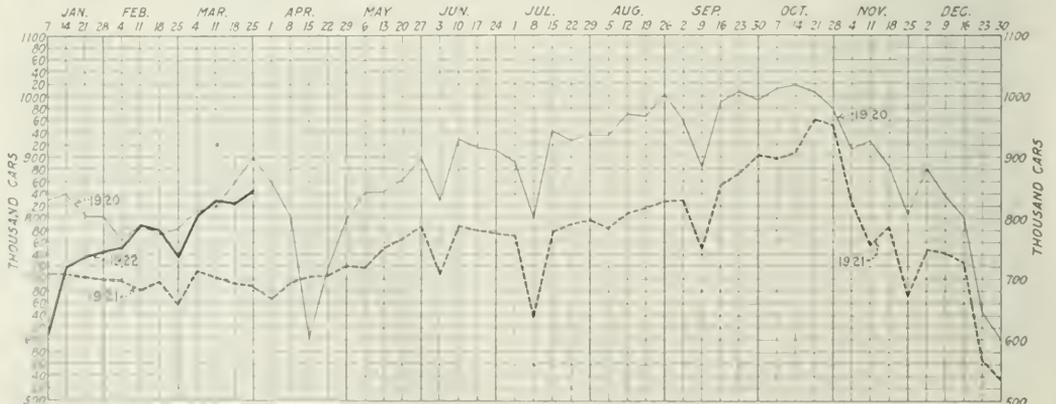
WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight increased again during the week ending March 25 to the highest point reached this year. The total was 846,035, an increase of over 22,000 as compared with the week before. This compares with 686,567 in the corresponding week of 1921 and 895,386 in the corresponding week of 1920. There was an increase of approximately 14,000 cars as compared with the week before in the loading of coal and there were also increases in coke, forest products, merchandise and miscellaneous. As compared with the corresponding week of last year there were increases in all districts and in all classes of commodities except ore, but the largest increase as compared with last year is shown in coal loading, which increased 83,000 cars. There was also an increase of 35,000, however, in the loading of miscellaneous freight. The summary as compiled by the Car Service Division of the American Railway Association is as follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDING SATURDAY, MARCH 25, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	6,882	2,609	58,281	2,111	4,782	1,073	70,677	70,712	214,127		
	1921	5,637	2,492	36,806	797	5,979	654	54,783	58,462		165,610	222,365
	1920	2,407	2,668	60,137	4,170	2,366	1,129	50,198	57,897	180,972		
Poconantas	1922	2,007	2,860	36,855	2,653	2,407	1,365	41,560	47,362		137,069	200,285
	1921	243	71	25,071	253	1,252	23	6,076	4,027	37,016		
	1920	135	68	13,468	149	1,361	17	8,432	2,893		23,543	35,923
Southern	1922	3,286	2,057	24,867	516	18,169	656	38,918	47,192	135,661		
	1921	2,819	1,834	15,541	556	13,713	658	36,264	43,198		114,583	133,151
	1920	9,892	7,201	7,388	1,241	15,334	601	28,045	30,346	100,048		
Northwestern	1922	9,370	6,548	3,906	783	14,417	968	27,185	27,017		90,194	117,695
	1921	10,641	9,157	23,223	198	5,199	1,084	32,532	35,146			
	1920	9,134	9,128	11,692	145	4,583	2,330	30,849	31,406		99,267	120,789
Central Western	1922	4,715	2,195	5,619	187	7,712	716	16,410	23,437	60,991		
	1921	4,307	1,776	3,111	175	6,283	463	16,936	23,530		56,301	65,178
	1920	10,641	9,128	11,692	145	4,583	2,330	30,849	31,406			
Total Western Districts	1922	25,248	18,553	36,230	1,626	28,245	3,401	76,977	88,979	278,259		
	1921	22,711	17,452	18,709	1,103	25,283	3,761	74,970	81,773		245,762	303,662
	1920	38,066	25,958	204,586	8,676	54,814	5,282	239,846	268,807	846,035		
Total All Roads	1922	31,329	24,706	121,379	5,538	48,743	6,455	213,000	233,688		686,567	
	1921	33,995	30,343	195,974	13,615	67,428	17,680	174,757	261,594		895,386	
	1920	47,377	1,252	83,207	3,418	6,071		26,837	35,119	159,468		
Increase compared	1921	4,071		8,612			1,173	65,089				
Decrease compared	1920											
Increase compared	1920			4,385		1,614	12,998	12,787		49,351		
Decrease compared	1920					54,814	5,282	239,846	268,807	846,035	686,567	895,386
March 25	1922	39,866	25,958	204,586	8,676	54,814	5,310	247,338	266,119	823,369	691,396	855,060
March 18	1922	39,866	25,958	204,586	8,676	54,814	5,310	247,338	266,119	823,369	691,396	855,060
March 11	1922	45,160	29,931	104,568	8,530	51,140	5,107	236,244	248,460	829,128	700,440	816,329
March 4	1922	44,830	28,329	196,639	8,257	47,674	4,651	241,433	261,778	804,255	711,367	811,106
February 25	1922	46,729	27,740	187,447	8,072	47,704	4,330	199,157	214,107	735,286	659,642	783,295



Revenue Freight Car Loadings Up to March 25, 1922



Simple in Design and Pleasing in Appearance

Bridge Slabs Waterproofed Before Erection

Interesting Procedure Developed by Philadelphia & Reading to Avoid Delay to Traffic

By Harry B. Glisson

Assistant Engineer, Philadelphia & Reading, Philadelphia, Pa.

THROUGH THE DEVELOPMENT and utilization of an interesting method of pre-cast concrete construction in practically every detail, the Philadelphia & Reading has completed an eight-track bridge over Oley street in Reading, Pa., with little disturbance to railway traffic and none to the

passenger trains and 70 freight trains. On the two tracks east of the main tracks, the deliveries to the industries and the freight station require an almost continuous shifting service.

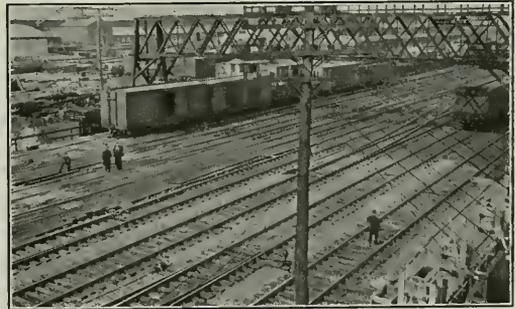
To rebuild this bridge it was necessary to design a structure which could be placed with the least interference with the traffic, as the location is but a short distance from the important junction of the main line with the Lebanon Valley



The Old Structure

highway. Special means were employed in pre-casting certain parts and pouring others of the structure, which is of the concrete slab type, to secure accuracy and the quick use of the bridge as each section was placed and to insure adequate protected waterproofing without the necessity of placing any concrete during the erection period.

Three of the eight tracks are main tracks, used for passenger and freight traffic; two tracks east of the main tracks are used for deliveries to the industries and the principal freight station in the city, and the three tracks west of the main tracks for the storage of freight cars. Much of the traffic of the main line and practically all of the freight traffic, do not pass through the city but are carried via the Reading Belt along the west side of the city. The traffic on the main tracks over this bridge in 24 hours consists of 46

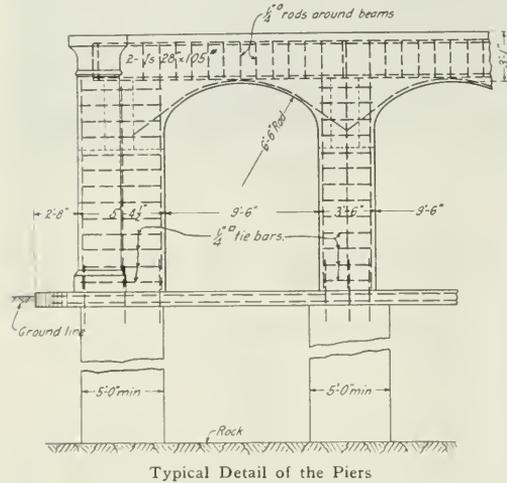


Replacements for Four Tracks Have Been Completed with Four Remaining to Be Done

branch, and within the limits of a large electric interlocking plant, controlling the traffic. No change in the track layout was considered permissible and the City of Reading would not grant permission to occupy any portion of the streets, except for such supports located along the curb lines and in the center of the street, as it was considered impossible to avoid.

The old structure was a deck girder span, supported by Phoenix columns located on each curb line, resting on stone

masonry footings, and with stone masonry abutments on the house lines. The width of the street is 60 ft., with two sidewalks, each 13 ft. wide, and a 34-ft. roadway. This old structure was too light to carry the locomotives of the Mikado type used in the freight service over the Lebanon Valley and East Penn branches. The new structure is a reinforced concrete slab bridge. It was built using the present abutments and constructing concrete columns on the curb lines and in the center of the street. The total distance face to face of bridge floor is 109 ft. 6 in. under copings, and 112 ft. 1 in.

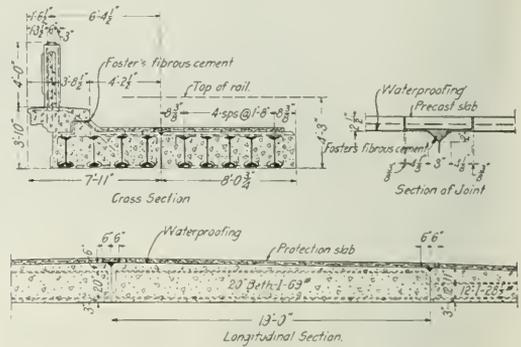


Typical Detail of the Piers

between faces of copings. The angle between the center line of the tracks and the center line of the street is 81 deg. 36 min.

The work required the removal of the stone masonry bridge seats of the abutments and replacing with reinforced con-

crete bridge seats of the abutments and the masonry bridge seats and back walls, it was necessary to place wooden trestle bents on each side of the Phoenix columns. The bents on the abutment side were placed close to the face of the abutment and carried the old superstructure on wooden stringers supported by the bents and blocking



Details of the Slab Construction Showing the Method of Waterproofing

placed back of the back wall of the abutment. The trestle bents were about 13 ft. center to center. The Phoenix columns were then removed and the excavation made for the new column footings.

The concrete column footings were three feet by five feet in area, and the foundations were carried to lime stone rock, which was found at an average depth of 31 ft. below the curb level. The least depth was 17 ft. and the greatest about 39 ft.

The construction of the columns in the center of the street did not require any supports for the existing bridge, but necessitated a change in location of a 10-in. water main, and the construction of two supports and a reinforced con-



Waterproofing the Pre-Cast Slabs on the Casting Platforms

crete bridge seats of the abutments and the masonry bridge seats and back walls, it was necessary to place wooden trestle bents on each side of the Phoenix columns, located back of the curb lines, and the construction of the concrete columns in the center of the street. All of this work was done without interruption of the traffic on the railroad or the street

crete saddle, over a 4-ft. by 6-ft. egg-shaped storm water sewer, located directly under the end column on the west side of the bridge.

Excavation was carried on simultaneously in three column footings and the concrete foundations were placed before

starting work on the other foundations. The columns in the center of the street were constructed first. Above the foundations, concrete was placed in one operation to the spring line of the arches connecting the columns, and at the same time in the small 1-ft. 9-in. square supports to carry two I-beams at the top of the columns. The balance of the concrete for four columns was then completed in one operation. A construction joint was made at the center of the arch joining the columns. The corners of the columns were cast square, no fillets being used on the inner corners of the forms.

A total of 56 slabs were required, consisting of 14 rows, four in each row. The end slabs are 6 ft. 4½ in. in width, the others being about 8 ft. ¾ in. wide. Of the end slabs, the ones adjoining the abutments were each 15 ft. 9 in. long, from 1 ft. 6 in. to 2 ft. 2 in. thick, and contained two 12-in. 28.5 lb. I-beams, 13 ft. 10 in. long and three 12-in. I-beams 11 ft. 9 in. long. Their weight was 54,000 lb. each. Other slabs ranged from 12 ft. 7 in. long to 19 ft. long, reinforced in some sizes with 20 in. 69 lb. I-beams and in another with 28.5 lb., with individual weights ranging from 34,000 lb.



Placing the Slabs in Position—Note the Shoulder on the Slabs for the Protection Coating

to 68,000 lb. Expanded metal caging was used on the bottoms of all I-beams and ½-in. square reinforcing rods on 24-in. centers were used across the top and bottom of all beams.

To cast the 56 concrete slabs, a space 85 ft. by 25 ft. was graded to a level surface near the bridge. This surface, which was on an embankment composed of engine ashes, was thoroughly compacted, and a concrete slab three inches in thickness was placed to give a smooth and level working surface. At a later date, an additional casting platform about 50 ft. by 20 ft. in size was constructed.

On the larger platform, 24 slabs were cast at one operation, and the water proofing and the protection coat of concrete placed before the slabs were removed from the platform. The slabs were numbered as to relative position and date of casting, and were placed in the permanent floor of the bridge, in the same relative position as cast. In pouring, every other slab was formed, the position being similar to the blocks on a checkerboard, and when the concrete was hardened sufficiently, the wooden forms were removed. Two thicknesses of rubber roofing were then fastened against the concrete, and the next slabs cast, using the sides of the surrounding

slabs to act as forms. This made the adjoining faces of the slabs conform to each other, thus compensating for any movement in the wooden forms while casting and resulting in better joints when in permanent position in the bridge floor. Great care was taken to cast the slabs as nearly according to plan as possible; the lines for the forms were all checked carefully, and plugs placed so that they could be rechecked easily at any time during the casting operations, and this was done.

The Waterproofing

The slabs were waterproofed with three layers of saturated cotton fabric, mopped with hot asphalt before placing. Upon this waterproofing a 2½-in. layer of concrete was placed, reinforced with No. 12 electrically welded wire, with a 4-in. by 4-in. mesh. The protection coat terminated six inches from the vertical face of the slab, which had beveled edges. When the slabs were placed in position, these beveled edges formed large grooves, which were filled with fibrous waterproofing cement, and the surface of the exposed waterproofing, and the vertical faces of the protection coat of the slabs, were given a half-inch coat of the fibrous waterproofing cement. This space was then covered with small pre-cast sections of the reinforced protection coat, pressed into the fibrous cement thus waterproofing all the joints between the slabs. These pre-cast slabs were about 4 ft. long, 11¾ in. wide and 2½ in. thick, some with square ends and the others with ends making the same angle with the sides as the angle between the center line of the bridge and the center line of the street. These slabs were also reinforced with the electrically welded wire mesh. The whole plan was designed for the purpose of permitting the use of the bridge as soon as the new slabs could be placed in position and the tracks relaid, without delaying traffic while waiting for the concrete to get sufficiently hard to sustain the weight of the passing traffic.

The method adopted for placing the slabs in position on the bridge was to load the slabs on cars on the preceding day, and abandon two tracks at a time, beginning on the east side, previous notice of the date on which the tracks were to be out of service having been given and the industries and freight house having been served. The tracks were removed at about 8 a. m. and relaid and traffic resumed about 6 p. m. of the same day.

A wrecking train removed the old superstructure and placed the new slabs in position. The position of each joint parallel with the center line was marked upon the abutments and tops of the columns. While the slabs were being placed in position, great care was exercised to have the joints conform to the plan location, which had been marked previously on the bridge seats and the tops of the columns. Just previous to placing the slabs, the tops of the columns and the bridge seats were given a thin coat of cement mortar, to provide a uniform bearing. While the slabs were being placed, a tight or a normal joint spacing between the slabs was made, and this aided in preserving the plan for location for the joints. The concrete coping, posts and railing were not cast in place until after the permanent floor had been placed.

The new bridge is well lighted at night by incandescent electric lights, each sidewalk having 5 lights on the sidewalk side of the columns, and three lights on the columns on each side of the roadway, a total of 10 for the sidewalks and 6 for the roadway. Two lights, one on each face of the structure, illuminate its outline when viewed by approaching traffic. The wiring is all concealed in metal conduits.

The work was carried out under the direction of Samuel T. Wagner, chief engineer, and Clark Dillenbeck, assistant chief engineer. The plans were prepared in the office of P. S. Baker, engineer of bridges and buildings, and the field work was in charge of the writer.

Coal Strike Makes Big Cut in Rail Traffic

THE IMPORTANCE of the coal strike insofar as concerns the railroads is embodied primarily in the fact that of the total tonnage carried by the railroads about 30 per cent is bituminous coal and approximately 6 per cent anthracite coal. Naturally interest is being directed chiefly at the coal carrying roads, the coal traffic of some of which runs as high as 50, 60, 80 or even 90 per cent of their total tonnage. The question at present is one primarily of traffic considerations. The matter of fuel supply is made more or less secondary because of the large storage of fuel which has been accumulated for an extended period prior to April 1—the date on which, in accordance with schedule, the coal strike began.

In the Anthracite Fields

The effect on the rail carriers thus far has been such as would naturally be expected from the cessation of so large a percentage of the total traffic. This is shown, for example, by the anthracite carriers. Practically no anthracite is being mined. The anthracite carriers have, therefore, in some cases, made drastic cuts in their forces. The Delaware & Hudson, for instance, whose anthracite tonnage makes up about 42 per cent of its total traffic, has laid off 1,000 men, including employees in train service and in shops and round-houses.

Eastern Bituminous Fields

The situation in the soft coal fields may be summarized by saying that the union mines in every district responded to the strike call. It appears, however, that the non-union fields are but little affected. Coal Age in its issue of April 6 gives the following details:

One thing is clear at the outset and that is that there has been no general exodus of non-union workers. Here and there disaffections are shown in what were commonly supposed to be un-organized areas, but these are of minor importance.

West Virginia is largely non-union. Such districts as Pocahontas, Tug River, Kenova-Thacker and Logan are entirely unaffected. Winding Gulf is reported to be working 90 per cent, but New River is practically closed down.

In the Kanawha district reports vary, but show from 12 to 23 mines working. The Fairmont region, a closed-shop district, reports that of 136 mines in Harrison County, 95 mines in Marion County and 33 mines in Taylor County, a total of 264 mines, 18 were working open shop on Monday, April 3. In this region approximately 17,000 men are on strike.

In the Monongalia region from Parkers Run, W. Va., to Point Marion, Pa., no men were at work. Elsewhere in northern West Virginia there were few mines at work on Monday. Seven mines on the Morgantown & Kingswood R.R., one mine on the Cumberland division of the Baltimore & Ohio and five mines on the West Virginia Northern remained at work.

The situation in the Upper Potomac region may be briefly stated. Reductions in wages have previously been effected here. There is an agreement between the local union and the operators providing for a 90-day period after April 1 for negotiations without suspension. This is being observed and the miners are working. In Georges Creek the mines on the Big Vein are working, while those on the thin vein are closed.

The Connellsville, Uniontown and Johnstown regions, all non-union, are working, save that four mines of the H. C. Frick Co.—the Gates, Ronco, Edlenborn and Lekkone properties—were closed by a strike. Somerset County and adjacent non-union districts are reported working full, with the exception of 100 men at St. Michaels.

Northeastern Kentucky is working, as is southwestern Virginia. In Tennessee about half the mines that were operating in March are closed.

In further explanation of the details as given in Coal Age, it should be stated that the Pocahontas, Tug River and Kenova-Thacker fields which are noted as "entirely unaffected" are served by the Norfolk & Western. This means that the N & W will be but slightly affected by the strike and may, on the contrary, benefit from it through increased pro-

duction by the non-union mines. The Logan field, also "entirely unaffected," is a Chesapeake & Ohio field. Winding Gulf field, "reported to be working 90 per cent," and New River, "practically closed down," supply traffic to both the Chesapeake & Ohio and Virginian. The Kanawha field is also a C. & O. field.

Illinois, Kentucky and Indiana

Approximately 12 roads serve the coal fields of Illinois, Kentucky and Indiana, from which a very large proportion of all the coal consumed in the territory west of the Alleghenies and east of the Missouri river is obtained. Some 12 roads depend in large part for their traffic from coal mined in this territory. Of these, the Chicago & Eastern Illinois and the Chicago & Alton are affected to the greatest extent by the strike. Coal represents about 60 per cent of the business of the Chicago & Eastern Illinois, with 95 per cent of this coal originating on its own lines. Practically all of this coal, coming as it does from the Illinois fields which are now inoperative, has resulted in an immediate falling off of business on this line. To meet this situation heavy reductions have already been made in forces, practically all employees involved in the work of switching and handling coal business at originating points having been laid off indefinitely. The company has about 80 days' supply on cars for itself.

Coal represents almost 50 per cent of the Chicago & Alton's tonnage and 30 per cent of its revenue. Since this coal is also obtained almost entirely from Illinois fields which are now inoperative, the result has been to necessitate an immediate reduction in forces everywhere including many offices, some terminal points having been shut down entirely and the forces at other points largely reduced or put on a shorter working week. The supply which the company has for its own use will probably last until the first of July.

Next to the Chicago & Alton, the Illinois Central has been affected the most heavily by the coal strike, nearly 45 per cent of Illinois Central tonnage consisting of coal which is obtained from fields of Indiana, Kentucky and Illinois. One interesting observation to be made in connection with the Illinois Central's situation, however, is that the Kentucky fields from which 20 per cent of the Illinois Central coal is obtained are still working and will undoubtedly continue in operation. Of the remaining roads in this territory affected by the situation are to be found the Burlington, the St. Paul and the Great Western, approximately 20 per cent of all Burlington business consists of coal, with the percentage running between 25 and 30 per cent for the lines east. As in the case of the Chicago & Eastern Illinois, this coal is obtained almost entirely from southern Illinois fields necessitating heavy reductions in forces involved in transporting it. On the St. Paul, coal constitutes from 15 to 20 per cent of the business, 692,000 tons of a total of over 2,000,000 coming from the Indiana fields. As in the case of the other roads, coal for company use is in storage both in cars and on the ground and will last for about 40 days. On the Chicago Great Western the supply for company use is almost entirely on the ground and will last in excess of two months.

LUMBER EXPORTS from British Columbia to the United States during the year 1921 amounted to 26,712,000 board feet; of which quantity 5,431,000 went to the Atlantic seaboard and 20,000,000 to California.

THE BACON HOG is the chief subject of the latest science of agricultural lectures to be "broadcast" through the country by means of a special train. This train is operated under the auspices of the Alberta Department of Agriculture and, beside the hog industry, will demonstrate dairying and other branches of agriculture. The train will shortly begin its journey at Edmonton.

A Reply to McAdoo's Charges Before Committee

Daniel Willard Denies That Federal Control Was Required
Because of Railroad Breakdown

WASHINGTON, D. C.

THE SENATE COMMITTEE on interstate commerce on April 4 resumed its post-mortem investigation of the federal control period, which has come about as an incident to its general railroad inquiry instituted early last year. Testimony on behalf of the railroad executives was first presented before the committee, which was followed by other testimony, largely in the nature of rebuttal, by representatives of the railroad labor organizations and by the former director generals, William G. McAdoo and Walker D. Hines. Their testimony in reply to the railroad executives contained many statements to which the railroad executives have asked an opportunity to reply, and Daniel Willard, president of the Baltimore & Ohio, was the first witness called by the railroads in rebuttal. Replying particularly to the testimony of Mr. McAdoo, Mr. Willard denied that there had been any breakdown in 1917 which necessitated the taking over of the railroads by the government.

"I am unable to find anything in the record to justify the statement made by Mr. McAdoo that the railroads in this country have ever broken down at any time, either before, during or since federal control," Mr. Willard said. "The actual performance of the carriers during 1917, when measured in terms of ton-miles and passenger miles, together with the statements which I have quoted in that connection from officials of the government in position to know, would seem to clearly establish the contrary for that year at least. A serious and troublesome situation, it is true, did develop in the fall of 1917, but it cannot fairly be contended that it was due to a breakdown of the railroads. It might well be argued, however, that the situation was due to a breakdown, or I should prefer to say, to a failure of certain governmental agencies to deal effectively with a most unusual and unforeseen situation. It might even be said also that there had been a failure if not a breakdown, of our system of railroad regulation as then in effect, but certainly not a breakdown of the railroads themselves.

"Mr. McAdoo has pointed with pride, and justifiably so, to the accomplishments of the railroads under his direction during 1918, but the figures show that the same railroads that moved 430 billion ton-miles in 1917, moved only 440 billion ton-miles in 1918, or about two per cent more than they moved during the previous year, and I submit that a difference in accomplishment of only two per cent between the two periods under consideration is hardly sufficient to indicate a breakdown in the one year and a satisfactory accomplishment in the other. The effect of the breakdown, as I use the term, certainly could not be measured by a mere difference of two per cent. If it could, then it might with equal force be urged that the railroads in 1918, while under federal control, had broken down, because substantially the same properties in 1920 under private control and operation moved 447 billion ton-miles, or nearly two per cent more than was moved in 1918. But no one claims that the railroads broke down in 1918 and of course we all know that they did not break down in that year."

Mr. Willard said that the trouble in 1917 was not that the railroads broke down but the fact that there was no one in authority who could say at that time what freight should be moved and what should wait. The enormous increase in the export business and the great stimulation of manufacturing and other industries due to the war naturally seriously affected the railroads, Mr. Willard said, but the railroad congestion was centered in the territory between Balti-

more and Bridgeport, Conn., and was due to the railroads bringing in freight faster than it could be unloaded.

It was not until after the roads were taken over by the President that there was any central governmental agency authorized to deal broadly and effectively with the relative importance of the traffic to be moved, the witness said. This lack of such supervision and direction he added was largely, if not entirely responsible for the unusual accumulation of cars in the fall of 1917, particularly at eastern terminals.

One of the outstanding reasons, however, for the President's action in taking over control of the railroad systems of the country, Mr. Willard said, was the financial condition of the carriers, "which condition had been brought about by the rapidly mounting cost of operation, caused by the war, together with a fixed basis of earnings."

"Some have said that this in itself indicated a breakdown of the railroads," Mr. Willard said. "I cannot agree with that point of view. I repeat, however, that it might be said that the situation indicated a breakdown or failure of the form of regulation in effect at that time, when subjected to the severe test of conditions brought about by the war."

Declaring that he desired to reply "to certain statements made early in the period of federal control which tended—whether meant to do so or not—to cast discredit unjustly upon the private management of the railroads," Mr. Willard called attention to statements made by Mr. McAdoo in his testimony and in his annual report that from December 28, 1917, to January 5, 1918, 132 engines were frozen up at the east side Philadelphia roundhouse of the Baltimore & Ohio and that the roundhouses were obsolete and were still being used to house locomotives more than twice the size for which the houses were designed. Mr. Willard said that both he and F. H. Clark, general superintendent motive power of the Baltimore & Ohio, had investigated the matter shortly after the charge had been originally made and found that, while some pipes had been allowed by the enginemen to freeze, out of the total number of engines reported frozen up 108 actually came into the terminal hauling their trains while the cost of repairing the 132 locomotives totaled \$126.29, or less than the average of \$1 per engine.

Mr. Willard said he called the Railroad Administration's attention to a statement identical to that of Mr. McAdoo's which appeared in the operating section of Mr. McAdoo's annual report for 1918 and pointed out that such a statement was not only inaccurate but gave a wrong impression. The statement remained, however, in the annual report.

"Why should such a matter as that be so magnified?" asked Chairman Cummins and Senator Fernald of Maine.

"It was for the purpose of discrediting private ownership, at least that is my own private guess," replied Mr. Willard.

Replying to statements that have been made as to the inefficiency of labor during the war, and referred to by Mr. McAdoo in his testimony, Mr. Willard said that he did not think this criticism applied to the men in the train and engine service generally but that it did apply particularly to the unskilled labor and to the men connected with the shop crafts. Mr. Willard said that he had no reason to say that those men were not loyal and patriotic but that regardless of their patriotism and loyalty they were not in all cases as efficient in their positions as the men whose places they had taken, oftentimes because of their physical ability, skill and mechanical efficiency.

"I think there has been much misunderstanding as to what

is meant by inefficiency of labor," he said. "It was only natural that young, active and ambitious men should leave our employ and take better paying positions offered them with other industries. The railroads were compelled to employ men who because of their age, physical condition and skill, were not as efficient as the men who made up our rank and file under ordinary conditions previous to the war."

Mr. Willard said he was not discussing federal control of the railroads as a critic. He was in favor of the President taking over the railroads in the fall of 1917 and when his opinion was asked had unhesitatingly recommended that the President should exercise the power granted him in the army appropriation act of 1916. The railroads as common carriers, under the law were required to serve all without discrimination, but innumerable representatives of the government were issuing conflicting orders. He also pointed out that no suggestion that the railroads had broken down in 1917 is to be found in any of the public utterances of President Wilson. Mr. Willard said he could not help thinking that perhaps some of the unjustified criticism of the railroads of the character of that relating to the roundhouses and frozen engines "might have a tendency to stimulate, even if it did not justify other criticism of the character complained of by Mr. McAdoo and adverse to federal control."

In reply to Mr. McAdoo's statement that railroad managers claim that the roads were in "first-class condition in every respect" when taken over, Mr. Willard said that may be true of some of the roads and such a statement may have been made by some of the managers, although he could not recall ever having seen it. Certainly he had made no such statement, but he reiterated what he had previously said, that the Baltimore & Ohio was "in good serviceable condition for efficient operation when taken over by the government and that its standard of condition was substantially lower when surrendered by the government.

"That, however," he said, "is being fully investigated by the present director general and I have no doubt that the facts which I now state will be established. But whether the policy of the director general in that connection was wise or unwise, does not seem to me to be a question."

Referring to Mr. McAdoo's quotation, in opposition to statements by Mr. Willard, of a letter by J. J. Tatum, general supervisor of freight car repairs of the Railroad Administration, regarding the system of classifying bad order cars adopted by the administration, Mr. Willard said he had talked with Mr. Tatum and found nothing inconsistent between their statements. He said, and he quoted a new letter from Mr. Tatum to show, that the federal administration did order the establishment over the United States of a better system of classifying bad order cars than had been in effect generally, which was substantially the same as the system which for some years had been in effect on the Baltimore & Ohio. Mr. Tatum also said that efforts were made to comply with the system but that, owing to the urgent demand for cars and also to restrictions which were placed by the federal administration upon the amount of money which the federal managers were permitted to spend for car repairs and maintenance of equipment generally, the roads were not able to carry out the plan in its entirety or live up to the specifications and standards which were established. Mr. Willard said that personally he thought the administration had pursued the proper policy as to maintenance in 1918 while the war was still in progress but that during 1919 effective steps should have been taken to put the equipment in as good condition as it was when the government took possession.

Commenting on Mr. McAdoo's statement that the movement of bread cereals by the railroads in February and March, 1918 was one of the outstanding accomplishments of federal control and had "saved the war for America and the Allies" Mr. Willard said that the official records show

that the total amount of grains received at Boston, New York, Philadelphia and Baltimore for export during those months was 17,521,614 bushels and that during February and March, 1917, over 54,000 bushels of grain were delivered to the same four ports for export.

"Assuming that the entire amount which was received at the four ports mentioned—Boston, New York, Philadelphia and Baltimore—during the whole of the two months of February and March had been moved during the 30 day period between February 8 and March 15, within which time Mr. McAdoo states the situation was cleared up, it would have required an aggregate average movement of only 357 cars per day by all the railroads available for the service. Of the 17,500,000 bushels under consideration, however, only 8,170,000 were received at New York and having in mind the other uses to which the Baltimore & Ohio and the Pennsylvania facilities were primarily assigned at that time, it may be assumed, that the burden of moving the grain which reached New York, rested chiefly upon the New York Central, Erie, Lackawanna and Lehigh Valley Railroads and that it required an average aggregate daily movement by all of these lines of only 160 cars.

"It would appear that the burden which was thrown on the four northern roads in connection with the movement of bread cereals to our Allies and in connection with which he said it was necessary to absolutely arrest the domestic commerce of America did not exceed an average daily delivery of 160 loads in the aggregate at New York and was certainly well within the combined carrying capacity of all of the four lines mentioned or of any of them. Whatever was required of the railroads in that connection, however, was apparently performed in a satisfactory manner and if it resulted in saving the 'War for America and the Allies' as Mr. McAdoo asserted, we have much reason to be satisfied with and proud of the accomplishment."

"During the late summer and fall of 1917," Mr. Willard continued, "the Railroad War Board, having no such broad authority as the director general, nevertheless ordered and accomplished the movement of more than 35,000 empty box cars from the east to the west for return loading, practically three times as many cars as were involved in the particular movement referred to by Mr. McAdoo. It also appears in the report of the Railroad War Board that during the life of that Board in 1917 it actually ordered and largely accomplished the movement of more than 222,000 empty cars from places where they were not needed, to other places where they were needed. It might be thought from Mr. McAdoo's statement that the movement of empty cars ordered by him was something unprecedented. The report of the Railroad War Board already filed with this Committee shows clearly that such a thought would not be justified."

Taking up the serious coal situation that prevailed in New England in the winter of 1917-18, Mr. Willard said that "one might gain the impression from reading Mr. McAdoo's statement that the condition which he describes was brought about . . . by the inefficiency of the railroads."

"The coal situation in New England during the winter," said Mr. Willard, "was the logical and natural result of the policy of the government in commandeering all available bottoms for use in connection with the naval program. I think the policy which the government pursued in that connection was the proper one under all the circumstances. It was one of the conditions which was likely to arise when a nation goes to war, but upon the whole it seems to me that the situation was taken care of in a very creditable manner. I have no desire to minimize the accomplishment of the federal administration in that or any other connection. I simply desire that all the facts should be known, particularly so if the case itself has any bearing upon this hearing. Mr. McAdoo apparently seems to think that it has." Mr. Willard was to continue his statement on Friday.



Dinner in Honor of William G. Besler, President of the Central Railroad of New Jersey, Upon the Twentieth Anniversary of His Connection With That Road

Making Good With the Employees and the Public

How One Executive Has Gained the Confidence of His Co-workers
and the Communities Served

TWO OF THE MANY serious problems which confront railway executives today stand out so prominently that they overshadow all the others—these relate to securing better relations between the railroads and the public, and to the development of a more cordial spirit of co-operation between the managements and the employees. Upon the right solution of these two problems, and to a certain extent they are inter-related, depends not only the successful operation of a road but its very life indeed.

Some few roads have been eminently successful in improving their relations with the public and with their employees. Among these is the Central Railroad of New Jersey. The secret of its success in these respects was clearly demonstrated at a dinner which was given to its president, William G. Besler, on March 18, 1922, at the Hotel Biltmore, New York, in honor of his twentieth anniversary as an officer of that road. Among the speakers were the toastmaster, C. H. Stein, assistant to the president, Central Railroad of New Jersey; W. A. Garrett, general transportation manager, Baldwin Locomotive Works; F. T. Dickerson, secretary and treasurer, Central Railroad of New Jersey; Robert W. DeForest, vice-president and general counsel of the same road; DeWitt Van Buskirk, president of the Mechanics Trust Company, Bayonne, N. J.; B. E. Chapin, editor of the Railroad Employee; Clarence H. Howard, president of the Commonwealth Steel Company; Clarence E. Case of the New Jersey Senate, and Frank Hedley, president of the Interborough Rapid Transit Company.

The New General Manager

How Mr. Besler came to be connected with the Central Railroad of New Jersey was explained in a few words by Mr. Dickerson: "On March 18, 1902, I was a clerk in the executive department of the New Jersey Central. It was a Tuesday, and the late George F. Baer, who was president of the company, had, in accordance with his custom, come over from Philadelphia that morning. Our Lehigh and Susquehanna division, which is our main line in Pennsylvania,

was cut in two and out of business due to the devastating freshets and floods of the winter of 1901 and 1902. A strike at the coal mines in Pennsylvania, known as the Mitchell strike, was impending.

"President Baer came to my desk, with an expression upon his face that I can never forget. A desperate situation confronted him. He dictated the following telegram addressed to Mr. Besler, who was general superintendent of the Philadelphia & Reading: 'You are appointed general manager of the New Jersey Central, effective at once.' The next day a comparatively young man walked into our office and introduced himself as our new general manager."

In addition to the serious conditions in the flooded districts of Pennsylvania, Mr. Besler found the property generally in unsatisfactory condition. The roadway and structures were under-maintained and a goodly portion of the equipment was in a deplorable state. The spirit and morale of the employees was practically destroyed, the men being disgruntled and discouraged. The general public, antagonized, was unfriendly and the local press was hostile.

Cultivating the Public

In explaining the situation as to the relations with the public, Senator Case related the following incident: "I remember just prior to the time of his coming to the road there was a good deal of complaint on the part of those who had occasion along the line of the Central as passengers to use that road, and a committee was sent from our town to interview the then manager. He saw this committee—honest, perhaps, mistaken souls, thinking that they could make suggestions to a railroad management—and they were told very gruffly that a car of freight from California was worth more than all the passengers along the line. Now, there may have been a good deal of truth in that, but that is one of the things that Mr. Besler has had the good sense not to tell us. He has been exceedingly considerate and wise and expedient in his methods with those of us who live along the road."

In telling why Mr. Besler had made the road popular

with the public which it served, Mr. Van Buskirk said: "I have found Mr. Besler very responsive indeed to any suggestions that might be made to him along the lines of civic betterment, wherein the railroad could in any way perform a part. Mr. Besler has always been willing to meet with the heads of the industries, and confer with them about improvements that may be made that enter into their problems and the railroad problems."

Continuing, he said: "I know of Mr. Besler's interest in the civic interests of the various communities around New York. I have very frequently attended gatherings of chambers of commerce, boards of trade, and so forth, where he has spoken, and he has always been a welcome guest. He has always had something constructive to bring forward, and I believe that there is no man along the line of the Jersey Central that is more respected and beloved in the railroad fraternity than is Mr. Besler. He has, in every case where he could see his way clear to do it, given service, and he has regulated the train service to satisfy the requirements of the various communities."

Other speakers indicated that in cultivating the public Mr. Besler took special pains to cultivate the acquaintanceship of the editors of the local newspapers.

One speaker said: "He personally attended conferences and meetings of boards of trade, civic associations, and other public bodies and made them all see that he really was anxious to know their problems, and to co-operate in protecting their interests. He thus created a cordial relationship, and a spirit of mutual understanding with the patrons, based upon the motto, which originated with himself, 'A satisfied patron is our best advertisement.' The result has been that the relations with the public were never more harmonious and cordial than now, and this friendly attitude has been uniformly maintained for years."

A Big Family

In commenting upon the conditions as to the employees which existed on the Central of New Jersey prior to Mr. Besler's advent, Mr. Chapin said that he "knew of engineers coming to my office and saying, 'Well, I will let the damned old engine break down, what do I care?'"

Mr. Stein told about one of the engineers who came into his office recently and said: "Mr. Stein, you were not here when Mr. Besler came among us, you don't know the war that was on foot at that time, you don't know the spirit of the employees as they looked for this new manager, and how every one of them was up in arms, so you cannot appreciate the real seriousness of the situation as it existed then. The moment he lighted on the property and got among us he simply seemed to sweep away all discontent and all dissension, and everybody seemed to be happy; he brought about a spirit of concord and unity that we had never known before on the Jersey Central."

The exact way in which Mr. Besler brought about an improvement in the situation was related by Mr. Dickerson: "In his intercourse with the men in the service, Mr. Besler always applied the principles of the Golden Rule. His slogan was 'A happy and contented employee is our greatest asset'; and he enabled the men to see that he was not only preaching the Golden Rule, but that he was being guided by it in his dealings with them. He accomplished this by holding meetings with groups of employees, as well as by personal contact, and thus, by personal work, and by example and precept, an era of good feeling between employer and employee was established. One of the means that he made use of to establish personal relations with the men was through the Veterans' Association. The annual reunion of that association has been marked for many years as the occasion for a heart to heart talk, where Mr. Besler presents his problems to the men, and the men discuss their problems with him."

"The result of this policy is shown by the fact that when this company was face to face with the threatened strike of 1916, the pensioned and retired veterans volunteered to resume their old jobs, and keep the trains running."

"Another indication of Mr. Besler's interest in the welfare of the men may be shown by the fact that in the passenger station at Jersey City, through his generous support, an athletic association, which has grown to a membership of 1,800, was organized and provided with accommodations for recreation, social and educational purposes, thus adding greatly to the happiness and comfort of the men in the terminal district."

"Let me give an illustration of his method of leadership. Some of us will recall the unusually heavy snow storm of Sunday, March 1, 1914. In the afternoon it turned to sleet. Trains were stalled, telegraph poles and wires had fallen in a tangled mass across the tracks and on top of the stalled trains over practically our entire system. Telegraph and telephone communication along the line was impossible. Wreck trains and work trains, with gangs of men, were sent out to help clear the road and restore normal conditions as soon as possible."

"Mr. Besler had been confined to his home under the doctor's care, but knowing the conditions which confronted us he left a sick bed and took personal charge of the work, thus inspiring and encouraging the men—with the result that the road was soon cleared of poles, wires, snow and ice, and he and his crews then proceeded to assist a neighboring line in opening up its tracks."

"As an illustration of the friendly regard which our men have for our president, I might state that it is not unusual to see men from the ranks seeking just a moment of his time for the exchange of friendly greetings. It might be a pilot, a man from the shops, or a locomotive engineer, or conductor. I recall, not long ago, that we had a visit from the vice-president of another road. The president was engaged at the time, and the situation was explained to the caller. In a few moments two of our locomotive engineers, dressed in overalls, walked out of the president's office with smiles that were born of the heart. The vice-president who was calling and who seemed surprised at what he saw, asked me concerning this incident, and I explained that this was of frequent occurrence; that our employees from every branch of the service delighted in calling to pay their respects to the president, and always found him accessible and a welcome awaiting them."

The extracts from the addresses quoted above indicate some of the things which were done by Mr. Besler to bring about the conditions which exist today. They are simple and not at all spectacular, and yet they have secured results—results which are lacking on too many roads.

That Mr. Besler enjoys a correspondingly good standing with the executives of other roads is indicated by his selection as first vice-president of the American Railway Association.



A Well-Loaded Car on the W. & L. E.



Engine Terminal at West Roanoke

N. & W. Increases Net Operating Revenue

Net Increases 373 Per Cent—Gross Declines 8.73 Per Cent and Expenses 24.65 Per Cent—Maintenance No Lower

THE NORFOLK & WESTERN annual report made public on Monday of last week has a special interest because it was the first report covering the year ended December 31, 1921, to be issued by one of the larger roads. It is interesting to examine the figures given in the report, therefore, not only with a view to seeing what they tell about the operations of this particular carrier in 1921 but also with a view to getting an idea as to the kind of reports we may expect to see from the other important railroads.

First of all, the Norfolk & Western report shows a large measure of improvement over 1920 conditions. It does not show an improvement to a pre-war status, but the amount and kind of improvement is such as to augur well for 1922. The corporate income account, which in the final analysis is the principal factor, showed for 1921 a net income available for dividends of \$10,043,181 as compared with \$12,496,788 in 1920, a decrease of 19.63 per cent. The usual dividends were paid, namely four per cent on the preferred, totaling \$916,692, and seven per cent on the common, or \$8,505,271.

The difficulty of using net corporate income in comparing 1921 with 1920 is that one is unable to get an idea of the real operating conditions because in 1920 operations for two months were covered by the standard return and for six months by the guaranty. A better guide it would seem, there-

fore, would be net after rentals. This figure shows the actual results of operation and it is to be presumed that if there was any kind of an improvement at all, it would continue into the present year and perforce be reflected in the corporate net for 1922. The Norfolk & Western's net after rentals in 1921 was, as reported in the December earnings' statement to the Interstate Commerce Commission, \$14,870,021 as compared with \$3,655,717 in 1920. Although this represents an increase of about four times it does not bring the Norfolk & Western back to its pre-war standard of earnings. The standard return based on the average net after rentals in the three years ending June 30, 1917, is as good a basis of comparison as may be found. The Norfolk & Western's standard return was \$20,534,163.

Continuing our idea of using the Norfolk & Western's figures as an index to what we may expect in the annual reports of the other railroads of the country for 1921, let us next examine its gross earnings and expenses. In 1921, the Norfolk & Western carried 33,100,267 tons of revenue freight, a decrease of 11,000,808 tons from 1920, or 27.04 per cent. Its revenue ton-miles totaled 8,482,095,487, a decrease of 23.33 per cent. Its freight revenues totaled \$67,294,972, a decrease of \$6,623,330, or of 8.96 per cent, which latter per cent is smaller than the decrease in revenue tons

NORFOLK AND WESTERN OPERATING RESULTS 1912-1921

Year ended June 30	Freight revenue	Total operating revenue	Operating expenses	Net operating revenue	Operating ratio	Revenue tons	Per cent of coal tons to total	Revenue ton miles	Avg. Revenue haul train load	Revenue car load
1912	\$34,022,572	\$39,735,237	\$25,669,430	\$14,065,807	64.60	29,335,583	67.60	8,030,301,398	274	692
1913	37,588,024	43,739,921	28,565,813	15,174,108	65.31	32,701,743	64.71	8,856,070,381	271	764
1914	38,038,622	44,470,619	29,935,842	14,534,777	67.32	34,000,572	68.30	9,155,506,727	269	802
1915	36,550,550	42,987,044	27,831,815	15,155,228	64.74	32,767,701	71.05	8,918,549,288	272	841
1916	49,559,140	57,304,586	32,181,346	25,123,240	56.16	44,373,456	68.22	11,795,891,557	266	967
Year ended Dec. 31										
1916	51,114,186	59,449,982	33,508,732	25,941,249	56.36	46,421,391	66.03	12,110,422,936	261	980
1917	56,381,036	65,910,242	41,161,503	24,748,739	62.45	48,196,792	60.18	12,456,970,303	258	1,021
1918	68,752,260	82,004,034	61,579,297	20,424,737	75.09	46,601,920	58.77	12,255,303,617	262	1,041
1919	62,681,028	76,925,599	64,021,285	12,904,314	83.22	37,944,615	63.95	10,026,871,217	264	1,106
1920	73,918,301	88,489,356	84,943,837	3,545,519	95.99	40,685,743	63.99	11,063,033,480	272	1,107
1921	67,294,972	80,760,589	64,006,171	16,754,418	79.25	29,684,935	73.33	8,482,095,487	286	1,013

because of an increase in receipts per ton-mile of 18.71 per cent. Total operating revenues in 1921 were \$80,760,589 as compared with \$88,489,356, a decrease in 1921 as compared with 1920 of 8.73 per cent.

Increased Net Operating Revenue of 372.55 Per Cent

The real story of Norfolk & Western improvement in 1921 came in the decrease in operating expenses. As compared with a decrease of 8.73 per cent in operating revenues, there was a decrease of 24.65 per cent in operating expenses. The result was a percentage increase in net operating revenue of—the figure is so large as to sound incorrect—372.55 per cent.

Total operating expenses in 1921 were \$64,006,171 as compared with \$84,943,837 in 1920. The net operating revenue was \$16,754,418 as against \$3,545,519 in 1920. The operating ratio in 1921 was 79.25; in 1920, 95.99.

In view of the decreased revenue ton-miles which figured out at 23.33 per cent and the increase in net operating revenue of 372.55 per cent, it would seem somewhat unnecessary to make any extended comment on what the Norfolk & Western net would have been with a larger volume of traffic.

The next question that arises is the manner in which the Norfolk & Western succeeded in decreasing its operating expenses to the extent of 24.65 per cent. An analysis will show that the decrease came about through lessened wage costs, and lower material and fuel costs. For 1921 as compared with 1920, payrolls decreased 30.8 per cent (the number of employees at the beginning of the year was 30,993; at the end 22,732); cost of fuel decreased 28.5 per cent and cost of other materials decreased 17.0 per cent. With reference to the reduction in fuel costs, whereas in 1920 the average cost of fuel was \$4.33 a ton in 1921 it was but \$3.39 a ton. The company secured 547,790 tons of its fuel

ing up and improving these standards. First as to equipment. The total expenses for maintenance of equipment were reduced 34.88 per cent. That sounds as if the road may have cut its maintenance of equipment unduly. One of the best means of checking a thing of that sort is the percentage of bad-order cars and unserviceable locomotives. The figures show that the Norfolk & Western's equipment condition is much better than the average. The latest figures available are those for March 1, 1922. On that date the road had on its line 1,045 bad-order cars needing light repairs and 1,590 needing heavy repairs, a total of 7.1 per cent. The average for all the roads in the country on that date was 14.7 per



The New Tie Treating Plant at East Radford, Va.

cent. The N. & W. locomotives out of service on March 1 for repairs requiring over 24 hours totaled 8.2 per cent of the engines in service. The average for all roads on the same date was 20.2. It should be sufficiently evident that the Norfolk & Western—despite its sharp decrease in maintenance of equipment expenses—did not make these decreases at the expense of its maintenance condition. It is interesting in this connection to notice that the repairs, depreciation and retirement expenses for steam freight locomotives in 1921 were decreased from \$11,001 to \$6,792 per locomotive, or 38.3 per cent; and of freight cars from \$281.64 to \$194.70 per car, or 30.6 per cent.

The decrease in maintenance of way expenses was \$1,032,545 or 8.06 per cent. There were several of the primary accounts, however, which showed a marked increase, notably ties, \$794,186 or 46.25 per cent, and rails, \$375,774 or 70.43 per cent. Track laying and surfacing, however, showed a decrease of \$754,373 or 26.09 per cent and ballast \$337,717 or 67.32 per cent. Taking the situation as a whole it is evident that the savings made were in labor and that they did not represent scrimping in maintenance standards.

More Rail and Ties

It is of interest to put this in terms of materials, bearing in mind, of course, that to a certain extent expenses for material may be charged partly to capital account as additions and betterments. The figures show that the Norfolk & Western laid more rail, and put in more ties than its annual average for the past few years, but that this statement does not similarly apply to ballast. The figures follow:

Year	New rail laid tons	Ties number	Tie plates number	Ballast yards
1916	26,853	1,504,019	337,598	954,303
1917	11,530	1,143,069	473,911	693,733
1918	17,980	1,201,601	357,790	679,389
1919	7,510	1,079,230	316,627	650,750
1920	8,856	1,252,680	453,049	557,639
1921	39,940	1,703,232	1,089,027	379,464
		Treated 83,808		

During the year there were laid 42 miles of new 130-lb. rail, a new departure for the Norfolk & Western. There were laid also 142 miles of 100-lb. rail. At the end of the year of a total trackage of 4,313 miles, 44 were laid with



A View of the 200,000 Gal. Storage Basin for the New Water Supply Plant at Roanoke

supply from its own mines at an average cost of \$2.92 per ton.

Charges to maintenance of way in 1921 totaled \$11,778,985 or 8.06 per cent less than in 1920; to maintenance of equipment, \$19,342,536 or 34.88 per cent less and to transportation \$30,018,159 or 24.06 per cent less. The ratio of transportation expenses to total revenues in 1921 was 37.17 in 1921 as compared with 44.67 in 1920, but it will be noted that the decrease in transportation expenses was not quite as large as the decrease in revenue ton miles.

Bad-Order Cars on March 1, Only 7.1 Per Cent

Norfolk & Western maintenance standards are high. It is apparent that during 1921 much effort was devoted to keep-

130-lb. rail; 1,249 with 100-lb. rail and 2,080 with 85-lb. rail, the remainder, principally branches, sidings, etc., with lighter rail. The road's practice in the past has been to use white oak ties and although it is still using white oak ties, their installation is being confined chiefly to heavy traffic curves and tangent track where mechanical wear is the determining life factor. About 20 per cent of the annual tie requirements are being met through the use of treated red oak, a plant capable of four different preservative methods having been built at East Radford, Va., with a capacity of 1,500,000 tons annually. The increased attention thus given to the securing of a greater tie life has resulted in the use of a greater amount of tie plated track, the benefits of which, in connection with the treated ties, will not be immediately apparent. The details given should indicate that the Norfolk & Western maintenance of way standards have apparently been much improved during the past year in spite of the decrease in maintenance of way expenses of 3.06 per cent.

Speaking further of improvements, it should be noted that the total additions and betterments charged to capital account in 1921 were \$5,297,395 including \$994,566 for new branches and extensions, \$4,658,773 to other way and structures and \$638,622 to equipment. The big item under new branches and extensions was the Lenore branch 18 miles, Lenore, W. Va., to the coal lands of the United Thacker Coal Company in Mingo County, W. Va. This was completed November 1; its total cost was \$2,200,000 and it serves coal lands leased by the coal company extending over 26,000 acres. Other important improvements completed were the tie-treating plant at East Radford, Va., already mentioned, new engine house facilities at West Roanoke, a new 16-stall roundhouse at Bristol, Va., a new pumping plant at East Radford, etc.

Coal 73.33 Per Cent of Total Tonnage

One of the most interesting features of Norfolk & Western operations in 1921 was the manner in which its coal traffic held up proportionally to the other traffic. Its total bituminous coal tonnage was 21,766,196 as compared with 26,035,500 in 1920. This was a decrease of 4,269,304 tons as compared with a decrease of all revenue tonnage of 11,696,975. The result was that whereas in 1920 bituminous coal tonnage made up 63.99 per cent of the total tonnage, in 1921 it made up 73.33 per cent. Although the coal tonnage held up, speaking comparatively, it was the smallest for several years, for in 1919 it totaled over 24,000,000 tons; in 1918, over 27,000,000 and in 1917 over 29,000,000. The interesting factor in the Norfolk & Western's coal business is the coal dumpings at Norfolk. It is presumably well known that the N. & W. dumps more coal at its Norfolk piers than is dumped at any other Atlantic Coast pier., In 1920 when America through its coal export trade was realizing on the difficulties occasioned to the British operators by the coal strike there were dumped at Norfolk 8,807,803 gross tons. In 1919, the dumpings totaled 6,820,341 gross tons, which decrease while large does not seem to be as great as might have been expected under the conditions. The figures for coal dumpings at Norfolk for the past several years are as follows:

Year	Cars	Tons
1915		7,503,607
1916	141,193	7,450,802
1917	102,498	6,321,457
1918	132,790	7,914,644
1919	96,896	5,874,540
1920	147,750	8,807,803
1921	116,172	6,820,341

Although the tonnage the Norfolk & Western moves to its Norfolk piers is a most important factor in the road's operations and was the primary reason why it has secured 100 and 120-ton coal cars, it will also be borne in mind that the road through its connections has a good route to the lakes. The lake coal business of the carriers in general was good

during 1921 and it is to be presumed that the Norfolk & Western supplied its proper share of it. The uncertain feature of the coal business at present and, therefore, of the Norfolk & Western earnings is the labor situation in the coal industry. The coal fields served by the Norfolk & Western are the Thacker, Pocahontas, Tug River, Clinch Valley and Kenova. These are all non-union and will, it is expected, not participate in the strike. Whether they do or not, is an important factor to be watched in connection with the Norfolk & Western's operating results for the coming few months.

Lehigh Valley Offers Employees Insurance at Reduced Rates

THE LEHIGH VALLEY, according to a plan just announced, is offering accident and life insurance at exceptionally low rates to all its employees. The company has arranged with the Travelers' Insurance Company of Hartford, Conn., to handle the insurance and the group policy totals about \$50,000,000, said to be the largest policy of its kind ever written.

The plan is optional and is open to all active employees who have been in service a year or more. Some 18,500 of the Lehigh Valley's 20,000 employees are eligible. Enrollment of 75 per cent of the employees on each division was necessary to put the plan in force on that division. Every one of the road's divisions have exceeded this percentage. Premiums will be deducted from earnings. No medical examinations are required.

The insurance protects the families of employees against the death of the breadwinner and also provides accident benefits against death, dismemberment or loss of sight. The amount of insurance allowed to each man ranges from \$2,000 to \$4,000 according to the classification in which he falls. This amount is divided equally between life and accident insurance. Engineers, conductors, shop foremen, and supervisory forces are entitled to \$4,000. Trainmen not included in the preceding classifications are entitled to \$3,000. Other employees fall in the \$2,000 class. All over 70 years of age are limited to \$1,000.

The amount of the life insurance is payable in the event of the employee's death from any cause while his insurance is in force, to the person named as beneficiary. If an insured employee becomes wholly disabled by either bodily injuries or disease before his sixtieth birthday and will be permanently prevented thereby for life from engaging in any occupation, the amount of his life insurance will be paid to him in a fixed number of instalments chosen by him. If he dies before receiving all of the instalments, they will go to his beneficiary until completed.

The policy regards the irrecoverable loss of both eyes or the loss of the use of both hands, both feet, or the loss of the use of one hand and one foot as permanent total disability. Under the accident part of the policy the employee is insured against loss resulting from bodily injuries. It pays the principal sum for loss of life, both eyes, both hands or both feet and one hand and one foot, and pays half the principal sum for the loss of one hand or one foot or one eye.

Premiums are 80 and 90 cents and \$1.00 a month, depending upon occupation, for both \$1,000 of accident and \$1,000 of life insurance. Rates on different amounts are proportionate.

Termination of employment with the company cancels the insurance, except that the employee leaving the service may continue his life insurance with the insurance company without a physical examination. This insurance he may continue in any form except term insurance, but he is required to pay regular premium rates, and not the reduced rate secured while in the employ of the Lehigh Valley.

Labor Leaders Argue for Large Wage Increases

B. M. Jewell and F. J. Warne Present Labor Board With Mass of Data on Railroad Situation

HEARINGS BEFORE the Railroad Labor Board in the present controversy over proposed reductions in the wages of the railway shop employees continued during the past week with Frank J. Warne presenting a mass of statistics, charts and oral testimony on the financial history of the railroads, interlocking directorates, freight and passenger rates and many other phases of the general railroad situation. The introduction of evidence of this character was protested by representatives of the carriers as entirely irrelevant but the Board permitted Mr. Warne to continue. A great deal of Mr. Warne's testimony is the same as that which he presented before the Senate committee on Interstate Commerce during the course of its recent hearings.

B. M. Jewell's Testimony

B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, completed his testimony (the greater part of which was abstracted in last week's *Railway Age*) on March 30. In closing he said:

My purpose has been to describe as well as we could in brief space the working of the present wage system. For it is only against such a background that the full implications of the present case can be seen. From the facts developed it appears that there is a steady tendency for decisions vitally affecting the livelihood of the people to be made according to business standards, that is, according to standards which place interest, rents and dividends ahead of the return to wage earners of the regular supplies which their families need for health and comfort. The results are apparent enough, an increasing absorption of national purchasing power by so small a percentage of the population that it ceases to create a normal demand for the production of enough essentials to meet the real requirements of the country. It is our belief that, wholly aside from the justice of wage demands, this tendency cannot continue indefinitely without undermining the very foundation of the social structure.

Early in my presentation we asked two questions:

First—If industry can pay a living wage but will not, what should be the attitude of the workers?

Second—If industry as at present operated cannot pay a living wage, what should be the attitude of the workers?

Our study of the wage question during the inflation period has developed clearly that the extent to which industry is able to pay a living wage has nothing to do with its payment. Labor does not share as a partner in the increased profits of prosperity. Whether prices rise or fall, whether production goes up or down, labor is tied close to the lowest level at which it can be bought in the market which capital owns and controls. Therefore, it is clear that industry does not intend to pay a living wage.

Our study of the ability of industry as at present organized has further shown us that the prime purpose for which business is today operated will always prevent the production of those goods necessary to a comfortable living in sufficient quantity to be able to afford them to every family.

The "Will to Pay a Living Wage"

As a matter of fact the two questions are really one. So long as industry will not pay a living wage it cannot, because purchasing power creates the demand which production satisfied. Without that purchasing power, extra production of wheat and corn and vegetables and fruit would be dumped in the creeks and rivers as oversupply. But our examination of the possibility of physical production shows us that the converse is also true. If industry will pay a living wage it can pay a living wage.

Our physical resources, our plant, our labor power, our scientific knowledge, all these are more than adequate. Only the will to pay a living wage is absent. We came here, then, as consumers seeking recognition of our right to sufficient purchasing power to enable us to call forth such products as are essential to the well-being and homely comforts of family life. We have developed clearly in our study the nature of the market in which wages are determined, that is, in which the purchasing power of the community is apportioned. This market operates according to the unending law of commercialism, "charge what the traffic will

bear," "capitalization based on the highest limit of prospective earning power." The productive system and its product are considered as the property of commercial capital. From the sale of the product commercial capital pays costs and keeps the rest as a return on property,—either rent, interest or profits. Labor is merely one of the costs like upkeep of machinery. Capitalization of prospective profits means that capital must absorb all increased productivity.

In our study of the deflation period we have seen the operation of the system in its crudest form. We are now in such a period. Our findings may be summarized in a single brief paragraph which places the present wage demands of railroad management, together with all the wage data which they have presented in their true setting.

Industry Preparing to Absorb Entire Increase When Production Increases

The interests in control of prices and jobs have put the lid on domestic consumption at just the time when wages are beginning to overtake prices. They are holding the lid on until they get low wages in all industries, including low returns to farmers. They are pursuing this policy in order that when increased production is again initiated they can again absorb the entire increase. The process which we traced through the inflation period, prices running ahead of wages, will then be repeated.

This is the way the business cycle works. If the Labor Board, constituted to provide just and reasonable wages, must conform to this cycle, then the employees of industry will have to answer the question which we have asked in terms which will protect their interests as consumers. That, to our mind, is a justification, and completely so, for the request for increases that we have presented to this Board.

F. J. Warne Attacks Carrier's Evidence on "Wages in Other Industries"

The first part of Mr. Warne's testimony was devoted to an attempt to discredit the material which has been submitted to the Board by representatives of the carriers and dealing with the "wages being paid by other industries." In beginning his presentation he said:

It is quite evident at the very outset that we must know the exact meaning or application of "other industries" if this Board in its decision is to mete out economic and industrial justice to the railway employees.

By "other industries" it unquestionably cannot be meant to include any industry of which any railroad company as a corporation is in control, or in the affairs of which it has any influence, either direct or indirect, in the determination of wages to employees in that industry. Otherwise the provision of the Transportation Act above referred to would be subject to justifiable ridicule.

This is true, for the reason that the result would be that wages of railway employees, which this Board has been authorized and directed to determine to be just and reasonable, would be determined, in so far as such a comparison enters into the determination, by the wages in "other industries" which have been fixed by the railroad corporations in control of or having influence over them. In brief wages of railway employees would be determined by the railroad corporations and not by this Board.

He then attempted to support this position by reciting a long list of interlocking directorates and purporting to show the interests of certain railway directors in other industries. Upon being questioned, Mr. Warne indicated that the holding of an interest in any "outside" company by a railway officer should automatically eliminate the wages paid by that company as factors in the determination of just and reasonable wage scale for railway employees.

B. W. Hooper Defends President Harding and the Administration

On March 31, Mr. Warne opened his testimony by referring to the "conspiracy charges" recently made by Senator

LaFollette. This reference immediately brought forth a long and extended cross examination of the witness by J. L. Coleman, counsel for the western roads in which the latter exploded Mr. Warne's charges and the former took refuge in evading questions on the grounds that he had prepared his testimony and desired to present it in a certain way.

During the course of this cross examination Mr. Coleman made the statement that the first suggestion that labor costs be reduced came from the Interstate Commerce Commission and that later President Harding with his cabinet became interested in the suggestion. Ben W. Hooper, member of the public group on the Board and acting as chairman at the time, misunderstanding the import of Mr. Coleman's remarks, immediately rose to the defense of the administration stating:

“Insofar as the members of this Board are concerned, neither the President nor any member of his cabinet or anyone highly connected with the administration has ever given the slightest intimation publicly or privately as to what course should be pursued in regard to the increase or reduction of wages of the employees. The President himself, I happen to know, has very scrupulously kept separate and apart from any discussion of that matter and from any appearance of wanting to indicate to the Board in any way as to what its course should be in regard to that particular proposition.

F. J. Warne Continues Presentation

of Employee's Case

On the strength of the fact that certain carriers, parties to this dispute, have pleaded inability to pay as a factor in their requests for lower wages, Mr. Warne took up several of the board's sessions with the presentation of lengthy arguments on the financial condition of the carriers, their revenues and expenses, and other subjects of a similar nature. All of this material had previously been presented to the Senate Committee on Interstate Commerce. He was frequently interrupted and examined by representatives of the carriers who sometimes protested against the introduction of this data and at other times pointed out the fallacy in Mr. Warne's reasoning, his lack of qualifying experience, etc. He was, nevertheless, allowed to continue with this testimony.

The next point taken up by Mr. Warne was an attempt to prove that there is no relation between transportation rates and the wages of railway employees. After considerable discussion on the increases in transportation rates which have been allowed by the Interstate Commerce Commission, during the course of which Mr. Warne several times quoted from the transcript of hearings before the Interstate Commerce Commission, the chairman of the board said:

“Do you not think that this hearing is degenerating into a situation where, if someone should drop in here and listen to the discussions going on, that person would suspect that he was listening to a hearing before the Interstate Commerce Commission and not to a hearing before the Labor Board, and ought it not be pretty well understood by both parties to the controversy that the board will not put itself in the position of bargaining off the wages of railway employees for a prospective or already realized reduction in passenger or freight rates, or both? This board can only consider those things set out in the statute and the elements there laid down for consideration. While all of this discussion about freight rates may be entertaining to you gentlemen, it at the same time involves something of an assumption that the board is going to bargain off the wages of employees for a reduction in rates. I do not believe the board could be expected to do that and it can only act upon testimony that has a bearing on the seven elements that are set out in the Transportation Act.”

Mr. Warne closed this phase of his testimony with the statement that:

“The point is that increases in rates have been considerably more than the increases in wages in the same period

of time and that there could be, if necessary, a rate reduction (although I would like to have it understood that the employees are not arguing for a reduction of transportation rates) but if there had to be a rate reduction, it can be made without reductions in rates of wages and still the relative proportion of freight rate increases to the wage increases would be greater.”

Mr. Warne, in addition, presented considerable evidence to show that business was rapidly approaching normal and closed this phase of his testimony with the statement that:

“Because of this marked tendency towards industrial revival and an increase in consequence in the volume of railway traffic, which by itself will increase the operating revenues of the carriers, the railway employees contend most emphatically that there is no economic nor even political necessity at the present time for a decrease in their wages in order to secure the much to be desired reductions in the present high transportation rates.”

The testimony of Frank J. Warne before the Labor Board in the wage reduction case was concluded on April 4, Mr. Warne being recalled to Washington to appear before the Interstate Commerce Commission. Mr. Jewell, directing the presentation of the shop crafts' case, then called upon representatives of the organizations comprising the federated shop crafts to present specific rebuttal testimony to the evidence presented by the carriers.

Group Three Nominates Representatives

for Labor Board

Officers of those unions whose membership embraces employees in “Group 3” as defined by the Interstate Commerce Commission, met at Chicago on April 3 and made the following nominations for appointment to the Railroad Labor Board to fill the vacancy caused by the recent resignation of Albert Phillips.

J. H. Sylvester, vice-president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees; D. W. Helt, president of the Brotherhood of Railway Signalmen; Timothy Healy, president of the Brotherhood of Stationary Firemen and Oilers; J. J. Farnan, vice-president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers; J. F. Dewey and C. Z. Taylor, Order of Railroad Telegraphers. These names will be submitted to President Harding at once. Various of the labor leaders at the meeting stated that in view of the fact that almost 71 per cent of the railway employees were in this group they are entitled to a representative on the board.

Clerks Petition for Abolition of Labor Board

Protesting the alleged “unfair treatment” accorded their members by the Labor Board, the Eastern Federation of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees recently forwarded to the board a copy of a resolution to petition President Harding to abolish that body immediately. The resolution declared it was “self-evident that recent decisions are unfair, unjust and contrary to the principles of fair play.” It referred particularly to several recent decisions, upholding the right of the carriers to lay off men one day a week after reaching an agreement to do so with the employees.

Manufacturers Present Wage Data to Board

The Illinois Manufacturers Association recently submitted to the board an exhaustive survey of the wages being paid in other industries in various cities in Illinois and substantiating the material already presented to the board by the railroads.

In submitting the results of this independent study to the board, George R. Myercord, chairman of the railway com-

mittee of the Illinois Manufacturers Association, said in part:

Our independently gathered statistics show the same results as those gathered by the railroads. It is apparent that the wages paid in the small industrial centers are very much lower than those paid in the large communities and the object of this letter is to acquaint you with the fact that we wish to go on record to the effect that the statistics submitted to your board by the railroads are a true representation of fact as to wages paid in private industry in the different communities.

As it is vital to industry that lower freight rates obtain, we plead with you to take into consideration in your decision the fact that industrial wages are lower and vary with communities.

We respectfully point out that you will completely disrupt the industrial foundations of communities if your decision is based on a uniform percentage reduction in crafts and you see fit to ignore the great difference in wages existing between communities.

Wage Cut Hearings to End Before May 1

At the end of the Board's session on March 31 the Board announced that the hearing of the dispute as to rules and working conditions between the carriers and the Brotherhood of Locomotive Engineers and the Brotherhood of Firemen and Enginemen would begin on May 1 and that the hearing now in progress should be completed before that date. The division of time between the various classes of employees and the carriers was left for settlement by conference.

Pennsylvania-Labor Board Dispute

Before Federal Court

The controversy between the Pennsylvania and the Labor Board as to the authority of that body to authorize the procedure to be followed in the election of representatives of employees with whom new rules and working conditions could be negotiated was finally heard by Judge George M. Page of the United States District Court at Chicago on April 3 and 4. The hearings before Judge Page were on a temporary injunction against the Board granted the Pennsylvania several months ago and restraining the Board from issuing an order which the Pennsylvania believed would be unfair. The district attorney's office which is handling the case for the Labor Board is petitioning for the dismissal of this temporary injunction.

Blackburn Esterlin, special assistant to the attorney general of the United States, and Judge R. M. Barton, chairman of the Railroad Labor Board, presented the Board's case before Judge Page, contending that the court did not have jurisdiction in the dispute, inasmuch as the board is part of the administrative branch of the government. Judge Barton also contended that if this position were to be overruled by the court the Board was still within its authority in prescribing the procedure by means of which representatives of the employees on the Pennsylvania should be selected.

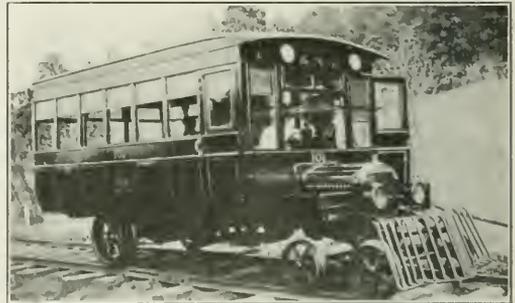
T. J. Scofield, appearing on behalf of the Pennsylvania, presented a lengthy brief setting forth the contentions of the carrier and argued in opposition to the contentions of both Mr. Esterlin and Judge Barton. Mr. Scofield introduced arguments on the powers of the Board under various sections of the Transportation Act and declared there was no authority in the act to allow the board to declare contracts void, as was done when the Pennsylvania negotiated new rules and working conditions with its employees. At the close of the hearing Judge Page announced that he would hand down his decision in the immediate future.

A BUILDING AND LOAN ASSOCIATION has been started by the employees of the Pennsylvania Railroad, in the general offices at Philadelphia, to be called the "Broad Building and Loan Association." E. T. Kennah, superintendent of car service is president and Walton M. Wentz, vice president; Charles P. Brady is secretary and William Leutz, treasurer.

White Gasoline Motor Car on Tennessee, Kentucky & Northern

IN 1919 the Tennessee, Kentucky & Northern decided to install a gasoline motor car for handling its passenger traffic. At the time there were very few cars of this type in service and the officers were unable to get information regarding the construction of such equipment. Nevertheless, the railroad worked out plans for a car which was built by the White Motor Company at Nashville, Tenn., and put in service in July, 1919.

The car has a seating capacity of 20, the body being 14 ft. 10 in. long, 7 ft. 6 in. wide and 6 ft. 9 in. high. The front of the car is carried on a four-wheel truck with 20-in. diameter wheels; the car is driven from the two rear wheels, which are 33 in. in diameter. It was first put in service with a two-wheel front truck but this was not satisfactory and was soon changed to the four-wheel truck now in use. The wheel-



Gasoline Motor Car, in Service Since 1919 on the T. K. & N.

base of the car is 14 ft. 8 in. and the light weight 9,000 lb. It has the White two-ton truck motor, transmission and brakes, hand-operated sander, and a whistle operated by the exhaust from the engine.

Since it was put in service, the car has made two round trips of 36 miles daily over tracks that have 75 curves in 18 miles.

The curves range from 3 degrees to 20 degrees. The line also has grades as high as three per cent with several 1½ per cent grades two miles long. The average daily mileage is 75 and the total to date about 100,000 miles.

The performance of the car has been entirely satisfactory. It is operated by one man and makes about 13 miles per gallon of gasoline and 270 miles per gallon of oil. The railroad states that the operating expenses per mile amount to 9.8 cents and that the car has increased passenger revenues at least 100 per cent.

"FACTS AND FACTORS in Proper Grain Door Installation and Conservation" is the title of a large illustrated poster prepared by the Grain Door Reclamation and Coöperation Bureau, Chicago, and recently issued by the General Managers' Association of that city. The problem discussed is that of over-nailing and spiking grain doors to the door posts of freight cars. "This," says the poster, "causes delay to the unloaders and often results in needless destruction of the grain doors; also, over-sized nails are usually left in the posts which damage other freight later shipped in the same cars. Recommendations of suitable nail dimensions, varying according to the thickness of the grain doors, and illustrations showing both correct and incorrect methods of installing grain doors and reinforcements are given in the association's poster.

General News Department

Train No. 10, the northbound Florida Limited, of the Seaboard Air Line, was derailed on April 4, at Ford, Ga.; several passengers were slightly injured.

R. H. Ford, assistant chief engineer of the Chicago, Rock Island & Pacific, will present a paper on Labor Saving Appliances in Railroad Work before the Western Society of Engineers, at Chicago, on April 20.

In the Shops of the Philadelphia & Reading the working time has been reduced to five days a week; and in the coal regions, where mining has been suspended, numbers of car inspectors have been laid off.

Malicious Loosening of a Rail is given as the cause of the derailment of freight train No. 92 of the Atlanta, Birmingham & Atlantic on the night of March 28, near Manchester, Ga. The fireman was killed and the engineman fatally injured.

Ten Bandits held up a freight train on the New York Central near Poughkeepsie, N. Y., early in the morning of April 2. Several cars were entered but nothing was stolen. The robbers evidently mistook the train for a silk train which passed the point some minutes before.

The Mexican Chamber of Commerce of the United States has been incorporated in New York and has opened offices in the Woolworth building, New York. The directorate is composed equally of citizens of both countries and the purposes of the organization to foster trade between the two countries and to foster friendly relations generally.

William S. Wollner, general safety agent of the Northwestern Pacific, has been elected vice-president of the Society of Safety Engineers of California. Wollner is a past president of the American Association of Engineers and at the time of his appointment as general safety agent of the Northwestern Pacific was assistant to the chief engineer of that company.

Missouri Pacific passenger train No. 12, enroute from Kansas City, Mo., to St. Louis, was derailed on March 31 by a landslide near Boles, Mo., 50 miles west of St. Louis. The engine and the first four cars left the tracks and plunged down a fairly steep embankment to the edge of the Missouri river. It is said that recent heavy rains caused parts of high bluffs along the right of way to fall under additional weight. There were no casualties.

Grade Separation in Texas

During the past three years the State Highway Commission of Texas, according to J. P. Fauntleroy, State highway engineer, has made provisions for the elimination of 150 railway grade crossings and contemplates the elimination of crossings at 50 more points.

Derailment on the Pennsylvania

In the derailment of a passenger train on the Pennsylvania Railroad near Halifax, Pa., early on the morning of March 31, five sleeping cars and one coach were ditched and a dozen passengers were injured; but the injuries are reported as slight and the cars remained upright. The train was southbound express No. 574, the Dominion Express, from Buffalo, N. Y., to Washington, D. C. Halifax is 18 miles north of Harrisburg.

Illinois Central Wins 28-Year Old Suit

After 28 years of litigation, a \$100,000 damage suit of the Illinois Central against the city of Chicago was settled by a compromise on March 28, the city agreeing to pay the road \$39,050. The suit was the result of damages caused by the

burning of box cars by strikers during the A. R. U. conflict on July 5, 1894. The railroad maintained that this damage could have been averted if the city had provided adequate police protection.

Western Railway Club

The Western Railway Club will hold a meeting at the Great Northern Hotel, Chicago, on April 17, at which a paper entitled "Locomotive Types from a Transportation View Point," will be read by J. F. Porterfield, general superintendent of transportation of the Illinois Central, and will be the general topic of discussion. This club will hold its annual meeting on May 15, at the Drake Hotel in that city, and has made arrangements for securing several speakers of national reputation.

Railway Returns for February

Preliminary compilations of reports to the Interstate Commerce Commission by 192 roads of their earnings and expenses for the month of February show a net railway operating income of \$44,843,404, which is at the annual rate of approximately 4½ per cent on the tentative valuation. This compares with a deficit for those roads of \$8,343,000 in February last year. The total operating revenues of these roads, \$383,000,000, show a decrease of 1.3 per cent as compared with last year, although the western roads show a decrease of 8 per cent. The total operating expenses, \$311,000,000, show a decrease of 15.7 per cent.

Laws Proposed in Senate

The Senate committee on interstate commerce, on April 3, favorably reported a bill introduced by Senator Cummins to provide that the United States safety appliance acts shall not apply to the Territory of Hawaii.

The Senate committee on interstate commerce on April 3 favorably reported a bill, introduced by Senator Cummins, to amend Section 10 of the Transportation Act by substituting for Paragraph 3 new provisions to strengthen the prohibition against false billing, false description, false report of weight, etc. Such actions are made subject to a fine of not exceeding \$5,000 or imprisonment not exceeding two years, or both.

Government Delegates to International

Railway Congress

The corrected list of delegates appointed by the United States Government to attend the Ninth Congress of the International Railway Association at Rome, Italy, consists of the following four all of whom are now in Europe or on the way there:

General W. W. Atterbury, vice-president, Pennsylvania Railroad.

D. F. Crawford, vice-president, Locomotive Stoker Company.

J. W. Lieb, formerly vice-president of the American Society of Mechanical Engineers.

Walter F. Schleiter, vice-president, Dilworth, Porter & Co.

Roads Reporting as to Excess Earnings

In response to the recent order of the Interstate Commerce Commission, railroads have been filing reports of their earnings for that part of 1920 during which they were not under government guaranty, on the basis of which they are expected to pay into the United States Treasury one-half of any excess in their net railway operating income over 6 per cent, in accordance with the so-called recapture provision of the transportation act. Under the commission's order the railroads reporting a return in excess of 6 per cent were to send

checks for the amount payable to the government to Secretary McGinty of the commission. He has thus far received no checks and very few roads reported a net income in excess of 6 per cent for this period. A number of the roads in reporting stated a belief that that part of the law is unconstitutional, but that the issue would not be raised at this time because they did not earn in excess of 6 per cent, and it is understood that one carrier which earned in excess of 6 per cent has informed the commission that the recapture provisions are unconstitutional and that it would decline to pay over any money unless compelled to do so by court proceedings. It is understood that the commission expects to make public the names of any roads that report earnings in excess of 6 per cent.

Wage Statistics for 1921

The Interstate Commerce Commission's summary of wage statistics for December and for the 12 months of 1921 shows the number of employees of Class 1 railroads was less in every quarter of 1921 than in the corresponding quarter of 1920. The reduction averages 19.1 per cent for the year. Compensation decreased 22.9 per cent. In 1921 the number decreased from 1,804,822 in January to 1,542,716 in April. Beginning with May the employment increased from month to month until in October it reached 1,754,136. November reports showed a decrease of 21,783, and a further decrease of 95,202 is shown for December. The returns by quarters are compared as follows:

Quarter	1920		1921	
	Average number employees	Compensation Thousands	Average number employees	Compensation Thousands
Jan.-March	1,993,524	\$795,616	1,691,471	\$757,325
April-June	1,604,766	801,067	1,568,143	699,684
July-Sept.	1,879,869	1,052,109	1,677,706	666,058
Oct.-Dec.	2,060,368	982,606	1,707,880	677,828
Year	1,684,160	\$3,631,396	1,661,301	\$2,800,896

A comparison of the number of employees and their compensation, by months, for the period covered by the new classification, excluding the Detroit, Toledo & Ironton, which has not filed its report, shows the following:

Month	Number of employees	Total compensation
July, 1921	1,634,872	\$214,339,385
August, 1921	1,679,927	227,745,895
September, 1921	1,718,330	223,972,822
October, 1921	1,754,136	337,602,950
November, 1921	1,732,353	235,304,006
December, 1921	1,637,151	214,921,396

Annual Meeting, Short Line Association

The American Short Line Railroad Association has called its annual meeting to be held at the Washington Hotel, Washington, D. C., on April 25 and 26. The call for the meeting states that the executive board has been constrained to change the time for the annual meeting and direct that it be held in Washington on the date fixed, "for the reason that the legislative situation in Congress is such as to force the belief that there is grave danger that interests opposed to the railroads will succeed in having some of the vital principles of the Transportation Act repealed; bills for that purpose are pending in both the Senate and House. The committee on interstate and foreign commerce of the House is conducting extensive hearings on bills intended to repeal the most important and most essential principles of the transportation act. A vigorous effort is being made to accomplish that result, and in that way, among other things, overturn the recent decision of the Supreme Court of the United States in the Wisconsin and New York cases."

That committee is at present considering the interchangeable mileage book bill, and has other important objectionable bills pending before it. The situation demands not only the attendance of the strongest and most influential officers, or officers, of all roads, but that they carefully consider pending legislation and thereafter make a most earnest effort to confer with their respective officers and congressmen, and give them full information as to the effect of each of the pending bills."

The announcement also calls attention to the importance to the short line of the consolidation hearings, valuation proceedings and other matters pending before the Interstate Commerce Commission. In addition to the foregoing important matters

the annual meeting will discuss divisions; labor; claims for federal control period; claims for guaranty period; self-propelled motor vehicles; motor truck competition; excess earnings; accounting; federal taxes; car hire; loans and railway mail pay.

Communication With Moving Trains

Experiments are again being made on the Delaware, Lackawanna & Western with radio telephony and telegraphy as a means of communication between a moving train and established radio stations. At the present time a car running between the Lackawanna terminal, Hoboken, N. J., and South Orange, N. J., has been equipped with several different types of receiving apparatus and a sending outfit. On April 5 a car similarly equipped was run on a special train carrying students from Cornell University at Ithaca, N. Y., to New York City. The receiving set on this car was equipped with a loud-speaking device. Among the different types of equipment being tried is the super-heterodyne outfit which was used for receiving messages



Photo by Kodak & Herbert.

Radio Equipment in Operation on Car

in Scotland from amateur radio operators in the United States. The transatlantic tests were made in December, 1921.

So far, operations on the Lackawanna have been limited to communication between a train running at full speed with amateur radio stations within a radius of 30 miles.

Wider possibilities have been opened by recent developments in radio equipment. Radio stations can be connected with ordinary telephone circuits, and with radio stations located at intervals along the right-of-way, it should be possible for a person on a moving train to communicate with any point reached by regular telephone service.

Illinois Central Advertises Safety

In its most recent newspaper advertisement in its campaign to inform the public regarding railway operation, the Illinois Central cites the excellent records recently made in the reduction of fatalities. In 1920 the railroads of the United States carried 16,239,774 passengers for each passenger fatally injured in a train accident. To load 16,239,774 passengers into 70-ft coaches (88 passengers each) would require 184,542 coaches, which would make up a train 2,446 miles long.

Trespassing and automobile grade-crossing accidents accounted for nearly one-half of all the fatalities on the railroads in 1920.

The number of fatalities on the Illinois Central System in 1921 was the smallest in 24 years. In the road service of the Illinois Central System there has not been a passenger fatally injured in a train accident in more than four years. In the suburban service at Chicago, only one passenger has been fatally injured in a train accident in the entire history of this service, which was established in 1856, and which has grown until it now amounts to nearly 30,000,000 passengers a year.

"We believe the public will agree with us that the handling of a heavier business, with a smaller number of fatalities, is a barometer of railway efficiency. The Illinois Central System pledges renewed effort toward rendering to the public a transportation service of safety and satisfaction, and asks the co-operation of the public."

Extensive Railroad Advertising

The Central of Georgia Railway has been communicating with the public through the newspapers once each month since last October, and finds the results of this policy eminently satisfactory. The address on safety at highway crossings, reproduced in minia-

Traffic News

The Grand Rapids (Mich.) Traffic Club recently elected the following officers for the ensuing year: President, Harry E. Willard; vice-presidents, Clare J. Hall and William Vyn; secretary, Walter H. Condin; treasurer, Frank E. Coombs.

Mileage Book Hearing

The hearing on proposed mileage book legislation before the House committee on interstate and foreign commerce was continued on March 31 and April 4. Bird M. Robinson, president, and B. B. Cain, vice-president, of the American Short Line Railroad Association, described the effect a reduced rate mileage book would have on the revenues of the weaker roads. They suggested that the bill be amended to authorize the Interstate Commerce Commission to exempt any line upon a showing of inadequate revenue; and also to provide that the mileage tickets be exchanged, each trip, for regular tickets in order to avoid abuse of the baggage checking privilege.

M. O. Lorenz, statistician for the Interstate Commerce Commission, also testified before the committee, giving statistics of railroad earnings and expenses during the past year and since the passage of the Transportation Act.

Coal Production

A final spurt of activity in anticipation of the strike carried production of soft coal up to 11,437,000 tons in the week ended March 25, according to the weekly bulletin of the Geological Survey. The output was the largest recorded since December, 1920, and exceeded by nearly 400,000 tons the lesser peak reached last October when consumers anticipated a possible railroad strike. Production was still far short of what the mines can produce and the railroads transport, for in the last week before the great coal strike of 1919, a total of 13,140,000 tons was recorded. As the present rate of consumption at home and shipments abroad is not more than 8,300,000 tons a week, the bulletin says, the output in the week of March 25 provided at least 3,000,000 tons to be added to consumers' stock piles. This confirms the Geological Survey's forecast that stocks in the hands of consumers would reach 63,000,000 tons by April 1.

Kansas City, Mexico and Orient Asks Increased

Divisions and Diversion of Traffic

The Kansas City, Mexico & Orient and the Kansas City, Mexico & Orient of Texas have filed an application with the Interstate Commerce Commission alleging that their revenues are insufficient to enable them to render such transportation service as will properly meet the needs of the public and requesting such orders from the commission respecting divisions of joint rates and such orders with respect to traffic not routed by the shippers as will result in increasing their revenues. In two separate orders the commission has instituted investigations for the purpose of inquiring into the matter, first, relating to the divisions of joint rates, and the second, as to whether or not the public interest in a fair distribution of the traffic requires that as to traffic not routed by the shipper the commission shall, under the provision of Paragraph 10 of Section 15 of the interstate commerce act, direct that a greater proportion of such traffic shall be routed over the lines of the applicants than is at present so routed, and, if so, the changes in routing that should be ordered. Some 40 connecting and intermediate railroads are made respondents in the division case, which is assigned for hearing before Examiner Burnside at Washington on May 15. Both the applicants and the respondents are ordered to file with the commission before that date statements in detail regarding the interchange of traffic, etc. The routing case is assigned for hearing before Examiner Bartel at Washington on May 1. In this case all carriers by railroad subject to the interstate commerce act are made respondents.

CENTRAL OF GEORGIA RAILWAY DIRECTS ATTENTION TO THE GRADE CROSSING PROBLEM

For the four-year period ended December 31, 1920, there were 4,350 persons killed and 12,750 persons injured in automobile grade crossing accidents in the United States.

For the same period there were 32 persons killed and 215 persons injured in automobile grade crossing accidents on the Central of Georgia Railway. During 1921 there were 84 grade crossing accidents in which 17 people were killed and 95 injured. Analysis of these cases shows that crossings considered the safest are actually the most dangerous.

A serious automobile grade crossing accident, involving personal injury or loss of life, is usually followed by a demand upon the railway for the elimination or "protection" of the crossing involved.

Crossing gates do not entirely eliminate accidents. People become educated to rely upon the gateman instead of upon their own faculties. If the gateman errs, the danger of accident is very great.

Electric warning bells do not entirely eliminate accidents. If they ring a great deal, automobilists disregard them. In addition, there is always the possibility that a bell may not be in order just at the moment of greatest danger.

Crossing flagmen are not infallible. The human element enters into most accidents, and crossing flagmen are like other human beings. Some of the most disastrous automobile grade crossing accidents have occurred at crossings where flagmen were on duty.

One of the results of crossing "protection" is to teach the public that crossings are safe. The opposite should be taught. All railway grade crossings are dangerous—the "protected" as well as the unprotected crossings. This should be impressed upon the minds of everybody, beginning with the children in the schools.

There are about 1,557 grade crossings on the Central of Georgia Railway. It would cost approximately fifty million dollars, or substantially more than all the outstanding bond issues of the Company, to eliminate them by separation of the grades. The following is quoted from the report made by the Grade Crossing Committee of the National Association of Railway and Utilities Commissioners at Washington in November, 1920: "To eliminate all grade crossings in the United States would probably cost as much as all the railroads in the United States have cost."

Outstanding features of this question are: 1.—Inability of the railroads to eliminate all grade crossings at any period within present vision. 2.—The unreasonableness of some communities insisting upon the railroads doing things for them that cannot be done for all. Every community has its dangerous crossings.

One state could not reasonably expect the railroads to eliminate all of its grade crossings, unless the same thing were done in neighboring states—in all states. The same principle applies to cities and towns.

The railway grade crossing problem is usually considered from two viewpoints—the railways and the public. There is the viewpoint of engineers and firemen, which should be considered. Their duties are nerve-racking, and the habit of automobilists in racing to crossings, and darting upon the track immediately in front of locomotives has a great tendency to confuse and distress them. They do not want to be involved in accidents causing personal injury or loss of life. They ought to have some assurance that an automobile will be brought to a stop before it is permitted to cross a railway track.

The benefits derived from the elimination of grade crossings by the construction of overhead bridges and underpasses—the only plan promising absolute safety—accrue largely to the public in safety and convenience. Therefore, when crossings are eliminated, the expense should be divided on some fair basis between the taxpayers receiving the benefits and the railway.

The automobile, in proper hands, is an agency of safety at railway grade crossings. It can be driven up close to the tracks and stopped in perfect safety. That cannot always be done with a spirited horse. Therefore, the increasing use of the automobile and the decreasing use of the horse should be solving the grade crossing problem, instead of making it worse.

We recognize there are crossings that should be eliminated, but the crying need is for some plan of action that will prevent loss of life and destruction of property in automobile grade crossing accidents that can be put into effect immediately. One practicable remedy, which would cost but little, would be to inaugurate a great crusade against carelessness of automobilists at railway grade crossings. Require them to Stop, Look and Listen. No automobilist who does that will ever meet with an accident at a railway crossing.

Constructive criticism and suggestions are invited.
W. A. WINBURN,
President, Central of Georgia Railway Company.

ture on this page, is an example of one of these advertisements. Our illustration is reduced about one-half, in width and height, from the size in which the display is usually made.

The advertisements are published in cities adjacent to the Central's lines in Georgia, Alabama and Tennessee, and always deal with some topic of general or local interest. They are given to 28 daily papers and 66 weekly papers of general circulation.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until July 30 the operation of schedules published by various carriers in Trunk Line and C. F. A. territories which propose reduced rates on iron ore.

The commission has suspended until July 30 the operation of certain schedules published by the Chicago, Burlington & Quincy which propose to increase the rates on slack coal from Sheridan, Wyo., district to Crawford, Neb., and other stations by from 40 to 74 cents a ton.

The commission has suspended until July 30 the operation of schedules making increases in export rates on iron and steel from C. F. A. territory to Texas Gulf ports, as shown in agent W. J. Kelly's tariff which propose to establish, for export, rates the same as the domestic rates from the same territory to New Orleans.

The commission has suspended until July 30 the operation of certain schedules published by the Illinois Central which propose reductions in rates on grain from points in Illinois to St. Louis, Mo., Cairo, Brookport, East St. Louis and Metropolis, Ill., Evansville, Ind., Louisville, Ky., and other Ohio River Crossings.

The Commission has ordered the cancellation of tariffs filed by the railroads proposing reduced rates on coal from mines in the Rock Springs and Kemmerer districts in Wyoming to points in Utah, south of Ogden, on the Oregon Short Line and its connections, on the ground of the relation between these rates and rates from Utah mines.

The Interstate Commerce Commission has issued a decision finding justified proposed reduced rates on bituminous coal from points on the Chesapeake & Ohio in Eastern Kentucky and West Virginia and consequent proposed reduced rates from destinations in Northern Tennessee, Eastern Kentucky and Southwestern Virginia on the Louisville & Nashville to points west of Louisville, Ky., on the St. Louis division of the Southern Railway in Indiana and Illinois and to St. Louis, Mo. The orders of suspension were vacated.

Restriction on Kansas Intrastate Rates Removed

The Commission on April 1 issued an order vacating its orders increasing intrastate rates in Kansas, which were issued to remove discrimination against interstate commerce following the increases in Ex Parte 74. By an order entered April 1 the Public Utilities Commission of Kansas, successor to the Court of Industrial Relations, has set aside the order of October 9, which authorized maximum increases in the intrastate rates less than those authorized by the federal commission as to interstate rates. The federal commission's order says that the increased intrastate rates prescribed by its orders will continue in effect as the lawfully established and applicable intrastate rates unless and until changed by further affirmative order of the competent authority of the state. The effect of this is to remove any cause for complaint that the state rates have been "frozen" by the order of the federal commission, the state commission is now free, without the necessity for applying to the interstate commission, to make adjustments in local rates, provided such local rates do not discriminate against interstate commerce.

Personnel of Commissions

President Harding on April 5 sent to the Senate the names of G. W. W. Hanger, I. H. Elthott and A. O. Wharton for reappointment as members of the Railroad Labor Board for a new term upon the expiration of their present term on April 15. He has not yet nominated anyone to succeed Albert Phillips, resigned.

Labor Board Decisions

Deny Reinstatement of Man 51 Years Old

A transferman employed by the American Railway Express was dismissed from service on January 8, 1921, for alleged inability to perform properly the duties assigned to him. The employees contend that this man executed adequately all work assigned to him, except heavy labor. The company states that the man was 51 years of age, was employed during war time and under normal conditions would not have been hired. Further, during the war period the volume of business was sufficiently large to enable the company to divide the work so as to give the lighter duties to this man. The Labor Board sustained the contention of the carrier.—*Decision No. 817.*

Management Is Judge of Qualifications

In a case brought against the Delaware, Lackawanna & Western by the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, it was shown that four carpenters were laid off while men younger in the service were retained. The contention of the management was that the employees in question did not have the qualifications necessary to perform high grade carpenter work in an efficient manner within reasonable time. The Labor Board sustained the railroad, stating that the language of the agreement definitely leaves the matter largely in the hands of the carrier to determine whether or not an employee is capable of doing work.—*Decision No. 807.*

Engine Crew Granted Run-Around On A

Terminal Delay Feature

Enginemen Diggs and Pannell were assigned to the extra list, "first in, first out" on the Missouri, Kansas & Texas, at Denison, Texas. Engineman Diggs was called at 4:45 a. m. for a turn-around trip between Denison and Greenville over the Dallas division; and engineman Pannell was called at 5:25 a. m. to take a light engine from Denison to Waco, also over the Dallas division. He left the terminal at 5:25 a. m., while engineman Diggs did not leave until 7 a. m. The employees claim run around pay for the first crew called. The carrier claims that as engineman Diggs was called to move a train from Ray Yards and engineman Pannell, although called 40 minutes later, was assigned to handle a light engine from Denison roundhouse, starting from a point three miles east of Ray, engineman Diggs at no time ran around engineman Pannell, although both were moving in the same general direction to different terminals. However, the Labor Board decided that the first crew called had been run around in the terminal and should be paid 100 miles.—*Decision No. 774.*

To Ballot as To Whether O. R. T. is to Negotiate

For Agents and Agent Telegraphers

The Order of Railroad Telegraphers contends that this organization is entitled to negotiate an agreement with the Buffalo & Susquehanna covering rules and working conditions for agents, agent-telegraphers and telegraphers. In recent negotiations the carrier sought to exclude from the agreement employees classified as agents and agent-telegraphers, subsequently negotiating individually on acceptable terms with these employees. It contends that existing wages and working conditions are satisfactory and that there is no discussion among the employees. The Labor Board decided that a conference should be held on April 1, 1922, at which time a secret ballot should be canvassed between duly authorized representatives of the O. R. T. and of 100 or more unorganized employees, after which, the chosen representative shall proceed with the negotiation of rules.—*Decision No. 826.*

Practically the same decision was rendered by the Labor Board in the contention of the O. R. T. that this organization should negotiate for the agents and agent telegraphers on the Cincinnati, Indianapolis & Western.—*Decision No. 825.*

Foreign Railway News

Americans to Build Line in Jugo-Slavia

According to cable dispatches from Rome to the Philadelphia Public Ledger, a group of Americans, including the American Car & Foundry Company, the American Locomotive Company and the Equitable Trust Company, have received a concession from the Jugo-Slav government for the construction of a railway from the Adriatic ports of Spalato and Sebenico. The line, which will have many branches, will connect with the railways of Roumania by a bridge over the Danube and will be completed in six years. The estimated cost of the project is \$187,000,000. Interests in Trieste and Fiume are reported to be disturbed over the plan, since they see in the plan a probable diversion of Jugo-Slav traffic now passing through these Italian ports.

Austrian Railway Rates and Fares

LONDON.

A report to the Department of Overseas Trade, England, states that freight rates and passenger fares on the Austrian railways have been repeatedly increased in the endeavor to keep up with the fall in the value of the currency, though the deficit in working the railways has also steadily grown larger. Freight rates have, on the average, increased by 1,187 times and passenger fares by 465 times. The value of the Austrian crown in Vienna, compared with the pound, has in the meantime fallen to less than one fifteen-hundredth of its pre-war value and it therefore follows that most of the new rates when measured in sterling or other stable currency are still much below the pre-war rates.

Austria Builds 300 Locomotives in 1921

The locomotive works of Austria were well employed during 1921, chiefly on foreign orders, according to Commerce Reports. About 300 locomotives were built and delivered, as against 211 and 144 in the two preceding years. In order to keep up with the increased demand the leading firms have undertaken large additions and improvements of their plants. On account of the light demand within the country the railway car establishments were obliged to undertake foreign orders. They also had a great deal of repair work to do for foreign countries. It is difficult to obtain orders for cars from the Succession States because they are trying to get their cars from Germany by way of reparations payments.

Car Exports in December

In December our exports of freight cars totaled 298, valued at \$227,154. No passenger cars were shipped. Parts of cars exported totaled \$406,261 in value. Detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Freight and Other.		Parts of Cars. Dollars
	Number	Dollars	
England	.....	.....	14,198
Canada	.....	.....	80,337
Honduras	25	19,735	705
Mexico	33	71,225	14,352
Cuba	176	100,519	11,194
Dominican Republic	.....	.....	2,448
Brazil	.....	.....	144,905
Chile	.....	.....	1,126
Peru	.....	.....	1,109
Venezuela	.....	2,000	125
Cbina	.....	.....	86,987
Japan	.....	.....	23,895
Australia	16	11,800	417
Philippine Islands	.....	.....	5,270
British So. Africa	.....	.....	1,173
British East Africa	45	21,875	.....
Portuguese Africa	.....	.....	4,357
Egypt	.....	.....	6,083
Scotland	.....	.....	1,510
Argentina	.....	.....	2,633
Other Countries	.....	.....	3,537
Total	298	227,154	406,261

December Track Material Exports

Rail exports totaled 14,943 tons, valued at \$557,337, in December. Miscellaneous track materials shipped were valued at \$181,372 and spikes at \$24,203. Totals by countries, as compiled by the Bureau of Foreign and Domestic Commerce, are:

Countries	Railroad Spikes. Pounds	Rails of Steel. Tons	Switches, Frogs, Splice Bars, Etc.
			Dollars
England	.....	.....	19,440
Canada	9,070	2,242	50,069
Guatemala	20,000	.....	2,106
Nicaragua	34,000	1,037	1,436
Panama	4,310	.....	39
Mexico	353,431	127	16
Cuba	81,800	50	5,756
Dominican Republic	12,800	16	11,260
Brazil	5,400	976	22,550
Chile	.....	33	1,230
Columbia	122,600	117	1,698
Peru	2,000	.....	951
China	22,400	76	1,139
Dutch East Indies	.....	.....	925
Japan	189,319	9,650	39,246
Australia	.....	.....	2,325
Philippine Islands	57,998	19	4,950
Portuguese Africa	.....	.....	10,585
Other Countries	15,731	599	3,032
Total quantity	832,459	14,943	.....
Total value, Dollars	24,203	557,337	181,372

Bill Allowing British Railways to Engage in Highway Transport

A bill has been presented in Parliament to allow the railways of the Northwestern and Midland group to engage in highway transport in competition with regular motor trucking concerns.

On the railroad's behalf it is argued that they should be allowed to enter this field and to transport goods by highway where it is cheaper to do so than by rail. If they are to be kept from the highways, they will be forced to meet competition of motor trucking concerns under unequal terms.

The shippers are contesting the granting of highway privileges to the railways for fear that they will reduce rates and put the trucking companies out of business and then raise rates again.

Against the shipper's position is the argument that railway rates are subject to review by the Railway Rates Tribunal and that, by law, rates must be sufficiently high to give a fixed return to the owners of the property. It is not, however, the standard class rates which the shippers object to, but the "exceptional" rates which are not less than 5 per cent or more than 40 per cent under standard charges which may be used to meet competition. The railways, however, are backing a clause in the bill to require road rates to be sufficiently high to provide returns to capital after expenses are paid.

The objections of shippers to the granting of the powers asked for are stated afresh in a letter which Sir W. Peter Rylands has addressed to the Warrington Chamber of Commerce. He accepts the statement of the railway companies that road transport is filching from them the most favorable types of traffic, which must, in consequence, have a tendency to put up the cost of the traffic for which road transport is less suited, but which, so far as it is raw material, largely constitutes the foundation of industry. The aggregate reduction of traffic may, in addition, tend to reduce the efficiency of the railways. On the other hand, it is pointed out that any serious development by the railway companies in the direction of road transport must tend to increase the amount of traffic diverted from the railways, and thereby aggravate the evil.

It is felt that it would be desirable that for a few years, at all events, the railway companies should devote their undivided energy and attention to improving the efficiency of the railways, and seek rather from that point of view to prevent any further diversion of traffic to the roads, rather than themselves take a hand in stimulating road transport. It is suggested that many things may happen during the next few years, including consideration of the question of the charges to be levied upon road transport as a contribution to wear and tear; also that railway companies might be well advised to delay a decision on such an important matter of policy until times are normal, rather than frame a policy when conditions are to a large extent abnormal, and may lead to errors of judgment. These arguments are not new, but their reiteration is evidence of the continued hostility of a section of the shipping community to the idea of railways engaging in road transport.

Equipment and Supplies

Locomotives

THE CHICAGO, PEORIA & ST. LOUIS is inquiring for 3 locomotives.

THE KENTUCKY & INDIANA TERMINAL is inquiring for 5 locomotives.

THE TENNESSEE CENTRAL is inquiring for from 4 to 6 Mikado type locomotives.

THE NEW JERSEY, INDIANA & ILLINOIS is inquiring for one Mogul type locomotive.

THE U. S. COAL & COKE COMPANY, Pittsburgh, Pa., is inquiring for one 6-wheel switching locomotive.

HOEKKAIEO KOGYO TETSUDO, Japan, has ordered 2 prairie type locomotives from the Baldwin Locomotive Works.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE in the near future may ask for prices on about 10 locomotives.

THE TEMPLE LUMBER COMPANY, Pineland, Texas, has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE ALABAMA & VICKSBURG has ordered 2 Mikado type and 1 Santa Fe type locomotives from the Baldwin Locomotive Works.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 1, 4-wheel saddle tank switching locomotive from the Baldwin Locomotive Works.

THE INTERNATIONAL PAPER COMPANY, Glens Falls, N. Y., has ordered two 0-4-0, saddle tank switching locomotives from the Baldwin Locomotive Works.

DWIGHT P. ROBINSON & COMPANY, INC., New York City, has ordered from the Baldwin Locomotive Works, 12, 0-4-0 saddle tank locomotives for export to Brazil.

THE BUFFALO, ROCHESTER & PITTSBURGH reported in the *Railway Age* of February 18 as inquiring for 20 locomotives is now asking for 14 Mallet type, 5 Pacific type and 9 Switching locomotives.

THE CHICAGO, MILWAUKEE & ST. PAUL reported in the *Railway Age* of March 11, as inquiring for 50 Mikado type locomotives, has ordered from the Baldwin Locomotive Works, 25 Mikado type locomotives.

THE APALACHICOLA NORTHERN has ordered 2 Consolidation type locomotives from the American Locomotive Company. These locomotives will have 18 by 24 in. cylinders and a total weight in working order of 124,000 lb.

THE DENVER & RIO GRANDE WESTERN, reported in the *Railway Age* of February 18 as asking for prices on 20 Pacific type locomotives, has ordered 10 Mountain type locomotives from the American Locomotive Company.

THE SOLWAY PROCESS COMPANY, SYRACUSE, N. Y., has ordered two 4-wheel switching locomotives from the American Locomotive Company. These locomotives will have 13 by 20 in. cylinders and a total weight in working order of 65,000 lb.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of March 25 as inquiring for 6 Mikado type locomotives, has ordered this equipment from the American Locomotive Company. These locomotives will have 26 by 30 in. cylinders; a total weight in working order of 295,000 lb. and will be equipped with superheaters.

Freight Cars

THE PEORIA & ST. LOUIS is asking for prices on 400 refrigerator cars.

THE MISSOURI PACIFIC is inquiring for repairs to 200 refrigerator cars.

THE ARGENTINE STATE RAILWAYS are inquiring through the car builders for 50 caboose cars.

THE MERCHANTS' DISPATCH will build from 1,000 to 1,500 refrigerator cars at its own shops.

THE MISSOURI, KANSAS & TEXAS in the near future may ask for prices on 2,000 automobile cars.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY, St. Louis, Mo., is inquiring for 2,000 refrigerator cars.

THE TENNESSEE CENTRAL is inquiring for 300 composite gondolas, 50 single sheath box cars, and 50 stock cars.

THE CHESAPEAKE & OHIO is asking for bids until April 17 for 1,500, 40-ton box cars and 200, 40-ton stock cars.

THE EAST INDIA RAILWAY COMPANY is inquiring through the car builders for 350 open and 150 covered goods wagons.

THE GRAND TRUNK is having 250 refrigerator cars repaired at the shops of the National Steel Car Corp., Hamilton, Ont.

THE LAKE CHAMPLAIN & MORIAH has ordered 10 ore cars and 12 ore car bodies, of 50-ton capacity, from the Pressed Steel Car Company.

THE JACOB DOLD PACKING COMPANY, Buffalo, New York, is inquiring for from 50 to 100 wooden refrigerator cars, with steel end sills, of 30 tons capacity.

THE CHICAGO & NORTH WESTERN, which was noted in the *Railway Age* of April 1 as having opened bids on inquiries for 3,100 freight cars, has rejected all bids. It has not been definitely decided when new inquiries will be called for.

Passenger Cars

THE SEABOARD AIR LINE is inquiring for 5 dining cars.

THE ST. LOUIS SOUTHWESTERN is inquiring for six chair cars and six coaches.

THE ARGENTINE STATE RAILWAYS, are inquiring through the car builders for 50 baggage cars.

THE COWLITZ CHEHALIS & CASCADE is in the market for a gasoline propelled motor passenger car, with seating capacity for 41 passengers and an eight-foot compartment for express.

THE BOSTON & MAINE reported in the *Railway Age* of March 11 as inquiring for 50 cars for passenger service and 25 milk cars, has ordered 65 coaches, 20 smoking cars, 8 combination smoking and baggage cars and 5 baggage and mail cars from the Osgood-Bradley Car Company and 25 milk cars from the Laconia Car Company.

THE PENNSYLVANIA RAILROAD has placed orders for the 250 cars for passenger service which were recently authorized, as noted in the *Railway Age* of March 11. The orders were distributed as follows: Pressed Steel Car Company, 75 coaches; American Car & Foundry Company, 65 coaches; Standard Steel Car Company, 50 coaches; Bethlehem Shipbuilding Corporation, Harlan Plant, 35 combination passenger and baggage cars and the Pullman Company, 25 combination baggage and mail cars.

Iron and Steel

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, April 20, for 32,000 tons of rail.

THE CHICAGO & EASTERN ILLINOIS has ordered 1,250 100 per cent rail joints from the Rail Joint Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 18,000 100 per cent joints from the Rail Joint Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered 2,000 tons of rails from the Tennessee Coal Iron & Railroad Co.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has placed an order for a number of 100 per cent rail joints with the Rail Joint Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of March 18, as inquiring for 26,000 tons of 85 lb. rail, has ordered this tonnage from the Tennessee Coal, Iron & Railroad Co.

Machinery and Tools

THE VIRGINIAN RAILWAY has given an order to the Industrial Works for a 200-ton wrecking crane, and has also given an order to the American Hoist & Derrick Company, for one American ditcher.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for one heavy-duty double-end car axle lathe with motor drive, one 90-in. motor driven driving wheel lathe, one wheel press, one four-foot radial drill and one 300-lb. Beadry hammer.

Miscellaneous

THE WABASH has placed an order with the Illinois Steel Company for 160,000 tie plates.

THE MISSOURI PACIFIC has placed an order with the Railway Supply Company for 500,000 tie plates.

THE MISSOURI, KANSAS & TEXAS is inquiring for 360 wheels (135 tons) for the 30 passenger coaches, inquiry for which was noted in *Railway Age* of March 25.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 75 low switch stands and two No. 10, 90-lb. manganese frogs, bids on which are due before noon, April 14.

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS have ordered through Mitsubishi Shoji Kaisha, Ltd., 120 Broadway, New York City, 3,500 steel ties from the Consolidated Steel Corporation.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for bolts, screws, nuts, shapes and bars, plates, billets, locomotive tires, nails, wire, axles, and tubes, to be supplied for the period from April 1, 1922, to July 1, bids on which must be in by 12 o'clock, noon, April 10.

THE HOUSE COMMITTEE on labor, which has been holding hearings this week regarding the coal situation, at which President Lewis of the United Mine Workers testified, on April 4 ordered telegrams sent to a large number of bituminous coal operators in the central competitive field asking them to meet officials of the miners' union on April 10 to negotiate a new wage agreement. Mr. Lewis had stated that if sufficient of the operators responded to this request, it would be ample basis for negotiations for new contracts.



Photo by Underwood & Underwood

A Radio Telephone on the Rocky Mountain Limited,
C. R. I. & P.

Supply Trade News

H. H. Bingham, vice-president, secretary and controller of the Charcoal Iron Company of America, Detroit, Mich., has been made general manager, succeeding F. W. Hutchings, resigned.

The Pyrene Manufacturing Company, Inc., has moved its offices and factory into a modern fireproof building at 520 Belmont avenue, Newark, N. J. The general offices formerly were in New York City and all manufacturing departments are now located under one roof.

Howard K. Moore, secretary of the Portsmouth-Solvay Coke Company prior to its joint absorption by the Wheeling Steel Corporation and the American Rolling Mill Company, has been appointed assistant general manager of the Steubenville, Ohio, works, Wheeling Steel Corporation.

Combustion Engineering Corporation, New York City, announce the opening of a new branch office at 1137 Guardian building, Cleveland, Ohio. This office will be in charge of Frank Henderson, who has been associated with several stoker companies in this territory for many years.

R. C. Haley, salesman and inspector for the United States Light & Heating Corporation resigned on March 10, to accept the position of sales engineer with the Edison Storage



R. C. Haley

Battery Company, with office in the Railway Exchange building, St. Louis, Mo. Mr. Haley will have charge of sales and service for the car lighting, signaling and industrial trucks in the central southern territory for the railway department. He entered the railway electrical field in 1899 with the Wagner Electric Company in St. Louis, and in 1902, he became associated with the Consolidated Electric Lighting and Equipment Company of New York. In 1906, when the Missouri Pacific

equipped a number of its cars with axle lighting equipment, Mr. Haley was appointed assistant chief electrician of that road. He also became associated with the electrical department of the St. Louis-San Francisco and later, for a second time, with the Consolidated Railway Electric Lighting and Equipment Company. In 1907 he entered the service of the Bliss Electric Car Lighting Company at Milwaukee, Wis., and a few years later when this organization was merged into the present United States Light & Heating Corporation, Mr. Haley was appointed salesman and inspector, which position he held until his recent appointment.

H. Fowler has been appointed district sales manager of the Cincinnati, Ohio, territory of the Carborundum Company, Niagara Falls, N. Y., succeeding C. R. Cox. The appointment will be effective July 1 when Mr. Cox will be transferred to the main office as sales statistician.

A. E. Nelson, district sales representative of the National Cast Iron Pipe Company, with headquarters at Kansas City, Mo., has been promoted to western sales manager, with headquarters at the main office in the Peoples Gas building, Chicago, succeeding W. B. Neal, who has resigned to accept a similar position with the Somerville Iron Works, Somerville, N. J., with headquarters at Chicago.

H. B. Thurston on April 1 was appointed sales manager of the **Talmage Manufacturing Company**, Cleveland, Ohio. Mr. Thurston has been connected for the past ten years with the Bureau of Locomotive Inspection, Interstate Commerce Commission, in charge of its work in the Pittsburgh district.

A. P. Blackstead, formerly chief engineer of the Camden Iron Works, Camden, N. J., and prior to that hydraulic engineer of the Henry R. Worthington Company, New York, has become associated with the engineering staff of the **Dayton-Dowd Company**, Quincy, Ill., manufacturers of centrifugal and fire pumps.

The **Detroit Seamless Steel Tubes Company**, Detroit, Mich., has established its own branch sales office in the Canadian Pacific building, 342 Madison avenue, New York City. H. C. Kensing has been appointed sales manager for the New York territory. Mr. Kensing was formerly manager of the steel tubing department in the New York branch of the U. T. Hungerford Brass & Copper Company.

The **Westinghouse Electric & Manufacturing Company**, has separated the power and railway divisions of the Pittsburgh office. **Barton Steveson**, who has been manager of both divisions, will continue as manager of the power division and **F. G. Hickling** has been appointed manager of the railway division; **S. R. Shave** has been appointed manager of the price section of both the power and railway divisions in the Pittsburgh office.

American Brake Shoe and Foundry Company

The report of the American Brake Shoe and Foundry Company for the year ended December 31, 1921, shows net income of \$1,320,271 after all charges and federal taxes, equivalent after dividends on subsidiary companies' stocks and preferred dividends to \$4.41 a share on the company's outstanding common stock of no par value. This compares with \$2,571,848, or \$13.08 a share in the previous year.

Joseph B. Terbell, president, in his statement to the stockholders says in part:

"Your company has passed through one of the most trying years in its experience. Incoming orders during the first half of the year were at a very low ebb, but in July an improvement was noticeable and continued throughout the last six months. The amount of sales at no time reached a normal volume.

"During the present year every effort will be made to reduce production costs to the lowest possible level consistent with good management and maintenance of our present standard and quality of product. We expect a further reduction in costs will enable our sales force to make substantial increases in the volume of sales in all departments.

"Competition is very keen and our products are being sold on a narrow margin of profit. For our earnings we are, therefore, relying on the volume of business transacted rather than on a high percentage of profit. While there are many unfavorable features in the present situation, the general exhaustion of the stocks of our products in the hands of our customers should necessitate their now buying in amounts equal to their current consumption. This, we anticipate will result in a substantial increase in incoming orders as compared with 1921."

The consolidated balance sheet of the American Brake Shoe and Foundry Company, as of December 31, 1921, follows:

ASSETS		
Cash		19,711
Marketable securities and investments		\$596,066
Accounts receivable		985,398
Notes and mortgages receivable		2,798,733
Inventory		406,556
Deferred assets		2,648,304
Capital stocks of associated companies		108,809
Plant and equipment less depreciation		3,880,162
Patents, goodwill, etc.		5,953,485
		6,817,134
		\$33,194,146
LIABILITIES		
Accounts and wages payable		\$1,110,873
Federal taxes (estimated)		262,136
Unpaid debt		170,000
Reserves		179,008
Preferred stock		9,548,300
Common stock		*11,781,719
Capital stock of subsidiary companies		1,800
		\$33,194,146

* Outstanding 148,851 shares of no par value represented by surplus of \$11,781,719.

Western Electric Company

The total sales of the Western Electric Company, Incorporated, for the year ended December 31, 1921, were \$189,765,000, which compares with \$206,112,000 in 1920. The unfilled orders of the company at December 31, 1921, aggregated \$75,525,000, as compared with \$82,655,000 at the end of the year 1920, and \$47,442,000 at the end of the year 1919.

The net earnings for the year 1921 were \$10,166,337, out of which were paid interest amounting to \$5,842,340 and dividends amounting to \$3,500,000—\$10 per share on the common stock—leaving a balance carried to common stock of \$823,997. This compares with net earnings of \$8,277,414 and a balance of \$894,769 in the previous year.

The company's bills payable were reduced during the year from \$42,730,000 to \$29,050,000, a reduction of \$13,700,000, while the cash on hand increased \$5,438,000, making a total improvement for the year in its financial position of \$19,138,000. In the two months since the end of the year, according to the company's annual report, a further improvement of about \$8,500,000 has been made in the financial position.

The balance sheet, December 31, 1921, follows:

ASSETS		
Total plant		\$45,569,836
Merchandise	\$58,978,025	
Cash	13,262,850	
Bills receivable	779,019	
Trade acceptances	573,474	
Marketable securities	833,268	
Accounts receivable	39,035,927	
Total current assets		113,462,593
Trustees, employees' bond purchase plan		465,464
Sundry investments		2,315,471
International Western Electric Company, Incorporated, of Delaware		17,988,053
Grand total		\$179,801,417
LIABILITIES		
Common stock, 500,000 shares authorized, 350,000 shares issued, no par value	\$58,773,450	
First mortgage bonds, 5 per cent, 1922	15,000,000	
Convertible gold bonds, 7 per cent, 1925	28,600,000	
Total capital liabilities		\$102,373,450
General bills payable	\$29,050,000	
Trade acceptances and bills receivable discounted	448,456	
Accounts payable	13,586,093	
Total current liabilities		43,084,549
Reserve for depreciation on plant	27,924,413	
Reserve for employees' benefit fund	1,600,000	
Reserve for contingencies	4,819,005	
Total reserves		34,343,418
Grand total		\$179,801,417

Trade Publications

ELECTRIC HEADLIGHTS.—The Pyle National Company, Chicago, has recently issued a 22-page illustrated catalog (No. 101) describing its line of electric lighting equipment and accessories for locomotives, shops and yards. Sectional views show the construction, adjustment and maintenance of headlights, turbo-generators, flood-light units and switches. Diagrams of the complete circuits for locomotives are given, together with lists of material and directions for installation.

OUTSPINNING THE SPIDER.—An interesting book of 137 pages, illustrated, has recently been issued by John A. Roehling's Sons Company, Trenton, N. J., in which the history of wire is traced from its development. The story is told in a smooth, easy-reading, non-technical manner beginning at the time of the first wire cable built by the founder of the company, up through the increasing uses for such products, the building of suspension bridges, to the manufacturing processes of making all forms of modern finished wire, from furnace to shipping room.

LAP ROBES, free, may be had by passengers on the Baltimore & Ohio trains 5, 6, 7 and 8 between New York and Chicago when they desire to make use of the observation end of the train to enjoy the scenery. It is found that many passengers like to watch a sunrise, sunset or other scenic effect while enjoying the fresh air; but at this time of the year the early morning air may be too chilly on the observation platform, without protection, so lap robes were provided. These robes may be obtained from the Pullman conductor or porter upon request. The innovation has proven popular so far.

Railway Construction

BOSTON & MAINE.—This company is contemplating the construction of an engine house at Portsmouth, N. H.

CANADIAN PACIFIC.—Work is progressing on the extension of this company's line from Kipawa to Les Quinze at the further end of Lake Temiskaming, 800 men being at present employed on the work.

CENTRAL OF NEW JERSEY.—This company is constructing a new bridge across the Lehigh river at Nesquehoning, Pa., in connection with a revision of line at this point. S. B. Mutchler & Co., Newark, N. J., has the contract for the substructure and the Bethlehem Steel Bridge Corporation for the superstructure which will be five deck plate spans each 93 ft. long. The new structure will be on a six degree curve instead of ten degrees as with the old. The cost is estimated at about \$850,000. A new interlocking plant will be installed also.

ELDORADO & SANTA FE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of three lines in Kansas, one line of 3 miles in Chase county, another of 38 miles in Chase and Butler counties and another of 2½ miles in Butler county. It is stated that the first and second lines with the existing line of the Atchison, Topeka & Santa Fe will furnish a direct route from Ellinor to Eldorado, reducing the haul for through trains by 13.65 miles, and that the third line, together with 1½ miles of the second line, will furnish a belt line around the east side of the city of Eldorado.

ILLINOIS CENTRAL.—This company, the Bloomington & Normal Railway and Light Company and the Union Gas & Electric Company are named as defendants in a petition of the City of Bloomington, Ill., set for a hearing before the Illinois Commerce Commission at Springfield, Ill., April 4, involving the separation at grades at Washington, Clay, Justin and Grove streets in Bloomington.

OREGON SHORT LINE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a branch line from Homedale, Ida., in a southeasterly direction for 7½ miles.

PENNSYLVANIA.—This company has announced that it will undertake additions and betterments in the Pittsburgh district to cost about \$8,000,000, details of which will be announced later.

PENNSYLVANIA.—This company has entered into an agreement with the Pere Marquette, the Wabash and the Union Station in Detroit, under which it has obtained trackage rights over the Ann Arbor from Toledo to Lexa Junction, from which point trains will be operated over the Pere Marquette to Carlton, thence over 20 miles of line to be constructed by the Pennsylvania to Del Rae, beyond which trains will be operated over the Wabash to River Rouge Junction and thence over the Pere Marquette to the Union Station. Included in the 20 miles of new line to be constructed by the Pennsylvania in the near future, will be a terminal yard at Del Rae.

PERE MARQUETTE.—This company has completed plans for a \$7,500 heating plant for installation in its resort hotel at Charlevoix, Mich., in time for the opening of the hotel about July 1.

VIRGINIAN & WESTERN.—This company has applied to the Interstate Commerce Commission for authority for the construction of a line of 3.6 miles in Wyoming county, Virginia, to be leased to the Virginian, which has also applied for authority for the lease.

WESTERN PACIFIC.—This company, now owner of the Sacramento Northern, an electric line running from Sacramento to Chico, with branches to Oroville, Colusa and Woodland, and owner also of a line extending from Woodland to Fairfield, has begun surveys for an extension of approximately 42 miles from Woodland to Vacaville, and from the terminus on its tracks near Fairfield to the vicinity of Vallejo.

Railway Financial News

ANN ARBOR.—*Railroad Sustained.*—A decision has been handed down in the Court of Appeals, State of Ohio, sustaining the contention of this company that the reorganization of the Pere Marquette five years ago automatically terminated the contract for the use of the Ann Arbor terminal at Toledo, Ohio, by the Pere Marquette and requiring the latter road to enter into a new contract, retroactive five years.

ATLANTA, BIRMINGHAM & ATLANTIC.—*Proposes State Purchase.*—Senator Frank Manson, representing the Atlanta district, recently proposed that the state of Georgia purchase this road, which is now in the hands of receivers and in danger of being scrapped. Mr. Manson said that many members of the legislature from sections contiguous to the road had promised to support the plan and indicated that such a bill would be offered in the legislature this summer. He expressed the opinion that the Atlanta, Birmingham & Atlantic could be purchased for \$10,000,000 by issuance of bonds.

ATLANTIC & CAROLINA.—*Asks Certificate to Operate Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the operation of the Atlantic & Carolina Terminal, formerly operated as a private logging road.

BOSTON & MAINE.—*Annual Report.*—The annual report issued Thursday shows the corporate income for the year ended December 31, 1921:

	1921	1920
Railway operating revenue	\$78,477,418	\$75,539,327
Railway operating expenses	73,158,885	76,346,024
Net railway operating revenue	5,318,533	Def. 806,697
Railway tax accruals	2,728,224	2,469,913
Railway operating income	2,583,028	Def. 3,312,291
Total non-operating income	1,568,332	14,536,286
Gross income	4,151,360	11,223,995
Hire of freight cars—debit balance	3,178,427	3,866,942
Interest on funded debt	5,966,305	5,272,223
Net deduction from gross income	10,763,781	10,609,265
Net income	Def. 6,612,421	614,730
Income applied to sinking funds	205,836	410,978
Dividends	.....	1,227,948
Equipment trust installments	548,979	340,496
Net appropriation of income	754,815	1,979,423
Net deficit transferred to profit and loss	7,367,236	3,366,692
* Interest amounting to \$141,230 accrued on bonds held in sinking funds is included below in account "Income Applied to Sinking Funds."		

The annual report of the Boston & Maine will be reviewed editorially in next week's issue.

CHICAGO & ILLINOIS MIDLAND.—*Authorized to Issue Notes.*—The Interstate Commerce Commission has authorized an issue of \$484,000 of 7 per cent promissory notes, the proceeds to be used in payment for rebuilt equipment.

CHICAGO & ILLINOIS WESTERN.—*Bond Authorization Modified.*—The Interstate Commerce Commission has issued a modification of its previous order to authorize this company to issue \$291,000 of 7 per cent non-cumulative preferred stock instead of \$600,000.

CHICAGO GREAT WESTERN.—*Annual Report.*—The annual report issued this week shows an income statement for December 31, 1921, as follows:

	*1921	1920
Operating revenues	\$24,273,653	\$24,032,435
Operating expenses	20,989,981	26,452,243
Net revenue from operating	\$3,283,672	Def. 2,419,808
Taxes	899,938	1,010,657
Railway operating income	\$2,383,085	Def. \$3,429,543
Equipment, rents, debit	776,909	29,933
Joint facilities, debit	792,495	698,868
Net operating income	\$812,681	Def. \$4,158,341
Received from U. S. Government	.....	3,185,000
Net	\$812,681	Def. \$973,344
Other income	376,552	683,211
Gross income	\$1,189,233	Def. \$290,133
Deductions from gross	1,781,834	1,665,036
Net deficit	\$592,601	\$1,955,169
Lap-over adjustment, credit	.....	406,794
Net deficit	\$592,601	\$1,548,375

*Guarantee period lap-over items excluded.

CINCINNATI, INDIANAPOLIS & WESTERN.—*Authorized to Procure the Authentication and Delivery of Bonds.*—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of \$1,129,000 of first mortgage 5 per cent gold bonds to be held in its treasury.

CISCO & NORTHEASTERN.—*Application for Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$114,500 to this company to assist it in making additions and betterments.

DELAWARE & HUDSON.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$7,500,000 of 15-year 5½ per cent gold bonds to be sold at not less than 84 or pledged at not less than 70. It is proposed to use \$6,024,000 to discharge or refund at maturity on July 1 a like amount of first lien equipment 4½ per cent bonds and the balance to discharge or refund demand notes.

DENVER & RIO GRANDE.—*Time Extended.*—The Hammond committee has extended until April 21, 1922, the time for depositing the Denver & Rio Grande first refunding mortgage 5 per cent gold bonds under the reorganization agreement dated January 27, 1922. Arrangements have been made for the purchase of the coupon dated February 1, 1922, as heretofore. More than 25 per cent of the \$31,114,000 bonds outstanding have been deposited under the plan.

The Sutro committee, representing the 7 per cent cumulative adjustment mortgage bonds, has announced an extension of time to and including April 21, 1922, for the deposit of bonds and certificates of deposit representing the same.

James H. Perkins, chairman of the protective committee of the Denver & Rio Grande first and refunding 5 per cent bonds, stated that the time for the deposit of these bonds under the deposit agreement of January 31, 1922, has been extended until and including April 21.

EASTERN MAINE.—*Asks Authority to Issue Securities.*—This company, which has been organized to build a line of 128 miles to Bangor, Me., has filed an application with the Interstate Commerce Commission for authority to issue \$1,400,000 of common stock and \$7,000,000 of 30-year, 7 per cent gold bonds.

HOCKING VALLEY.—*New Director.*—Thomas J. Davis, of Cincinnati, has been elected a director to succeed John Galvin, deceased.

MANILA RAILROAD.—*Trustee of Bond Issue.*—The Chase National Bank has been appointed trustee of an issue of \$1,500,000 Manila Railroad Company 15-year 7 per cent sinking fund collateral bonds, principal and interest guaranteed by the government of the Philippine Islands.

NEW YORK, NEW HAVEN & HARTFORD.—*Time Extension for Depositing Debentures.*—The time limit for the deposit of dollar and franc debentures under the terms of the plan for handling the \$27,582,691 European loan has been extended from April 1 to April 15, 1922. The dollar debentures may be deposited with the Bankers Trust Company of New York, with the Old Colony Trust Company of Boston, or with Drexel & Co., of Philadelphia. The franc debentures may be deposited with the Equitable Trust Company in New York, Paris, or London, or with the American Trust Company in Boston, or the Rhode Island Hospital Trust Company in Providence.

A writ of attachment against the New York, New Haven & Hartford was served on April 3 upon C. F. Hall, assistant treasurer at the Grand Central Terminal, New York City, in an action begun by Howard Major and Charles B. Squier, seeking judgment in the amount of \$10,000 and \$20,000 respectively. Their petition, made before Supreme Court Justice Lehman, charges that the company failed to meet on April 1 last maturing franc debenture bonds included in the European loan which the railroad company is endeavoring to extend until 1925.

The Interstate Commerce Commission has authorized the New Haven to extend its European debentures. See *Railway Age* March 25, 1922, page 763.

NORFOLK & WESTERN.—*Notes Paid.*—An issue of \$1,000,000 three-year 6 per cent collateral trust gold notes extended to April 1, 1922, were paid off at maturity at the office of the Central Union Trust Company, New York City. The issue

fell due on April 1, 1920, but was extended at that time to April 1, 1922, with interest at 7 per cent.

NORFOLK & WESTERN.—*Annual Report.*—See article on another page of this issue entitled "N. & W. Increases Net Operating Revenues 373 Per Cent."

PENNSYLVANIA.—*Annual Report.*—The corporate income for the year ended December 31, 1921, compares as follows:

	1921	*1920
Railway operating revenues:		
Freight	\$328,932,914	.....
Passenger	129,324,480	.....
Total, including other	500,175,084	.....
Railway operating expenses:		
Maintenance of way and structures	61,093,428	.....
Maintenance of equipment	132,091,758	.....
Traffic	5,312,286	.....
Transportation	210,350,455	.....
General	13,636,341	.....
Total, including other	430,758,629	.....
Net railway operating income	41,221,968	\$11,965,685
Non-operating income:		
Miscellaneous rent income	1,967,267	1,905,996
Dividend income	15,988,560	14,771,513
Income from funded securities	2,297,795	1,885,520
Income from unfunded securities accounts	5,894,663	4,337,849
Miscellaneous income	11,201,264	616,418
Total non-operating income, including other	38,036,467	24,562,834
Gross income	79,258,435	87,666,701
Deductions from gross income:		
Rent from leased roads	15,617,101	22,741,979
Interest on funded debt	25,808,688	18,448,750
Interest on unfunded debt	8,803,980	7,826,208
Total deductions from gross income, including other	54,950,766	54,865,028
Net income	24,307,669	32,801,673
Disposition of net income:		
Income applied to sinking and other reserve funds	1,147,830	2,239,790
Dividend appropriations of income (4 per cent in 1921; 6 per cent in 1920)	19,966,936	29,950,404
Construction expenditures on leased and branch roads directly operated, borne by the Pennsylvania Railroad Company	2,759,796	.....
Balance transferred to credit of profit and loss	433,107	611,479

*Operation during 1920 having been for two months under federal control, for six months under the government's guaranty, and for four months without government relationship, no comparisons of items of railway operating revenues, expenses, etc., are shown in this statement.

The annual report of the Pennsylvania is reviewed in an article on another page of this issue entitled "Remarkable Improvement Shown by Pennsylvania."

New Director.—Spencer O. Gilbert has been elected a director to fill the unexpired term of Joseph Wood, who died March 4 last.

FERRIS MARQUETTE.—*Dividends.*—This company has declared a dividend of 1½ per cent on the 5 per cent preferred stock for the four months ending April 30 and 1 per cent on account of the arrearage of the cumulative dividend on the same stock. The regular 1¼ per cent prior preference has also been declared. All dividends are payable May 1 to stock of record April 15. Hereafter dividends on the preferred stock will be payable quarterly on the same dates as those on which dividends are paid on the prior preference.

PITTSBURGH, BESSEMER & LAKE ERIE.—*New Director.*—J. G. Frazer has been elected a director to succeed D. M. Clemson, retired.

ST. LOUIS-SAN FRANCISCO.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$11,453,000 of prior lien 5½ per cent gold bonds to be sold at not less than 80 or pledged at not less than 70. It is proposed to issue \$10,932,000 in lieu of and on surrender of a like amount of prior lien 6 per cent gold bonds authorized by the commission last year and the balance to provide for the refunding of equipment notes.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

New England Steamship Company	\$100,000
Wilkes-Barre Connecting Railroad Company	27,500
Chicago Heights Terminal Transfer Railroad Company	500

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Sales of Equipment Trust Certificates

The director general has announced additional sales at par plus accrued interest, of railroad equipment trust certificates held by the government, to:

Alfred Borden, New York:	
Detroit, Toledo & Ironton, 1923 to 1935, inclusive.....	\$487,500
Speyer & Company, New York:	
Wabash, 1923 to 1935, inclusive.....	6,546,800
	<hr/>
	\$7,034,300

The sales comprise approximately two-thirds of all the maturities of these equipment trust issues. The balance of one-third of all maturities will be stamped as subordinated, in accordance with the agreement as amended under the plan recently announced. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$228,115,200.

Payments to Railroads

Total payments by the Treasury Department to railroads and other transportation companies under various provisions of the Transportation Act up to March 31, according to an announcement issued by the Treasury Department on April 1, have been as follows:

(a) Under Section 204, as amended by Section 212, for reimbursement of deficits during Federal control:		
(1) Final payments, including partial payments previously made.....	\$1,378,369	
(2) Partial payments to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission.....	1,815,841	
Total payments account reimbursement of deficits.....		\$3,194,210
(b) Under Section 209, as amended by Section 212, for guaranty in respect to railway operating income for first six months after Federal control:		
(1) Final payments, including advances and partial payments previously made.....	8,248,174	
(2) Advances to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission.....	259,510,874	
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above.....	164,652,775	
Total payments account of said guaranty.....		432,411,823
(c) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided.....	298,478,717	
Total.....		\$734,084,750

Repayments of loans amounting to \$74,003,570 have been made by 22 companies.

Dividends Declared

Atchison, Topeka & Santa Fe.—Common, \$1.50, quarterly, payable June 1 to holders of record May 5.
 Bangor & Aroostook.—Common, 2 per cent; preferred, 3½ per cent; both payable April 1.
 Delaware, Lackawanna & Western.—3 per cent, quarterly, payable April 20 to holders of record April 8.
 Georgia Railroad & Banking.—3 per cent, quarterly, payable April 15 to holders of record April 1.
 Meadville, Conneaut & Linesville.—2 per cent, payable April 1 to holders of record March 15.
 New London Northern.—2½ per cent, quarterly, payable April 1 to holders of record March 16.
 New York, Chicago & St. Louis.—First preferred, \$1.25, quarterly, payable April 20 to holders of record April 8; first preferred, \$1.25, quarterly, payable June 30 to holders of record June 19; first preferred, \$1.25, quarterly, payable September 30 to holders of record September 19; first preferred, \$1.25, quarterly, payable December 30 to holders of record December 19; second preferred, \$1.25, quarterly, payable April 20 to holders of record April 8.
 Pere Marquette.—Five per cent preferred stock, 2½ per cent; five per cent prior preference stock, 1½ per cent; both payable May 1 to holders of record April 15.
 Pittsburgh & West Virginia.—Preferred, 1½ per cent, quarterly, payable May 31 to holders of record May 3.

Trend of Railway Stock and Bond Prices

	April 4	Last Week	Last Year
Average price of 20 representative railway stocks, close of business.....	62.03	60.60	53.87
Average price of 20 representative railway bonds, close of business.....	83.83	83.19	73.49

Railway Officers

Executive

W. A. Colston has resigned as director of the Bureau of Finance of the Interstate Commerce Commission and has been appointed vice-president and general counsel of the New York, Chicago & St. Louis, succeeding H. D. Howe, deceased.

G. W. Lupton, superintendent of terminals of the Atchison, Topeka & Santa Fe at San Francisco, Cal., has been appointed assistant to the vice-president in charge of operation, with headquarters at Chicago, effective April 1, to succeed W. K. Etter, whose appointment as acting general manager of the Eastern lines, with headquarters at Topeka, Kan., was announced in the *Railway Age* of April 1.

J. B. Finley, whose promotion to vice-president and general manager of the Southern Pacific of Mexico, with headquarters at Empalme, Sonora, was reported in the *Railway Age* of March 25, was born November 22, 1856, at Santa Rosa, Cal., and entered railway service in September, 1882, as a warehouseman on the Southern Pacific of Mexico. He was employed in 1883 as a car sealer, from 1884 to 1886 as a car carpenter, from 1887 to 1897 as master car repairer, and in 1908 became general storekeeper following which he served in the capacities of master car repairer, commissary agent, and purchasing agent until 1911, when he became assistant general superintendent.



J. B. Finley

He held this position until September 1, 1920, when he was promoted to general superintendent, the position he occupied at the time of his promotion to vice-president and general manager on March 1, 1922.

Financial, Legal and Accounting

J. W. Broome has been elected secretary and assistant treasurer of the Western Maryland with headquarters at New York. S. R. Gehlert has been appointed treasurer and assistant secretary with headquarters at Baltimore, Md.

M. L. Countryman, general solicitor of the Great Northern, whose promotion to general counsel, with headquarters at St. Paul, to succeed E. T. Lindley, was noted in the *Railway Age* of March 4, has been elected vice-president as well as general counsel. F. G. Dorety, assistant general counsel, has been promoted to general solicitor to succeed Mr. Countryman. A. L. Janes, assistant general solicitor, has been promoted to assistant general counsel to succeed Mr. Dorety. R. J. Hagman has been promoted to assistant general solicitor to succeed Mr. Janes.

F. G. Dorety, assistant general counsel of the Great Northern who has been promoted to general solicitor with headquarters at St. Paul, Minn., was born on July 20, 1878, at Boston, Mass., and studied law at the University of California and Harvard University from which he graduated in 1900 and 1903, respectively. He entered railway service on October 1, 1908, as an assistant attorney on the Great Northern at Seattle, Wash., since which he has served as attorney

from 1910 to 1915; attorney for the Great Northern and for Oregon-Washington Railroad & Navigation Company from 1915 to 1918; and assistant general counsel of the Great Northern with headquarters at St. Paul from 1918 to the time of his recent promotion. As general solicitor, Mr. Dorey will have general jurisdiction over all litigation and legal matters throughout the system except the Canadian provinces.

Edith Jarvis Alden, who has been doing confidential work in the office of the secretary and treasurer of the Chicago, Burlington & Quincy for a number of years, has been elected assistant secretary of the corporation to succeed H. E. Jarvis, resigned. Mrs. Alden was born and educated in Burlington, Iowa, and entered the service of the Burlington in May, 1918, as an assistant in the treasury department in charge of liberty bonds. Upon the completion of this work in 1921, she became an assistant to H. E. Jarvis, until November of that year, when she assumed the office of assistant secretary left vacant as the result of the absence of Mr. Jarvis on account of ill-health. Her appointment as assistant secretary took effect March 9.



Edith J. Alden

M. L. Countryman, whose election as vice-president and general counsel of the Great Northern, with headquarters at St. Paul, was announced in the *Railway Age* of March 4, was born at Nininger, Minn., on August 27, 1862, and studied law at Washington University, St. Louis, Mo., from which he was graduated in 1886. Mr. Countryman entered the service of the Great Northern in 1903 as an assistant general solicitor with headquarters at St. Paul, and held this position until 1916, when he was promoted to general attorney, with the same headquarters. He was promoted to general solicitor in 1918, and held this position with headquarters also at St. Paul, Minnesota, until his recent election as vice-president and general counsel.



Underwood & Underwood
Studios, N. Y.

M. L. Countryman

Operating

W. C. Showalter has been appointed acting superintendent of the Seattle division of the Northern Pacific with headquarters at Seattle, Wash., to succeed **T. H. Lantry**, appointed acting general superintendent, Western lines, with headquarters at Seattle. Mr. Lantry succeeds **A. D. Brown** who has been appointed acting general manager, Lines West, with headquarters at Seattle succeeding **E. C. Blanchard** who has been elected to serve on the Train Service Board of Adjustment for the Western Region with offices in Chicago, for the period April 1 to August 1.

W. E. Canning, whose appointment as superintendent of the Long Island was announced in the *Railway Age* of April 1,

page 855, was born on February 5, 1867, at Jamaica, Queensboro, New York City, and was educated in the public schools of Jamaica. He entered the service of the Long Island as a messenger in the train dispatcher's office in 1880 and two years thereafter became a telegraph operator. During the next forty years, up until the time of his recent appointment, Mr. Canning has served as towerman, train dispatcher, chief dispatcher, assistant train master, freight train master, assistant superintendent and superintendent of freight transportation.

C. D. Baker, whose appointment as general superintendent of the Long Island was announced in the *Railway Age* of April 1, page 855, was born on September 21, 1873, at Suffern, New York. He was graduated from Rockland College in 1890 and entered the service of the Long Island in 1891 as a car record clerk. Subsequently he served successively as staff record clerk, stenographer and clerk, timekeeper in the transportation department and chief clerk to the general superintendent. In 1909 he was appointed train master in charge of electric lines and four years later had his jurisdiction extended to cover all train operations. On April 20, 1916, he was promoted to superintendent and on the termination of federal control on March 1, 1920, to assistant general superintendent, which position he was holding at the time of his recent promotion.



C. D. Baker

W. K. Etter, whose appointment as acting general manager of the Eastern lines of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., to relieve **F. C. Fox**, was

announced in the *Railway Age* of April 1, was born at Shippensburg, Pa., on January 16, 1874, and entered railway service as a rodman on the Atchison, Topeka & Santa Fe, at Wichita, Kan., on June 1, 1891, following which he was employed consecutively as a stenographer, timekeeper and clerk at Wichita, Kan., and Arkansas City, Kan., until May, 1893, when he became stenographer and chief clerk in the assistant superintendent's office at Fort Madison, Iowa. He held the latter position until June 10, 1894, when he became stenographer, clerk, and chief clerk to the superintendent at Las Vegas, N. M., and later at Needles, Cal., where he remained until October, 1901, at which time he was appointed chief clerk to the general superintendent at La Junta, Colo., a position which he later occupied at Topeka, Kan. In July 1, 1905, Mr. Etter was promoted to trainmaster of the Eastern division at Topeka, Kan., and on January 1, 1906, he was made a superintendent with jurisdiction first over the Rio Grande division at San Marcial, N. M., and later of the Oklahoma division, with headquarters at Arkansas City, Kan., in November, 1916, he was promoted to general superintendent, with headquarters at Newton, Kan., where he remained until November, 1918, when he was promoted to assistant general



W. K. Etter

manager at Topeka, Kan. He was appointed assistant to the operating vice-president with headquarters at Chicago, in April, 1921, the position he occupied at the time of his recent appointment.

A. T. Owen, assistant superintendent of transportation and superintendent of stations and transfers of the Philadelphia & Reading, has been appointed superintendent of transportation,

effective April 1. Mr. Owen succeeds **Oscar W. Stager**, who has retired after almost 59 years of service with the Philadelphia & Reading. Mr. Owen was born April 6, 1870, at Norristown, Pa. He was graduated from the Norristown High School and entered the service of the Philadelphia & Reading on July 1, 1886, as a clerk at Philadelphia. He was promoted to the position of yardmaster at West Falls on July 1, 1900, and to yardmaster at Pencoysd on December 1, 1900; agent at Pencoysd on April 1,

1902; and agent at Wayne Junction Transfer on October 15, 1906. He was promoted to the position of supervising agent of the Philadelphia division on July 1, 1918, and on April 1, 1919, was appointed superintendent of stations and transfers; on August 1, 1921, he was appointed assistant superintendent of transportation in addition to his duties as superintendent of stations and transfers.

A. T. Owen

Traffic

C. S. Bourque has been appointed commercial agent of the Southern with headquarters at Cincinnati, Ohio.

E. D. Osterhout, assistant general passenger agent of the Philadelphia & Reading with headquarters at Philadelphia, has been appointed general passenger agent with the same

headquarters, succeeding **E. L. Lewis**, promoted. Mr. Osterhout was born in Philadelphia on October 13, 1887. He began his railroad career with the Pennsylvania at its North Philadelphia station in 1903. On November 1 of the same year he entered the employ of the Philadelphia & Reading as a clerk in the general passenger department. He served in that capacity until May 1, 1910, when he was appointed chief rate clerk. On November 1, 1917, he was appointed special representative of the department and

on October 1 of the following year was promoted to assistant general passenger agent, which position he was occupying at the time of his recent promotion.

R. L. Baylor has been appointed district freight and passenger agent of the Tennessee Central, with headquarters at Knoxville, Tenn.

Frank G. Nigg, traveling freight agent of the Union Pacific at Chicago, has been promoted to freight traffic agent with the same headquarters.

G. C. Speight has been appointed manager of the land and industrial department of the Norfolk Southern, succeeding **C. I. Millard**, resigned.

D. C. Stephenson has been appointed commercial agent of the Chicago, Rock Island & Pacific with headquarters at Kansas City, Mo., effective April 1.

C. A. Washer, acting coal and ore agent of the New York Central, with headquarters at Cleveland, Ohio, has been appointed coal and ore agent with the same headquarters.

T. B. Porr, traveling freight agent of the Missouri, Kansas & Texas, has been promoted to division passenger agent, with headquarters at Austin, Tex., to succeed **T. L. Darneal**.

C. C. Williams has been appointed district passenger agent of the Philadelphia & Reading, with headquarters at Philadelphia, succeeding **G. F. Ingram**, promoted, effective April 1.

J. P. Thomas, general agent of the Los Angeles & Salt Lake, with headquarters at Chicago, has been transferred to Riverside, Cal., succeeding **J. H. Burtner**, district freight and passenger agent, who has been appointed agriculturist.

E. L. Lewis, general passenger agent of the Philadelphia & Reading with headquarters at Philadelphia, has been promoted to passenger traffic manager, succeeding **E. J.**

Weeks, who after many years of service has been relieved from active duty and appointed assistant passenger traffic manager. Mr. Lewis was born on September 17, 1882, and entered railroad service as a stenographer in the employ of the Central of New Jersey. On March 12, 1903, he left that position to enter the service of the Philadelphia & Reading in the same capacity in the office of the general passenger agent at Philadelphia. In 1906 he was appointed assistant chief clerk in that department and on December 1, 1909, was promoted to district passenger agent at Philadelphia. On April 11, 1917, he was appointed assistant general passenger agent, which position he resigned on July 1, 1918, to become assistant sales manager of the Packard Motor Car Company. With this company he served as sales manager, general distribution manager and assistant general manager, which latter position he resigned on March 1, 1920, to return to the Philadelphia & Reading as general passenger agent, in which position he was serving at the time of his recent promotion.



E. L. Lewis

E. T. Reynolds, formerly commercial agent of the Pere Marquette at Pittsburgh, Pa., and more recently traffic manager for the C. H. Wills Company, Marysville, Mich., has been appointed general agent of the Pere Marquette, with headquarters at Detroit, Mich.

Rufus D. Heusner, New York State freight agent of the Philadelphia & Reading with headquarters at Rochester, N. Y., has been appointed division freight agent with headquarters at Harrisburg, Pa., succeeding **C. H. Morgan**, deceased. **E. H. Stone**, succeeds Mr. Heusner at Rochester.

J. E. Light, district freight and passenger agent of the Southern Pacific, with headquarters at Salt Lake City, Utah, has been transferred to Los Angeles, Cal., to fill a vacancy made some time ago by the promotion of **L. C. Zimmerman**. **P. Bancroft**, district freight and passenger agent, with headquarters at Phoenix, Ariz., will succeed Mr. Light, and will be succeeded himself by **D. Smith**.



E. D. Osterhout



William Pugh has been appointed assistant general freight agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y. Everett D. Davis has been appointed to a similar position with the same headquarters, and R. R. Williams has been appointed division freight agent with headquarters at Rochester, N. Y.

A. J. Grummett, whose appointment as assistant general freight agent of the Great Northern, with headquarters at Seattle, Wash., was announced in the *Railway Age* of February 18 (page 455), entered railroad service as a freight handler on the Chicago, Milwaukee & St. Paul. He was promoted successively to foreman's clerk, check clerk, receiving clerk, billing clerk, freight received clerk, and assistant cashier. In 1898 he took a position with the Minnesota Transfer (St. Paul) in the "over, short and damage" department. He entered the service of the Great Northern in 1900 as a revising clerk in the accounting department, and three years later he was transferred to the claim department as a rate clerk. In 1905 he was made assistant chief clerk in the traffic department of that road, since which time he has been consecutively transcontinental clerk, chief tariff clerk, chief clerk to the assistant traffic manager, and chief clerk to the general traffic manager. He was holding the latter position at the time of his recent promotion.

G. F. Ingram, district passenger agent of the Philadelphia & Reading, has been appointed assistant general passenger agent with headquarters at Philadelphia. Mr. Ingram was born on June 24, 1886.

He entered the service of the Philadelphia & Reading on July 10, 1902, as an office boy in the office of the vice-president. For the next 11 years he was employed in the operating and executive departments and in 1913 entered the traffic department. In 1915 he was appointed advertising and publicity agent and, in 1917, district passenger agent. During the period of federal control he was assigned to duty in the office of the federal manager and, in March, 1920, returned to his former position of district passenger agent, which he was occupying at the time of his recent promotion.



G. F. Ingram

Mechanical

M. J. McGraw has been appointed superintendent of motive power and cars of the Wheeling & Lake Erie with headquarters at Brewster, Ohio, succeeding J. F. Hill, who has been appointed assistant superintendent of motive power and cars, effective April 1.

Engineering, Maintenance of Way and Signaling

F. M. Siefer, division engineer of the Sacramento division of the Southern Pacific at Sacramento, Calif., has been transferred to the Stockton division at Stockton, Calif., to succeed J. B. Dawson, resigned.

R. C. Miller, division engineer of the Chicago Terminal division of the Northwestern region of the Pennsylvania, with headquarters at Chicago, has been transferred to the Philadelphia division, with headquarters at Harrisburg, Pa., to succeed Elmer Irving, promoted to engineer maintenance of way of the Central Pennsylvania division. C. L. Barnaby, division engineer, at Fort Wayne, Ind., has been transferred to the Chicago Terminal division, to succeed Mr. Miller; J. K. Sherman, division engineer at Grand Rapids, Mich., has been transferred to Fort Wayne, to succeed C. L. Barnaby,

and E. L. Hoops, supervisor on the Eastern region with headquarters at Huntingdon, Pa., has been promoted to division engineer, with headquarters at Grand Rapids, Mich., to succeed J. K. Sherman.

C. K. Bowen, whose appointment as chief engineer of the Southern Pacific of Mexico with headquarters at Empalme, Sonora, was reported in the March 25 issue of the *Railway Age*, was born on March 15, 1878, at Galveston, Tex. Following the completion of his engineering course at the Agricultural and Mechanical College of Texas in 1898, he entered railway service with the Santa Fe as an assistant on preliminary location and on construction in East Texas, where he remained until 1902, when he entered the service of the Hill-Polley Land Company at Center, Tex. In July, 1903, Mr. Bowen re-entered railway service as a draftsman on the Pacific Electric at Los Angeles, Cal. He became chief draftsman on the same road in 1906 and served in this capacity until 1908, when he was promoted to assistant engineer in charge of constructing various track extensions, power plants, bridges, etc. He became field engineer in general charge of all engineering and construction for the same company in 1910, and in 1913 and 1914 served as acting chief engineer. He left this road in 1918 to enter military service as a field engineer with the 81st engineers, from which he was discharged in 1919 as a captain. He then re-entered the employ of the Pacific Electric with direct charge of all engineering and construction, and continued in this capacity until his connection with the Southern Pacific of Mexico as noted above.

Purchasing and Stores

W. C. Bower has been appointed assistant manager of purchases and stores of the New York Central Lines. The title of general purchasing agent of the New York Central Railroad and the Pittsburgh & Lake Erie has been abolished.

A. J. Mello, whose appointment as purchasing agent of the San Diego & Arizona, with headquarters at San Diego, Cal., to succeed F. C. Howard, was announced in the *Railway Age*

of March 25, was born December 20, 1866, at Jackson, Cal. After completing a course in a business college in that city in 1906, he entered the service of the Southern Pacific as a trucker in the freight sheds at Sacramento, where he remained until March 28, 1907, when he became a clerk in the general stores at Sacramento. In November, 1910, he was promoted to accountant. In July, 1913, he became a stationery storekeeper with headquarters at Oakland, and in February, 1918, he was promoted to general stores inspector in the general storekeeper's office at San Francisco. In August, 1918, he was promoted to traveling storekeeper and in September, 1921, became superintendent of the commissary stores at San Francisco, the position he held at the time of his recent promotion to purchasing agent.



A. J. Mello

Obituary

John W. Midgely, who was chairman of the Western Freight Association until its dissolution in 1898 and who organized the Bureau of Car Performances, which became the Railway Clearing House Bureau, died in Chicago on April 4 at the age of 79. Mr. Midgely was instrumental in the agitation which resulted in putting car rentals on a per diem rather than a mileage basis. He retired in 1908 owing to his loss of sight. Mr. Midgely was born in Leeds, England.

EDITORIAL

Railway Age

EDITORIAL

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Annual Reports as a Medium of Publicity

IT WILL be generally admitted, we believe, that it is considered quite the proper thing for a railroad to devote some attention to telling the public something about its problems or its accomplishments. And yet there may be some question as to how generally this thesis is admitted. In spite of the large sums which are spent for publicity and—in the case of some roads—for advertising, it is still disconcerting, in fact, discouraging, to see how reticent some carriers can be. It would appear that the idea of publicity is regarded as correct theoretically but that in too many cases the practical applications receive a different kind of consideration.

Now publicity is neither simple, nor is it a science. We do not desire at this time to enter into a discussion of its manifold applications. We do desire, however, to point out that frequently much is lost that might be gained were it not for a mistaken attitude as regards the value of publicity, or possibly because of a failure to realize the possibilities of a situation. These thoughts are not new or original. They are, however, brought to mind by the recent advent of what can be aptly termed the annual report season.

A great deal of money is spent in the preparation, publication and distribution of annual reports. Some of them have an extremely wide distribution or, as it would be termed in the publishing field, a large and influential circulation.

It would be interesting to calculate the aggregate circulation of all the annual reports published in a single year, or to estimate the number of people interested in railroads who are reached by them. It would be a commonplace to say that the value of this circulation reaches high proportions. The question arises: Is this circulation properly used? The answer must be in the negative.

Some of the annual reports are truly formidable documents. They contain, in many cases, seemingly numberless pages of statistics of all kinds, a large proportion of which, we fear, are frequently not understandingly intelligible even to the officers of the roads which publish them. Of course, it is usually the case that these statistics for one reason or other must appear in some form or another, for there must be a readily available record for the use of those sufficiently driven, skilled, patient—or all three—to peruse them.

Nevertheless, it must be surprising if not also disappointing to a layman or a mere stockholder to see how much mate-

rial can appear in a report statistically and yet how little can be gleaned from this vast maze of statistics as to the actual operations of the railroad in which he is interested, or as to the railroad problem as a whole. And who is more entitled to have these details than the stockholder? Who is it more useful to inform than he who is already in a receptive frame of mind? The situation as it exists today is not fair to the stockholder. In view of the expense incurred in getting out the annual reports, it is still less fair to the railroad company.

There is a remedy for this, and an extremely simple one. It is merely to expand on the president's remarks to his stockholders—to give in addition to the income account, balance sheet, statement of revenues and expenses and all the other necessary figures, something more than a mere perfunctory statement explaining these figures. Why not discuss in an interesting manner such things as the conditions of the year on the railroads in general and on the railroad issuing the annual report, in particular; the amount of business, why it increased or decreased, the matter of costs, relationships with labor, competition with the motor truck, problems of increasing taxation, new engineering projects proposed or under way and the various other details in which the public is primarily interested? There is a story to tell in the case of every railroad. Why not tell it?

This idea contains nothing particularly new or particularly startling, in proof of which we should suggest the perusal of the annual reports of such lines as the Pennsylvania, the Boston & Maine, the Southern and others of a small minority of railroads which have realized the value of these important documents. These reports all constitute interesting and informative reading and they all follow the ideas herein suggested. The Pennsylvania report, incidentally, adopts the valuable idea of pointing out the net after rentals and return on the investment, a good idea truly in view of the importance given these figures in section 15-a of the Transportation Act. The Southern issues its preliminary remarks in a small booklet distinct from the annual report itself, which booklet is sufficiently interesting to assure one that it must be of great value for purposes of telling the railroad's story. In the case of the Lackawanna, the most authoritative information concerning the contemplated electrification project at Scranton, a matter of very lively interest,

appears in the 1920 annual report with a resulting increase in the interest and value of the report.

Roads which are adopting this policy in connection with their annual reports are utilizing the opportunity presented. They give the stockholder details characterized by their value and interest alike, and sufficiently well gotten up and worded so that the person who receives the report is not unduly wearied in reading them understandingly.

Publicity schemes usually cost large sums of money and require much time and thought. Annual reports are expensive and elaborate—and also necessary. Why not use them to best advantage and make them worth while—without additional expense—by causing them to play their part in the publicity scheme?

The railroads that are already taking the very simple steps to utilize their annual reports in the manner suggested are "selling" their railroads to their own stockholders.

It has been stated over and over again, in addresses, newspapers, magazines, and even books, that the railways are

The Engineer Can Play a Part

seriously behind as to adequate facilities, terminal and otherwise. The public, in its way, realizes this. Yet the public is fickle and that characteristic must be recognized as we have stated in previous editorials. The engineer can play no small part in helping to educate the public, for it is the work his department is doing or is intending to do, that will remedy much of the inadequateness of facilities. And the describing of this work, whether under way or projected, will do much to prove to the public that the railways are really endeavoring to overcome the deficiencies. Too often the details, or for that matter even the general outline, of the work being undertaken are not released to the newspaper and technical magazines until the work is so far along—even completed—that the opportunity of producing a real effect on the public has passed. It is no longer news—it has seeped into the public's mind by degrees and so slowly that the people fail to recognize that something is being done for their ultimate benefit. Stop hiding your light under a bushel! Some roads have and the rest should do so!

Each year sees a large number of small construction tasks, such as the building of tool sheds, section houses, box culverts

Every Day Economy Possibilities

and other miscellaneous work, whose performance is usually considered as a routine matter. Such work is commonly carried out with the regular forces and the cost, while more or less simple to compute, varies with the materials employed, the labor and its relative efficiency. There are possibilities for making savings in this work which, while not large in any particular instance, may amount to a substantial and worthwhile sum when taken as a whole. A method not exactly new, yet certainly not common, is the assignment of this work to capable, regular forces with the understanding that, in addition to their wages, they will be given, for instance, one-half of whatever they save in the cost of the work. This estimated cost can be figured quite accurately, the figures used being based on the amount of work ordinarily performed in a given territory by the labor assigned to it. Any saving in the cost is a clear gain for the railroad, as it is so many dollars actually saved; in addition indirect benefits may be derived through the data so obtained and through the training of the men to plan their work.

Occasionally critics of the railroads refer to the provisions of the Transportation Act—which for the two years ended on February 29 directed the Interstate Commerce Commission to try so to adjust rates as to give the railroads of the United States as a whole a return of 5½ to 6 per cent on their value—

A "Fair Return" for Railroads and for Ships

constituting a subsidy. In this connection it may be noted that the administration plan for giving a real subsidy to the operators of merchant ships contemplates 10 per cent on the invested capital as a fair return. Robert H. Montgomery, the accounting expert who testified before the Congressional committees as to this provision of the ship subsidy bill, explained as the reason for proposing a 10 per cent return for shipping that "if 6 per cent is considered a reasonable return on capital invested in railroads and other public utilities which are monopolistic in character and whose earnings are subject to far less fluctuation, a minimum of 10 per cent would appear to be a fair return on capital employed in the hazardous business of overseas shipping." Recent history shows, however, that even railroading is subject to rather violent fluctuations, since the traffic of 1921 was approximately one-fourth less than that of 1920. The ship subsidy bill, it is true, does not in any way provide for a guaranty of 10 per cent, or any other per cent, any more than the railroad law provides for a guaranty, as indicated by the fact that during the period this so-called guaranty provision was in effect the railroad net return scarcely exceeded three per cent. The shipping bill provides that companies having a net operating income in excess of 10 per cent shall return to the government one-half of such excess, whereas the Transportation Act provides that any railroad shall return one-half of any excess over 6 per cent. But there is also another difference. The shipping bill provides for the "recapture" of one-half of the excess only up to the amount of the direct subsidy that may have been received, while a railroad earning more than 6 per cent is required to give up one-half of the excess although it has received no subsidy; it has merely been allowed to charge rates which were sufficient to enable railroads as a whole to earn three per cent.

Every catastrophe brings to light certain shortcomings in practice. The recent destruction of a large part of the contents of the Burlington general office building in Chicago furnishes another illustration of this fact. This fire occurred in a building of the most modern construction, as is indicated by the fact

The Protection of Records

that it was given the lowest insurance rate of any office building in the city. In spite of the terrific attack to which it was subjected, the building did as well as could reasonably be expected of it. The fire did not extend from one floor to another but each floor suffered an individual conflagration communicated from the exterior. Yet the contents of seven floors were entirely consumed and large quantities of records were destroyed, many of which can never be replaced. This fire demonstrated the inherent weakness of ordinary window construction. While past experience had not shown the necessity of wire-glass window construction on the sides of buildings facing streets, this was the vulnerable point in the Burlington building. There is rather conclusive evidence that wire glass windows would not have withstood the flames, but it is reasonable to expect that they might have delayed the progress of the fire to such an extent that the fire department would have had a chance to have fought it to better advantage. The fire also demonstrated the importance of reducing the combustible contents of an office building to the minimum, for while metal furniture would not have withstood the flames, it would not have added fuel to the con-

flagration. However, the lesson of this catastrophe is that no building designed for efficient office use can be secure against fire hazard from outside sources. When a building of as nearly fireproof construction as the Burlington building was can be gutted by a fire, the danger to the average railway office building can be realized. In addition to reducing the fire hazard in offices and record rooms to the minimum, the railways also face the necessity of taking such steps as may be reasonably practicable to reduce the possibility of loss if such a fire should occur. This involves consideration of the advisability of duplicating important records for storage at widely separated locations, the installation of ample fireproof vaults in which records in current use may be stored over night and similar measures. The time for action is now while the danger is fresh in mind.

The International Railway Congress will be held at Rome, Italy, from April 18 to 30. The American delegates, of whom there are a goodly number and whose names have appeared previously in these pages, are already in Europe at the Rome Congress or on the way there. The *Railway Age* will be represented by its editor, Samuel O. Dunn, who sailed on April 4. Mr. Dunn's observations of the congress will be published in the *Railway Age*. After the congress, he will spend several weeks traveling in Europe. He expects to record his impressions for *Railway Age* readers in the form of weekly letters.

The *Railway Age* has received information, which will doubtless be of interest to many of its readers, that Clifford Thorne, now of the Chicago law firm of Thorne & Jackson, who as attorney for various organizations of shippers and for a time as chairman of the Iowa railroad commission has for several years been one of the most prominent if not one of the most successful of railroad baiters, is about to announce a campaign for the seat in the United States Senate which will become vacant upon the expiration of the term for which W. S. Kenyon, recently appointed a federal judge, was elected. If Mr. Thorne should succeed at the polls the state of Iowa, which has always been especially interested in railroad affairs, would be represented in the Senate by two widely differing varieties of statesmanship in relation to transportation questions. Senator Cummins, now chairman of the Senate Committee on Interstate Commerce, stands for the constructive policy represented by the Transportation Act, which seeks to make the railroads an adequate and effective instrument of commerce. For a good many years Mr. Thorne has been collecting fees for his efforts to have the laws relating to railroads made and enforced in the interests of his clients. These efforts and those of others in a similar direction have been among the causes that finally made it necessary to enact a law which, in the interest of the public as a whole, would contain a recognition of the rights of railroads as well as of shippers. Whether this has led to a situation such that Mr. Thorne has decided it is time for him to seek a broader field of activity, or whether he considers that his influence on railroad laws may be more potently exercised from within the lawmaking body than from without, we are not informed, but we believe that Mr. Thorne's kind of activity was somewhat more effective while he was occupying a public office and speaking in the name of the public as a representative of the Iowa and other state commissions than it has been when exerted in behalf of private interests. At any rate it takes all kinds of people to make a world and Mr. Thorne doubtless realizes that the statement also applies to the electorate of Iowa.

Best Accident Record in History

THE RAILWAYS of the United States in the year 1921 made the best record for safety of operation that they have ever made in the 34 years since accident statistics have been compiled by the Interstate Commerce Commission. Undoubtedly the record was the best ever made as it is not probable that any better record was made before the statistics began to be compiled.

The statistics of accidents in 1921 the Commission has just made public are not quite complete, but they are near enough so to indicate beyond any question what the complete statistics will show. The statistics for 1920 showed that in proportion to the number of persons employed by the railroads and the amount of traffic handled, the number of persons of all classes killed in that year was the smallest in history. Most of the statistics for 1921 just made public by the commission are much better than those for 1920. This seems fully to warrant the conclusion that when they are available the complete statistics for 1921 will be better than the complete statistics for 1920.

Only the figures regarding persons killed will be given here, as owing to the changes in the ways of reporting them, those regarding persons injured are always of doubtful significance.

The total number of employees on duty killed in train or train service accidents in 1921 was 1,096. This was a reduction of 1,011, or 48 per cent, as compared with 1920. It is the smallest number of employees on duty ever killed in any year for which statistics are available. The number of passengers killed was 205. This is a reduction of 24, or 10½ per cent, as compared with 1920. It is the smallest number of passengers ever killed in any year for which statistics are available except 1895, 1896 and 1915. The total number of employees on duty and passengers killed in train and train service accidents was 1,301 as compared with 2,336 in 1920—a reduction of 44 per cent, and the smallest ever reported. The total number of "non-trespassers"—that is employees, passengers and all other persons having a right to be on railway property—killed was 3,106, as compared with 4,329 in 1920, a reduction of over 28 per cent.

The foregoing statistics do not include fatalities resulting from "industrial and other non-train" accidents—that is accidents occurring in shops and other places which were not due to the operation of trains. The number of persons killed in such accidents in 1920 was 463, and in 1921, 409, a reduction of 12 per cent.

The only class of persons the fatal accidents to which showed an increase was trespassers. The number of these persons killed in 1920 was 2,166, while in 1921 it was 2,481, an increase of 14½ per cent.

The Commission's statistics of accidents for the last 15 years reflect an increase in the safety of railway operation in the United States which probably has not been surpassed, and may not have been equalled, in any other industry in this country, or on the railways of any other country.

The fatalities on railroads reached their maximum in 1907. In that year the total persons of all classes killed was 11,839. Of these, 4,534 were employees and 610 were passengers. The number of fatal accidents has fluctuated from year to year since then, but has shown a generally declining tendency. The traffic of 1921 represented a very large decline from that of 1920, but the decline in fatalities to employees and passengers was relatively much greater. In 1921 the railroads handled about one-third more passenger business and about one-half more freight business than in 1907, but the number of employees and passengers killed was almost exactly 66 per cent less than in 1907.

There has not been a corresponding reduction in the number of trespassers and other classes of persons killed. Auto-

mobile accidents have seriously interfered with efforts to reduce the number of people killed at highway crossings. Nevertheless, when the complete figures for 1921 are available they will show that the total number of persons of all classes killed was only about 6,000. It was only about one-half the number killed in 1907, and probably was less than the number killed in any year since 1889.

When it is considered that the total number of persons killed in 1921 was about the same as in 1889, while since then the number of employees has increased about 140 per cent, the passenger traffic handled about 225 per cent and the freight business handled about 400 per cent, some idea of the increase in the safety of operation which has occurred within the last 30 years, and especially during the last 15 years can be formed.

The great increase in safety of operation has been largely due to improvements in the railway plant. It has been very much more largely due to the education of employees to the need of observing the rule of "safety first" in their work, for the great majority of accidents always has been due to man failures rather than to plant failures.

Make the Valuation Reports Easier to Use

THE VALUE of any work may be measured by the use to which it may be put. Based on this premise the work of the federal valuation forces is falling far short of its possibilities and the Division is not fully discharging its obligation to the public. This work has now been in progress for nearly ten years and has cost the carriers and the government over \$80,000,000.

Tentative reports have been issued on nearly 200 properties and this number is being increased almost daily. Copies of these reports are being sent to the railways concerned, to the governors and the public service commissions of the states in which the properties are located, and to the attorney general of the United States. These, however, constitute only a small portion of those interested; the investors in the securities of the railways have a direct interest, as do the shippers and the public at large. In view of these vast expenditures of time and money it is important that the reports be presented in a manner which will enable these various interests to place the same interpretations upon the information and make them of the maximum value to all interested parties. This is not now being done. Undertaken originally as a means of protecting the public from the evils of over-capitalization then feared, the valuation work is now seen to afford protection to the investor.

The reports as now issued contain a vast mass of information concerning the properties which is bewildering to the average railway man, investor, or public officer, and is understandable only to the expert; moreover, because of their complicated make-up they may be misused to the detriment of public interest. Important and necessary as this information is, it would seem highly desirable for the commission which has prepared the report and collected the information incorporated in it, to summarize this information in a brief introductory statement in which there would appear those figures in which the vast majority of the people are interested. These include the commission's findings of value, including the property owned and used for transportation purposes, the land and buildings owned but not used for transportation, and other investments in contrast with the capitalization, and the carrier's and the commission's book record of investment in road and equipment. Further than this, many are interested in the cost of reproduction and the cost of reproduction less depreciation of the property owned and used, and of that owned but not used for transportation purpose.

By summarizing this and other basic data which would involve little additional work, the commission would protect its report from mis-use and mis-interpretation and would complete the service to the public for which the Division of Valuation was created. The commission owes it to itself, as well as the public, to complete its report in this way to protect itself against the mis-use of its information and to enable the public regulatory bodies, the railways and investors to avoid all possibility of confusion as to results. The commission will render a great service to the railways and to those interested in them by presenting such a summary in order that "he who runs may read."

Railroad Terminals Come High

A MAN who enters a manufacturing venture is confronted with an exceedingly difficult problem in the design of his plant. Obviously he must plan for the future, but his efforts at a solution are hampered by the necessity of making some exceedingly rough approximations concerning future requirements. He can only guess at the growth in the volume of his business and the probable character of the product most in demand, and it is, of course, impossible for him to forecast improvements in manufacturing processes which may render a large part of his plant obsolete. He must also guard against excessive capital expenditures. As a result, his provisions for the future are necessarily limited, and as years go by he is compelled to discard portions or even entire units of his plant to make way for new facilities adapted to new requirements.

So it has been with railroad terminals. Changes in conditions, too well understood to require mention here, are constantly compelling the roads to raze existing terminals and replace them with new ones designed to meet the requirements of the present with further allowance for the future. In general, such replacements cannot be considered as added facilities, but merely as enlargements of the existing plants. Yet in spite of this, the expenditures which are entailed in such replacements assume enormous proportions. Thus, in the city of Chicago, the railroads are committed to an expenditure of 150 million dollars for track elevation. This enormous outlay, two-thirds of which has already been made, will add little to the facilities for the conduct of railway transportation.

The renewal of passenger and freight terminals in that city also involves an enormous expenditure. That of the North Western, completed within the last ten years, totaled more than 20 million dollars. The work now in progress for passenger and freight facilities in what is known as the Union Station group will cost over 65 million, while the improvements to which the Illinois Central is committed are estimated to cost 85 million. The remaining group of railroads, which includes those using the Dearborn, La Salle and Grand Central stations, are now using passenger and freight facilities which are admittedly inadequate and various plans completed or now under consideration indicate that not less than 50 million dollars is necessary to effect the replacements of existing terminals to meet the needs of the immediate future.

The aggregate of all these expenditures reaches a total approaching a half billion dollars, and represents an outlay that is not designed to open new markets for transportation, but provides simply for the renewal of terminals which, while required primarily for increases in traffic, are nevertheless an enormous additional charge against transportation over a railway mileage which has not measurably increased. This unquestionably imposes one of the greatest burdens on our national transportation system and occupies an important place in what is termed our "transportation problem."

Railroads Are Buying!

THE RAILWAYS are preparing for the country's expected prosperity and the resulting increased business. They are ordering freight and passenger cars in unusual volume and the announcements of authorizations for the expenditure of millions for additions and improvements by the various roads are tripping so closely upon one another's heels that it is becoming difficult to realize how much there is to be done.

The *Railway Age*, in its issues in January, reported the placing of orders for 7,960 freight cars; in February, for 14,771 and in March, for 6,550, a total for the three months of 29,281. In the two issues which have been issued so far in April, excepting, that is, the present issue, orders for 5,010 cars were reported, or a total to date of 34,291. In the first three months, as noted, the total was 29,281, which compares with total domestic orders in all 12 months of 1921 of 23,346. A comparison with 1921 is not of great value because 1921 was characterized as being an exceedingly poor year. But, nevertheless, 1921 had to be tolerated and that we are now out of it is not the least of the things we can be thankful for. The year 1916 may perhaps be a better year to choose for purposes of comparison. In the first three months of 1916 the freight car orders totaled 38,169.

THE CAR AND LOCOMOTIVE ORDERS OF 1922

	Freight cars	Passenger cars	Locomotives
January	7,960	235	5
February	14,771	160	8
March	6,550	25	77
Three months	29,281	420	90
April, first two weeks	5,010	423	86
Total	34,291	843	176

It is too early in the week at the time this is written to estimate how many cars will be reported as ordered before the week is ended. The number will be considerable for the placing of orders by the New York Central for 16,000 cars, and of large orders by other companies, guarantees that the present week will see the placing of more business than has been the case for any week in many months.

A feature of the 1922 freight car business has been the size of the orders as evidenced by the New York Central's 16,000, the Burlington's 7,300; the St. Paul's 4,000; the Norfolk & Western's 4,000; the Union Pacific's 4,500; the Pacific Fruit Express' 3,300, etc.

The passenger car business has come into its own after a long-drawn-out period of lethargy. Passenger car orders were omitted from the scheme of things during federal control. During all 1921, the passenger car orders totaled only 246. In the first three months of 1922, the orders totaled 420; in the *Railway Age* of April 1, there were reported 50, and in that of April 8—last week's issue—there were reported 373, a total thus far this year, therefore, of 843. The figure for the first three months of 1922—420—compares with that of the 537 for the first three months of 1916. But it is worth remembering that in one week of 1922, the issue of January 21, more passenger car orders were reported than the figure for Class I roads in all of 1921, or that in last week's issue the Pennsylvania's order for 250 cars again exceeded the 1921 figure.

The buying of locomotives has not yet reached the same proportion as in the case of cars. A buying movement has started, however, and should soon be showing results.

Last year was not a good year. It was, on the contrary, an exceedingly poor one. A comparison between the record of an exceedingly good period such as we are now in, with the poor conditions of 1921, therefore, has some interesting results. There are several railway supply concerns that report having taken more business in one month—in some cases, in one week—than in all 12 months or all 52 weeks of

1921. A marked change indeed, and, no doubt, all the more appreciated because of the sharpness of the contrast.

"Philadelphia & Reading's Improvements to Cost \$15,000,000," "Pennsylvania to Spend \$8,000,000 in Pittsburgh District," "Union Pacific Plans \$29,000,000 Outlay." These are typical of the headlines which one can see with increasing frequency in the daily papers. They indicate optimism—practical optimism, that is—and prosperity. The railways went through a very trying year in 1921. They earned for the year but 3.3 per cent on their property investment. The amount of traffic they handled was comparatively small—so much below 1920 as to be hardly comparable. Although the 1921 net was not as great as the Transportation Act requires, it was greatly in excess of the 1920 figure. The reason for the increased net with the greatly decreased traffic was the extremely severe cuts in expenses. Except in the matter of wages—still under consideration—the railways succeeded in getting things back on a rock bottom basis. They made savings in maintenance—less, insofar as concerns the final result, in way and structures than in equipment.

As concerns equipment, the railways now have a higher percentage of bad order cars and unserviceable locomotives than is advisable. This means that there is still a large amount of repair work to be done although it is also to be presumed that the proportion of bad orders will be reduced in due time through retirements of worn out or obsolete equipment. Track is better now than it was in 1920 in spite of the 25.9 per cent reduction in expenses of maintenance of way in 1921. It is by no means restored to pre-war standards. Further than that, there is to be overcome the suspension which took place in 1919, 1920 and 1921 in improvement work. The railways, in short, have a big program of catching up ahead of them. The placing of these large orders for freight and passenger cars and the authorizations of expenditures for other kinds of improvements show a realization of that fact. They also show a will to accomplish that which is necessary to supply a pre-war standard of transportation service.

The most practical feature of the situation, however, is the manner in which preparations are being made for the coming of prosperity. This program would not now be under way if the railroads were not convinced that business is about to pick up and to pick up in considerable extent. But, further than that, the railways are, in fact, taking the lead in the whole situation and by so doing are themselves starting the ball rolling. By and large, things look good for 1922. It seems safe to feel optimistic and enthusiastically optimistic at that.

New Books

Modern Tunneling, by Brunton & Davis. Second edition with new chapters on railroad tunneling, by J. Vipond Davies. 6½ in. by 9 in. 612 pages. Illustrated. Bound in cloth. Published by John Wiley & Sons, New York.

As stated above this is a revision and enlargement of the first edition published in 1914, the revision consisting in the addition of 200 pages devoted to railroad or larger bore tunnels. The earlier edition was confined primarily to water and mining tunnels of smaller section than those used in railway work. Apparently, the first 400 pages have not been revised in the new edition since all data and references antedate 1914, the date of previous publication. Consequently, references to the more recent tunnel projects do not cover their completion subsequent to that time. This seems rather unfortunate in the case of the table of noted railroad tunnels on page 32 since it omits reference to the Rogers Pass or Connaught tunnel, the longest railway bore in

America. The arrangement of the text very properly is topical, taking up the various factors entering into tunnel work in separate chapters, including such subjects as machinery, ventilation, drilling, timbering, blasting, etc. Another noteworthy feature of the book is the large amount of space given to bibliography. This amounts to 60 pages in the older portion and is supplemented in the newer part by 9 pages. The 200 pages on railroad tunneling are subdivided into chapters dealing with the general subject and construction and are followed by chapters treating of the building of tunnels through different classes of materials, beginning with hard rock, following with loose rock and softer materials and terminating with a rather extended treatment of subaqueous tunnels. In this connection it is to be noted that outside of the Mount Royal and Rogers Pass tunnels, the principal references to particular projects relate to tunnels built in the vicinity of New York City.

The Transition Spiral. By Arthur Lovat Higgins, assistant lecturer in engineering in the Victoria University of Manchester, England. 5 in. by 7½ in., 110 pages, illustrated. Bound in cloth. Printed in Great Britain. D. Van Nostrand Company, New York.

This handbook deals with the development of a transition spiral which will be of easy and practical application in the field and yet afford an effective compromise between the elements necessary for that result and those for correct mathematical truths. The curve developed is the clothoid which, according to the author, does not necessitate the use of tables, is virtually interchangeable with the cubic parabola and lends itself readily to the three characteristic modes utilized in American spiraling practice; i. e., a constant chord length, the number of chords constant, and constant deflection angles.

Earthwork in Railway Engineering. By John W. F. Gardner. 6 in. by 9 in., 152 pages, illustrated. Bound in cloth. Printed in England. D. Van Nostrand Company, New York.

The apparent intent of the author, an Englishman with experience on English railways, has been the presentation of the underlying principles controlling earthwork in a practical and easily understandable manner. In many respects, he has succeeded admirably although the book, so far as its application to American uses is concerned, suffers somewhat from the handicap of being largely descriptive of English practices. Much of the chapter dealing with the execution of earthwork, as well as the chapters on drainage and, in particular, slips in earthwork, are quite applicable to any practice and are interesting and instructive for students of railway construction.

Design of Steel Mill Buildings. By Milo S. Ketchum, director of the department and professor of civil engineering, University of Pennsylvania. 6½ in. by 9 in., 632 pages, 410 illustrations. Published by the McGraw-Hill Book Company, New York.

This is the fourth edition of this book on the design of steel mill buildings; it has been rewritten and enlarged. In the original edition, it was intended to provide a short course in the calculation of stresses in framed structures and to give a brief discussion of mill building construction, with the underlying idea of presenting methods, data, and details on design and the making of estimates not ordinarily found available. The fourth edition, following along these lines, has been enlarged to include a discussion of the calculation of the stresses in statically indeterminate trusses and frames, several problems in framed structures, detailed designs of a frame girder, a roof truss and a steel frame mill building. The text has been divided into three parts and an appendix, the latter covering specifications for steel frame buildings.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Standardization of Automatic Connectors

NEW YORK

TO THE EDITOR:

I have read with much interest the editorial on The Future of the Automatic Hose Connector which appeared in the *Railway Age* of February 11. I note in the article the following paragraph: "There will be no extensive application of connectors to freight equipment until through some agency all but one type of gasket face and one type of gathering device has been eliminated. But who ought to do the eliminating?" That is now the heart of the connector question. "Who ought to do the eliminating?" Some contend, and I understand your article to contend, that the connector manufacturers should do it, while others claim it is a matter for the railways. It seems to me that the latter is the correct view.

For the manufacturers to undertake to determine the standard connector would be much like a lawyer acting as advocate and judge in his own case. The railways are the customers for the connector. Is it not their wish, expressed through a proper committee, which should be the deciding factor in arriving at a standard? Can it be regarded as likely that any association of connector manufacturers could persuade all the railways of the United States and Canada operating approximately three million cars, to use a single connector type merely because they recommend it? Granting that such a thing is possible, which I do not believe, would it be the logical course from the viewpoint of the railways? The connector manufacturers are not immune from the commercial instinct any more than any one else. As between a good device, which they cannot control by patents, and a good device which they can control, it would be but natural that they should recommend the latter. The railways, on the other hand, would prefer to select the device least protected by patents.

Thus the standardization of a connector is confronted, at the outset, with a conflict of interests, the consumer desiring to adopt, as far as possible, an unpatented device and the producer desiring to protect his shareholders, and his own heavy investment in time and money, by getting adopted something which his patents control. To my knowledge, one of the two connector companies now most active has spent several years of hard effort, and probably a half million dollars bringing its device to a state of efficiency, while the other company has spent more than a million dollars and fourteen years of equally hard effort developing the connector it offers. Naturally they will labor earnestly to secure some benefit from a thing obtained at so dear a price.

This is the chief difficulty in the way of realizing the goal which could come from the acceptance of your suggestion that the connector manufacturers voluntarily "get together." An endeavor to accomplish this has been repeatedly made during the past ten years, and in each instance it has failed because of the inability of the connector companies to agree upon the consideration to be awarded the different companies for their patent rights. Each concern believes in the merit of its device and regards it as the one which the railroads should adopt. It is to no purpose to

disagree with them. Until the railroads have indicated what they want in a connector, these companies are about as well off in the argument as those who may oppose their convictions. As matters stand, it is simply a matter of difference of opinion. Until the railways have decided on a standard connector, the companies do not know where their respective devices stand and cannot negotiate intelligently.

A few months ago, for instance, when this matter of getting together was up among the connector people, one concern having but one connector and only eight patents (as far as I know) to contribute, demanded 60 per cent of the benefits of the entire combination. How is it possible to make any headway toward "getting together" under such circumstances? Except for the extent of their demand, the attitude of this company is typical. It has a device which is being favorably received, its officers are honest, conscientious men who really believe their device superior to all others. Until some disinterested, authoritative committee has confirmed, or rejected, their conviction, the likelihood of "getting together" with them is remote.

You may say leave them out, but that would not cure the difficulty. Where and by whom would the line be drawn on the leaving-out process? Besides, this concern may be entirely justified in its conviction. I do not, of course, think it is, but after all that is only my opinion. It may be that this company has a device which the railways should use, in which case it is entitled to the larger share. But who is to determine whether it has or has not such a device? Can it be expected that a committee made up of engineers, representing the different competitive connector manufacturers (which would be the expected of course if the connector manufacturers are to get together, and themselves decide upon a connector to be offered for standardization), would render a decision acceptable to this company? Each member of such a committee would be prejudiced by his own ideas of connector design, and it is extremely doubtful that his vote would fail to reflect this prejudice. Is not the question of standardization really one for the railroads? It is they who must be satisfied as to design.

Even if it were possible for the connector manufacturers to get together at this time, what good would it accomplish? I cannot imagine the railways adopting a connector merely because it is presented to them by the various connector manufacturers as a body. The roads would, and with good cause, insist upon thorough demonstration. Why not then have this demonstration now? Let a committee representing the railways select the various connector designs which it regards worthy of trial and put them through a series of conclusive elimination tests, select therefrom the connector most desirable for standardization and then compel the connector manufacturers to get together on patents, with a penalty for failure of refusal by the roads to standardize any connector. Such a course would bring to light the connector the roads are willing to use, and would make known to the connector manufacturers what they were to get together on. Under such circumstances it can scarcely be doubted that they would get together. To refuse would be to stand in their own light and postpone the general use of any connector.

Until something of this kind is done, it seems to me that any attempt to get together on the part of the connector manufacturers on a basis involving the giving up of patent rights, which I understand to be the basis your article suggests, would be to negotiate in the dark. Each concern would hesitate to give up any of its rights in return for a share in the rights of something which they do not know the railways want, and which they conscientiously believe less meritorious than their own device. Could you blame them for this? None of us like to "buy a pig in a poke," and that would be the nature of such a trade in the absence of some indication by the railways as to exactly what they want in the standard connector.

Considerable impetus would undoubtedly be given the subject if the connector manufacturers would come together in a friendly association, not involving any sacrifice of patent rights, but compelling each joining company to work in harmony with its member companies for the adoption of a connector by the railways (leaving it to the railways to determine what design they want), and to accept the railways' fair recommendation as to patent rights and price at which the connector should sell. I have long advocated such an association and would be glad to do anything I can to bring it about.

JOSEPH ROBINSON.

The Boiler Compound

CHICAGO.

TO THE EDITOR:

I desire to take exception to a number of statements which appeared in "a criticism" of the article entitled *The Interior Treatment of Boiler Waters* (November 12, 1921, page 935), which criticism appeared in the *Railway Age* of December 24, 1921, page 1241. It is being admitted more and more generally that there is more in the field of chemistry that relates to water treatment than lime and soda ash. In a paper presented before the Western Railway Club of Chicago two years ago on the treatment of water for locomotive use, the consulting chemist of the Union Pacific system said:

"It is a mistake to believe that treatment with boiler compound is identical with the process of water softening. If anyone has the idea that the manufacture of boiler compounds is a sort of hit-or-miss proposition, I would ask you to correct this impression. There is room for more variation in the composition of boiler compound than there is in outside treatment. Because fraud may have been detected in attempts to sell boiler compounds that have no value, I do not believe in condemning the use of honestly made compounds."

The United States Geological Survey has, for many years, published the following statement in its water supply papers, its first appearance being probably in Water Supply Paper No. 164, eight or ten years ago:

"An honestly prepared boiler compound has many advantages. * * * Such compounds, when intelligently and carefully prepared, are efficient and satisfactory."

Recently two very carefully developed articles have appeared in the *Journal of the American Water Works' Association*. One by Milton F. Stein contains the following paragraph, referring to the results of the reactions where lime is used to precipitate the carbonates of lime and magnesia:

"The calcium carbonate formed is only soluble to the extent of about 13 p.p.m. and so precipitates out. The magnesium carbonate, being soluble to the amount of about 100 p.p.m., remains in solution to that extent, and requires additional lime for its removal as the insoluble hydroxide. At least this is the theory, but in practice such ideal conditions do not obtain. The solubility of the calcium carbonate as precipitated from a solution seems to be greater than the amount which can be dissolved by shaking it in the powdered form with water. The presence of magnesium carbonate affects the solubility of calcium carbonate, as there appears to be a definite limit to the combined solubility of the two salts. The presence of other compounds, particularly sodium chloride, tends to increase these residual solubilities, and they are also affected by the temperature of the water. The magnesium hydroxide forms very slowly and is apt to assume a colloidal condition, and to return to its former state by absorbing carbonic acid from the air."

Then, with reference to the reaction, using carbonate of soda, he states that the use of soda ash is on a more precarious basis, due to the fact that in the cold the reactions occurring are very sluggish and sometimes are not even completed.

In the same number of this journal appeared an article by W. A. Sperry of Grand Rapids, who opens his article with the following sentence: "To soften water with lime is

beautifully simple in theory, but in practice there are difficulties that are both vexing and perplexing."

Among the difficulties, he gives one: "The fact that approximately 30 p.p.m. of the calcium carbonate produced is soluble, varying somewhat with the temperature and pressure"—and again—"Contrary to the general rule, calcium salts are more soluble in cold water than in warm, the completeness of reaction being greatly accelerated or seriously retarded by an increase or decrease of temperature, as in changes from summer to winter conditions, with a corresponding change in the time element necessary,"—and again—"The ideal condition for a lime softening plant is expressed in some form of the hot water softening system."

In both of these articles, the point discussed was what change or improvement should be made in the method of treating to eliminate this incompleteness of reaction as well as the development of what are called "after deposits," and in both cases the fallacy of putting too much faith in a method of such antiquity is emphasized.

If heat is necessary to complete a reaction, and this heat is obtained in the neighborhood of the boiler, the only difference between this method of treatment and that of the so-called interior treatment is that in one case materials are present to control the separation of the incrusting salts in the boiler, and in the other nothing at all is present, and the precipitate usually forms in a distinctly crystalline condition and deposits just as though no treatment of any kind had been attempted.

Another point that the writer of this article went into great detail on was that relative to foaming. Much has been done in the way of foaming, and much has been learned. Many complicated causes have been detected, but it is recognized that concentrated soda salts stimulate as well as create a foaming tendency.

The matter of boiling is considerably more than the forming of steam bubbles. It is a matter of getting the steam bubbles out of the water and into the steam spaces, and foaming more than anything else, is a matter of surface tension. Surface tension is the force developed to hold together the film of water which makes the division between the liquid and the gaseous space above. The increase of certain soluble salts makes this film tougher, and the presence of other salts makes it weaker. So far as we know to date, inorganic compounds invariably increase the surface tension, and, if, in addition to the increased concentration of soda salts, which are the principal soluble salts to be reckoned with, there is an increase in the quantity of sludge in the boiler, there will be increased foaming because there will be more bubbles trying to break through this surface film.

However, there is quite as apt to be sludge in the boiler from an outside treated water as from an inside treated water, and, in the first case, the sludge is quite apt to be crystalline and get nearer to boiler surfaces, and just as apt to become the nucleus of the steam bubbles as the other sludge, which in many cases of interior treatment is intentionally controlled through organic materials, which not only assist in making this sludge light and flocculent, but, through their organic qualities, exert an action upon the surface film, making it less tenacious and more liable to break when the bubbles reach it.

With reference to the ideas regarding soda ash, it is not necessary to specify all the discussions. All of the authorities referred to in this article have made statements of more or less definite character on the importance of soda salts in stimulating foaming. Dole and Stabler, working for the United States Reclamation Service, and attaching their names to numerous publications of the government, are very definite with reference to its quality. Quoting from one of the government bulletins to which R. B. Dole's name is attached is the following:

"Foaming is believed to be due principally to sodium and potas-

sium, which remain in solution after most of the other bases are precipitated, and which increase the surface tension of the water. The increased surface tension tends to prevent the steam bubbles from bursting and escaping. Other factors undoubtedly affect, or cause foaming, but sodium and potassium are the chief causes."

With reference to the use of an anti-foaming compound, it is true that the United States government, through the agency of the United States Railway Administration, conducted a test on one of the western railways, using a commercial anti-foaming preparation of relatively high quality, and, as a result of this test, published a bulletin in which it was shown that with the treatment in question it was possible to increase the total mileage two to three times over the normal at which the water foamed before this type of trouble would begin to be experienced. This service would greatly reduce the expense of boiler washing and real data rather than guesses proved that the savings were well worth considering.

D. K. FRENCH,
Directing Chemist, Dearborn Chemical Co.

Rough-Riding Passenger Cars

SMALL TOWN, N. Y.

TO THE EDITOR:

Your remarks from time to time on the passenger transportation problem are to the point. I often have to travel and by nature prefer to go by rail rather than road. I have a keen interest in the railroad on which I live, having money invested in it and having been employed by it. And yet I usually travel by motor for two reasons—the bad riding quality of the coaches, and lack of punctuality. The steel coaches of this company were originally equipped with the orthodox six-wheel truck and were quite comfortable to ride in. Since then they have substituted a truck which, for maintenance, may be an improvement but for riding qualities is worthless. The trouble is due to the weight being carried entirely on short plate springs rather than partly by coil springs as in the conventional truck. This sets up a vibration in the interior of the car causing a sensation on the ear drums only one degree less annoying than the noise emitted by a locomotive when standing with a hole in the tire.

Nowadays the aim seems to be the building of a ponderous car to withstand collision but with no thought as to comfort. As I sit in one of these battering rams and try to divert my thoughts from the vibration, I wonder how much of my fare is absorbed by a car weighing 75 tons instead of 50 tons of the coach of 20 years ago. The thought comes that in automotive engineering, steel has been substituted for wood, without any increase in weight or decrease in strength; that the tendency has been to build motor cars lighter; that the lesser weight has been accompanied by better riding qualities through better suspension; that, although collisions with other vehicles and with trains at crossings occur, often with serious fatalities, the automobile is not built armored for these occasions.

On the other hand, when I travel in an English passenger coach 70 ft. long and weighing less than 40 tons, I appreciate how comfortably it rides, how all the shocks and noises are deadened. The reason is that the designer deliberately tried to do it. The wheels, for instance, have a wooden filler between the hub and rim; the long wheelbase of the truck, the long springs making contact with the truck frame through rubber blocks all contribute to the desired end. We frequently criticize the British for not profiting by our methods of handling freight. Why don't we profit by their way of handling passengers?

W. G. LONDON.

The St. Louis (Mo.) Chamber of Commerce invited the Chicago city passenger agents of various railroads to be its guests in St. Louis on April 15 and a party of 75 Chicago passenger representatives attended.

Modern Tendencies in Locomotive Design*

Need of Increased Economy in Use and Production of Steam; Turbine and Internal Combustion Locomotives Possible

By James Partington

Estimating Engineer, American Locomotive Company, New York

THE TYPES, weights and general details of construction of locomotives have undergone striking changes in the last 20 years. A study of these changes will show in a great measure the modern trend of locomotive design.

Modifications of type may be briefly summarized as follows: Eight-wheel passenger locomotives have been superseded by Pacific and Mountain types; Consolidation freight locomotives have been superseded by Mikado and Santa Fe types, and to some extent by Mallets; four and six-wheel switchers have been, to a large extent, superseded by eight-wheel switching locomotives.

The weight per axle has been increased from time to time as track and bridges would permit so that 60,000 lb. per axle is a common axle load today and 70,000 lb. is sometimes reached.

The boiler of moderate size with a narrow firebox between the frames or between the drivers has been superseded by a modern steam plant with wide firebox above the wheels, fitted with superheater, brick arch, flexible staybolts, feed-water heater, thermic syphons, circulating devices, combustion chambers, exhaust steam injectors, etc.

Stephenson valve gear and slide valve cylinders have been superseded by piston valve cylinders with outside steam pipes and outside valve gears of a number of different types.

Some Prime Requisites

All locomotives should conform to certain prime requisites that may be stated as follows: (1) A drawbar pull that will handle the largest tonnage that road conditions permit; (2) The production and delivery of drawbar horsepower at minimum cost; (3) Careful designing to embody road standards, to meet Interstate Commerce Commission requirements and to keep maintenance charges down to a minimum.

To meet the first requirement all the physical conditions of the road must be carefully studied, the horse power curves of different types of locomotives at the speeds they will have to operate analyzed and the type selected that best fulfills the needs of the service.

Importance of Economy

In designing locomotives to meet the second requirement, all the devices which make for economy of fuel must be considered. The application of a brick arch in the firebox and a fire-tube superheater are items of general design which have shown noteworthy reductions in coal and water and are being applied in all modern locomotives. The use of a feedwater heater or an exhaust steam injector is a comparatively recent development in American practice although each of these devices has shown marked saving in fuel in European operation. The use of these is now becoming more common on our railroads. On many designs of locomotives the use of a combustion chamber, providing a longer flame-way and an opportunity for secondary combustion before the flame and gases enter the tubes, shows an economy which is available with but slight additional first cost.

A more careful consideration of diameter of tubes as a factor of the length over tube sheets may also be cited. For the best results with bituminous coal the length of the

boiler tubes should be approximately within the following limits:—

Out. diam. of tube	Distance over tube sheets
2 in.	18 ft. 0 in. to 19 ft. 6 in.
2¼ in.	22 ft. 6 in. to 24 ft. 6 in.
2½ in.	28 ft. 0 in. to 30 ft. 0 in.

These proportions are based on the evaporative values of tubes of varying lengths and can serve only as a guide in deciding tube diameters, especially for the intermediate lengths not covered by the table where a choice of either of two diameters can be made without sacrificing efficiency. For example, 2 in. or 2¼ in. tubes may be used for a length over tube sheets of 21 ft. unless there are special conditions of draft or fuel which require separate consideration.

The tendency which was frequently indicated after the introduction of superheaters, to curtail the steam space of the boiler, is being avoided to as large an extent as possible in the locomotive of today. Sufficient steam space and a throttle designed and located to deliver dry steam to the superheater are recognized items having an important bearing on the performance of the locomotive.

The type of throttle usually applied now is designed to permit entrance to the boiler through the dome without removing the throttle, thus avoiding the use of an auxiliary or inspection dome.

The boiler and cylinder proportions of modern locomotives are such that extravagant forcing of the fire is unnecessary, the heating surface and the grate area being sufficient to provide the maximum amount of steam required with a coal consumption per square foot of grate per hour not exceeding 120 lb. for bituminous coal, and not exceeding 55 lb. to 70 lb. for anthracite.

Present day locomotives are usually designed to be as large and powerful as the roadbed, bridges and clearances will permit. This makes it necessary to apply automatic stokers to supply the large amount of coal consumed, the limit per hour for hand firing by one fireman being about 6,000 lb.

In connection with the economical production of steam there are a number of other devices coming into use, important among which the following may be mentioned:

The application of two or three thermic syphons; the number depending on the width of the grate. These provide a considerable amount of additional heating surface in the most effective location, i. e., in the firebox, and contribute toward a better circulation of water over the firebox crown.

Another method of improving circulation which has been applied on a number of recent locomotives, embodies the application of a horizontal plate laterally in the boiler shell, located so that about one-half of the tube heating surface is above this plate, the balance below it, causing a lower circulation of water toward the back tube sheet and sides of the firebox and an upper circulation forward.

A generous use of flexible staybolts is noticeable in all modern boilers on account of the noteworthy saving in frequency of inspection and cost of renewals.

On account of the weight necessary to provide for boilers of ample size and the auxiliary attachments necessary for the most economic production of steam, the weight of the machinery parts must be carefully proportioned to keep them down to a safe minimum. This has caused a demand for the

*Abstract of a paper presented April 7, 1922, at the Newport News meeting of the American Society of Mechanical Engineers, Virginia Section.

employment of special alloy steel for many parts subject to severe stress and fatigue.

To secure materials which can be readily repaired or replaced by the ordinary railroad shop the present trend is toward the employment of alloy steels which will give the required additional strength and tenacity without the necessity of heat treatment of these special forgings.

The employment of a booster to gain additional tractive power by utilizing the adhesive weight on truck wheels and the application of cylinders on the tender in a number of cases may be noted as one of the recent developments intended to provide increased tractive power for emergencies, such as short steep grades, starting trains on a grade, etc.

Maintenance Cost Must Be Kept Down

In designing locomotives to meet the third requirement—keeping down the maintenance charges—the engineers of the railroads and of the locomotive builders are giving special attention to the following points:

Careful determination of the stresses in all parts of the locomotive and tender and securing proportions and materials which will withstand these stresses and avoid costly failures in service.

Adoption of designs which will reduce the number of parts as much as possible thus keeping bolted connections to a minimum.

Avoidance of construction which cannot readily be removed for repair or renewal or repaired in place at reasonable cost.

Due consideration of the question of lubrication and making the engine parts accessible for lubrication and inspection. Nearly all bearings on modern designs are arranged for grease lubrication.

Possible Future Developments

Whether the design of locomotives of the future will continue along conventional lines will depend largely on experiments along new lines and the success or failure of such experiments.

The writer believes we will see more successful adaptation of three-cylinder locomotives in which the advantages secured will be greater and the complications of construction will be simplified. Increased efficiency will also be sought by the employment of higher boiler pressures and higher degrees of superheat. To secure higher boiler pressures without entailing prohibitive increased charges for boiler maintenance, a new type of boiler may be necessary. To secure higher degrees of superheat, the changes involved can readily be worked out and adapted as required.

It may be that the merits of internal combustion will be tested out on our railroads, although the complications involved do not appeal strongly to the maintenance departments. Several locomotives of this type are being developed in other countries.

Progress is being made abroad in condensing turbine driven locomotives and the results thus far obtained have been encouraging.

Further improvements in the draft appliances and reduction in the back pressure of exhaust are being diligently sought. The improvement of locomotives from the standpoint of design and operation is a fascinating subject on which much time and study has been expended in the past, is being expended at the present time and will undoubtedly attract as much if not greater effort in the future. The promise of the future is bright. May the accomplishments of the next decade equal, yes, may they exceed what has been attained in the past etc.

Discussion

L. D. Freeman, *Assistant Superintendent Motive Power, Seaboard Air Line*. An interesting feature in the design of modern locomotives is found in a comparison of the Mountain type locomotive of Seaboard Air Line

with locomotive No. 50000 built by the American Locomotive Company in 1910. In 1913 the largest passenger locomotive on the Seaboard Air Line was a Pacific type of 36,000 lb. tractive effort, the maximum permissible wheel load at the time being 47,000 lb. per pair of driving wheels, necessitating double-heading on regular trains.

Based on the proportions of locomotives No. 50000, ten Mountain type locomotives were built in 1914 by the American Locomotive Company having 47,800 lb. tractive power and weighing 209,000 lb. on four pair of drivers, or 52,250 lb. average per pair, which is still the maximum permissible wheel load on that road. After experience with these locomotives five more were built in 1917 and ten more in 1922.

The performance of these locomotives over a period of seven years indicates that the original design was correct and no changes were found necessary in the two repeat orders. It is felt that in view of this performance the statement that the basic principles developed in the design of locomotive No. 50000 were correct is fully justified.

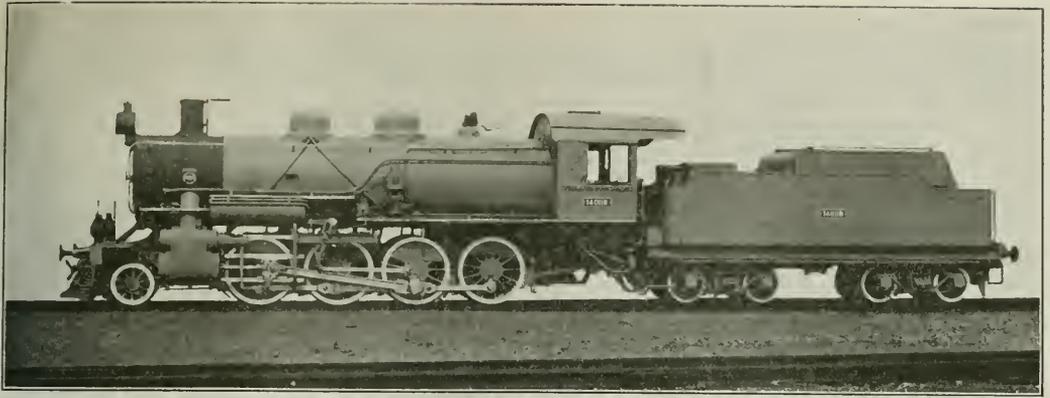
The locomotives in question are successfully operating over a very congested section of single track regularly handling 11 steel cars weighing 75 tons each or 825 tons behind tender at 28 m.p.h. over ruling grades of 1.1 per cent with a maximum speed restriction of 50 m.p.h. over a division of 154.7 miles, making an average speed of 34.9 m.p.h. On the next division under the same conditions the train is handled 202.3 miles, making an average speed of 36.7 m.p.h. When conditions require, these locomotives handle up to 13 cars weighing 75 tons each, or 975 tons behind the tender over the 1.1 per cent ruling grade at 22 to 25 m.p.h. and maintain the regular schedules.

The average fuel consumption in winter months is 120 lb. of coal per locomotive mile with an average of 12 cars per train which takes into account the varying condition of the entire group of locomotives of this class. The first ten locomotives have performed since 1914 a total average mileage of 370,000 per engine, with an average mileage between the general repairs of 95,000 miles and in a few exceptional cases of 180,000 miles, indicating proper design of details.

In recent years many improvements tending to economy in steam production have been made in the locomotive boiler by the addition of superheaters, brick arches, feedwater heaters, mechanical stokers, power grate shakers and improvements in grate arrangements, ash pans and front ends.

Unfortunately the same degree of improvement in the use of steam in locomotive cylinders has not been attained. After nearly a hundred years of locomotive building we have still retained the slide valve, or in cylindrical shape the piston valve, to admit steam to and to exhaust steam from the cylinders, the latter with increased cylinder clearances. The most objectionable feature in connection with the use of a single slide valve or piston valve is the fact that when the valve travel is decreased to reduce the steam cut-off the exhaust closes earlier, causing high back pressure and necessitating comparatively large cylinder clearance space to prevent compression in excess of boiler pressure, which results in considerable loss due to the comparatively low ratio of expansion at short cut-off and early release periods.

Experiments are now being made of applying to a locomotive a valve arrangement consisting of four valves for each cylinder, two for intake and two for exhaust, operated by a modified Walschaert valve motion, the object being to apply the best principles of the four-valve non-releasing Corliss valve mechanism as used in high speed stationary engines to a locomotive, with a view of reducing the cylinder clearance, delaying the exhaust closure to reduce the back pressure and increase the ratio of expansion by providing a constant point of exhaust opening independent of the point of cut-off of the steam inlet valves. While this arrangement is still in the experimental stage it appears to point the way for a substantial increase in steam economy for locomotives.



On a Previous Trip Mr. Vauclain Sold to Roumania 50 Locomotives Like This

An Interview With Samuel M. Vauclain

Returns from Extensive Trip in Europe and Discusses
Economic Conditions There

IN 1920, Samuel M. Vauclain, president of the Baldwin Locomotive Works, spent some two months in Europe, his itinerary including France, Poland, Roumania, Serbia and England.

The substance of an interview with Mr. Vauclain in his London office, given just before he left for America, appeared on page 1506 of the May 28, 1920, issue of the *Railway Age*. Later, on September 21, 1920, Mr. Vauclain talked in more detail about his trip at a meeting of the Western Railway Club in Chicago. Summed up, the contracts for locomotives made by Mr. Vauclain during his 1920 trip as modified later, were as follows: 150 Consolidations for Poland, payable in Polish government bonds; and 50 of the same type for Roumania, payable 10 per cent in either cash or oil, the balance to be covered by government notes payable in 60 monthly payments either in oil or in cash plus 6 per cent interest, and 1 per cent yearly for financing, the interest to be included in the face value of the notes. The contract for 50 engines was supplemented by orders for a lot of spare parts and \$507,000 worth of machinery and supplies.

On December 14, 1921, Mr. Vauclain again went abroad, returning to the United States on February 15, last. This time he covered much of the same ground, visiting Paris; Brussels, Antwerp and Liege, Belgium; Essen and Berlin, Germany; Stockholm and Gothenborg, Sweden; Christiania, Norway; Warsaw, Poland; Vienna, Austria; Budapest, Hungary, and London.

During the 1920 trip Mr. Vauclain wrote in some detail to the Philadelphia office, interspersing business transactions with accounts of people he met and the way in which he was entertained by royalty and others, and with observations of the countries through which he passed, their people and activities. The letters proved "so full of human interest, keen business observation and humor" to those at the home office that they were reproduced in pamphlet form "for the confidential information of directors, officers and foreign sales organization of the Baldwin Locomotive Works; also for a few of Mr. Vauclain's friends."

Our London interview in 1920 having proved fruitful, we approached Mr. Vauclain some days after his return to

Philadelphia from his last trip; and in his usual frank manner he talked freely about the results of his observations. As in 1920, he kept his office informed of his doings; and these letters, too, are being put in type for limited circulation.

Paris having been Mr. Vauclain's first, as well as his next to last objective, it was but natural that he should first discuss France. He was astonished at the progress made since his previous visit in reconditioning the French railways, particularly the all but war-destroyed Nord, and in rebuilding the towns which were demolished, in whole or in part, during the war. Generally, the French trains were on time, the cars clean and the roadway smooth. As to locomotives, Mr. Vauclain found that the railways have a sufficient number in good condition and that there is no chance that any will be bought outside of France for a long time to come, the locomotive building shops of the country having ample facilities for taking care of normal requirements.

In Belgium Mr. Vauclain found considerable industrial activity, although labor conditions were far from good. Many factories that had been dismantled by the Germans during the war were being rebuilt with machinery supplied by Germany under the reparations agreement.

As to Essen, Berlin and Germany, generally, Mr. Vauclain made a number of facetious remarks about the time consumed and the trouble to which he had been put in getting in and out of the country. At Essen he found that part of the Krupp plant which he visited to be working under severe handicaps in the way of obsolete machinery and methods, the only compensating feature from the viewpoint of competition being the cost of labor, which is only about 10 per cent of what we pay for similar work. The locomotive shop was turning out only about one engine a day. At the time of his visit, Germany was in the throes of a railway strike. He found the cars dirty and the morale of the train crews at low ebb. "One could buy the whole train from the conductor," he said; adding, "It was worse than in Russia in 1914 and it will require a long time for Germany to correct it."

In Sweden Mr. Vauclain found the country alive with activity. The various locomotive builders were busy in their comparatively slow way on the order for one thousand engines

for Russia. At the rate at which they are being turned out the order will not be filled until 1926. All of the locomotives are being assembled at the plant of the Russian-Swedish Locomotive Works at Trollhattan, near Gothenburg, and shipped to tidewater by canal. Mr. Vauclain pronounced as good both materials and workmanship of the locomotives.

Contrary to Sweden, Norway was found to be commercially stagnant, due to a severe depression in its fisheries, the life of the nation.

From Stockholm, Mr. Vauclain had intended to go to Russia; but on advice he decided to postpone his visit indefinitely, especially as at that time troops were being massed on the Finnish border.

As to Poland, Mr. Vauclain found marked progress since his visit in 1920; but he does not look for much business for America until a way can be found to provide the country with much needed working capital. He hopes that Americans with real vision will appreciate the possibilities for increasing our exports to Poland and furnish the necessary credit.

Czecho-Slovakia seemed to Mr. Vauclain to be teeming with prosperity, while Austria, especially Vienna, was in a pitiable state of inactivity. Hungary he found fairly prosperous and busy.

When asked specifically about the chances for orders for locomotives in the near future from the countries of Central and Western Europe, Mr. Vauclain said: "All of the countries are amply supplied, with the exception of Poland and Roumania. They could use a few more profitably; but with us negotiations are out of the question because of the necesse Works have been pioneers in the matter of trading city for extending long time credits. The Baldwin Locomotives for commodities and the outcome to date has been very satisfactory. However, I feel that for the present we have done all that we should."

Coal Production During First Week of the Strike

WASHINGTON, D. C.

THE TOTAL production of all coal—anthracite and bituminous—in the first week of the strike was the lowest in modern coal history, according to the weekly bulletin issued by the Geological Survey. The output of bituminous coal dropped to approximately 3,500,000 tons, and in the anthracite region work ceased entirely. During the 1919 strike the anthracite mines operated at capacity.

The reports so far received consist of the number of cars loaded on each division of 130 of the principal coal-carrying railroads. They show that from 60 to 64 per cent of the bituminous tonnage of the country has been closed by the strike. Of the remaining tonnage a significant portion had not been operating recently for lack of demand. In the first week of the 1919 strike 71 per cent of the tonnage was closed. The smaller portion closed during the present strike is partly explained by the fact that certain organized districts whose contracts did not expire on April 1 have continued to operate.

The following statement shows the cars of soft coal loaded daily, according to telegraphic reports received from the carriers. As April 1 is a union holiday, loadings on that day did not reveal the extent of the strike. The first test came on Monday, April 3. On that day 11,445 cars were loaded, against 38,056 cars on the preceding Monday. Another loading for the balance of the week was: Monday, April 3, 11,445; Tuesday, April 4, 11,019; Wednesday, April 5, 11,411; Thursday, April 6, 11,061; Friday, April 7, 11,334; Saturday, April 8, 8,881; Monday, April 10, 10,773. During April 1921, the average loading was 20,054 cars daily and for the year 1921 the average daily loading was

24,295. The total output for the week will be in the neighborhood of 3,500,000 tons. In the first week of the 1919 strike 3,582,000 tons were produced.

Reports from all non-union fields to the National Coal Association state that production is running at various rates from 40 per cent to 70 per cent or 80 per cent of normal and that the only reason for the failure to produce more is the indifference of consumers. Thousands of cars of coal are standing on the mine sidings and in railroad yards awaiting billing orders from consumers. Consumers are said to manifest no anxiety with respect to their future stocks of coal. Large amounts of coal produced in the union fields during the last week before the strike are remaining unsold upon the sidings.

The week's output falls short of what the mines not affected by the strike can produce if the demand is active. From mines in many non-union districts reports of "dull market," and "no orders" have been received, and there is a large number of loaded cars unbilled on the sidings, some of which are in fields closed by the strike. Even during the week before the strike it was reported that 30 per cent of full-time output was lost because of no market.

Production of soft coal continued to increase during the last five days before the strike, but because of the decline on Saturday the total output for the week ended April 1 was less than the week before. Including lignite and coal coked, the production is estimated at 10,453,000 net tons.

The record of production during March removed all reasonable doubt that the 52,500,000 net tons of soft coal in the hands of consumers on March 1 had increased to 63,000,000 tons, or more, by the opening day of the strike. The quantity on hand on April 1 was therefore equal to the maximum stock at the end of the war.

At the rate of consumption prevailing in January and February the reserve in the hands of consumers April 1 was sufficient to last 52 days, if evenly divided. But stocks are never evenly divided. There are some consumers who store virtually no coal, and in some entire states the average stock is much lower than in others. Further, a certain minimum reserve is necessary for steady operation of utilities.

Back of this stock of 63,000,000 tons in the hands of consumers April 1 there was a further reserve of over 4,000,000 tons on the Upper Lake Docks, and a smaller quantity stored on the ground at the mines or at intermediate storage yards. These figures take no account of the coal on wheels, including a heavy tonnage of unbilled loads on hand at the mines when work stopped in the union districts on Saturday.

Anthracite is stored commercially in three places—in retail coal yards, on the Upper Lake Docks, and in the storage yards of the producers. Retail coal dealers' stocks on March 1 were about the same as a year ago, but much larger than in 1919 and 1920. Stocks on the Lake Docks were 821,000 tons on the same date. No statistics of anthracite in producers' storage are available for March 1. On November 1 last there were 4,500,000 gross tons in the yards, of which 40 per cent was domestic sizes. In addition there is a surplus of 1,000,000 tons of coke on hand at by-product coke works, much of which may be considered a substitute for anthracite.

Under the stimulus of heavy demand due to the approaching miners' strike, production in March passed the 50,000,000 ton mark. Estimates based on statements of cars loaded place the total at 50,193,000 net tons, against 40,951,000 tons in February. This was the highest record for any March during the past ten years, the period over which the Geological Survey's records of monthly production extend. In round numbers, this was an increase over March, 1921, of 19,800,000 tons, or 64 per cent, and it even exceeded the corresponding month in the war years 1917 and 1918 by more than 2,000,000 tons.

The total production during the coal year 1921-22 is estimated at 434,279,000 tons, the lowest for many years.

Daniel Willard Testifies Before Senate Committee

President of Baltimore & Ohio Refutes Statements of
Messrs. Warne and McAdoo

WASHINGTON, D. C.

DANIEL WILLARD, president of the Baltimore & Ohio, on April 8 completed his statement before the Senate Committee on Interstate Commerce in rebuttal of statements reflecting on the railroads made by W. G. McAdoo and Frank J. Warne.

Mr. Willard concluded his statement with the following summary:

"In conclusion. I gathered from a careful reading of his statement before this committee that Mr. McAdoo desired to show:

1. That the railroads under private management and previous to federal control had broken down as transportation agencies, and that it became necessary on that account for the President to take possession and assume control of the railroads as a war measure.

2. That the operation of the railroads while under federal control had been much more efficient and economical than under private control, and that the properties were returned to their owners on March 1, 1920, with facilities and equipment much improved.

3. That the railway managers found it necessary soon after the termination of federal control to call on the Interstate Commerce Commission for help, and, further, because of the abandonment of the unified practices introduced during federal control, the operation of the roads under their owners was less efficient and less economical in 1920 than it was during the period of operation by the director general.

No Breakdown of Railroads

"I have endeavored to show to this committee that not only had the railroads *not* broken down as transportation agencies in 1916 and 1917, as stated by Mr. McAdoo, but that on the contrary they performed in 1917 the greatest transportation service ever accomplished up to that time.

"I do not question Mr. McAdoo's statement that the railroads were efficiently operated while under federal control and that they met the transportation requirements incidental to the government's war program. Freed from all the restrictions surrounding their operations during the previous year, it is not surprising that the railroads in 1918 should have been able under governmental control to move in the aggregate approximately 2 per cent more tonnage than they moved in 1917.

"The contention of Mr. McAdoo that the railroads were returned to their owners in better physical condition than when taken over by the President can not, in my opinion, be sustained, but whether it can be sustained or not, that question has no direct bearing whatever upon the merits or demerits of federal control. It does, however, involve an important question or fact. If it is true, as the railway managers claim, and as I believe, that the condition of the carriers as a whole was lower at the end of federal control than at the beginning, then the difference in standard, however great, must be made up, and unless it is made up from monies paid to the carriers by the director general on account of under-maintenance, it will, of course, have to be done with monies collected from the people through the medium of transportation charges. The question itself has a very intimate relation with the future basis of rates.

Railroad Record Broken in 1920

"It is true, as Mr. McAdoo states, that the railway managers did take up with the Interstate Commerce Commission shortly after the termination of federal control, and as contemplated in the Esch-Commins act, certain matters pertaining to the then transportation situation. It is also true that in co-operation with the commission, and in full accord with the provisions of the act, the railroads under private management in 1920 were able to move and actually did move nearly 2 per cent more ton-miles than they ever moved before under any circumstances. It seems to me that the results so obtained not only justified the carriers in their action, but also fully justified the act itself.

"I have not attempted to reply in a critical manner to the criticisms—personal or otherwise—contained in Mr. McAdoo's statement. In fact, I am inclined to believe that the real merits of the questions actually before this committee have been obscured and made more difficult of ascertainment because of too much criticism on both sides.

Railroads Taken Over Only for War Purposes

"My own judgment leads me to the following conclusions:

1. Congress itself acted wisely in 1916 when it made provision in advance for the taking over of the railroads by the President whenever

such action in his judgment should seem necessary as a war measure.

2. The President, under the circumstances, acted wisely when in the exercise of the power granted him as a war measure, he took possession of the railroads on December 28, 1917.

3. After the Armistice there was certainly no reason why the President should longer retain possession of the properties as a war measure. It was recognized by all, however, that it would be both unwise and destructive to terminate federal control until Congress should provide a better method of regulation than had been in effect previous thereto. Owing to the magnitude of the problem so presented to Congress, it was necessary to prolong the period of federal control until March 1, 1920.

4. Inasmuch as Congress had never authorized the President to take possession and assume control of the railroads for the purpose of developing the relative merits of private ownership and operation versus Government control and operation, any steps in that direction which were taken during the period of federal control and which resulted in any manner inimical to the best interests of the public or of the carrier properties so seized, were unfair, unwarranted and illegal because they were not justified by law.

5. Congress itself having decided upon the policy of private ownership and operation of the railroads, with governmental regulation, provided by suitable legislation for the continuance of the method so determined upon. Nothing has yet developed to show that Congress erred in its decision either to terminate federal control and operation, or in the scheme of regulation which it provided for the future operation of the roads, while much that has happened since the termination of federal control, tends to justify the action of Congress and confirm the wisdom of the Transportation Act.

What the Railroads Need

6. What the railroads need more than anything else at the present time is an opportunity under the terms of the act to work out their problems without unnecessary and burdensome interference, and I have the utmost confidence that they will successfully surmount their present difficulties if given a fair chance to do so. I am also confident that they will provide the people of this country with adequate transportation at reasonable rates and lower rates than are to be found for similar service in any other country in the world. This the railroads did do under the faulty scheme of regulation in effect before the war, and much more should they be able to do so under a better and wiser scheme of regulation now in effect."

Mr. Willard Stands on His Record

Mr. Willard said it had not been his intention to refer to the letters introduced by Mr. McAdoo, which he had written shortly after becoming director general in 1918 to a number of eastern railroad presidents, expressing dissatisfaction with the operation of their roads, but at the request of members of the committee he submitted a statement outlining his railroad experience of 40 years, beginning as a track laborer and recently having been chosen by the railroads of the United States as chairman of the advisory committee of the Association of Railway Executives and chairman of the board of directors of the American Railway Association.

Mr. Willard also pointed out that while he was serving the government in Washington in 1917 the Baltimore & Ohio under his general direction had handled more freight business than ever before, 19 billion ton-miles, and that for 1920, when he resumed its management after the expiration of federal control it also performed more freight service than ever before, 21,600,000,000 ton-miles, as compared with 17,700,000,000 in 1918 and 17,900,000,000 in 1919. He also said Mr. McAdoo's letter criticizing the performance of the Baltimore & Ohio and other roads was written on January 17, 1918, only 21 days after he had become director general, without consultation with him or any officer of the Baltimore & Ohio regarding its conditions, and only six days after Mr. Willard had resigned as chairman of the War Industries Board to devote his entire time to the Baltimore & Ohio.

Regarding the alleged dismissal of the railroad presidents in May, 1918, Mr. Willard said that C. H. Markham, regional director, had asked him to become federal manager of the eastern lines of the B. & O., but that he had elected to remain with the company. He said that he and President Rea of the Pennsylvania had been called to Washington to

see Mr. Hines, then assistant to the director general, and had been informed of the plan to separate the officers reporting to the companies and those reporting to the administration. Mr. Willard said they were told that undoubtedly Mr. Markham would be glad to appoint them federal managers but that it was assumed they would prefer to remain with their companies and they did so. "We were told we were not dismissed," he said, "but evidently something got crossed in their publicity department, because it was given out that we were fired."

Mr. Willard said he did not recall hearing any railroad president criticize the administration because of increasing the wages of railroad employees as a class, but he thought there was quite a general belief among railroad managers and others, which he shared, that with respect to rules and working conditions the director general made concessions that seemed unwise, uneconomical and unnecessary.

Regarding statements made before the committee by Mr. McAdoo, and by Mr. Warfield as to the economies to be realized by unification and joint use of facilities, Mr. Willard said he was inclined to think they were not fully advised concerning all that the railroads had done and are still doing in the way of joint use of facilities. As bearing upon this point, he filed a statement on this subject based on a questionnaire prepared by Julius H. Parmelee, director of the Bureau of Railway Economics, which he had used in his recent testimony before the Interstate Commerce Commission.

Denying numerous statements made before the committee by Frank J. Warne, Mr. Willard said the Baltimore & Ohio is not interested through stock ownership or otherwise in any company making commercial shipments of coal from mines tributary to its lines, or for that matter, from anywhere else.

B. & O. Has No Interest in

Commercial Coal Operations

"I have been president of the Baltimore & Ohio since January 1910," he said, "and from my personal knowledge the company has had no interest whatever in commercial coal operations since that time. The only interest the Baltimore & Ohio previously had in coal operations making commercial shipments, was in the Consolidation Coal Company. It did, as stated by Mr. Warne, own 52 per cent of the stock of that company, which in turn owned extensive operations in Maryland, Pennsylvania and West Virginia and from which company there was purchased at advantageous figures (the prices for years being from 85 cents to \$1 per ton) a large proportion of the railroad's fuel requirements. Anticipating the public sentiment which later developed against such dual ownership, the Baltimore & Ohio, more than 14 years ago, sold its entire interest in that company to former Senator C. W. Watson, of West Virginia, and his associates. Since then, as stated above, the Baltimore & Ohio has not been interested in any commercial coal operations on its lines or elsewhere. Mr. Warne could easily have ascertained the facts in this connection if he had desired to do so.

"For a time following this sale the Baltimore & Ohio held certain fixed interest bearing obligations of Mr. Watson and his associates, secured by a pledge of the stock which was deposited with the Empire Trust Company as trustee. In 1913, the purchasers paid these obligations in full and since that date the Baltimore & Ohio has had no investment or interest directly or indirectly in the Consolidation Coal Company.

"It is notable that despite the mass of data he submitted, Mr. Warne does not demonstrate generally, and certainly in the case of the officers of the Baltimore & Ohio he fails to establish a single instance where because an officer or employee had any such interest, it had in fact operated injuriously either to the railroad or the public, and it is also to be noted that notwithstanding their full investigation, conducted under the supervision of Mr. Justice Brandeis, the Interstate Commerce Commission in their report in the case (five per cent) made no statement that any improper relations or practice had been disclosed.

Some Other Facts Mr. Warne Overlooked

"Mr. Warne dwells at much length on the reply which was submitted by the Baltimore & Ohio to the questionnaire of the commission in the case just mentioned, because, as he states, that company furnished such complete information. Mr. Warne neglected to advise this committee, however, that in the answer

submitted by the Baltimore & Ohio, it was shown that the chief executive, the man who was directly and personally responsible for all of the affairs of the company, was not interested in any way in any company with which the Baltimore & Ohio had business relations, and furthermore that its purchasing agent and chief engineer, who reports to the chief executive, were not interested in any way in such companies.

"Aside from the fact that neither the president, purchasing agent or chief engineer of the Baltimore & Ohio (the three officers primarily responsible for all purchases and contracts entered into by the company) appear as being interested directly or indirectly in any corporation with which the company had transactions, the method used by Mr. Warne in presenting the subject to this committee was such as to exaggerate the situation and to give impression that a large number of the company's officers were interested in a great many institutions and that the situation he presented was that currently existing instead of one developed more than nine years ago. As a matter of fact this statement, on which Mr. Warne lays so much stress, gives the names of but 19 out of a total of more than 150 officers and directors of the company, and of the items he enumerates in 23 instances the parties named were bondholders where their interest was that of a creditor holding an obligation upon which they could receive only a fixed rate of interest.

"A review of the situation shows that of the more than 150 present officers and directors of the Baltimore & Ohio, only 10 in 1913 held interest in any one of the 20 concerns with which the company had transactions. Such interest was relatively small and in many instances the transactions involving so-called relationships were trivial. For instance, in three cases the parties appear as stockholders in a street railway company to which it chanced that the Baltimore & Ohio Railroad had sold through its purchasing agent some second-hand bridges, and in another instance a director was a shareholder in a trust company with which the railroad company maintained a small deposit account, and in another case a Baltimore & Ohio director was a shareholder in a trust company which had purchased a ground rent of \$29.72 upon property perpetually leased to the railroad company.

"Of the 19 directors and officers reported as having some interest, six are no longer associated with the company, three being dead and therefore unable to refute Mr. Warne's implications.

"I note particularly the name of Oscar G. Murray, formerly president and, at the time of his death, chairman of the board of directors of the Baltimore & Ohio. While Mr. Murray appears as having had an interest in a number of companies, in no case was this interest substantial, and from my long and intimate personal acquaintance with him, I am unwilling to believe that Mr. Murray used his position in such manner as to inure in any way to his personal or private advantage and to the disadvantage of the property of which he was in charge. Mr. Murray was a bachelor who lived within his income, and at his death left his entire estate in trust in perpetuity for the benefit of widows and orphans of Baltimore & Ohio employees. In view of Mr. Warner's wholly unsupported intimations, I have thought it not only proper but my duty to say this much with respect to the late Mr. Murray.

"I need hardly remind this committee of the fact that this whole question of dealings between common carriers and companies in which officers or directors may have substantial interest has been given consideration by Congress, resulting in the passage of the Clayton act, wherein it is recognized that the extent and character of the investments of individuals should not be controlled, but wherever substantial interest is had, purchases can be made only through complete competitive bidding as provided in the law.

"In view of the fact that this whole subject has had the consideration of Congress and legislation duly enacted protecting the railroads and the public, it might appear that I have given this question more space than its importance dictates, but it seems proper to show how false and misleading impressions can and have been drawn from such statements as those referred to and given such prominence in Mr. Warne's testimony when no real or substantial evidence in support is produced."

"As to some of Mr. Warne's statements regarding railroad "propaganda" in the five per cent rate case, Mr. Willard said that while it is true, as Mr. Warne states, that he served as chairman of the committee of eastern presidents in the five per cent case, no publicity fund was raised or made use of in connection with that case, nor was a publicity committee appointed or charged with the duty of conducting propaganda. As chairman of the presidents' committee he did personally appear before and address the members of many trade organizations, commercial bodies, etc., in such cities as Boston, New York, Baltimore, Cincinnati, Chicago and others.

"I also wrote many letters in connection with the matter to the publishers of newspapers," he said, "and particularly so when I observed statements in such papers that from my point of view were incorrect and misleading, and it is a fact that the public became very much interested in that rate case and seemed to be sympathetic with the contention of the carriers, and if we may judge at all by subsequent expressions which have appeared in the public press and which have even been given voice on the floors of Congress itself, it is at least an open question whether in that particular case the public was not more nearly right than the commission. However that may be, I maintain that the action of the railroads concerning the case was in every sense proper and justifiable. We knew, of course, that if the public, or particularly the trade organizations, believed our request for an increase in rates to be unjust and unwarranted that they would undoubtedly appear before the commission in opposition thereto, and consequently we made diligent, frank and intelligent efforts to bring the public, in advance, to our point of view. I am personally unable to see anything in connection with that phase of the question that was or is properly subject to criticism in a country and under a government such as ours.

"On page 1335 Mr. Warne uses the following words: 'In other words, you have your railroads organized as an operating machine; you have such men as Mr. Rea, of the Pennsylvania; Mr. Willard, of the Baltimore & Ohio; and Mr. Smith, of the New York Central; and other men whom I could mention, who are at the head of the operating side of the railroad machine. I believe emphatically that if those men had the determination of policies as to the relation of the railroads to the public, and the relation of the railroads to their employes, that the policies would be quite different than they are at the present time.'

"Naturally I have no knowledge whatever concerning the relations existing between Mr. Rea and Mr. Smith and their respective boards of directors. I do wish to say, however, that never at any time during the 12 years that I have been president of the Baltimore & Ohio has the board of directors endeavored directly or indirectly, or in any manner whatever, to influence me to pursue a line of action with reference to the public, to our employees, or concerning our financial requirements or the purchases we should make with which I was not in full and complete accord. On the contrary, the Baltimore & Ohio board of directors have given me their most complete support at all times, and if the policy of the Baltimore & Ohio company concerning any of the matters referred to by Mr. Warne has not been wise and enlightened, the fault is primarily mine and is not the fault of the Baltimore & Ohio board of directors. It is true, of course, that the board of directors at all times had authority to over-rule the president or to remove the president if they so desired; I wish to say, however, that at all times they gave me their most helpful and sympathetic advice and support."

In reply to a statement by Mr. Warne as follows: "Now, at one time the Pennsylvania Railroad owned a considerable amount of the stock of the Baltimore & Ohio. That has since been discontinued by what I think is a fictitious maneuver," Mr. Willard said:

"There is absolutely no foundation whatever, for such a statement as is contained in the last sentence of this question. It is

true that at one time the Pennsylvania Company did own a substantial block of Baltimore & Ohio stock. I think its holdings at one time amounted to approximately 46 per cent of the entire Baltimore & Ohio stock issue at that time outstanding. Later on, however, it sold substantially one-half of its holdings to the Union Pacific, and for a period the Pennsylvania and the Union Pacific companies may be said to have had together a controlling interest in Baltimore & Ohio stock. At the same time the Union Pacific was the owner of a considerable amount of the capital stock of the Southern Pacific Company. In 1913 as a result of court decisions the Union Pacific decided to divest itself of its ownership of Southern Pacific stock and as a step in that direction the Union Pacific exchanged its Southern Pacific stock or some of it with the Pennsylvania Railroad for its Baltimore & Ohio stock. I have no knowledge whatever concerning the terms of the exchange so effected, but the result of the exchange gave the Union Pacific Company an ownership of approximately 46 per cent of the Baltimore & Ohio stock.

"In 1914 the Union Pacific company decided to dispose of its Baltimore & Ohio shares and they were distributed ratably as a dividend to all Union Pacific stockholders. The effect of the distribution was to increase the Baltimore & Ohio stockholders from 14,000, which had been the number previous to the Union Pacific distribution, to about 28,000, which was the number after such distribution. At the present time the Baltimore & Ohio Company has more than 36,000 stockholders, and the average holding is 60 shares per individual. We have 19,000 shareholders having 10 shares or less apiece. The largest single shareholder of the Baltimore & Ohio company today is the Oregon-Washington R. R. & Navigation Company, which is a part of the Union Pacific System. That company, as last reported, had in its treasury 50,000 shares of the Baltimore & Ohio stock. Neither the Union Pacific nor the Oregon-Washington R. R. & Navigation Company is represented on the Baltimore & Ohio board and neither company has any voice whatever in the Baltimore & Ohio management, or anything to do with the affairs of the company. The Pennsylvania Railroad Company has not held a single share of Baltimore & Ohio since the exchange was made in 1913 and to which I have above referred. The Pennsylvania Company has no representation on any Baltimore & Ohio board, nor has it any interest or influence whatever in any of the affairs of the Baltimore & Ohio Company. These facts have long been known to the public, and had Mr. Warne desired to know the truth concerning this matter he could have obtained full information from my office at the mere cost of mailing a letter of inquiry."

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended April 1 showed a drop of over 19,000 as compared with the previous week, but an increase of 163,000 over the corresponding week of last year. The total was 827,011 as compared with 663,171 in 1921 and 858,827 in 1920. The decrease as compared with the week before is

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

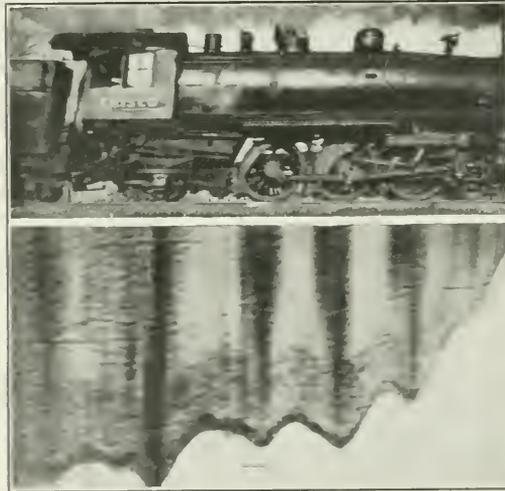
SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, APRIL 1, 1922

		Total revenue freight loaded											
		Grain and grain products		Live stock	Coal	Coke	Forest products	Ore	Misc. L.C.L.	Miscellaneous	This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	6,620	2,542	50,374	2,224	4,419	1,170	67,709	71,591	206,649	160,599	210,655	
	1921	5,621	2,413	28,961	995	5,807	355	56,240	60,207	179,768	129,069	191,219	
Allegheny	1922	2,077	2,620	34,205	4,529	2,592	1,727	50,497	61,521	115,522	129,069	191,219	
	1921	2,176	2,447	31,038	2,517	2,384	1,221	41,552	45,934	37,212	22,466	30,944	
Peachont	1922	211	69	24,907	241	1,316	30	6,082	4,356	37,212	22,466	30,944	
	1921	144	63	12,700	171	1,300	36	3,926	3,123	132,540	109,958	130,993	
Southern	1922	3,150	2,156	23,602	541	18,396	685	39,336	44,674	112,519	84,848	110,871	
	1921	2,003	1,693	14,988	485	13,141	768	35,074	40,806	109,958	84,848	110,871	
Northwestern	1922	8,841	7,054	7,539	1,255	16,588	386	28,389	31,104	101,356	84,848	110,871	
	1921	8,066	6,535	4,226	566	13,465	616	27,070	23,940	112,519	84,848	110,871	
Central Western	1922	9,746	9,300	19,591	1,660	3,749	962	32,827	34,684	112,519	84,848	110,871	
	1921	8,977	8,457	11,581	1,584	3,477	1,830	31,135	31,812	99,827	84,848	110,871	
Southwestern	1922	4,389	2,194	4,734	302	6,956	651	16,197	21,644	56,967	56,967	63,608	
	1921	4,571	1,963	3,602	120	6,230	478	16,682	23,112	56,967	56,967	63,608	
Total Western Dist.	1922	22,976	18,548	31,864	3,117	27,293	2,199	77,413	87,432	270,842	241,079	294,316	
	1921	22,414	17,055	19,483	2,280	23,172	2,224	75,887	78,864	241,079	241,079	294,316	
Total all roads	1922	35,034	25,935	184,952	10,652	54,016	5,811	241,037	269,574	827,011	663,171	858,827	
	1921	33,158	23,671	107,170	6,448	45,804	5,304	212,682	228,934	663,171	663,171	858,827	
Increase compared	1921	1,876	2,264	77,782	4,204	8,212	507	28,355	40,640	163,840	163,840	163,840	
Decrease compared	1920	3,118	16,276	16,276	4,224	11,605	68,556	68,556	68,556	68,556	68,556	68,556	
Decrease compared	1920	2,235	2,235	2,235	4,224	10,167	11,605	11,605	11,605	11,605	11,605	11,605	
April 1	1922	35,034	25,935	184,952	10,652	54,016	5,811	241,037	269,574	827,011	663,171	858,827	
March 25	1922	38,066	25,938	204,586	8,676	54,814	5,282	239,846	268,807	846,035	686,567	895,386	
March 18	1922	39,896	26,722	190,683	8,502	54,599	5,310	237,538	260,119	823,369	691,396	855,060	
March 11	1922	45,160	29,930	204,568	8,530	51,120	5,107	236,244	248,469	839,128	700,440	819,329	
March 4	1922	49,520	28,329	196,639	8,257	47,664	4,651	231,433	236,762	803,255	711,567	811,108	

entirely accounted for by the decreased movement of coal as this week included the first day of the strike. Increases as compared with last year were shown in all districts and in all classes of commodities. While a large part of the increase as compared with last year was the increase in coal loading which amounted to about 77,000 cars, there was also an increase of 28,000 in the loading of merchandise and of 40,000 in the loading of miscellaneous. The summary as compiled by the Car Service Division of the American Railway Association is given on the preceding page.

Applying Photography to the Study of Track Stresses

IN VIEW of the widespread interest which engineers and metallurgists are taking in the question of the magnitude of the stresses which exist in rails in service, it is interesting to note that the art of photography has been applied to the study of this problem by H. F. Roach, president of the Reinforced Rail Joint Company, St. Louis, Mo. In this investigation, Mr. Roach has photographed locomotives and the deflections which they produce in the rail in a way which has magnified the deflections many times vertically without

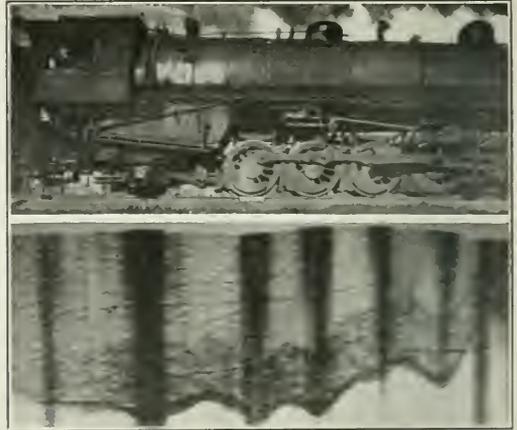


A Heavy Passenger Locomotive Moving at the Rate of 55 Miles per Hour with a Graph of Rail Deflections on a Vertical Scale 400 Times the Scale of the Photograph

distortion horizontally to enable them to be studied more intelligently.

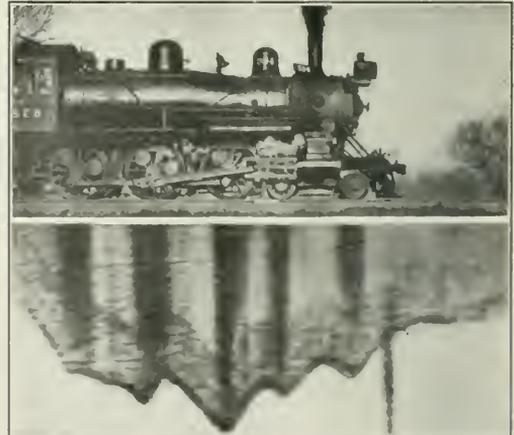
This method of photography has been applied to the study of the action of rails in the eastbound track of the St. Louis-San Francisco near South Webster, Mo., under (1) a light passenger engine starting from a stationary position, producing a maximum stress in the rail of 61,390 lb. per sq. in.; (2) a locomotive pulling a heavy passenger train at a speed of 55 miles per hour, resulting in a maximum stress of 36,810 lb. per sq. in., and (3) a heavy freight locomotive traveling at 25 miles an hour, producing a maximum stress of 33,030 lb. per sq. in. The track on which these observations were made is laid with 90 lb. A.S.C.E. rail supported on good ties imbedded in chats ballast and with good drainage. The track at the point of observation is tangent. The illustrations show the locomotives passing over the track in question and the graphs of the distortion which they produce.

In a report to F. G. Jonah, chief engineer of the St. Louis-San Francisco, Mr. Roach claims that the method of investigation makes it possible to determine (1) the rail stresses at any point for any position of load or loads; (2) the points of maximum stress; (3) the stress in rail joints at any point and for any position of load or loads; (4) the effect of the



A Heavy Freight Locomotive Traveling at 25 Miles per Hour with a Graph of Rail Deflections on a Vertical Scale 400 Times the Scale of the Photograph

counterbalance of the locomotive drivers both collectively and individually, and also whether the equalizers are properly installed so as to distribute the load over the respective drivers as intended; (5) the tie reactions, and (6) the work being done by the ballast. Attention is also directed to the fact that with a high grade moving picture camera with a



A Light Locomotive at Starting Speed with a Graph of Rail Deflections on a Vertical Scale 400 Times the Scale of the Photograph

fast lens as many as 800 pictures per second may be taken which will make it possible to take a picture of the track for every $1\frac{1}{4}$ in. of progressive movement of a train moving at a speed of 60 miles an hour, by which means the complete distortion of the rail can be shown.

Mr. Roach has applied for a patent on this development.

Boston & Maine Has 1921 Deficit of \$7,348,086

Revenue Ton-Miles Fall Off 27.8 Per Cent.—Fuel Costs
and Per Diem Also Disturbing Factors

THE SHARP FALLING OFF in traffic which took place in 1921 prevented the Boston & Maine from realizing on the drastic savings which it succeeded in making in operating expenses. Its report to the Interstate Commerce Commission for December showed a deficit after rentals of \$1,401,770; its annual report made public on Thursday of last week showed a deficit after taxes, equipment and joint facility rents and fixed charges of \$7,348,086. It is not difficult, in the light of such results as these, to understand the tenacity with which the New England carriers have carried through their fight to secure increased divisions. The deficit shown in the corporate income account—as noted above, \$7,348,086—compared with a net income available for dividends in 1920, of \$614,730. The difference as between 1921 and 1920 is explained by the fact that in the former year the road received standard return and guaranty, whereas in 1921 it had not been sufficiently restored to normalcy to be able to get its net earnings back to the pre-war basis.

However, although 1921 was an extremely poor year from the standpoint of the operating results, it was considerably better than 1920; that is, outside of the fact that in the former year there was standard return and guaranty. The actual deficit in 1920, excluding the payments from the government, was \$17,132,481. This reduction of \$9,784,395 represents the ground the Boston & Maine succeeded in covering in its efforts to overcome the disadvantages of after the war readjustment.

The Boston & Maine in 1920 came far—very far—from earning for the government its standard return for January and February and its guaranty for the following six months. In fact, in 1920, it had a deficit after rentals of nearly \$12,000,000 whereas its standard return, based on the results of the three years ended June 30, 1917, approximated \$10,000,000. In 1921 the deficit after rentals was reduced to \$1,401,770—a deficit still, but a deficit sufficiently smaller to indicate considerable improvement and to make one presume that with more normal traffic the figure of net after rentals would have been in black instead of in red.

A 27.8 Per Cent Reduction in Traffic

In view of all that has been said on the subject, it seems quite in order to remark that the Boston & Maine's primary trouble is that it is a New England road. In 1921 it had the additional difficulty that it had a comparatively small traffic to move. This, to be sure, was not a difficulty that was confined to the Boston & Maine, but the Boston & Maine experienced it in rather severe degree. The revenue ton-miles carried by the road in 1921 were 27.8 per cent less than in 1920. On the Class I railroads as a whole, the decrease in traffic was 25.2 per cent; in the Eastern district, 26.4 per cent. The Boston & Maine's traffic in 1921, measured as before in revenue ton-miles, was but slightly more than in 1914. The revenue tons were less than those carried in 1905, but the average haul was longer than in that year.

The Boston & Maine operated in 1921 at a ratio of 94.3. In 1920 the ratio was 105. The ratio of transportation expenses to revenues was 52.4 as compared with 59.3. This indicates improvement, to be sure, but roads do not make money with an operating ratio of 94.3, and especially if they are terminal carriers and their per diem debit balances are large.

"The freight business and passenger business," says the annual report, "which had reached a high record in 1920,

fell off in 1921 to an extent never before experienced in the history of the railroad as between one year and another." The revenue tons carried were 20,060,610. The ton-miles were 2,673,769,008 as compared with 3,705,528,286 in 1920, a decrease as noted above of 27.8 per cent. The freight revenues totaled in 1921, \$47,660,728 as compared with \$53,306,738 in 1920, a decrease of \$5,646,009. The passenger revenues of \$23,662,146 were \$1,058,290 less than in 1920. Total operating revenues of \$78,289,750 compared with \$86,652,745 in 1920. The operating expenses in 1921 totaled \$73,833,472 as compared with \$90,989,433. The decrease in operating revenues was \$8,362,995; in operating expenses, double that figure, or \$17,155,960.

An analysis of the savings in operating expenses brings out the familiar details which we may expect to see in most of the annual reports which will appear during the coming year, with the important exception that in the matter of fuel costs—always a bugbear for the New England carriers—the savings were not as great as might have been expected. The reductions in expenses, naturally, were primarily due to the smaller amount of business done. There were savings in the number and compensation of employees and in material costs. There were also savings in maintenance, especially in equipment. In the case of maintenance of way, more rail and ties were put in track than in 1920.

With reference to labor the details are given that the average number of employees on the payrolls was reduced from a maximum of 34,138 in September, 1920, to a minimum of 26,161 in May, 1921. Wage decreases and changes in the rules and working conditions made further savings, but reference to them is not necessary, as readers of the *Railway Age* are sufficiently familiar with this feature.

Cut in Equipment Maintenance

In the case of maintenance of equipment, the drastic cut in expenses is shown in an increasing percentage of bad order cars throughout the year, another familiar story. The Boston & Maine's bad order car situation is bad. On March 15, 1922, the percentage was 19.4 as compared with a percentage on all roads of 14.5. The same applies in the case of locomotives, the percentage of unserviceable locomotives (out of service for repairs requiring more than 24 hours) on March 1, 1922, was 27.3 which, as compared with the figure for all roads of 20.2, is rather too high to indicate favorable conditions.

Ties and rails put in track in 1921 were considerably above the totals for 1920, even though there was a decrease in expenses of maintenance of way of over \$2,000,000. The number of ties put in track was much greater than in 1920, but not in excess of the yearly average over a term of years. The tons of rail laid in 1921 totaled 24,834; in 1920, only 9,632. The yearly average for previous years would be about 20,000.

Fuel—\$7.88 Per Ton

Fuel costs rival per diem as one of the leading difficulties of the New England roads. This is plainly evidenced by the fact that in 1921, the Boston & Maine's average cost of fuel on locomotives was \$7.88 per ton. The average in 1920 was \$7.95, or in other words, the decrease was slight. A maximum of \$9.26 was reached in November, 1920, but in December, 1921, costs had dropped to \$6.82. "While the savings in the cost of fuel and other material have been substantial in certain items as compared with war period

prices," says the report, "the effect of these reductions has not been fully reflected in operating results for two causes—the first due to contracts in force before the reduction in prices obtained and the second due to the accumulation of stocks on the basis of normal volume of traffic." The actual savings in "fuel for train locomotives" amounted to \$2,720,935, the decrease being primarily due to the smaller traffic handled. However, there were evidences of economy because there were more traffic units moved per ton of coal consumed.

The debit per diem balance of the Boston & Maine in 1921, was \$3,178,427, a figure of rather staggering proportions but, nevertheless, \$1,223,496 or 27.7 per cent less than in 1920. This factor does not need extended attention as it has been the subject of considerable discussion in connection with the divisions case. However, it is worth noting that the average cars on line daily was lower in 1921 than in any year since 1908.

Passenger Cars Ordered

The Boston & Maine in 1921 had a net charge for additions and betterments of \$4,420,142, which seems a sizable amount under the conditions governing during the year. This includes new bridges at various points, extensions to the yard at Rotterdam, N. Y., and a new engine terminal at Concord, N. H. These were mostly paid for by a loan from the revolving fund administered by the Interstate Commerce Commission. The loan authorized late in 1920, amounted to \$5,443,979. There was also a loan of \$1,212,500 to assist in the purchase of new locomotives, but as a result of the falling off in traffic the purchase of this power was deferred and the I. C. C. has since approved a change whereby fewer locomotives will be purchased than originally intended and steel passenger cars will be secured instead. The placing of an order for 98 passenger train cars and 25 milk cars was noted in last week's issue of the *Railway Age*.

It is difficult to make any surmises as to what the Boston & Maine may be able to do in 1922. There can be no question but that it will be able to secure a much better net than it did in 1921. The extent of the improvement will depend very largely upon the outcome of the divisions case, the Interstate Commerce Commission's decision in which the trunk line carriers have sought to hold up by injunction. The Boston & Maine has the advantage that it has readjusted its financial structure and has put behind it the difficulties that formerly confronted it as a system made up of leased lines. The morale of the road seems to be good and there is not much doubt but that President Hustis has won for the road the good feeling of the shipping public in New England. These two assets it has to help it overcome the fact that it is a New England carrier.

Railroads Preparing New Terminal Plans at Chicago

WORK IS NOW IN PROGRESS on two entirely new plans for complete passenger and freight terminals in Chicago for all the railroads now using the Dearborn, La Salle and Grand Central passenger stations in that city. This fact was made public on Friday, April 7, by Edward J. Noonan, engineer of the Chicago Railroad Terminal Commission, before a committee of the city council and introduces an entirely new factor in the solution of the problem of new facilities for these railroads. The roads concerned are those now occupying terminal property between the Chicago river and State street, for which no plan for rehabilitation has yet been determined upon, all the other railroads being parties to the Chicago & Northwestern, Union Station or Illinois Central Terminal ordinances which have either been carried to completion, are now in progress, or definitely arranged for.

Studies by the Chicago Railroad Terminal Commission under the direction of Mr. Noonan and the late John F. Wallace have been in progress for a long time, in the development of plans for new terminals for the railroads in question, looking toward the opening of streets and other civic improvements which would greatly encourage the city's development in the territory occupied by these railroads. The plan for the Illinois Central Terminal approved by city ordinance in 1919, also provides for the accommodation of as many of these railroads as so desire in the passenger terminal which the Illinois Central will build at Twelfth street and the lake front. The new plans now being prepared will be submitted to the city as alternatives for plans previously proposed by the city's terminal commission and the Illinois Central.

One of the new plans is being prepared by the interests owning and occupying the Dearborn station, or what is known as the Chicago & Western Indiana group. This includes the Atchison, Topeka & Santa Fe, the Wabash, the Monon, the Erie, the Chicago & Eastern Illinois, the Grand Trunk and the Chesapeake & Ohio. The plan embodies complete new facilities for these roads with an alternative plan which will also take care of the railroads using the other two stations, namely, the La Salle street and Grand Central terminals.

The other plan is being developed by the railroads of the two groups, last named. These include the New York Central, the Rock Island, and the Nickel Plate, now in the La Salle station and the Baltimore & Ohio, the Pere Marquette, the Minneapolis & Sault Ste. Marie and the Chicago Great Western now in the Grand Central station. The plan being developed for these roads contemplates a new terminal in substantially the location of the existing La Salle street station of adequate size to take care of all the railroads in the three groups.

The complete details for these new terminal development plans have not yet been made public, but enough is known to make clear that they contemplate a fulfilment of the requirements outlined by the city's terminal commission for an improvement in the street layouts throughout the territory involved. In the case of the Western Indiana project, the plan includes a development on the property in the area bounded by State street, Clark street, Sixteenth street, and Polk street. Dearborn street would be opened up as a new north and south street throughout the length of this territory and four or more east and west streets would also be opened. The entire improvement is estimated to cost about \$50,000,000.

Mr. Noonan's announcement of these plans in advance of their formal presentation to the city by these railroads was brought about in connection with a discussion of work on the Twelfth street viaduct. Sometime ago, the city commenced the construction of this viaduct, which is a monumental structure in reinforced concrete, designed to carry the street over the terminal area in question, but was compelled to suspend work for lack of funds. Recently there has been considerable agitation for the resumption of the construction but Mr. Noonan pointed out that it would be unwise to go ahead with it now owing to the fact that the viaduct as now designed is committed to the present track layout and this would interfere seriously with the radical changes which would be required in carrying out new terminal plans in this territory. It is understood that the railroads involved will be ready to submit their plans to the city within the next few months.

THE RAILWAYS OF GREAT BRITAIN paid £11,055,408 in taxes in 1921, an increase of 128 per cent over 1913, according to Modern Transport (London).



The Women's Aid of the Pennsylvania System

A "Ladies' Aid" Covering 10,000 Miles of Railroad, Business
Methods Make Friendly Neighbors

THE ABOVE TITLE is the name of an organization which now has scores of thousands of members; which mustered over 1,200 women at its annual meeting at West Philadelphia on March 30, and which has during the past year done an immense amount of social welfare work, including the expenditure of over \$25,000 in relief work in one region, the Eastern (east of Altoona and Renovo).

Using as a starting point the welfare work done by their organization for soldiers and soldiers' families during the war, the wives of the officers of the Pennsylvania Railroad have built up a permanent organization which carries out on a gigantic scale the several kinds of neighborhood work that are characteristic of ladies' aid societies of churches and local brotherhoods; and reports indicate that they are making of the work a grand success.

The constitution, the by-laws and all of the activities are planned to produce an organization which shall be thoroughly democratic in its activities and its results, though the management is entirely in the hands of wives of officers. Membership is open to the wives and daughters of all officers and employees, active or retired; to widows of employees and to women employed by the road; and the membership fee is uniformly 25 cents a year. This makes for an outward and formal uniformity. For the maintenance of actual uniformity of status and the avoidance of all offensive caste spirit, the dependence is on the skill, discretion and tact of the officers of the association and members of committees.

Large sums of money have been dispensed in aiding sick or unfortunate families of employees; but this is not charity, for the payments are from a fund which is made up mainly of dues paid by members; and the leaders keep always prominent the fact that friendliness and sympathy, not measured in money, are the main elements in their purposes. Flowers taken to a sick man in a hospital, or the activities of an experienced housekeeper or nurse in the home of the overworked or incompetent wife of a foreigner who works on the track, may constitute more important features, in the

final summing up, than would the definite expenditure of money for food, or fuel or medical attention. While many of the doings of the committee may look like the rich patronizing the poor, this appearance is not true, except to the extent that the officers' wives, with their years of experience and advantages, are, indeed, "rich" in the qualities of head and heart which make pleasant homes and the benefit of which they, as members of visiting committees, give, freely, to those less fortunate than themselves.

The annual meeting above referred to was held in the building of the Railroad Young Men's Christian Association in West Philadelphia, one of the sessions being presided over by Mrs. W. W. Atterbury, director for the entire system and the other by Mrs. Elisha Lee, associate director.* Following the afternoon meeting, brief addresses were made by President Samuel Rea, Vice-President W. W. Atterbury, Vice-President George L. Peck, Vice-President Elisha Lee and General Manager Charles S. Krick. In each region the wife of the regional vice-president of the road is an associate director, and is in charge of the work of that region. Mrs. Lee, in charge of the Eastern region, reported on March 30 a total enrollment of 49,600 members in that region; and total expenditures in relief work \$25,243. Members of local committees in that region have made calls on 11,547 families of employees; and in the cases of 2,271 families, financial and miscellaneous aid have been rendered. The funds of the Aid are replenished not alone by the dues

*In the picture at the head of this page, Mrs. W. W. Atterbury, director, sits at the right, and Mrs. Elisha Lee, associate director, (Eastern region) at the left. The others, as numbered, are as follows, those indicated by an asterisk being members of Mrs. Atterbury's staff and the others members of Mrs. Lee's staff:

- | | |
|-------------------------|--------------------------|
| 1 Miss Constance Schell | 10 Mrs. G. LeBoutillier |
| 2 Mrs. J. A. Huntzinger | 11* Mrs. A. H. Rudd |
| 3* Mrs. W. B. McCaleb | 12 Mrs. J. D. Jones |
| 4 Mrs. J. M. Henry | 13 Mrs. I. A. Miller |
| 5* Mrs. E. B. Hunt | 14 Mrs. J. C. Johnson |
| 6 Mrs. H. M. Carson | 15 Miss E. Kathryn Krick |
| 7 Mrs. A. M. Parker | 16 Mrs. C. S. Krick |
| 8 Mrs. C. L. Leiper | 17* Mrs. Joseph V. Reaph |
| 9 Mrs. Gamble Latrobe | |

of members, but also by bazaars, candy sales, picnics, excursions, etc. On one occasion a dance was given in the Hotel Pennsylvania, New York City, at which \$3,000 was realized.

The local committees, in their relief work, are aided by and co-operate with the officers of the Employees' Voluntary Relief Department, which department is intimately related to substantially all of the employees of the road, and employs medical officers on all divisions throughout the railroad system. The Aid also co-operates in the Americanization work of this road which for several years has instructed foreign born employees in the English language and the social standards of American life.

At the various local centers, meetings are usually held once every month. The Aid is organized on precisely the same basis as the organization of the management of the road, the chief of the women's work at a given place being the wife of the highest officer at that point. Their associates are the wives of their husband's staff officers.

The constitution of the Women's Aid consists of nine sections and the by-laws of six sections. There are ten associate directors, the plan being that each one of these shall be the wife of a vice-president; but the rules allow for variation of the plan in case the wife of a given officer declines to serve. In the event of no wife of a vice-president being ready to serve, there is a provision under which a vice-president may nominate a woman connected with his department.

In each region there are associate directors and these, with the wives of subordinate officers, called general superintendents, form a regional commission in charge of the work in that region. In each region also there are lower officers called superintendents, assistant superintendents and auxiliary superintendents; and if the extent of the work makes necessary further sub-division, "supervisors" will be appointed.

The constitution may be amended, under proper regulations, by a majority vote of the board of managers.

One-eighth of the dues are applied to general expenses, and the other seven-eighths reserved for relief work.

There are on each division of the road (or each department) three committees; one on membership and visiting; one on relief and one on finance. Where necessary, because of extensive territory, sub-committees are organized. All work of committees is to be summarized in monthly reports. At the regular monthly meeting of the relief committee, reports must be made of the families visited and aided, and cases requiring discussion will be discussed, but names of persons are not to be used in these discussions. As a rule, names of persons aided are known only to the person conferring the aid and to the vice-chairman or chairman.

The finance committee must, as necessary, secure funds to replenish the treasury; and the committee must meet once a year, or oftener as may be found necessary or desirable.

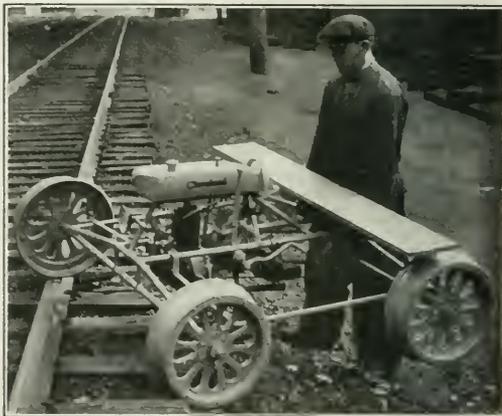
Where an employee is seriously injured, or is killed, by accident, the Women's Aid is to be notified; and the doctors of the Voluntary Relief Department are to advise semi-weekly of cases of illness involving a probable absence from work for more than ten days; also notify promptly in cases of death. A visitor can expend relief to the amount of \$10 at her own discretion; but for larger expenses she must go to her general superintendent; while for expenditures of more than \$25, consultation must be had with the associate director. All information obtained by the relief committee must be treated as confidential.

THE SPOKANE TRANSPORTATION CLUB, Spokane, Wash., has moved its largest quarters in the Title building, Sprague and Wall streets, in that city. The officers of the club, recently elected, are as follows: President, A. S. Cobble; vice-presidents, G. B. Paul, R. F. Carlson; secretary-treasurer, E. J. Greene.

A New Lightweight Railway Motor Car

A NEW LIGHTWEIGHT railway motor car has recently been put on the market which embodies a number of unusual features. The car, while only weighing about 260 lb., has a carrying capacity of five men. It is equipped with a starter, clutch control and a two-speed transmission, which, with the engine proper, form a self-contained unit that is removable as a whole by the loosening of two special bolts.

The framework of the car is made from cold drawn seamless tubing, brazed and welded at the joints over reinforcing forgings of the proper shape. The engine is of the valveless type, having a single cylinder, two-cycle motor with a 2 3/4-in. bore and stroke, rated at 3 1/2 h. p. It is the standardized power unit used by the Cleveland Motorcycle Manufacturing Company, Cleveland, Ohio, in the motor cycles manufactured by that company. The transmission contains the usual spur gear arrangement, the gears, however, being in mesh constantly, the speed change being effected by the use of "dogs." The drive from the transmission is made through an alloy steel worm of generous pitch meshing with a titanium bronze worm-gear which is clutch-connected to a



One Man Can Handle the New Car Easily

large size sprocket. A large size roller chain furnishes the drive to the live axle. All bearings in the power unit are ball bearing and all wheel bearings and line axle bearings are of the roller type. The crank case and transmission and the worm-gear housing are of aluminum. All other parts of the unit which are subjected to heavy stress are made from molybdenum steel.

The clutch has 13 hardened steel discs running in oil and is controlled by a hand lever which permits of the engine being started while the car is at a standstill, or of the motor being allowed to run free. The two-speed transmission may be operated with or without the use of this clutch. A starter is included in the unit, this consists of a foot-operated lever, geared to the motor, one movement causing four revolutions of the motor. Ignition is by a direct-driven high-tension Bosch magneto. A generator furnishes current through an automatic voltage regulator for a head light and a tail light. The brake is a contracting band which is designed to work on the live axle. The railroad sales for this car are handled by Craft Incorporated, 52 Vanderbilt Avenue, New York City.

Wages of M. of W. Employees Before Labor Board

Eastern and Western Carriers Reply to Testimony of B. M. Jewell
and F. J. Warne

THE RAILROADS' ANSWER to B. M. Jewell's recent attack upon the nation's industrial system and the financial and statistical evidence presented to the Railroad Labor Board by F. J. Warne was concisely and emphatically given by J. G. Walber, representing the eastern carriers, and J. H. Higgins, representing the western carriers, to that body during the past week. Mr. Jewell's testimony was abstracted in the *Railway Age* of April 1, page 821, and Mr. Warne's testimony was abstracted in the *Railway Age* of April 8, page 884.

Regarding the "living wage" advocated by Mr. Jewell, Mr. Walber cited the history of that principle and said:

In view of the impropriety and irrelevancy of urging upon the Board consideration of the co-called "living wage" we feel that it would be improper for us to undertake to present to this Board any detailed answer to that contention. We submit that our position is sound not only because the law does not recognize the so-called "living wage" as a relevant subject for consideration here, but also because in the very nature of things the subject is intangible and based on averages that do not exist and conditions that do not prevail. It must be borne in mind that the amount of money which a family expends is not without substantial dependence upon the tastes and inclinations of the individual families, and their ability to manage the family budget. We all know of instances where families are able to live in reasonable comfort on incomes under which families are unable to pay their bills. The subject of the "living wage" and of family budgets has filled volumes and economists without number have undertaken to deal with the subject. An examination of this output of literature impresses one with the thought that no two of the treatises agree and yet each is convinced that he has a 100 per cent solution of the whole problem.

The budget information submitted by Mr. Jewell was also discussed at length by Mr. Walber, who pointed out numerous fallacies in the facts and figures presented by the former. "It must be evident that the board cannot accept these budgets as being representative or typical," Mr. Walber said.

Referring to other phases of Mr. Jewell's lengthy presentation, Mr. Walber said:

There is no need to discuss the soundness or fallacy of the conclusions reached in these sections of the presentation because they are obviously irrelevant to the issue now before the Board and, at most, present sociological problems not only beyond the power of the Board to consider and decide but as well not even concerning the transportation industry. Notwithstanding this fact, however, we think it will be interesting to the Board if we point out a few instances wherein these conclusions are erroneous, misleading, unfair and entirely irrelevant when applied to the railroad situation, which is the only subject that the Board may at this time consider.

There followed a brief analysis of several other phases of Mr. Jewell's testimony, ending in an analysis of the comparative purchasing power of the wages received by members of the Federated Shop Crafts in different years. Tables presented by Mr. Walber, making allowance for the reduced purchasing power of the dollar, showed that machinists, electricians, sheet metal workers, boiler makers, blacksmiths and moulders are able to purchase 47 per cent more of the necessities of life with their wages at the present time than they were in 1914, while carmen are able to purchase 81 per cent more than they were in 1914. Mr. Walber, in addition, showed that, measured in actual purchasing power, the return upon investment of the eastern railroads for the year 1921 was but 1.84 per cent instead of 3.01 per cent. "If it is right to convert the wages into the equivalent in purchasing power," Mr. Walber said, "certainly as far as the individual stockholders are concerned it is proper to convert the returns of the railroads on the same basis."

In closing his analysis of Mr. Jewell's testimony, Mr. Walber said:

We definitely disclaim any purpose to answer the statements, figures, theories and conclusions contained in Mr. Jewell's presentation. The few to which we have in passing made any reference whatever are those only in which it seemed to us there might at least be some interested although not the slightest relevancy. If time permitted and useful result might thereby be served, we could point out instance after instance of half-truths, distorted figures and illogical conclusions.

The presentation shows that it opens with certain questions and ends with certain questions without any answers in either place. The only possible conclusion that we can draw is that it is an advocacy of communistic doctrines. It is well known that there have been various experiments of this kind on a small scale and at different times in different portions of this country, and they have in every case dismally failed. Our faith in this country makes us believe that it will never be misled into such a pitfall.

J. G. Walber Points Out Inconsistencies in Warne's Position

In taking up the testimony of Mr. Warne, Mr. Walber pointed out the inconsistencies in the employees' position in submitting the wages being paid by the steel and coal industry, for instance, in support of wage increases and then denying that the wages paid to employees in these industries should be considered in connection with wage decreases as was contended by Mr. Warne. He pointed out in addition, that Mr. Warne's testimony on the holdings of railway officers in other industries, which the latter contended should eliminate these industries as factors in the determination of wage scales because of "control," was of no value because Mr. Warne did not state the amount of the holdings of the individuals he named and furthermore, because many of the men named are not living at the present time. As an illustration, Mr. Walber cited the fact that of the 15 directors of the New York, New Haven & Hartford, cited by Mr. Warne, only two are still directors, two died in office in 1913 and the others' terms expired in 1913 or 1914, and they have not been in office since then.

Referring to the financial testimony produced by Mr. Warne, Mr. Walber said:

It seems that no presentation of a dispute regarding either rates or wages is quite complete in the minds of the representatives of the employees without reference to alleged improper financial transactions of one kind or another on the part of the railroads in the remote past, notwithstanding the remedial legislation that has been passed by both Congress and the states within the past few years, making such alleged improper financial transactions impossible today. We submit that it is an unfair and unjust assault upon the railroad industry as a whole and can serve no possible useful purpose in a hearing of this kind other than to excite the prejudice of the Board and the public against the industry hoping that in this artful way they may draw into the case for consideration, a matter which is wholly irrelevant and unimportant.

Graded Rates for Mechanics Defended

The application of the railroads for the right to establish varying rates of pay for mechanics' work based upon the skill and training required, was attacked by the employees and termed impossible. Taking up this phase of the controversy, Mr. Walber defended the railroads' request on the ground that this practice was in effect more or less throughout the country prior to federal control, that it is now being done in other industries and that therefore there is no reason why it cannot be established on the railroads.

In closing his presentation Mr. Walber said in part:

The Board certainly realizes that the discussion during the progress of this case wandered far afield. We believe that the opening statement which we made on behalf of the Eastern railroads clearly and briefly outlines the matters involved in the present controversy and the basis upon which the Eastern railroads feel that they are justified in asking their employees to accept reductions in wages. This statement was made March 9 and it may not be amiss to recall to the minds of the members of the Board that the basis of the contentions of the Eastern railroads was set forth as follows:

The Transportation Act enumerates seven specific criteria to be considered by the Board, etc.; that the Board has interpreted "other relevant circumstances" in Decision No. 2; that it must be obvious that these circumstances are of paramount importance; that the prosperity of the railroad workers is interwoven with and dependent upon the success of the railroad business itself; that so long as wages must be maintained at a wartime level the railroads will be prevented from adjusting their conditions to a peace-time basis; that if the income of the railroads is to be absorbed by such wartime scales of pay it necessarily follows that corresponding reductions must be made in the working forces; that it is to the greater interest of the railroad employees and the public in general that the employees be placed upon a basis which will permit of working the maximum forces, so producing employment for the greater members, increasing the consuming public and in that way contributing to the general revival of business; that it was not only because of the compelling necessity for reductions in labor cost that the carriers proposed to their employees reductions in wages, but also because the carriers are convinced that the new scales of pay which they propose are just and reasonable in the light of the specific elements enumerated for the determination of wages. The Board will recall that we then proceeded with an analysis of wages in outside industries and with changes in the cost of living and supported our contentions in those directions with exhibits relevant thereto. We did not introduce exhibits on the "Hazards of Employments"; "Training and Skill Required"; "Degree of Responsibility," as we considered that there had been no material changes in these respects since the previous decision of the Labor Board.

J. H. Higgins, representing the western carriers, also replied to the contentions of the employees, stating in reference to Mr. Jewell's attack upon the industrial system:

We all agree that workers should have a fair and even liberal share of the profits of industry. We understand that the workers of this country obtain a greater share of such profits than do the workers of any other country. The workers' profits are expressed in wages, which is the most practicable way of giving to the worker the variety of products he requires for his own needs. Mr. Jewell did not explain how the workers will get their share under his dictum. He did not show you where he would find those willing to operate at a loss to themselves in order to give others profits in the form of wages.

J. H. Higgins Attacks Warne's Testimony

The charge that the railroads precipitated the present coal strike is absurd and unsupported, according to Mr. Higgins. Mr. Warne had said, "The railroad companies, in conjunction with the steel companies . . . are forcing 500,000 coal mine workers to go out on strike."

Mr. Higgins, replying to this charge, said:

Without offering a scintilla of supporting evidence, Mr. Warne has brazenly charged the railroads with precipitating a nationwide coal strike. The thing is so absurd that even a poorly developed sense of the ludicrous would have made such a statement impossible. With as much truth he might have outlined holdings of railroad officers in ballast pits and for tie timber and then charged that such holdings control the stone, gravel, sand and lumber business of the country.

Speaking of the employees' evidence in general, Mr. Higgins said:

Their presentation seems to wholly satisfy their minds and they aim to convince the Board that directors and managers of corporations are unworthy of confidence. No evidence is submitted by them outside of the fact that those men are the responsible trustees of the property and guardians of the corporate interests of hundreds of thousands of other owners. Without a iota of supporting evidence, they pillory these directors and managers as men with a predilection for conspiracy—even the small holder of a share of stock or a bond of other industry, if he happens to be a railroad man, fall under their suspicion.

Mr. Higgins closed his remarks with the request that the Board refuse to take into consideration any evidence pre-

sented by the employees bearing upon the railroad situation prior to July 1, 1921, when "after a hearing and consideration of all factors, the board fixed fair and reasonable wages in accordance with the law."

Carriers Ask for Lower Wages for M. of W. Employees

The wide difference between the rates of pay of unskilled labor on western railroads and common labor employed by other industries in the same territory was cited by Mr. Higgins on April 10, in support of the carriers' plea for lower wages for railway maintenance of way department employees. In presenting the results of a survey of wage and employment conditions made by railroad officers, Mr. Higgins said:

Of the total of 318,893 employees of all classes studied in other industries in 28 Western states in December, 1921, 121,866 or 38 per cent were performing work analogous to that performed by railroad employees in the maintenance of way departments. Of these 121,866 employees, 87,113 or 72 per cent are getting lower wages than are paid by Western carriers for like service. Furthermore, of the 121,866 workers, 111,939 or 92 per cent are laborers performing work similar to that performed by the unskilled laborer in the maintenance of way department, and 82,153 or 74 per cent of these men are receiving less than the railroads pay for like services.

Even in the large cities where it is generally understood the industrial rates of pay more nearly approximate the railroad rates we find similar conditions. This is shown by the studies made in 26 principal cities of 125,425 workers, 98,814 or 79 per cent of whom are being paid lower wages than are paid by the railroads for analogous work. Of this 125,425 employees 33,903 or 27 per cent are doing work similar to that being done by railroad employees in the maintenance of way departments. Approximately 73 per cent of these men, or 24,822 employees are receiving less than the railroad rate for like services. In addition, of these 33,903 employees, 29,211 or 86 per cent are unskilled laborers performing work comparable to that performed by the common laborer on the railroads, and 21,570 or 74 per cent of them are receiving lower wages than are paid on the carriers.

It is largely because of this disparity between the wages paid by the railroads and the wages in effect in other industries for employees performing comparable services that the western roads are asking the Labor Board to authorize: (1) a decrease of five cents in the hourly rate of bridge building and painter foremen, assistant foremen, track and maintenance foremen, assistants and mechanics; (2) a decrease of seven and one-half cents in the hourly rate of mechanics' helpers in the maintenance of way departments; and (3) the railroads to pay unskilled laborers the prevailing rates in the territory in which they are employed.

After calling attention to the fact that the present railroad rate for unskilled labor is from 139 to 153 per cent above the 1915 rates and 80 per cent above the 1917 rates, Mr. Higgins added that "this confirms our position that railroad rates are entirely out of line when considered in connection with the rates of pay in outside industries and the other relevant circumstances named in the law for determining just and reasonable wages."

In discussing the principle of the "living wage" which has been advocated by representatives of the employees, Mr. Higgins said:

The railroads are in full accord with the principles that all workers have a right to a "living wage" and that "minimum rates of pay should be established which will insure the subsistence of the worker and his family in health and reasonable comfort." They believe that this Board can and should fix a minimum wage commensurate with the living requirements in the different sections of the country, giving heed to the difference as between large cities, smaller cities and rural communities and likewise to the climatic, geographical and other conditions which have a direct influence on living costs.

Mr. Higgins also called attention to the advantages enjoyed by certain employees in the maintenance of way departments of the railroads such as company houses at nominal rent, bunk cars for extra gangs, economical subsistence in railroad labor camps, opportunity to buy produce direct from farmers along the line, etc., and asked that these factors be taken into consideration in fixing new rates.

J. H. Higgins Asks for Latitude to Meet Local Conditions

The efforts of the railroads in the present wage controversy are directed toward a return to the long-established and recognized practices of pre-war times when the managements had sufficient latitude to meet local wage and employment conditions in the different sections of the country, Mr. Higgins contended in closing the testimony of the western roads on the wages of maintenance of way employees. He said in part:

It is a well known fact that the rates for common labor are always the first to go up, and that these rates in industries were increased in much greater proportion than those of most of the classes during the war period. In many cases the increase was over 200 per cent, and in comparatively few cases did it increase less than 100 per cent.

While we want wage rates for such employees to be fair and adequate, we hold that under the provisions of paragraph (d), Section 307 of the Transportation Act, Congress did not intend by those provisions that a flat rate should prevail throughout the entire country. On the contrary, by requiring that the wages for railroad employees should be considered and related to wages paid similar work in other industries, Congress undoubtedly intended that comparison should be made with the rates paid in such industries in localities contiguous to each road. Therefore, the comparison should be with natural rates in other industries in the various sections of the country, and not with an artificial flat rate.

After outlining the manner in which "rigid" rates for unskilled labor came to be applied on the railroads during the war and the effect of these conditions, Mr. Higgins continued:

It has been impossible to make agreements with the men to fit local conditions and hence our appeal to this Board for relief from the high rates and anomalous situation thus created. We think the Board should not persist in retaining this disability. As the situation stands the railroads, being obliged to pay higher rates than paid in outside industries for this unskilled work, are under a great financial disability that also subjects them to criticism from the public, not only as shippers, but as employers of labor.

J. G. Walber Shows Difference Between Railroad and Industrial Wages

If the reduction asked by the eastern roads in the rates of pay of railroad maintenance of way employees were to be granted the wages of these men would still be higher than the wages of men doing comparable work in other industries. This fact was brought to the attention of the Board on April 10 by Mr. Walber, representing the eastern carriers. A mass of wage data was briefly summarized by Mr. Walber and is partly contained in the following table:

RATES OF PAY IN CENTS PER HOUR

	Rate in Outside Industries	Present R. R. Rate	Rate by R. Rs.	Rate Proposed by Men
Foremen	66.9	75.9	70.9	85.9
Carpenters	54.3	61.6	56.6	71.6
Iron Workers	39.1	74.2	69.2	84.2
Painters	47.3	62.1	57.1	72.1
Masons, Bricklayers, Plumbers, etc.	66.5	67.5	62.5	77.5

In addition, Mr. Walber showed that:

Of 705 employees in outside industries who are comparable with these foremen, only 317 (45 per cent) received rates equaling or exceeding the present prevailing rate on the railroads and only 361 (51 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal. Fifty-eight (eight per cent) were receiving rates equal to or in excess of the average requested by the employees.

Of 2,016 employees in outside industries who are performing work comparable with that of carpenters, 461 (23 per cent) received rates equaling or exceeding the present prevailing rate on the railroads; 764 (38 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal; 262 (13 per cent) were receiving rates equal to or in excess of the average requested by the employees.

Of 300 employees in outside industries who are comparable with bridge and building iron workers, 85 (28 per cent) received rates equaling or exceeding the present prevailing rates on the

railroads; 85 (28 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal; 55 (18 per cent) were receiving rates equal to or in excess of the average requested by the employees.

Of 493 employees in outside industries who are comparable with bridge and building painters, 20 (4 per cent) received rates equaling or exceeding the present prevailing rates on the railroads; 86 (17 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal; two (four-tenths of one per cent) were receiving rates equal to or in excess of the average requested by the employees.

Of 1,190 employees in outside industries who are comparable with other skilled maintenance of way employees, 366 (31 per cent) received rates equaling or exceeding the present prevailing rates on the railroads; 531 (45 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal; 293 (25 per cent) were receiving rates equal to or in excess of the average requested by the employees.

Regarding unskilled labor, Mr. Walber showed that whereas these employees were receiving from the railroads a weighted average hourly rate of 39 cents per hour, the average hourly rate of 91,734 employees in other industries performing work comparable to that performed by common laborers on the railroads is but 33 cents. Of these 91,734 workers, 36,865 were receiving 30 cents an hour, 25,856 were receiving 33 cents an hour, and 29,013 were receiving 37 cents an hour, Mr. Walber said.

During the war the Eastern territory was particularly affected by competition for labor. The result was that to a very large extent the former differentials in the rates between cities and rural points, large terminals and way points were practically eliminated.

An examination of the disputes from the railroads shows that each railroad proposes adjustments to meet conditions peculiar to it. It is of course recognized that unless the Board were to render a separate decision upon each dispute, each proposal could not be met, but based upon the disputes, it is evident that the intent running through all of them, is to be placed in position to apply certain rates to main line operations, differentials thereunder for branch lines, where the work is less responsible, with differentials above the main line rates for labor engaged in engine terminals, etc. To work this out it would appear that, considering that practical standardization exists today, a decision permitting graded reductions to apply to the different services indicated would meet the problem.

Of 36,865 employees in outside industries who are comparable with common laborers in the shops and roundhouses, only 575 (two per cent) received rates equaling or exceeding the present prevailing rate on the railroads; only 10,535 (29 per cent) received rates equaling or exceeding rates which would obtain under the railroads' proposal, (preponderating rate 32 cents) while only four were receiving rates equal to or in excess of the average rate requested by the employees.

Of 25,856 employees in outside industries comparable with laborers in the maintenance of way department, approximately 12,400, or about 48 per cent, were receiving rates equal to or below the rate proposed of 32 cents. Approximately 22,500, or 87 per cent, were receiving rates below the present average wage of 39.8 cents. Only 44 were receiving rates equal to or in excess of the average rate requested by the employees.

Of course the Board understands that labor in other industries does not do precisely the same kinds of work that track labor performs, but it must be admitted that in the large manufacturing centers common labor freely shifts between the railroads and the industries, but it is all of the same general character and such common labor in the industry affords the most direct comparison that it is possible to make.

F. P. Walsh Directs Defense of Present Wage Scales of M. of W. Employees

Representatives of the maintenance of way employees began the defense of their present wage scales before the board on April 11, Frank P. Walsh, W. J. Lauck and Arthur Sturgis testifying. Mr. Walsh's opening remarks were confined to pointing out the inability of maintenance of way employees, particularly section men and other unskilled labor, to live on a wage of \$70 a month or \$840 a year, which he said these men were now receiving.

Mr. Lauck dwelt at length on the effect of "unduly low wages on infant mortality." "Further reductions in the already pitifully low wages of these men," he said, "will mean

the death of thousands of children through malnutrition or through the enfeebledness of the mother."

Lowering wages, he contended, is not a statistical, economic or industrial problem but rather a problem of public policy, morals, ethics and of humanity itself.

A request was made by Mr. Lauck that the Board summon a list of expert witnesses "to demonstrate conclusively that it would be equivalent to depriving laborers and their families of the very means of existence, that it would be violative of public and private morals and contrary to all considerations of a sound and enlightened public policy, for the Board now even to consider any reduction in the rates of pay of unskilled labor." In addition he stated that by these witnesses he would attempt to "prove that if the Board should reduce wages of section men and unskilled labor, it would impair the efficiency of the railroad, it would be directly contrary to enlightened public policy, it would result in the physical and moral deterioration of these employees and their families and in the malnutrition and actual death of their children."

The Board later ruled that it would not grant this request immediately but would again consider it when all of the evidence now available has been presented.

In closing his remarks, Mr. Lauck contended that there is a "stopping place" below which wages cannot go. "We claim it has already been reached in the case of unskilled and low paid workers," he said, "and therefore, all the testimony and exhibits presented by the railroads and bearing on their wages are here irrelevant and valueless."

Mr. Sturgis' testimony opened with the statement that, "justice to the workers would demand an immediate increase in wages but a wage tribunal must keep at least one foot firm on the ground and in my opinion this is no time for a wage increase even if leaving wages as they are now results in hardship and sacrifices on the part of the railroad workers."

He also discussed the "so-called law of supply and demand" which he contended was not now a law in the determination of just and reasonable wages and should not be considered in this case through the admittance of testimony presented by the carriers and showing the disparity between the rates of pay on the railroads and the rates of pay prevailing for analogous work in other industries, the employees of which, Mr. Sturgis contended, were subject more or less to the workings of supply and demand.

The witnesses asked for by Mr. Lauck include:

Prof. William F. Oglburn, Columbia University, New York; Dr. B. S. Warren, assistant surgeon general, U. S. Public Health Service, Washington; Edgar Sydenstricker, chief statistician, U. S. Public Health Service, Washington; William E. Mosher, director of the New York Bureau of Municipal Research, New York, and Ethelbert Stewart, commissioner of labor statistics, Department of Labor, Washington.

A. F. of L. Leaders Denounce Labor

Board and Transportation Act

With Samuel Gompers, president of the American Federation of Labor, and B. M. Jewell, head of the Railway Employees' Department of the federation, on the firing line, the Labor Board and the Transportation Act were targets of a double barreled attack at the opening session of the railway department's sixth biennial convention at Chicago. More than 500 delegates, representing 750,000 workers in the six railway shop-crafts and the clerks' and switchmen's unions are attending the convention which probably will last two weeks.

Mr. Gompers assailed the Transportation Act as "injurious and a failure" and implied that railroads get the "break" in decisions of the Board. Mr. Jewell's remarks were even more pointed. He denounced the Transportation Act as the

"most vicious piece of legislation ever foisted upon the people," adding that the next two years will tell whether employees will continue to abide by decisions of the Board.

"The attention of the workers of this continent are fixed on your deliberations here," said Mr. Gompers, "for out of them will come certain settled policies which make for the good of men and women in your industries. It is essential that you know your cause well, depend on it strongly, and be willing to do and dare the right thing for the working masses of the country. There has come a time when men must show they have teeth and can bite."

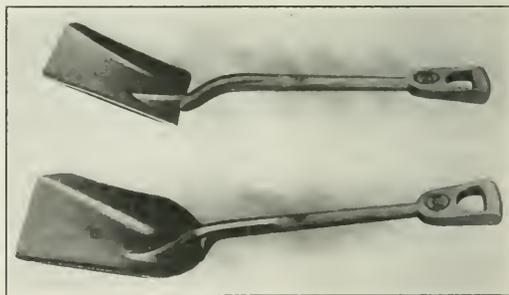
F. P. Walsh's Human Exhibits

On April 12 Mr. Walsh began the presentation of a series of human exhibits to prove his contention that it is impossible to live decently on present wages. A number of section men and section foremen and their wives testified as to their living costs during the past year. Several of the witnesses presenting detailed figures on their expenditure. The majority of these witnesses stated that since the wage cut of last July they have been forced to go into debt for food, clothing, et cetera, and stated their belief that it is impossible for them to maintain their present standard of living and educate their children on the present or reduced wage scale.

Molybdenum Steel in

Shovel Construction

A MOLYBDENUM steel scoop for firing locomotives and stationary boilers has been placed on the market by the Wood Shovel & Tool Company, Piqua, Ohio. The blade of the scoop is made of molybdenum steel, especially treated to give great hardness combined with remarkable toughness. The greater strength of molybdenum steel permits lighter construction with its resultant saving of energy for the worker. A feature of the new scoop is the welding of the straps to the blade, making the two parts virtually one. The bolts are countersunk into the handle which is of



Track Shovel and Fireman's Scoop Made of Molybdenum Steel

seasoned second-growth northern ash. The rigidity of this construction assures long life in actual service.

The molybdenum shovel is made in different types, one being designed for track maintenance and similar work. In designing the track shovel, the manufacturers recognized the fact that it is frequently used in place of a sledge or a crowbar in addition to its normal function, hence, a shovel was constructed to stand up under the gruelling strain and abuse of track maintenance service. Shovels made of the new alloy have been subjected to rigid tests by the Wood Shovel & Tool Company and have demonstrated the value of molybdenum steel for shovel construction.

Julius Kruttschnitt Before Senate Committee

Testimony Offered in Rebuttal of Statements Made by Former Directors General McAdoo and Hines

WASHINGTON, D. C.

JULIUS KRUTTSCHNITT, chairman of the Southern Pacific, testified before the Senate Committee on Interstate Commerce on April 12 in reply to statements by Mr. McAdoo and Walker D. Hines. Mr. Kruttschnitt told the committee that the charges made before the committee by Mr. McAdoo to the effect that federal control was necessary because the railroads "broke down" in 1917 contradicted statements made previously not only by Mr. McAdoo but by President Wilson, the Interstate Commerce Commission and others. Mr. Kruttschnitt said that Mr. McAdoo's charges were made after "Mr. McAdoo's failure to make good his prophecies as to the results of his operation of the railroads."

The McAdoo of 1918 and of 1922

"The authorities we cite," Mr. Kruttschnitt said, "prove that the McAdoo of January and February, 1918, rightly gave the reasons for taking over the railroads. It follows inevitably that the McAdoo of February, 1922, was inconsistent and wrong and that the changed dates and decisions make it clear that little weight should be attached to his testimony before you in 1922. Although in January and February, 1918, Mr. McAdoo gave the true reasons why the government found it necessary to take over the roads, in February, 1922, he asks you to believe it was because the railroads were broken down physically to such an extent and so inoperative as to be 'the strongest ally of the German Kaiser.'"

Mr. Kruttschnitt said that "two bad features stand out prominently in the government management of railroads which were responsible for most of its shortcomings and subjected it to most criticism. They were extreme centralization of authority, established by the first director general and attributable to his temperament and unwillingness to delegate adequate and necessary power to his local officers, and excessive and unintelligent standardization.

Lack of Discipline

"To the first must be attributed the destruction of morale and discipline. The teaching of labor to ignore and condemn their officers, to look to Washington to save them from punishment for neglect of duty and breaches of discipline, for increases of pay and indirect increases, for services never performed, double pay for the same hours of service, all of which produced poor service and indifference to the public. The 'public be damned' policy, unjustly and improperly accredited to private railroad management, was inaugurated and worked to such an undreamed of degree that at the end of the war the return of the railroads to private management was demanded, by those who used them, with substantial unanimity.

"After 26 months of mismanagement the government surrendered the roads with a heritage of \$1,800,000,000 of debt, according to Senator Cummins, saddled on the country, conveniently alleged to represent a legitimate war cost, although much of it was inexcusable, avoidable waste, a scale of government-control operating expenses that ran up to over \$3,000,000,000 more than in 1917 before it could be checked and so burdensome as to make it cost almost 100 cents to earn each dollar of gross revenue."

Mr. Kruttschnitt said that the President in taking over control of the railroads had given assurance to security holders that their rights and interests would be as scrupulously looked after as they would be by the directors of the several railway systems and that there would be as little dis-

turbance of the operating organization and personnel of the railroads as possible.

"These promises and the guarantees of Congress that the roads should be maintained in as good repair and in as complete equipment as when taken over, were completely ignored," said Mr. Kruttschnitt. "The percentage of operating expenses to earnings was raised from 70.48 to 93.47 per cent, the renewals of rails, ties and ballast, was skimmed to the danger point; and the equipment, scattered all over the United States, had been given scant attention and was in the worst condition ever known. At the beginning of federal control 128,780 freight cars were reported in bad order and at the end of federal control 153,727 cars were in bad order, an increase of 24,947 cars. This increase alone would fill a track 192 miles long, but Mr. McAdoo did not disclose the real situation as to the physical condition of freight cars at the end of federal control.

Savings Due to Less Service

"Mr. McAdoo summarizes alleged savings by him of \$118,000,000 in 1918 over 1917. These are substantially the same figures analyzed by us before your committee when we showed that out of the total savings \$79,665,000 represents the cost of suppressed passenger train mileage, service of which the public was deprived during government control and which from patriotic motives they endured patiently. The total amount claimed to have been saved outside of the cost of suppressed passenger service, \$19,193,000, is sixty-five one-hundredths of one per cent only of the total operating expenses. The director general informed your committee in April, 1919, that monthly payrolls of central and regional administrations amounted to \$513,000 in December, 1918, or at the rate of \$6,390,000 per annum; that in addition, office and traveling expenses for the year amounted to \$778,625; grand total at close of 1918, \$7,168,000 per annum or \$1.17 for every dollar saved in salaries of corporate officers.

"Mr. McAdoo out-Hines Mr. Hines in claiming that the railroads were in very bad condition before federal control; that the Railroad Administration increased efficiency, and that the heavy traffic moved in 1920 was due directly to the good conditions in which the properties were turned back," said Mr. Kruttschnitt. "Private operation neither failed nor broke down in 1917 and with the plant provided by railroad owners it gave service that had never been equalled in railroad history."

Praise from the Executive

Calling attention to the statement made by the President in his message to Congress on January 4, 1918, explaining why he took over the railroads, as well as statements of the Secretary of War, the Quartermaster General, and the National Association of Railway Commissioners regarding the accomplishments of the railroads in 1917, Mr. Kruttschnitt added:

"If all of those unbiased gentlemen including the Commander in Chief of the Army and Navy, commend the loyal and co-operative service of the railroads, all of them according to Mr. McAdoo must be aligned with the strongest allies of the German Kaiser."

Asked as to his opinion of the plan proposed by the Association of Railroad Security Holders relative to the pooling of equipment, Mr. Kruttschnitt said that the plan "seems to be full of glittering generalities," but that he had recommended the appointment of a committee to study it.

European Experience with Cab Signals

THE USE OF AUDIBLE cab-signals in Europe, reviewed by L. Weissenbruch in 1920 (*Railway Age*, July 2, 1920, page 29) is the subject of two papers that have been prepared for the International Railway Congress being held this month at Rome, which bring the history of this subject down to date.

The first of these two papers is by Ferdinand Maison, an officer of the railway department of the French Government, bringing the subject down to the beginning of the war, in 1914; and the second is by Jules Verdeyen, inspector of management of the Belgian State Railways (apparently the successor of the late Louis Weissenbruch). The first paper is printed in the Bulletin of the International Railway Association for November, 1921, and the other in the Bulletin for March, 1922. The first one fills about 90 pages, and discusses at length all proposals for assisting engineers in the observing of signals; describes the devices of the principal inventors and has a chapter on speed recording indicators, four of which are described.

The "crocodile" of Lartigue, the well-known cab signal in use on the Northern Railway of France, was put in use on all of the double-track lines of that company as far back as 1880. In September, 1891, Ribard's automatic stop apparatus was tried in France, following the disaster of St. Mandé, when 46 persons were killed. In 1898 another disaster aroused the public, and the Minister of Public Works of France issued a circular to the railroads calling upon them to develop some preventive of collisions. Two years later another circular was issued, and the subject was discussed again at the International Railway Congress in Paris in 1900; but actual progress was slow and halting, for reasons apparently quite similar to those which have prevailed in America. Numerous trials were made in France in 1901 and 1902, a dozen devices being mentioned, but there were no permanent results of much consequence. About 1907 the Eastern Railway of France and the Paris, Lyons & Mediterranean began trying the "crocodile" or something similar to it.

Finally, in November, 1913, occurred the disastrous collision at Melun; and the reflections of the reviewer at that time indicate that all of the efforts of the government had amounted to little. "With the exception of the Northern Railway, the managements have not thrown into the investigation of this problem all the energy and ingenuity which they have displayed in the study of other problems which appeared to them to be of higher interest."

Following this introduction, Mr. Maison occupies 40 pages with descriptions of the various appliances that have been tried; and then there are 20 pages of theory and 10 pages describing speed recorders. On January 1, 1914, the number of locomotives equipped with speed recorders in France was 10,894, of which about four-fifths were passenger engines. All of the six principal companies had locomotives thus fitted, the State Railways having the largest number. Four-fifths of all engines on all roads were equipped. The Flaman apparatus, noted in the *Railway Age* of May 7, 1920, page 1351, appears to be the one most generally used, being found on all of the roads except the Southern and the Orleans.

Mr. Verdeyen begins with a brief review of the few advances made during the war. The circular issued by the French government in 1919 called upon the railroads to make, without delay, a definite selection from the various appliances that had been tried; and, in the meantime, to make more general use of torpedoes, to be placed on the rails behind halted trains, the same as is done in America. Since 1920 the Eastern, the Orleans, the State and the P. L. M. have decided to adopt the crocodile as used on the Northern Railway, with minor modifications. The crocodile has been

improved by an arrangement for keeping its surface coated with paraffin or oil which makes it easy for the brush to clear the surface of frost or snow.

The State railways abandoned the various contact devices which had been under trial since 1911 and adopted the Augereau wireless apparatus which was described in the *Railway Age* of May 7, 1920. The extent to which this apparatus was installed is not stated; although it is said that the experiments on the line between Paris and Chartres included 40 signals. In a subsequent paragraph Mr. Verdeyen says that the Augereau apparatus has been abandoned and that the crocodile of the Northern Railway has taken its place: this with a view to securing uniformity.

The Southern Railway, acting on the suggestion of the government in 1919, that torpedoes should be more generally used, installed a torpedo machine, set at the side of the road, made apparently on the same general principle as that which has been brought out in this country by the Federal Signal Company, as recently noted in the *Railway Age* (March 4, page 517). Mr. Verdeyen seems to think that if the good results thus far shown are confirmed by longer trial, the Southern Railway will be in favor of adopting this machine instead of using cab signals.

Mr. Verdeyen, in his summing up, referring to the favorable opinion entertained by the Southern Railway concerning roadside audible apparatus, says that experiments with apparatus of this kind in Belgium, extending over two years had produced less favorable results; there had been a considerable number of failures of torpedoes and there was trouble because of the premature exhaustion of the store of torpedoes.

The Northern Railway now has cab signals on all of its road locomotives; and the number of fixed contacts on the roadway is 3,800 on a length of 2,360 miles of track. The Eastern, the State and the P. L. M. are making good progress in extending installations. The Northern and the Eastern railways both have added to the cab signal an audible warning, different from the cautionary warning, to sound when the signal is at clear.

Mr. Verdeyen finds that in 1920 the total number of locomotives in France fitted with speed recording apparatus was 12,655. Supplementing the descriptions of speed recorders given by Mr. Maison, this paper contains a brief description of the Deuta apparatus which is in use on the railways of Alsace-Lorraine. Of these and other designs of recorders, the railroads of Alsace-Lorraine have 1,018 in use.



Photo by International

Loud Speaking Radio Phone on Cornell University Special,
D. L. & W.

Automatic Train Control Hearing Is Resumed

I. C. C. Hears Train Control Companies Present Facts Pertaining to Their Systems

IN ORDER that automatic train control companies could present evidence in connection with the proposed order of the Interstate Commerce Commission on automatic train control, the Commission at the close of the testimony of the railroads on March 24 (reported on page 837 of the *Railway Age* for April 1) continued the hearing until April 12.

Before the train control companies were called on, M. C. List, attorney for the Commission, presented for the record a list of acts and documents pertaining to train control showing the government's activity on this subject. Mr. List outlined the reasons which led up to the formation of the Block Signal and Train Control Board in 1907; the amount appropriated and spent by the government in its investigations through the Board and later by the Bureau of Safety. Extracts pertaining to automatic train control were read into the record from the reports of the Board and from the Bureau of Safety's annual reports after the Board was discontinued.

Performance and Accident Records

The Bureau of Safety prepared and submitted through Mr. List a tabulation of the operating records of the American Automatic Train Control Corporation, the Miller Train Control Corporation and the Regan Safety Devices Company which were based upon the reports of the engineer-examiners and the inspectors of the Joint Committee on Automatic Train Control of the American Railway Association. These tabulations cover the same period as that portion of the report of the subcommittee of the Joint Committee (of the A. R. A.) which relates to the devices in use which was presented by J. A. Peabody at the hearing on March 20, and in connection with the tabulation prepared by the Bureau of Safety a careful check of the Joint Committee's compilation was made. Differences in the classification and record of failures and undesirable stops were shown in the statement accompanying the memorandum.

A summary of the accidents which have occurred between 1906 and 1921 inclusive shows a total of 106,473 which resulted in 6,142 killed, 95,936 injured and a loss of \$80,386,694. There were 17,042 rear end collisions resulting in 1,914 being killed, 25,974 injured and a loss of \$21,507,894. During this period the number of head end collisions were 9,255 in which 2,412 were killed and 34,708 were injured. This resulted in a loss of \$19,461,769.

Collisions investigated by the Commission from July 1, 1911, to March 31, 1922, were as follows:

Kind of Collision	Number	Persons	
		Killed	Injured
Head end	255	863	5,462
Rear end	205	773	3,948
Side	43	130	738
Miscellaneous	15	41	139
Totals	518	1,807	10,287

The collisions investigated by the Commission which occurred in automatic block signal territory due directly or indirectly to the failure of enginemen to observe or be governed by signal indications from July 1, 1911, to March 31, 1922, numbered 80 which resulted in the death of 416, the injury of 1,837 and a property loss of \$1,081,583.35. This loss did not include damage to lading. In addition to the above and among other exhibits presented by Mr. List was one listing the roads cited in the proposed order on train control giving their total automatic block signal mileage; total passenger lines operated; territory designated in the Commission's order of January 10; mileage covered by this

territory and the automatic block signal mileage in it with certain explanatory notes.

American Train Control Corporation

C. W. Hendrick, in presenting his brief, stated that "after 14 years, on the part of the Commission, through its safety division, to secure the co-operation of the railroads by getting them to recognize that the present wayside signals are not giving sufficient protection, your Commission, after careful and extensive investigation, and not until two years after the passage of the Transportation Act giving you power, did you take any positive action until the issuance of the present order now under discussion. For this committee (the Carrier's Committee) to come forward at this late date and endeavor to discredit your investigation and order by trying to show that train control is in an undeveloped stage and does not warrant your having issued the order is clearly a desire on their part to secure further delay, which is largely based on prejudice. We are perfectly justified in taking the stand that wayside signals are also in a developing stage * * * after 30 years of development. Knowing that a first impression is difficult to overcome, special efforts have been made to create an unfavorable impression by magnifying small things and belittling important accomplishments of train control, at the same time praising wayside signals."

Mr. Hendrick told how long freights can be handled on mountain grades without danger of losing the air through gradual application. Regarding the service record on the Chesapeake & Ohio, attention was called to the testimony of the signal engineer in which he stated that during two years of service, out of 1,120,000 operations there were only two false clear failures. The objections of the Carrier's Committee were next answered in detail.

In speaking of installation costs, Mr. Hendrick said that he did not want these costs mixed up with the cost of signals and that the costs should be based on three things:

(1) Installation of train control in connection with wayside signals, when wayside signals are provided. (2) Installation of train control when no wayside signals are provided. (3) Apparatus to be supplied for the engine equipment. The approximate cost of this system was given for installations where wayside signals are already in. Engine equipment was listed at \$850; each ramp location at \$200 and the cost of attaching the equipment to engines is \$50 per engine. Maintenance costs were given as \$14.03 per engine per month. In concluding his brief, Mr. Hendrick said that "if you (the Commission) defer the issue, you can rest assured the signal companies, who have been advising the railroads through these years of opposition, will not work overtime to aid in developing a system that will eventually cause them a heavy loss by putting the wayside signals in the same class as the horse car is to the electric car." C. C. Paulding, attorney for the railroads, asked Mr. Hendrick on what grounds he based his charge that the railroads were influenced by signal companies and he stated that it was from general observation. Mr. Hendrick was asked if that was basis enough on which to make such grave charges and he could not present any specific instances to substantiate his statement.

B. F. Wooding Presents Brief

Dr. Wooding said: "If all the presidents of railways were to appear before your Honorable Commission and it was

put up to them that they must either kill one of their number each year or install all the railroads with the automatic train control, can you guess what their answer would be?" Dr. Wooding gave a description of his device and told of the difficulties experienced in developing it and the trouble he had in arranging for and conducting experiments on the railroads. In touching on the induction type of train control he said that it "is far behind the contact, though having had every advantage with the latter. * * * With the contacts * * * all complications and uncertainties are eliminated which are common to the transference of electrical impulses in comparison with definite mechanical operation. Besides, the maintenance cost for current along the roadway cannot help but be expensive."

The cost for locomotive equipment was placed at \$450; track equipment for 100 trains daily, complete, \$800; 200 trains daily, \$900 and for 300 trains daily, \$1,000. Fixed charges for locomotive maintenance, if the battery is charged from the headlight dynamo was placed at from \$2 to \$5 per month while that for track maintenance was placed at \$5 for 100 trains a day; \$10 for 200 trains a day and \$15 for 300 trains.

Commissioner McChord asked if he thought that engineers would be less alert with train control than without it and was answered in the negative. Dr. Wooding explained why he felt that an emergency application of the brakes should be made and stated that it would be a mistake for the railroads to make installations of signals without also installing train control. Interlocking construction, in his opinion, could well be delayed until after installations of train control.

F. J. Sprague Takes the Stand

Stating that many of the objections raised to train control were of the "rubber stamp" type, F. J. Sprague said that it was unfortunate that the same committee of the American Railway Association which had been appointed to co-operate with the Commission was the one to handle the case against train control for the carriers. He pointed out that the opposition raised by the railroads to the adoption of Section 26 of the Transportation Act was based largely on a statement made by S. M. Felton, president of the Chicago & Great Western, who had ventured in a field of prophecy already disproved by facts. Mr. Sprague felt that the Carrier's Committee could have done much better had it offered constructive criticisms rather than presenting every defect against the devices found in service. The wayside signals, in his estimation, gave only a limited indication of traffic conditions ahead and that if an accident happened every time an engineman passed a red signal the newspapers would be full of them as they are of automobile accidents. Accident statistics, he stated, were a dry menu for the widows and orphans and as to the victims themselves it was a 100 per cent loss. In giving a general description of his device, Mr. Sprague said that he had adopted certain requirements which he felt should be met and that the application of magnetic induction to other fields such as the telegraph, electric railways, signal systems, etc., proves that it is available for the train control field and that any system, in his opinion, should be a thorough mentor and guide to the engineman to assist him in his work. He stated that the price for his equipment would be furnished those railroads asking for estimates and that estimates given by the railroads were absurd.

When the meeting adjourned the Miller Train Control Corporation was presenting its brief which was continued over for the Thursday morning session. Other train control companies yet to be heard in the order of their hearing are the Sumner, Shadle, Webb, Schweyer, Clifford, Richards, Wharton, Bevan-Wallace, General Railway Signal Company, Finnegan and Regan.

Railways Should Make Vast Expenditures

THE RAILWAYS of the United States should spend one and one-half billion dollars per year on enlargements and extensions to bring their facilities up to the point that they were in 1914 with reference to the business of the country, according to W. B. Storey, president of the Atchison, Topeka & Santa Fe. Mr. Storey made this statement in the course of an address before the eighth annual conference of the seventeenth district of the International Association Rotary Clubs at Muskogee, Okla., on March 31. In discussing the railway situation of today, Mr. Storey based his arguments on the two facts that the railways and the people are interdependent and that the roads must build and grow as the country grows. He spoke in part as follows:

"In regard to the first, the people of this country are absolutely dependent on the railways. This country has developed only by reason of the transportation afforded by the railways. The railways are necessary to bring in all necessities of life—to bring in coal and supplies of all kinds and carry away all produce. They may be likened to the circulatory system of the body and are as essential to the life of the country as the arteries and veins are to the health of the human system. Conversely, the railways are just as dependent on the people. They must have people to serve, to give them business and hence life. A railway goes into a new country, finds no people—hence no products to haul—and generally loss results. Many railways went bankrupt because they did not recognize this until too late. The Santa Fe made this mistake in that it over-extended too rapidly, and as a consequence 30 years ago it became bankrupt. Now it adds mileage only as fast as it can be digested; that is, made productive. We count on a new branch being unproductive for a few years. * * *

"The second fact is that the railways must build and grow as the country grows. This means that branches must be built, that additions in the way of sidings and new and larger stations must be provided, that more cars and more locomotives must be bought, with the shops and roundhouses to take care of them. Secretary Hoover, in a recent statement before the Interstate Commerce Commission, used the following language:

"One thing is absolute—our transportation facilities are below the needs of our country and unless we have a quick resumption of construction the whole community, agricultural, commercial and industrial, will be gasping from a strangulation caused by insufficient transportation the moment that our business activities resume."

"To give you some idea of what this matter of growth means on a road like the Santa Fe, we expended for extensions, for additions and betterments, and for equipment over \$20,000,000 a year for the five years prior to 1914. This has nothing to do with the ordinary expenditures for maintenance, but is new money put into new appliances to take care of the growth of the country along our lines. That amount of money today will not buy or provide the same that it would. Twenty millions then means forty now * * *

"The same situation obtains on all other roads throughout the country, and applying the same expenditure to the entire mileage of the country we find the prodigious total of one and one-half billion dollars which ought to be expended on enlargements and extensions alone per year for three years to bring the railroads of the United States up to date. Mr. Hines, in testimony before the Interstate Commerce Commission on January 31, last, said: 'It would be a conservative estimate to say that for several years the public interest would be promoted if about a billion dollars a year could be expended for this purpose.' Mr. Hines' figures are large, but I believe them not large enough, and in my judgment one and one-half billions should be spent."

General News Department

Z. G. Hopkins, assistant to the chief operating officer of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., addressed the St. Louis Railway Club on Friday evening, April 14, on "The Field for a Railroad Bloc."

Union Pacific's Proposed Expenditures

The Union Pacific has recently announced its intention to spend \$29,000,000 for additions, betterments, equipment, and extensions during 1922. The construction of three short extensions is contemplated, and \$9,200,000 has been set aside for new equipment. The major portion of this sum will be for freight cars, for which a large number of contracts have already been let. The Pacific Fruit Express, which is jointly owned by the Union Pacific and the Southern Pacific, will spend \$9,000,000 for betterments during the ensuing year, of which sum \$8,000,000 will be spent for new equipment and \$1,000,000 for new ice plants.

A Correction

In the article entitled "New Specifications for Rail," which appeared on page 828 of the *Railway Age* of April 1, the statement was made that the rail manufacturers had agreed to accept orders for rails to be rolled in accordance with the new experimental specifications this year without additional charge. While this statement is in the main correct, it has given rise to some misunderstanding. The facts are that some mills have agreed to permit a portion of the 1922 tonnage to be rolled under this experimental specification for the purpose of ascertaining the practicability of this specification and with the understanding that for the specific test tonnage (the amount of which is to be determined by agreement between the mill and the road in question) there is to be no extra charge.

D. T. & I. Earnings Increasing

The Detroit, Toledo & Ironton, which had shown a steady reduction in net operating income since last April, until it had a deficit of \$331,000 for December, has been showing an improvement since then, according to its reports filed with the Interstate Commerce Commission, as its traffic and earnings have increased. In January the road had a net operating income of \$23,159, while for February it was \$131,538. For the corresponding two months of 1921 the road showed a deficit of \$311,370. For the first two months of 1922 the operating revenues were \$1,056,022, an increase of \$617,425 over 1921, while operating expenses were \$764,464, an increase of \$99,364. Expenditures for maintenance of way and structures were \$55,328 less than for the corresponding months of 1921, while expenditures for maintenance of equipment were \$31,697.

The Air Mail

The Airplane Mail Carriers, carrying mail between New York and San Francisco, have flown, since July, 1921, about one million miles; and 94 per cent of the trips were completed satisfactorily. In that time there has been but one accident, a pilot falling from a distance of 300 feet at San Francisco while flying in a plane without mail. He was killed. No other accident, fatal or non-fatal, is recorded. This and other facts are given in an article published in the Union Pacific Magazine for February, by A. R. Dunphy, superintendent of the Central Division of the Air Mail Service. In the three years and three months prior to last July, 21 pilots and eight mechanics or other employees were killed, an average of one death to every 75,000 miles flown. Mr. Dunphy says that the New York-Washington air mail was discontinued on July 1, 1921, the appropriation for the current fiscal year having made no provision for that, or for any line except the one between New York and San Francisco. He gives interesting data concerning the machines used and condenses figures showing the

volume of traffic since the beginning of this service, which was on May 15, 1918. He also relates some of the thrilling adventures of the flyers in the Rocky Mountains.

April Meeting of the New York Railroad Club

Harrington Emerson, of the Emerson Engineers, who will be the principal speaker at the meeting of the New York Railroad Club to be held on April 21 at the Engineering Societies' Building at 8 p. m., was from December, 1920, to June, 1921, field director as to wastes in transportation in the study which the Federated American Engineering Societies made of the elimination of waste in industry. During the summer of 1921 he went abroad and studied railway conditions in England, France and Germany. He then spent three months in Mexico, studying the national railways of that country at the request of the Mexican government.

The railways of all countries are suffering from the same difficulties. Mr. Emerson will attempt to diagnose the troubles that have recently come upon the railway world and will suggest remedies. His address will be illustrated with charts and diagrams.

Illinois Central Plans Hotel on Wheels

The Illinois Central is preparing to house 6,000 of the 30,000 visitors expected to attend the triennial conclave of Knights Templar to be held in New Orleans, La., April 24-27. There will be a hotel on wheels, consisting of 250 Pullman sleeping cars, in the railroad's Poydras yards, between Poydras and Lafayette streets, and extending five blocks from Magnolia to Saratoga streets. To provide the necessary space, eleven new tracks are being built.

The sleeping cars will be operated after the pattern of a miniature city, with dining cars at convenient intervals. A section of warehouse No. 3 is being converted into a temporary clubhouse, containing toilets, 24 shower baths, a three-chair barber shop, and a laundry agency. The municipal water supply will be tapped with laterals leading to each car. Two locomotives will furnish steam for heating the cars and the clubhouse. The railroad company is spending about \$65,600. In addition to the facilities in Poydras yard tracks will be laid on neighboring territory immediately east of the yard, and this will be available as parking space for more cars, while if still more space is needed, cars will be switched to several tracks directly west of the Union station. Arrangements have been made for the handling of 200 cars.

Production of Non-Union Coal Fields

Conditions in some of the more important fields are reported by the Coal Review to be as follows:

In the non-union fields of Pennsylvania production is running at about the pre-strike rate. In the non-union fields of Eastern Kentucky and Tennessee, output is not up to normal solely because of lack of orders for coal.

West Virginia, with operation for the entire State at 65 per cent of normal, is held down by lack of orders. The Kanawha Field of West Virginia reports 1,250 cars standing unsold and that, if there were sufficient orders on hand to justify running the mines, a larger percentage of the men now idle would return to work under conditions offered them by the operators on April 1. In the Winding Gulf Field of West Virginia, 4,200 cars are standing unsold on the tracks.

Ohio, Indiana and Illinois are nearly 100 per cent closed down, but a large number of cars loaded during the last week before the strike are still unsold. West of Mississippi, union mines are closed; non-union mines are operating so far as orders for coal enable the mines to run.

Western Kentucky reports that, while a large number of mines are not working, the explanation is to be found in the lack of orders and the unsold cars of coal already standing at the mines.

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF FEBRUARY AND TWO MONTHS IN CALENDAR YEAR 192

Aver- age per- centage during period	Name of road	Operating revenues				Operating expenses				Total	Operating ratio	Net from railway operations	Net after rentals	
		Freight	Passenger	Total (inc. misc.)	Maintenance of way and structures	Equip- ment	Traffic	Por- tion	General					
Feb. 141	A. & P. E. Ry.	\$48,402	\$230,141	\$309,084	\$54,903	\$90,979	\$90,979	\$11,451	\$403,781	\$9,461	89.46	\$24,160	\$4,613	\$13,944
Feb. 141	A. & P. E. Ry.	106,255	499,667	757,073	106,365	159,191	159,191	21,308	1,047,588	47,409	89.50	47,409	9,155	59,681
Feb. 171	Atchafalaya, Memphis & B. Ry.	107,210	360,626	467,836	82,320	35,381	233,977	46,249	488,944	36,131	85.80	80,982	10,977	28,365
Feb. 171	Atchafalaya, Memphis & B. Ry.	58,585	156,512	38,370	45,918	8,533	165,726	12,020	270,567	6,435	75.70	85,945	6,435	47,758
Feb. 201	Atchafalaya, Memphis & B. Ry.	80,421	710,443	739,999	123,743	348,262	348,262	3,842	947,601	83,500	83.50	117,842	78,969	32,687
Feb. 855	Atchafalaya, Memphis & B. Ry.	1,378,751	14,475,941	14,447,213	3,293,417	2,401,455	4,438,826	3,28,543	59,490,630	78,840	78.80	2,627,831	1,604,510	1,585,067
Feb. 840	Atchafalaya, Memphis & B. Ry.	6,611,868	54,774,102	51,323,803	6,963,368	5,247,811	8,949,652	6,959,845	20,212,368	81.00	4,361,734	2,548,726	2,473,231	
Feb. 177	Atchafalaya, Memphis & B. Ry.	236,866	392,138	353,847	38,409	34,940	341,911	77,835	1,516,955	101.30	18,864	402,562	198,285	
Feb. 177	Atchafalaya, Memphis & B. Ry.	2,113,678	8,845,510	8,082,322	1,972,728	8,761	1,883,018	3,848,925	31,406,664	91.40	15,417	2,024,211	402,664	
Feb. 857	Atchafalaya, Memphis & B. Ry.	809,077	1,877,882	1,058,626	195,072	407,435	1,278,262	400,670	37,277	1,053,122	99.50	5,454	40,234	
Feb. 93	Atchafalaya, Memphis & B. Ry.	55,534	62,068	100,008	23,448	36,386	7,700	10,210	151,588	95.00	7,420	7,420	10,172	
Feb. 133	Atchafalaya, Memphis & B. Ry.	171,194	131,663	344,528	85,283	157,134	146,931	20,142	34,358	95.00	17,212	1,309	16,780	
Feb. 133	Atchafalaya, Memphis & B. Ry.	47,347	161,678	23,361	44,352	4,464	61,620	11,673	151,407	95.30	7,211	1,464	2,707	
Feb. 133	Atchafalaya, Memphis & B. Ry.	175,381	131,911	307,869	85,378	137,729	137,729	22,121	317,721	102.00	25,290	11,840	5,561	
Feb. 93	Atchafalaya, Memphis & B. Ry.	444,167	63,523	549,819	109,863	172,999	403,167	33,336	661,344	130.70	113,595	152,976	78,684	
Feb. 492	Atchafalaya, Memphis & B. Ry.	3,886,754	17,526,628	6,006,660	6,009,029	11,115,552	123,206	2,117,331	134,972	69.40	1,815,644	1,469,333	673,869	
Feb. 492	Atchafalaya, Memphis & B. Ry.	7,311,653	33,800,299	11,900,710	1,269,115	2,071,276	41,581	281,587	8,355,714	73.30	2,947,996	2,432,024	521,659	
Feb. 342	Atchafalaya, Memphis & B. Ry.	1,891,410	36,862	239,102	33,664	44,582	6,120	6,287	206,160	86.20	32,942	21,862	22,113	
Feb. 342	Atchafalaya, Memphis & B. Ry.	182,385	72,003	15,759	95,004	20,386	120,386	14,547	1,247,238	89.30	9,868	3,879	10,514	
Feb. 342	Atchafalaya, Memphis & B. Ry.	23,684,160	3,915,985	1,800,015	2,944,000	588,358	12,505,991	937,660	4,848,824	81.30	5,657,558	4,138,575	3,594,235	
Feb. 90	Baltimore & O. Ry.	209,522	25,166	26,201	5,924	134,709	10,134	20,850	301,830	96.30	7,673	38,683	84,059	
Feb. 23	Baltimore & O. Ry.	74,019	166,508	29,881	27,177	2,140	103,940	12,618	175,687	105.50	9,179	24,085	58,190	
Feb. 63	Baltimore & O. Ry.	1,167,499	1,506,460	1,499,629	22,904	55,795	21,807	311,038	4,942	411,038	63.00	182,583	151,969	
Feb. 32	Baltimore & O. Ry.	932,655	5,713	10,774	10,774	31,226	442,915	18,794	627,125	67.30	30,430	241,462	285,121	
Feb. 25	Baltimore & O. Ry.	535,961	27,619	579,884	58,134	254,305	11,756	232,903	27,807	589,995	101.50	10,611	43,500	
Feb. 35	Baltimore & O. Ry.	1,046,330	59,011	1,139,188	12,494	540,930	27,710	484,212	52,869	1,238,333	108.70	99,145	164,738	
Feb. 35	Baltimore & O. Ry.	9,464	9,618	18,710	3,108	3,108	910	4,495	3,156	31.26	33.30	21,538	27,300	
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Feb. 25	Baltimore & O. Ry.	535,961	27,619	579,884	58,134	254,305	11,756	232,903	27,807	5				

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1922—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total Operating revenues, Maintenance of Way and structures, Equipment, Traffic, Trans-operations, General, Total, Operating ratio, Net from railway operations, Operating income (or loss), Net after rentals, Net after rentals 1921.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1922—CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Freight, Passenger, etc.), Operating expenses (Traffic, Transportation, etc.), Net from railway operations, Operating ratio, Net after rentals, Net after rentals 1921.

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1932.—Continued

Table with columns: Name of road, Average mileage, Operating revenues (Freight, Passenger, Mail, Express, Total), Maintenance of way and equipment, Operating expenses (Trans-shipment, General, Total), Operating ratio, Net from operations, Operating surplus, Net after rentals, Net after taxes. Rows include various railroads like Pkts. Co., West Jersey, Peoria & Evans, etc.

Annual Meeting of Signal Section

11. S. Balliet, secretary, 30 Vesey street, New York, announces the tenth meeting of the Signal Section, American Railway Association to be held at the Monmouth Hotel, Spring Lake, N. J., on Wednesday, Thursday and Friday, June 14, 15 and 16. The reports of committees are contained in the advance notice which will be mailed May 22. Hotel reservations should be made direct with the hotel management. Rates, on the American plan, range from \$8 a day for single rooms without bath to \$18, \$20 and \$22 for double room with bath. The stipulation for occupancy of rooms is one person to a single room and two people to a double room. Members who desire to remain at the hotel beyond the convention period will be accommodated at the same rates until the evening of June 18. Spring Lake is reached from New York by the Pennsylvania or the Central of New Jersey, in eighty minutes, with fast train service about every hour.

Report of Pennsylvania Reviewing Committees

The reviewing committees of the Pennsylvania Railroad—committees composed of officers of the road and representatives of the employees brotherhoods—who consider controversies between the company and its employees, have during the year ending December 31 last, considered 6,196 cases, of which 3,729 were adjusted or compromised in favor of the employees; 2,314 cases were withdrawn and 43 were decided in favor of the management. The remaining 110 cases, equal to two per cent of the total, were either dropped, pending appeal, or were brought up at a later date in some other shape. The cases decided in favor of the employees equaled 60 per cent of the whole; the cases withdrawn, with those decided in favor of the management equaled 37.94 per cent. The committees which deal with complaints of engine and train service employees have been in existence since January 1, 1921, but those which deal with the other classes of employees were not established until August or September.

Of the 3,729 cases settled in favor of the employees, 1,409 were decided by officers below the grade of superintendent; 1,935 were settled by superintendents; 258 by general superintendents; 59 by general managers and 28 by reviewing committees.

Accident Bulletin No. 81

The Interstate Commerce Commission has issued quarterly accident bulletin No. 81, dated February 8, giving statistics of railroad accidents occurring in the United States in the three months ending with September, 1921. During this quarter 11 passengers, 51 employees and 21 other persons were killed in train accidents, and 900 passengers, 338 employees and 62 other persons were injured; a total of 83 persons killed and 1,300 injured.

Adding train service accidents, the total number of casualties occurring in train operation was as follows: passengers killed 46, employees killed 302, other persons killed 1,331; passengers injured 1,992, employees injured 7,236, other persons injured 2,508; a total of 1,679 killed and 11,666 injured. As compared with the corresponding quarter in 1920, (Bulletin No. 77) all items show a decrease. The total number of persons killed in the earlier quarter was 2,044 and of injured 1,947.

Of passengers killed in train accidents the total this year, 11, compares with 24 in Bulletin No. 77. Under the head of employees killed in train accidents the diminution is 59.5 per cent, the total last year having been 126. The nontrain accidents now reported total 119 killed and 20,997 injured, as compared with totals in the same quarter of 1920 of 124 killed and 29,057.

Southern Pacific Will Send Enginemen to Fuel Association Convention

Eleven engineers and eleven firemen from the Southern Pacific Line, together with several officers of the road, will be sent to the convention of the International Railway Fuel Association to be held in Chicago, April 22 to 25, as a recognition for maintaining an excellent fuel record during the past twelve months. Individual fuel performance records are kept on the Southern Pacific for each engineer, fireman, and locomotive and by means of these records the most efficient enginemen are selected. Competition throughout the year has been keen and interest has been maintained through the publication of an honor roll each month showing the enginemen and firemen making the best fuel performance

in through freight, local freight, through passenger and local passenger service.

In order to arouse the interest of all employees on the different divisions, a fuel conservation banner made of silk, suitably inscribed and trimmed with gold braid and tassels, is awarded to the division making the best fuel performance for a three-months period. The winning division is indicated by a gold lettered strip which is fastened on the bottom of the banner on which the winning date, as well as superintendent's name, is shown. Gold hat badges are awarded to the engineer and fireman who make the best showing in fuel economy for each three-months period. The Southern Pacific has rewarded enginemen who made unusually good fuel records with a trip to the convention in previous years and the continuation of this practice indicates that the results of attendance at the sessions of the Fuel Association have been found beneficial.

Reparation During Federal Control

The Interstate Commerce Commission has issued a decision holding that the question whether reparation should be awarded on the same basis in respect of transportation during federal control before and after June 25, 1918, depends upon the facts of record in each case.

This proceeding was instituted upon the commission's own motion to afford interested parties an opportunity to argue orally the question whether, in finding unreasonable the rates charged by the director general on traffic which moved during federal control, and in awarding reparation therefor, it should apply a lower basis to shipments made prior to June 25, 1918, when rates were increased approximately 25 per cent, than on shipments made on or after that date.

The position of the director general was that the commission should adopt a uniform rule based upon the principle that any rate found unreasonable on such shipments made prior to June 25 should include the general increase effective on that date because the increase in wages of railroad employees was made retroactive to the beginning of federal control on January 1, 1918, and because railway materials and other expenses had substantially increased before the increase in rates was operative. In this respect he asked that consideration be given to the fact that although certain economies were instituted as an incident of federal control there was a deficit in operating results for the period from January 1 to June 24, 1918. His position was that if, in awarding reparation against him, the same basis is not applied on shipments made prior to June 25 as on shipments thereafter, the effect is to penalize the government for having failed to initiate at an earlier stage of federal control the increased rates which would doubtless have been found reasonable.

The report, by Commissioner Hall, says in part: "Shippers urge that the rule suggested by the director general is unsound and if adopted would bring about anomalous situations. In Sulzberger & Sons Co. v. C. R. I. & P., 55 I. C. C., 691, the complaint was filed in 1916. The decision was in 1919. If the reasonable maximum rates there prescribed had been established prior to June 25, 1918, they would have been subject to the general increase of that date. Can it be said that because a case is decided after June 25 the fact that rates prior to that date were on a different level should be disregarded? The director general asks in effect that, where particular rates are found unreasonable after June 25 on shipments which moved during federal control both before and after that date, we arbitrarily use January 1, 1918, as the dividing line because the retroactive application to January 1 of the wage award substantially increased the operating expenses during the ensuing period down to June 25, although operating revenues were not increased until the latter date. That is another way of saying that the increases effective on June 25 should be applied retroactively to January 1, 1918, in so far as affecting complaints. If that contention is sound as applied to the director general it is likewise sound as applied to the corporate carriers. Their rates were increased on August 26, 1920, and, as the wage award of July, 1920, was applied retroactively to May 1, 1920, the question would arise in determining the reasonableness of rates on shipments made prior to August 26, 1920, whether any rate, found to have been unreasonable prior to that date may nevertheless properly include the percentage increase authorized in that case. Shippers might with equal propriety ask that general reductions apply retroactively.

"The fact that in some of the decided cases we have awarded reparation to the same basis upon shipments made before and after June 25, 1918, does not necessarily reflect any variance in principle. Operating conditions prior to June 25, 1918, including the retroactive application of the wage award, were important factors, but they were not necessarily controlling in determining the reasonableness of rates after January 1 of that year. Unconsciously, it may be, but none the less really, counsel for the director general asks us to decide cases in advance by laying down some principle of determination which will be controlling before we know anything about the state of facts to which it will be applied. We are convinced that we would not be warranted in announcing any rule of general application as a basis for determining the reasonableness of rates exacted on shipments moving before or after June 25, 1918, or any other date. We are equally convinced that in proceedings against the director general, as in all others, we must adhere to the sound and salutary principle that whether and to what extent a rate was or is unjust or unreasonable in a particular case is a question of fact, to be determined by the exercise of good judgment, informed by experience, in the light of all the pertinent facts of record in that case."

Cogary Cogs

The above title is not so cryptic as it seems. It is the name of a quarterly magazine which has been started by the Central of Georgia Railway Clerks' Organization, to enable the clerks in the operating, accounting and mechanical departments, and in the station agencies, to keep in touch with each other. The clerks recognize that they are only cogs in the railroad machine, but they mean to demonstrate the importance of having every such member exactly fitted for its duty. They forgot to put into the magazine the name of the editor or of the city where it is printed; but we will assume that Savannah is the place.

Railroad Earnings for February

Reports filed with the Interstate Commerce Commission show that the Class I railroads of the United States had a net operating income in February of \$47,762,600, which, on the basis of their tentative valuation, would be at the annual rate of return of 4.57 per cent, compared with an operating deficit during the same month last year of \$5,176,867. This was short \$14,884,000 of the amount necessary to have enabled the carriers to earn a 6 per cent return. In January their net operating income was \$29,476,000 or at the annual return of 2.69 per cent on their tentative valuation.

Operating revenues amounted to \$401,328,700, a decrease of 1.3 per cent as compared with last year, while operating expenses totaled \$324,423,800, 15.6 per cent below those for February, 1921. Virtually complete reports filed with the commission showed that the railroads in February handled approximately 14 per cent more freight than they did during that month last year.

The carriers in the Eastern district in February had operating revenues of \$204,382,100, an increase of 5 per cent, while their operating expenses totaled \$162,328,700, a reduction of 15.1 per cent. Their net operating income was \$29,535,800 compared with an operating deficit of \$7,627,592 the year before. The net operating income for the month was at the annual rate of return of 7.17 per cent on the tentative valuation, exceeding by \$4,833,000 a 6 per cent return.

The railroads in the Southern district had operating revenues of \$53,024,800, a decrease of 3.6 per cent. Operating expenses totaled \$42,225,800, a reduction of 17.7 per cent, while their net operating income was \$7,048,800, compared with \$466,257 during the previous February. This was at the annual rate of return of 3.98 per cent but \$3,584,630 below a 6 per cent return on their tentative valuation.

With the Green Bay & Western alone missing, the operating revenues for the carriers in the Western district amounted to \$143,921,700, a reduction of 8.2 per cent, while their operating expenses totaled \$119,869,100, a decrease of 15.6 per cent. Their net operating income totaled \$11,177,900 compared with \$1,984,468 in February, 1921. This amount, which is at the annual rate of return of only 2.46 per cent, fell \$16,133,000 short of the amount contemplated to be earned under the transportation act.

Traffic News

The Ann Arbor Railroad resumed its car ferry service between Frankfort, Mich., and Menominee, on April 5.

The Chicago & North Western and the Union Pacific have opened a joint ticket office at 37 Plural street, Council Bluffs, Iowa.

The Great Northern has announced its intention to inaugurate Pullman sleeping car service on its lines next month. Heretofore this company has furnished its own sleeping car equipment.

The Wabash has announced a reduction in fares from Chicago to New York, similar to that of the Erie, effective April 17. The round trip fare will be \$43, with stop-over privileges at Detroit, Buffalo and Niagara Falls.

The Erie has announced a 30 per cent reduction in its round trip fare from Chicago to New York, to be effective April 17. The tickets will be good for one week with certain stop-over privileges. The reduction is from \$61.40 to \$43.

The House committee on interstate and foreign commerce, which recently completed a series of hearings on various bills to require the use of interchangeable mileage books at reduced rates, has postponed any further consideration of these various bills until May 2.

The Chicago & North Western has announced week-end excursion fares from Chicago to points in Central Wisconsin to be effective from May 15 to October 1. The fares will be on a basis of 2.7 cents a mile. Tickets will be valid between Friday and Monday mornings, within 30 days.

The Canadian Pacific has announced a reduction of 5½ cents per 100 lb. on grain to be consumed at destination (domestic consumption) and one cent per 100 lb. on grain for export, applicable between the head of the Great Lakes and points in eastern Canada and eastern United States. The reduction in export rates goes into effect on April 20, and in domestic rates on April 29.

The Spokane, Portland & Seattle has announced that effective May 18, it will establish proportional rates of forest products from Pacific Coast and interior points as shown in tariff 18-D, applicable on traffic destined to the lake ports of Michigan, also to Ohio, Pennsylvania and New York or beyond. The reductions on the various commodities will be as follows: shingles from the coast 5½ cents, and from interior points 4½ cents; fir lumber, from the coast 5½ cents, and from interior 4½ cents.

R. C. Dearborn, whose appointment as chairman of the National Perishable Freight Committee, with headquarters at Chicago, to succeed E. S. Briggs, was announced in the *Railway Age* of March 18, was born in Yorkville, Ill., on August 8, 1877. He became a stenographer on the Michigan Central in 1900 following a period of service in the employ of the North Shore Dispatch and later in the general freight office of the Michigan Central at Chicago. In 1902 he was employed by the Santa Fe Refrigerator Dispatch Company, where he remained for a year, when he became associated with the Fruit Growers' Express, with which company he served until 1907. With its successor, the Pacific Fruit Express, he served as chief clerk and general agent until July 1, 1920, when he was appointed traffic manager, the position he held at the time of his recent appointment.

At the annual meeting of the Chicago Traffic Club, held on March 28, the following officers were elected for the ensuing year: President, J. A. Brough, traffic manager, Crane Company; first vice-president, E. K. Fleming, general agent, Chicago, Burlington & Quincy; second vice-president, C. E. Barnes, warehouse department, Peter Schoenhofen Brewing Company; third vice-president, E. L. Whitney, assistant general freight agent, New York Central; treasurer, R. J. Wallace, traffic manager, Jaques

Manufacturing Company; secretary, E. S. Buckmaster, assistant general agent, American Railway Express, Directors: H. H. Bascom, traffic manager, Steel & Tube Company of America; B. S. Garvey, vice-president of the Illinois Bell Telephone Company; J. F. Coykendall, treasurer, Chicago Great Western; and the retiring president, R. B. Robertson, assistant freight traffic manager, Union Pacific.

To Investigate Western Coal Rates

Considerable dissatisfaction having been manifested against the rates on bituminous coal in the western part of the United States, the Interstate Commerce Commission has concluded to institute an investigation into all such rates from producing points in Montana, Wyoming, Colorado, New Mexico and all states west thereof to destinations in those states and to El Paso, Tex. To afford all interested parties an opportunity to be heard hearings will be held in May at representative points, including Denver, Salt Lake City, Butte, Seattle, San Francisco, Phoenix, and El Paso. In so far as practicable it is desired that rates to points in Colorado be considered at the hearing at Denver, to points in Utah at Salt Lake City, to points in Montana and Idaho at Butte or Salt Lake City, to points in Washington and Oregon at Seattle, to points in Nevada and California at San Francisco, and to points in Arizona and New Mexico at Phoenix or El Paso.

Traffic Statistics for January

Class I railroads in January handled 23,682,356,000 ton-miles of revenue freight, as compared with 26,627,393,000 in January, 1921, according to the Interstate Commerce Commission monthly bulletin of revenue traffic statistics. The average revenue per ton-mile was 1.164 cents as against 1.215 last year and the average haul per road was 198.67 miles as against 188.11. The number of passenger miles for the month was also less than in January last year, 2,698,888,000, as against 3,378,782,000. The average revenue per passenger-mile was 3.102 cents as against 3.114 and the average journey per road 33.21 as against 35.69. The average number of revenue passengers per car was 14.54 as against 17.11.

The number of revenue passenger-miles in commutation service was 511,373,000 and the commutation revenue was \$5,726,063. As indicating how the average revenue and the average journey per passenger were reduced by commutation service and rates, the bulletin shows that the average journey in commutation service was 13.87 miles, while the average in other service was 49.26 miles. The average revenue per passenger-mile in commutation service was 112 cents and in other service 3.565 cents.

Anthracite Shipments—March, 1922

The shipments of anthracite for March, 1922, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,778,667 gross tons, an increase over the preceding month of February of 1,539,653 gross tons, and over the month of March last year of 1,040,896 gross tons.

March, 1922, stands third as a record for that month, shipments in excess of this figure being made during the years when the anthracite industry reached the high water mark, a record of 7,276,777 gross tons being established in March, 1918, and 6,989,075 gross tons in March, 1917.

The total shipments for the coal year ending March 31, 1922, have amounted to 67,039,037 gross tons, as compared with 69,346,731 gross tons shipped during the previous coal year ending March 31, 1921, a decrease of approximately 2,300,000 gross tons. Shipments by originating carriers were as follows:

	March, 1922	March, 1921	Coal Year 1921-1922	Coal Year 1920-1921
P. E. R.	1,372,084	1,018,858	11,319,886	13,952,197
L. V.	1,000,563	1,039,214	11,647,084	12,580,764
C. I. N. & I.	64,1679	540,456	6,632,425	5,674,767
D. T. & W.	1,017,642	1,070,181	10,218,320	10,140,398
D. & H.	909,261	837,644	8,998,519	10,198,735
D. & H.	51,771	131,687	4,927,204	5,840,868
Pennsylvania R. R.	644,497	561,013	6,881,690	6,501,683
Ferri	11,661	144,910	1,548,303	1,999,761
N. Y. O. & W.	4,887	857,988	7,865,798	3,977,666
A. B. S. F.				
	6,778,667	5,777,721	67,039,037	69,346,731

Commission and Court News

Interstate Commerce Commission

The commission has suspended until July 30 the operation of schedules published by the Illinois Central which propose reduced rates on coal from Illinois mines on the Illinois Central to points on the St. Louis Southwestern, the present rates ranging from \$4.00 to \$4.94 per net ton while the proposed rate to all the stations is \$4.45 1/2.

The commission has suspended from April 5 to August 3 the operation of schedules which propose changes in routing of shipments of grain, grain products, cereals and cereal products, carloads, on traffic originating in Colorado, Iowa, Kansas, Missouri, Nebraska, Oklahoma and Wyoming, destined to Arizona, California, Mexico, Nevada, New Mexico, Oregon and Utah.

The Interstate Commerce Commission on April 7, vacated its order advancing intrastate rates in Indiana because the Indiana commission had withdrawn on April 4, its order which had prevented the railroads from making effective as to intrastate rates the increases ordered by the federal commission in Ex-Parte 74, until the federal commission issued the intrastate rate order.

The commission has suspended to August 8, the operation of schedules published by the Chicago & North Western and the Chicago, Milwaukee & St. Paul, which propose new joint and proportional reshipping rates on wheat, corn and other grains from Chicago in connection with those roads to Milwaukee, Wis., thence by car ferry in connection with the Grand Trunk and the Pere Marquette to eastern cities, on both domestic and export traffic, which are the same as the reshipping rates, currently in effect from Chicago, in connection with eastern lines and from Milwaukee, when routing via Chicago, or by car ferry across Lake Michigan.

The Commerce Commission has issued a notice to all railroads saying that for some time it has been receiving very many requests for a waiver of that portion of section 6 of the act, which requires changes in rates to be established on not less than 30 days' notice. Because of the relationships which exist in rates between points and between commodities, the establishment of rates on short notice frequently results in discrimination and necessitates the filing of additional applications. The purpose of the notice is to advise all concerned that the commission will not approve the establishment of changes in rates on less than statutory notice unless carriers make in their applications a substantial showing of an emergency which warrants the waiver of statutory notice, nor will the commission, under any circumstances, approve an application for waiver of statutory notice, which application covers only a portion of an adjustment and gives no heed to similar changes in rates at related points or on related commodities. Administrative ruling No. 58 of tariff circular No. 18-A has been amended in line with the foregoing.

State Commissions

The Public Service Commission of New York has issued an order, to go into effect at once, calling for a reduction in the rates for the transfer of baggage in New York City. The Commission has revised the zones under which the baggage transfer companies have worked for many years and has reduced most of the rates. In the center of the city—Manhattan, south of 59th street—the rate is \$1 for each trunk and 75 cents for each bag. Hitherto the charges have been \$1.25 for a trunk and 90 cents for a bag. On commercial trunks the rate may be 15 cents (each) higher than the scale for ordinary trunks; and on baggage taken by the wagonload of not less than 20 trunks, the rate will be 30 per cent less than the normal tariff. Under the order the Westcott Express Company and the New York Express Company are required to report to the commissioner monthly.

showing the number of pieces of baggage handled in and between the zones with a statement of operating expenses; also withdrawals from and additions to their capital accounts. The order evidently leaves open the question of further and more detailed investigation of the reasonableness of these rates.

Photographs on Commutation Tickets

The New York Public Service Commission holds in the case of Crosby v. New York Central that a requirement that a commutation ticket for exclusive use of the purchaser is valid only when presented with a holder containing the purchaser's photograph and signature is reasonable, not discriminatory and not in violation of the legal tender act as requiring the tender of value in addition to the price of the ticket.—Decided December 14, 1921.

Personnel of Commissions

The Senate on April 11 confirmed the President's appointments of G. W. W. Hanger, J. H. Elliott and A. O. Wharton as members of the Railroad Labor Board for a five-year term.

Charles D. Mahaffie, an attorney in the Law Department of the United States Railroad Administration, with office at Washington, D. C., has been appointed director of the Bureau of Finance of the Interstate Commerce Commission, effective on May 1, succeeding W. A. Colston, who has resigned to become vice-president and general counsel of the New York, Chicago & St. Louis. Mr. Mahaffie is 37 years of age and has been with the Railroad Administration since July 1, 1921, having formerly been solicitor for the Interior Department from 1916 to that date. From 1909 to 1916 he was engaged in the practice of law at Portland, Ore.

Court News

Negligent Cause of Damage to Live

Stock Must Be Proved

The mere fact that hogs, apparently sound when delivered for shipment, arrive at their destination sick with pneumonia, does not raise a presumption that the railroad has been guilty of negligence which caused it. This might have been caused by inherent weakness or infirmity of the animals. Nor is the railroad chargeable with delay in unloading the hogs due to congestion of cars at the stockyards, or other causes beyond its control.—Bragg v. Payne (Mo. App.), 235 S. W., 148.

Cotton Not in Possession of Carrier, as Carrier,

Until Shipping Directions Are Given

Cotton was destroyed by fire after it had been loaded on cars by a compress company at the owner's request. The loading certificate issued by the compress company was held by the owners, who had given no shipping directions and had made no application for bill of lading. In an action by the owners the Circuit Court of Appeals, Fifth Circuit, holds that the defendant railroad was not in possession of the cotton, as a common carrier, and was therefore not liable for its loss.—Harris, Cortner & Co. v. L. & N., 276 Fed. 277.

Defect in Hand Brake Must

Cause Injury to Warrant Recovery

In an action for the death of a man employed by a street railway company to unload coal from cars received from defendant, the Chicago, Burlington & Quincy, who was killed while riding a freight car down a grade on the street railway company's premises, it appeared that, through no fault of the railroad, the car broke away from the engine and the deceased could not stop it by means of the hand brake. The plaintiff claimed the brake was defective, the shoe being worn and the chain knotted. The Minnesota Supreme Court held that, in the absence of evidence that these defects impaired the efficiency of the brake, the trial court properly directed a verdict for the defendant.—Benedict v. Chicago, B. & Q. (Minn.), 186 N. W. 296.

Labor Board Decisions

Switchman Not Always a Baggage-master

Station employees of the Boston & Maine claimed that the term "switchtender" as used in memorandum 16-27 of Railway Board of Adjustment No. 1, means an employee who is assigned to handle a main line or lead switch. The employees contend that certain of their members are devoting four or more hours time to work which is usually assigned to baggage-masters, while still under the pay and classification of a switchtender. The carrier states that while the employees in question do not handle switches for yard engines or freight trains, they do handle one or more main line switches in connection with a terminal where a yard engine is maintained, and therefore, come within the scope of the decision of the Railway Board of Adjustment No. 1 of the United States Railroad Administration. The position of the carrier was sustained.—Decision No. 765.

Watchman Not Entitled to

Overtime for Emergency Work

A crossing watchman on the Acheson, Topeka & Santa Fe was employed on a monthly basis for eight hours daily. For a period of six days he was required to work three hours extra each day on oral instructions received from the station agent and no additional compensation was paid. The employee's representative claimed that he should have been paid under section A-12 of the agreement which specifies that overtime shall be paid on the hourly basis for the ninth and tenth hours and time and one-half for hours in excess of ten. The decision of the board was that this clause was not intended to cover temporary assignments for emergency purposes and decided that the watchman was not entitled to extra compensation for his work. The decision stated further, however, that it is not intended to permit the assignment of employees for any considerable period without payment of overtime.—Decision No. 808.

Brakemen to Receive Baggage-men's Pay

If Any Baggage is Handled

The brakemen on two through passenger trains on the Missouri, Kansas & Texas were required in connection with their other duties to handle a limited amount of baggage carried in the head end of a combination car. These employees made claim for additional pay for this service, after which the duty was transferred to the train porter. The employees then contended that the baggage should be handled by the brakemen and paid for at the rate shown for baggage-men, which at that time was \$4 additional monthly. The carrier stated that the amount of baggage was not enough to justify the employment of a baggage-man and that the train porter could handle it without interfering with his other duties. However, the Labor Board decided that the work of handling baggage on these trains should be paid for at the rate shown for baggage-men and that the practice of having the work performed by trainmen was approved.—Decision No. 772.

Seniority Rights of Signal Maintainers

The Brotherhood of Railroad Signalmen of America brought before the Labor Board the case of a signal maintainer on the Chicago, Burlington & Quincy, who was "bumped" from his position by a supervisor whose position was abolished. It was contended that when the maintainer was hired no mention was made of the position being a temporary one and that because of the fact that the supervisor of signals was considered an official he did not come within the provisions of the signalmen's agreement. The Labor Board decided that the appointment of this man to the position of signal supervisor did not constitute a temporary appointment in this case and that his service with the carrier was not disturbed by such an appointment. It further decided that the man demoted is entitled to the position of signal maintainer by displacing the employee having the least seniority

rights on the seniority district and that the man originally holding the position of maintainer before the supervisor was demoted was entitled to retain his position, provided his position was not that of junior signal maintainer.—*Decision No. 801.*

Right to Close Telegraph Office on Certain Days

In a controversy between the Order of Railroad Telegraphers and the Baltimore & Ohio it developed that in March, 1921, because of light traffic the telegraph office at Cheat Haven, Pa., was closed on a Sunday and a Monday and that at Mount Braddock on a Monday. The employees claimed that no provision was made in the agreement for notifying employees when they are not required to work on week days, which they claim indicated that the carrier did not contemplate suspending an employee on any other days than Sundays and holidays. The carrier contended that to agree to the claim of the employee would guarantee pay for 306 days each calendar year whether employees worked or not and would prohibit reductions in force to meet future fluctuations in business. The claim of the employees was denied.—*Decision No. 789.*

Elevator Men Not Rated As Stowers or Stevedores

Prior to Federal control, the men operating elevators in the freight house of the Michigan Central at Chicago, were rated with stevedores and certain other classes of employees who were paid a differential of one cent an hour over truckers. In the application of Supplement No. 7 to General Order No. 27, this differential was absorbed by the provision of that supplement which fixed a maximum rate of 43 cents per hour for all such classes of employees. The increase of 10 cents per hour provided for the elevator operators in section 5, Article 11, of Decision No. 2, was added to the rate of 43 cents per hour, effective May 1, 1920. The employees state that while they are classed as elevator men, they perform other duties incident to the handling of freight which justifies a differential over truckers, and, inasmuch as they received the same differential as stevedores, etc., prior to federal control, they should receive the increase provided for such classes in paragraph (b) section 8 Article 11 of Decision No. 2. The carrier contends that these employees are classified as elevator men and that their duties consist of operating elevators between the various floors of the freight house and, that they do not perform the other duties mentioned. The contention of the carrier was sustained.—*Decision No. 788.*

Must Reinstatement Employee Discharged

For Alleged Insubordination.

In a case where an assistant division accountant of the Chicago, Milwaukee & St. Paul was dismissed from the service of that road on February 24, 1921, for alleged insubordination caused by his refusing to work overtime in order to make up such work as accumulated during his vacation period, the Labor Board was requested to reinstate the man in question and pay him for the time since lost. The carrier contended that he was granted a vacation with pay from November 19, 1920, to December 3, under a rule which provided that employees would receive vacations with pay with the understanding that the other employees would keep up the work, or that the employees who received vacations with pay, would be required when they returned to make up the work accumulated on their desks without extra compensation. Upon returning from his vacation this assistant division accountant was informed that there was sufficient work to require the overtime performance of his duties, and he thereupon insisted for extra payment for any such overtime work which he might do. He showed an uninterested attitude toward the work and welfare of the service, with the result that certain reports were delayed. The employees state that he did not refuse to work overtime when ordered to do so, and that the reports had not been delayed any more than had been frequently the case in that office. Also, that if overtime was required it should have been ordered from proper authority and that the controversy for overtime payment should be likewise submitted for settlement in accordance with the provision of the clerks' national agreement. The Labor Board has decided that the discipline in the case was not well sustained and ordered the employee reinstated with seniority rights unimpaired, though it denied claim for pay during time since lost.—*Decision No. 734.*

Foreign Railway News

Further Reduction in British Wages

LONDON

A further reduction of 2 shillings a week (about 48 cents at the normal rate of exchange) in the sliding scale wages of the railway workers in Great Britain came in operation on April 1, 1922, owing to the fall in the cost of living index from 99 points in December to 86 points at the present time, both figures representing the increases over the 1914 level.

German Industry and Java

LONDON

It is reported that a German industrial syndicate, the Siemens-Rhine-Elbe-Schuckert Union Works, is erecting a factory in Cheribon, North Java, for the manufacture of rolling stock and steel and iron goods. The works are planned so as to make them independent of the parent company as regards the construction of locomotives, railway carriages, freight cars and wagons, railway bridges, and so forth. The local government has already placed orders for a large number of locomotives and general railway rolling stock.

1922 Budget of Swiss Railways

On January 24, according to Commerce Reports, the Swiss National Assembly passed the 1922 budget for the Swiss Federal Railways, which shows estimated receipts of 412,000,000 francs and estimated expenses of 335,000,000 francs. There is, therefore, a credit balance of 75,000,000 francs, against a smaller balance of 20,000,000 in 1921. The credit balance for 1922 does not cover fixed charges or amortization, which, if included, would turn the favorable balance into a 30,000,000 franc deficit. After approving the budget the National Assembly authorized the Federal Railway Council to raise a loan of 250,000,000 francs.

Turbo-Electric Locomotive Being Tried in England

LONDON

Trials are being made on the London & North Western Railway, England, of a turbo-electric locomotive constructed by Messrs. Armstrong Whitworth & Company, for the Ramsay Condensing Locomotive Company. The engine has a length over all of 69 ft. 7 in. and weighs 130½ long tons, including coal and water. The boiler, which is in front, generates steam at 200-lb. pressure and 300 deg. F. superheat. The main three phase turbo-alternator and the auxiliary exciting turbo-generator are also in the front. The current is taken to four 275 h.p. electric motors, two of which drive the wheels of the front part and two those of the back part or tender. The exhaust steam is conducted to the tender, where it is condensed in a condenser of special construction. The condensed water returns to the hot well and thence to the boiler. The object sought is economy of coal and water.

American Ability to Compete for

Argentine Car Business

Commerce Reports gives some gratifying figures of American ability to compete against foreign bidders on railway equipment in Argentina in spite of adverse exchange rates. On bids for supplying 650 freight cars of 750 millimeter gage the bids were as follows: Belgian, 1,080,000 pesos; American, 1,160,000 pesos; British, 2,000,000 pesos; German, 2,480,000 pesos. The quotations include three years' interest. The American offer is based upon an exchange rate of 1.22 pesos per U. S. dollar, against a par of 1.04—or a disadvantage of 17 per cent. In spite of this fact, however, the American bid was but 7 per cent over the Belgian. Attention is called to the fact that Germany with exchange all in her favor quoted more than double the American price. All of which goes to show our strength in the market, which will become greater if the Argentine peso continues its move to parity with the dollar.

Failure of Soviet Railways Brings Starvation

The number of persons who will survive the famine conditions in stricken Russia is almost wholly dependent on the Russian railways now transporting grain for the American Relief Administration, Secretary Hoover has declared.

During the past thirty days 100,000 tons of seed wheat and foodstuffs have been delivered to seven different ports on the Baltic and Black seas, but only 25,000 tons has been transported over Russia's demoralized rail system.

American relief ships have delivered the seed and foodstuffs to Reval, Riga, Libau and Danzig, on the Baltic, and Novorossisk, Theodosia and Odessa on the Black Sea. From 120,000 to 140,000 additional tons of stuff, according to Mr. Hoover, will be delivered at these same ports during the next thirty days and the prospects are that shipments will continue to pile up at the ports, with very little chance of the Russian railroads being able to transport to the famine area much more than the amount shipped during the last thirty days.

The best shipment in one day into the famine area was 1,400 tons. Normally the Russian railroads to this region should be able to transport 20,000 tons. Mr. Hoover said, attributing the difficulty experienced in handling the grain in Russia to lack of fuel, dilapidated equipment and incompetent management of the railways.

Waterloo Station Completed

Waterloo station, the London passenger terminus of the London & South Western, has just been completed after 20 years spent in building. This station is, according to Modern Transport (London), the largest and probably the best designed in England.

It was in 1900 that authority was secured for undertaking the remodeling of the Waterloo terminal. It was soon discovered that an entire remodeling of the layout would be required. Accordingly, in addition to the rebuilding of existing facilities, 8½ acres of additional lands were taken over and improved.

The completed station has 21 stud-end platforms, varying in



Photo by Kadel & Herbert

The New Memorial Arch, Waterloo Station

length from 531 feet to 860 feet, and all of them giving onto a concourse. In addition, passenger and baggage subways connecting 15 of the platforms are provided beneath the tracks and electric elevators are provided to connect the baggage subways with the platforms. There are ample facilities for the comfort and refreshment of employees and passengers.

One of the features of the station is the arch, erected in memory of the 585 members of the railway's staff who lost their lives in the war. This arch in process of completion is shown in the accompanying illustration.

Equipment and Supplies

Locomotives

THE NORFOLK SOUTHERN contemplates buying 5 locomotives.

THE LONG ISLAND has ordered 6 eight-wheel locomotives from the American Locomotive Company.

THE BOSTON & MAINE is inquiring for 2 Mallet 0-8-8-0 type and 20, 0-8-0 Switching locomotives.

THE ALABAMA GREAT SOUTHERN has ordered 10 Mikado locomotives from the American Locomotive Company.

THE WICHITA FALLS & SOUTHERN has ordered 2 Mogul type locomotives from the Baldwin Locomotive Works.

THE TENNESSEE, COAL, IRON & RAILROAD COMPANY has ordered 4 locomotives from the American Locomotive Company.

THE CINCINNATI, NEW ORLEANS & TEXAS PACIFIC has ordered 10 Mikado type locomotives from the American Locomotive Company.

THE MOBILE & OHIO, which was reported in the *Railway Age* of April 1 as inquiring for 10 Mikado type locomotives, has ordered this equipment from the American Locomotive Company.

THE LOUISVILLE & NASHVILLE has ordered 4 Mikado type and 6, 0-8-0 switching locomotives from the American Locomotive Company, in addition to the 6 Mikados previously reported.

THE TENNESSEE CENTRAL, reported in the *Railway Age* of April 8 as inquiring for from 4 to 6 Mikado type locomotives, has ordered 8 Mikado type locomotives from the American Locomotive Company.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of March 25 as contemplating the purchase of 50 locomotives, has plans drawn for 50 locomotives and will have them built if prices are satisfactory.

THE NEW YORK CENTRAL, reported in the *Railway Age* of March 25 as inquiring for 50, 0-8-0 type switching locomotives, has ordered 40 locomotives from the Lima Locomotive Works and 35 from the American Locomotive Company.

Freight Cars

THE TENNESSEE CENTRAL is inquiring for 350 gondola cars.

THE WABASH is inquiring for 250 hopper car bodies of 50 tons capacity.

THE ATLANTIC SEABOARD DISPATCH is inquiring for 400 refrigerator cars.

THE CHESAPEAKE & OHIO will close bids on April 17 for 1,500 40-ton box cars and 200 40-ton stock cars.

THE SOUTHERN PACIFIC will close bids on April 17 for 2,000 single-sheath automobile cars.

THE KIMBERLY CLARK COMPANY, Neenah, Wis., is inquiring for a small number of coal cars.

THE MISSOURI, KANSAS & TEXAS will close bids on April 25 for 2,000 single-sheath automobile cars.

THE ST. LOUIS SOUTHWESTERN has awarded a contract to the American Car & Foundry Company for repairing 200 cars.

THE SOUTHERN PACIFIC will build 200 double-sheathed box cars of 40-tons capacity in its shops at Los Angeles, Cal.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered 200 sets of underframes and superstructures from the Pullman Company.

THE ELGIN, JOIET & EASTERN has ordered 200 car bodies for 50-ton structural steel side dump cars and 300 car underframes from the J. W. Heggie Company, Joliet, Ill.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of February 25 as inquiring for 100 steel phosphate cars, has ordered this equipment from the Chickasaw Shipbuilding Corporation.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age* of April 8 as contemplating the purchase of 2,000 automobile cars, is asking for bids on this equipment until 12 o'clock noon April 25. These cars are to be of 40 tons capacity.

THE AMERICAN REFRIGERATOR TRANSIT COMPANY, St. Louis, Mo., has awarded a contract to the American Car & Foundry Co. for repairing 200 refrigerator cars at Memphis, Tenn., and also has awarded a contract to the Missouri Pacific for repairing 100 refrigerator cars.

THE LOUISVILLE & NASHVILLE, noted in the *Railway Age* of March 25 as inquiring for 500 all-steel hopper cars, of 55 tons capacity and for 500 to 1,000 composite gondola cars of 50-ton capacity, has ordered 1,000 hopper cars from the Chickasaw Shipbuilding Company and 1,000 all-steel gondola cars from the Cambria Steel Company.

THE CHICAGO & NORTH WESTERN has renewed its inquiry for 2,750 freight cars and will accept bids until noon, April 22, for 1,250 40-ton, single-sheathed steel underframe box cars; 500 40-ton steel under and upperframe stock cars; 500 50-ton steel underframe and wood floor flat cars; 250 40-ton steel underframe and wood upper structure refrigerator cars, with insulated bodies and basket rack ice bunkers, and 250 50-ton steel underframe and composite body gondola cars.

New York Central Orders 16,000 Cars

THE NEW YORK CENTRAL, reported in the *Railway Age* of April 1 as negotiating with the car builders for the purchase of about 16,000 freight cars, has placed orders for 16,000 cars as follows:

Cincinnati Northern	750	40-ton	Box	Am. Car & Fdy. Co.
	750	55-ton	Hopper	Pullman Company.
New York Central	1,000	55-ton	Hopper	Am. Car & Fdy. Co.
	1,000	50-ton	Box	Am. Car & Fdy. Co.
	1,000	50-ton	Box	Standard Steel Car Company.
	1,000	50-ton	U.S. Gond.	Pressed Steel Car Company.
Cleveland, Cincinnati, Chicago & St. Louis	1,000	55-ton	Hopper	Am. Car & Fdy. Co.
	2,000	50-ton	Box	Am. Car & Fdy. Co.
Pittsburgh, McKeesport & Youngstown	1,500	70-ton	Hopper	Pressed Steel Car Company.
	1,000	70-ton	L.S. Gond.	Standard Steel Car Company.
Pittsburgh & Lake Erie	1,500	70-ton	Hopper	Standard Steel Car Company.
	1,000	70-ton	L.S. Gond.	Standard Steel Car Company.
Michigan Central	1,000	50-ton	Box	Standard Steel Car Company.
	500	50-ton	U.S. Gond.	Gen'l. American Car Company.
	500	50-ton	U.S. Gond.	Buffalo Steel Car Company.

Passenger Cars

THE MISSOURI, KANSAS & TEXAS is inquiring for 30 passenger cars.

THE SOUTHERN PACIFIC is rebuilding 23 mail cars in its own shops.

THE CHESAPEAKE & OHIO will close bids on April 22 for 53 passenger train cars.

THE CANADIAN PACIFIC has ordered 50 express refrigerator cars from the Canadian Car & Foundry Co.

THE A. B. C. TRANSIT REFRIGERATOR COMPANY, Chicago, is inquiring for from 100 to 200 40-ton express refrigerator cars.

THE BALTIMORE & OHIO, reported in the *Railway Age* of January 28 as inquiring for 40 coaches, 2 dining cars, 3 combination baggage and mail cars and 5 mail cars, has ordered 50 cars from the Pullman Company.

Iron and Steel

THE NEW YORK CENTRAL has ordered 2,000 tons of rail from the Illinois Steel Company.

THE LONG ISLAND will receive bids until 12 o'clock noon, April 27, for 2,500 tons of rail.

THE UNION PACIFIC has ordered 760 tons of steel to be used for reconstruction of a bridge at Parker, Wash.

THE SOUTHERN PACIFIC will install an electrically operated turntable, 100 ft. in length and weighing 183,000 lb. at Siskiyou, Ore.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will receive bids for its requirements of high speed tool steel for the period from April 1 to June 30.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 140 tons of structural steel from the American Bridge Company, for track elevation work in Chicago.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 10,000 tons of rails, divided as follows: 6,000 tons from the U. S. Steel Corporation; 1,000 tons from the Inland Steel Company; and 3,000 tons from another company. The same company is soon expected to order 2,000 additional tons.

Track Specialties

THE TERMINAL RAILWAY ASSOCIATION of St. Louis is inquiring for 75 track frogs.

THE TEXAS & PACIFIC is inquiring for 50,000 tie plates to be used on 75 and 85-lb. rails.

THE NORTHERN PACIFIC, noted in the *Railway Age* of April 1 as inquiring for 5,000 tons of tie plates, has placed its order with the U. S. Steel Corporation.

Machinery and Tools

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a 15-ton electric traveling crane.

THE WESTERN MARYLAND has placed orders for six machine tools including 2 lathes, 2 shapers, and one radial drill.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for four 20-in. lathes, an emery wheel stand and a boilermaker's flange clamp.

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS have ordered through Mitsui & Co., New York City, 4 locomotive cranes, from the Browning Company, Cleveland, Ohio.

Miscellaneous

THE NEW YORK, NEW HAVEN & HARTFORD will receive bids until 12 o'clock noon April 17, at New Haven, Conn., for its requirements until December 31, 1922, of malleable iron castings.

THE CHILEAN STATE RAILWAYS will open bids on May 10, at Santiago, Chile, for railway equipment, consisting of replacement materials for locomotives, coaches and tenders. The New York City representative, Carlos Schneider, 141 Broadway, is authorized to receive tenders for transmission by cable up to the day previous to the opening of tenders.

Signaling

THE CENTRAL OF NEW JERSEY has contracted with the General Railway Signal Company for the installation of an electric interlocking at Nesquehoning Junction, Pa., a 64-lever machine of the unit lever type. Complete approach and sectional route locking will be provided, also electric lighting of signals and alternating current track circuits. This apparatus will be installed by the signal company.

Supply Trade News

Howard Cook has been appointed vice-president of the Columbia Nut & Bolt Co., Bridgeport, Conn.

E. T. Pelton, vice-president of the Armstrong Steel Castings Company, Huntington, Ind., resigned on April 1.

The George Oldham & Son Company, Baltimore, Md., has opened a Philadelphia, Pa., office at 527 Commercial Trust building.

William E. Dougherty has joined the sales force at the Philadelphia, Pa., office of the Independent Pneumatic Tool Company, Chicago.

The Whiting Corporation, Harvey, Ill., has removed its Chicago sales office from 1245 Marquette building to 945 Monadnock building.

The National Railway Appliance Company has removed its office from 50 East Forty-second street, to suite 3002, Grand Central Terminal, New York City.

Ralph Barstow, sales manager of the Greenfield Tap & Die Corp., Greenfield, Mass., has resigned and Edward Blake, vice-president, has taken over his duties.

The International Filter Company, Chicago, has moved its general offices from the First National Bank building to its works at 333 West Twenty-fifth place.

The Hulson Grate Company, Keokuk, Iowa, has recently established a grate assembling plant at 209 Johnson street, Keokuk, Iowa, to which address it has also moved its general offices.

The Roberts-Pettijohn-Wood Corporation, accounting service, has moved its offices from 20 East Jackson boulevard, Chicago, to 30 Cedar street in that city, where it has recently purchased a building.

Prof. C. C. Williams, professor of civil engineering at the University of Kansas, has been appointed head of the civil engineering department of the University of Illinois, succeeding I. O. Baker retired.

George W. Schalchlin, sales engineer of the Allen-Bradley Company, manufacturers of electrical controller apparatus, Milwaukee, Wis., has been appointed district manager of this company's new office in St. Louis, effective April 10.

S. W. Linheimer, formerly vice-president of the Walter A. Zelnicker Supply Company, St. Louis, Mo., has resigned from that company and has opened offices under his own name, at 428 First National Bank building, Chicago, as a dealer in second hand railroad equipment.

W. A. Van Hook, cost engineer of the Bureau of Valuation of the Interstate Commerce Commission, and formerly assistant district engineer of the Central District of that body, has resigned to become chief engineer of the Roberts-Pettijohn-Wood Corporation of Chicago.

W. C. Ames has been appointed district sales manager of the Sharon Pressed Steel Company, New York, with office at 20 East Jackson boulevard, Chicago, and Ralph E. Phillips has been appointed district sales manager with headquarters at 66 Broadway, New York City.

O. A. Lawrie has been appointed district sales manager in the New England territory with headquarters at Boston, Mass., of the Ohio Brass Company, Mansfield, Ohio. For the past 16 years Mr. Lawrie has been with the American Copper Products Company, Bayway, N. J.

F. Lavis has recently returned to New York from Bolivia where he has been engaged as consulting engineer to the Bolivian government and the Ulen Contracting Corporation

in connection with the railway from Atocha and La Quiaca and other railway projects in that country.

H. H. Roberts, chief engineer of the Franklin Railway Supply Company, New York, has been elected vice-president in charge of engineering; G. L. Winey, secretary, has been elected executive vice-president and G. W. Floyd Coffin, vice-president of the company, has been elected vice-president in charge of production and service.

C. J. McGregor, assistant sales agent of the American Steel & Wire Company, with headquarters at Cleveland, Ohio, has been promoted to sales agent, with headquarters at Buffalo, N. Y., succeeding E. A. Niven, who has been transferred to New York City, and will be succeeded at Cleveland by P. B. Gilroy, who has been transferred from the Detroit office. Mr. McGregor has been in the service of this company for 20 years, first traveling in the New England territory for a period of 12 years, after which he was transferred to the Chicago, Ill., and Milwaukee, Wis., districts, where he remained for a year and eight months. He was made assistant sales agent at Cleveland in 1915, which position he was holding at the time of his recent promotion.

The Replogle Steel Company, Wharton, N. J., has acquired the property of the Empire Steel & Iron Company, Oxford, N. J. This addition to the Replogle Company has increased its pig iron production capacity 250,000 tons a year, bringing its total producing capacity to 600,000 tons and it has secured a controlling interest in the Mount Hope Mineral Railroad. It already owned the Wharton & Northern Railroad. The Replogle company is contemplating an early resumption of operation at its new furnaces at Wharton, N. J., and Catsauqua, Pa., where a large furnace has recently been modernized. J. Leonard Replogle, chairman of the board of Replogle Steel will remain in that capacity and Leonard Peckett, president of the Empire Steel & Iron Company, will be elected president of the Replogle Steel Company.

Obituary

Knox Taylor, since 1910 president of the Taylor-Wharton Iron & Steel Company, High Bridge, N. J., died at his home in High Bridge, on April 4. He was born at High Bridge on



Knox Taylor

October 19, 1873, and was graduated from Princeton University with the degree of bachelor of science in 1895. In January, 1902, he entered the service of the Taylor Iron & Steel Co. and worked up through various departments in the foundry and the old wheel shop until he became general manager in October, 1905. The High Bridge plant had been engaged in the production of manganese steel since 1892, under license of the Hadfield patents.

In 1912 the company purchased all the interests of William Whar-

ton, Jr. & Co., Inc., of Philadelphia, and its subsidiary, the Philadelphia Roll & Machine Co. The Wharton Company had originated the application of manganese steel in track work in co-operation with the old Taylor Iron & Steel Company, and the new combination became known as the Taylor-Wharton Iron & Steel Company. In 1913 the company also bought out the interests of the Tioga Iron & Steel Company, Philadelphia. During the war, Mr. Taylor, in addition to the work of his company's own contracts for gun forgings, helped supply railway track material for the American Expeditionary Forces. Mr. Taylor was a vice-president of the Railway Business Association and a member of many clubs.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has authorized the construction of a brick combined freight and passenger station and the making of necessary track changes at Lyons, Kan. It has also begun the construction of a 7½-mile extension north-east from a point on its main line between Apperson and Burbank into the Hickman oil fields.

BALTIMORE & OHIO.—This company has awarded a contract to the Empire Engineering Company, Baltimore, Md., for the grading and masonry work on the ventilating plant on tunnel No. 1 at Ocean, W. Va. The contract for the motors and fans has been awarded to the B. F. Sturtevant Company, Washington, D. C. and the installation of the nozzle ducts and the housing of the equipment to the Virginia Bridge & Iron Works, Roanoke, Va.

CANADIAN PACIFIC.—This company has a location party in the field running surveys northwest from Tuffnell, Saskatchewan, to Wadena and north from Wadena to the North Saskatchewan river in contemplation of completing a line started 15 years ago.

CHICAGO & NORTH WESTERN.—This company will receive bids until April 20 for the construction of a 450-ton mechanical coal-station and ash handling facilities at Chicago avenue, Chicago, the construction of which will involve an expenditure of approximately \$100,000.

CHICAGO, BURLINGTON & QUINCY.—This company closed bids on April 13 for the construction of a 20 ft. by 60 ft. frame station at Pattensburg, Mo.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to the Thompson Black Company, Chicago, for the superstructure of its new inbound freight terminal at Chicago, this terminal to consist of a five-story building to form a part of the Chicago Union Station development.

CHICAGO UNION STATION.—This company has awarded to the Mellon-Stuart Company, Chicago, a contract for track slabs for the new station project and will close bids next week for foundations for a hoiler plant and for a retaining wall along Canal street; and also for the construction of a concrete tunnel to be used in conjunction with the boiler house.

ILLINOIS CENTRAL.—This company which was noted in the *Railway Age* of March 4 as accepting bids for work incident to the construction of a third track from Matteson to Kankakee, Ills., a distance of approximately 25 miles and which was noted in the March 18 issue as awarding a contract to M. L. Windham, Centralia, Ills., for work between Kankakee and Tucker, has awarded a contract to the Walsh Construction Company, Davenport, Ills., for the work from Peotone to Matteson. The Bates & Rogers Company, Chicago, will do all masonry work in the vicinity of Matteson, including the extension of box culverts, the erection of overhead bridges over the Elgin, Joliet & Eastern and the construction of subways incident to grade separation work.

MISSOURI PACIFIC.—This company closed bids on April 14 for the construction of a pumping plant, reservoir and treating plant at Hoisington, Kan. The work to involve an expenditure of approximately \$250,000.

NORFOLK & WESTERN.—This company has awarded a contract to H. M. Waugh, Bluefield, W. Va., for the construction of a line 1.5 miles in length from Lamberts Point to Atlantic City, Va. The work involves the laying of 7,900 ft. of main line track and 1,800 ft. of spur tracks and sidings.

SOUTHERN PACIFIC.—This company has made definite plans for the rebuilding of timber preservation plants at Wilmington and Oakland, Cal., the plant at Wilmington to have 4 retorts, each 6 ft. in diameter and from 117 to 132 ft. long with two operating tanks of a total capacity of 62,000 gal., storage tanks of 31,000 gal. capacity and an annual treating capacity of 673,000 ties. The plant at Oakland will have 3 retorts, each 18 ft. in diameter and 132 ft. long, with adzing and tie boring machines, 3 operating

tanks having a total capacity of 195,000 gal., storage yards for 350,000 ties served by a 20-ton locomotive crane and an annual treating capacity of 7,500,000 board ft. of timber and 384,000 ties by the Reuping process as well as capacity for 625,000 ft. of piling by the dipping process. John D. Isaacs, consulting engineer, Southern Pacific, New York, is handling this work.

ST. LOUIS-SAN FRANCISCO.—This company has awarded a contract for a new hospital building to be erected at Springfield, Mo., at a cost of approximately \$800,000 to the William McDonald Construction Co., St. Louis.

NEW YORK CENTRAL.—This company has awarded a contract to the McClintic-Marshall Company, Pittsburgh, Pa., for the 23,000 tons of steel work for the Castleton bridge over the Hudson river.

PHILADELPHIA & READING.—This company has awarded a contract for the filling in of the Ringtown, Pa., viaduct. About 1,000,000 yards of dirt will have to be handled. A contract has been awarded to Bennett & Randall, Lebanon, Pa., for rebuilding a stone arch bridge north of Reading, Pa. This road is also contemplating the installation shortly of an interlocking plant and automatic block signals in connection with the completion of the Harrisburg bridge.

TUCKASEEGEE & SOUTHEASTERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line from Sylva to Blackwood, Jackson County, N. C., and also for authority to issue \$300,000 of capital stock.

Pennsylvania to Spend \$8,000,000 at Pittsburgh

The Pennsylvania Railroad has authorized the expenditure of \$8,000,000 for improvements in the vicinity of Pittsburgh, Pa., as announced in last week's issue of the *Railway Age*. The expenditure forms a part of a general program of improvement work on the Central region which the company expects to carry out, step by step, in succeeding years. Little other work except as noted below has been authorized as yet. The various projects included in the Pittsburgh authorization are as follows:

At Pitcairn, 12 additional stalls of the reinforced pre-cast concrete type with drop pits and other facilities will be added to the existing facilities, making a full 34-stall house. The old 100-ft. turntable will be removed and the stalls connected up to a 110 ft. turntable now in place. The estimated cost of this work is about \$380,000.

At the Sharpsburg yard, additional running and yard tracks will be constructed and present tracks and layout consolidated to form one unit of a final yard development at that location. A part of this work will include two main freight running tracks from Etna to Aspinwall. The estimated cost is \$776,000.

The line from the west end of the Sharpsburg yard (Etna) will be extended to Thirtieth street, a distance of about three miles, at a cost of about \$713,000. This forms an extension of the four track system and will require the construction of two additional main tracks and the rearrangement of the existing tracks.

The construction of the Kenwood to Rochester low grade line on which work was suspended in 1921 will be resumed and about \$1,623,000 expended. This line will be two tracks from Kenwood Junction, Pa., along the Beaver river to West Rochester, Pa., and will have a maximum grade of 0.3 per cent compensated.

Two other items of improvement work, regarding which the exact location and details have not been announced as yet, include about one and one-half miles of heavy grade elevation and crossing elimination work to cost about \$2,365,000; and the enlargement and improvement of a yard and the construction of additional connecting tracks at a cost of nearly \$2,000,000.

Bids have been closed on other work not included in the \$8,000,000 authorization mentioned above as follows: A through truss overhead, highway bridge with a span of 108 ft. 6 in.; flanked by concrete viaduct approaches, at an estimated cost of about \$62,000, and a half through girder bridge, 84-ft. 2-in. span with concrete viaduct approaches, at an estimated cost of about \$77,000. In addition there are six more highway bridges to be constructed, the details of which are not as yet available.

Railway Financial News

Dividends:		
7 per cent preferred.....	2,059,547	2,059,547
6 per cent preferred.....	1,506,148	1,507,938
Total dividends.....	3,567,695	3,567,485
Balance surplus (carried to profit and loss)	2,212,564	1,095,670

FORT WORTH & DENVER CITY.—*Asks Authority to Issue Equipment Trusts.*—This company has applied to the Interstate Commerce Commission for authority for the issuance of \$750,000 of equipment trust certificates.

ILLINOIS CENTRAL.—*Authorized to Execute Equipment Agreement.*—The Interstate Commerce Commission has authorized the execution of an agreement for the lease and purchase of 650 refrigerator cars from the Pullman Company at an estimated cost of \$1,748,500.

MISSOURI & NORTH ARKANSAS RAILWAY.—*New Company.*—This company has been granted a 50-year charter by the State Board of Railway Incorporation of Arkansas. The new company was organized to take over the lines of the defunct Missouri & North Arkansas Railroad, operating from Joplin, Mo., to Helena, Ark., a distance of 368 miles. The road will be sold at a receiver's sale to be held in St. Louis, Mo., on April 10, and it has been stated that it will again be in operation by May 1. The new company has been capitalized at \$3,000,000, divided into 30,000 shares of \$100 each. In addition to the capital stock, the Interstate Commerce Commission authorized a federal loan of \$350,000 to any new corporation formed to take over the road, provided it is capitalized at not less than \$3,000,000. The former company's indebtedness, \$2,062,750, will be assumed by the new owners.

Asks Authority to Issue Securities.—Application has been made to the Interstate Commerce Commission for authority to issue securities for the purpose of taking over the property of that company in accordance with conditions proposed by the Commission in connection with a loan of \$3,500,000 from the government. It is proposed to issue \$3,000,000 of common stock to the holders of the receiver's certificates to the amount of about \$2,000,000 who propose to secure the payment of \$50,000 additional working capital and \$60,000 to provide competent supervision and operation of the property, and a 6 per cent first mortgage bond for \$5,000,000 to be given as security for the government loan.

MISSOURI & NORTH ARKANSAS.—*Application for Loan Approved.*—The Interstate Commerce Commission has certified its approval of a loan of \$3,500,000 to this company to meet maturing indebtedness, conditioned on the carrying out of a plan of reorganization in accordance with suggestions made by the commission. Application for authority to issue securities on this plan was filed recently.

NEW YORK CENTRAL.—*Bond Sale.*—A syndicate headed by J. P. Morgan & Co. has sold \$60,000,000 90-year 5 per cent refunding and improvement mortgage bonds at 94 3/4. The proceeds are to be used to liquidate 6 per cent notes and other indebtedness to the director general of railroads, to reimburse the treasury for expenditures, and to pay and refund bonds of affiliated companies. The issue has been authorized by the Interstate Commerce Commission.

NEW YORK, NEW HAVEN & HARTFORD.—*Annual Report.*—The annual report issued this week shows a corporate income account for the year ending December 31, 1921 as follows:

	1921	1920
Railway operating revenues:		
Freight.....	\$53,593,929	\$55,348,919
Passenger.....	50,934,294	52,270,794
Total railway operating revenues.....	116,405,233	123,512,310
Railway operating expenses:		
Maintenance of way and structures.....	20,655,931	20,654,480
Maintenance of equipment.....	27,244,576	30,438,181
Traffic.....	728,599	756,798
Transportation—rail line.....	54,728,204	67,723,626
General.....	4,061,645	4,402,602
Total railway operating expenses.....	106,402,295	126,346,384
Net revenue from railway operations.....	10,002,938	def. 2,834,073
Railway tax accruals.....	4,443,275	4,500,175
Railway operating income.....	5,559,663	def. 7,349,938
Total non-operating income.....	7,465,815	7,926,145
Gross income.....	12,979,756	576,210
Interest on funded debt.....	13,883,311	10,341,382
Total deductions from gross income.....	28,306,391	27,996,235
Net income, excluding government guaran- tees (see note).....	def. 15,326,635	def. 27,420,025
Government guarantees (see note), credit.....	1,205,012	22,798,519
Net corporate income.....	def. 14,121,623	def. 4,621,506

Note—Government guarantees in 1920 included United States Railroad Administration operations and standard return for January and February, 1920, and guarantees under Transportation Act six months ending August 31, 1920. The figures shown against this item in 1921 cover lap-over items audited during the year but applying to the federal control or guaranty periods.

BALTIMORE & OHIO.—*Authorized to Abandon Branch Lines.*—The Interstate Commerce Commission has issued certificates authorizing the abandonment of 2.76 miles of the Magnolia branch, and the Pigeon Run branch, 7.31 miles, in Ohio.

BOSTON & MAINE.—*Annual Report.*—See article on another page of this issue entitled "Boston & Maine Has 1921 Deficit of \$7,348,086."

Opposes New Haven Directors.—There was no election of directors at the annual meeting on April 12 owing to the controversy which has arisen among certain groups of stockholders over the attempt of the New York, New Haven & Hartford to place a representation on the directorate. A hearing had been scheduled for April 8 in the District Court of the Southern District of New York on the New York, New Haven & Hartford's petition for a modification in the decree of 1914, so as to enable the New Haven to secure a representation on the Boston & Maine directorate proportionate to the Holding Company's voting rights, but this hearing was postponed until May 12.

Owing to this move by the New Haven there developed a sharp contest for proxies to be used at the annual meeting. One group of stockholders asking for proxies to run to Charles F. Adams, Philip Dexter and E. Sohler Welch, sent the following communication to holders of Boston & Maine first preferred and preferred shares:

There is no apparent reason which might now lead the preferred shareholders of the Boston & Maine to think that the nominees which the New Haven seeks to place on their board could devise means which would produce either the credit or the earnings which the Boston & Maine needs before the preferred dividends can be resumed. On the contrary, the preferred shareholders are bound to feel that this action of the New Haven is intended in its own interest.

The voting strength of the first preferred and preferred shares is nearly double that of the New Haven shares held by the trustees. These preferred shares, however, are widely distributed and have had no opportunity for concerted action since the reorganization. There was perhaps no occasion for such action so long as the New Haven needs before the preferred dividends should be voted in the sound discretion of trustees charged by the terms of the decree with a public interest, and in whom other shareholders of all classes felt a justified confidence.

The attempt of the New Haven, whether it be successful or not, shows that the preferred shareholders can no longer rest safely in this position, and that the time has come for them to look to their own interests.

Another group to bid for proxies was the Boston & Maine Stockholders' Protective Association. President Edward F. Brown of that organization strongly attacked the motive of the other group and asked for proxies for Edmund D. Codman.

BUFFALO, ROCHESTER & PITTSBURGH.—*Authorized to Draw Down Bonds.*—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of \$4,269,000 of consolidated mortgage bonds. The company had applied for authority to issue 8,351,000 of bonds, but inasmuch as it did not desire to dispose of them at the present time the authority was limited to the bonds which the applicant is entitled to draw down at this time under its consolidated mortgage.

CHICAGO, ROCK ISLAND & PACIFIC.—*Annual Report.*—The corporate income account for the year ended December 31, 1921, as shown by the annual report issued this week, follows:

	1921	1920
Operating revenues:		
Freight.....	\$99,000,440	\$94,973,798
Passenger.....	30,579,092	34,648,808
Total railway operating revenues.....	139,272,024	142,026,152
Operating expenses:		
Maintenance of way and structures.....	20,790,435	26,238,501
Maintenance of equipment.....	23,852,510	34,648,808
Traffic.....	2,235,114	1,841,026
Transportation.....	57,637,630	64,997,585
General.....	3,095,134	3,452,893
Total railway operating expenses.....	117,611,209	131,178,813
Net revenue from railway operations.....	26,318,967	10,327,444
Railway tax accruals.....	5,663,722	5,660,560
Railway operating income.....	20,654,009	4,656,556
Total other income.....	5,780,259	17,811,269
Total income.....	23,051,831	6,637,825
Interest on funded and unfunded debt.....	10,876,198	10,952,618
Total deductions.....	17,271,572	14,769,719
Net income.....	5,780,259	def. 8,131,894
Estimated government guaranty.....		23,028,100
Additional needed to earn standard return.....		133,025,100
Balance of income.....	5,780,259	4,663,155

Asks Authority to Abandon Line.—The New York, New Haven & Hartford has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of 1.52 miles of track and of other railroad facilities at Saybrook Point, Conn.

Asks for Representation on B. & M. Board.—See Boston & Maine.

NEW YORK, ONTARIO & WESTERN.—Annual Report.—The annual report issued this week shows the following income account for the year 1921:

	1921	1920
Operating revenues	\$14,127,867	.....
Operating expenses	12,067,086	.....
Net from railway operations	2,060,781	.....
Tax accruals	449,215	.....
Operating income	1,603,349	.....
Non-operating income	761,813	.....
Gross income	2,365,163	2,378,815
Deductions from gross income	1,728,703	1,523,477
Net income	636,550	855,339
Less expenses prior to January 1, 1918, settled through federal accounts	.....	49,449
Balance carried to profit and loss account	636,550	805,890

For the purpose of comparison, the following details of revenues and expenses show for 1920 the combined figures of the corporation, March 1 to December 31, inclusive, and those of the United States Railroad Administration for January and February:

OPERATING REVENUES			
	1921	1920	
Merchandise freight	\$3,220,694	\$3,115,005	
Coal freight	5,498,964	4,885,788	
Milk	179,616	1,167,535	
Passenger	3,421,743	3,098,508	
Total, including other	\$14,127,867	\$13,154,689	
OPERATING EXPENSES			
	1921	1920	
Maintenance of way and structures	\$2,291,227	\$2,249,094	
Maintenance of Equipment	3,194,650	3,449,277	
Traffic	1,457,718	1,457,718	
Transportation	6,025,267	6,484,478	
General	376,706	355,750	
Total operating expenses	\$12,067,086	\$12,684,317	
Net revenue from railway operation	2,060,781	470,372	
Railway tax accruals	449,215	457,040	
Total railway operating income	\$1,603,349	\$10,714	
PASSENGER TRAFFIC			
	1921	1920	
Number of revenue passengers carried	1,645,586	1,925,897	
Number of passengers carried one mile	95,065,432	98,911,515	
Average distance carried	57.77	51.36	
Average receipts per passenger per mile	\$0.360	\$0.313	
MILK TRAFFIC			
	1921	1920	
Number of tons carried of milk earning revenue	148,623	152,835	
Number of tons carried one mile	28,607,128	27,131,032	
Average haul of one ton	192.48	177.52	
Average receipts per ton per mile	\$0.457	\$0.430	
FREIGHT TRAFFIC			
	1921	1920	
Number of revenue tons carried	4,944,135	5,279,972	
Number of tons carried one mile	669,994,265	691,073,698	
Average distance haul of one ton	135.51	130.89	
Average receipts per ton per mile	\$0.310	\$0.116	

NORTHERN PACIFIC.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue so many of its 5 per cent refunding and improvement mortgage bonds maturing July 1, 2047, as may be necessary to pay off joint Great Northern-Northern Pacific 6½ per cent bonds which may be turned in for payment in cash after being called for redemption under the provisions of the joint indenture securing them. Of the issue of \$230,000,000 of joint 6½ per cent bonds, \$115,000,000 have already been converted into Great Northern bonds and about \$11,000,000 have been converted into Northern Pacific 6 per cent refunding and improvement mortgage bonds, leaving the Northern Pacific liable for \$104,000,000 of the joint bonds outstanding. It appears to the Northern Pacific that it can bring about a large reduction in its future interest payments by calling for redemption as soon as possible all outstanding 6½ per cent joint bonds at 103½. Holders of the bonds have the right to convert into 6 per cent bonds, which would reduce the interest by ½ per cent, but the company believes that the holders of a large amount of the joint bonds will take cash instead of converting them. It has received from J. P. Morgan & Co. and the First National Bank a proposal to purchase 5 per cent bonds at 90 and interest to whatever amount may be required to furnish the cash to retire the joint bonds, providing authority for the entire transaction is obtained from the commission.

Directors Resign.—F. M. Willis, assistant secretary and assistant treasurer of the Northern Pacific, and E. A. Gay, secretary of the company, have been elected directors to succeed James N. Hill and Thomas W. Lamont, resigned. Mr. Lamont, of J. P. Morgan & Co., has resigned as a director because his firm will float the issue of new proposed 5½ per cent bonds, which the company will offer in exchange for the joint 6½ per cent bonds, issued jointly with the Great Northern last summer.

Restoration of 7 Per Cent Dividends.—Howard Elliott, chairman of the board, in reply to a stockholder who asked when the restoration of dividends at the former annual rate of 7 per cent might be looked for, said:

In 1921, because of the large extra dividend, the Northern Pacific received from the Burlington \$13,000,000 more than it will receive from that company this year. This extra dividend enables the Northern Pacific, as is shown by the annual report, to meet its interest charges and to pay the full 7 per cent on the stock.

At the recent meeting of directors, at which the dividend was reduced, it was decided that it would not be conservative, in view of the prevailing conditions and uncertainties, to pay the full rate. I cannot say when it will be restored, but at that time the board hoped that business would resume next Autumn to such an extent as to justify that action.

The returns on the Northern Pacific for the first three months of this year were discouraging. Business is better, but there are still many elements of uncertainty. The pay of our employees has been cut to the bone, and no further reduction can be made unless the Railroad Labor Board gives relief as to the units of wages.

OREGON TRUNK.—Asks Authority to Abandon Line.—This company has applied to the Interstate Commerce Commission for authority to abandon its line between South Junction and Metolins, Or., 28.9 miles, because it is paralleled by the Central Oregon branch of the Oregon-Washington Railroad & Navigation Company and the two companies have entered into an agreement for the joint use of the latter's track.

ULSTER & DELAWARE.—Guaranty Certified.—The Interstate Commerce Commission has issued a final certificate stating the amount of this company's guaranty for the six months following federal control at \$314,250, of which the balance due was \$69,450.

UNION PACIFIC.—New Directors.—Newcomb Carlton and Paul M. Warburg have been elected directors to succeed Otto H. Kahn and Mortimer L. Schiff, who resigned December 1 in accordance with the Interstate Commerce Commission's ruling against interlocking directorates.

VIRGINIAN.—Authorized to Issue Bonds.—This company has been authorized to issue \$1,590,000 5 per cent, first mortgage, 50-year gold bonds to be pledged as part collateral security for a 6 per cent promissory note of \$2,000,000 to be issued to the director general of railroads.

WEST JERSEY & SEASHORE.—Annual Report.—The annual report issued Wednesday shows an income account for December 31, 1921, as follows:

	1921	*1920
Total operating revenues	\$12,929,706	\$12,476,036
Total operating expenses	11,683,649	11,995,283
Net revenue from railway operations	1,246,058	480,753
Railway tax accruals	711,611	473,848
Railway operating income	534,779	6,654
Net railway operating income	286,636	Def. 301,282
Total non-operating income	318,439	281,960
Gross income	605,075	140,102
Total deductions from gross income	414,547	503,801
Net income	190,528	Def. 363,699
Appropriations in sinking fund	103,045	99,445
Balance transferred to credit of profit and loss	87,483	463,144

*Operating results March 1 to December 31, 1920.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Lehigh & New England	\$675,000
Ogden Union Railway & Depot Company	15,000

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Trend of Railway Stock and Bonds Prices

	Last April 11	Last Week	Last Year
Average price of 20 representative railway stocks, close of business	64.27	62.03	53.42
Average price of 20 representative railway bonds, close of business	84.54	83.83	73.78

Railway Officers

Financial, Legal and Accounting

C. L. Snyder has been appointed assistant auditor of disbursements of the Philadelphia & Reading, succeeding **W. K. Bean**, assigned to other duties.

Operating

S. A. Johnson, general superintendent of the St. Paul Bridge & Terminal, having resigned, the position has been abolished.

H. D. Green, division superintendent of the Cleveland division of the Baltimore & Ohio until its consolidation with the New Castle division as announced in the *Railway Age* of April 1 has been appointed general agent with headquarters at Cleveland, Ohio.

T. R. Baird has been promoted to district supervisor of transportation of the Southern district of the Southern Pacific at Los Angeles, succeeding **L. P. Hopkins** who has been promoted to trainmaster of the Salt Lake division in place of **W. H. McBean**. Mr. McBean has been promoted to assistant superintendent of the Tucson division at Tucson, Ariz., succeeding **A. E. Brown**, deceased.

Mechanical

J. P. Puette has been appointed supervisor of electric appliances, New York Central, lines west of Buffalo, with headquarters at Cleveland, Ohio. Mr. Puette was born near

Lenoir, N. C., and was educated in public and private schools of that section. He entered the service of the Ashville Street Railway Company, Ashville, N. C., in 1896. He remained with this company for a period of two years, 1896-1897. The next two years were spent with the Whiting Lumber Company, Elizabethtown, Tenn., and the following year and a half, 1900-1902, with the Pittsburgh Railway Company, Pittsburgh, Pa. The following year he was in the employ of the Variety Iron & Steel Company, Cleveland, Ohio. In the fall of 1903, Mr. Puette entered the service of the Lake Shore & Michigan Southern as an electrician at Collinwood, Ohio, and held this position until January, 1908, at which time he was transferred to Chicago as foreman electrician of car lighting, holding this position until May, 1910, when he was transferred to Collinwood, Ohio, as general foreman electrician of car lighting. In February, 1913, he was transferred to the General Office Building, Cleveland, Ohio, as assistant to the supervisor of electrical appliances in this position until the time of his recent promotion.



J. P. Puette

Traffic

T. L. Darneal has been appointed district freight and passenger agent of the Missouri, Kansas & Texas with headquarters at Denver, Colo.

W. E. Bock has been appointed district freight and passenger agent of the Missouri, Kansas & Texas with headquarters at Seattle, Wash.

B. M. Croll has been appointed general agent, freight department, of the Philadelphia & Reading with headquarters at New York City. **I. L. Fish** has been appointed assistant general agent with the same headquarters.

Roy Pearce, special representative of the Passenger Department of the Chicago & Alton with headquarters at Chicago, has been promoted to general agent, passenger department, with the same headquarters, to succeed **Harry K. McEvoy**, resigned to engage in other business.

William Pugh, whose appointment as assistant general freight agent of the Buffalo, Rochester & Pittsburgh was announced in the *Railway Age* of April 8, page 900, was



Wm. Pugh

born in England on August 22, 1871. He was educated at a boarding school in England, at the Highbury School, London, and at the night sessions of Central High School, Rochester, N. Y. In May, 1889, he entered the service of the Buffalo, Rochester & Pittsburgh as a messenger in the accounting department. Later he became a clerk in the ticket auditing department and was later transferred to the freight auditing department. He served in the claim department for more than a year

and was then appointed assistant paymaster, which position he occupied for two years, when he was assigned to the position of rate revision clerk. He held this position for six years and was then appointed chief clerk in the freight auditing department. Seven years later he became a rate clerk in the freight department and, two years later, was promoted to chief clerk in the department, which position he held at the time of his promotion as above noted.

J. R. Holcomb has been promoted to Pacific Coast agent of the Toledo, St. Louis & Western with headquarters at Los Angeles, Cal., where he will assume the duties of **W. H. Andrew**, general agent who has resigned, the office of general agent at San Francisco having been abolished.

Fred Wight, city passenger agent of the Chicago, Great Western at St. Paul, Minn., has been promoted to general agent, passenger department, with headquarters at Des Moines, Iowa, to succeed **W. L. Feeley**, who has been transferred to Minneapolis, Minn., succeeding **J. D. Elmer**, resigned.

A. W. Noyes, general traveling passenger agent of the Chicago Great Western, with headquarters at Chicago, has been promoted to assistant general passenger agent with the same headquarters. **Fred White**, division freight and passenger agent at St. Paul, Minn., has been appointed city passenger agent at St. Paul to succeed **Warren L. Seeley**, who has been promoted to general agent, passenger department, at Des Moines, Iowa, in place of **C. D. Fisher**, assistant general passenger agent at Des Moines, who has been appointed general agent, passenger department, at Minneapolis, Minn., to succeed **J. D. Elmer**, resigned to engage in other business, the offices of assistant general passenger agent at Des Moines and Minneapolis having been abandoned.

Eugene B. Finegan, who has been promoted to general freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, to relieve **T. W. Proctor**, also general freight agent, of duties incident to management of the general office and of handling tariffs, rates divisions, etc., in all territory east of Moberge, S. D., was born at Iron Ridge, Wis., November 16, 1880. He entered railway service in December, 1899, as an assistant in the car shops of the Chicago, St. Paul, Minneapolis & Omaha at Hudson, Wis., where he remained until February, 1903, when he became a stenographer

and clerk in the office of the general agent of the Great Northern at St. Paul. In May, 1904, he was employed in a similar capacity in the office of the commercial agent of the Chicago, Milwaukee & St. Paul at St. Paul and continued in this work until November, 1906, when he was transferred to Chicago as chief clerk to the assistant general freight agent of the same road. Thereafter he was successively chief clerk to the general freight agent, chief clerk to the freight traffic manager and chief clerk to the vice-president until April, 1916, when he was promoted to chief of the tariff bureau. In February, 1917, he was promoted to assistant general freight agent, with the same headquarters, and continued in this capacity until his recent promotion to general freight agent.

Engineering, Maintenance of Way and Signaling

G. W. Rear, general bridge inspector of the Southern Pacific, with headquarters at San Francisco, Cal., who was recently given the newly created title of engineer of bridges, as announced in the *Railway Age* of April 1, was born in Ontario on June 13, 1873, and attended the Campbellford Collegiate Institute from 1886 to 1889, when he entered the engineering department of the Midland Railway of Canada as a student. He held various positions in this department on the Midland until its acquisition by the Grand Trunk in 1894 and continued in similar positions with the latter company until 1901, when he became connected with the Southern Pacific. His first work on this road was in steel bridge erection, in which service he was employed until April 1, 1902, when he became assistant general bridge inspector. He served in this capacity until August 15, 1905, when he was promoted to general bridge inspector, with duties similar to those of engineer of bridges, his new position.

Elmer Irving, division engineer of the Pennsylvania Railroad with headquarters at Harrisburg, Pa., has been promoted to engineer maintenance of way with headquarters at Williamsport, Pa., succeeding C. H. Niemeyer, deceased. Mr. Irving was born at Trenton, N. J., on January 4, 1878, and entered the services of the Pennsylvania as a rodman in the office of the assistant engineer in New York on June 15, 1895. Later he enrolled in Cooper Institute and was graduated from that institution in 1900. On July 20, 1901, he was promoted to drafterman on the New York division and on April 25, 1902, he was advanced to the position of trainman under the principal assistant engineer at Albany, Pa. On January 1, 1903, he was promoted to assistant supervisor of the West Jersey & Delaware Valley division at Haddonfield, N. J., being subsequently transferred in that capacity to New Lorenz, Pa., on January 15, 1904. On August 1, 1905, he was promoted



Geo. Rear



Elmer Irving

to supervisor of track with headquarters at Osceola Mills, Pa., being transferred to Earnest, Pa., on December 1, 1908, and to Lancaster, Pa., in 1912. On September 28, 1916, Mr. Irving was promoted to division engineer on the Trenton division with headquarters at Camden, N. J., serving at this point until May 26, 1918, when he was transferred to the Philadelphia division with headquarters at Harrisburg, Pa., where he was located at the time of his recent promotion.

W. R. Triem has been appointed assistant division engineer of the Logansport division of the Pennsylvania.

Purchasing and Stores

H. H. Disher has been appointed purchasing agent of the Toronto, Hamilton & Buffalo Railway and of the Toronto, Hamilton & Buffalo Navigation Company, succeeding **G. W. Holmes**, resigned on account of ill health.

Obituary

J. H. Campbell, treasurer of the Interborough Rapid Transit Company, New York, died at Garden City, Long Island, on April 5.

John D. Smith, retired superintendent of telegraph of the Canadian Pacific, died in Chicago on April 7 from heart failure.

John W. Midgley, whose death in Chicago on April 4 was announced in the *Railway Age* of April 8, was born in Leeds, England, on September 24, 1843, and entered railway service in 1868 as a stenographic secretary to the general superintendent of the Illinois Central at Chicago. After serving in this capacity for three years he became stenographic secretary to the president and from 1872 to 1876 was employed in similar positions in the office of the president, general manager and general solicitor of the Chicago & North Western. In 1876 he became the secretary of the South Western Railroad Rate Association, in which association he was made a commissioner in 1878. He remained a commissioner of this association from 1878 to 1887 and from January, 1881, to April, 1887, was also a commissioner of the Colorado Traffic Association, from October, 1882, to December, 1883, a commissioner of the Iowa Trunk Line Association and from October, 1884, to January, 1887, a commissioner of the Pacific Coast Association. On April 1, 1887, he became chairman of the Associated Southwestern Colorado, Utah and Pacific Coast Lines and was chairman of the Western Freight Association until its dissolution in 1898. In April, 1891, he organized the Bureau of Car Performances and began the agitation which led to the substitution of per diem mileage for rental of freight cars. During 1903 and 1904 he carried on an investigation of private car uses which resulted in the federal investigation of this activity and in 1905 promoted the sentiment which led to information of the American Railway Clearing House Bureau. Mr. Midgley retired from active service in 1908 because of blindness and took up his residence in Evanston, Ill., where he was living at the time of his death.



John Midgley

THE SPOKANE TRANSPORTATION CLUB, Spokane, Wash., has moved to larger quarters in the Title building, Sprague and Wall streets in that city. The officers of the club, recently elected, are as follows: President, A. S. Cobb; vice-presidents, R. F. Carson, G. B. Paul; chairman house committee, W. N. Joyner; and secretary treasurer, F. J. Greene.

EDITORIAL

Railway Age

EDITORIAL

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There is a tendency in some quarters to cast suspicion on those railroads which

Nothing New About Contracting

have arranged to conduct certain maintenance operations by contract. It is intimated that these contracts are but a subterfuge designed to avoid compliance with the terms of the Transportation Act, and that they are, withal, an unwarranted and unprecedented arrangement. Those who look askance at these measures may be surprised to learn that, after all, there is nothing new about such contracting, and that there is a precedent for it to an extent far exceeding anything that the railroads are now doing. An article appearing elsewhere in this issue describes the methods pursued by one railroad in contracting practically all of its operating activities, including the operation of trains, the conduct of passenger stations and freight houses and even the soliciting of traffic. All this occurred, not in recent years, but *before the Civil War*. Just what conditions were responsible for the initiation of these arrangements is not made clear. The object in view, however, is definitely stated—to reduce expenses—and the results as tabulated in the article speak for themselves. There are just two reasons why the managements of the railroad or any other commercial undertaking should let work to contract. The first of these is to have the work done more cheaply; the second is to expedite the work during times when the company's own forces and facilities are inadequate to complete it within the time available.

"I think that the most serious complaint that can be made of the Railroad Administration lies in the fact that it did

Not Returned Self Sustaining

not return the railroads to their owners self-sustaining. . . . It was just as much the duty of the government to return these roads with rates that would sustain them in their operations as it was its duty to return them in as good condition physically as it took them." This statement, made by Senator Cummins at the hearings before the Senate Committee on Interstate Commerce, must be regarded as one of the most valuable contributions which has thus far been made to all the arguments pro and con relative to the activities of the Railroad Administration. It must be regarded in this light not only because of its intrinsic truth but because it is the opinion of a man who is in a position to know whereof he speaks and who can speak and will be recognized as speaking with unbiased mind. The idea expressed by Senator Cummins is not new. It is restated, however, at an opportune moment, because just now the railroads in their annual reports are giving evidence of the success which they have been having during the past year in restoring their net income to the pre-war level. The figures in the case of practically every road show a great measure of improvement, the degree of which can only emphasize how much improvement there was room to make. The difficulty is, of course, that this improvement was made partly as a result of economies of a drastic sort, which economies served to intensify a period of depression sufficiently severe without that factor. The improvement similarly was partly due to higher rates—these rates having been made higher when the tendencies in industry were in the other direction. The Railroad Administration,

in failing to raise its rates at the proper time, did the un-economic thing and created a situation which has been extremely difficult to get out of. Now that we are getting out of it, is a good time to take a look back over the rough ground that has been traveled. Senator Cummins helps us do so and adds a contribution which will serve to keep the view in its correct perspective.

Second or multiple track work always imposes a heavy burden on the operating department. The fact that the

Light Traffic An Aid To Construction

added track has been authorized is proof positive that the traffic has approached the limit of the existing track capacity. Therefore, to impose the added burden of slow orders, frequent shifts of the operated tracks, temporary run-offs, work trains, and the presence of contractors' grading equipment on the main line, and other inconveniences that go with second-track projects, adds greatly to the problems of the operating officers until the time when the pressure can be gradually reduced by the opening of section after section of the newly completed second track. Conversely, this pressure of a heavy revenue business places certain restrictions on the construction work that add to its cost. Expensive bridge construction arrangements must be adopted to avoid even an hour's interruption of traffic. In some cases the contractor may be required to build considerable stretches of construction track when the operated tracks would have served just as well but for the heavy traffic. These conflicts of the opposing interests of the operating and construction departments must be settled by compromise, and it makes but little difference which department bears the brunt of the burden, for the railroad, as a whole, suffers in any event. These difficulties can be relieved in great measures if the work is undertaken at times of light traffic. Thus, at present, the coal strike has resulted in greatly reducing the train movements on certain lines, and in the case of the Illinois Central this condition has been taken as an opportunity for the completion of a stretch of third track which has been badly needed for some time. Other railroads will find it to their advantage to follow the example of this road.

It should be self-evident that the banners on automatic highway crossing signals should present a uniform aspect to the

Standard Aspect for Highway Crossing Signals

highway traveler regardless of the railroad he is approaching. In the past manufacturers have supplied banners painted according to the best known indications or have furnished special markings or designs to suit their individual tastes. This has resulted in the installation of a variety of banners which are confusing to the automobile driver who has no means of ascertaining whether all of these moving banners are intended to indicate that a train is approaching. Realizing the need for standardization, the Signal Section of the American Railway Association has recently prepared a new specification which provides that the word "DANGER" shall appear in black with a semi-circle above also in black, on

a white disk 24 in. in diameter, thus presenting an optical effect of decided contrast that can be distinguished at a maximum range. Efforts are being made to secure the adoption of this specification at the annual meeting of the Signal Section in June. It would seem advisable for all railroad officers who are interested to give the matter serious and expeditious consideration in the meantime in order that a standard may be established without delay.

That railroad freight traffic and general business have been improving rapidly during the early months of this year is indicated by the fact that the number of carloads of freight handled up to April 1, when the coal strike began, has been greater than it has been for any other of the past five years except the record year 1920. The total car loading since April 1 has naturally shown a reflection of the reduced coal production, but from January 1 to April 1 the total number of cars loaded with revenue freight was 9,996,184, as compared with 9,015,934 during the corresponding period of 1921, although it was less than for 1920, when a total of 10,223,813 cars were loaded. The number of cars of freight received by the railroads for transportation up to April 1 was, of course, swelled considerably by the amount of coal ordered for storage in anticipation of the strike, just as the reduction in coal loading at the present time will doubtless be made up later on when the strike is over or when the present reserves become diminished. However, there have also been large increases in the loading of merchandise and miscellaneous freight. It is also true that a carload of freight represents less tons this year than it did when the shortage of freight cars made the shippers more responsive to the efforts of the railroads to induce them to load cars to capacity. However, the tonnage and ton-mile figures will not be available for some time and in their absence the gains shown in car loading totals represent one of the reasons for optimism which have recently been reflected in a beginning of railroad purchases on a much larger scale than has prevailed for several years. While there are still some 300,000 freight cars out of service for need of repairs, the number of serviceable surplus cars had been reduced from 500,000 a year to 206,746 by March 31 this year.

The *Railway Age*, in the reviews of the operations of various railroads, which have recently appeared in its columns, has been, in a measure, emphasizing the factor of maintenance.

The Per Cent of Bad Order Cars

With the increasing value of the dollar brought about by changing wage scales and material costs, it is difficult, if not

impossible, to compare maintenance in one year and another on a dollar basis. Thus, if a road's expenses of maintenance-of-way show a sharp reduction as between 1921 and 1920, it is not clear whether this may be due to lesser work done, to economies in carrying on the maintenance activities, or merely to lower wage and material costs. In other words, the expense figures do not serve the purpose. A more better basis of comparison is to be found in the cost of rail road ton put in track, yards of ballast, etc., and in several cases these details have been utilized. In the case of equipment, there are similar details available for comparison, the percentage of bad order cars to total on line and the percentage of unserviceable locomotives. These figures appear in a very few cases in the annual reports. They are given in the form of a monthly and cumulative average in the operating statistics reported to the Interstate Commerce Commission and they are similarly reported—in much greater

detail—to the Car Service Division of the American Railway Association. We believe these figures to be valuable and of considerably greater value than the attention that has been paid them would indicate. It is simple enough to say, for example, that if the average percentage of bad-order cars on all the roads at a certain time is, say, 14 per cent, and the X. Y. & Z. is reporting only 6 per cent, its car condition is good; or that if it reports 20 per cent, its condition is bad. Of course, we know the average of the country should be not 14 per cent but between 4 and 7 per cent; that factor must also be borne in mind. Further, there may be many cars in the bad-order list that will never be repaired but will be retired. The effect on the maintenance of equipment expenses will be similar whether the charge is to repairs or to retirements. As concerns operation, the car is not ready for service in either case. This is the reason the *Railway Age* uses the bad-order figures extensively. It believes that, if they are used properly, the bad-order percentages are of great value as an index to equipment maintenance.

It would be difficult to over-estimate the importance of modern car and driving wheel lathes in efficient railroad shop operation. Obviously cars and locomotives can be put through a repair shop no faster than tires can be turned.

The Wheel Lathe a Barometer of Shop Efficiency

In fact the production and morale of the entire shop is dependent on the output of the wheel department as limited by its wheel lathes. A superintendent of motive power is quoted as saying recently, "Before I had the new 90-in. wheel lathe, the driving box gang always took its own good time because the driving wheels were always behind; but now driving wheels are always waiting for the box gang which has been compelled to speed up. This speeds up all the other gangs so the whole shop tries to keep up with the big, new wheel lathe which is the pace-maker. Naturally engines are going out faster and cost less." The modern wheel lathe is a highly specialized machine, designed to develop great cutting power and tax the capacity of high speed steel tools to the utmost. Heavy internal stresses are continuous for long intervals and price should be the last thing considered in purchasing this type of tool where there is sufficient work to keep it busy. Continuous high production during 15 or 20 years, with economy in power consumption, easy control by the operator, and freedom from breakdown are essential features which should be given first consideration in selecting wheel lathes. A railroad can ill afford to sacrifice anyone of these features for the sake of a few hundred or even a few thousand dollars in first cost. Railroads can also ill afford to continue the operation of the many inefficient wheel lathes now in constant use.

A newly designed locomotive or car always and properly attracts careful attention and inspection. A shop superintendent or master mechanic invariably takes occasion to point out to a higher officer or other visitors the latest new machine or improved method which turns out more or better work than the machine or method which was replaced. This spirit is natural and commendable, but in a search for the new and spectacular do we not oftentimes overlook something that might be learned from the old or even discarded device or part? One of the most interesting spots around any shop, roundhouse or car repair yard is the scrap heap. Many a railroad man might learn a lesson from the traveling mechanical representatives of the various railroad supply firms

Study the Scrap Heap

who early learn the importance and location of the scrap piles, no matter in what out-of-the-way corner they may be situated; immediately after calling at the office they make a bee-line for these interesting points. Here are found car brake shoes that have overlapped or crowded against the flange due to improper condition of foundation brake rigging and have had to be removed before any benefit had been obtained from a large part of the wearable metal; locomotive brake shoes tapered and hardly worn at one end due to lack of attention to maintenance of the driver brakes; brake beams distorted because of some inherent weakness in the design or improperly hung and allowed to come in contact with the wheel flanges; broken spring hangers and other worn or broken parts of locomotives and cars that have gone to the discard. Our present rolling stock has assumed much of its present form as a result of a long period of evolution and a study of failures. For a designer or one looking for improvements, something of interest can always be found by going over a scrap pile. The men responsible for maintenance also will find the time spent at such points equally profitable, even though they do not find much material that might have been repaired by welding, or otherwise, instead of being scrapped.

Railway officers who have a desire to serve beyond the actual requirements of their ordinary duties are availing themselves

**A Symposium
on Railway
Economics**

more and more of opportunities to speak before chambers of commerce and other public gatherings. To do this successfully they must be well informed on railroad economics generally and keep abreast of current thought along these lines. For those who are desirous of improving their knowledge of current problems of railway economics, the semi-annual meeting of the Academy of Political Science at the Hotel Astor, New York, on April 28, offers an exceptional opportunity. Railroads and Business Prosperity is the subject for discussion and from the list of the speakers who are going to talk upon this subject it is evident that it will be treated thoroughly and ably. The meeting will be divided into three sessions—morning, luncheon and afternoon, beginning at 10 a. m., 1 p. m. and 3 p. m., respectively. The first session will be devoted to the consideration of railway labor problems, with Professor Henry R. Seager of Columbia University presiding. At this session E. M. Loomis, president of the Lehigh Valley; W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen; C. B. Heiserman, general counsel of the Pennsylvania; and Professor Frank H. Dixon of Princeton University will be the principal speakers. Professor Samuel McCune Lindsay of Columbia University will preside at the luncheon session and Henry Wallace, Secretary of Agriculture; Hale Holden, president of the Chicago, Burlington & Quincy; and Walker D. Hines, formerly director general of railroads, will speak on Railway Policies and the General Welfare. Freight Rates and Business Revival will be the topic at the afternoon conference. The speakers will be T. C. Powell, vice-president of the Erie; R. H. Aishton, president of the American Railway Association; Professor W. J. Cunningham of Harvard University; C. R. Cook, vice-president of the American Rolling Mill Company; and J. D. A. Morrow, vice-president of the National Coal Association. The conclusion is inescapable that attendance at these sessions will be an education in present day railway economics. Certainly railway officers who are seeking to increase their service and who feel the need of further knowledge of current developments in railway economics will do well to attend these sessions in person or, if that is impossible, to study the proceedings when they are published.

The extensive use of timber for pole lines has made such inroads upon the supply of suitable species of wood that the costs are becoming so high as to

**The Permanency
of Pole
Lines**

force pole-using companies to seek means of construction that will give greater permanency. Also the labor costs of replacing poles and the damage to the line wires when making changes represent a high percentage of the operating costs. Increased life of pole lines may be secured by treating the butt of the poles with preservatives or by banding them with other materials, such as expanded metal or reinforced concrete. The average 30 ft. western cedar pole costs approximately \$5.50 in the central states and has a life of from 12 to 18 years, while this same pole butt-treated with a preservative at an additional cost of \$3.50 is said to last for approximately 36 years. The Telegraph and Telephone Section of the A. R. A. recently presented a detailed estimate of a 93-mile pole line, showing that the additional investment for wood preservative will produce a saving of over \$3,000 per year during the 36-year life of the poles. On the average railroad which expects to construct additional tracks, change grades, etc., the added expense for a pole line with a life of more than 36 years might not be justified. However, at corner turns, crossing spans, terminal poles and transformer locations, the labor cost for transferring equipment when renewing poles is so high that still more permanent construction, such as reinforced concrete, is being used to some extent; the advisability of its more general use on railroads considered as permanently located is also being studied. A 30-ft. reinforced concrete pole costs from \$28 to \$49, depending on the number of wires to be carried. Therefore in order to justify the additional cost, permanency must be the first consideration. With the increased installation of railroad-owned telegraph, telephone, signal and power lines the railroads have a vital interest in the cost of construction and maintenance of the poles used and it would seem advisable for them to offer every assistance to the Telegraph and Telephone Section of the A. R. A. in securing data concerning the life of pole lines.

Will newspaper reporters ever learn that, as motive power for heavy passenger and freight service, the Mogul locomotive is no more? Recently bandits held up main line freight train on one of the largest roads in the East. In telling the public about it the next morning one of New York's greatest papers

**The
Mogul
Obsession**

said in all solemnity that the train was drawn by a large locomotive of the Mogul type. Well, perhaps it was, but we doubt it. The chances are several hundred to one that few up-to-date roads are using Moguls in heavy main line freight service. About a year ago there was a serious accident not far from Chicago involving two limited trains. Once again we were told by the big dailies all over the country that the locomotives in the accident were Moguls. They published photographs of the engines, however, which showed that they were Pacifics. The obsession about Moguls is just a symptom and is not the disease itself. Or to say the same thing in other words—the reporters, assigned by many of our best newspapers to “cover” railroad news, know little or nothing about the subject. Consequently, when there is a big accident or some other news involving technical railroading, the newspapers find themselves completely at a loss. As a result, when a railroad man reads what they say, he can get no adequate idea of just what has happened, but has to seek accurate information elsewhere. There is little specialization in an American newspaper office outside the fields of politics, sports, the theater, finance and literature. The same reporter may in any week be assigned to such various

subjects as a murder case, a strike of garment workers, a meeting of the W. C. T. U. and a collision on the X. Y. & Z. Railroad. He cannot be an expert in so many lines. Consequently omissions and inaccuracies creep into almost everything he writes. In England they do things differently. There court cases are reported by men trained in the law, medical matters by doctors, railway affairs by men with railway experience, and so on. One of the most important steps toward improving the quality of railway news in our daily papers would be taken if railway officers would protest to papers in which they find inaccurate information.

Attacking the "Recapture" Provision

THE *Railway Age* believes that from the standpoint of the railways as a whole a serious mistake will be made if the plan now being considered for attacking in the courts the so-called "recapture" provision of the Transportation Act is carried out. The railways themselves are opposing repeal of the rate-making provision of the Transportation Act. A successful attack in the courts upon the recapture provision probably would make inevitable the repeal of all the rate-making provisions. The mere beginning of litigation to test the recapture provision might under present conditions be sufficient to cause Congress to wipe out all the rate-making provisions.

The recapture provision is, of course, that which requires any railway which earns over six per cent in any year to in effect pay one-half of the excess earnings over to the government. From a constitutional point of view this provision may be assailable, but the Supreme Court of the United States upheld the Adamson law, which from a constitutional point of view surely seemed much more vulnerable than the recapture provision. The Supreme Court has upheld many kinds of railway legislation which our legal friends did not expect it to. The *Railway Age* hazards a layman's prediction that if a case involving the constitutionality of the recapture provision ever reaches the Supreme Court it will be upheld.

There is involved a question of public policy and of railway policy far more important than the question of law. The purpose of the rate-making provisions was to insure that the railways as a whole would be allowed to earn a reasonable average return. It was argued by some, however, that if the average return allowed to be earned by all the railways should be reasonable the returns earned by the more prosperous individual railways would be excessive. The *Railway Age* never accepted this argument as logical or fair. On the most rigorous "fair return" theory of reasonable rates it must be that if the railways as a whole earn only a fair average return the rates from which it is derived are reasonable. How can the net return of an individual railway be excessive if it is derived from rates which for the railways as a whole are reasonable?

However, facts are stubborn things. In every important rate case for years the making of rates which would be reasonable for the railways as a whole was successfully opposed with evidence and arguments which convinced commissions and the public that under these rates the returns earned by the more prosperous railways would be excessive. Many railway executives and financiers favored the recapture provision because they were convinced that without some such provision in the law rates never would be permitted to be made which would enable the railways as a whole to earn an average return which would be reasonable for all and enable them to raise needed amounts of new capital.

The situation in this respect has not changed since the Transportation Act was passed. There is no evidence whatever that Congress, commissions or public have been convinced that the rates should be made high enough to enable

some railways to earn relatively large returns in order that the railways as a whole may be enabled to earn a reasonable average return. So long as the sentiment of Congress, commissions and public remains what it apparently is now it seems most probable that a successful attack upon the recapture clause would involve the complete destruction of the rate making provisions. It seems very likely the result would be in the long run that the more prosperous railways would not be allowed to earn and keep any more money than if the recapture provisions were retained, while the poorer roads and the average roads would not be allowed to earn and keep as much money as they would be if the recapture provisions were retained.

If the railways want to get rid of the recapture provisions without at the same time completely destroying the rate-making provisions they should take their case to Congress and the public and not to the courts. If they go to the courts and win it is to be feared that as in some past instances they will merely win a battle and lose a campaign unless they also present and win their case in the court of public opinion.

On What Basis Should Paint Be Bought?

OF THE THOUSANDS of materials which the railroads buy there is probably none which proves more troublesome to the purchasing agent and to the department using it than paint. The policy adopted with regard to the paint question is serious in its consequences. Paint, considered in the broad sense as including enamel and varnish, forms one of the large items in the expenditure for supplies. To meet the needs of all departments requires material of varying character, color and composition. Scores of different products are bought and as there are over 200 paint manufacturers doing more than a local business, the range of choice of the purchasing department is almost unlimited.

In general, railroads follow one of three methods in buying paint. Some buy on practically no consideration except price. Often these roads have a specification, so called, but it allows so much latitude or is so seldom enforced that it affords no assurance of the quality of the product. In contrast with this many of the large roads have detail specifications, and every shipment of paint is checked in the laboratory to make certain that it conforms to the requirements. Another practice followed by some roads is to specify the purpose for which the product is to be used, leaving the composition to the judgment of the manufacturer and holding the maker responsible for the service obtained. Bidding is restricted to a limited number of well-established companies. Results are checked by service tests and any manufacturer whose product does not give satisfactory service is removed from the list of bidders.

Recently there has been a noticeable tendency on the part of some railroads to try to save money by buying paint solely on a price basis. This is one of the worst crimes that has been committed in the name of economy. The economy of paint is not measured in cents per gallon, nor in square feet covered per gallon. The cost of the paint is usually less than the labor of applying it. The combined cost of paint and labor is usually insignificant in comparison with the value of the equipment or structures which it protects. To determine the true value of a paint, it is necessary to consider the first cost, the covering properties, the cost of application, the time the equipment is out of service and the length of time between paintings. How many roads have ever had a report on paint that considered all these factors? Is not such an analysis justified when many roads spend from \$50,000 to \$100,000 for each of several varieties of paint? These are some of the fundamentals which is now causing more than one road serious concern. Other phases of the question will be discussed in succeeding issues.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated.]

Public Relations Work and Advertising

BOSTON, Mass.

TO THE EDITOR:

We have waited long—oh, so long—for you to recognize the continued neglect, and in many cases the utter abandonment by many American lines of two important essentials of successful railroad management—public relations work and advertising. However, if this recognition has been delayed, your perception and understanding of the situation has certainly been clearly and forcefully presented in your excellent editorials in recent issues. Indeed, it makes in every respect an admirable introductory text to a study of the problem that exists—a text, in fact, that is worthy of thought upon the part of those who decide questions of policy. Truly you have hit the mark and hit it hard!

During the last year and a half the slogan of a closely related industry, the electric railways, has been "Salesmanship in Transportation." At last its bigger, older, and we wonder if not characteristically more conservative, brother seems to be rubbing his eyes, and speculating why the awakening process has been so slow.

As you point out, the railroads have really got something to sell. Today they have competitors, imitators, call them what you will. Yet railroads should certainly lay claim that theirs is the genuine, the best, form of transportation. And there is a wealth of reasons to support such a claim. Without expanding upon this point, however, the truth is that railroad men, both officers and employees, have been convinced that the rails constitute the standard method of transportation. It has been the strength of this assurance that has been detrimental. The lack of aggression on the part of the roads has been the opportunity of the relatively weak electric roads and the motor trucks. Now the situation does seem to be pretty well appreciated, but the realization was admittedly very slow.

It is the passenger service, however, that I am especially considering. Let us ask a few pertinent questions.

Take any large city: How many people know what points of special interest are located within 50 miles by rail?

Take the city that is not a metropolis: How many people know to what principal points its railroads radiate, to what places through trains, including Pullman cars, are operated?

Take the smaller town out "on the line." How many of the people know the destinations of the trains that they see every day? How many have even a hazy idea of the distance to the destination of these trains, the distance in hours as well as in miles?

How many citizens of any of these communities have ever heard a railroad representative at any sort of public gathering?

To most readers of the *Railway Age*, Niagara Falls and the Mammoth Cave are not unfamiliar—we know how quickly and easily these places may be reached. And so rather unconsciously we assume that the average person knows all about these and other pleasure resorts. The contrary is true. A great new generation has sprung up that knows virtually nothing of these wonders in every part of the country. Tell them about these things, educate them until they want to go and see.

Also there is a vast multitude, not undesirable either, which has never enjoyed a Pullman car or visited a diner. The issue is clear: We have got to drive away, through the carefully planned dissemination of information, firmly rooted beliefs common to a large class, that these luxuries are only intended for and within the reach of millionaires.

Let us mention in passing the observation car. Assuredly, from an operating standpoint, particularly here in the east, it has many objections. And yet even if not actually much used by passengers (I am speaking here only of the platform), because of road conditions, its very presence on a train, both in the terminal and along the line is worth pages of advertising.

Keep up the good work you have started. If we must consider our various railroad systems as necessary utilities, let us have continually before us the principle that volume of traffic carried measures the degree to which a railway is a public servant. More advertising, closer public relations. Bigger, better business. But don't wait for it to come—go get it, fight for it, make it. C. RADFORD SANDS.

Educate Employees in the Use of Appliances

BROOKLINE, Mass.

TO THE EDITOR:

Every description of a new locomotive carries a lengthy list of appliances, all more or less complicated. Many are so generally used that they are accepted as a matter of course; others are still in the development stage. That these improvements will come in time no one denies. Orders for recent equipment show that. How are these devices to be handled by the men and what steps will be taken by the management to instruct them in their proper use?

Most of the men who sit at the throttle today entered the service of the railways through the attraction railroad life had for them. This class of men is fast disappearing and those who are entering the service now enter it only because of the pay envelope. Unless something happens, it is going to be these men that are going to handle our trains.

The back head of the boiler of a modern locomotive today presents a mass of pipes, gages, cocks, valves and levers, with the use of which the engineman must be familiar and every new device added means an additional something for the man in the cab. When we hear of a green fireman making the excuse to the engineer that his steam was low because he did not know how to blow her up, the problem becomes serious.

To my mind there is only one cure for it and the mechanical department must act right soon. Engineers and firemen must receive a more thorough and better training in regard to the proper use and care of the locomotive and new devices. Call it going to school if you will, make it compulsory if necessary. Do it in the lay-over on the runs, take the men who are there on the spare board and pay them for the time spent in the class room. Have as many pieces or parts as necessary; extend it to the roundhouse men; include shop men if you wish; but to carry the thing through to a success, compulsory attendance must be enforced.

Would the men kick at this? Doubtless some would. Some would kick at anything anyway. But, I'll guarantee that the brotherhoods would stand behind this plan, would probably be willing to reproduce some of the material in their publications and, moreover, public opinion would shortly silence any opposition from any party, once it was learned what was being attempted.

As for the expense, it would be slight compared to the results. Can anyone imagine what the saving would be to have every engineer and fireman thoroughly interested in his

locomotive to see that it is in proper condition, that the roundhouse forces are interested in doing a thorough and an honest job when it is reported to them? Can anyone estimate these savings? Is it possible, and is it not worth trying? Without some direct handling of this subject the American railways within the next 25 years are going to lack the sound timber they have been producing for locomotive engineers and will have themselves solely to blame.

CHAS. E. FISHER.

For a Better Understanding Between the Railways and the Public

NEW YORK

TO THE EDITOR:

Your recent editorials on railway advertising are much to the point. The railways are spending little or no money on making their facilities or their attractions known. The propaganda of the railway executives is about the driest reading imaginable. At the present time the interest in railway day-to-day affairs is at the lowest ebb.

Years ago the people talked of railway items, but such is no longer the case. No one seems to care about train performance, or the performance of individual engines. Before me I have a current English railway magazine full of such items. There are seven pages of replies to correspondents inquiring about the Midland coat-of-arms, locomotives on Isle of Wight, the largest station in the world, etc. All of this evidences the deep interest of the travelling public. Our lines have become highly standardized, but nevertheless there is much that might be told of daily interest. Clean engines should always appeal to the traveler and the naming of locomotives is not a matter to be considered as of no advertising value—especially of large passenger engines.

Music is essential in the army; so are the small items of the daily doings of the railways to a real interest in their welfare. Tactics in the army and tons per mile on the railway are not for everybody. If one of the large systems were to paint an engine pink and send it over the system, the fact would get into all local papers and the line would be talked about in thousands of homes where ton-miles are unknown. This would not minimize the importance of study of train loads to those who are responsible for them. One recalls the Ghost train of the old New England road in this connection.

Your editorials speak of the selling of transportation as the sole function of a railway. Technically so, but not the real fact. What a railway sells is the community it serves to the rest of the world in competition with other communities; in other words, it sells transportation plus service, and service covers many factors, such as punctuality and properly timed trains in passenger service, proper freight car supply, efficient local freight service, smooth handling of trains, minimum destruction of merchandise in transit and not a few other items. This will not be done as it should be till some line establishes a service department with an executive in charge who will have time to study the requirements of the line intimately—not incidentally. He will ascertain traffic which needs encouragement—the establishment of, say, fruit or fish trains, and likewise in passenger service—make people travel, for one reason or another, more often than they otherwise would. To such an officer should come all complaints, it being his prime duty to investigate them and not to have such complaints pigeon-holed. He should seek the boards of trades, tell them how they can create new business, ask what can be done to help them; this in contrast to the boards of trade seeking the railway officials and asking or demanding why such and such business is being handled in an unsatisfactory way.

Many of our lines are so large that with the present system of executive organization the actual contact with the communities and the personnel is of a most superficial nature and if the systems are merged as has been discussed, it would be less. The effect of the recent mergers in England in this respect will be watched with interest. Till the soil well, plow deep, rather than cultivate too large a field superficially. One railway under present conditions in a highly competitive territory is earning nearly 10 per cent, due to the service rendered. The same line a few years ago was in a deplorable condition.

There are over 57 varieties of the railway problem and most of them are just human problems which can be and only can be solved as human problems have to be; by knowledge, fraternity and honesty.

I am not unmindful of the excellent work done by the Long Island in its agricultural experiment station; of its showing the farmers how to ship commodities to secure the best market prices. The war stopped such work but its need exists today in many sections. James J. Hill, I believe, at one time distributed many thoroughbred bulls along the Great Northern; but such efforts have been few and far between.

More advertising in printer's ink and in every way ought to be distinctly helpful to railways and to a better understanding between the railways and the public.

GEORGE B. LEIGHTON.

Another Complaint Against American Passenger Service

NEW YORK CITY

TO THE EDITOR:

I was pleased to read in your journal of April 15, Mr. Langdon's able attack on the ridiculous designs of the steel cars now in use on American railroads.

In yet another way, however, have American railway men proved their inferiority to their English contemporaries in the handling of passenger traffic. I refer to the absurd platform accommodations provided at most passenger stations.

These platform accommodations are inadequate in two essentials. In the first place they are seldom higher, and often lower, than the top of the rail, making necessary the use of steps in entering or leaving the cars. In the second place, many double-tracked railroads have only one platform for trains in both directions, necessitating the crossing of tracks by passengers. Not only is this an unsafe practice which, moreover, blocks both running tracks when only one is in use, but it also makes necessary the use of a step box, since the platforms cannot, under such an arrangement, be higher than the top of the rail. The use of the step box further slows up the loading and unloading of trains.

The adoption of the English scheme of two platforms on the car floor level would, of course, restrict clearances to some extent and would involve minor changes which could be brought about over the entire country only during a period of years. My complaint is that practically nothing is being done to initiate this innovation. We do have raised platforms in ample number at a few of our metropolitan stations, but other stations even in same city are not so equipped. The result is that steps and trap doors have to be provided. If the raised platform were generally adopted, these steps could be done away with entirely—this, in addition to providing greater safety and comfort for passengers and reducing the waiting time of trains at stations about 75 per cent.

Will some of the officers of our roads which enjoy a heavy passenger traffic tell us why no steps are being taken to bring about these improvements, the need for which is so obvious?

R. C. LEWES.

New Locomotive Facilities at Clifton Forge, Va.

The Chesapeake & Ohio Has Provided a New Roundhouse, Power Plant and Other Utilities in a Congested Location

TO MEET the rapidly growing requirements for locomotive repair and terminal operations at Clifton Forge, Va., the Chesapeake & Ohio has prosecuted a program of intensive rehabilitation and renewal of the facilities at that point. This work has resulted in the recent completion of the new 10-stall roundhouse, a power plant, a storehouse, an oil house and a lavatory and locker building. This work had its inception in 1917, when it became apparent to the officers of the railroad that the facilities at Clifton Forge were becoming inadequate. The situation was aggravated by the enormous growth of traffic during the war period,

a plan was perfected for taking down certain of the old buildings and rebuilding over the same area.

The new roundhouse has 10 stalls, the greater number of which are 120 ft. deep. The section of the building is similar to the one constructed at Richmond, Va., where it was found that the arrangement of the roof, together with the outlets at the edges of the monitors and the louvred openings in the monitors, provided adequately for the escape of smoke, gases and steam. This will be seen readily by referring to the drawing showing the roundhouse in section. The roof rafters and purlins are laid radially from the center of the turn-



Above—Two Exterior Views of the Power Plant. Lower Left—Belt Conveyor for the Coal Handling Equipment. Lower Right—View Above the Boilers Showing the Steam Headers

and after an extended study of the situation work was undertaken actively late in 1920.

The Roundhouse Has Long Stalls

Clifton Forge is an important division point on the main line at the junction with the James River division and midway between engine terminals at Hinton, W. Va., and Charlottesville, Va. Heavy grades on all lines leading to and from Clifton Forge require the use of the heaviest type of locomotives and Clifton Forge is the logical location for the engine terminal, as well as for shops for running repairs and certain heavy repairs. The space available for shops and terminal buildings and for the necessary track facilities is limited by hills on one side and by the Jackson River on the other; the problem was further complicated by the fact that the existing buildings were very close together and by the necessity for minimum interference with the shop and terminal operations during the alterations and improvements. Because of the obstacles imposed to any construction work,

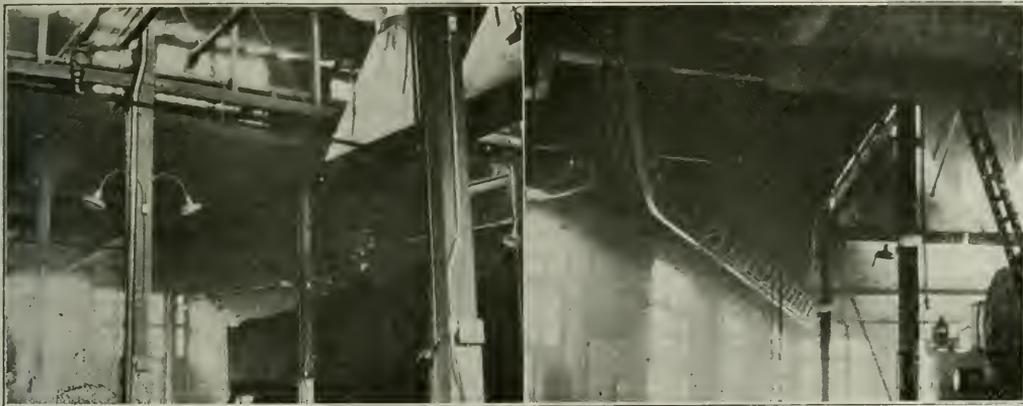
the roof sheathing or deck being laid cross-wise over them. There are no pockets or obstructions under the roof sheathing to prevent the movement of smoke along the sheathing to the outlets in the monitor, and the removal of gases from the building is accelerated by the action of wind across the roof, similar to the action in a properly designed roof ventilator.

This building is constructed with a concrete foundation and side walls, extending up to the window sill line. From that level to the eaves, the side and end walls are brick. The building columns and the superstructure framing throughout, including the roof sheathing, are of wood. The roof deck is covered with a four-ply, pitch and slag roofing. The engine doors are 14 ft. wide by 17 ft. 1 in. high, heavily reinforced with iron hinges and provided with hand-operated locking devices for holding them either in a closed or open position. The engine pits are of a very heavy design which has been adopted by the railway as standard. A truck and tender wheel drop pit, equipped with a Watson-Stillman hydraulic

for the roundhouse, together with toilet and lavatory facilities for both the colored and white employees in the machine and blacksmith shop. There are also 217 steel lockers in this building. All of the lavatories are supplied with hot and cold water, and the plumbing is modern throughout.

A new 100-ft. twin-span turntable, of the type recently

steam, compressed air and electric current and accessible for coal supply and ash removal. An unoccupied location to fit this specification was not to be had, so it was decided to remove the pipe and tin shop building to make room for the power house. The location is shown in the map. Here advantage could be taken of the excellent situation of an



Two Interior Views of the Roundhouse. Monorail Shown at the Right

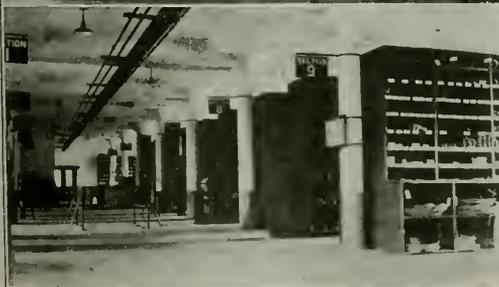
developed by the Bethlehem Steel Bridge Corporation, of Bethlehem, Pa., has been installed by the railroad in a heavy concrete turntable pit. This turntable serves the new roundhouse, together with that portion of the old roundhouse which has not yet been rehabilitated.

A Centrally Located Power House

The most desirable spot for the power plant was naturally one that would be central with respect to the distribution of

existing track, elevated 12 ft. above the boiler room floor, which afforded an unusual opportunity to construct a coal unloading and receiving hopper, without the need of a deep excavation.

The power-house building is 134 ft. long by 52 ft. wide. A length of 76 ft. 6 in. at one end is used for the boiler room while the remainder of the building, 57 ft. 6 in., serves as the air-compressor room. The building is of concrete, brick and steel construction throughout and has a concrete tile slab



Upper Left—The Storehouse. Upper Right—The Oil House. Below—Two Interior Views of the Storehouse

roof deck, covered with four-ply pitch and gravel roofing. Reinforced concrete overhead coal bunkers provide storage capacity for 200 tons of coal within the building.

The boiler equipment consists of two 200-hp. and three 350-hp. Sterling water tube boilers, making a total capacity of 1,100 hp. These boilers are fitted with Detroit Murphy type stokers. Draft is provided by a Heinecke radial brick chimney, 8 ft. inside diameter, 175 ft. high.

The furnaces are fitted with Blonck efficiency draft meters. A new Cochran boiler feedwater heater of 1,666 hp. capacity, together with two 10-in. by 6-in. by 12-in. Deane horizontal duplex outside packed, plunger type boiler feed pumps are installed at the rear of the boilers. An 8-in. by 10-in. by 10-in. American Marsh vacuum pump is installed in connection with the shop heating system.

The coal and ash elevators and conveyors were furnished by the Ogle Construction Company, Chicago, and the coal crusher by the Stephens-Adamson Company. The coal for the plant is dumped from drop-bottom cars into the track hopper and then elevated by an automatic electric inclined bucket-skip-hoist, to a crusher, placed above the coal bunkers in the plant. From the crusher the fuel is carried on a belt conveyor which distributes it to the bunkers, from which it is fed by gravity to the stokers. Ashes, when removed from the ash pits, are elevated by an automatic electric skip-hoist and stored in an elevated steel, concrete-lined ash bin and discharged by gravity into standard gage cars, spotted on the track below it.

The compressor room houses two air compressors, of 888 cu. ft. capacity each, driven by individual motors, one 1,700 cu. ft. steam-driven air compressor, one 150-kw. motor-generator set and one 800-ampere, 75-volt motor-generator welding set together with the switchboard, which controls the motor-driven units in the compressing room and the distribution of low tension current throughout the shops.

Adjacent to and just outside of the compressor room are three 350-kv.a. transformers and two steel air reservoirs.

The Storehouse

The greater portion of the power plant equipment was moved from the old power house, located adjacent to and west of the machine shop. The old house had to be partially taken down to make room for the new roundhouse. The moving of all of this equipment was accomplished satisfactorily, without interruption to the daily operation of the terminal or shops.

The new storehouse is a reinforced concrete building, 209 ft. 6 in. long by 49 ft. 6 in. wide, two stories high, with a space 48 ft. square, provided on the third floor for a drafting and file room and the apprentice instruction department. On the first floor, at the east end of this building, are the offices for the time-keeper and storekeeper and on the second floor the master mechanic's office, together with spacious offices for his clerks, the road foreman and general storekeeper. The building is located at the south edge of the property, the natural contour of the site here sloping towards the river. This made it possible to place the first floor of the storehouse level with the shop floor and eliminate the usual ramp leading to the platform in most railroad storehouses. A standard-gage material track is laid parallel with the platform on the south side of the building, this track being on a level four feet below the platform, thus bringing the platform level with the floor of cars spotted on this track.

The first and second floors of the storehouse proper are furnished with steel material racks and steel shelving. A two-ton electric freight elevator is being installed to serve the second floor. The building is equipped with steam heat and electric light throughout and the building and equipment represent the best in construction and equipment that is now used in railroad shop warehouses.

The Oil House

The oil house is a reinforced concrete, fire-proof building, 34 ft. 2 in. wide by 60 ft. 2 in. long, with an oil delivery room on the first floor and oil tank storage room in the basement. The basement is furnished with five 8,000-gal. steel oil storage tanks and one 1,600-gal. tank. Self-measuring, hand-operated oil pumps control the distribution of oil from these tanks, the pumps being located in the oil delivery room. A fire-proof waste storage room, having a capacity of a carload of waste, is constructed at one end of the first floor. The remainder of the first floor is utilized for the storage of oil and paint in barrels and is further supplied with a battery of five 110-gal. and one 320-gal. rectangular, steel storage tanks, with self-measuring pumps. Suitable pipe terminals, with valved outlets, are provided underneath the edge of the platform for making connections to tank cars so that oil can be unloaded by gravity directly from tank cars to the storage tanks in the basement.

Water for the shop service system and engine supply is taken from the Clifton Forge water mains and also from a gravity line, recently laid to the city reservoir. The power house contains two auxiliary motor-driven pumps for taking water from the Jackson river, in case of emergency.

The new buildings are all abundantly supplied with electric lighting fixtures, all of which are equipped with steel, enameled reflectors. The main wiring for the roundhouse lighting is carried on brackets around the outside wall. From these mains, branches extend in conduits through and down the wall and underneath the floor to the building columns, where they are brought up to the lighting fixtures supported on these columns. Ralco plug receptacles placed three between each of the engine pits, supply extension cord lights in the pits or elsewhere, when required.

The layout, including the design and preparation of the plans and specifications for all of the new buildings and equipment, was made by the Arnold Company, Chicago, co-operating with the motive power department of the railroad, under the direction of J. R. Gould, superintendent of motive power. The construction was carried out by the Arnold Company, under the supervision of C. W. Johns, engineer of construction for the Chesapeake & Ohio.



Entrance to the Connaught Tunnel, C. P. R.

Further Testimony Before Senate Committee

Julius Kruttschnitt Replies to Former Director-General and W. J. Lauck Assails Railroad Financial Management

WASHINGTON, D. C.

JULIUS KRUTTSCHNITT, chairman of the board of the Southern Pacific, in continuing his testimony on April 12 before the Senate interstate commerce committee charged that the Railroad Administration respected neither the promise of the President nor the guarantee of Congress to maintain the railroads in as good repair and in as complete equipment as when taken over on January 1, 1918. He also said that it is "a just cause of complaint against the director general that he refused to recognize the moral obligation he was under to make an increase in the carriers' revenues corresponding to the enormous and destructive burden of expenses he had placed on them."

"He left to the owners," said Mr. Kruttschnitt, "the unpopular task of seeking before the public an increase of revenue to meet this increase of expenses. It was easy to shift this burden to the carriers, which at the threshold of resuming their relations with the public were confronted with a necessity of asking a large increase in rates. In equity this obligation was not theirs. It was the obligation of those who had created the necessity."

"What do investors in railroad securities think of the degrees of the respect paid by the director general to the President's assurance 'that their rights and interests will be as scrupulously looked after as they would be by the directors of the several railway systems' when he returned their properties with a margin of but 6.53 per cent between operating expenses and earnings compared with 29.52 per cent when he received them."

Mr. Kruttschnitt said that the statistics compiled by the Interstate Commerce Commission show that the director general skimmed in the use of both ties and rails.

"In two years cross-tie renewals," he said, "were 32,628,360 short—enough to lay 11,500 miles of track or about 3½ tracks stretching from New York to San Francisco. Rail renewals were cut 440,230 tons—enough to lay 3,120 miles or a track from New York to San Francisco. There was also a shortage of 1,816,155 cubic yards of ballast used in repairs."

"Mr. McAdoo tries to convince himself that it was not his duty to put into the track an average number of ties annually, determined by the test-period average, in order to fulfill the obligations of the government to return the properties in substantially as good repair as they were on January 1, 1918. If the federal administration has discovered a way to maintain a track for two years on a 28 per cent reduction annually from the number normally used, it has discovered something of inestimable value to maintenance engineers."

Ties Skimped and Repairs Neglected

The effect of skimping ties and neglect of car repairs on derailments was shown strikingly in a chart which Mr. Kruttschnitt had prepared for all Class 1 roads. Deraillments rose rapidly from 5.26 in 1917 to 12.34 in 1920 per million locomotive miles run, or 135 per cent higher in the latter than in the former years. There was an increase of derailments on the Louisiana and Texas Lines of the Southern Pacific from 4.37 per million locomotive miles in 1917 to 13.57 in 1920, or 211 per cent, confirming the assertion that these lines were conspicuously neglected by the federal directors general and in many places were dangerous. Mr. Kruttschnitt also presented photographs of track and car conditions in 1920 after the return to the owners.

"The low total number of derailments due to defective equipment and permanent way in 1917, 1916 and 1915, both

on all Class 1 roads and on Southern Pacific Lines in Texas and Louisiana, and the rapid decline from the peaks of 1920—all based on the records of the Interstate Commerce Commission—afford the strongest possible confirmation of the repeated assertions of the carriers," he said, "that the roads and their equipment were in safe and satisfactory physical condition when taken over by the government at the end of 1917, disprove conclusively Mr. McAdoo's assertion that the railroads were broken down physical wrecks, and show clearly by the great increase in accidents that depreciation under federal control was rapid and excessive and maintenance as to both track and equipment was neglected to such an extent as to be absolutely unsafe and in a condition (convincingly proved by government statistics) far below that required by the president's promise and the contracts entered into with the carriers."

As to Traffic Volume

"Mr. McAdoo asserts that the handling of the greatest volume of traffic on record in 1920 disproves the charges of the carriers that their properties were returned in March, 1920, in deplorable condition—much worse physically than when turned over in January, 1918. We assert with equal force that handling by the federal administration the largest volume of tonnage in 1918 ever moved up to that time disproves Mr. McAdoo's charge that the railroads were broken down and the equipment in wretched condition when he took them over."

The truth is, the federal administration *worked* the track and equipment received on January 1, 1918, so as to make them handle the record-breaking traffic of 1918, but did so at the expense of their physical condition; as shown by records, the percentage of bad-order freight cars rose from 5.1 per cent in January, 1918, to 7.0 per cent in March, 1920—an increase of 37 per cent. Private management pursued the same course to handle the record traffic of 1920 and the number of bad-order freight cars arose from 7.0 per cent in March, 1920, to 8.7 per cent in January, 1921—an increase of 24 per cent. In both cases the work was forced by high pressure out of the properties at the expense of its condition *with this vital difference, however*: that the federal administration got the increased service out of equipment by increasing the number of bad orders by 37 per cent *at the expense of the owners*, notwithstanding it was obligated by contract and the promise of the president, to bear it; whereas the expense of repairing the 24 per cent increase of bad-orders after the restoration of private control fell on the owners, where it belonged. The further increase of bad-orders from 8.7 per cent, January 1, 1921, to 15.4 per cent in September, 1921, being due to neglect in restoring cars to the owning lines from all over the United States, the expense of relocation and making good the deterioration during relocation, although incurred long after the return to private operation, is directly chargeable to the Railroad Administration, which caused it, and in common justice should be paid by it. All admit it was necessary as a war measure to use cars regardless of ownership, but it was grossly negligent and a flagrant breach of contract *not to keep them in repair*.

The government received about 45.5 per cent of home cars on home roads and returned only 21.9 per cent of home cars on home roads, leaving the owners to get the balance back at their own expense as best they could.

The record-breaking traffic of 1917, 1918 and 1920 was handled with substantially the same number of equipment

units provided by private management, the number of locomotives alone showing a slight increase. While the data relates to equipment solely, the same is true as to general improvements: they were the same substantially in all the years covered by the statement.

Notwithstanding Mr. McAdoo asserts in many places the inadequacy of equipment and its wretched condition, the average number of locomotives and freight and passenger cars ordered in the years 1918 and 1919 of federal control, when Mr. McAdoo says the need was most pressing, was the smallest of any two years in railroad history.

Citing the maintenance instructions issued by the Railroad Administration in 1919, Mr. Kruttschnitt said: "The condition of the railroads when received by the government was the result of maintenance policies followed before and during the test period ended June 30, 1917, when maintenance policies could not be influenced by knowledge that the government would take the properties over, therefore, the owners are clear of suspicion of having unduly highly maintained their properties in order to impose on the government a higher standard than called for by normal conditions. It was no concern of the federal administration whether an unusual amount of replacement or repair work of a character not usually spread evenly from year to year had been done during the test period; nor was it any concern of the government, under the President's pledge, whether the condition of the carriers had been sub-normal prior to 1915 and had been restored to normal in the test period; nor was it its concern whether in the test years improvement programs had been followed which involved unusual charges to operation; nor whether heavy retirements were made during the test period that might not have been found necessary during government control; nor whether unusual expenditures were incurred in the test period incidental to raising the standard or character of a railroad from a lower to a higher class; but it was the sole concern of the government and its bounden duty under the solemn promise of the President and under the contracts made with the director general to return the properties in the condition in which it received them on January 1, 1918. Recalling how the railroads were taken over by the President over night, it is evident that the condition of the railroads on January 1, 1918, cannot remotely be attributed to the intention of the carriers to make their roads appear much better than they normally were for the purpose of obliging the government to maintain them to an abnormally high standard.

Citing the Louisiana and Texas lines of the Southern Pacific system specifically, Mr. Kruttschnitt charged that tie replacement made during federal control on those lines were inadequate both in quantity and quality and that "hundreds of thousands of low grade ties were used in violation of the President's promise and contract obligation." He said Mr. McAdoo had sought to prove the incorrectness of these statements by giving replacement figures for the entire Southern Pacific system.

"The damage to the railroad property," he said, "is continuing until the inferior ties are removed but as long as they remain in the tracks the maintenance expense is increased largely over what it should be under the company's specifications."

"Out of every dollar of expense for 1920 for the railroads of the country, 82½ cents was paid out at prices directly fixed by the government itself," he said. "Materials and supplies used during the last 10 months of 1920 costing 15 cents out of every dollar were purchased by the carriers at prices fixed by general market conditions beyond their power to control. In other words prices fixed by the government or by market conditions covered 97½ cents out of every dollar of operating expenses."

The laudable effects of government practices necessarily continued after the return of the properties and notwith-

standing strenuous efforts to correct them are still responsible for the unsatisfactory condition of the railroads.

"The effect of government control of labor costs which began with the passage of the Adamson Act in 1916 has been to yield to labor under the operation of Class I railroads of the United States \$3,698,216,000 and to the railroads \$21,661,782 net operating income in 1920 or in the proportion of over 170 times as much to labor as to the railroads.

"We admit that increases in the wages of railroad employees were necessary to keep them on a parity with wages in outside industries due to war conditions, but we deny emphatically that railroad employees were underpaid to such an extent when the government took control as asserted by Messrs. McAdoo and Hines as to justify the unreasonable increases which they authorized."

U. S. R. A. Did Not Return Railroads

Self-Sustaining, Says Senator Cummins

"I think the most serious complaint that can be made of the Railroad Administration lies in the fact that it did not return the railroads to their owners self-sustaining," said Senator Cummins at the conclusion today of the testimony. "It ought to have established rates before the railroads were returned that would make the railroads reasonably self-sustaining. The failure to do that not only imposed upon the railroads a most unpopular, and I think unnecessary duty, or at least necessity, but it imposed upon Congress the requirement to make the guarantee running from March 1, 1920 to September 1, 1920.

"If the Railroad Administration—in anticipation of the increase in wages which it knew would come about, and in consideration of the existing fact that the rates were not even then maintaining the properties—had increased the rates as it should have done, the railroads at least would not have inherited that very disagreeable performance and the guarantee that the government has to bear now for the six months would not have drawn upon the Treasury as it had drawn and as it must continue to draw.

"I feel that there is a very just complaint against the Railroad Administration in that regard, far beyond any other controversy that it may have with the railroads. It was just as much the duty of the government to return these roads with rates that would sustain them in their operations as it was its duty to return them in as good condition physically as it took them. And that is a matter that has not been sufficiently understood by the people of the country. I think when it is fully understood, that very much of the criticism that has fallen upon the railroads since that time will disappear."

"I had the same thing in mind when I called attention to the fact that they increased expenses and made no attempt to increase the revenues during the first five months of 1918," said Senator Pomerene of Ohio.

"The roads made repeated requests on Director General Hines in the last half of 1919 to increase the rates," said Mr. Kruttschnitt, "but he kept saying, 'wait, wait, things will probably improve; prices may fall and you will be better off,' and it was finally delayed until it was not done at all."

Lauck Praises Mechanical and Operating Officers

Responsibility for the "present plight" of the railroads was placed upon the financial rather than the operating end of railroad management by W. J. Lauck, who testified on April 17 before the Senate committee on interstate commerce as the consulting economist of the Railway Employees' Department of the American Federation of Labor.

"Their properties are depleted," said Mr. Lauck, "their efficiency is seriously impaired, their credit is undermined, their profits are dwindling, it is hopeless to ask for higher rates, because the traffic cannot stand higher rates, and, caught in this impasse, they find themselves between the horns of

government control or bankruptcy. And this situation has largely arisen because the railroads have been dominated by men who knew how to manipulate stocks and bonds, rather than by men who knew how to carry on the service of transportation on the basis of a maximum of load for a minimum of energy."

"We realize that freight and passenger charges may be too high," said Mr. Lauck, "but we do not concede that it arises from wages paid to railway employees. We acknowledge that labor costs of the operation of the railroads are excessive, but this is due to the delinquencies of railway management and policy, and not to unreasonable wages, working standards, or inefficiencies of railway employees. We will even admit that too much has been paid for labor as a whole, and that, while the individual employee's rates of pay have not been sufficient, labor costs of operation have been too great. This has not been due, however, to any lack of productive efficiency of railway workers, but to the inadequate and impaired facilities of the railroads which are acknowledged even by railroad officials to be a generation behind the commercial and industrial requirements of the nation."

Mr. Lauck explained that he did not bring charges of wastefulness and extravagance against present railway executives, who, he said, are struggling under a handicap they cannot overcome, but against those who made and directed the financial policy of the railroads. The operating and mechanical officers, he said, are "geniuses who have efficiently, honestly and unselfishly devoted themselves to the service, and whom," he said, "we have accorded unstinted praise."

Failure to set aside a sufficient percentage of their earnings to cover depreciation was one of the counts in Mr. Lauck's indictment. He submitted a table purporting to show that in the eight years from 1911 to 1918 the depreciation fund of the railroads was \$2,155,500,000 less than it should have been and said that if this money had been set aside and expended properly an annual saving of approximately \$800,000,000 in operating expenses would have been effected.

Mr. Lauck said the railroad executives look upon labor simply as an item of operating costs and the first to be attacked when economies and retrenchment are necessary. The workers, on the other hand, regard labor as essentially a human factor in the operation of the roads and insist that wage reductions should not be considered until every other measure has been taken to reduce operating costs.

A Living Wage Basis

Mr. Lauck went into a detailed discussion of the wages of railway workers and said that they should be determined upon a living wage basis, with differentials for skill, experience, hazards of employment and productive efficiency. Senator Cummins said he agreed with him in this; that a government body could adopt no lesser standard as "just and reasonable." To arrive at what constitutes a living wage Mr. Lauck cited the various so-called "comfort budgets" and said that on the basis of living costs in May, 1921, they averaged \$1,970. As against this he computed the average annual compensation of railway workers in 1920, as corrected by deducting overtime on the basis of figures presented by the railroads, to have been \$1,603.36, further reduced to \$1,475.89 by the decision of the Railroad Labor Board effective July 1, 1921.

Large numbers of railroad workers fall far short of any such earnings, however, according to Mr. Lauck. Section men to the number of 275,352 can only earn \$925.32 annually under the present scale, if they work full time; construction gang and work train employees, numbering 28,760, can average but \$970.08 annually; other unskilled labor numbering 108,977 can average but \$1,000.68, and 22,572 crossing flagmen and gatemen can earn only \$810.84.

"Here," said Mr. Lauck, "is a total of over 430,000 em-

ployees, about one-quarter of all railroad employees, whose average earnings run between \$810 and \$1,000 per year, and for the largest group—section men—average only \$925 per year. Moreover, the earning of these amounts per year depends on absolutely continuous employment.

Instead of seeking further to reduce the wages of men now inadequately paid Mr. Lauck said the railroad executives should at least first make some effort to economize on their outlays for fuel, supplies and equipment, a conservative estimate of the possible annual saving in that direction being one billion dollars, on the basis of 1920 prices.

"There never has been and is not now any public protest on the part of railway management against excessive prices for steel rails, coal, or other materials and supplies," said Mr. Lauck. "Although in 1920 their fuel bill at prices then prevailing was \$700,000,000, and their cost of supplies and materials was \$2,000,000,000, there was no protest. The indefensible prices of materials, fuel and supplies were accepted, but a most determined drive was made in 1921, and has been growing in strength ever since, to reduce railroad wages.

"This seemingly inconsistent attitude on the part of the railroad executives would be inexplicable were it not for the results of official and private investigations as to the control of credit in this country, and the relations between large producers of fuel, iron and steel and other basic railroad materials, and certain groups of private banking houses and financial institutions. It has been shown that the control of railroads, manufacturing and mining finance and credit centers in a small inner group of New York bankers and financiers of which the banking house of J. P. Morgan & Co. is the apex. This group controls and directs the Association of Railway Executives and through the members of this organization gives expression to its public policies and propaganda."

Billions Needed, Says Lauck

Additional capital to the amount of at least four billions of dollars must be provided for the railroads of the United States if the nation's transportation problem is to be solved, according to Mr. Lauck. "The transportation industry requires a major operation and further palliatives will only accentuate its deplorable conditions," he said. "It should be financed and placed on a proper basis. In order to develop co-operation between employees and management, practical measures should be formulated to give to the railway workers proper participation in all branches of management. Friction and controversy between management and employees should be supplanted by team work and united effort. The experience of the Railroad Administration furnishes concrete demonstration of what splendid achievements can be obtained from such a policy. If our fundamental suggestions are accepted by the committee we are sure that better and more efficient transportation facilities will be provided, operating costs greatly reduced, freight and passenger rates decreased with net gains in operating income, and a larger measure of peace and co-operative effort between management and employees will prevail in the transportation industry."

In estimating the new capital outlays required by the railroads Mr. Lauck divided the amounts under two headings, (1) The capital necessary to bring the properties up to a par standard, which should have been taken care of by depreciation reserves, and (2) The capital needed to meet increased traffic requirements. Under the first heading the items were as follows: Locomotives, \$500,000,000; track and yard facilities, \$224,200,000; bridges and grade revisions, \$26,700,000; signal equipment, \$82,000,000; freight and passenger stations, \$300,000,000; miscellaneous properties, \$25,000,000; total, \$1,822,900,000.

Under the second heading the items were: 5,000 new locomotives, \$265,000,000; 300,000 new freight cars and 6,000

new passenger cars, \$882,000,000; locomotive terminals and repair shops, \$100,000,000; 15,000 miles of new main track, \$600,000,000; signal equipment, \$61,500,000; re-location of terminals, \$200,000,000; miscellaneous properties, \$100,000,000; total, \$2,748,500,000.

The grand total of all items of estimated new capital requirements was \$4,571,400,000.

"We do not agree with the railroad executives that this requisite capital is practically unobtainable," said Mr. Lauck. "We believe that it is the duty of the banking group which controls the railroads to produce this required credit or capital, that it is practically possible for them to do so, and that they should be required to do so as a condition of their continued control of the transportation system. "We estimate that if all possible improvements and economies were adopted, and if all the necessary capital and credit were available to the railroads to remedy their inadequate facilities, and to install economy devices and methods, an annual savings in operating costs could be made amounting to more than two billions of dollars, or, to be exact, \$2,026,000,000, or approximately 40 per cent of the operating expenses of Class One railroads for 1920. Of this amount of possible annual savings, approximately \$1,137,508,000 is dependent on new capital outlays. The remainder is based on changes in operating methods or on the introduction of new processes and methods and on unified control.

"The immense saving which could be realized from a conservative plan for properly financing the railroads (\$1,137,508,000) would alone reduce total operating expenses at least one-fourth, and constitutes more than one-third of the total outlay for railroad labor. In other words, it would be equivalent to the savings in operating costs if the earnings of railroad employees were further reduced approximately 33½ per cent. It would be an amount sufficient to pay the 6 per cent guarantee on the \$18,900,000 valuation placed on the railroads by the Interstate Commerce Commission.

"If a broad, scientific and honest policy were outlined by the banking interests who control the railroads, setting forth what savings might be made and what returns might be expected, there can be no doubt that the required amount of new capital would be quickly absorbed by the investing public. So far the bankers have refused to adopt this policy because there is a more profitable field immediately for new capital in other branches of industry, and it is easier and more profitable to take advantage of this and at the same time deflate general labor costs and require the employees and the public ultimately to pay the costs of railroad rehabilitation.

"If the banking combine which controls the railroads will not accept this new policy as a condition of the continuance of their control, then adequate railroad financing should be done under public auspices."

Objections to Contracting Out Work

Mr. Lauck also referred to the petition which he had filed with the Interstate Commerce Commission as counsel for the International Association of Machinists, asking it to prohibit railroads from contracting out repair and maintenance work without its permission. He said that many of the railroads are following the practice of telling their men that unless they will accept lower wages they will "farm" the work out and that this practice is running through all branches of railroad labor except transportation service. If allowed to continue, he said, it will circulate the transportation act and deprive the labor board of jurisdiction over a million and a half men. He said that while the Interstate Commerce Commission had practically substantiated the charges made by the unions regarding the locomotive repair contracts, the commission had done nothing about it except express an opinion, but if the commission should not have authority to issue such orders,

the only way to prevent the practice would be to amend the law to provide specifically that the men engaged on railroad work of this kind are under the jurisdiction of the labor board even if the work is done outside. But, he said, legal opinion seems to be that if locomotives are taken out of service to be repaired they are temporarily not in interstate commerce and, therefore, the men engaged on the work would not be in interstate commerce. Mr. Lauck said that the labor board should not take judicial notice of a reduction of wages made by the United States Steel Corporation, for instance, because it was purely arbitrary and should not be a standard to be followed by a governmental body. He said the railroad representatives would not concede that they are asking for less than a living wage, but they are under great pressure. He also said that the law does not provide specific standards for determining railroad wages, but that if the board does not take the position that it requires an adequate living wage it will become merely a barometer for registering supply and demand. He said the board had accepted the principle of an adequate living wage, but had not yet given it practical effect.

Nature of Mr. Lauck's Testimony

Mr. Lauck's testimony continued for three mornings and consisted largely of repetition of testimony previously given before the Railroad Labor Board. Most of the time only Chairman Cummins and Senator La Follette of the committee were present and on Wednesday Senator La Follette was the only member of the committee present. At the conclusion of Mr. Lauck's statement, Senator La Follette asked him to file for the record a large number of detailed exhibits, to which he had referred, but which he had said were too voluminous to put into the record, and practically gave the witness permission to file such statistical material as he cared to. Mr. Anderson was also given permission to read into the record a large amount of detailed testimony that had been presented before the labor board.

J. F. Anderson, vice-president of the International Association of Machinists, preceded Mr. Lauck, urging that the law be amended to make the formation of boards of adjustment mandatory instead of optional. He said there should be four national boards for the four principal groups or classes of railway employees, saying there would be danger with regional boards of confusion of decisions. He also urged that the law should be changed to prevent railroads from contracting out repair work

* * * * *



Photo by International

Built by "Rheinmetall" at Its Essen, Germany, Works for the Russian Soviet Government



The Train Now Being Used in the New York Central to Test the Train Control System

The Sprague System of Auxiliary Train Control

Apparatus Is Now Undergoing a Series of Daily Tests on a Section of New York Central Track

THE SPRAGUE SYSTEM of auxiliary train control, in the words of Frank J. Sprague, who is responsible for its development, is not an automaton in the place of an engineman, but an auxiliary system of train control which, while fully protecting the train and re-inforcing the engi-

the block, and there is a differential reset magnet near the exit end.

The brake-application magnets are of the permanent magnet type with neutralizing coils wound on the two ends or pole pieces, while the reset is simply an electro magnet. All of the magnets are controlled by the track circuit relay of the section in advance, the brake applying magnets being normally alive and the reset normally dead.

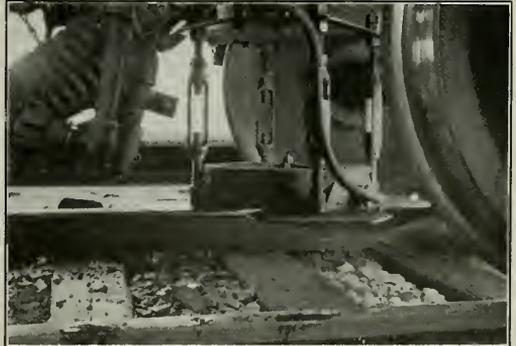
When a train enters this approach block, and the block



The Two Pole Pieces of a Brake Application Magnet. The Permanent Magnet Which Connects Them is Underneath the Ballast

neer's intelligence, leaves him practically undisturbed in the handling of his train so long as he performs his duty.

All apparatus on the track, as well as on the locomotive, is operated on the normal danger plan. Assuming a train



The Receiver Under the Forward End of the Tender



A Reset Magnet

ahead is clear, the application magnets are made inactive by the neutralizing coils, thus permitting the magnetically responsive receiver on the locomotive to pass through the space over the magnet poles without being affected. If the advance block is not clear then the application magnets will remain normal, or active, and the magnetic receiver on the locomotive is subject to their influence. The reset magnet then is inert.

The track magnets are enclosed for protection in sealed

in the block section approaching the block to be protected (which may or may not be occupied by a preceding train) it encounters two normal-danger, brake-application magnets, one near the entrance end and one at the critical point in

manganese steel casings which are supported in the ballast, between adjacent ties, by extension arms resting upon and secured to the ties. The application and reset magnets are placed at right angles to each other in the center of the track, the application magnets being parallel to the ties, and the reset magnets parallel to the rails. This insures proper registration and operation of the apparatus on the locomotive regardless of the direction of motion or heading of the locomotive. The faces of the magnet poles are between four and five inches lower than the tops of the running rails.

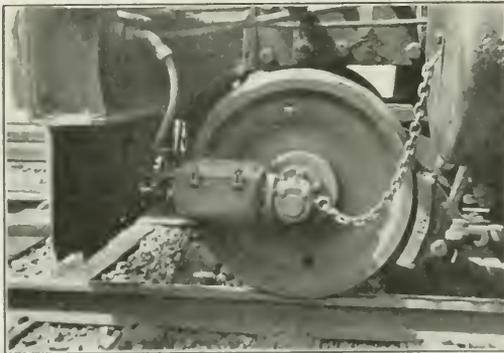
Locomotive Equipment

A double receiver is hung under the forward end of the tender on adjustable supports. This receiver is composed of two pairs of flat iron collector plates attached to the bottom of a non-magnetic box. These plates are from three to four inches higher than the tops of the running rails, thus making the distance from the track magnet to the receiver about seven or eight inches.

The magnetic flux from the track magnet is carried, through movable iron cores within the receiver box, to a floating receiver in which this flux is concentrated on one or the other of two moving armatures of small mass. The application magnets affect one armature while the reset magnets affect the other. The tops of the pole pieces are eight inches in diameter, and when a locomotive is running at a high speed the receiver will pass over the track magnet in less than 1/100th of a second. During this time the small armature in the receiver breaks contact momentarily.

RELAYS

The momentary breaking of contact by the armature in the receiver is translated into action by relays mounted in a box located on the running board. There are three relays, operating self-centering pressure contacts in definite se-



The Speed Control Mechanism

quence. These relays will respond to impulses as short as 1/1000th of a second. They are sealed and cushioned, and it is claimed they are unaffected by vibration.

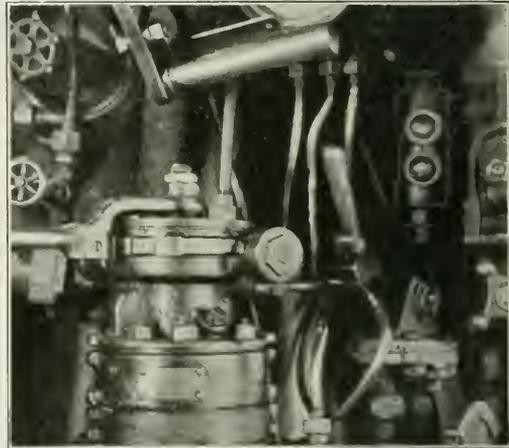
VALVE ASSEMBLY

The impulses picked up by the receiver and passed on by the relays, result in influencing the action of two pilot control valves located underneath the cab on the fireman's side. The function of these control valves is to establish an opening to atmosphere from one or another of the piston chambers which control the movement of a ported slide valve. The operation of this valve will, as may be determined by a selector valve, effect any required combination of measured and limited light and heavy service and emergency brake applications under speed control, with or without enforced

stop if the automatic brakes come on, or with the privilege of proceeding under limited speed until released. The operation of this valve assembly may cover any one of a number of different possibilities, depending upon the conditions of train make-up and of operation met in practice. Under usual conditions of operation, caution and stop signals will cause two brake applications, called primary and secondary. The character of these two applications is governed by the selector valve. Primary and secondary braking may be used in any combination, for example as follows: 10-lb. and 25-lb. reduction; 25-lb. reduction and emergency application; nothing and 25 lb., and so on. The valve assembly is applicable to any kind of standard brake equipment.

SPEED CONTROL MECHANISM

The speed control mechanism is carried on the front end of the locomotive, one end of it being supported on an ex-



The Special Head for the Engineman's Brake Valve and One Pair of Signal Lamps

tension of the forward truck axle. The other end has a spring-suspended nose support. The drive is by enclosed bevel gearing running in oil, while the governor assembly is carried in a dry chamber in which there is a centrifugal governor, a small air cylinder and fixed and movable end-contact steel brushes.

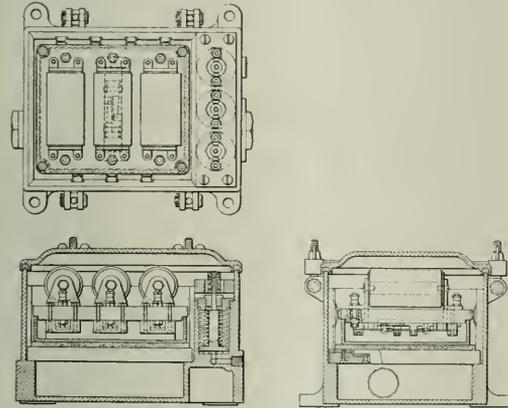
A single flexible air hose and a flexible electric cable, terminating in a standard coupling, are attached to the free end of the speed control mechanism. The air hose is connected to the engine brake system. The whole constitutes a combination of a speed-responsive device (not an odometer) and a brake-responsive device, by means of which the necessary co-ordination may be automatically secured to prevent unnecessary operation of automatic braking.

The remainder of the equipment on the locomotive consists of a small storage battery and the headlight generator for supplying the storage battery; a manually and power-operated engineer's valve interchangeable with the standard valve; and two pairs of signal lamps, one on each side of the cab. The engineer's valve is operated by air-oil pressure when a track impulse is received. This pressure is used to move the handle of the valve to lap position, the actual braking, other than manual, being accomplished by the automatic valves under the left side of the cab. The green lights show when the equipment is in running order and the block ahead is clear, and the yellow ones when the relation between speed and manual braking makes it safe to proceed under control.

Operation

On entrance to every block the cab signals indicate whether or not the next block in advance is occupied. If the signal at the entrance of the advance block is at caution, then, on passing over a live distant magnet, the green light disappears, an audible warning is given and a service brake application is initiated, this being light or heavy, depending upon how the selector valve is set. The yellow proceed light appears if braking is sufficient to forestall secondary braking at the home magnet.

The engineer's brake handle will be moved to lap position, but it can then, with effort, be pushed back to the re-



Plan and Sections of the Relays and Relay Case

lease position, against the brake-head operating pressure on the motor pistons, which pressure will then be promptly released if the train is not running above the predetermined caution entrance speed. If the engineer is attending to his duty he may, therefore, forestall actual braking of the train or he may promptly release his brakes in response to a change in roadside signal indications. The automatic service brake application may be augmented or diminished manually at will.

If the selector valve has been set for no primary brake application, as may be required in the movement of slow freights, then only an alarm will be given if the speed is under control.

If the engineer, while approaching the home magnet, makes a service brake application, the yellow light will appear in the cab whenever there is sufficient braking to insure reducing the speed to "control" speed in a suitable distance after passing a live home magnet without automatic secondary braking.

If the danger condition persists when passing the home magnet a second service braking will be initiated, which may likewise be released by the engineer, but conditions are established for an immediate or subsequent secondary brake application, according to the speed and braking conditions which then or thereafter obtain within the block.

If when getting the second impulse at a live home magnet the locomotive is running without braking and below the determined control speed, say 15 or 20 miles an hour, as indicated by the yellow lamp, and so continues until reaching the reset magnet, there will be no secondary brake application, but if the speed is increased and goes above the control speed before passing an active reset magnet, the brakes will be applied.

If the engine when passing a live home magnet is running

below the predetermined speed limit, say 45 or 50 miles an hour, and the train as a whole is being properly braked under a manual or automatic service application, the secondary braking will not take place; but if the brakes are released before reaching the control speed, then a heavy service or emergency braking will occur, depending upon the setting of the selector valve. The secondary brake cannot be released, however, until it has completed its function, no matter how short the initial impulse or whatever the engineer attempts to do with his brake handle.

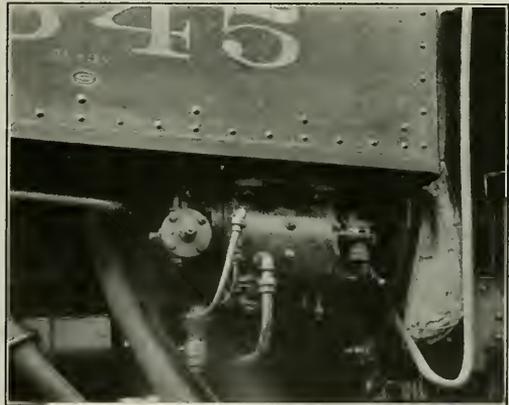
When the speed has been reduced to "control," the brakes may be released, but if the speed is later increased above the low limit before passing an active reset magnet, the secondary or emergency braking will again take place.

If the engine when passing a live home magnet is running above a predetermined high speed limit then there will be an uncontrolled secondary braking which cannot be released until its function has been completed.

When running above a predetermined allowed maximum speed on a clear track, a service brake will come on, regardless of the roadside signal indication, and the train speed must be pulled down to a safe caution block entrance speed to have the pressure on the engineer's brake handle released before passing a reset magnet.

If under these conditions a train, having had a maximum speed brake impulse and not having been pulled down to a suitable speed, should enter a caution block, then it will get a secondary braking at the first application magnet.

If under any conditions the secondary brake has come on, the predetermined set of the selector valve will determine



The Valve Assembly

whether the train can proceed under control on the engineer's initiative alone, or whether the train must first be brought to a stop and require the co-operation of the engineer and fireman outside of the cab to release the brakes.

When passing over a live reset magnet the engine relays will be restored to normal position, ready for response to the next live application magnet, no matter whether there have been one or two application impulses received, and if none has been received the reset impulse will have no effect on the apparatus. The reset only restores the control relays to normal; it has no effect on the brakes.

If, however, when passing the reset magnet it is not energized by the clearing of the home signal, the reset will not act and the allowed speed will be held down to the control limit, but the train may proceed into and through the next block under control.

If the conductor unlocks a control switch he can tem-

porarily give to the engineer and fireman the privilege of joint action to establish an early reset, if and only when the proceed cab light is in evidence.

In interlocked or other special territory an additional reset magnet may be installed to permit earlier acceleration in case the signals go to clear, and provision can also be made, subject to the positive control of the train conductor, so that simultaneous co-ordinated action by an engineer and his fireman can reset the relays to normal.

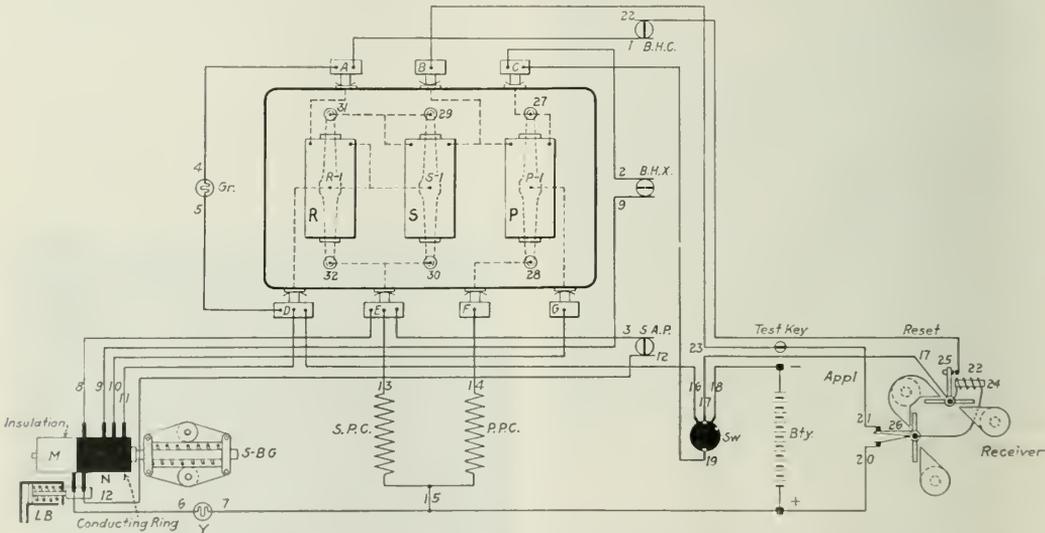
The response to the service brake impulses, and to the secondary brake impulses when exceeding the speed limits, as well as to the resets, is exceedingly rapid, and both brake controls are operated on closed circuits.

Sections under speed control, as for example, dangerous curves or bridge or crossing approaches, may be treated as permanent signal blocks, each being provided with one or more permanent application magnets to initiate service braking at the proper point if the speed is excessive, or later if it is augmented, and a permanent reset magnet after the

The re-closing of contact 21 immediately energizes relay S and picks up armature S-1.

The application of pressure to the engineer's brake head puts pressure on the BHC switch, opens the reset circuit, breaks green lamp Gr, de-energizes reset relay R, drops armature R-1 and breaks contacts 31 and 32, relay S remaining energized through stick contact 29. There is, therefore, a condition established in which, instead of P, S and R being all active, as in normal running, P and R are opened and S is still alive.

The movement of the brake head pistons opens BHX to atmosphere and closes circuit from relay P through speed brush 9 and cylinder contact N to negative line through brush 11 and switch Sw. This response is permissible only when cylinder contact N, which is normally shifted to the left with increase of speed, is moved sufficiently far to the right to permit brush 9 to make contact with cylinder N. Under these conditions relay P picks up and there is now established these conditions: P and S active and R dead,



A Complete Diagram of the Electrical Circuits and Connections on the Locomotive

- Bty Batteries.
- SW Main switch.
- P, S and R Primary, secondary and reset relays.
- PPC and SPC Primary and secondary pilot valve coils.
- MN Speed-brake controller.
- 26, 25 Application and reset armatures.

- Gr and Y Green and yellow lights.
- BHC and SAP Contacts operated by pressure in brake head cylinder and straight air pipe.
- BHX Contact operated by absence of pressure in brake head exhaust.

curve is passed. Portable magnets may also be used for wayside emergency conditions control.

The brakes once applied, the actuating pressure on the brake valve handle persists until the speed is reduced to a predetermined limit, which is individual to each class of locomotive.

All of the electrical connections in the apparatus are shown in the diagram.

FIRST IMPULSE

When application contact 21 is momentarily opened, relays P and S are de-energized and drop their armatures P-1 and S-1. The dropping of P-1 opens stick contact 27 and the circuit of the primary pilot valve coil PPC, with resultant primary brake application. The dropping of armature S-1, while opening the stick contact 29, does not then break circuit of relay S because the additional stick contact 31, controlled by armature R-1 of reset R, is still closed.

BHC being meanwhile closed on release of brake head pressure, relay contact 22, however, being left open.

SECOND IMPULSE

On second impulse from the track the contact 21 is again momentarily opened and P and S again de-energized, but this time (contact 31 at reset relay R being now open) the dropping of armature S-1 opens the stick contact 29 of relay S, and this relay therefore remains dead, although contact 21 has closed; relay P can be restored as before. The condition of the relays now is: P alive and S and R dead, and two of the four circuits, 8-3-30 and 32, in parallel and connected through 13 to the secondary pilot valve SPC, are opened, leaving the control of SPC through brush 8, or movable brush 12 and the switch operated by SAP.

Brush 12 and brush 6, connected to proceed light Y, are moved to the left by pressure in the locomotive brake system in the same direction as NM is moved by the centrifugal

governor. If SAP is opened then the final control is on brush 8, but if SAP is closed the control is shifted to brush 12, that is, to a co-ordinated position depending upon speed and braking. Contact 6 breaks before contact 12, and hence the yellow light Y becomes a warning and proceed light.

RESET IMPULSE

On receiving a reset impulse, contact 22 is closed by armature 25 and locked closed by holding coil 24, which is a part of the receiver. Relay R is, therefore, made active; contacts 31 and 32 are closed by R-1 and green lamp Gr is lighted, while S is likewise re-energized and through contact 31 all circuits, relays and pilot valve coils are restored to normal condition. If only one application impulse has been received, the reset contact on the receiver simply restores R and Gr to an active condition, S already being energized.

Tests are now being carried on for seven hours a day, six days a week, on a section of the New York Central, between Ossining and Tarrytown, covering six signal indications on eastbound track No. 2. This is about 30 miles from New York. All other trains are temporarily excluded from this section and several hundred recording operations, under varying conditions, are made each week. Electric locomotives and multiple unit trains which take direct current from a third rail, with a traffic rail return, are operated on this section of the road. The automatic block signal system is normal clear and the rail circuits are alternating current. The normal danger track magnets are supplied from storage batteries located along the right-of-way maintained by a trickling charge from the alternating current power lines.

This train control system was developed by the Sprague Safety Control & Signal Corporation, 421 Canal street, N. Y.

The Relation of Freight Rates to Agriculture

Chairman Anderson of Joint Commission of Agriculture Inquiry Forecasts Commission's Report

WASHINGTON, D. C.

CHAIRMAN ANDERSON of the Congressional Joint Commission of Agriculture Inquiry has given out a forecast of the section of the forthcoming report on transportation dealing with the economic relation of transportation to agriculture and industry.

"The joint commission has decided to report to Congress," said Chairman Anderson, "that the transportation rates on many commodities, more especially the products of agriculture, bear a disproportionate relation to the price of such commodities; that immediate reductions in transportation rates should be first applied to farm products and other basic commodities; that reductions in rates upon the articles of higher value, or upon tonnage moving upon so-called 'class rates,' are not warranted while the rates upon agricultural products and other basic commodities remain at their existing levels; that greater consideration should be given in the future by public rate-making authorities and by the railroads in the making of transportation rates to the relative value of commodities and existing and prospective economic conditions.

"It also appears from our inquiry that the pyramided per cent advances in rates authorized by the Interstate Commerce Commission or made by the United States Railroad Administration caused the dislocation of long standing rate relationships between rates upon agricultural and industrial products and between competitive enterprises and competitive sections of the country; also, that the railroads and public rate-making bodies should seek to readjust rates so as to preserve as far as practicable the general relationship existing prior to 1918 with due regard to present and future economic conditions.

"We have found that freight rates on perishables normally take about one-third of the selling price and frequently two-thirds, and in periods of low prices and light demands, they constitute a heavy burden upon this traffic. It is manifest from the evidence we have secured that the purchaser and the farmer are dependent to a marked degree upon the transportation charges of farm products. Regardless of the distance involved these transportation charges must enable both the carrier and the producer to realize a profit from his operations.

"The report will show that in October, 1921, farm products were at an index figure of 102 and railway rates at 169, and that in this period of falling prices for farm products the increased freight charges made the farmer feel more keenly

the relationship of freight charges to the price obtained for his product.

"In the opinion of the commission as a whole," Chairman Anderson said, "both the producers and consumers of grain and its products should have the following advantages of transportation:

- (a) Competitive avenues of distribution through which the largest number of consumers can reasonably be reached;
- (b) Through rates from points of production to points of final consumption through two or more competitive primary grain markets;
- (c) General application of the Interstate Commerce Commission's recent conclusion applying lower rates on coarse grain than on wheat, except where rates are affected by water competition or other factors outside the jurisdiction of that Commission;
- (d) Adequate and suitable box car equipment.

"Hay," the commission will declare, "must have a reduction in both rates and sales margins before there can be a resumption of normal shipments and in order that the producer may get a reasonable share of the final sales price.

"We are convinced," said the chairman, "that freight rates are still too high to permit the production and marketing of hay at a profit to the producer, and further reductions are essential before the production and marketing of hay will be upon a normal basis. The price of hay on the farm is now at or below the pre-war level, and if that price is maintained both freight rates and marketing costs must likewise be readjusted to a similar level."

The commission has found that livestock shows marked fluctuations in daily, weekly, monthly, and yearly shipments, and it urges that railroads, shippers, and stock yards should co-operate to bring about a more even distribution of shipments at the livestock markets. Increased marketing costs, including freight, commission, and other charges are found to have borne with the greatest severity upon the livestock producer farthest from market.

"Farm prices of livestock in 1921," Chairman Anderson said, "were below the 1913 level. If higher prices cannot be realized, it is obviously necessary that all the cost in marketing and distribution must be stabilized at approximately the 1913 level. If, as now appears to be the case, prices of livestock are going to find their level somewhat higher than in 1913, freight, commission charges, feed, yardage, and other

costs may also find a level corresponding to that of the price of livestock."

Present freight rates have been found by the commission to be but a small percentage of the value of the cotton crop, but it says that they do add to the cotton planter's burden.

"Any increase in freight rates, therefore," said the chairman, "presses with undue severity upon the cotton producer because of the high cost per bale of cotton production. It is pertinent to call attention to the fact that the export of cotton has in the past been the principal factor in balancing the trade of the United States and that it is greatly to the interest of the whole country to have profitable production and large export of cotton continue."

Wool Producers' Low Returns

Figures in the report will show, Chairman Anderson says, that the difference between market prices for wool and the return to the producer plus freight is unduly large. In 1913 the spread varied from \$0.17 to \$5.74, and in 1920-21 from, low, \$3.54½, to, high, \$6.28½. The chairman said on this point: "It is difficult to believe that the cost of marketing increased in any such ratio. We believe that the price of wool to the producer has been depressed somewhat by the freight rates but primarily by disorderly and unscientific marketing." The steps taken toward co-operative grading and selling will help to bring the wool producer closer to the consumer.

In dairy products the commission has found that the freight rate has a varying influence upon the return to the producer and the price to the consumer. For the United States the weighted average freight rate on whole milk is probably less than one cent per quart. Since buttermaking changed from a farm industry to a factory production, the transportation charge has entered largely into the price of butter to the producer and consumer. The farmer's price for butter fat is obviously more largely influenced by fluctuations in market prices than by the freight rate. Cheese rates have been found to be on a very high level and out of alignment with rates on more valuable and more perishable commodities such as eggs or grapes.

"Aside from their direct application to the products of agriculture," said Mr. Anderson, "transportation charges have an indirect but important effect on agriculture through their relation to the cost and selling price of the basic commodities. We have gone into the subject from that angle and will be able to present some definite conclusions in our report.

"For example, fertilizer prices are now close to the pre-war basis except for the higher freight costs now prevailing. Material prices and costs of manufacture are almost back to normal, leaving the present freight costs almost entirely responsible for the difference between present cost of fertilizer and that which prevailed prior to the war.

Farm Implements

"We have found that the weighted average of farm implements factory price, exclusive of power of equipment and twine, shows that price to be 41 per cent above 1913; inclusive of power equipment and twine, these prices are now approximately 20 per cent above 1913. It would appear that the factory price of agricultural implements does not show price advances to such a marked degree as other commodities and that they are rapidly receding to a lower price level. In 1914 the transportation charge on agricultural implements was about 11 per cent of the selling price to the farmer, including the freight on raw material entering into the manufacture, and in 1921, same increased to 15 per cent. A reduction in freight rates on each basic commodity, such as pig iron, steel, coal, coke, and lumber, would assist in reducing the farmer's expense for farm implements."

The report will show that the farmers are the second largest consumers of steel, coming next to the railroads, and

purchasing annually about 30 per cent of the country's steel production. They are, therefore, intimately interested in the relationship of transportation cost to the sales price of steel. The freight element in a ton of steel is declared by iron and steel makers to be in excess of 41 per cent of the selling price of the finished article and still higher in the case of pig iron.

The farmer is similarly interested in coal freight charges, since he is directly or indirectly concerned in from 20 to 22 per cent of the annual consumption of bituminous coal. Mine prices, freight rates, sales margins on both bituminous and anthracite coal have very greatly increased since 1913. There has been practically no depression in this industry although prices were somewhat lower in 1921 than in 1920. The commission believes that reduction in mine prices, freight rates, and sales margins on coal, especially on bituminous coal, would probably be promptly reflected in improved business conditions.

As to Coal

With further reference to bituminous coal, Mr. Anderson said that the commission had reached these conclusions:

- (a) That the wages of the coal industry should be considered in the light of the prevailing economic conditions;
- (b) That the transportation charges should be adjusted with due regard to the prevailing conditions;
- (c) That items of immediate expense in handling should be reduced to the lowest possible minimum;
- (d) That duplication of any items of expense intermediate between producer and consumer should be eliminated where such expense can be avoided without unnecessary interference with the broad avenue of distribution now existing.

Directly or indirectly, the commission has found that the farmers consume 46 per cent of the country's lumber production, largely in the so-called lower grades, and on these grades the retailer now realizes on the long hauls more in his sales margin on the freight cost than upon the lumber's mill value.

"From the standpoint of the railways as a whole," Chairman Anderson said, "they could better afford to obtain the needed revenue from the lumber business by the assessment of relatively higher rates to apply to their short haul business in order to give needed relief to the long haul traffic and still maintain a total compensatory railroad revenue."

Oil Products

The price of gasoline and kerosene, of which farmers are large consumers, has been found to be influenced little or not at all by changes in freight rates. As to cement, which is in the same category, the commission has found that both freight rates and prices of this commodity should show the trend of price levels of other basic commodities. "When the freight rates are reduced," Mr. Anderson said, "such decrease should be reflected in the price to the consumer and not absorbed as profit by various other factors in the distribution system. We believe that the public constituted authorities might properly analyze retail price trends of this commodity in relationship to the level of rates established."

Canned goods prices have been found to be practically back to pre-war levels. The price and distribution of canned products is not materially affected by present freight rates, the freight rate bearing a relatively small ratio to the final sales price.

Freight rates on such articles as boots, shoes, dry goods, men's and women's clothing, in the commission's judgment, are not materially responsible for the price of these commodities. Where the freight rate is not absorbed by the merchant but is made a part of the cost basis upon which margins and profits are figured, it represents a small proportion of the final sales price.

B. R. & P. Ton-Mileage Reduced 53.92 Per Cent

Result of Sharp Decline in Traffic Is 1921 Deficit of \$965,508,
Which Equals 5.85 Per Cent on Stock

BITUMINOUS COAL makes up about two-thirds of the total tonnage of the Buffalo, Rochester & Pittsburgh. The tonnage of this commodity in normal years runs about 10,000,000 tons and the total tonnage of all commodities about 15,000,000. In 1921, the Buffalo, Rochester & Pittsburgh carried only 3,854,947 tons of bituminous and its total tonnage was only 7,503,909 tons. The result was a corporate surplus available for dividends shown in red—in other words, a deficit of \$965,508, or a return on capital stock figuring out at a loss of 5.85 per cent. These figures, compared with a net of \$2,295,049 in 1920, amounting to 13.91 per cent on the capital stock. The contrast between 1921 and 1920 is made all the more striking because 1920 was the best year in the company's history and 1921 the poorest for an extended period of time. The past year was the first in which the company experienced a deficit since 1894.

In 1920, the road was unusually fortunate. It did not succeed in doing anything at all spectacular during the last two months of federal control—January and February—nor did it shine particularly during the guaranty period. It did, however, do some rather remarkable work during the last four months of 1920 when it was operating on its own account. It then had the advantage of the increased rates effective in August and it had a heavy traffic movement which lasted well into December. It was its earnings for these four months which enabled the road to show the large corporate net which it did show for 1920—namely 13.91 per cent on the capital stock. The decline in traffic, when it did come, was extremely sharp. Its sharpness was evidenced in the figures for January and was accentuated in the following months. Thus in October, 1920, the net ton-miles, including both revenue and non-revenue freight, were 251,562; in November, 213,321; in December, 197,064; in January, 1921, the figure had dropped to but 115,072 and in February there was a further drop to the low figure of 85,276. Nor was there during 1921 any sign of recovery. The best month in 1921 was October; in that month the net ton-miles totaled only 122,708.

The decline in traffic on the Class I railroads as a whole from 1920 to 1921 was 23.3 per cent. The Buffalo, Rochester & Pittsburgh, however, suffered a loss of 49.78 per cent in revenue tonnage and of 53.92 per cent in revenue ton-miles.

With a decline such as this one, no one could expect any railroad, no matter how efficiently managed—and the Buffalo, Rochester & Pittsburgh is noted for its efficient management—not to suffer a severe loss even with the advantage of higher rates and the most drastic sort of economy.

Extraordinary Unfavorable Conditions in Coal Fields

The road serves what may be generally termed the central Pennsylvania bituminous field, which in 1921 experienced, as President Noonan puts it in his annual report, "extraordinary unfavorable conditions." Bituminous coal, as noted, makes up about two-thirds the total tonnage. The road also has an important tonnage of iron ore, coke and pig iron. In 1921 this latter traffic, like coal, was also conspicuous by its approach to absence. The details may be given briefly as follows: The total tonnage of all commodities carried was 7,503,909 as compared with 14,941,182 tons in 1920, a decrease, as above noted, of 49.78 per cent. The tonnage of bituminous coal was 3,854,947 tons as compared with 9,402,558 in 1920, a decrease of 5,547,611 tons.

Coke which totaled in 1921, 154,388 tons was 442,393 tons less than in 1920. The iron ore tonnage was but 99,727 tons, 642,614 tons less than in 1920.

"Other freight" did not suffer as severely; it was 3,300,670 tons in 1921 as compared with 3,954,892 tons in 1920. The tons one mile were 1,136,943,603 as compared with 2,467,398,051 in 1920, a decrease of 1,330,454,448, as above noted, or 53.92 per cent. It is well, in using these 1920 figures, to point out that although the net income of the property in 1920 was the best in the company's history—due to the results of the last four months—the traffic carried in 1920 did not break any records. The revenue ton-mileage was greater in both 1917 and 1918.

Putting these on a revenue basis gives us more interesting details. The freight revenues in 1921 totaled \$11,962,147 as compared with \$19,014,479 in 1920, a decrease of \$7,052,331. The road shows its revenues from coal transportation separately: the 1921 coal revenues were \$6,261,050 as against \$11,828,281 in 1920, a decrease of \$5,567,231. The total revenues, including passenger, etc., totaled in 1921, \$14,399,526, or \$7,334,198 less than in 1920. As would be natural under the circumstances and as we would expect it to be the case in any report of 1921 operations, there were sharp cuts in operating expenses. The operating expenses were actually \$13,917,032 as compared with \$21,127,624, a decrease of \$7,210,592 from 1920. It seems hardly worth while to go into an analysis of these figures as we have already pointed out the effect of the reduction in tonnage and have shown that the good corporate result for 1920 was the result of the favorable earnings of the past four months of that year.

Cost and Profit per Ton-Mile

The company's annual report gives some unusually interesting figures of cost and profit per ton and per ton-mile. The figures are on an annual basis—in other words, insofar as concerns 1920, the unfavorable conditions of the first eight months of the year are averaged out with the good conditions of the last four months. Thus it is shown that in 1921 the receipts per ton were 159.41 cents as compared with 127.26 cents in 1920. The cost per ton in 1921 was 151.69 cents as against 123.54 in the previous year and the profit per ton was 7.72 cents as against a profit in 1920 of but 3.72 cents, which profits per ton, incidentally compare with a loss in 1919 of 6.08 cents and a profit of 17.75 cents in 1917, or 20.28 cents in 1916. The figures per ton-mile show receipts in 1921 of 1.052 cents; in 1920, .771, and profits in 1921, of .051 cents; in 1920, .023 cents, or in 1917, .104 cents.

Naturally, with the sharp reduction in traffic, the operating statistics do not show favorably. Thus, in 1921, the average revenue train load was 754 as compared with 943 in 1920. The tons per loaded car were 34.50 as against 39.98.

The Buffalo, Rochester & Pittsburgh is an extremely high-grade road financially and physically. It is a well-managed property. It is to be presumed that the poor results of 1921 will not be far-reaching because they have been the result of a single thing—lack of traffic. Of course, conditions at present are disturbed by the coal strike, and in general, the desired improvement in earnings is not in sight. The road, however, is prepared to handle a heavy business and apparently its only problem at present depends upon its getting that business through restoration of normal conditions in the territory which it serves.

Rail Production in 1921

THE PRODUCTION of rails in the United States during 1921 was the lowest in any year since 1914, according to statistics of the American Iron and Steel Institute. The total, 2,178,818 gross tons, is less by 425,298 tons than the production in 1920.

Year	Open-hearth	Bessemer	Re-rolled*	Electric	Iron	Total
1907	2,377,704	3,180,025	.....	.....	925	3,633,654
1908	2,717,901	1,849,153	.....	.....	71	1,921,015
1909	1,356,634	1,767,171	.....	.....	.....	3,023,805
1910	1,751,959	1,884,442	.....	.....	230	3,636,031
1911	1,676,923	1,053,420	91,751	.....	234	2,822,790
1912	2,195,144	1,099,926	119,390	3,455	.....	3,327,915
1913	1,512,911	1,117,591	155,043	2,436	.....	3,507,981
1914	1,525,851	323,897	95,169	178	.....	1,945,095
1915	1,775,168	326,952	102,083	.....	.....	2,204,203
1916	2,269,660	440,092	144,826	.....	.....	2,854,578
1917	2,292,197	533,325	118,639	.....	.....	2,944,161
1918	1,845,443	494,193	101,256	.....	.....	2,540,892
1919	1,893,111	214,121	96,422	50	.....	2,203,843
1920	2,334,252	142,899	126,698	297	.....	2,604,116
1921	2,027,145	55,559	96,039	5	.....	2,178,818

*Re-rolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1907 to 1910, inclusive.
 *Small tonnages, rolled in 1909 and 1910, but included with Bessemer and open-hearth rails for these years.

It is interesting to note that there has been a further reduction in the use of Bessemer rail as indicated by the table below. In 1921 only 2.55 per cent of the rail rolled was Bessemer as compared with 5.49 per cent in 1920.

Kinds	1920	Per cent	1921	Per cent	Decrease	Per cent
Open-hearth	2,334,252	89.63	2,027,215	93.04	307,037	13.15
Bessemer	142,899	5.49	55,559	2.55	87,340	61.12
All other	126,995	4.88	96,044	4.41	30,951	24.37

Total, 2,604,116 100.00 2,178,818 100.00 425,298 16.33
 Girder and high T-rails for electric and street railways are included in the figures given above. For recent years the tonnage was as follows: 1916, 127,410; 1917, 91,674; 1918, 20,834; 1919, 112,712; 1920, 100,910; 1921, 89,162 gross tons. The total production of rails as given above includes, in addition to new rails rolled, rails re-rolled from defective rails and from old rails. The total of renewed or re-rolled rails so included is given in gross tons below.

Years	Produced from new second-hand, new defective rails, etc		Rolled from old rails		Total re-rolled
	Open-hearth	Bessemer	Total	Decrease	
1914	13,538	13,234	26,772	95,169	121,941
1915	6,477	2,652	9,129	102,083	111,212
1916	1,711	2,149	3,860	144,826	148,686
1917	1,825	7,182	9,007	118,639	127,646
1918	11,296	19,462	32,758	101,256	134,014
1919	1,933	5,768	7,701	126,698	134,399
1920	19,493	1,979	21,472	126,698	148,170
1921	6,525	702	7,227	96,039	103,266

The tendency toward the use of heavy rail is indicated by

the following table showing the production of rails by weight per yard. This shows an increasing preponderance in rails weighing 85 lb. or more. Attention is also called to the fact that rail weighing 100 lb. or over now represent almost the same tonnage as rails weighing 85 lb. and less than 100 lb. As an evidence of the greater use of heavy rail it is also interesting to note that during the past year the tonnage of rails weighing 85 lb. or more represents 80.5 per cent of the total, whereas in 1915, when the tonnage of all weights was almost the same, the rails weighing 85 lb. or more represented only 65.0 per cent of the total.

Years	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over	Total Gross tons
1905	228,252	1,601,624	1,546,053	1,375,929	3,375,929
1906	284,612	1,749,650	1,943,625	3,977,887	3,977,887
1907	295,838	1,569,985	1,767,831	3,633,654	3,633,654
1908	383,869	1,687,612	1,049,514	1,921,015	1,921,015
1909	355,726	1,024,856	1,743,263	3,023,843	3,023,843
1910	260,709	1,275,339	2,099,983	3,636,031	3,636,031
1911	218,758	1,067,696	1,536,336	3,822,790	3,822,790
1912	248,672	1,418,559	1,960,651	3,327,915	3,327,915
1913	370,405	796,713	2,265,062	3,507,981	3,507,981
1914	238,423	330,865	868,104	528,703	1,945,095
1915	254,101	1,518,291	742,816	688,995	2,204,203
1916	495,535	1,667,791	1,225,341	766,851	2,854,578
1917	308,258	1,882,673	989,704	763,226	2,944,161
1918	395,124	1,665,165	888,141	592,462	2,540,892
1919	263,803	1,495,577	965,571	478,892	2,203,843
1920	489,043	1,433,333	952,622	729,118	2,604,116
1921	211,568	1,243,936	902,748	849,566	2,178,818

*Includes rails under 50 pounds.
 †Includes 50 pounds and less than 85 pounds

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended on April 8 naturally reflected the decrease in coal traffic resulting from the strike, but it still represented an increase as compared with the corresponding week last year. The total was 714,268 cars as compared with 694,851 in 1921 and 801,559 in 1920. The decrease as compared with the week before was 112,000 cars. The number of cars of coal loaded fell from 184,952 in the week ended April 1 to 69,456 in the week of April 8, a decrease of 115,000. During the corresponding week of 1921 the coal loading was 126,461 cars.

As compared with last year there was a decrease in the loading of grain and grain products, livestock and coal, but increases in coke, forest products and ore and large increases in merchandise and miscellaneous freight which more than made up for the decrease in coal. In the Pocahontas district, where many of the non-union mines are located, the coal loading was greater this year than last year.

REVENUE FREIGHT LOADING

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, WEEK ENDED SATURDAY, APRIL 8, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Miscellaneous	Total revenue freight loaded			
									This year, 1922	1921	1920	
Eastern	1922	5,905	2,758	6,940	1,407	4,161	1,337	69,511	166,365	192,333	192,333	
Western	1922	2,096	2,553	19,955	4,216	3,579	3,568	51,013	63,873	150,448	140,645	192,205
Central	1922	1,449	591	38,688	4,777	2,36	826	41,420	48,158	180,643	180,643	180,643
Northwestern	1922	25	76	1,385	231	1,341	37	5,992	4,447	33,641	33,641	33,641
Southwestern	1922	1,000	3,155	13,851	188	1,148	37	5,011	4,518	111,114	111,114	111,114
Northwestern	1921	8,41	2,031	15,354	188	1,341	37	6,587	10,544	112,727	112,727	112,727
Northwestern	1920	7,718	6,913	3,305	113	1,633	801	39,273	39,948	97,126	87,558	135,175
Central Western	1922	1,919	8,601	1,590	117	1,075	1,706	9,653	37,177	101,381	114,441	144,441
Central Western	1921	1,613	7,163	1,522	174	6,300	21	16,430	30,658	50,000	50,000	50,000
Central Western	1920	3,809	1,785	8,874	1,854	1,110	37	16,014	21,518	122,766	122,766	122,766
Texas & Oklahoma	1922	1,800	19,866	19,866	773	18,159	76	3,143	8,934	244,706	244,706	244,706
Texas & Oklahoma	1921	1,111	11,111	11,111	111	11,111	111	11,111	11,111	694,881	694,881	694,881
Texas & Oklahoma	1920	1,111	11,111	11,111	111	11,111	111	11,111	11,111	801,559	801,559	801,559
Central Western	1922	1,800	19,866	19,866	773	18,159	76	3,143	8,934	244,706	244,706	244,706
Central Western	1921	1,111	11,111	11,111	111	11,111	111	11,111	11,111	694,881	694,881	694,881
Central Western	1920	1,111	11,111	11,111	111	11,111	111	11,111	11,111	801,559	801,559	801,559
Central Western	1922	1,800	19,866	19,866	773	18,159	76	3,143	8,934	244,706	244,706	244,706
Central Western	1921	1,111	11,111	11,111	111	11,111	111	11,111	11,111	694,881	694,881	694,881
Central Western	1920	1,111	11,111	11,111	111	11,111	111	11,111	11,111	801,559	801,559	801,559



Some of the Listeners at the Automatic Train Control Hearings—Photo by Underwood & Underwood, N. Y.

Hearing on Train Control Concluded at Washington

Train Control Proprietors' Testimony Completes Evidence on Which Commission Will Base Decision

THE MILLER TRAIN CORPORATION had not completed the submission of its brief before the Commission at the time of our going to press last week and was not included in our report (page 927), which covered the hearing on Wednesday the 12th. The first witness on the morning of April 13 was H. H. Orr, signal engineer of the Chicago & Eastern Illinois, who testified as to the operation of the Miller device on that road.

The Miller Train Control Brief

W. B. Murray, chief engineer of the Miller Train Control Corporation, began with a discussion of the faults cited by the railroads' committee. He said that action had been taken to remedy them, and that his company was working in closest accord with the committee of the American Railway Association, the representatives of the Interstate Commerce Commission and the officers of the Chicago & Eastern Illinois. Regarding the possibility of a ramp being accidentally displaced, he said that the chances of this are extremely remote as has been demonstrated during the eight years of regular service on the C. & E. I.

As to operation under adverse weather conditions the roads' committee stated that no dependable records were available prior to May 1, 1921; but daily reports, similar to those made of the automatic signal performance, are made of the operation of the train control apparatus by the railroad; and during these eight years there have been all kinds of weather, including many storms of snow, sleet and ice; experience has conclusively proved that operation is satisfactory under all weather conditions which permit train movement. In February, 1914, it was necessary to plow snow drifts from the tracks, and the ramps were covered with snow and ice, but there was no interruption. The winter of 1918-1919 was the most severe for many years and the control operated satisfactorily on all classes of trains.

The device has been in service on 107.2 miles, double track, for eight years; 85 engines equipped and 175 ramp locations. Mr. Murray traced the development work carried on since 1908, showing the low cost of installation and maintenance. Averages of operation and maintenance for one year based on

actual figures of the railroad company for five years are as follows: Engines, \$8,330; ramps, \$8,160; total, \$16,491; an average yearly cost per engine of \$98.01, and average yearly cost per ramp, \$46.64. These figures include the usual 10 per cent added for supervision and use of tools on cost of labor, and 15 per cent for freight and handling on cost of materials. The interest on investment is not included. The price of installation of apparatus such as is now used on one engine division of the C. & E. I., 107.2 miles, double track, is 85 engines complete at \$500 each, \$42,500; 175 ramps complete at \$300 each, \$52,500, or a total of \$85,000.

Mr. Murray said that his company could deliver 50 of the engine devices a day. All material except ramp stands, control instrument and shoe is of standard manufacture, which can be obtained anywhere. Arrangements have been made with large foundries and machine shops which have patterns of their material and are acquainted with their work.

Statement by H. H. Orr

Mr. Orr, signal engineer of the C. & E. I., has been connected with the signal department in various capacities throughout these introductory years. Replying to Attorney Lyon, he said that in the main he concurred in the report of the Miller Train Control Corporation as read.

Mr. Lyon:—Has the stop as installed and operated on your line a permissive feature?

Mr. Orr:—Yes.

Mr. Lyon:—Why do you install and operate it in that way?

Mr. Orr:—In order that the engineman may retain control of the train if he is alert. The engineman would have to release it wilfully to prevent a stop.

Commissioner McChord:—Why wilfully? Might it not be thoughtlessly?

Mr. Orr:—In my opinion it would have to be wilfully.

Replying to further questions, Mr. Orr said he had never heard of an engineman releasing brakes thoughtlessly after an automatic application.

After the conclusion of the testimony the carriers' attorney waived cross-examination, this being the only train control

company with an extensive installation which was not cross-examined.

Various Devices

Clifford Automatic Train Control & Signal Corporation.—F. J. Clifford sketched the development of train control devices during the last 50 years. Automatic train control has been advocated in the public press for a good many years, and especially after each serious collision. The speaker quoted from a paper read by W. G. Bierd, president of the Chicago & Alton, before the Western Society of Engineers at Chicago on October 21, 1920, after which he gave a general description of his device. The functioning of his device when a train is in live territory cannot be prevented by manipulation of the engineman.

H. W. Richard stated that he had been engaged in development work for about seven years. He described his device, and in reply to Mr. McChord, said that he expected to have it ready to be installed in about three weeks.

Warthen Automatic Train Control Corporation.—A. F. Dulin, presenting the brief for this company, said that up to the time of Mr. Warthen's death in 1919 he had kept in close touch with the development of this field and with the Bureau of Safety. Mr. Dulin set forth his claims regarding patents, cost, and adaptability. He declared that the intermittent contact type had proved its case. The carriers have stated that the induction type is preferable and want time for it to be developed; but they have had time to try out all of these devices, and the unnumbered millions of the traveling public demand protection without further delay.

H. A. Brown, speaking for the Warthen company, presented an itemized statement of cost. The estimated cost of wayside apparatus is \$585.95 and locomotive apparatus \$497.50, or a total of \$1,083.45 for one location of wayside apparatus and one locomotive. Reductions might be made if the electric headlight generator were to be used.

Nevins-Wallace Train Control Company.—L. R. Wallace presented the brief for this company, stating that its device was of the mechanical ground trip type electrically controlled.

The General Railway Signal Company and the Union Switch & Signal Company did not take the stand but presented statements for the consideration of the Commission.

Abstract of Remarks by G. P. Finnegan

George P. Finnegan presented a written statement in which the railroads were criticized for their attitude on the whole train control question. He has worked on this subject for over 20 years developing and patenting trips, ramp rails, electric and mechanical contacts on engine, continuous a. c. control with a plurality of frequencies and, finally, intermittent induction. The avoidable losses due to wrecks and the absence of train control would finance the installation of train control on the principal railways of America.

"Railroads are so positive that trains will make prompt arrivals that they sell insurance, guaranteeing that the passenger will be delivered on time; and the whole responsibility rests on the engineer, and he depends on the wayside signals to guide him in his flight. Although signals have been in a state of development for the past 50 years under the supervision of the most able engineers in the world, they still fail to function perfectly and they have the physical defects of being unreadable under various conditions, such as snow storms, fogs or a blanket of smoke. Therefore, aside from the ability of the track circuit to report a defect in the rail, what does the most up-to-date form of signals add to railroad safety? They simply accelerate traffic over the rails, admittedly at the cost of safety. However, the higher railroad officials naturally do not want to spend money for new things and they wonder why the signal companies have not up to the present time shown any determined interest in

train control. There are hundreds of engineers employed by railroads in the maintenance of signal systems, and the majority of these engineers are pupils of the signal concerns, many of them having worked for these corporations. The stock of goods that are put in their hands to work with are mostly manufactured by and purchased from the signal companies, and so naturally these engineers prefer to deal with those who have an able force of engineers to help them install and maintain; so the signal companies have been sitting back in their traces with respect to train control. The signal makers know that reliable cab signals are more desirable than the junk that they deliver to the railroad companies today, therefore, why not wait; in fact, why not retard, if possible, any movement towards automatic train control and cab signals? But at the eleventh hour we see them rushing about trying to bite a mouthful from some poor inventor's dream and go out after the business that seems forthcoming.

"The Interboro Rapid Transit Company of New York, the Pennsylvania and the Baltimore & Ohio afforded us every courtesy in assisting to develop the principles of train control. There are also other railroads which have granted permission to inventors whereby they might develop their devices; such as the Erie (18 years ago).

"The Lackawanna has permitted the installation of several devices, including those of the Union Switch & Signal Co., within the past 15 years, and, strange as it may seem, they are still determined to find an efficient system of speed control. We are glad to inform this commission, and some of the old guard of signal engineers who 20 years ago thought Finnigan's train control ideas were loony, that the Lackawanna has entered into an agreement to install 15 to 30 miles of the Finnigan induction traffic speed control with a view of equipping the whole system. The installation will be made on the main line between Hoboken, N. J., and Scranton, Pa., work to begin at once. Who's loony now? Yes, hoys, 'the world do move.'

"Many signal engineers for a long time have been in favor of train control and have endeavored to keep themselves posted; but there are many dyed-in-the-wool anti-control signal engineers who have not missed a single chance to submerge train control when the opportunity was offered. These men are on record at every official meeting within the past 12 years as train control knockers.

"In 1910 and 1911 on the Interboro line, in New York, our system of train control was commended by J. M. Waldron, signal engineer of the Interboro. With this induction apparatus we developed a remarkably simple form of speed control. The engine apparatus designed on a closed circuit had no contacts or moving parts, and if it failed it failed safe.

"Some of the parties who inspected this system at that time were J. P. Coleman and F. L. Howard (U. S. & S. Co.), Oler and Allen (P. R. R.); also Charles Stephens (C. & O.), who since that time has done more to develop and operate automatic train control on steam railroads than any man in America. The device was also inspected by the famous 'we-don't-want-to-find-train-control' committee of the New York Central, composed of Elliott, Mock, Balliet, Rose and Denney. These men saw the device under all conditions of flexibility that could be required by any railroad and it functioned 100 per cent.

"For a practical device for mixed railroad traffic we are confronted with cold, hard facts, and these facts have been laid down in commandments issued by your commission. There is nothing in these requisites but what should be conformed to. The conditions are reasonable. The engine apparatus should be of few parts, as it is almost impossible to maintain electrical contacts or moving parts on an engine, due to impact and vibration.

"We have recently heard much discussion of automatic train control on the engine subject to manual control. Is not

the object of automatic control to eliminate the human element, and does not this feature re-introduce it? Why is train control desirable or worthy of consideration if the human element still exists in operating trains? Are all these years of toil and millions of dollars that have been consumed by hundreds of inventors trying to eliminate the human element to be annulled and the conditions made more hazardous by introducing instead of one engineer, two 'piano players' on each locomotive, whereby the cardinal principle is submerged? Has not an engineer running at 75 miles an hour with signals appearing every 50 seconds, enough responsibility, with the care of his engine, without adding to his burden the task of synchronizing himself with the other piano player in letting themselves past the signals and creating a condition more hazardous than the present signal system?

"Anyone aware of the responsibility of an engineer or fireman running a high speed train, will agree that these men have no time to play tag around the boiler of a fast moving train.

"If we are to have automatic train control, let it be automatic. Do not install any device that will produce any degree of degradation on the engineer nor inconvenience his control while he elects to run safe. When a device is shown in operation to conform to these conditions, the railroads may be expected to be glad to accept it as a financial and humanitarian adjunct to their system. . . ."

The Simmen System

P. J. Simmen, of the Simmen Automatic Railway Signal Company, outlined his years of development work. His company has developed an automatic block system, a speed control device, and a remote control dispatching and recording system. He told of his agreement with the General Railway Signal Company, under which that company was licensed to use his speed control device, and by means of which train control has been carried beyond the experimental stage. He described his speed control and train dispatching system as installed on the Indianapolis & Cincinnati Traction Company's line. Mr. Simmen would make no provision to enable an engineman to prevent the automatic application of the brakes except by properly reducing speed. He would favor making a record every time the engineman permits the air brakes to be automatically applied, and discipline him for unnecessary operations. C. C. Paulding, attorney for the carriers' committee, asked Mr. Simmen some questions about the operation of cab signals. Mr. Simmen declared that on general principles cab signals are less costly than our fixed signal installations.

Edward Stegelmeyer, secretary of the Automatic Train Control Company, presented a brief describing his electrically controlled mechanical trip type of train control. It was tried on the Big Four in 1909. When asked by Mr. McChord why these tests were not continued, he said that he did not know. Regarding his attempt to get a test installation on the Monon road, Mr. Stegelmeyer said that the president had promised to allow a test to be made after the end of federal control, but up to the present time nothing had been done. Replying to Mr. Borland as to what facilities he had to make an installation, Mr. Stegelmeyer said that his company was prepared to handle its first order on a job lot basis.

A. J. Brookins, describing the Brookins-Burdette train control system, said that he had studied the subject for 10 years; and he entered into a long discussion of general principles.

M. T. Miller, attorney for the Simplex Train Control Company, presented a short brief and asked that the Commission's order be modified so that those railroads desiring to use types which have not as yet been developed could have opportunity to do so. Commissioner McChord stated that

no modification of the order was needed to do that; but Mr. Miller thought that if the order was issued as now drawn, there would be a rush of the railroads for the ramp type; an extension of time should be allowed.

Thomas C. Clark's Wireless Control

J. G. Dunn presented a brief for Mr. Clark. He deemed it essential to have an efficient method of putting the indication before the engineman at any time or at any point in the block. This problem has been solved by his system. Mr. Dunn gave a brief description of the development of the apparatus, which is of the continuous inductive type, controlling the train at any point in the block. The engineman may handle his train without interference so long as he does it properly. Mr. Dunn suggested that if the order is issued now the railroads will be so busy that proprietors having devices which have not been tested will have no opportunity to show what their devices can do; and he asked that the order be held in abeyance until this system can be developed. The Pere Marquette has given permission for a 10-mile section to be installed for test purposes.

Leslie M. Shaw, representing the Julian-Beggs system, told of tests which had been conducted on the Cincinnati, New Orleans & Texas Pacific. He asked that the Commission's order be issued substantially as it is drawn, with little extension of time. It would not be fair to his clients for the uncertainty to be continued.

C. C. Paulding, attorney for the carriers' committee, stated that it was the intention of the railroads to try out the various devices.

The Shadle Train Control.—A brief was presented in behalf of this system. It called attention to the large number of collisions and the large loss of life and the cost to the railroads for these; and the opinion was expressed that some action should be taken by the railroads. A comparison of the cost of automatic train control was made with the cost of couplers, brakes, fittings for mail cars, underframes, et cetera.

The International Signal Company

J. F. Webb, Jr., secretary-treasurer of International Signal Company, said that the arguments of the carriers against the installation of these safety devices fall naturally into two classes; (a) general objection to all such devices, and (b) specific objection to the ramp type. Mr. Webb discussed the objections in detail. "The fight of the carriers against automatic train control is in line with their fight against air brakes and automatic couplers. They lost those earlier fights, but they are now blessing the days of those defeats. The day will come when the carriers will also bless the installation of this newer safety device."

James P. Whissman stated that he had developed an intermittent contact overhead, or compression trip type, and in 1908 had applied to the New York Central for permission to test it.

Regan Safety Devices Company

This company presented a great mass of exhibits. The first was an analysis of the report of the carriers' committee on inspections. In another exhibit exception was taken to the request of the A. R. A. committee for the re-insertion in the proposed order of paragraph *b*, Section 1, under automatic stops, reading "Under control of enginemen, who may, if alert, forestall automatic brake application." The Regan Company "does not agree with the committee that a forestalling feature with the automatic stop only should be permitted. If one is permitted, then the engineman may cancel at will the automatic stop, when imposed or when about to be imposed; then it is a question of the engineman's judgment as to whether his train shall be brought to a stop, or whether he shall cancel the stop himself, expecting to control

the train when it proceeds in accordance with conditions ahead as he sees them."

The exhibits presented were, Exhibit A: A reply to carriers' sub-committee; defects pointed out. Exhibit B: A detail record of the performance of the Regan device on the Chicago Rock Island & Pacific from February 12, 1920, to date. Exhibit C: A cost analysis of the testimony of railroad witnesses. Exhibit D: A map of the United States showing location of collisions which have occurred in automatic block signal territory from September 4, 1911, to May 17, 1921. Exhibit E: A series of photographs showing the condition of the storage battery used on the locomotive, and pictures showing that ramps do not interfere with men getting on or off trains, and that other obstructions such as switch stands, switch movements for electric interlocking, lamps, etc., offer greater obstructions than do ramps. Exhibit F: Analysis of the committee report on specification. Exhibit G: A series of descriptive circulars showing installations of Regan apparatus in the United States, France and Great Britain.

A. G. Shaver, chief engineer of Regan Safety Devices Company, was the first witness for that company. He gave a description of the device and cited records of engine movements, both passenger and freight, over the equipped territory. Concerning induction apparatus, C. E. Denney interrupted to ask if this type was being developed by the Regan Company; and whether it had been brought to the attention of the railroads' committee; also whether the Bureau of Safety had passed on it. Mr. Shaver replied in the negative. Regarding installations in France and Great Britain, where the ramp rail was placed between the running rails, Mr. Denney asked Mr. Shaver if that was a good thing and whether it could be used in this country. Mr. Shaver believed that in some cases it could be done.

Mr. Shaver next discussed the objections cited by the carriers' sub-committee. Certain changes in engine circuits have recently been made, and when questioned about this by Mr. Peabody, Mr. Shaver said that the changes would provide for more economical operation. Mr. Shaver stated with reference to the speed control apparatus that it will run about 100,000 miles before needing attention.

Mr. Peabody wished to know what the introduction of speed control would do on heavy mountain grades, particularly with reference to the losing of the air by repeated applications by the speed control apparatus. Mr. Shaver said there were no heavy grades in Illinois in the territory equipped. He said that enginemens must conform to the caution signal indication. A penalty should be imposed if the signal is not observed. To support the committee's contention that speed control as applied on the Rock Island sometimes stopped instead of reduced the speed of trains, Mr. Denney asked if a speed control application was liable to produce this result if the enginemans fails to take action. Mr. Shaver admitted this, but said that it was in the province of the enginemans to reduce speed so that the speed control does not take effect.

Mr. Denney asked what an enginemans must do, and, continuing, said, "You maintain that the speed control will in some cases reduce the speed of the train and in others stop the train. The device does not do what it is designed to do. It is recognized that there is more difficulty and greater hazard in managing the speed of freight trains than of passenger trains, and the sub-committee wishes to bring out its desire to have apparatus developed so that no hazard exists to the trains themselves or to adjacent tracks through accidents and for that reason any device developed should function at all times as it was designed to function."

At this point Mr. Shaver was replaced on the stand by C. A. Lyon to answer questions regarding the effect of speed control on freight train operation.

I. Beaumont, vice-president and sales manager for the

Regan Company, was called to the stand next and attempted to destroy the force of the carriers' committee report by cross examination. After setting forth the imposing array of engineering talent in the service of the Regan Company, and their qualifications, Mr. Beaumont went on to explain the purpose of speed control, and gave further details of the installations in Great Britain and France. He then discussed the cost analysis as presented in one of the briefs. Instead of reading the entire brief, he criticized the estimates of cost which were presented before the Commission by W. H. Elliott, J. A. Peabody, C. J. Kelloway, A. W. Trenholm, W. J. Eck, and others. Regarding facilities for manufacturing, his company could manufacture 100 units of automatic train control a week, having factories at Niagara Falls, in Great Britain and in France.

W. M. Camp, editor of the Railway Review, was expected to take the stand after the train control proprietors had finished, it being the understanding that he was to explain the elimination of paragraph *b* from the Commission's order; but Chairman McChord, after a conference with Commissioner Esch, said that they had decided it would not be necessary to call Mr. Camp to the stand, enough testimony having already been taken regarding this question.

B. & M. Valuation Exceeds Property Account and Capitalization

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on April 14 made public its tentative valuation of the Boston & Maine, as of the valuation date of June 30, 1914, in which it reports the "final value" of the property owned and used for common carrier purposes, including 708.8 miles of first main track and 1,380 miles of all tracks, as \$101,712,972. The final value of the property owned and used is given as \$234,189,816. This covers 2,183 miles of first main track and 4,134 miles of all tracks.

The capital obligations of the Boston & Maine outstanding on valuation date were \$109,739,190, but this covers considerable property not included in the valuation report of the carrier property owned, including \$2,414,820 of improvements on leased property which the commission has readjusted to \$2,289,820. It also covers securities of other companies of a par value of \$20,029,769 recorded on the books at \$20,722,230, and also non-carrier lands which are reported at a present value of \$1,555,451. The final value of the used property includes \$132,476,845 for leased property, including 1,474 miles of first track and 2,752 miles of all tracks. It also includes \$58,016 of property leased to others. The total capital obligations of the companies that owned the leased properties, stated separately in the report, foot up to about \$110,000,000, or considerably less than the final value placed on them of \$132,476,845. This would make a total of capital obligations of \$220,000,000 roughly comparable to the \$234,189,816 final value of the used property, although the capitalization of the corporations cannot be exactly compared with the commission's valuations of the carriers as the former cover much property not represented in the valuation.

The investment in road and equipment of the Boston & Maine as of the valuation date is stated on its books as \$90,653,840, of which \$59,927,508 represents the investment in road and \$30,726,332 the investment in equipment. The commission's report says that if certain readjustments were made this would be reduced to \$88,090,755, of which \$27,142,464 represents the par value of securities issued and assumed and other liabilities of predecessor companies, the value of which at the time of entry cannot be determined.

The original cost of the property cannot be ascertained from the records, the commission reports, but it gives the "recorded outlay" for 548 miles of road, after the deduction of about 26 miles abandoned or sold, out of a total of approximately 707 miles owned on valuation date. This includes \$45,788,402 as the recorded money outlay including some short term notes, and \$5,843,405 as "recorded outlays for which the consideration is undetermined." The original cost of 20,764 units of equipment is given as \$30,450,035, with a statement that the carrier claims an additional \$5,187,004 based on estimates.

The cost of reproduction new of all common carrier property other than land reported is \$93,851,564 for the property owned and \$223,317,897 for the property used. The cost of reproduction less depreciation is given as \$72,174,404 for the property owned and \$170,629,869 for the property used.

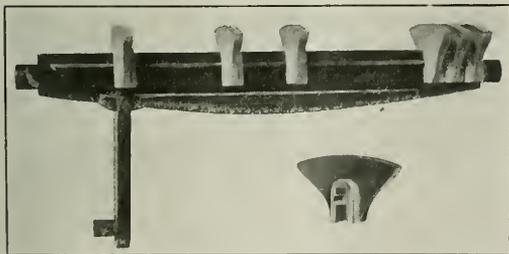
The present value (as of 1914) of carrier land owned and used is given as \$16,316,256 and of the land used for carrier purposes as \$44,130,611, while the excess cost of acquisition of the land is given as \$12,670,673 for the property owned and \$32,443,417 for the property used.

The value of materials and supplies on hand is stated as \$5,702,134.

In accordance with the usual practice, the company and the state authorities on whom the report is served are given 30 days within which to file any protest against the tentative valuation before it can be made final. Some of the valuations heretofore served in the case of short lines have become final by reason of no protest being filed, but most of the roads have protested the tentative valuations and the commission has announced a number of hearings on them for various dates in May.

Service of Hulson Grates on the Wabash

THE TYPES OF GRATES generally used in locomotive fire-boxes have probably been subject to less modification than any other part of the locomotive which has to do with combustion and heat absorption. The simplest form of finger bars or table castings still prevail although it is generally recognized that they have well defined limitations as



Hulson Grate Finger Bar and Fingers

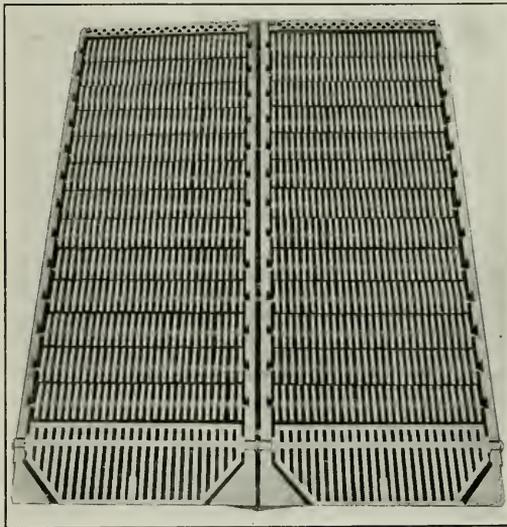
to economy of maintenance, percentage of air opening and restricted removal of ash from the firebox to the ash pan.

Several years ago the Hulson Grate Company, Keokuk, Ia., brought out a locomotive grate (see *Railway Age Gazette*, August 20, 1915) in the construction of which was embodied a number of novel features designed to remove or materially extend these limitations. This grate was an adaptation of a design which at that time had already met with considerable success in stationary service. This grate differs in construction from the ordinary finger grate in that each grate bar is built up of loose fingers of light sec-

tion fitted onto a finger bar which sets well below the surface of the grate, so that the openings between the fingers may extend entirely across the surface of each assembled grate instead of being interrupted at the center. This feature makes it possible to secure an air opening equal to 55 per cent of total grate area with $\frac{5}{8}$ -in. openings between fingers. This is considerably in excess of the maximum draft area obtainable with conventional locomotive grate designs, and tends toward fuel economy.

An equally important feature of the removable finger construction is the possibility of decreased maintenance which it offers. If a finger burns off in service it is replaced by a new one weighing two pounds whereas with ordinary grates it would be necessary to renew a grate bar weighing from 85 lb. to 150 lb.

Consideration of these features, together with a favorable report from another road that had its locomotives equipped with the Hulson grate, led the Wabash to equip a Ten-wheel passenger locomotive, having rather limited grate area for



A Full Set of Hulson Grates for a Wide Fire Box

the size of the boiler, in January, 1918. The service of the grates on this locomotive was quite satisfactory, and after about three years the maintenance cost was found to have been less than half that of the standard grates.

It was then decided to equip 10 Prairie type freight locomotives. These have 54.25 sq. ft. grate area, use Illinois and Missouri coal, and operate out of Moberly, Mo., principally between Moberly and St. Louis. The first of these locomotives was equipped in December, 1920; the others followed within a few months. Records have been kept of repair costs on these 10 locomotives and fuel records are available for all engines in the class.

The fuel records from May, 1921 to December, 1921, inclusive, show the following results:

Type of grate	Ave. tons per train	100 ton-miles	Tons coal	Lb. coal per 100-ton-miles	Decreased fuel consumption per 100 ton-miles, per cent
Standard	1,300	4,149,415	26,572	12.81	
Hulson	1,340	2,665,032	16,189	12.15	5.15

Fuel records of locomotives in local service were eliminated on account of the erratic performance in local freight on the ton-mile basis.

The maintenance costs are not here compared with other

grate costs but are presented for use where costs are already known or can be derived from existing records. These grates have only been in service a year, and after several years there may, of course, be a period of somewhat higher maintenance when finger bars need renewal. The repair costs were as follows:

Total repair cost (labor and material) to Jan., 1921...	\$116.27
Total grate area.....	542.5 sq. ft.
Cost of repairs per sq. ft. grate area per month.....	.0216
Cost repairs per engine per year.....	\$14.05

The Hulson grate fingers roll through the fire bed instead of tearing it, and they are in favor with the firemen because of the ease with which they can be shaken. The fire is kept in better condition on the road, and on long freight divisions the cleaning of fires half-way over the road has been eliminated on these engines. It has also been possible to increase the diameter of the nozzle tips by $\frac{1}{4}$ in.

The standard grate on this class of locomotives is of good design, with about 43 per cent air opening, and the additional air opening of the Hulson grate would probably not result in as much fuel saving as on grates with but 30 to 35 per cent air opening. The experience with these locomotives, however, has led to the conclusion that the reduced maintenance cost alone will make the Hulson grate worth while. At present 10 more of the Prairie type locomotives are being equipped and it is the intention to extend the application to those classes of locomotives most susceptible to reduced grate repair cost. The locomotive grates now in service include rocker grate bars only, and while there has been no difficulty in cleaning the fire the plans are to include the Hulson shaking dump grate* in future installations.

This type of grate has a wide use in stationary power plants and during 1921 the Wabash equipped six 250-hp. boilers in the power plants at Moberly, Mo., and Decatur, Ill. The grates have the good will of the stationary firemen, and there has been a noticeable decrease in fuel consumption and in black smoke. It is the intention to extend their application to all large stationary boilers.

Locomotive Types from a Transportation Viewpoint

By J. F. Porterfield

General Superintendent of Transportation, Illinois Central

LOCOMOTIVES should be designed so as best to meet varying conditions such as the grade line, the economical train load, which will vary according to the character and density of traffic, the acquired train schedules, etc.

The items going to make up the cost of freight train operation—except crew wages—do not materially decrease with the increase in locomotive capacity, as the decreased cost of ownership per unit of service is offset by a material increase in the expense of maintenance and by decreases in the time in service and the average mileage. From various estimates, I figure the increased cost of maintaining the large 2-10-2 type, compared with the cost of the 2-8-2 type, at about 20 per cent, with a decrease of about ten per cent in mileage. These items, with the increased cost of ownership, will about equal the saving in crew wages, particularly on lines with favorable grades where the traffic consists of average weight commodities requiring prompt movement.

On train districts with more than one-half per cent grades, especially where the preponderance of traffic is in the heavier commodities not requiring preferential movement, the 2-10-2 type locomotives will sufficiently reduce the freight train cost

per 1,000 gross ton-miles to justify the additional investment in locomotives, roadway, yard facilities, engine terminals, etc.

On train districts with grades of .5 per cent or less where the traffic is fairly well divided between the heavier and lighter commodities, I believe the Mikado type locomotive is the proper type to use. These locomotives will handle 75 to 90 loaded cars, which under average conditions is an economical train. While the larger capacity type will show a decrease in crew wage cost per 1,000 gross ton-miles, this saving will be more than offset by the increased cost of maintenance, investment in locomotives, roadway, yard facilities, engine terminals, etc. In addition to this there will be a loss in car efficiency incident to greater delay at terminals for full trains, and a loss in time on the road on account of the slower speed and delays incident to handling excessively long trains. These disadvantages will apply to even a greater extent on single track.

Take a train district with favorable grades where the density and character of traffic and train frequency prevent the train load from being increased. The cost per 1,000 gross ton-miles with 2-10-2 type locomotives would be about as follows:

Wages	\$.079
Locomotive maintenance .....	.113
Interest on investment .....	.058
Total	\$.25

The same items with a Mikado type locomotive would be about as follows:

Wages	\$.078
Locomotive maintenance .....	.093
Interest on investment .....	.039
Total	\$.21

This shows a loss of 19 per cent in the use of the larger locomotive.

On an Illinois Central train district with .8 per cent grades, where 60 per cent of the traffic is coal and other heavy commodities, the operation of the 2-10-2 type, with a tractive effort of 73,800 lb. shows a decrease in crew wage cost per 1,000 gross ton-miles from 41 cents to 25 cents, or 39 per cent, compared with the operation of the 2-8-2 type, with a tractive effort of only 51,630 lb.

On another train district, with grades and curvature equalling one per cent, on which 60 per cent of the traffic consists of high-class freight requiring fast time, the decrease in crew wage cost per 1,000 gross ton-miles is only 24 per cent. With a 43 per cent increase in tractive effort, the trainload increase is only 19 per cent, because the preponderance of high-class commodities requiring fast time prevents the accumulation of the tonnage for a maximum trainload. Where similar conditions prevail, I think a careful analysis will show that the increased cost of owning and operating the larger locomotive equals the crew-wage saving. However, even though there was no saving in operating cost, it might be necessary to adopt the larger locomotive to keep the train units within the road capacity.

Because of the increased cost of maintenance and of ownership and the decrease in efficiency of the extremely large types of locomotives, careful study and consideration should be given to the grade and traffic conditions, the train frequency or road capacity, the terminal expense required to reduce or increase trains, etc., before an investment is made in locomotives of the 2-10-2 and larger types. In offering these suggestions, I have assumed that, first of all, consideration will be given to grade reduction.

THE OLD DOMINION LINE (now the Old Dominion Transportation Company), after a vacation of two years, has resumed the running of passenger steamships between New York City and Norfolk, Va.

*From a paper presented before the Western Railway Club, Chicago, on April 17, 1922.

Thermic Syphons Save 19 Per Cent in Fuel

Improved Performance of Ten-Wheel Locomotive Enables Spokane International to Haul Heavier Trains

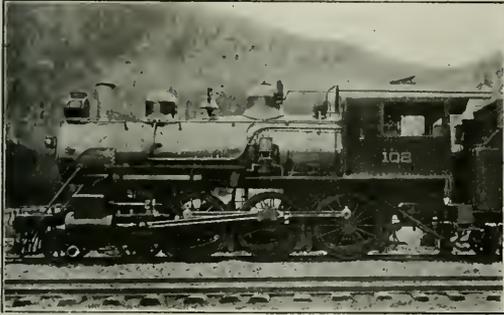
THE SPOKANE INTERNATIONAL operates through passenger trains over its main line from Spokane northward, a distance of 140 miles, to Eastport, Idaho, where connection is made with the Canadian Pacific. Ordinarily the trains consist of five cars, including standard sleepers and a dining car. While the time on this run is not fast, the trains do considerable local work and the grades encountered are severe so that the schedule has proved difficult to maintain with the locomotives now in service; these are of the Ten-wheel type with narrow fireboxes 19 in. by 24 in. cylinders, and 22,000 lb. tractive effort.

Another condition affecting the steaming capacity of these locomotives and limiting their ability to handle heavy trains over this road is the slow-burning character of the coal used; it contains approximately 75 per cent fixed carbon and averages 12,500 B.t.u. per lb. With this coal and the limited grate area of only 27 sq. ft., it is difficult to keep full steam pressure at all times and the fuel consumption

of a single thermic syphon made it possible to increase the diameter of the cylinder $\frac{1}{2}$ in. without reducing the ratio of boiler capacity to cylinder capacity.

In view of the character of fuel burned, it would not have been practicable to have increased the cylinder diameter without a corresponding increase in the capacity of the boiler and while this increase may seem small, it should be borne in mind that this change in cylinder size not only added more than 60 hp. to the capacity of the locomotive, but increased its maximum tractive effort by 1,160 lb. In addition to insuring an immediate increase in the capacity of the locomotive, it was thought that the application of thermic syphons would improve the efficiency of the locomotive, not only on account of the improved boiler circulation, but also because any considerable reduction in the rate of fuel consumption per square foot of grate surface on these locomotives would in itself tend to improve the fuel efficiency of the boiler. Factors in the selection of the thermic syphon were its adaptability to the locomotive without involving extensive alterations, and low maintenance charges.

The application of one Nicholson thermic syphon in the firebox of locomotive 102 on the Spokane International was made during the past summer and on September 27, 1921, a test of this locomotive was begun in comparison with a locomotive of the same class and operating in the same service but not equipped with this device. The principal dimensions of both locomotive 102, which is equipped with this device, and locomotive 104, without the syphon, are given in the table.



Installation of a Nicholson Thermic Syphon Enabled This Locomotive to Meet the Demands of Heavier Traffic

frequently exceeds 160 lb. of coal per square foot of grate surface per hour. Under these conditions not only is the capacity of the locomotives limited, but the fuel performance is not as economical as it should be. For that reason the officers of the Spokane International have recently been looking into the possibility of improving the efficiency of the locomotives and increasing their capacity so that they will be able to haul additional cars when necessary and still make the running time, thus obviating the necessity for purchasing heavier locomotives for the present.

Reasons for Installing Syphon

As a result of this investigation the road decided to apply a Nicholson thermic syphon with brick arch to one of these Ten-wheel type passenger locomotives and to test this locomotive in comparison with another locomotive of the same class which did not have the syphon but was equipped with a fire-brick arch supported on studs. In selecting the thermic syphon for this test in preference to other devices designed to improve locomotive capacity and efficiency, the railroad was governed largely by the fact that the application of a syphon would enable an immediate increase in the tractive effort by merely reboring the locomotive cylinders. As the weight on driving wheels was sufficient in this case to permit of an increase in the cylinder diameter without reducing the factor of adhesion too greatly, the application

LOCOMOTIVE DATA

Type	Non-Syphon Locomotive	Syphon Locomotive
	104	102
Type	Ten-Wheel	Ten-Wheel
Cylinders	19 in. by 24 in.	19½ in. by 24 in.
Boiler pressure	200 lb.	200 lb.
Firebox heating surface	153 sq. ft.	178 sq. ft.
Tractive effort	22,000 lb.	23,160 lb.
Grate area	27 sq. ft.	27 sq. ft.

In conducting these tests it was so arranged that both locomotives hauled the same equipment and weight of train during all trips. The same engineer and fireman operated both engines. Care was exercised to make all conditions uniform in every respect. The tender was carefully weighed at the beginning of the trip, the water in the tender being measured at the same time. At the end of the trip the tank was filled so that it contained the same amount of water as when starting. Then the tender was weighed to determine the total coal consumption. Two trips were made with each locomotive.

Results of Tests

Although the tractive effort and cylinder horsepower were increased in connection with the application of thermic syphons to locomotive 102, the results of these tests show clearly the decidedly better firebox conditions and boiler conditions on the syphon-equipped locomotive as indicated in the tabulated summary of results. The increased boiler and cylinder capacity of this locomotive made it possible to handle the same train with greater ease, while the additional heating surface and improved water circulation caused by the syphon made a marked improvement in the steaming capacity of the locomotive. Maximum steam pressure was maintained at all times and the boiler was fully supplied with water during all of the runs with the syphon-equipped locomotive while with the non-syphon locomotive, it was

necessary to trade water for steam in hard places. The general performance of the syphon locomotive was reported as being much better and the coal consumption per square foot of grate area was reduced to 133 lb.

The conditions under which the tests were conducted were favorable for securing accurate comparisons. As will be noted from the summary of the test results, the number of cars and the tonnage in each case was the same. It will be noted that the locomotive equipped with a syphon used 6.16 per cent less water per ton-mile than the locomotive with the ordinary firebox. This saving is attributed to the improved steaming of the syphon locomotive which results in drier steam supplied to the cylinders. Part of the saving is also due to the fact that the blower was used much more on the locomotive without the syphon. The pounds of coal per thousand gross ton-miles with the syphon locomotive was

Date of test	SUMMARY OF TEST RESULTS		Difference Favor 10.
	Non-Syphon Engine 104	Syphon Engine 102	
	October, 1921	September, 1921	
Tonnage—average per trip	269	269	
Mileage per trip	145	145	
Gross ton-miles—average per trip	39,030	39,020	
Number of cars—average per trip	5	5	
Car mileage—average per trip	725	725	
Total coal used, as fired, pounds; average per trip	22,190	17,980	19 per cent
Total water used, pounds, average per trip	82,942	77,833	6.16 per cent
Pounds coal (as fired) per 1,000 gross ton-miles	569	461	19 per cent
Pounds coal (as fired) per locomotive mile	153	124	19 per cent
Pounds coal (as fired) per car mile	30.6	24.8	19 per cent
Pounds water evaporated per pound of coal	3,738	4,329	15.81 per cent
Pounds water per 1,000 gross ton-miles	2,126	1,995	6.16 per cent

19 per cent less and the pounds of water evaporated per pound of coal, 15.81 per cent greater. Based on these figures, the locomotive with the Nicholson thermic syphon would save on this run approximately 770 tons of coal a year which, at \$5.70 per ton on the tender, would represent a decrease in the expenditure for fuel of \$4,390.

As a result of these tests, the Spokane International has ordered syphon equipment for a freight locomotive which will enable the railway to increase the diameter of the cylinders on this locomotive one inch, thus materially increasing the tractive effort and cylinder horsepower.

Wage Cuts for Clerical Forces Before Railroad Labor Board

HEARINGS in the present controversy over proposed reductions in the rates of pay of various classes of railway employees continued before the Railroad Labor Board during the past week, the majority of the time being consumed in the presentation of evidence bearing on the wages of clerical forces.

The character of the evidence presented by representatives of the railroads is illustrated in the testimony of J. H. Higgins, representing the western carriers, who, after pointing out the decreases which have taken place in the cost of living since the last wage reduction, summarized the results of an investigation of clerical wages in other industries in western states as follows:

Of 318,875 employees of all classes employed by other industries, 17,104 or 22 per cent are performing work comparable to that performed by clerical forces of the western roads. Of these employees 27,484 or 31 per cent would be rated as clerks if they were employed by the carriers, 31,132 or 44 per cent would be rated as unskilled employees in the clerical department, and the remaining 35 per cent would be rated as supervisory or miscellaneous office and station forces.

Of the 27,484 clerks in other industries, 19,701 or 72 per cent were found to be receiving lower wages than are paid by the railroads for like services. Of the 31,132 comparable unskilled employees in other industries, 25,982 or 83 per cent were found to be receiving lower wages than prevailed for comparable work for the carriers.

Of the employees in other industries in 26 of the principal cities in the western territory, 39,553 or 32 per cent were found to be performing work comparable to that performed by the clerical forces, covered in this hearing. Of these employees, 31,506 or 80 per cent were found to be receiving lower wages than prevailed for analogous work for the carriers.

In addition, Mr. Higgins pointed out the wide range in the rates prevailing in other industries as between various western states and cities.

J. G. Walber and W. A. Northcutt, representing respectively the eastern and the southeastern carriers, presented similar evidence for their respective territories.

E. H. Fitzgerald Presents Employees' Case

The employees' case was directed by E. H. Fitzgerald, president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees. The gist of Mr. Fitzgerald's testimony was summarized by him as follows:

The evidence in this case on behalf of the clerical forces will attempt to show:

- (1) that the clerks' wages are now lower than those prevailing in other industries;
- (2) that the present wage rates for clerical forces fall far short of a "minimum health and decency level";
- (3) that a rise in prices and therefore in the cost of living is inevitable;
- (4) that the increase in wages of clerical forces are small when computed over a long period of years rather than from an arbitrary point selected by the carriers because of the relation at that time of wages to prices and other factors;
- (5) the relation between wages and rates;
- (6) the relation between rates and business conditions;
- (7) that wage reductions have always been accompanied by increases in dividends;
- (8) that wage reductions will not reduce the cost of living; and
- (9) that wage reductions at this time will tend to check the recovery of business.

Disputes involving proposed reductions in the rates of pay of signalmen and train dispatchers occupied all of the Board's sessions on April 18 and 19. J. G. Luhrsen, appearing on behalf of the train dispatchers, defended the present rates of these employees on the grounds of the skill and training required to perform the work properly and upon the grounds that a reduction in the rates of pay of train dispatchers would destroy differentials that have always existed between the wages of these employees and of train service employees.

Labor Board Considers Wage Cut for Signalmen

Hearings before the Labor Board on the rules for engineers and firemen scheduled for May 1 have been postponed indefinitely. The reasons given by the Board are, first, a conflict with the date of a convention of the Brotherhood of Locomotive Firemen and Enginemen, second, the work of the Board will not be expedited but may be confused and retarded by beginning lengthy hearings on the day following the close of the present wage hearing, and, third, eastern roads have asked for a separate hearing of disputes involving the rules of these employees. The Board in addition granted the eastern carriers the separate hearings referred to the date to be set later.

The controversy between the railroads and their signal

department employees was taken up by the board on April 17. Representatives of the carriers repeated their requests for reductions in the rates of pay of signal department employees ranging from 5½ to 14 cents per hour. D. W. Helt, president of the Brotherhood of Railroad Signalmen, presented the employees' case, citing in defense of the present rates of pay the responsibility of these employees, the skill and training required of them to perform their work prop-

erly and the value of their services to their employers.

The rate at which the hearings are now progressing indicates that the whole controversy over proposed wage reductions will be in the hands of the board for decision prior to May 1, the dead line recently set by the board. Several of the smaller organizations will present their testimony during the present week, but it is not expected that this will consume a great deal of time.

Contracting of Work by Railroads Not New

Maintenance of Way and of Equipment and Even Running of Trains Handled by Outsiders as Early as 1855

THAT THE HANDLING of railway work by contract is by no means a present day innovation is shown by old records and reports of the Philadelphia, Wilmington & Baltimore, now a part of the Pennsylvania System, which has been brought to our attention by Samuel M. Felton, president of the Chicago Great Western. These records show that the contracting of many railway operations were carried out at a very early period. The contracts which have been entered into recently by various railroads and which have attracted much attention have been confined principally to the repair of cars and locomotives and to the maintenance of tracks and structures. Those in the earlier days of the Philadelphia, Wilmington & Baltimore covered a much wider scope, amounting practically to entire operation and maintenance as well as some of the items of new construction.

The first mention of the contract system is in the annual report of the Philadelphia, Wilmington & Baltimore for 1854. Samuel M. Felton, Sr., then president of the company, said the plan had been "examined and discussed," and referred to it as being in his opinion adapted to secure the greatest economies, both in labor and materials. He predicted its general adoption throughout the country. In the report for the next year, 1855, Mr. Felton stated that the contract system had been placed in partial operation for the latter six months of the year and had effected a saving of \$33,070 in operating expenses, the expenses for the first half of the year when no contracts were in effect were \$209,083 and for the second half, \$176,013.

Contractors Given Broad Responsibilities

The broad scope of the contracts is indicated by an entry in the directors' minute book, showing that on June 17, 1856, President Felton reported that responsible parties had submitted offers for one year, to supply under contract all wood, oil and waste; to keep engines in repair and furnish men to run them; to furnish labor to keep the road in repair, to lay new track and turnouts not exceeding seven miles; to furnish all labor in the freight department and clerical hire; and to take all risk and damage to freight in transit, and all loss on freight in collection.

President Felton recommended the acceptance of this offer, which the board approved. In consequence on August 19 of that year he presented contracts, made under the authority conferred by the board, and described as follows:

1. Contract with A. J. Barrett, George Stearns, Jr., William Stearns and Henry F. McKinney, for operating the road for one year from August 1, 1856;
2. Contract with Andrew C. Gray for operating the road from Wilmington to any and all points on the Delaware Railroad and the New Castle & Wilmington and New Castle & Frenchtown for one year from August 1, 1856;
3. Contract with William Windle for taking care of the

Southwark depot and collecting tolls, etc., on the Southwark Railroad;

4. Contract with Charles P. Dare to perform the duties of depotmaster, to furnish watchmen and for work at the depot in Philadelphia.

In subsequent reports for a number of years, President Felton made enthusiastic references to the success of the contract system. A typical comment from the annual report of 1856 follows:

"All the trains are now run at a stipulated price per mile, including repairs and renewals of locomotives, fuel, oil and waste and wages of engineers and firemen. The labor on repairs of road is also furnished by contract. The freight business is paid for by the ton in all its details, including loss and damage, and wages of conductors and brakemen. The fuel for all the stations, shops, steamboats, cars and for the ferry, is furnished for a stipulated sum per year. This system, more effectually than any other, brings to bear upon the affairs of the company the element of individual responsibility, the true element of success in any business."

Again in the report for 1857, Mr. Felton said, "Nothing can more effectually secure promptness, energy and thoroughness than this system, properly carried out in the hands of faithful contractors." In the annual report for 1858, Mr. Felton attributed the regularity of train movements and practical freedom of accidents to the operation of the contract system. For the following year, substantially the same comment was made.

In the report for 1860, after referring to the fact that the system had been extended to details not previously embraced, Mr. Felton said, "The work is better and more cheaply done and with more regularity and safety than under the old system, and we feel confident that in our case it has largely contributed to the success of the road."

The contract system on the Philadelphia, Wilmington & Baltimore, proper, passed out of existence during the Civil War. The fiscal year 1862 was the last under which general operation and maintenance were performed by contract. In his report for that year, under the heading "The Contract System," President Felton said:

"This system, which has been in operation on this road for several years, and resulted in great saving in expenses, has been given up for the coming year in most of the departments, because the prices of the principal articles used in operating the road had so rapidly increased and were so uncertain as to the future, that it was deemed more for the interest of the company to take the risk of future prices, than to pay an amount for the service by contract which would cover all the risks that the contractors would be liable to."

In order to be sure of the quality of the materials purchased, the president of the company supervised all purchases and charged them to the contractor. The working of the contract system may be judged to some extent by the follow-

ing compilation of receipts and operating expenses for a series of years both before and after adoption of the plan. The figures are for the Philadelphia, Wilmington & Baltimore, proper, excluding the branch lines:

PHILADELPHIA, WILMINGTON & BALTIMORE
(Excluding affiliated branches)

Company's fiscal year	Method of operation	Earnings	Operating expenses	Operating ratio, per cent
1850	No contracts in effect.....	\$503,161	\$218,755	43
1851	No contracts in effect.....	580,723	252,784	43
1852	No contracts in effect.....	667,785	284,284	43
1853	No contracts in effect.....	868,017	(a)348,310	40
1854	No contracts in effect.....	930,370	391,434	42
1855	Contracts in effect one-half year.....	942,449	401,325	43
1856	General contract system.....	1,105,101	421,702	38
1857	General contract system.....	1,119,910	400,086	36
1858	General contract system.....	1,059,962	394,418	37
1859	General contract system.....	1,014,963	379,695	37
1860	General contract system.....	1,211,598	451,109	37
1861	General contract system.....	1,494,676	488,275	33
1862	General contract system.....	2,233,570	640,110	29
1863	No contracts in effect.....	2,540,248	956,561	38

(a) Report states this item is about \$25,000 too high, owing to a change in accounting during year.

It will be observed that during 1862 the operating ratio fell to the remarkably low figure of 29 per cent. This was evidently a very trying year for the contractors, as the old records state they sustained a heavy loss. In consideration of this the board of directors authorized the payment to them of the additional sum of \$13,000.

A specimen contract form accompanying files on this subject discloses the interesting character of the agreements entered into in connection with these railway contracts. Under the terms of this form the railroad turned over to the contractor all the locomotives with the stipulation that the contractor provide the entire force for their operation and upkeep, including not only the maintenance attending ordinary wear and tear, but also to make good all damage resulting from accidents. With certain exceptions the contractor was required to employ all the train crews and the entire station forces as well as the passenger and freight department employees, including even the general freight agent and the freight solicitors.

The contractor also took over the entire maintenance of the tracks, including the laying of certain lengths of new trackage specifically mentioned in the contract. The maintenance of bridges and the maintenance of all cars remained in the hands of the railroad company. Another stipulation required the contractor to undertake all emergency work, including the employment of all additional men required to make good damage done by storms, floods, etc. The railroad company provided insurance against fire damage, but the contractor was liable for any losses resulting from carelessness of any one in his organization. The contractor was also liable for loss and damage to freight or personal injuries to passengers or employees.

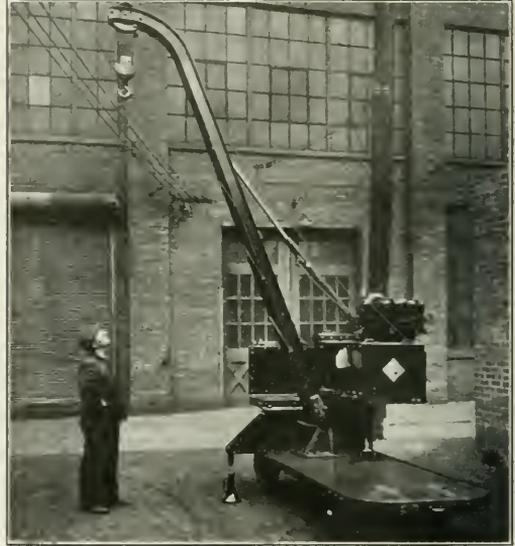
Expenditures and disbursements were handled through the treasury of the railroad company. All moneys received by the station agents or other persons were turned into the railroad's treasury, a certified payroll of the contractor was furnished the railway each month and necessary funds were turned over to the contractor to pay his men. The compensation to the contractor was provided on the basis of certain fixed amounts stipulated in the contract for carrying out the various services required of him.

SENATOR ARTHUR CAPPER of Kansas, who has recently succeeded to the leadership of the "agricultural bloc" formerly held by Senator Kuylen, in a speech in the Senate on April 13 stating the aims of the farm bloc and that it "believes railway freight rates are too high and must come down" and that it "would restore to state railway commission much of the power taken away from them by an unwarrantable interpretation of the transportation act by the Interstate Commerce Commission." This "unwarrantable interpretation" was recently upheld by the Supreme Court

Storage Battery Truck with Crane of Unusual Length

THE ELWELL-PARKER Electric Company, Cleveland, Ohio, has recently developed an electric truck with a carrying capacity of 3,000 lb. and a revolving counterbalanced crane of unusual length. The crane is a handy, portable device for hanging smokebox doors or air pumps on locomotives in shops or engine houses. It is also adaptable to use in storerooms to handle castings, lighting generators and other parts which can be safely and easily stacked, reducing the storage space usually required.

The heavy vertical steel column has a long bearing in a pedestal bolted to the steel platform on the truck, and supports a 12-ft. boom which may be racked in or out by the



Elwell-Parker Truck With 8-Ft. Power Crane

operator without leaving the driving position. The hoist is operated by a separate motor direct-connected to an enclosed hoist mechanism. It is mounted on a steel frame which houses the battery, the battery, hoist and motor all acting as a counterbalance. A special trip switch mounted on the front of the battery box stops the inward motion of the boom as set.

The crane is designed to pick up 1,000 lb. at an 8-ft. outreach, or with outriggers in position as shown 3,000 lb. at 6-ft. outreach. The boom may be lowered to permit entrance of doorways. The outriggers are quickly adjusted, folded and swung in beside the crane column when not in use.

The truck is equipped with 21½ in. by 3½ in. drive wheels and 15 in. by 3½ in. trailing wheels, all four of which steer. Large wheels permit use in yards. A coupler is furnished on the rear to permit using the unit for intermittent tractor service. Motors, differential worms, wheels and crane pillar column are all fitted with ball bearings. A single battery furnishes power to propel the truck as well as to operate the crane.

GEORGE E. MACE, of the transportation bureau of the Boston Chamber of Commerce, has resigned to become traffic manager of the Chamber of Commerce of Trenton, N. J.

General News Department

Fire at Pennsylvania Shops

The shops of the Pennsylvania Railroad at Meadows, N. J., were damaged by fire on the morning of April 16 to the extent of \$175,000. The erecting shop, cabinet shop, paint shop and tin shop were a total loss.

Preservation of Railroad Records

The Interstate Commerce Commission has issued an order that the period of federal control shall not be computed in determining the periods of time after which carriers are permitted to destroy their records, as provided for in regulations prescribed by the commission in 1914.

New York Central Shops on Piecework Basis

Three shops of the New York Central, which have been idle for six weeks or longer, were reopened on Monday of this week with about 775 men at work at piecework rates. These are the shops at West Albany, N. Y.; Avis, Pa., and Collinwood, Ohio. It is said that the rates of pay will be about 25 per cent higher than those which prevailed in 1917.

The Labor Board's New Quarters

On and after April 24, 1922, the Railroad Labor Board will be located in the Transportation building, 608 South Dearborn street, Chicago, and all communications intended for the Board should be addressed accordingly. Unless otherwise advised, all hearings will be conducted in the new hearing room on the twenty-second floor of the above-mentioned building.

Phillips Not to Quit Labor Board

Albert Phillips, member of the labor group on the Railroad Labor Board, whose resignation was tendered several weeks ago, will continue to be a member of that body, according to an announcement made by the Board on April 19. Mr. Phillips resigned because of continued ill-health, but it is stated that he will be able to complete his term, which expires in April, 1923.

Swindlers Collect Money Ostensibly for Mileage Book Campaign

Swindlers claiming to represent a movement to secure a law reducing rates for mileage tickets, and asking for money to promote such a law at Washington, are said to be unusually active just now, while a bill for such a law is under discussion in a Congressional committee. These "solicitors" usually carry a petition addressed to some territorial passenger association (which is never presented), and claim to represent the "Interstate Travelers' League" or some other imaginary association. All legitimate commercial organizations interested in railroad fares have repudiated these frauds.

Harris Bill on Steel Cars Amended

The Interstate Commerce Commission in a report on a bill introduced by Senator Harris of Georgia, to compel the use of steel passenger cars, has recommended that a year be allowed for study of the matter, and the bill has been modified accordingly.

The commission told the senators that the proposed bill would introduce many complications where existing roadbed and structure would not be heavy enough to support steel cars; also that the progress in recent years in the construction of steel cars and cars with steel under-frames, had been voluntary on the part of the railroads; and that to prevent shortage the retirement of the

remaining wooden cars would have to be extended over a period of years.

The opinion was also expressed that legislation at present should provide only that no wooden cars should be located in a passenger train between or ahead of steel or steel under-frame cars.

Effective Date of Tank Car Specifications Announced

The Mechanical Division of the American Railway Association has issued a circular announcing that the effective date of the requirements of Section 7c of the specifications for Class I and II tank cars, and the last paragraph of Section 7c of the specifications for Class III and IV tank cars is further extended to July 1, 1923. The sections of the Tank Car Specifications referred to provide that no nipples, valves or other attachments shall project below the bottom outlet cap except while the car is being unloaded.

Exhibits and Entertainment at Fuel Association Convention

Detail arrangements are being completed for the convention of the International Railway Fuel Association to be held at the Auditorium Hotel, Chicago, May 22-25. The International Railway Supply Men's Association is arranging for exhibits and space is being taken rapidly. Entertainments are planned for Monday, Tuesday and Wednesday evenings, including moving pictures of coal mining operations, an informal reception and dance and a dinner.

The Sciotoville Bridge of the Chesapeake & Ohio Northern

The continuous truss bridge of the Chesapeake & Ohio Northern over the Ohio river at Sciotoville, Ohio, was the subject of a paper presented by Gustav Lindenthal, consulting engineer, New York, before the regular meeting of the American Society of Civil Engineers at New York City on Wednesday, April 5. The Sciotoville bridge is the second largest continuous truss bridge in the world having two spans, 775 ft. center to center of bearings and presented a large number of unusual problems and difficulties. Mr. Lindenthal described in detail the major problems of design, the methods of erection, which had to be worked out in fine detail, and the results obtained, illustrating his talk by means of lantern slides.

Machinists' Union Asks Limitation on Contract Work

The International Association of Machinists has filed a petition with the Interstate Commerce Commission referring to the charges which it made before the commission last year regarding the practice of the railroads in sending locomotives to contract shops for repairs and asking the commission to extend its investigation of the "contracting out" practices of the railroads to cover also the practice of closing their own shops and farming out work to existing private companies or companies especially formed for this purpose.

The commission is asked further to investigate the relationship of financial control, if any, between the carriers and the companies to which the work is transferred and to issue an order forbidding the letting out or transfer of shop work which was not wholly or in substantial part performed by the carriers at the time of the passage of the transportation act, except after obtaining from the commission a permit authorizing such work, such permit to be issued only for specific cases and subject to the conditions that the work could not be done in the railroad shops, that the contract prices are not excessive, and that the labor standards established by the Railroad Labor Board shall be observed in full by the contracting shops.

Operating Statistics of Large Steam Railroads—Selected Items for the Month of February, 1927

Region, road and year	Average miles of road operated	Locomotive-miles			Car-miles		T-n miles (thousands)		Average number of locomotives on line daily					
		Principal and Light	Light	Light	Loaded (thousands)	Per cent loaded	Gross, Excluding locomotive	Net, Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored		
New England Region														
Boston & Albany	1922	394	248,987	262,649	29,460	4,409	230,556	92,999	27	116	27	118	1	
1921	394	240,140	258,441	30,152	3,844	61.1	219,481	80,683	127	30	19.1	...		
1922	394	240,140	258,441	30,152	10,611	70.1	551,380	230,400	322	133	29.2	45		
1921	3,469	504,830	548,666	50,873	9,273	68.1	518,466	228,511	338	117	28.7	27		
1922	1,960	404,840	424,735	24,735	2,972	29.9	247,667	97,248	289	65	21.7	102		
1921	1,939	394,848	426,626	34,136	3,370	66.8	452,695	200,711	299	63	17.8	31		
Great Lakes Region														
Delaware & Hudson	1922	887	366,260	483,721	33,691	8,819	62.5	595,560	302,043	272	42	13.5	97	
1921	880	339,150	339,679	34,148	8,363	86.9	601,043	292,223	280	35	12.5	50		
1922	994	476,367	589,526	111,654	13,688	68.5	729,231	329,889	300	64	17.5	127		
1921	995	448,220	523,326	113,241	12,017	55.2	693,223	321,373	319	58	15.5	35		
1922	2,259	919,950	1,047,472	58,347	28,185	65.8	1,712,226	807,769	546	221	28.8	30		
1921	2,259	854,150	976,731	48,517	22,333	38.5	1,575,354	713,663	570	129	18.3	1		
1922	1,431	504,204	564,407	52,362	12,822	62.6	812,591	390,497	406	133	24.7	93		
1921	1,827	480,395	487,707	20,001	14,187	93.1	788,062	312,256	315	95	23.1	76		
1922	1,829	427,784	437,829	16,133	10,991	58.0	683,559	265,231	346	74	17.5	107		
1921	1,431	504,204	564,407	52,362	12,822	62.6	812,591	390,497	406	133	24.7	93		
1922	1,827	480,395	487,707	20,001	14,187	93.1	788,062	312,256	315	95	23.1	76		
1921	1,829	427,784	437,829	16,133	10,991	58.0	683,559	265,231	346	74	17.5	107		
1922	1,652	1,878,746	1,949,987	134,100	58,834	61.6	3,003,642	1,516,988	1,092	505	31.6	253		
1921	5,646	1,679,495	1,850,219	130,046	48,853	55.9	3,087,178	1,300,829	1,493	516	33.1	171		
1922	516	336,817	338,356	792	10,352	65.5	555,511	225,575	173	31	20.0	42		
1921	516	312,491	314,311	181	8,243	63.0	454,291	183,641	109	61	36.6	60		
1922	2,191	297,677	307,732	6,400	4,966	62.9	438,924	169,977	153	54	20.2	21		
1921	2,207	234,952	240,086	4,091	5,299	72.3	278,807	131,961	172	34	16.7	34		
1922	238	95,046	100,860	6,966	3,108	58.2	228,778	125,946	59	20	25.5	8		
1921	225	101,452	114,382	1,138	1,907	58.1	216,515	118,685	67	14	17.0	13		
1922	2,830	642,481	637,216	21,616	7,216	69.2	836,189	386,189	263	74	20.4	9		
1921	4,418	471,060	500,007	3,970	12,672	58.2	692,284	301,607	270	65	19.3	34		
Ohio-Indiana-Allegheny Region														
Baltimore & Ohio	1922	5,235	1,638,005	1,621,343	148,436	41,007	53.1	2,636,078	1,735,192	912	479	34.4	107	
1921	5,233	1,621,343	1,600,811	148,436	32,792	53.2	2,616,688	1,626,688	1,028	385	25.3	198		
1922	689	275,922	309,831	40,141	5,728	56.1	395,102	194,954	218	38	14.9	10		
1921	678	247,323	270,085	28,611	4,945	56.7	351,384	175,293	262	62	23.6	14		
1922	945	309,702	320,622	3,178	5,042	61.6	316,505	159,650	117	50	29.9	33		
1921	1,131	207,226	217,749	4,451	5,569	58.8	298,417	133,333	117	69	27.9	11		
1922	1,857	662,316	698,447	64,150	17,920	67.1	933,291	547,735	319	128	28.6	36		
1921	2,396	587,355	618,304	2,188	3,133	54.3	1,377,950	377,960	314	117	21.1	50		
1922	840	102,214	115,629	7,655	2,949	63.0	217,959	122,139	96	12	11.2	28		
1921	831	113,555	122,895	7,698	3,063	65.4	238,765	131,106	113	12	8.2	9		
1922	963	88,081	91,021	6,635	4,246	64.6	106,426	59,342	38	9	19.6	3		
1921	995	36,884	41,470	7,343	4,235	64.4	52,555	9,897	34	7	16.7	10		
1922	10,882	4,120,605	4,312,155	345,640	10,980	61.7	6,040,286	3,504,507	2,534	884	25.8	494		
1921	10,869	3,671,358	4,137,179	311,112	83,282	58.6	5,789,087	2,907,840	2,137	834	26.7	485		
1922	1,219	422,356	437,235	76,186	6,112	61.2	438,710	248,484	78	12	15.2	87		
1921	1,119	189,631	500,276	74,107	11,099	59.1	790,879	415,046	347	89	20.5	87		
1922	2,548	766,212	861,572	10,558	21,914	57.1	1,727,268	938,567	453	167	19.2	56		
1921	2,533	747,141	840,327	19,236	15,793	57.1	1,747,891	585,329	465	135	27.7	84		
1922	2,228	731,533	898,226	33,700	20,583	77.1	1,610,593	827,340	600	135	14.9	26		
1921	2,210	571,828	696,520	24,271	14,329	78.2	1,089,434	371,135	478	203	29.8	141		
Southern Region														
Atlantic Coast Line	1922	4,924	642,368	651,331	10,095	14,261	38.6	762,727	265,862	280	103	26.3	25	
1921	4,889	625,191	630,400	11,231	13,436	61.3	720,670	272,832	282	137	31.9	11		
1922	1,908	188,671	189,126	2,834	4,330	75.7	210,416	94,127	102	20	19.0	...		
1921	1,908	210,896	412,570	2,185	4,106	70.2	231,515	110,429	102	24	19.0	...		
1922	6,137	1,578,166	1,585,438	33,432	41,028	67.4	2,605,125	1,100,824	757	81	10.7	...		
1921	6,151	1,508,839	1,517,942	31,811	32,625	52.6	2,260,912	1,016,933	732	110	13.1	...		
1922	5,021	1,420,177	1,512,419	58,154	35,103	58.9	1,661,297	786,877	573	98	14.6	27		
1921	5,026	1,331,202	1,422,891	46,681	20,948	59.5	1,359,816	616,202	545	105	16.2	4		
1922	3,537	395,152	404,981	7,829	8,554	65.2	455,208	211,957	173	27	29.4	...		
1921	3,537	422,356	437,235	8,969	4,768	69.6	478,715	178,715	173	78	30.9	...		
1922	6,942	1,143,529	1,167,561	28,881	24,689	67.3	1,969,699	542,503	483	253	22.9	27		
1921	6,942	1,129,047	1,150,600	24,109	25,229	67.4	1,215,793	633,442	884	240	21.9	70		
Northwestern Region														
C. & N. W.	1922	8,301	1,412,292	1,453,860	18,115	27,117	62.5	1,566,954	683,116	807	236	21.9	4	
1921	8,320	1,394,373	1,434,977	18,094	24,765	59.5	1,492,768	675,285	639	219	33.3	...		
1922	11,027	1,466,957	1,496,665	63,944	32,263	65.0	1,838,002	862,828	839	206	19.7	82		
1921	10,694	1,011,867	1,232,855	61,470	26,000	61.1	1,481,664	640,780	677	360	34.7	70		
1922	1,226	279,694	303,580	14,988	4,728	69.3	315,376	100,828	163	63	39.7	27		
1921	1,226	282,345	318,236	13,154	4,888	64.0	322,599	111,630	152	52	25.5	27		
1922	8,055	686,792	709,801	27,373	15,235	70.8	885,415	422,112	481	177	23.4	181		
1921	8,171	618,104	636,792	23,085	14,796	71.3	824,007	401,690	589	180	23.4	245		
1922	4,384	360,468	392,376	7,655	7,237	73.7	360,156	168,501	341	63	15.7	35		
1921	4,384	357,141	382,622	7,655	7,237	68.0	342,262	162,949	341	67	19.7	84		
1922	4,414	681,178	712,735	45,809	17,194	74.6	935,655	457,871	541	152	21.9	30		
1921	6,408	588,200	616,966	41,955	15,395	70.4	872,781	423,227	547	157	22.3	168		
1922	2,166	183,202	208,904	28,795	4,446	70.7	259,298	125,235	125	37	22.7	2		
1921	2,196	167,305	185,344	23,319	4,014	74.5	200,232	110,073	121	41	25.3	4		
Central Western Region														
Ach., Top. & Santa F.	1922	9,908	1,203,323	1,256,278	36,015	30,180	66.5	1,512,404	586,385	800	179	18.2	232	
1921	9,711	1,556,358	1,415,535	64,722	30,311	57.2	1,876,664	750,614	688	251				

Compared with February, 1921, for Roads with Annual Operating Revenues above \$25,000,000.

Table with multiple columns: Region, road and year; Average cars number of freight cars on line daily; Gross tons per train, excluding locomotive; Net tons per train loaded; Net tons per car-day; Net tons per mile per car-day; Pounds of coal per 1,000 gross tons, including locomotive; Passenger service (Train-miles, Passenger-car-miles). Rows include New England Region, Great Lakes Region, Ohio-Indiana-Allegheny Region, Pocahontas Region, Southern Region, Northwestern Region, Central Western Region, and Southwestern Region.

*Includes Chicago, Terre Haute & Southeastern from July 1, 1921, only.

Tentative Valuation Hearings

The Interstate Commerce Commission has announced a series of hearings before examiners at Washington on protests which have been filed against tentative valuation reports. On May 18 the hearing will be on the St. Louis-Southwestern case and on May 25 there will be hearings on the Green Bay & Western and the Chicago, Rock Island & Pacific.

Railway Labor Disputes and the Federal Power

A discussion of the "use of federal power in railway labor disputes," by Clyde O. Fisher, assistant professor of economics at Wesleyan University, has been issued by the United States Department of Labor as Bulletin No. 303. It discusses the experience of this country in the development of governmental authority in the settlement of railway disputes. The law of 1888, providing for voluntary arbitration, the Erdman Act, the Newlands Act, the Adamson law, and the Esch-Cummins law are set forth, with the reactions of the different factions, that is, the unions, the railroad operators, and the public.

Cross Crossings Cautiously

The board of directors of the American Railway Association has decided to promote, from June 1 to September 30, a "Careful Crossing Campaign" with a view to impressing on everybody the thought expressed in the title of this paragraph.

Uniform colored posters have been designed and will be furnished at cost. The co-operation of the National Automobile Chamber of Commerce, the National Safety Council, and other organizations has been secured. The plan of campaign will be discussed at the annual meeting of the Safety Section in Chicago, on May 3, 4 and 5, and Safety officers of member railroads are urged to be present.

Twenty Thousand, Plus

The Pennsylvania Railroad Employees' general athletic exhibition takes place at Columbus, Ohio, April 22 and the number expected to attend is 20,000, besides women and children. There will be more than 1,500 contestants, including individuals and teams will compete at Columbus, Ohio, on April 22 in the Pennsylvania System indoor championships. Through the co-operation of the Columbus Chamber of Commerce, the Coliseum, which seats 7,000, and the Ohio State fair grounds will be placed at the disposal of the railroad men free of charge. Swimming events will be contested in the 60-foot pool of the Columbus Athletic Club. Women employees will compete in basket ball, volley ball, duck and ten pins, and 50 and 75 yard dashes. There will be indoor baseball, pocket billiards, trap shooting, boxing, wrestling, horse shoes, quoits, shuffle board, and rifle shooting.

H. A. Miller, sporting editor of "The Columbus Evening Dispatch" will give a loving cup to the individual scoring the most points in the track and field events, and "the Deshler trophy" offered by Dr. A. L. Wallicke, will be presented to the bowler who rolls the highest score in a single game. P. F. Neff will referee the meet, assisted by I. W. St. John, director of athletics of Ohio State University. E. J. Hughes is chairman of the local committee of Columbus employees in charge of arrangements.

President Markham Pays Tribute to Labor Board

That the United States Railroad Labor Board has done remarkably well in the face of the serious obstacles with which it is confronted is the opinion of C. H. Markham, president of the Illinois Central, as expressed in an address at a dinner of the St. Louis Association of Commerce, on April 14. Mr. Markham said, in part:

"The Railroad Labor Board, which was created by the Transportation Act, has been the object of considerable censure, and that censure has come alike from railway executives, railway workers and the public. Considering all the obstacles which the board has faced during the trying two years since it was created, I believe it has done remarkably well. Generally speaking, its decisions have been accepted and lived up to by the railroads and the employees, although questions of jurisdiction have made it appear that some of the roads have not accepted all its findings

in good faith, and there was a short period last fall when some groups of employees flaunted a decision of the board with a strike threat. However, the public members of the board were able to smooth out the difficulty, and the strike was averted. The three representatives of the public group hold the balance of power. I believe that they have tried to deal fairly with all questions brought before the board, and that they have had a wholesome influence in making the board a respected public body."

Canadian Pacific Memorial in New York

One of the massive bronze tablets recently made for the Canadian Pacific Railway to perpetuate the memory of the employees of the road who gave their lives in the great war has been put up on the company's building at 44th street and Madison avenue, New York city. The number of employees who made the supreme sacrifice was 1,100 and the wording of the inscription is given below. The tablet is 50 in. wide and 40 in. high, and weights 270 lb.

At the top of the tablet Britannia calls to her sons; at the left there is a battleship and a tank, at the right a Canadian Pacific locomotive and a steamship, and below these advancing artillery and infantry. At the bottom are the names of the battles in which the Canadians fought and died, from Ypres through the terrible years to Mons.

In all 11,062 Canadian Pacific men served "king and country"; 2,088 were wounded and about 19,000 former soldiers are now employed by the company. Replicas of this tablet are being placed in all the principal Canadian Pacific offices in Canada and in its offices in London, Liverpool and other cities. The tablet was designed by Archibald Pearce, of the railway's engineering department, and was engraved by the Bromsgrove Guild, Worcestershire, England.

THIS TABLET COMMEMORATES THOSE IN THE SERVICE OF THE CANADIAN PACIFIC RAILWAY COMPANY WHO AT THE CALL OF KING AND COUNTRY LEFT ALL THAT WAS DEAR TO THEM, ENDURED HARDSHIP, FACED DANGER AND FINALLY PASSED OUT OF SIGHT OF MEN BY THE PATH OF DUTY AND SELF SACRIFICE, GIVING UP THEIR OWN LIVES THAT OTHERS MIGHT LIVE IN FREEDOM. LET THOSE WHO COME AFTER SEE TO IT THAT THEIR NAMES BE NOT FORGOTTEN.

Air Brake Association Transfers Convention from Washington, May 9, to Atlantic City, June 19

The executive committee of the Air Brake Association after careful consideration has decided to transfer the twenty-ninth annual convention from Washington, D. C., May 9-12, to Atlantic City, June 19-21. This change is made at the eleventh hour because of the culmination at this time of plans which have been developing during the past two or three years for the closer affiliation of the Air Brake Association with the Mechanical Division of the American Railway Association.

This change of convention place and time is decidedly advantageous to the Air Brake Association in that it now makes possible a closer co-operation with the work of the Train Brake and Signal Committee of the American Railway Association. The identity and individuality of the Air Brake Association is to be retained. The officers, membership and activities will be the same as formerly with no change in constitution or by-laws. The association will continue to be a distinctly educational organization working for improvements in air brake practices and a higher standard of maintenance.

Convention headquarters will be at Haddon Hall, conveniently situated on the boardwalk, where a spacious convention hall and ample room for exhibits have been secured. In addition to accommodations at Haddon Hall, special rates on the American plan have been obtained at Hotel Rothwell, Hotel Wiltshire and Avon Inn.

The usual exhibits of the Air Brake Appliance Association will be displayed at Haddon Hall and are entirely distinct from the extensive Railway Supply Manufacturers' Association exhibit of railway machinery at Young's Million Dollar Pier, which will be

open to all members. Full participation in the entertainments of the A. R. A. Mechanical Division will be afforded members of the Air Brake Association and their families. This includes the grand carnival ball on the Pier, Monday, June 19, and the grand ball Tuesday evening. Free roller chairs will be available on the boardwalk for members from 9 a. m. to 5 p. m.

A. R. A. Recommends New Interchange Practice

The recommendation of the Joint Committee on Interchange of Equipment of the American Railway Association relative to joint interchange inspection of equipment, which was submitted to a letter ballot of the Association, has been approved by a vote of 303 to 14, with 81 not voting.

The recommendation, which follows, has been adopted by the A. R. A. as recommended practice.

It is the opinion of the Joint Committee that special rules of general application covering joint inspection of equipment at interchange cannot be formulated for the reason that local conditions must govern; that existing A. R. A. rules will enable interested roads to agree on inspection of equipment.

It is, therefore, suggested in the interest of economy in operation and to facilitate the movement of cars, that where inspection of equipment is involved at any point of interchange, that the interested roads arrange for conference to study conditions at that point. The following principles to govern any arrangements which may be adopted: 1.—Observance of A. R. A. rules. 2.—No backward movement of cars. 3.—No duplicate interchange inspection of cars. 4.—No delay to cars due to inspection in order to fix responsibility for damage to cars, adjustment or transfer of lading.

There are various forms of interchange inspection which can be adapted to the principle of some of which are outlined below:

A.—**JOINT INSPECTION**—Where all of the inspectors are joint men under a chief joint inspector.

B.—**INSPECTION UNDER THE JURISDICTION OF AN ARBITRATOR**—Where inspectors are in the employ of various railroads under the jurisdiction of an arbitrator, whose duty it is to harmonize and unify inspections and settle any disputes which may arise without holding cars or lading for this purpose.

C.—**DELIVERING LINE INSPECTION**—Where interested roads accept the delivering line inspection.

D.—**RECEIVING LINE INSPECTION**—Where interested roads accept the receiving line inspection and handle each other's defect cards.

E.—**INSPECTION BY RECEIVING LINE'S INSPECTORS IN DELIVERING LINE'S YARD**—Where receiving line inspectors make inspection in delivering line's yard.

F.—**JOINT INSPECTION AND REPAIRS**—Where a single organization in a joint terminal makes all inspections and repairs for the interested roads.

Value of Education in Railroadng

Samuel Rea, president of the Pennsylvania Railroad, replying to an inquirer, says that the man graduating from college and entering the railway business is likely to advance more rapidly than the man of his age who lacks college training. Other things being equal, the college man will go ahead faster and get farther than the man who lacks that great initial advantage.

"In the technical branches of railroadng we have reached the point where the preliminary training of a college or a university course is no longer looked upon merely as an advantage, but has become, practically speaking, a necessity for the young man who aims at a place in the executive forces. Of 163 principal officers and directors of the Pennsylvania System, 86 are college graduates and 77 not. Superficially, that does not look like a very striking preponderance in favor of the college men; but for every hundred men entering the railroad service with a college education, there are thousands who start without one.

"As to the best lines of training the statistics leave no doubt that they are civil and mechanical engineering, particularly the former. Out of the list of 163 men just mentioned, 81 are officers of the operating department, and, of the 81, no less than 54, or exactly two-thirds, are college-trained men; and out of the 54 college graduates, 38 are civil engineers, eleven are mechanical engineers, one is an electrical engineer, and four are graduates of the academic departments. If we confined our study to the younger operating officers, we should find that nearly 100 per cent are college graduates. For a number of years past it has been a rule of the company that graduates of recognized colleges or universities in civil, mechanical or electrical engineering, or their equivalents, be given preference for development into operating officers.

"In the other departments—traffic, accounting, purchasing, financial, insurance, real estate, legal, and the secretary's staff—the training received in a scientific course is not of direct advantage; but the training of an academic course gives young men entering those departments as much relative advantage as it would in the corresponding departments of any other large business. Ten of the Pennsylvania's leading traffic officers are graduates in academic courses.

"Comparatively few young men who have specialized in economics at college seem to have entered the railroad business,

but there should be a good field for them in the non-operating departments.

"I would not advise any young man whose principal conception of success was to become rich, or quickly to obtain a very large salary, to enter the railroad business. The period of adventure and pioneering in the railroad enterprise has now passed, and the firm establishment of public regulation as a definite policy tends to remove railroading almost wholly from the realm of speculative enterprise. As a result, the work of the railroad officer has become one of the most highly stabilized of the professions, from the viewpoint of remuneration and certainly of employment. To a young man of ability, about to graduate from college, and confronted with a choice of professions, I would, therefore, say that railroading offers a more certain career than most branches of commerce or industry, with less likelihood of suffering through the mistakes or wrongs of others and also with somewhat less probability of gaining the very highest monetary return."

Exhibitors at Atlantic City Conventions

The following list shows the names of the firms which have thus far been allotted space by the Railway Supply Manufacturers' Association for the exhibit which will be held on the Million Dollar Pier at Atlantic City during the meetings of Division V—Mechanical, and Division VI—Purchases and Stores, American Railway Association, June 14-21. This list compares favorably with similar lists published at this time for the exhibits of previous years.

Air Reduction Sales Co., New York.
Ajax Manufacturing Co., Cleveland, Ohio.
Allegheny Steel Co., Pittsburgh, Pa.
American Abrasive Metals Co., New York.
American Arch Co., Inc., New York.
American Automatic Connector Co., Cleveland, Ohio.
American Brake Shoe & Foundry Co., New York.
American Car & Foundry Co., New York.
American Chain Co., Bridgeport, Conn.
American Locomotive Co., New York.
American Malleable Castings Association, Cleveland, Ohio.
American Mason Safety Tread Co., Boston, Mass.
American Steam Gauge & Valve Mfg. Co., Boston, Mass.
American Steel Foundries, Chicago.
American Tool Works Co., Cincinnati, Ohio.
American Vaper Torch Co., Chicago.
Anchor Packing Co., Philadelphia, Pa.
Ashton Valve Co., Cambridge, Mass.
Assn. of Mfgs. Chilled Cast Wheels, Chicago.
Atkins, E. C. & Co., Indianapolis, Ind.
Atlantic Hand Brake Corp., Buffalo, N. Y.
Baker, R. & L., Co., Cleveland, Ohio.
Barco Mfg. Co., Chicago.
Barrett Company, New York.
Beaudry & Co., Inc., Boston, Mass.
Bessly, Charles H., & Co., Chicago.
Bettendorf Company, Bettendorf, Iowa.
Billingsley, P. L., Co., Cincinnati, Ohio.
Bird-Archer Co., New York.
Blackell, Robert H., Pittsburgh, Pa.
Boss Nut Co., Chicago.
Bowser, S. F. & Co., Inc., Fort Wayne, Ind.
Bradford Draft Gear Co., New York.
Brewster, Morris B., Inc., Chicago.
Brown & Co., Inc., Pittsburgh, Pa.
Brubaker, W. L. & Bros. Co., Milledburg, Pa.
Buckeye Steel Castings Co., Columbus, Ohio.
Bueyrus Co., S. Milwaukee, Wis.
Buffalo Brake Beam Co., New York.
Burry Railway Supply Co., Chicago.
Cambria Steel Co., Philadelphia, Pa.
Camel Co., Chicago.
Carborundum Co., Niagara Falls, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Champion Ry. Equipment Corp., New York.
Chase, L. C. & Co., Boston, Mass.
Chicago-Cleveland Car Roofing Co., Chicago.
Chicago Pneumatic Tool Co., New York.
Chicago Railway Equipment Co., Chicago.
Clark Car Co., Pittsburgh, Pa.
Clark Truettor Co., Buchanan, Mich.
Cleveland Car Specialty Co., Cleveland, Ohio.
Cleveland Pneumatic Tool Co., Cleveland, Ohio.
Cleveland Steel Tool Co., Cleveland, Ohio.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cochrane-Bly Co., Rochester, N. Y.
Commonwealth Steel Co., St. Louis, Mo.
Covington Machine Co., Inc., Covington, W. Va.
Craft Incorporated, New York.
Crosby Steam Gate & Valve Co., Boston, Mass.
Curtain Supply Co., Chicago.
Dale Machinery Co., Inc., New York.
Damasus Brake Beam Co., Cleveland, Ohio.
Davis Boring Tool Co., St. Louis, Mo.
Davis Brake Beam Co., Johnstown, Pa.
Dayton Pneumatic Tool Co., Dayton, Ohio.
Dearborn Chemical Co., Chicago.
Detroit Lubricator Co., Detroit, Mich.
Detroit Twist Drill Co., Detroit, Mich.
Diamond Machine Co., Providence, R. I.

- Dickson, Paul, Inc., Chicago.
 Diston, Henry, & Sons, Inc., Philadelphia, Pa.
 Dixon, Iosch, Crucible Co., Jersey City, N. J.
 Dressel Manufacturing Corp., New York.
 Duff Manufacturing Co., Pittsburgh, Pa.
 Eagle Manufacturing Co., Wellsburg, W. Va.
 Edgewater Steel Co., Pittsburgh, Pa.
 Edison Storage Battery Co., Orange, N. J.
 Edna Brass Manufacturing Co., Cincinnati, Ohio.
 Edson Manufacturing Corp., Boston, Mass.
 Edwards, O. M. Co., Inc., Syracuse, N. Y.
 Electric Arc Cutting & Welding Co., Newark, N. J.
 Electric Controller & Mfg. Co., Cleveland, Ohio.
 Electric Service Supplies Co., Philadelphia, Pa.
 Electric Storage Battery Co., Philadelphia, Pa.
 Elin Mechanical Stoker Co., New York.
 Ellwell-Parker Electric Co., New York.
 Emery, E., Pittsburgh, Pa.
 Enterprise Railway Equipment Co., Chicago.
 Everlasting Valve Co., Jersey City, N. J.
 Ewald Iron Co., Louisville, Ky.
 Fire Gun Manufacturing Co., Inc., New York.
 Flannery Bolt Co., Pittsburgh, Pa.
 Ford, J. B. Co., Wyandotte, Mich.
 Forged Steel Vase Corp., Rochester, N. Y.
 Fort Pitt Malleable Iron Co., Pittsburgh, Pa.
 Fort Pitt Spring & Mfg. Co., Pittsburgh, Pa.
 Foster, Walter H., Co., New York.
 Four Wheel Auto Drive Co., Clintonville, Wis.
 Franklin Railway Supply Co., Inc., New York.
 Frost Railway Supply Co., Detroit, Mich.
 Fretzell Compler Co., Inc., Streator, Ill.
 Galena-Signal Oil Co., New York.
 Garlock Packing Co., Paimyra, N. Y.
 Geist Manufacturing Co., Atlantic City, N. J.
 General Electric Co., Schenectady, N. Y.
 Giessel, Henry, Co., Chicago.
 Gold Car Heating & Lighting Co., Brooklyn, N. Y.
 Gould Compler Co., New York.
 Gray, C. A., Co., Cincinnati, Ohio.
 Griffio Wheel Co., Chicago.
 Grip Nut Co., Chicago.
 Hagy, J. Milton, Waste Works, Philadelphia, Pa.
 Hale & Kilburn Corporation, Philadelphia, Pa.
 Hall Draft Gear Corporation, Hamilton, Ont.
 Hammett, H. G., Troy, N. Y.
 Haoma Locomotive Stoker Co., Cincinnati, Ohio.
 Harrington, Edwin, Son & Co., Inc., Philadelphia, Pa.
 Heald Machine Co., Worcester, Mass.
 Hendey Machine Co., Torrington, Conn.
 Heywood Wakefield Co., Wakefield, Mass.
 Howell Electric Motors Co., Howell, Mich.
 Hunt-Spiller Manufacturing Corp., S. Boston, Mass.
 Hutchins Car Roofing Co., Detroit, Mich.
 Hyatt Roller Bearing Co., New York.
 Illinois Steel Co., Chicago.
 Independent Pneumatic Tool Co., Chicago.
 Individual Drinking Cup Co., Inc., Easton, Pa.
 Ingersoll Milling Machine Co., Rockford, Ill.
 Ingersoll Rand Co., New York.
 International Motor Co., New York.
 Jacques, H. W., Philadelphia, Pa.
 Jenkins Bros., New York.
 Johns-Manville Inc., New York.
 Joliet Railway Supply Co., Chicago.
 Jones & Laughlin Steel Co., Pittsburgh, Pa.
 Joyce-Cridland Co., Dayton, Ohio.
 Keller, Wm. H., Inc., Grand Haven, Mich.
 Kerrie Insulated Wire Cables, New York.
 Key-Bolt Appliance Co., Orchard Park, N. Y.
 Keyoke Railway Equipment Co., Chicago.
 King Pneumatic Tool Co., Chicago.
 Landis Machine Co., Waynesboro, Pa.
 Lehmann Machine Co., St. Louis, Mo.
 Lehon Company, Chicago.
 Lewis-Shepard Co., Boston, Mass.
 Libbey Glass Mfg. Co., Toledo, Ohio.
 Liberty Manufacturing Co., Pittsburgh, Pa.
 Locomotive Firebox Co., Chicago.
 Locomotive Stoker Co., Pittsburgh, Pa.
 Logan Iron & Steel Co., Burnham, Pa.
 Long, Chas. R., Jr., Co., Louisville, Ky.
 Lovell, F. H., & Co., Arlington, N. J.
 Lowe Brothers Co., Dayton, Ohio.
 MacRae's Blue Book, Chicago.
 Machinery, New York.
 Madison-Kipp Corp., Madison, Wis.
 Manning, Maxwell & Moore, Inc., New York.
 Massachusetts Mohair Plush Co., Boston, Mass.
 Mercury Manufacturing Co., Chicago.
 Merrill Co., Chicago.
 Metal & Thermit Corp., New York.
 Midway & Borrowsdale, Chicago.
 Milwaukee Steel & Ordnance Co., Philadelphia, Pa.
 Milburn, Alexander, Co., Baltimore, Md.
 Milwaukee Tank Works, Milwaukee, Wis.
 Miner, W. H., Chicago.
 Minich Railway Appliance Corp., Philadelphia, Pa.
 Miron Manufacturing Co., Chicago.
 Morson Manufacturing Co., Muskegon Heights, Mich.
 McCabe Manufacturing Co., Lawrence, Mass.
 McConway & Torley Co., Pittsburgh, Pa.
 Nathan Manufacturing Co., New York.
 National Baler Washing Co. of Ill., Chicago.
 National Brake Company, Inc., Buffalo, N. Y.
 National Car Wheel Co., Pittsburgh, Pa.
 National Lock Washer Co., Newark, N. J.
 National Malleable Castings Co., Cleveland, Ohio.
 National Railway Appliance Co., New York.
 National Railway Devices Co., Chicago.
 National Tybe Co., Pittsburgh, Pa.
 Nazel Engineering & Mach. Works, Philadelphia, Pa.
 Neville Lubricator Co., Pittsburgh, Pa.
 New York Air Brake Co., New York.
 Nicome Co., Chicago.
 Niles-Bement-Fond Co., New York.
 Norton, A. O., Inc., Boston, Mass.
 Norwalk Iron Works Co., So. Norwalk, Conn.
 Nuttall, R. D. Co., Pittsburgh, Pa.
 Okadee Company, Inc., Chicago.
 Okonite Co., Passaic, N. J.
 Oldham, George & Son, Co., Baltimore, Md.
 Oliver Elec. & Mfg. Co., St. Louis, Mo.
 O'Malley-Bear Valve Co., Chicago.
 Oxwell Railroad Service Co., Chicago.
 Page Steel & Wire Co., Bridgeport, Conn.
 Paige & Jones Chemical Co., New York.
 Pantasote Co., New York.
 Parkesburg Iron Co., Parkesburg, Pa.
 Paxton-Mitchell Co., Omaha, Neb.
 Pels, Henry & Co., Inc., New York.
 Penn Iron & Steel Co., Creighton, Pa.
 Pillid Company, Swant, n. Ohio.
 Pilot Packing Co., Inc., Chicago.
 Pittsburgh Steel Foundry Co., Pittsburgh, Pa.
 Pittsburgh Testing Laboratory, Pittsburgh, Pa.
 Pocket List of Railroad Officials, New York.
 Peter-Richards Machinery Co., Philadelphia, Pa.
 Pratt & Lambert, Inc., Buffalo, N. Y.
 Pressed Steel Car Co., New York.
 Princeton Foundry & Supply Co., Princeton, W. Va.
 Production Machine Co., Greenfield, Mass.
 Pyle-National Co., Chicago.
 Racine Tool & Machine Co., Racine, Wis.
 Railroad Herald, Atlanta, Ga.
 Railway Devices Co., St. Louis, Mo.
 Railway Materials Co., Chicago.
 Railway Purchases & Stores, Chicago.
 Railway Review, Chicago.
 Railway Storage Battery Car Co., New York.
 Ralston Steel Car Co., Columbus, Ohio.
 Reading Iron Co., Reading, Pa.
 Reed-Prentice Co., Worcester, Mass.
 Republic Iron & Steel Co., Youngstown, Ohio.
 Rivet Cutting Gun Co., Cincinnati, Ohio.
 Roberts Automatic Connector Co., Ltd., Sarnia, Ontario.
 Rogatchof Co., Baltimore, Md.
 Roehling's, John A., Sons, Co., Trenton, N. J.
 Rome Iron Mills, Inc., New York.
 Rubbiset Co., Newark, N. J.
 Ryerson, Joseph T., & Son, Chicago.
 S K F Industries, Inc., New York.
 Safety Car Hite, & Lig. Co., New York.
 Sargent Co., Chicago.
 Schaefer Equipment Co., Pittsburgh, Pa.
 Sellers, Wm. A. Co., Inc., Philadelphia, Pa.
 Sharon Pressed Steel Co., Sharon, Pa.
 Sherritt & Singer Co., Inc., Philadelphia, Pa.
 Silumite Products Corp., Philadelphia, Pa.
 Simmons-Bardman Publishing Co., New York.
 Smith Adjustable Hul. Plate Co., Chicago.
 Southern Wheel Co., St. Louis, Mo.
 Southwark Foundry & Machine Co., Philadelphia, Pa.
 Stafford Roller Bearing Car Truck Corp., Lawton, Mich.
 Standard Car Truck Co., Chicago.
 Standard Coupler Co., New York.
 Standard Fergines Co., Chicago.
 Standard Railway Equipment Co., Chicago.
 Stone Franklin Co., Inc., New York City.
 Sturteb. A. Co., Pittsburgh, Pa.
 Sunbeam Electric Mfg. Co., Evansville, Ind.
 Superheater Co., New York.
 Superior Steel Castings Co., Chicago.
 Swind Machinery Co., Philadelphia, Pa.
 Symington, T. H., Co., Rochester, N. Y.
 Talmage Mfr Co., Cleveland, Ohio.
 Tucco Products Corp., New York.
 Underwood, H. B., Corp., Philadelphia, Pa.
 Union Draft Gear Co., Chicago.
 Union Metal Products Co., Chicago.
 Union Spring & Mfg. Co., Pittsburgh, Pa.
 U. S. Light & Heat Corp., Niagara Falls, N. Y.
 United States Metallic Packing Co., Philadelphia, Pa.
 United States Rubber Co., Chicago.
 Universal Draft Gear Attachment Co., Chicago.
 Universal Packing & Service Co., Chicago.
 Vanadium-Alloys Steel Co., Latrobe, Pa.
 Vauvor Car Heating Co., Inc., Chicago.
 Verona Tool Works, Pittsburgh, Pa.
 Vicesinger, Harry, & Co., Inc., Chicago.
 Walworth Manufacturing Co., Boston, Mass.
 Waugh Draft Gear Co., Chicago.
 Wayne To I Manufacturing Co., Waynesboro, Pa.
 West Dismantling Co., New York.
 Western Railway Equipment Co., St. Louis, Mo.
 Western Steel Car & Foundry Co., New York.
 Westinghouse Air Brake Co., Wilmerding, Pa.
 Westinghouse Electric Mfg. Co., East Pittsburgh, Pa.
 Wheel Truing Brake Shoe Co., Detroit, Mich.
 White American Locomotive Sander Co., Inc., Roanoke, Va.
 Whitins Corporation, Harvey, Ill.
 Wilbert Manufacturing Co., Chicago.
 Wilhard Storage Battery Co., Cleveland, Ohio.
 Williams Tool Corporation, Erie, Pa.
 Wilson Imperial Company, Newark, N. J.
 Wine Railway Appliance Co., Toledo, Ohio.
 Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

Woods, Edwin S., & Co., Chicago.
 Worthington Pump & Machinery Corp., Philadelphia, Pa.
 Wyoming Shovel Works, Wyoming, Pa.
 Yale & Towne Mfg. Co., Stamford, Conn.

TRACK EXHIBITORS

Buckeye Steel Castings Co., Columbus, Ohio.
 Clark Car Company, Pittsburgh, Pa.
 Four Wheel Drive Auto Co., Clintonville, Wis.
 Inter-State Safety Appliance Co., Inc., Norristown, Pa.
 Stafford Roller Bearing Car Truck Corp., Lawton, Mich.

Traffic News

A meeting to organize a National Association of Traffic Clubs will be held in the rooms of the Traffic Club of Chicago at the Hotel LaSalle in that city on May 15, 16 and 17. Present indications are that more than 60 national committeemen, representing 30 traffic clubs, will be present at this meeting.

In a recent hearing before the Railroad Commission of California on an application of the Marin Transportation Company for authority to operate automobile freight service between San Francisco and points in Marin county the commission held that the present carriers are able to provide full service and as a result rejected the application.

Paul Henderson, of Chicago, has been nominated by President Harding for appointment as second assistant postmaster general in charge of railway mail service, to succeed Col. E. H. Shaughnessy, deceased. Mr. Henderson is a son-in-law of Congressman Madden of Illinois and has been connected with the Brownell Improvement Company of Chicago.

The Chicago, Milwaukee & St. Paul has announced a reduction in its dining car prices. Club breakfasts will be served at prices ranging from 25 cents to \$1, and club luncheons and club dinners at 60 cents to \$1.25. There will be no change, however, in the price of the table d'hotel dinner served on the Pioneer Limited between Chicago and the Twin Cities, and the South-west Limited, between Chicago and Kansas City.

Reductions in freight rates between the United States and Mexico have been proposed through a tentative agreement of five American railroads serving the Mexican border territory and the National Railways of Mexico. Reductions will range from 25 to 50 per cent. Summer tourists' rates have already been put into effect in Mexico, and it is expected that the American roads will follow with like reductions to border points. The present round trip fare from border points to Mexico City is \$51.75, representing a reduction of about \$19.

The Federal District Court at Kansas City, Mo., on April 13, upon the application of the railroads, issued a broad injunction against ticket scalping. The restraining order heretofore issued by this court is continued in force, as a temporary injunction, and the defendants are restrained from engaging in the business of purchasing or selling railroad tickets of any kind, nature or character, and from doing any business as railroad ticket brokers or railroad ticket scalpers; and from advertising for or soliciting for the sale or purchase of railroad tickets of any kind, nature or character. The scalpers have removed all cut rate signs and it is believed that the railroads will be free from scalping in Kansas City. This application for injunction was evidently made in view of the reduced rate excursion tickets that are soon to go on sale.

Fifteen carloads of silk arrived in New York over the New York Central last week in less than five days from Vancouver, B. C., and in two weeks from Yokohama. The Canadian Pacific reports the run as follows:

"The consignment, 3,697 bales of raw silk (17 cars), was delivered at Vancouver from the "Empress of Asia" on April 10, nine days after leaving Yokohama. Fifteen of the 17 cars were destined to New York and reached there in 4 days, 16 hrs., 10 min. after the ship tied up in Vancouver harbor. Actual running time Yokohama to Victoria, 8 days, 19 hrs., 32 min.; Victoria to Vancouver, 6 hrs., 20 min.; transfer to cars at Vancouver, 5 hrs., 58 min.; Vancouver to Prescott, Ont., 3 days, 17 hrs., 57 min.; time at Prescott 1 hr., 30 min.; Prescott to Ogdensburg, N. Y., 3 hrs., 10 min.; Ogdensburg to New York, 11 hrs., 35 min.; Yokohama to New York, 13 days, 18 hrs., 2 min.

The Chicago & Alton announces homeseekers' fares from all points on its line to destinations in Alberta, Colorado, Idaho, Manitoba, Minnesota, Montana, New Mexico, North Dakota, South Dakota, Oregon, Saskatchewan, Utah and Washington. The tickets will be sold on the first and third Tuesdays of each month at a one way rate plus two dollars for the round trip.

\$200,000,000 of Government Payments to

Railroads Postponed to 1923

Expenditures of the federal government on account of the railroads during the fiscal year ending June 30, 1923, are estimated at \$200,000,000 in a revised statement of the Treasury's latest estimates of receipts and expenditures sent by Secretary Mellon to committees of Congress on April 14. The estimates as to the fiscal year 1923 are based on estimates which appear in the budget submitted in December, 1921, after taking into account changes which have become apparent since that time. The budget for 1923 as submitted to Congress did not include any item of expenditure on account of the railroads, but Mr. Mellon says that the indications now are that owing to delayed settlements of matters arising out of federal control and under the guaranty for the six months following federal control, there will be payments of about \$100,000,000 under the Railroad Administration and about \$100,000,000 under the Interstate Commerce Commission during the fiscal year 1923. The postponement of these payments to 1923 is reflected in a corresponding reduction of railroad expenditures for the fiscal year 1922, and partly on this account and partly on account of the proceeds of the sale of about \$230,000,000 of equipment trust notes of carriers, the item of railroad expenditures in the statement shows an estimated credit of about \$56,000,000 as compared with estimated expenditures of about \$337,000,000 when the budget was submitted. The Secretary uses this figure of \$230,000,000 of equipment trust notes as of March 31, although the latest statement of the director general indicates a sale of \$249,000,000.

Railway Revenues and Expenses for February

The Interstate Commerce Commission summary of railway revenues and expenses of Class I roads for February and two months is as follows:

Item	February		Two months	
	1922	1921	1922	1921
Average number of miles operated...	235,696.53	235,326.75	235,709.82	235,327.29
Revenues:				
Freight	\$294,477,607	\$284,216,672	\$571,384,767	\$609,400,642
Passenger	73,585,326	88,462,552	\$157,314,702	\$193,720,099
Mail	6,986,554	7,913,642	14,364,298	16,136,847
Express	6,300,683	4,457,672	12,820,694	11,899,871
All other transportation	12,052,003	11,732,196	24,081,912	25,168,601
Incidental	7,426,180	9,314,845	15,819,132	19,915,069
Joint facility—Cr.	780,994	608,437	1,388,716	1,312,647
Joint facility—Dr.	177,675	210,437	350,962	395,506
Railway operating revenues	401,426,672	406,495,579	796,823,889	877,158,270
Expenses:				
Maintenance of way and structures	46,535,345	53,316,603	95,249,268	114,168,877
Maintenance of equipment	91,956,913	108,220,839	185,542,265	232,248,977
Traffic	6,790,020	7,400,577	13,964,980	14,390,621
Transportation	163,478,539	198,538,166	334,802,190	429,289,592
Miscellaneous operations	3,513,058	4,029,304	7,202,337	8,551,301
General railway expenses	12,656,797	14,077,993	26,189,782	29,358,814
Transportation for investment—Cr.	429,538	377,600	845,754	955,441
Railway operating expenses	324,501,134	384,645,882	662,105,068	827,052,741
Net revenue from railway operations	76,925,538	21,849,697	134,718,821	50,105,529
Railway tax accruals	22,627,661	21,279,262	45,198,590	43,432,257
Uncollectible railway revenues	97,659	77,335	186,568	147,390
Railway operating income	54,200,218	492,500	89,333,663	6,525,882
Equipment rents—				
Dr. balance.....	5,052,897	3,601,044	9,156,127	6,768,471
Joint facility rent—				
Dr. balance.....	1,376,424	2,056,427	2,872,825	3,383,754
Net railway operating income	47,770,897	\$5,161,971	77,304,711	\$3,626,343
Ratio of expenses to revenues (per cent)	80.84	94.62	83.09	94.29

* Includes \$4,371,793, sleeping and parlor car surcharge.
 † Includes \$4,761,527, sleeping and parlor car surcharge.
 ‡ Decrease.

the tickets good for 21 days from date of sale. This company will also place on sale daily between May 15 and September 30, reduced summer excursion fares from all points on its line. To destinations in the west these tickets will be sold at one and one-tenth fare for the round trip; to Michigan, Minnesota and Wisconsin, the rate will be one and one-half for the round trip; and to eastern and northeastern points, one and three-fifths rate for the round trip sales to Colorado, Wyoming and the national parks will not commence until June 1. There will also be 20 to 30-day excursion rates to points in Wisconsin, Michigan and Minnesota.

The United States Shipping Board is planning to begin hearings shortly in various parts of the country on Section 28 of the merchant marine act, which is intended to confine export and import rail rates to the traffic moved in American ships whenever the Shipping Board certifies to the Interstate Commerce Commission that adequate shipping facilities under the American flag exist to permit enforcement of the section. The announced intention of the Shipping Board to enforce this section had aroused numerous protests from chambers of commerce and other commercial organizations interested in export and import traffic and the board appointed a committee consisting of Commissioners Thompson, Benson and Chamberlin to conduct the hearings. The first will be held at Boston and a schedule of dates and places will be announced shortly. The board desires it made plain that the only question on which it desires evidence is as to whether there are adequate shipping facilities under the American flag.

Rate Decision Still Uncertain

Thus far no indications have appeared as to when the Interstate Commerce Commission will hand down its decision in the rate case, on which it held hearings for three months, although it is understood that the commissioners are working overtime in trying to reach a decision. Some time ago Commissioner Esch told the House committee on interstate and foreign commerce that the commission hoped to have the decision by the first week in April. It is understood that the 11 members of the commission are of many different minds as to whether and to what extent rates should be reduced. One rumor, which is probably only a guess based on the attitudes indicated by various members of the commission at different times, is that four members of the commission felt that under the law rates could not be reduced, while four were of the opinion that a small general percentage reduction should be made, while three were inclined to favor reductions on basic commodities.

Ticket Frauds Prohibited by New Law in New York

The Legislature of New York has passed a new law penalizing the misuse of railroad tickets, and the Long Island Railroad has issued a notice of it for the benefit of season ticket holders. The gist of the law is to the effect that

No person shall obtain transportation for himself, herself, or others, or shall avail himself, herself or others of any means of transportation at rates other than or different from those prescribed in the schedules of rates filed and published, or in violation of the conditions attached to any reduced rate ticket, provided such conditions are contained in the filed and published schedules.

This, says the circular, means that the misuse of commutation tickets, and family trip tickets, is a misdemeanor, punishable by imprisonment for not more than one year, or by a fine of not more than \$500, or by both. Commenting on the law, P. H. Woodward, general passenger agent of the Long Island, said that his road would expect the new law to be obeyed by persons who have been "innocently" lending their tickets on days not used by themselves. The regular scalpers, however, he intends to bring to justice. Persons who are not scalpers and not innocent seem not to be covered by Mr. Woodward's comment.

"Practical Permanent Pastures"

Saving two hundred years of the time that Nature would require to convert waste and uncared for lands in Georgia and Alabama into first-class feeding ground for cattle is the keynote of a pamphlet with the above title, which has been issued by the Agricultural Department of the Central of Georgia Railway describing the results of its activities during the past year, looking to the encouragement of farmers to introduce the best qualities of grass and thus promote the profitable raising of livestock. This

railroad company's hundred-dollar prizes, offered in 46 counties for the best pastures, were noticed in the *Railway Age* of June 10, 1921, page 1371.

During the past two months, the farmers in the territory adjacent to the railway have bought and sown 11 tons of seed, and much more could have been sold to them if it could have been obtained. The railroad company also has aided the farmers in the securing of several hundred head of registered cattle and has given 137 boars and 202 bulls as prizes in Boys' Club contests.

Every one of the 46 test pastures proved a success, and the pamphlet contains interesting letters from the farmers who made the improvements.

Joint Commission Report to Recommend Constructive Treatment of Transportation

The forthcoming report to Congress of the Joint Commission of Agricultural Inquiry will disclose a mass of valuable facts and figures bearing on the relation of transportation to agriculture and industry.

Chairman Sydney Anderson of Minnesota, speaking for the commission, says: "We are convinced that the inquiry concerning transportation has gone further than any such investigation heretofore made. The collecting and assembling of the data has required the combined efforts of more than 1,600 persons and the circulation of more than 250,000 questionnaires. Over 100 committees representing agriculture and industry were established, and those in turn appointed 200 sub-committees.

"Further, the joint commission has had the active and effective co-operation of the various governmental commissions, departments and bureaus and of farm and railway organizations, etc.

"The report will include a score or more of distinct recommendations to Congress, bearing chiefly on governmental contracts with transportation systems and an equal number of conclusions addressed to transportation management and to producers and shippers. The commission is convinced that transportation requires constructive and helpful governmental and public treatment rather than repressive or restrictive regulation."

Coal Production

Complete returns of coal loaded into cars at the mines, compiled by the Geological Survey, indicate that production during the first week of the strike was 3,784,000 net tons of bituminous coal, and a few cars of anthracite dredged from the rivers. The total production of all coal was 3,793,000 net tons.

Preliminary telegraphic returns for the week of April 10-15 indicate no change in anthracite, but a slight decrease in bituminous. It will be seen from the following table of cars of soft coal loaded daily that the output on Monday, Tuesday, and Wednesday was running consistently below that on the corresponding days of the week before. On Thursday, April 13, however, loadings increased to 11,480 cars, as high a figure as any recorded since the strike began.

First Week		Second Week	
Monday, April 3	11,445	Monday, April 10	10,732
Tuesday, April 4	11,019	Tuesday, April 11	10,671
Wednesday, April 5	11,437	Wednesday, April 12	10,973
Thursday, April 6	11,900	Thursday, April 13	11,480
Friday, April 7	11,307		
Saturday, April 8	9,028		

The current production is less than the districts now at work are able to produce when the demand for coal is active, the report says. It is true that a number of important non-union mines in the Connellsville coke region and in Central Pennsylvania have been closed by the strike, but the existing demand is not sufficient to call out full production in those districts remaining at work. From mines in many non-union fields reports of "no market," "dull demand," and "unbilled coal" continue to be received. The number of loaded cars unconsigned at the mines was very large when the strike began, and it is increasing rather than decreasing.

Production of anthracite ceased virtually during the first week of the strike 172 cars being shipped during the week ended April 8. Based on these loadings, the total output is estimated at 9,000 net tons.

Final reports of shipments of anthracite during March indicate a total production of 8,757,000 net tons. In comparison with February this was an increase of 27 per cent. The month's production exceeded that of any similar month during the past nine years, except in 1917 and 1918.

The government is still maintaining its policy of no interference

Commission and Court News

Interstate Commerce Commission

The commission has suspended until August 16 the operation of schedules published by the Erie which propose increases and reductions on brick from Corry, Pa., to New York rate points.

The commission has adopted a conference ruling that Section 208a of the Transportation Act, 1920, does not authorize the commission to award reparation, or consent to an award of reparation made by a state commission, on intrastate shipments which moved during the guaranty period.

The commission has suspended until August 13 the operation of certain schedules published by the Bessemer & Lake Erie which propose the cancellation of joint through rates on bituminous and cannel coal from B. & L. E. Group No. 1 points in Pennsylvania, to various destinations on the Buffalo, Rochester & Pittsburgh.

The commission has suspended until August 15 the operation of certain rates which propose to increase from 38.5 cents to 45.5 cents per 100 lb. existing rates on lumber from points in Mississippi on the Alabama & Mississippi, Jackson & Eastern, Mississippi & Western and Meridian & Memphis to destinations on the Chesapeake & Ohio, Ashland, Ky. to East Huntington, W. Va., inclusive.

Southeastern Sugar Investigation

The commission has ordered an investigation into the reasonableness of the rates on sugar from New Orleans and other producing points in Louisiana, and from Savannah, Ga., Boston, Mass., New York, N. Y., Philadelphia, Pa., Baltimore, Md., and other producing and distributing points on the Atlantic seaboard to points in Kentucky, Tennessee, Mississippi, Alabama, Georgia, Florida, North Carolina, South Carolina, and Louisiana east of the Mississippi river, including the east bank thereof, and the north bank of the Ohio river.

Court News

Telegraph Office Held Not Continuously Operated

A railroad, the International & Great Northern, kept a telegraph office open from 7 a. m. to 7 p. m. only, with one operator, who remained on duty from 7 a. m. to 6 p. m. and, when necessary, till 7 p. m. The company had an arrangement with another railroad, which had a telegraph office in a tower at some distance, continuously operated by three shifts, to receive and deliver its train orders when its own office was closed, for which service it paid. The Circuit Court of Appeals, Fifth Circuit, holds this did not make the office one continuously operated within section 2 of the Hours of Service Act. Judgment for the government was reversed (261 Fed. 703).—*Baker v. United States*, 276 Fed. 897.

Negligence in Kicking Coupler

The Georgia Court of Appeals holds that a car coupler who sees and knows that the drawhead and knuckle of the coupling are defective and will not act automatically, and who, while an engine with cars attached is backing rapidly to the point where the coupling is to be made, kicks against the drawhead and knuckle, to adjust them, just at the moment of impact, and thus gets his foot mashed, cannot hold the railroad liable, although a signal given by him was disregarded by the engineman in thus rapidly backing the engine and cars; it not appearing that the injured employee did not see and know the speed at which the engine and cars were moving. The rule of comparative damages under the Georgia Employers' Liability Act does not apply where the fault of the employee amounts to a lack of ordinary care, making him the author of his own injury.—*Green v. Flint River Northeastern* (Ga.) 110 S. E., 243.

Labor Board Decisions

Foremen Need Not All Be Paid the Same Rate

During the government control period the Portland division of the Southern Pacific was under a different regional director from the rest of the Southern Pacific System, and this regional director did not advance the wages of bridge and building and water service foremen and assistant foremen on the same basis that advances were made on the rest of the Southern Pacific System. Wage advances under Decision No. 2, being applied to the rates of pay in effect on March 1, 1920, perpetuated these differences. In answer to a complaint of the employees, requesting that this differential be removed, the railroad said that the provisions of Decision No. 2 had been applied legally; and this contention was sustained by the Labor Board. The board stated, however, that its decision does not prevent negotiations between the railroad and the employees with regard to the salaries paid these foremen.—*Decision No. 798*.

Seniority Retained While Filling Temporary Position

In February, 1920, a car repairman at the East Fitchburg shops of the Boston & Maine, with 19 years' seniority, applied for and was assigned to a temporary position as car inspector at the passenger station at Fitchburg. Later this job was advertised as a permanent vacancy and this man refused to bid on the permanent position, returning to the shops; and there he was informed that he had lost his seniority. The employees, through the American Federation of Railroad Workers, contended that in accepting the temporary assignment he did not lose his seniority at the shops. The Labor Board decides that in view of the fact that the position accepted by him was advertised as temporary, he should be restored to his seniority standing at the shops; and be compensated for any loss of wages which he later suffered by loss of seniority through a layoff on account of a reduction of forces at the shops.—*Decision No. 773*.

Brakeman May Act as Fireman in Emergency

L. C. Roth, a fireman on the Missouri, Kansas & Texas, became ill and was relieved in the middle of a trip at Cushing, Oklahoma, on August 13, 1920. H. G. Olmstead, a fireman regularly assigned to a switch engine at Cushing, who had been off duty about 12 hours at the time, claimed that he should have been called, instead of a brakeman, to relieve Roth for the remainder of the trip. The carrier contended that while Olmstead was assigned to the switch engine at Cushing he was not entitled to work outside of his regular assignment and, further, that there was no assurance that Roth's illness would improve sufficiently to justify putting him in Olmstead's place on the switch engine. The Labor Board decides that the claim of the train service brotherhoods that Olmstead is entitled to a minimum day's pay for not being called, is not supported by any rule of the agreement between the employees and the carrier; and the claim is denied.—*Decision No. 773*.

Board Sustains Managerial Function of Roads

The position of ticket agent on the Missouri, Kansas & Texas, at Sedalia, Mo., paying 713¢ per hr., was reclassified on February 28, 1921, as ticket clerk, paying a rate of 50¢ per hr. The Order of Railroad Telegraphers protested against this action, stating that prior to the change separate freight and ticket offices were maintained. No change was made in the duties or responsibilities of the position, the only difference being that reports were now made in the name of the agent instead of the ticket clerk. The road maintained that business conditions at Sedalia justified the reclassification of the position and the extension of the authority of the freight agent over the passenger station. The road contended further that the determination of the character of the service to be rendered in its relation to the public at its stations is purely a managerial function and that there is no rule in the agreement between the road and its employees to support the employees' contention that it shall confer with them prior to making changes of this character. The labor board denied the claim of the employees.—*Decision No. 837*.

Foreign Railway News

The First Locomotive Works in Poland

J. Dabrowski, Chrzanow, Poland.

One of the most important problems of the Independent Polish Government and of private industry has been to restore the railways and to increase the number of locomotives. This question became the more vital as the geographical situation of Poland makes it a natural mediator between west and east. For normal transport conditions there are necessary now about 3,000 addi-



General View of the First Polish Locomotive Works

tion new locomotives, the average number of locomotives needed for 1 km. of railway track being in Europe about 0.4.

The First Polish Locomotive Works Ltd., Chrzanow, Poland, are really the first step in the development of this industry in Poland and they have received a government order for 1,200 new locomotives. The works in question are advantageously situated near the coal mines and industrial districts of Upper Silesia.

In proportions and arrangement the buildings are unlike the

divided into seven parallel bays and provided with six cranes ranging from 5 to 15 tons. The position of the other buildings relative to the whole plant is shown in the general plan.

As to the internal equipment of the shops it was policy of the management to apply all technical improvements in both machine tools and working methods. Special machine tools, high speed steel, electric drive, interchangeability of parts, modern systems of shop management were taken into most careful consideration.

All electric current used in the shops is purchased from the neighboring electric power company being received as 22,000 volt 50 cycle, three phase alternating current, which is reduced by transformers to 380 volt three phase 50 cycle current. Rotary converters are also provided to supply 220 volt direct current which is used to operate the variable speed motors of machine tools. All cranes, except those of the cast iron foundry, are operated by alternating current.

The management of the works pays much attention to American industry and American methods of working and has active intercourse with many firms of this country. The present financial difficulties due to the low rate of exchange of Polish money do not permit the realization of many intentions. The first locomotives should be assembled this year.

The First Polish Locomotive Works is a private company with financial support of the Polish banks.

Proposed New Line from Llano Grande to Mazatlan

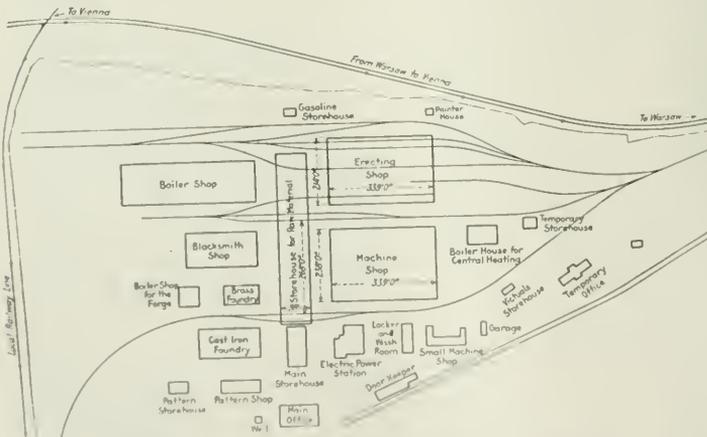
According to a report received from Durango, the financing of the construction of an extension of the line of National Railways of Mexico which now runs from Durango to Llano Grande, 75 miles, to the port of Mazatlan on the Pacific Coast, is proposed by a syndicate of California men who are said to own large bodies of land along the route of the proposed line. It is estimated by engineers that the cost of building the railroad from Llano Grande to Mazatlan would be about \$20,000,000. For much of the way the rough Sierra Madre range must be crossed at altitudes ranging from 7,000 to 8,000 feet. To get down to sea level on the Pacific side of the mountains the drop must be made within a distance

of 50 miles, it is stated. It was announced several months ago that the Mexican government had decided to build this extension and recently work was started on the grade out of Llano Grande, which is in the heart of one of the best timbered regions of Mexico.

The line from Durango to Llano Grande was built just before the revolutionary period for the purpose of affording a transportation outlet for a large body of commercial timber which at that time was being exploited. In connection with this railroad project the Mexican government plans to make extensive harbor and port improvements at Mazatlan at a cost of several million dollars. The construction of a railroad over the Sierra Madres to Mazatlan has been under consideration for many years. At the time the late Collis P. Huntington built the Mexican International Railroad from Eagle Pass, Texas, to Durango, it was his purpose to make Mazatlan the Pacific terminus of the line. He had engineers in the field for several years trying to find a feasible route over the mountains, but none was located. When the Mexican International passed out of the hands of the Southern Pacific interests the project of extending the line was dropped.

Begin Electrification in Chile

Work on the electrification of the Chilean State Railways between Valparaiso and Santiago was begun on April 12, according to press dispatches from Chile. The Westinghouse Electric & Manufacturing Company has this contract.



Plan of the Shops of the First Polish Locomotive Works

other plants completed during recent years in that country and they embody a number of features that warrant detailed consideration. The main buildings of reinforced concrete are spacious and secure an abundance of natural light by large windows and glass areas in the roof. The erecting shop has ground dimensions of 339 ft. 6 in. by 217 ft. 4 in., and consists of four parallel bays. The bay heights were determined very largely by the crane requirements. The main bay is equipped with a crane runway for two 50-ton cranes with top of rail 36 ft. 1 in. and two 10-ton cranes with top of rail 22 ft. 2 in. above the floor. The machine shop has ground dimensions of 339 ft. 6 in. by 238 ft. 2 in., is

Equipment and Supplies

Locomotives

THE ATLANTIC COAST LINE is inquiring for 20 Pacific type locomotives.

THE PACIFIC STATE LUMBER COMPANY, Tacoma, Wash., has ordered 1 Prairie type locomotive from the Baldwin Locomotive Works.

THE BOSTON & MAINE, reported in the *Railway Age* of April 15, as inquiring for 2 Mallet type locomotives and 20 switching locomotives, has ordered this equipment from the American Locomotive Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 15, 0-8-0 type locomotives from the American Locomotive Company. These locomotives will have 25 by 28 in. cylinders and total weight in working order of 216,000 lb.

THE CAMP MANUFACTURING COMPANY, Franklin, Va., has ordered one Prairie type locomotive from the American Locomotive Company. This locomotive will have 13 by 20 in. cylinders and a total weight in working order of 67,000 lbs.

THE CHICAGO & NORTH WESTERN is inquiring for 50 locomotives for which it will receive separate bids until noon, April 28. These include 20 Mikado type superheater freight locomotives, 20 six-wheel superheater switching locomotives and 10 Pacific type superheater passenger locomotives.

NORTON GRIFFITH & Co., Brazil, have ordered 5, 0-4-0 type locomotives and 3, 2-8-2 type from the American Locomotive Company. The switching locomotives will have 9 by 14 in. cylinders and a total weight in working order of 29,000 lb., the 2-8-2 type locomotives will have 15 by 20 in. cylinders and a total weight in working order of 84,000 lb.

Freight Cars

THE TOLEDO & WESTERN is inquiring for 10 to 20 box cars.

THE CENTRAL OF GEORGIA is inquiring for 50 to 200, 40-ton flat cars.

THE EL PASO AND SOUTHWESTERN is inquiring for 30 refrigerator cars.

THE ST. LOUIS SOUTHWESTERN is inquiring for from 200 to 1,000 box cars.

THE CINCINNATI, INDIANAPOLIS & WESTERN is inquiring for 300 freight cars.

THE CHICAGO GREAT WESTERN is inquiring for repairs to 100 refrigerator cars.

THE MISSOURI, KANSAS & TEXAS is inquiring for 300 flat cars of 40 tons' capacity.

THE NEW YORK, CHICAGO & ST. LOUIS contemplates asking for bids on 400 refrigerator cars.

THE ATLANTIC COAST LINE is in the market for 750 single sheathed box cars, of 40 tons' capacity.

THE TEXAS & PACIFIC will start immediately to repair a large number of freight cars in its shops at Marshall, Tex.

THE TOLEDO, ST. LOUIS & WESTERN is inquiring for 100 steel underframes, 50-ton flat car bodies and repairs to 300, 40-ton box cars.

THE SOUTHERN RAILWAY is asking for bids on 2,000, 36 ft. plain box cars, also on 500, 36 ft. automobile box cars. All these cars are to have steel center sills and steel ends and are to be of 40 tons capacity.

THE CHESAPEAKE & OHIO has given a contract to the Newport News Shipbuilding & Dry Dock Company for repairing 100 freight cars.

THE CHESAPEAKE & OHIO will receive bids until May 4 at Richmond, Va., for 1,500 hopper bottom gondola cars and for 1,500 flat bottom gondola cars, all to be of 57.5 tons capacity.

THE WABASH is inquiring for 250 all-steel coal car bodies of 55 tons' capacity. This is in addition to the inquiry for 250 car bodies of 50 tons' capacity, reported in the *Railway Age* of April 15.

Passenger Cars

THE SOUTHERN RAILWAY is inquiring for bids until April 25, at Washington, D. C., for passenger train cars as follows:

Twenty 69-ft. steel passenger coaches.

Fifteen 60-ft. steel combination baggage and express cars.

Ten 70-ft. steel combination passenger and baggage cars.

Fifteen 60-ft. steel postal cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 5 steel coaches and 2 steel baggage cars.

THE ANN ARBOR is inquiring for 2 coaches, 2 combination passenger and mail cars and 2 baggage cars.

THE CHICAGO, NORTH SHORE & MILWAUKEE will receive bids until May 22 for 10 passenger motor cars.

THE ATLANTIC COAST LINE, in the near future, contemplates inquiring for a number of passenger train cars.

THE FEDERAL RAILWAYS OF BRAZIL are inquiring through the car builders for 6 combination baggage and mail cars.

THE LOUISVILLE, HENDERSON & ST. LOUIS has ordered 5 passenger coaches from the American Car & Foundry Company.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 6 chair cars. An unconfirmed report says that this road is also inquiring for 8 coaches.

THE BALTIMORE & OHIO has ordered a gasoline railway motor car and trailer from the Edwards Railway Motor Car Company, Sanford, N. C.

THE CHICAGO, BURLINGTON & QUINCY has ordered a gasoline railway motor car from the Edwards Railway Motor Car Company, Sanford, N. C.

THE FLORIDA EAST COAST, reported in the *Railway Age* of March 18, as inquiring for 10 baggage cars has ordered this equipment from the Pullman Company.

THE MISSOURI, KANSAS & TEXAS, noted in the *Railway Age* of March 25 as having renewed its inquiry for 30 passenger cars, has postponed action on this inquiry after May 1st.

THE WABASH, reported in the *Railway Age* of April 1 as inquiring for 8 coaches, 9 chair cars, 2 buffet chair cars, 2 cafe chair cars and 4 dining cars, has ordered this equipment from the American Car & Foundry Company. All these cars are to be of steel construction.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of March 18 as inquiring for 5 baggage cars, 5 combination baggage and horse cars, 6 coaches, 4 combination passenger and smoking cars and 5 combination passenger and baggage cars, has ordered this equipment from the American Car & Foundry Company.

Iron and Steel

THE WABASH is inquiring for 300, 36-in. wheels for passenger coaches.

THE CHICAGO GREAT WESTERN is inquiring for steel rails with joints and fastenings.

THE TENNESSEE CENTRAL is inquiring for 7,000 tons of 80-lb. steel rail with joints and fastenings.

THE CHICAGO, BURLINGTON & QUINCY has ordered 15,000 tons of rail from the Illinois Steel Company.

THE SOUTHERN RAILWAY has ordered 300 tons of bridge steel from the Virginia Bridge & Iron Company for use on a bridge over the Holston river.

THE PHILADELPHIA & READING has ordered 500 tons of bridge steel from the American Bridge Company. This is for the bridge at Norristown, Pa., over the Schuylkill river.

THE CHICAGO, BURLINGTON & QUINCY has ordered from the American Bridge Company 2,496 tons of steel for bridge work and 2,136 tons of steel from the Fort Pitt Bridge & Iron Works for shop buildings at Denver, Colo.

THE SIAM STATE RAILWAYS are asking for bids until 2 p. m., July 31, 1922, at Bangkok, Siam, for a supply of rails and permanent way accessories. Specifications and drawings may be obtained from C. P. Sandberg, 143 Liberty street, New York City.

Track Specialties

THE ERIE is reported to have let a large tie plate order.

THE MISSOURI PACIFIC is reported to have ordered 1,500 kegs of spikes and bolts.

THE SOUTHERN PACIFIC is reported as inquiring for 20,000 kegs of spikes and bolts.

THE NEW YORK, CHICAGO & ST. LOUIS is about to place orders for 30,000 rail joints.

THE MISSOURI PACIFIC is inquiring for 164,000 angle bars and 2,000 kegs of track spikes.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will receive bids until noon April 28, for 198,000 tie plates, 30,000 pairs of 90-lb. angle bars, 7,000 kegs of track spikes and 4,500 kegs of track bolts.

Machinery and Tools

THE SOUTHERN PACIFIC has ordered one wheel press from the Niles-Bement-Pond Company.

THE NEW YORK CENTRAL has ordered one planer and one boring mill from the Niles-Bement-Pond Company.

THE EDWARDS RAILWAY MOTOR CAR COMPANY, Sanford, N. C., is in the market for one 18 in. and one 26 in. engine lathe and one 18 in. and one 24 in. shaper.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a 10-in. by 6-ft. heavy duty tool room lathe with relieving and draw-in attachments; a 16-in. by 6-ft., or 18-in. by 8-ft. engine lathe with taper attachment; a 20-in. by 12-ft., or 30-in. by 12-ft. engine lathe with taper attachment; a No. 60 or 61 Heald cylindrical grinder; a gear wheel boring machine; a 6-ft. plain radial drill; an upsetting machine; a motor driven shear; a swaging machine; a No. 4 Cincinnati horizontal universal milling machine; a 40-in. Bullard vertical turret lathe; a Ryerson or equivalent flue-testing machine; a 24-in. by 10-ft. motor-driven quick change gear tool room lathe; a Ryerson or equivalent pneumatic flue welding machine; a Ryerson or equivalent single pneumatic flue welding machine for superheater flues; A Morton, 36-in. draw cut slapper with one rotating head or slotting driving boxes; a hot saw and an expanding machine; a flue cutter for cutting safe ends; an automatic safe end cutting off machine, a superheater hot saw and tube expander; a sand blasting equipment; a No. 156 Day & Egan cabinet planer or equivalent; a No. 77 American or equivalent planer and matcher, and a 5 in. by 14-in. outside grinding machine.

SHORT LINE RAILROADS in Alabama (ten of them) operating over their 600 miles of line sustained a net loss in 1921 of \$1,792, or \$6.68 per mile. This statement was made by J. A. TRIVETT of Atlanta who appeared before the Alabama Public Service Commission last week to propose advances in freight rates. He said that the other roads would offer similar proposals.

Supply Trade News

G. Fred Collins is now associated with the sales department at Chicago of the Gould Coupler Company, New York.

THE PENNSYLVANIA PUMP & COMPRESSOR COMPANY has opened a Chicago office at 105 West Monroe street, under the management of H. M. Montgomery.

A. S. Merrill, formerly sales manager of the Chicago Fuse Manufacturing Company, has been appointed general sales manager of the Appleton Electric Company, Chicago.

THE AMERICAN AUTOMATIC CONNECTOR COMPANY, Chicago, has installed its connectors on cars of the Sells-Floto Circus, the Hagenbeck-Wallace Circus and the Gollmar Brothers Circus.

George W. Schalchlin, sales engineer for the Allen-Bradley Company, Milwaukee, Wis., has recently been appointed manager of that company's new district office in St. Louis, Mo.



G. W. Schalchlin

Mr. Schalchlin was born at Little Rock, Ark., in 1893. He was graduated from the electrical engineering department of the University of Arkansas in 1913 and served two years' apprenticeship at electrical testing in the factory of the General Electric Company, Schenectady, N. Y. In 1916 he was made manager of the Magnolia, Ark., plant of the Arkansas Light & Power Company, which position he later resigned to work for a year in electrical construction work on the Panama Canal.

During the war he served in France as a first lieutenant battalion adjutant of the 142nd Field Artillery. Upon his return from overseas he entered the service of the Allen-Bradley Company as controller engineer, which position he held until June, 1921, when he was placed on the sales force of that company.

C. J. Hamilton, Jr., assistant sales manager of the Chicago Fuse Manufacturing Company, Chicago, has been appointed manager of sales of that company, succeeding A. S. Merrill, resigned.

William E. Trubec, district representative of the Franklin Manufacturing Company, Franklin, Pa., has removed his office from 501 Fifth avenue, to room 1043 Grand Central Terminal, New York City.

THE POWER PLANT EQUIPMENT COMPANY, Kansas City, Mo., now represents the Combustion Engineering Corporation, New York City, in eastern Kansas, eastern Nebraska, western Arkansas and western Missouri.

W. W. Halsey, manager of the New York City office of the U. S. Light & Heat Corporation, Niagara Falls, N. Y., will, on May 1, remove his office from 30 East Forty-second street to room 5617, Grand Central Terminal.

Theodore L. Dodd, 80 F. Jackson street, Chicago, has been appointed western sales representative of the D. J. Crowley Company, Detroit, Mich. He will also supervise the sales of the Penn Seaboard Corporation, Philadelphia, and the Titusville Forge Company, Titusville, Pa.

T. W. Barnes, for many years factory representative of the Baker R & L Company in the Chicago district, and W. F. Hebard, national distributor of Buda industrial trucks, with

headquarters at Chicago, have formed an organization under the name of **W. F. Hebard & Co.** to handle a complete line of Baker industrial tractors, trucks, cranes and specialties in the Chicago territory.

J. B. White, president and general manager of the **Exchange Sawmills Sales Company**, has been appointed chairman of the board of directors with headquarters at Kansas City, Mo. **R. B. White**, assistant general manager, succeeds **J. B. White** as president and general manager and **F. R. Watkins**, central sales manager, has been appointed secretary, succeeding **A. T. Hemingway**.

Esherick & Hoyle, Otis building, Philadelphia, Pa., and **J. E. Perkins**, 113 East Franklin street, Baltimore, Md., will, in future, handle the **Roller-Smith Company's** line of electrical instruments, meters and circuit breakers in the territories of Philadelphia and Baltimore, respectively. The **Roller-Smith Company** was formerly represented in Philadelphia and Baltimore by the **Perkins-LeNoir Company**.

W. N. Fenley, sales engineer of the **Kerite Insulated Wire & Cable Company**, with headquarters at Chicago, has been promoted to western manager with the same headquarters, succeeding **B. L. Winchell**.

Jr., who has been appointed vice-president, with headquarters in New York. Mr. Fenley entered railroad service with the Cleveland, Cincinnati, Chicago & St. Louis in 1895, with which company he remained for three years; being yardmaster at Greengburg, Ind., during the latter two. In April, 1898, he entered the service of the **National Switch & Signal Company**, with which company he was engaged in construction and maintenance work until June, 1900, when he entered the employ of the **Chicago Great Western** at St. Paul, Minn. During the next 10 years, he was successively foreman, inspector, office engineer, supervisor and signal engineer of that road, having been promoted to the latter position on February 9, 1908. He also acted in the capacity of consulting engineer for the **McClintock Signal & Supply Company** during 1906 and 1907. He left in 1910 to become sales engineer of the **Union Switch & Signal Company**, with headquarters at Chicago, which position he held until August, 1911, when he resigned to become signal engineer of the **Panama Railroad**. On September 16, 1913, the telephone, telegraph and signal departments of this company were consolidated, and Mr. Fenley was appointed superintendent of the combined organization. He resigned on June 31, 1915, and was appointed sales agent of the **Kerite Insulated Wire & Cable Company**, which position he was holding at the time of his recent appointment.



W. N. Fenley

Manuel Trucco, director general of the Chilean State Railways, has, according to press dispatches from Santiago, sailed for New York, where he expects to take charge of the purchases of railway equipment for the lines in his charge. He will also have charge of the inspection of equipment recently purchased in this country for the electrification of Chilean railways. His offices will be at 141 Broadway, New York. Mr. Trucco will arrive in this country about May 8.

Obituary

Charles F. Molley, vice-president and general manager of the **American Boron Products Company, Inc.**, Reading, Pa., died on April 7.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has definitely authorized additions to its Harvey house at Gallup, N. M.

ATCHISON, TOPEKA & SANTA FE.—This company which was reported in the *Railway Age* of March 11 as contemplating, among other improvements, the construction of a new division office building at Newton, Kan., has definitely authorized the expenditure for this work along with incidental track changes to be made at that point.

BALTIMORE & OHIO.—This company has awarded a contract to the **Empire Engineering Company**, Baltimore, for the construction of a bridge at Brydon, W. Va., and for the preparation of roadbed for about two miles of second main track to be laid between Webster and Brydon.

CHESAPEAKE & OHIO.—This company has awarded a contract to the **Roberts & Schaefer Company**, Chicago, for the construction of a reinforced concrete, four-track, 500-ton capacity automatic electric coaling and sanding plant, with stoker coal crushing and screening facilities, for immediate erection at Peach Creek, near Logan, W. Va. This work will cost approximately \$45,000.

CHICAGO, BURLINGTON & QUINCY.—This company is now preparing plans and expects to call for bids in the near future for the construction of shop facilities at Denver, Colo., to involve the expenditure of approximately \$2,000,000.

CHICAGO & NORTH WESTERN.—This company, which was noted in the *Railway Age* of April 15 as receiving bids until April 20 for the construction of a 450-ton mechanical coaling station and ash handling facilities in Chicago, the construction of which will involve an expenditure of approximately \$100,000, has extended for another week the date for closing bids.

ELGIN, JOLIET & EASTERN.—This company contemplates the separation of the grade of its tracks and that of the **Illinois Central** at Matteson, Ill. It has also in contemplation the construction of new bridges over the **Grand Calumet** river at Gary, Ind., the authority for which has not yet been obtained.

GRAND NORTHERN.—This company, noted in the *Railway Age* of March 11 as receiving bids for the construction of a 500-ton reinforced concrete coaling station at Minneapolis Junction, Minn., has awarded a contract to the **Ogle Construction Company**, Chicago, for a station of steel construction.

ILLINOIS CENTRAL.—This company will close bids on April 25 for the construction of a joint passenger station at Gilman, Ill., with the **Toledo, Peoria & Western** to cost approximately \$75,000.

INDUSTRIAL TERMINAL RAILWAY.—This company contemplates the construction of a switching and terminal railway 2 miles long, in Los Angeles, and to this end has obtained authority from the **Railroad Commission of California** to deliver to **L. E. Hanchett**, \$420,000 of its common stock in return for advances made in acquiring right of way, rails and other materials.

KANSAS CITY TERMINAL.—This company has authorized and begun the preparation of plans for a union passenger station at Fifth street and Central avenue, Kansas City, Kans., to accommodate the **Missouri Pacific** and **Chicago Great Western**, the work to cost approximately \$100,000.

LEHIGH VALLEY.—This company, in connection with its work on the **Claremont** (Jersey City) pier and terminal project, has awarded a contract to the **Henry Steers Company**, New York, for a shop and electric substation.

MISSOURI PACIFIC.—This company contemplates the renewal of the draw span and sub-structure of its **Osage river** bridge, and the construction of two stations, one at Washington, Mo., to cost approximately \$50,000 and a second at **Lake Village, Ark.**, to cost \$25,000.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—Annual Report.—The annual report issued this week shows an income statement for the year ended December 31, 1921, as follows:

	1921	1920
Operating revenues.....	\$229,925,070	
Operating expenses.....	173,217,915	
Net operating revenue.....	\$56,707,154	
Railway tax accruals (including war taxes).....	14,836,268	
Equipment and joint facility rents (credited).....	474,739	
Net railway operating income.....	41,268,307	
Net railway operating income (four months ending December 31, 1920).....		\$14,863,379
Equalization charges (four months ending December 31, 1920, and offsetting credit in 1921).....	2,612,564	2,612,564
Compensation under federal control contract.....	3,175,149	7,699,532
Guaranty for six months ended Aug. 31, 1920.....	5,293,888	9,842,116
Other income.....	52,349,909	52,350,688
Gross income.....		
Deduct:		
Taxes, rent and other charges.....	1,065,245	2,700,315
Interest on bonds.....	11,953,002	12,015,621
Net corporate income.....	39,331,662	37,634,752
Dividends:		
5 per cent on preferred stock.....	6,208,685	6,208,685
6 per cent on common stock.....	13,518,420	13,441,110
Surplus carried to profit and loss.....	19,485,014	17,881,460

BELT RAILWAY OF CHICAGO.—Annual Report.—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues:		
Transfer switching.....	\$4,046,918	\$3,514,250
Local switching.....	1,411,804	1,151,235
Total railway operating revenues.....	5,495,789	4,730,854
Operating expenses:		
Maintenance of way and structures.....	595,978	649,238
Maintenance of equipment.....	683,189	813,100
Traffic.....	13,144	10,079
Transportation—rail line.....	2,606,054	2,913,174
General.....	130,394	110,338
Total railway operating expenses.....	4,028,761	4,495,929
Net revenue from railway operation.....	1,467,028	234,925
Railway tax accruals.....	340,320	280,375
Total non-operating income.....	586,268	1,915,473
Gross income.....	1,712,994	1,870,023
Rent for leased road.....	1,518,432	1,530,621
Total deductions from gross income.....	1,540,194	1,697,223
Net income.....	172,800	172,800
Dividend appropriation of income.....	172,800	172,800

BOSTON & MAINE.—To Form Equipment Trust.—At the annual meeting of the stockholders on April 12 steps were taken toward the formation of an equipment trust under which new equipment will be bought. In addition to the proceeds from the notes that are to be sold under this trust the Boston & Maine will receive a government loan of \$1,212,500 which has been authorized by the Interstate Commerce Commission under the provisions of the Transportation Act.

New Haven Representation on Board.—See New York, New Haven & Hartford.

BUFFALO, ROCHESTER & PITTSBURGH.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue, entitled "B. R. & P. Ton-Mileage Reduced 53.92 Per Cent." See also excerpts from annual report on adjacent pages.

CAROLINA, CLINCHFIELD & OHIO.—Equipment Notes Offered.—An issue of \$3,588,000 6 per cent equipment trust gold notes is being offered by the National City Company and Ladenburg, Thalmann & Co. The notes, which mature \$276,000 each on January 15, 1923, to 1935, inclusive, are offered at prices to yield from 5.30 to 5.70 per cent., according to maturity. The notes are redeemable as a whole but not in part upon any interest date on sixty days' notice at 103 and interest.

CENTRAL VERMONT.—Asks Authority for Equipment Trust Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$778,000 of equipment trust notes for 8 years at 6 per cent in be turned over to the American Car & Foundry Company for 700 freight cars which are to be rebuilt.

CHESAPEAKE & OHIO.—Authorized to Abandon Ferry.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of the ferry between Russell, Ky., and Ironton, Ohio.

CHICAGO & WESTERN INDIANA.—Annual Report.—The income

account for the year ended December 31, 1921, compares as follows:

	1921	1920
Total operating revenue.....	\$256,456	\$233,828
Operating expenses.....	463,649	418,223
Net operating loss.....	167,192	184,395
Other income:		
Joint facility rent income.....	2,652,267	1,930,586
Income from lease of road.....	1,933,632	1,980,167
Total non-operating income, including other.....	4,726,215	4,444,485
Gross income.....	4,559,022	4,260,090
Deductions from gross income:		
Interest on bonds.....	3,091,533	2,365,000
Interest on unfunded debt.....	1,320	814,776
Railway tax accruals.....	672,269	412,752
Total deductions from gross income, inc. other.....	3,918,652	3,743,679
Net income for year.....	640,140	516,411

CHICAGO, MILWAUKEE & ST. PAUL.—Equipment Notes Offered.—A syndicate composed of Freeman & Co., Hayden, Stone & Co., New York Trust Company and the Equitable Trust Company are offering \$9,500,400 6 per cent equipment trust notes. The notes are offered at prices to yield from 5.35 to 5.75 per cent. They are dated January 15, 1920 and mature \$730,800 annually from 1923 to 1925, inclusive.

These notes are a direct obligation of the Chicago, Milwaukee & St. Paul Railway under an equipment trust agreement between the director general of railroads, the railroad company, and the trustee. Through supplemental agreements, 33½ per cent of the notes of each maturity, held by the director general, are to be stamped as subordinate to the above prior lien notes. Upon subordination, these \$9,500,400 of unstamped notes will be outstanding to the extent of only about 53 per cent of the original cost of the equipment on which they are secured.

COLORADO & SOUTHERN.—Asks Authority to Issue Equipment Trusts.—This company has applied to the Interstate Commerce Commission for authority for the issuance of \$1,425,000 of 5½ per cent equipment trust certificates.

Proposed Denial of Certificate to Abandon Branch.—The Interstate Commerce Commission has made public a tentative report of an examiner recommending that the commission deny the application of this company for a certificate authorizing it to abandon its branch line between Buena Vista and Romley, Colo., 29.42 miles, on the ground that it would deprive a large section of the benefits of rail transportation and that the record in the case affords some assurance that the future operation of this line will be more profitable than it has been in the past.

DELAWARE & HUDSON.—Annual Report.—The annual report issued this week shows the following income account for the year ending December 31, 1921:

	1921	1920
Railway operating revenues.....	\$45,776,859	\$45,354,299
Railway operating expenses.....	38,825,529	42,126,330
Net railway operating revenues.....	6,951,330	3,227,969
Gross railway operating income.....	5,818,225	3,486,238
Railway tax accruals.....	993,974	1,186,054
U. S. government compensation guarantee.....		5,621,164
Net railway operating income.....	6,759,117	7,439,730
Dividend income.....	1,327,617	1,038,041
Miscellaneous income.....	1,569,869	1,311,427
Total non-operating income.....	3,437,877	2,991,287
Gross income.....	10,191,904	10,431,017
Deductions from gross income:		
Rent for leased roads.....	1,271,929	1,944,157
Interest on funded debt.....	3,284,580	3,228,948
Total deductions.....	5,254,433	5,497,855
Net income carried to profit and loss.....	4,937,452	4,933,163

DETROIT, BAY CITY & WESTERN.—Six Months Guaranty Certified.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months following the period of federal control at \$107,813, of which all but \$13,331 has been paid.

GEORGIA, ASHBURN, SYLVESTER & CAMILLE.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority for the issuance of \$540,000 of capital stock, the proceeds to be used for the purchase of that part of the Hawkinsville & Florida Southern between Ashburn and Camille, Ga.

HAMPDEN RAILROAD.—Plea Dismissed.—Judge Jenney of the Supreme Court of Massachusetts has ordered dismissed the petition brought by Edmund D. Codman against District Attorney Saltonstall of Middlesex county, et al., in which the petitioner sought a mandatory order directing the Superior Court of Middlesex county to recall and vacate the nolle prosequis of certain indictments concerning the affairs of the Hampden Railroad.

The indictments charged members of the banking firm of F. S. Moseley & Co., Charles S. Mellen and the members of the investment boards of the Cambridge and East Cambridge Savings Banks with larceny and conspiracy, setting forth that money was fraudulently secured for the construction of the railroad.

LOS ANGELES & SALT LAKE.—*New Directors.*—W. A. Harrison, Charles A. Peabody, W. G. Rockefeller and Frank A. Vanderlip have been elected directors.

MIDLAND VALLEY.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$341,000 of first mortgage 5 per cent bonds to reimburse the treasury for expenditures for additions and betterments, to be sold at not less than 75.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Court Enjoins Dividend.*—Federal Judge Wilbur F. Booth has temporarily enjoined this road from paying \$840,000 dividends on the common and preferred stocks. The Continental Insurance and Phenix Fire Insurance companies, owning 1,300 shares of preferred stock, asked that payment of a semi-annual dividend of \$2 a share on the common be enjoined on the ground that the preferred stockholders must be paid at the full annual rate of 7 per cent before the common stock participated in earnings.

MISSOURI PACIFIC.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$18,000,000 of first and refunding mortgage gold bonds to be sold at not less than 97½ and accrued interest. The proceeds are to be used to retire \$13,641,000 of first and refunding mortgage 5 per cent bonds which matured on January 1 and to reimburse the treasury for expenditures. Arrangements had been made for the sale to Kuhn, Loeb & Co.

MOBILE & OHIO.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of 10 year, 6 per cent promissory notes to be used in payment for 10 Mikado locomotives.

NEW YORK CENTRAL.—*Bonds Offered.*—Harris, Forbes & Co. are offering \$1,000,000 New York Central 4 per cent gold bonds (now consolidated mortgage), due January 1, 1942, at 89 and interest to yield about 4.88 per cent. These bonds are legal investment for savings banks and trust funds in New York, New Jersey, Connecticut and Massachusetts, and are listed on the New York Stock Exchange.

NEW YORK, NEW HAVEN & HARTFORD.—*Annual Meeting of Stockholders.*—President E. J. Pearson in an address to the stockholders at their annual meeting at New Haven, Conn., on April 19, called particular attention to the information contained on the first few pages of the annual report for 1921, relating to the great value and large return of industry and business in the territory served by the New York, New Haven & Hartford, and of the small percentage of such returns represented by the revenues of the company. The remarks of the annual report in this regard, according to President Pearson, may also be applied to the Boston & Maine where in the interest of the stockholders as a whole a similar possibility and policy will undoubtedly be found advisable and of advantage.

Vice-President E. G. Buckland read the address, which was in part as follows:

It will interest you to know that for the past month of March the New Haven operated at a ratio of about 77.74 in comparison with a ratio of 93.37 during the same month a year ago. The net income after all expenses, rentals and charges is estimated at about \$72,000, compared to a deficit during the same month a year ago of \$1,600,221. The volume of freight showed an increase. While the expenditures for maintenance were not as much as they would normally have been, nevertheless they are in proportion to similar expenditures for the preceding year, so that the comparison of operating ratios indicates better results during recent months.

Your company has not yet succeeded in securing a dissolution of the federal decree which placed its investments in the trolleys and in Boston & Maine in the hands of trustees, but is hopeful the dissolution may be brought about. There seems to be no reason to doubt that your company may legally hold these securities and resume its interest in the trolleys, and (under the limitation imposed by Massachusetts) in the Boston & Maine, so as to benefit these properties, your investment and the New England public. While the date within which by the decree the trustees are required to dispose of your holdings has been postponed from time to time, there has never been any suggestion that the holdings are to be sold in Boston which would have been reasonable or in your interest. As your ownership of Boston & Maine stock represents since the reorganization of the Boston & Maine but a minority, slightly over 28 per cent, it is not intended that the New Haven will attempt to assume control of the Boston & Maine. With representation on the board, however, proportional to your company's holdings, your company would be admitted to its counsels as it is right ought to be, and would be in a position: first, to further the interests of Boston & Maine to the fullest extent; second, to co-operate with the Boston & Maine in promoting all of those matters which are to the advantage of both companies and to the disadvantage of neither; and, third, to assist in the solution of the important problems which will arise in respect to plans proposed by the Interstate Commerce Commission for consolidation of the railways under the provisions of the Transportation Act of 1920.

While the traffic of your company has decreased, incidental to the change from war-time to the present conditions of business, the reduction is less

marked than throughout the country as a whole. As a result, the management of your company looks forward with confidence to the continued importance and supremacy, commercially, of the territory which it serves.

Extends Time for Deposits.—The company has announced a further extension of the period in which the 4 per cent debentures may be deposited under the three-year plan approved by the Interstate Commerce Commission. The extended period is to be subject to termination by the directors without notice.

A statement issued by the company said that the plan can become effective only if it is accepted by the debenture holders with practical unanimity, as it has been impossible to make provision for the payment of any debentures, the holders of which do not accept the company's offer of extension.

NORFOLK & WESTERN.—*New Director.*—Samuel P. Bush, of Columbus, Ohio, has been elected a director to succeed Joseph Wood, of Pittsburgh, deceased.

PENNSYLVANIA.—*Stockholders Pass Confidence Resolution.*—The stockholders at their annual meeting on April 11 gave a vote of confidence to the officials of the company for their management during the business depression.

SOUTHERN.—*Asks Authority for Equipment Certificates.*—This company has applied to the Interstate Commerce Commission for authority to guarantee the payment of \$9,300,000 of 5½ per cent equipment trust certificates.

WEST JERSEY & SEASHORE.—*Stockholders Adopt Resolution.*—The stockholders at their annual meeting on April 13 adopted the following resolution:

Whereas, On April 30, 1913, the stockholders of this company voted to lease properties and franchises to the Pennsylvania Railroad Company for a term of 999 years, but on July 23, 1913, the New Jersey Public Service Commission disapproved the lease, and the decision of the commission was approved by the courts; that since that date the railroad situation of the country has undergone considerable changes through passage of the Transportation Act, etc., now be it

Resolved, That the board of directors appoint a committee of three stockholders to confer with the management of the Pennsylvania Railroad Company, with a view of reopening the offer to lease, said committee to review the matter from all angles, and report to the stockholders at an adjournment of this meeting, the date of which is to be fixed by the management.

WHEELING & LAKE ERIE.—*Equipment Notes Offered.*—Hemp-hill, Noyes & Co., Cassatt & Co. and Freeman & Co. are offering \$2,649,400 Wheeling & Lake Erie equipment trust 6 per cent gold notes, maturing in equal annual instalments, from January 13, 1923, to January 15, 1935, inclusive, at 5.40 per cent basis for 1923 maturity, 5.50 per cent basis for 1924 maturity, 5.60 per cent basis for 1925 maturity, 5.70 per cent basis for 1926 maturity, 5.80 per cent basis for 1927 to 1933 maturities and 5.75 per cent basis for 1934 and 1935 maturities.

Equipment Trusts Sold

The director general announces additional sales, at par plus accrued interest, of railroad equipment trust certificates maturing January 15, 1923 to January 15, 1935, inclusive, now held by the government, to:

- Edward Lowber Stokes & Co., Philadelphia, Pa.; Harrison, Smith & Co., Philadelphia, Pa.; Biddle & Henry, Philadelphia, Pa., and Commercial Trust Co., Texas & Pacific Railway, \$1,381,900.
- National City Co., New York; Lauenburg, Thalmann & Co., and Alfred Borden, Carolina, Clinchfield & Ohio, \$3,588,000.
- Riggs National Bank of Washington; Redmond & Co., New York; Cassatt & Co., and Lewis & Snyder, Philadelphia, Grand Trunk Railway of Canada, \$2,000,000.
- Freeman & Co., New York; Chicago, Milwaukee & St. Paul, \$9,500,400.
- Hemp-hill, Noyes & Co., New York; Wheeling & Lake Erie, \$2,649,400.
- Cassatt & Co., Philadelphia; Chicago & Western Indiana, \$161,200, and Rutland Railway, \$213,200.
- Redmond & Co., New York; Charleston & Western Carolina, \$481,000.

Sales comprise approximately two-thirds of all the maturities of these equipment trust issues. The balance of one-third of all maturities will be stamped as subordinated. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$249,210,300. This leaves a balance of only about \$23,000,000 yet to be sold.

Trend of Railway Stock and Bonds Prices

	April 18	Last Week	Last Year
Average price of 20 representative railway stocks, close of business.....	64.99	64.27	53.53
Average price of 20 representative railway bonds, close of business.....	85.82	84.54	73.63

PASSENGER REVENUES.

The corporate gross passenger revenue amounted to \$1,794,927.24. The average rate received per passenger per mile increased .332 cent, being 3.341 cents as compared with 2.949 the preceding year.

The average distance each passenger was carried decreased 1.1 miles, being 28.1 miles against 29.2 miles.

Passengers carried in 1921. 1,913,670
 Passengers carried in 1920. 2,232,013

A decrease of 14.26% or 318,343
 Passengers carried one mile in 1921. 3,400,659
 Passengers carried one mile in 1920. 65,085,159

A decrease of 17.45% or 11,354,460

FREIGHT REVENUES.

The corporate gross freight revenue amounted to \$11,928,151.87. Excepting minor reductions in rates of certain commodities, the general rate structure remained practically the same throughout the year, the last general increase (34%), having been made on September 1, 1920.

The average rate received per ton per mile increased .278 cent, being 1.049 cents as compared with .771 cent last year.

The average distance each ton was hauled decreased 13.6 miles, being 151.5 miles, against 165.1 miles a year ago.

The revenue tonnage moved was the smallest in the history of the Company since 1904, and is as follows:

	1921.	1920.	Decrease.
Bituminous coal	3,875,197	9,402,558	5,527,361
Coke	154,388	596,781	442,393
Iron ore	99,727	642,614	542,887
Pig and bloom iron	94,177	344,337	250,160
Other freight	3,300,670	3,954,892	654,222
Total	7,503,909	14,941,182	7,437,273

A decrease of 49.78% or 7,437,273
 Tons moved one mile in 1921. 1,136,943,603
 Tons moved one mile in 1920. 2,467,398,051

A decrease of 53.92% or 1,330,454,448

A decline of 23.3% was registered in railroad traffic of all lines in the United States during 1921, the greatest ever recorded in American transportation history. Your line suffered a much greater loss of tonnage, due to the extraordinary unfavorable conditions existing in the Central Pennsylvania bituminous coal fields, from which approximately 65% of your traffic is derived. Also, the abnormal conditions existing in the steel trade caused a severe shrinkage of coke and ore tonnage.

The average number of revenue tons carried one mile per revenue freight train mile, excluding the mileage of helping engines, decreased 188.43 tons, being 754.15 tons against 942.58 tons a year ago.

The average number of revenue tons carried one mile per revenue freight engine mile, including the mileage of helping engines, decreased 82.57 miles, being 519.57 miles against 602.14 miles a year ago.

The averages for the past ten years are as follows:

	Train load.	Engine load.
Year ending June 30, 1912.	710	462
1913.	679	454
1914.	707	477
1915.	786	502
Six months ending December 31, 1916.	810	510
Year ending December 31, 1917.	836	545
1918.	943	602
1919.	884	586
1920.	943	602
1921.	754	520
Increase over 1912	107	81
Per cent	16.5	18.5

The non-revenue freight traffic, not included in any of the other figures of this report, is as follows:

	1921.	1920.
Number of tons	655,524	1,105,887
Number of tons carried one mile	59,251,341	106,575,272

EXPENSES.

The total corporate operating expenses were as follows:

Maintenance of way	\$1,974,309.33
Maintenance of equipment	4,908,568.20
Traffic	215,078.93
Transportation	6,223,691.49
Miscellaneous operations	30,120.12
General	485,696.76
Transportation for investment, C. R.	1,259.77
Total	\$13,836,205.06

PROFIT AND LOSS ACCOUNT DECEMBER 31, 1921

	CREDIT	DEBIT
Balance Surplus December 31, 1920.	\$5,434,542.67	
Unfundable overcharges	6,244.56	
Donations	1,344.52	
Miscellaneous Credits—		
Discount on funded debt retired	\$7,749.99	
Unclaimed wages, etc.	3,818.22	
Transferred from Pension Fund	251,728.76	
Transferred from Insurance Fund	425,868.82	
Final settlement, U. S. R. R. Administration	2,374,295.94	
Sundry items	1,096.77	3,064,558.50
Total	\$8,506,586.05	

The additional expenses chargeable as lap-overs to the Federal Control and Guaranty Periods were 80,826.51

Grand total expenses \$13,917,031.57

The percentage of each group of operating expenses, all periods combined to the combined operating revenue for the past six years is as follows:

	1921.	1920.	1919.	1918.	1917.	1916.
Maint. of way	13.73	16.58	16.95	15.28	9.71	12.39
Maint. of equipment	34.31	31.65	37.73	32.29	27.00	23.95
Traffic	1.50	1.03	1.26	1.10	1.28	1.20
Transportation	43.56	45.98	48.73	44.26	38.82	33.74
Misc. operations . . . . .	.21	.17	.20	.14	.14	.14
General	3.25	2.46	2.82	2.13	2.37	2.18
Transp. for Inv., Cr. . . . .	.01	.06				
	96.65	97.21	107.69	95.12	79.32	73.60

The condition of the Company's equipment at the end of Federal control is causing an unusual outlay for repairs, still under way. 500 steel gondola cars were repaired outside of your Company's shops, and arrangements have been made for the repairs of 1,000 more, to be completed during the next three months.

The increase in wages and the changes in working conditions during and since Federal control; the reclassification of employes, and special allowances granted by the Director General or ordered by the Labor Board; have created a serious condition now affecting the economical operation of your road. Partial relief was obtained from an order of the Labor Board effective July 1, authorizing an average reduction in wages of approximately 10% and as far as possible further reductions and economies were made consistent with safety and reasonably adequate service, to offset the reduced income.

The average cost per ton per mile is 1.001 cents, an increase of .253 cent over last year.

FIRE INSURANCE FUND.

This fund, created July 1st, 1892, was discontinued on August 11th, 1921, and its surplus transferred to the following accounts:

Profit and loss	\$425,868.82
Operating reserve—Fire Insurance	29,717.45
Total	\$455,586.27

PENSION FUND.

This fund, created July 1, 1903, was discontinued on May 31, 1921, and its surplus of \$251,728.76 transferred to Profit and Loss account. In the future all expenditures for pensions will be made directly from available current assets.

There were 83 pensioners on the roll on December 31, 1921, a net decrease of 8 during the year.

GENERAL REMARKS.

The valuation of your lines by the Interstate Commerce Commission began July 1, 1917, and is about 90% completed. The amount expended to date on this account has reached \$194,607.33.

The balance of \$2,374,295.94 received from the Director General of Railroads in final settlement for the use and operation of your property during Federal control, after adjusting and closing the several accounts with the United States Railroad Administration, was by order of the Interstate Commerce Commission dated January 25th, 1922, transferred to Profit and Loss account.

On March 1, 1921, the agreement with the Western Union Telegraph Company was revised and renewed for a term of 15 years, and to continue thereafter until a year's notice in writing is given by either party.

In December, 1921, an agreement was made with the New York Central Railroad Company granting it further trackage rights over your line from C. & D. Junction, Pa., to Rossiter, Pa., a distance of 18.07 miles. The agreement extends over a period of 15 years from September 1, 1920, and is to continue thereafter until canceled by two years' notice from either party.

A "Fire Crew Law" ostensibly to decrease accidents was enacted by the State of Pennsylvania in 1911. Its futility being realized, the law was repealed on May 5th, 1921, relieving your Company, under normal traffic conditions, of a needless expense of approximately \$96,000 per annum. A similar law, effective in New York State since 1910, still remains on the Statute Books.

The acknowledgments of the Board are renewed to its officers and employes for their faithful and efficient service.

By order of the Board,
 WILLIAM T. NOONAN,
 President.

Rochester, N. Y.,
 March 24, 1922.

Railway Officers

Financial, Legal and Accounting

A. M. Martin, assistant treasurer of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., has also been elected assistant secretary and transfer agent, to succeed **J. B. Hill**, who has been elected treasurer and appointed assistant to the president to succeed **J. H. Ambrose**, who has retired. Mr. Ambrose will continue to serve as a director and as a member of the finance committee.

J. W. Broome, whose appointment as secretary and assistant treasurer of the Western Maryland with headquarters at New York was announced in the *Railway Age* of April 8, page 897, was born on July 11, 1890, in Brooklyn, N. Y., and attended high school and normal school in that city. He entered the service of the Western Maryland in 1907 as a clerk. In October, 1912, he became chief clerk to the secretary and treasurer and served in that position until September, 1921, with the exception of the period from June, 1918, to August, 1919, when he was with the army overseas. On September 20, 1921, he was appointed secretary and assistant treasurer and was serving in that position at the time of his recent promotion.

Operating

A. G. Mitchell, superintendent of the West Jersey & Seashore (Pennsylvania), has been promoted to secretary of the Association of Transportation officers of the Pennsylvania System with headquarters at Broad Street Station, Philadelphia. **H. H. Garrigues**, superintendent of the Delaware division of the Pennsylvania, succeeds Mr. Mitchell on the West Jersey & Seashore with headquarters at Camden, N. J. **I. B. Sinclair**, assistant superintendent of the Philadelphia division with headquarters at Harrisburg, Pa., has been promoted to superintendent of the Delaware division and has been succeeded at Harrisburg by **J. B. Phelan**, freight trainmaster of the Middle division with headquarters at Altoona, Pa. Mr. Phelan has been succeeded at Altoona by **C. E. Whitlock**, trainmaster of the Schuylkill division with headquarters at Reading, Pa., who in turn has been succeeded by **A. M. Seward**, assistant trainmaster of the Schuylkill division. These changes were effective April 15.

Traffic

Val Kuska has been appointed colonization agent of the Chicago, Burlington & Quincy, with headquarters at Omaha Neb., effective April 1, to succeed **F. B. Howard**, deceased.

H. W. Bonderat, freight traffic representative of the Southern, with headquarters at Nashville, Tenn., has been promoted to commercial agent, with the same headquarters to succeed **J. W. Frank**, who has been promoted to freight agent, with headquarters at Savannah, Ga.

G. R. McIntosh, general agent of the Pacific Fruit Express, with headquarters at Los Angeles, Cal., has been promoted to superintendent at San Francisco, with jurisdiction over the agencies at Sacramento, San Francisco, Los Angeles, Portland, Ore., and Houston, Tex., to succeed **H. Gidding**, who has been promoted to assistant general manager at San Francisco, with jurisdiction over the lines of the Southern Pacific, the Los Angeles & Salt Lake, and the Western Pacific. **R. J. Bailey**, superintendent of ice plants at San Francisco, has been appointed superintendent of refrigeration, with jurisdiction over the Southern Pacific, the Los Angeles & Salt Lake and the Western Pacific. **J. B. Crawford**, superintendent of transportation at Chicago, has been promoted to assistant general manager at Chicago, with jurisdiction over the lines of the Union Pacific, the Oregon Short Line, and the Oregon-Washington Railroad & Navigation Company. **C. E. Carner**, chief clerk to the superintendent of transportation at Chicago,

has been promoted to traffic manager to succeed **R. C. Dearborn**, resigned to become chairman of the National Perishable Freight Committee. **J. Van Rensseler**, superintendent of refrigeration, with headquarters at Omaha, has been promoted to superintendent in charge of traffic with jurisdiction over the Union Pacific. **C. F. Gunnell**, general agent at Ogden, Utah, has been promoted to superintendent of transportation with jurisdiction over the Oregon Short Line, with the same headquarters. **R. M. Whitehead**, general agent at Portland, Ore., has been appointed superintendent of traffic with jurisdiction over the Oregon-Washington Railroad & Navigation, with the same headquarters and **T. G. Wall**, assistant superintendent of ice plants, with headquarters at Omaha, Neb., has been promoted to superintendent of refrigeration on the lines of the Union Pacific, the Oregon Short Line and the O.-W. R. & N., with headquarters at Omaha.

Obituary

John Carstensen, vice-president of the New York Central Lines and for over 50 years connected with that system, died at his home in Scarsdale, New York, on April 14. Mr. Carstensen was born on August 14, 1854, in New York City. He spent his early childhood on the island of Santa Cruz, then one of the Danish West Indies.



J. Carstensen

His family returned to the United States when he was ten years old. Mr. Carstensen was educated at Cayuga Lake Academy, Aurora, N. Y., Alexander Military Institute, White Plains, N. Y., and the high school at Clinton, New York. On July 10, 1871, he entered the service of the New York Central & Hudson River Railroad, of which company he became successively assistant treasurer and comptroller and was later elected a vice-president of the New York Central System and a director of a number of its subsidiaries.

Frank J. Woulfe, assistant traffic manager of the Lehigh Valley, died suddenly in New York on April 15, as the result of heart trouble. Mr. Woulfe was born at Fort Wayne, Ind., on November 9, 1863, and was educated in the public schools. He began railroad work on April 1, 1879, as night bill clerk for the Wash-



F. J. Woulfe

bash. From then until 1890 he served as cashier and in various clerical capacities. In 1890 he was appointed traveling freight agent of the Lehigh & Washash Dispatch and the Lehigh Valley Transportation Company with headquarters at Decatur, Ill. In 1898 he became general agent of the Lehigh Valley at St. Louis, Mo., and was transferred to New York as city freight agent in 1901. Later he became general eastern freight agent and on August 1, 1909, was appointed general freight agent. At the termination of federal control, Mr. Woulfe was appointed assistant traffic manager.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

"Listening-in" on the radio has become one of the popular pleasures of a large and growing number of people, the latest estimates of the number of receiving sets in operation being about one million. Broadcasting is being carried on by stations located at the large cities both in the east and the west.

Publicity Possibilities of Radio

Practically the entire country is thus being served. A few days ago, a substantial proportion of the "listeners" were treated to a talk on railway transportation problems broadcasted from WGI, the American Radio and Research Corporation station at Medford Hillside, Mass. This talk, given by R. H. Newcomb, executives' assistant of the Boston & Maine, is the first time, to our knowledge, that the railroads have utilized this important medium to present to the public some of the facts about the railroad problem. The possibilities of the radiophone seem almost unlimited in this respect and this is especially true if the man who speaks confines himself to the broad side of the question and is as little of a propagandist as possible. Naturally, such talks must be non-technical, even more or less popular in nature, for all classes of people are reached. In a degree far greater than in public speaking, they must be made personal. There is something about radio reception that produces a feeling in the listener that he alone is being addressed, and thus the speaker can get closer to his audience than is possible, perhaps, in any other way. The time is opportune for such talks and a great amount of good can be done by them. From the standpoint of the broadcast stations, we believe that talks such as we have outlined here roughly would be welcomed by those in charge of the programs.

In many ways railroad shops never have been and never will be operated on a real production manufacturing basis since

Specialized vs. Wide-Range Machines

their primary work is the repair of equipment. This maintenance or repair work, however, involves the use of many small parts which are not obtainable from the manufacturers and which, if standardized and made at one point for use on each railroad system, will be required in large numbers. During the past few months the *Railway Age* has strongly emphasized the need of central production departments with specialized machines for manufacturing these parts in order that the time and labor cost per piece may be reduced to a minimum. Highly specialized machines have their limitations, however, and carrying charges will overbalance labor savings unless sufficient work can be found to keep the machines operating at capacity. For example, thread milling machines are particularly adapted to the higher class of threading work on worms, screws and nuts, but the average railroad shop would hardly have enough work of this character to keep a thread miller busy even a fair proportion of the time. The average shop, and the one with which we are most interested because it is an average shop, stands in great need of modern, wide-range machines which are flexible and easily adjusted to different operations. In the majority of cases a machine cannot be kept busy continuously on one type of work, as is often the case in industrial plants. As a result, a few minutes saved on each piece of work is not so essential as that a machine of capacity to handle the work

shall be available. This is particularly true in engine terminals where the lack of a machine of the required capacity often necessitates sending some locomotive part to the back shop for repairs and results in a bad motive power delay. There is an actual, if somewhat indeterminate, line between the fields of usefulness of specialized as opposed to general purpose machines and this line should be always kept in mind. It is a disadvantage to both the machine tool manufacturer and the railroad to install a high-priced, specialized machine at any point not having sufficient work to keep that machine busy.

That inadequate trackage rather than an insufficient number of cars is often the real cause of a car shortage has been

Additional Trackage Needed

stated so often as to make repetition monotonous. Yet it would seem that this simple truth is not always given as much consideration as it deserves. Since November 1, the railroads have ordered 42,651 freight cars, or nearly three times as many in five months as were ordered in the previous ten. Of course, a portion of these car orders must be allocated to renewals of wornout or obsolete equipment, but a certain part of the new cars are to be considered essentially as additions. While there can be no controversy whatever as to the necessity for a larger number of cars, a question does arise as to the possibility of the railroads securing full return for the capital invested in them without a corresponding or even greater expenditure for increased trackage, particularly in yards and sidings. The fact that the need of adequate terminal facilities is being recognized by the managements of some of the roads is evident by such items as the authorization of an \$8,000,000 expenditure by the Pennsylvania System in the Pittsburgh district. The inception of work on the Castleton cut-off of the New York Central, as a means of relieving congestion at Albany, is another project to the same end.

The railroads are offering more and more inducements in the form of excursion rates in the effort to increase their passenger traffic. The Central of New

Tourist and Excursion Rates

Jersey has recently announced a series of tours from the Wyoming Valley, Pennsylvania (the territory adjacent to Wilkes-Barre), to Boston. Passengers will use the Central's line to New York whence the remainder of the journey will be completed by steamer. The price of tickets for this excursion includes not only train and steamer accommodations, but hotel charges and meals as well. This company has conducted these "one-price" tours before with considerable success. Other companies, too, are offering similarly attractive tours. Manifestly reductions in rates which serve to bring into use idle passenger equipment and to fill up trains which cannot be discontinued, indicate good business judgment on the part of passenger traffic officers. This is especially true where business is attracted which would not move at all under regular rates. The railroads have gone a long way toward restoring the pre-war tourist and excursion rates, but the *Railway Age* is of the opinion that the subject is worthy of even more study

by traffic officers. The railroads as a whole could handle 20 per cent more passengers than they do now with but slight additional expense. Tourist and excursion rates should be applied in every possible situation where they are likely to yield a profit, without affecting appreciably the volume of business moving at regular rates. Further than that, the roads should give whatever reduced rates they put into effect the widest publicity, not only to attract business but to counter the arguments advanced for general rate reductions.

The Joint Commission of Agricultural Inquiry is now making public the recommendations which it expects to present to Congress. An advance statement of

Commission of Agricultural Inquiry

the recommendations relative to railroad transportation and regulation will be found on another page of this issue. The analysis which the statement makes and the suggestions which are contained therein show that the Joint Commission under the guidance of its chairman, Sydney Anderson, member of the House of Representatives from Minnesota, has accomplished a commendable task in a commendable manner. Readers of the *Railway Age* will not necessarily agree with all the recommendations which are suggested; they will, however, agree with the larger part of them. It has been emphasized in these columns on numerous occasions that the welfare of the railways of this country depends in large measure on the good-will of the farmer. It has been a source of regret, however, that the gentlemen purporting to represent the agricultural interests have too often seemed to be too radical in their thoughts and expressions and that in general they have worked on the basis apparently that agriculture needs different theories of economics from those which apply to transportation or other industries. The Joint Commission of Agricultural Inquiry has not done its job this way. It has apparently studied transportation sufficiently to secure an adequate understanding of the subject. Its findings deal with railroad transportation as it is and they are not radical and theoretical but sensible and practical. All the recommendations will not receive unqualified approval but they at least are reasonable and represent honest differences of opinion. The report will have a standing entirely out of comparison with the radical effusions too frequently made in the past by many experts purporting to have a mandate from the farmers, who, in the last analysis, form one of the most important elements in this entire question.

Purchasing for a railroad is not fundamentally different from purchasing for individual needs. The same common sense principle of ultimate economy should be applied in both cases. A railroad purchasing agent certainly would not buy the cheapest paint that he could get for his home, but would insist on a product that would give satisfactory service. Too often when buying for a railroad, paint is just paint to the purchasing agent. It is a bulk commodity to be bought from the manufacturer who quotes the lowest price per gallon. It would be a good thing if the purchasing agent could have a talk with the master painter before placing his paint business with the lowest bidder. If he could do this, he would learn that the workman has trouble in applying paint that is not carefully made. Satisfactory working properties are obtained only by painstaking attention in the manufacture of paint; this the cheap product does not get and the higher labor costs of application offset the slight saving in the price of the material. Furthermore, cheap paint is certain to lack durability. To obtain a lasting paint film requires careful preparation, especially in the use of dryers. Paint

made to meet price competition on a quantity basis is not given the attention required and good results cannot be expected. Railroads that buy cheap paint are simply signing a bill for increased expenses in the future. One large railroad recently painted a large number of steel coal cars with a cheap paint having a mineral oil base. The paint failed in a short time and it became necessary to repaint the cars. The old coat adhered to the steel in spots and would have destroyed the value of any paint put on over it, so that it was necessary to sand blast the entire car before applying another coat. Probably this railroad will look for quality rather than price hereafter in buying paint, but other roads are constantly making the same mistake in buying on the basis of price alone. One large system recently bought paint at a price of 75 cents a gallon, freight prepaid. The freight from the manufacturer's plant cost 14 cents a gallon and barrels for the shipment, 5 cents a gallon, making the net price to the manufacturer 56 cents a gallon. At the same time a good grade of linseed oil was selling at 90 cents a gallon. It would be interesting to know what materials were actually used in this paint. The false economy of buying cheap paint is so evident it seems strange that railroads should ever follow such a policy. The trouble is that the purchasing department is usually too far removed from the user of the paint and does not have an opportunity to check the results obtained. The purchasing department would not be so proud of the saving of a few cents per gallon if it could see how cheap paint increases the costs of the department using it.

There has long been a feeling of more or less dissatisfaction with the effectiveness of the service obtained from the freight

Facts About Car Service

car equipment, to which expression has been given through frequently-recurring proposals for the formation of a general equipment pool. There has, however, never been an adequate basis of fact on which to form a sound conclusion as to the effectiveness of a pool to improve the unsatisfactory conditions, or as to the possibility of bringing about the desired improvement by much simpler measures. A notable contribution to this subject has been made by M. J. Gormley, chairman of the Car Service division, in his paper before the meeting of the Transportation division of the American Railway Association, at Chicago, April 19, an abstract of which appears elsewhere in this issue. As the result of a study over a period of three years, Mr. Gormley points out two factors which have been found to influence empty car mileage materially, both of which are inherent in traffic conditions beyond the control of the railroads and neither of which has ever been given sufficient consideration in discussions of this subject. These are the disproportionate decrease in the volume of traffic moving in the light direction during periods of light traffic and the effect of the light-loading of equipment in times of business depression, both of which inevitably increase the proportion of empty car mileage necessary to effect an equipment balance. Another fact brought out by Mr. Gormley, indicating that the volume of unnecessary empty car mileage has frequently been exaggerated, was developed by a check of over 20,000 cars moving in the direction of heavy traffic from which it was found that only 1.4 per cent of the cars were empty. The *Railway Age* does not assume that these facts prove the case for the present system of car service rules based on individual ownership. They do, however, emphasize the need for a detailed study of car movement on every division of every railroad to determine all of the causes for empty car movement and their relative importance. Only with such facts available will it be possible to settle the question of car service in such a manner that it is likely to stay

settled for any length of time. Without such a basis of fact, the railroads will continue to be placed on the defensive by constantly recurring proposals for car pooling in one form or another. What is worse, they will continue to be convicted of negligence in the management of their own business by public opinion because their failure to meet the question squarely, either by adopting the pool or by convincingly proving it to be a fallacy in terms which the public can understand.

Former Railroad Guaranty Payments Delayed Till 1923

MANY PEOPLE are confused into believing the statements so frequently made by critics of the Transportation Act that it constitutes a guaranty to the railroads. This is largely because they read so frequently in the newspapers about the delayed payments being made from time to time by the Treasury Department on account of the compensation which the government guaranteed the roads for the 26 months of the federal control period, which was also continued by the Transportation Act for the six months immediately following the termination of federal control to allow the Interstate Commerce Commission time to adjust railroad rates to meet the scale of expenditures established while the government was operating the roads.

This guaranty expired on August 31, 1920, yet the recent estimate made by Secretary of the Treasury Mellon to the Senate Finance Committee and the House Ways and Means Committee of the prospective receipts and expenditures of the federal government predicts that \$200,000,000 will still remain to be paid to the railroads on account of the old guaranties during the fiscal year ending on June 30, 1923, because many of the payments to railroads which it had previously been estimated would be made in 1922 had been postponed. During the period of federal control the government guaranteed the railroads a rental of approximately \$900,000,000 a year, but this amount has not all been paid. A considerable part was withheld pending final settlements with the various companies of their accounts with the government, including the capital expenditures of the Railroad Administration charged against the roads.

The Railroad Administration is announcing settlements with various companies almost every week but the Secretary of the Treasury estimates that \$100,000,000 will remain to be paid by the Railroad Administration during the fiscal year 1923 as well as \$100,000,000 on account of the six-months guaranty on which the railroads are still figuring with the Interstate Commerce Commission. The commission in its annual report estimated the amount of the six-months guaranty at about \$536,000,000, of which \$430,520,307 had then been paid, leaving an estimated amount still payable to the carriers of about \$105,500,000. Very little of this has been paid since the date of the annual report and the estimate of the Secretary of the Treasury apparently is not optimistic as to the prospect for the conclusion of the complicated process which the commission must go through in certifying the exact amounts due.

When the budget was submitted to Congress in December it was estimated that the Treasury would have to provide \$337,000,000 for payments to railroads during the present fiscal year, but partly because of the unexpected delay in reaching settlements, and partly because the Railroad Administration had derived \$230,000,000 in cash by selling the notes with which the railroads had paid for the cars and locomotives ordered by Director General McAdoo, Mr. Mellon's statement of April 14 shows a credit of about \$56,000,000 on railroad account instead of an estimated expenditure of \$337,000,000.

This would indicate that we are likely to hear a great deal more for another year or so about a guaranty to the railroads, although the only guaranty expired over a year and a half ago. Of course, most people who talk about a guaranty to the railroads do not refer to this real guaranty, some of which is still to be paid; they refer to the provision in the Transportation Act which directed the commission to try to so adjust rates as to allow them a 6 per cent return. This provision also expired on February 29, 1922, after having produced for the roads as a whole about 3 per cent, but we hear occasionally of some one who thinks that the delayed payments that are still being made on the old account represent payments from the Treasury to make good the so-called "guaranty" of 6 per cent. The Interstate Commerce Commission is to fix a percentage from time to time to represent a fair return to the railroads but of course this will entail no expense if the rates fail to produce the desired revenue.

There was also a loan fund of \$300,000,000, most of which has been loaned to railroads at 6 per cent. Of this \$74,003,570 had been repaid by March 31 and under the law no more loans may be made from it except on such applications as were filed before February 29.

Progress in Automatic Train Control

THIS COUNTRY now appears to be committed to "automatic train control." The Chicago & Eastern Illinois has used automatic stops extensively for eight years and evidently feels satisfied with the results. The Chicago, Rock Island & Pacific has used them two years and has decided to equip a whole division of the road. The New York Central is making elaborate experiments and evidently intends to make others. The Pennsylvania proposes to equip 50 miles of road, single track, to test an elaborate apparatus. The Erie is to enlarge its experimental operations on the Northern New Jersey line, and the Delaware, Lackawanna & Western is going to try George P. Finnigan's apparatus on a main line. The Chesapeake & Ohio has begun an extensive experiment from which it is not likely to back out.

So many important enterprises, not to mention the various smaller ones, indicate a widespread disposition to try out, with all necessary thoroughness, this method of abating the collision disgrace. The general use of cab signals as a simpler and much cheaper means of forestalling disasters due to engineers' mental lapses finds scarcely a friend in all America. It is a system which has proved so satisfactory in France, after 40 years' experience, that it is being extended, under governmental approval; but Americans seem determined to have the most refined perfection, or nothing. The idea is not merely to make the engineman more careful, but to make the train safe without any engineman at all.

The Boston & Albany is trying a roadside audible signal, which, doubtless, is cheaper and simpler than cab signals, and theoretically is about on an equality, as regards safety; but the officers of the Boston & Albany, with a very few others who look favorably on the audible signal principle, are still in a very small minority.

The present activity is due almost wholly to the prodding of the Interstate Commerce Commission; and the action of that body is interpreted as a mandate of public sentiment. But the activities of the Commission thus far leave much to be desired. The proposal that 49 experiments shall be made, at a cost of scores of millions of dollars, in a field where the wisest heads among both the progressives and the conservatives still find serious reasons for caution and still find their problems numerous and perplexing, cannot be classed as other than a very crude method of approach to a problem which calls for the best engineering talent.

With the leading parties disposed to evade or defer the

main issue—the financial issue—the question how to accomplish broad and friendly progress is still before us. The railroads cannot spend money until they get it, except as it is clear that borrowed money has a prospect of earning enough to pay for its use. The government tries to promise the railroads that they shall earn enough to bear new and unusual expenses; but after two years it is still unable to carry out its good intentions, on the basis of the *present scale of expenditures*—let alone additional refinements. The government cannot afford to build a railroad for experiments alone; nor can anybody, for the only satisfactory experiment must include a heavy regular traffic and scores of engineers. The hearty co-operation of a strong railroad organization is essential.

To meet the needs of the whole country and to satisfactorily settle the problem of uniformity, any plan must include, as a vital element, a board of supervising engineers of undoubted ability and independence. An ideal experiment would have to begin with the selection of such a board—say of three or five members—and its complete detachment from all railroad and commercial interests. And those three or five men would have to have the hearty co-operation of at least one strong railroad. In view of the financial and governmental—and other—obstacles to such a course, there will undoubtedly be practical men who will reject this suggestion as mere idealism; but what could be more absurd than the grandiose idealism of spreading a costly experiment over 10,000 miles of track and 5,000 locomotives, under 49 different and variously qualified experimenters and bosses, with no effective co-ordination of ideas and no financial regulation at all?

There would seem to be no way of avoiding a huge waste except by a pooling of interests; but nothing has yet been done toward broad and rational consultation, or toward discussion of means and methods of co-operation. The two important obstacles to wise and economical progress, the large initial cost of train control apparatus and the need of uniformity throughout the lines of connecting railroads, involve problems which can be reasonably solved only by co-operative study and approach: they are beyond the control of the individual railroad.

Coal Strike Situation Needs Some Publicity

IT IS TO BE PRESUMED that the coal strike is still on. We are reading but very little news about the affair in the daily papers—so little that it is not possible to feel absolutely certain that the difficulties may not have been peacefully settled, and not much said about it.

A situation of this sort is rather unusual for this year 1922 and it is particularly unusual to anyone familiar with the manner in which railway officers and the representatives of labor utilize every possible means to tell their respective stories to the world on every occasion when opportunity seems to permit. In the difficulty between the coal operators and the miners the opposite has been true. There was a great deal said in the daily papers prior to April 1 about the threatened strike. For a few days following April 1 the strike was front page news but since that time it has been relegated to the fourth or fifth page and information about it will be found in short items usually of relatively small importance. As a result the public is not interested in the strike. At the rate things are going it will continue to be disinterested until cold weather comes and finds the household coal bins empty, or until a fuel shortage results in a cessation of public utility operations, or in some other development equally serious in character. It may be regarded as settled beyond argument, however, that the public should be interested in a matter as vital as its fuel supply.

Neither the operators nor the miners are telling their case to the public. This may mean many things but to us it means only one of two things—either (a) that the parties involved in the dispute have no case, or (b) that they have failed utterly to realize the value of telling their case to the public.

It is possible that this assertion will be met with denial and statement to the contrary by both the operators and the miners. It is true that some small amount of publicity has been given out but it is nothing at all as compared with what presumably can be said by either side. The public has a very inadequate idea as to the points at issue in the strike. It may be presumed, we believe, that in the present state of thought in the country it would incline to be more favorable to the operators than to the unions. This feeling will not continue, however, unless the operators make some effort to meet the public half-way and take some steps to show that they deserve the public's good will. They should realize that there is a real necessity for taking the public into their confidence and of telling the public the facts as to the situation.

The coal consumers and the public in this United States have votes. The administration and Congress at Washington have a means of sounding and acting on public opinion. If the strike is continued too long and the operators show an offish attitude, the decision on the part of the public is too likely to be sudden and severe and there are too many chances that the ultimate result will be government regulation, or, at any rate, something somewhat distasteful to the coal industry.

The *Railway Age* has two reasons for commenting upon the situation. One is its general interest in the subject of publicity and the creating of good will through public relations work in the railway field. We believe the coal operators can learn a great deal from a study of what the railroads would do in similar circumstances. The other reason is our interest in the railroads.

It will be impossible to determine adequately the effect of the coal strike on railway revenues and expenses for at least another month or more, because the April reports will not be made public until that time. That the effect on the railway net will be severe there can be no question. This is unfortunate because earnings have only recently begun to show any relationship whatever to the standards required by the Transportation Act and the uncertainty of the situation is aggravated by our lack of knowledge as to what the Interstate Commerce Commission may do in the matter of decreasing freight rates.

Bituminous coal constitutes about 30 per cent. of the total tonnage of the railroads of this country, and anthracite an additional 6 per cent. In the week ending April 8, the coal loaded totaled 69,456 cars; in the week ending April 15, but 62,851 cars, or less than one-half as much as in the same weeks of last year. The bituminous loading, as compared with last year, has been reduced over 40 per cent.; the anthracite practically eliminated. Some roads, such as those in the Pocahontas district, are loading more coal than ever, due to their serving non-union mines. Other important coal carriers, both bituminous and anthracite, are loading no coal at all. It would take a true optimist to be unable to look upon this situation without apprehension. He might find some ground for optimism, of course, in the fact that there are large stocks of coal stored for locomotive fuel supply.

All this means that railway men should be taking a leading interest in the coal strike situation. To our way of thinking, however, the operators should formulate a case. If they have one now they should make it public and endeavor to "sell" it to the people of the country. Their present idea of sitting tight and waiting for the unexpected to happen will result in no good to their own industry or to any other industry with which they deal.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

The Cost of Treating Ties Should Not Be Charged to Maintenance

HOUSTON, TEX.

TO THE EDITOR:

In your issue of February 18, page 416, you published an abstract of a paper presented before the annual convention of the American Wood Preservers Association by Earl Stimson, chief engineer maintenance, Baltimore & Ohio, advocating the charging of the cost of treating ties to maintenance accounts. I desire to take issue with Mr. Stimson in this conclusion.

The railway maintenance engineer can no longer limit his horizon in considering the repairs and renewals necessary for the property in his charge, but must include in his consideration the viewpoints of the financier, the executive and the accountant. This requirement has been growing more imperative during the past 10 or 15 years—a period of rapidly increasing railway regulation by governmental bodies, which has been brought to a fitting climax by the passage of the Transportation Act of 1920. Railroads cannot be constructed or operated as institutions for the public benefit only. They must earn a fair return upon their value if they are to be expected to continue in existence and keep abreast of the development and progress of the territory they serve.

The primary need of a railroad is to earn money for operating expenses, fixed charges, improvements and, in order that it may prosper and fulfil its obligations to the investors in its securities, sufficient to pay a reasonable rate of return on those securities. The lack of sufficient earnings for all of these requirements is first felt by the maintenance departments and falls heaviest upon the maintenance engineer. Still, some of those most vitally interested continue to advocate the charging into operating expenses of amounts representing improvements to their property and go so far as to argue in favor of the most glaring inconsistency in the present accounting rules—that requiring the charging of the cost of treating ties to maintenance.

It is true that the Classification of Investment in Road and Equipment, Issue of 1914, as prescribed by the Interstate Commerce Commission, does not permit a charge to investment covering the cost of treating a tie used to replace an untreated tie, although it and the Classification of Operating Revenue and Operating Expenses, Issue of 1914, are both noticeably lacking as to specific instructions on this point. Betterments are defined in the Classification as improvements of existing facilities through the substitution of steel-tired wheels for cast wheels under equipment, the application of heavier rail in tracks, and the strengthening of bridges by the substitution of heavier members. We are led to infer that the excess cost of metal ties applied in the place of wooden ties over the current price of the wooden ties removed is the only betterment that can be obtained in a tie system. Are we to believe that a treated tie is no better than an untreated tie? If this could be a fact, then why do we use them?

The real facts have proven treated ties superior in overcoming decay to untreated ties. Their use results in economies of operation equally as important and probably even

greater than the economies secured from the application of heavier rails, ballasting of tracks, reductions of grades, or the development of terminal facilities. Improvements of the nature just mentioned are made with the intent of reducing operating expenses. The treatment of ties ordinarily will double their life and in this way will also reduce operating expenses. Can it be possible that this is not an improvement, or a betterment of the property under a proper definition of the word?

The carriers have, during the past eight years, been undergoing a valuation by the Valuation Bureau of the Interstate Commerce Commission. This bureau has not valued the untreated tie as highly as the treated tie because it recognizes the difference in worth. Very strenuous objections would have come from the carriers if the bureau had done otherwise. Now, the Interstate Commerce Commission is attempting to perpetuate this valuation by its Valuation Order No. 3, Second Revised Issue. But, under this order, a carrier which may have used one million treated ties in renewals replacing untreated since its valuation date, at an increased cost over the cost to replace in kind varying from 25 to probably as high as 75 cents per tie, and conservatively averaging 50 cents per tie, or \$500,000 total increased cost, cannot capitalize this half-million dollar improvement but must charge the value of the improvement into its operating accounts: Will such handling perpetuate the valuation work now almost complete? Is it not unfair when this carrier is deprived of its increased value, to give another carrier, constructed new in the past two or three years with, say one million treated ties in track, the privilege of capitalizing the full cost of those ties and earning a higher net operating income based on this higher capitalization?

Under the Transportation Act of 1920 the commission has placed a value upon the carriers by groups and fixed rates designed to earn a fair return upon such value in the aggregate. Two years have passed and at no time have the rates been sufficient to allow even a fair sized minority of the carriers to earn this promised return upon their value. But, assuming that conditions had been normal during this period, and that the carriers as a whole had earned the maximum allowable return, then this return would have been short by the amount they should have earned on the increased value of their tie systems resulting from the betterment growing out of the practice of using treated ties in larger numbers each year. And likewise the operating expenses would have been and actually were greater than they properly should have been, to the extent that they included the increased values of the improved tie systems.

Should not the commission amend the present accounting rules as affecting treated ties? By so doing, it would not only allow the carriers to earn a larger net operating income, but would materially decrease the operating expenses of the carrier, which decrease would finally reflect itself in lowered rates. It has been suggested that it would not be practical to keep accurate account of treated ties. This can be done very simply by the use of a marker so that treated and untreated ties can be identified and classified when retired.

It is quite true that there are varying kinds of treatment, both as to cost and effectiveness. But this cannot be used as an argument against charging the increased cost due to treatment to capital account. The cost of the same kind and size of untreated ties varies in different portions of the country. The Valuation Bureau did not argue that a flat price should be used for each size and kind of tie regardless of the local conditions entering into its cost. Neither can the increasing ratio of the cost of the timber to the cost of treatment have any bearing upon the principle involved. The treated tie will always cost more than the untreated, and the excess cost due to treatment will always be an appreciable amount.

The more general treatment of hardwood, as well as soft-

wood ties, is being strongly advocated, and it will not be many years until practically all ties will have to be treated as an economic necessity. It has been the urge of this necessity which has caused carriers in the past to attempt, through treatment, to increase the tie life by from 75 to 100 percent., regardless of how the cost was accounted for. But, can they be expected to continue this practice with the accounting classification throwing the expense into operating accounts and the Transportation Act limiting their income? Railroad earnings are now low and have been for so long a time that the carriers have almost forgotten the meaning of prosperity, although the rates are now generally higher than at any time prior to 1920 or than they probably ever will be in the future. What better method of providing for the increased expense due to treatment of ties can be found than by capitalizing this increased cost?

The writer is an unqualified advocate of the use of treated ties and would regret being interpreted otherwise. But it is not merely desirable but very essential to the continued use of treated ties in annually increasing quantities, that the excess cost be properly accounted for as a betterment and that inconsistencies in the Classification of Investment in Road and Equipment be removed. The maintenance engineer cannot keep every dollar of the carrier's earnings for maintenance uses only, but must share them with other interests who, by virtue of their investment, have a right to a share. He must plan his expenditures in such a way as to make the earning of each succeeding dollar just a little bit easier than the one before, and in so doing he will not be paying tribute to capitalization but will merely be fulfilling his trust.

F. S. SCHWINN,
Chief Engineer, International & Great Northern

Fatal, If Not Corrected

ON THE LINE.

TO THE EDITOR:

A patient complaining to a doctor usually describes his illness by the effect it has upon his feelings, but the doctor looks beyond the effect and endeavors to locate the cause. When the disease is complicated it is quite probable that there is more than one cause. An instance recently brought to our attention which indicates one phase of the unhealthy condition of the transportation business is clearly shown in the experience of one old freight conductor who runs a way freight or "peddler." On every trip over the road he finds that shipments for points at the distant end of the line are nearest the door, while those for the nearer stations are often buried under masses of other material that must be moved before the delivery can be made. The cost of a train crew waiting while this sorting process is going on is high. It takes much longer to get a train over the road than it should. This same train crew works six days a week, but with the overtime the pay they receive is equivalent to much more.

Now here is a sick condition if there ever was one. The cause is likewise very evident. If a way freight must lay at a station 45 minutes instead of 10 minutes, while the crew overhauls everything in a car to uncover a certain shipment, it is evident that the cause is unsystematic loading. This can be remedied and ought to be with all possible dispatch. Not only is this particular condition exceedingly expensive, but it has a deadening effect upon the men who unload the car. Who can blame them if they think "nobody cares how they put this stuff in the cars—we should worry?" But they don't worry so long as they get well paid for their time.

Is it not high time some one else should worry, for such conditions as these are sapping the finances of the roads

TRAVELER.

Is This the Future Locomotive?

WASHINGTON, D. C.

TO THE EDITOR:

The steam locomotive has been coming in for some pretty severe censure lately, part of it justified and part of it certainly unjustified. Considering the problem with no interest to serve or hamper me, I believe that the locomotive, when actually at work, performs that work with surprising economy but that the reasonable grounds for criticism are: (a) the first cost is too high; (b) the cost of maintenance is high and depreciation rapid; (c) the machine as a whole is vulnerable at so many points that it is out of service too much of the time.

There are three reasons for these points of objection. (1) The locomotive combines in a single unit, three somewhat distinct functions. It is a steam generating plant, it converts steam into reciprocating motion, and it must transmit that reciprocating motion to the rotation of the driving wheels. (2) The difficulty in solving this problem has increased steadily as the demand for power has increased and the limitations of width and height and even of length have been reached. (3) While many important economies have been added from time to time, they usually necessitate new parts requiring skillful attention and adding to the vulnerability of the locomotive, not to mention its high first cost and cost of maintenance.

Many of the writers on the subject seem to think that the limit of the locomotive has already been reached, and some declare that we must turn to electric traction with central power house installation. The great advantages of electric traction are so manifest on main lines of heavy traffic as to be very alluring, but it must necessarily come slowly on account of the difficulties of financing. Furthermore, it is apparently not economically applicable to more than, say, three-fourths of the present railway mileage. Under all the circumstances it is not highly probable that there is an intermediate stage between the present steam locomotive and the ultimate central power installation with electric motors? May not that intermediate stage be the electric locomotive driven with its own power generator?

The development of the steam turbine and the electric drive in marine practice has demonstrated the great advantage arising from electric transmission of power and we may well foresee the introduction upon the platform of a car not excessive in length, of a tender for coal and water, a boiler of such design that it will be far less expensive in first cost and in maintenance than the present type of boiler and at the same time be more efficient, and a turbine-driven generator delivering its power to motors on the axles of, say, two eight-wheel trucks. On such a car platform, say 75 to 80 ft. in length, the separate units of the installation would stand in much the relation that they do in the ordinary power house of a factory, though naturally more compactly placed. The design of the boiler would follow the experience of the best stationary and marine practice, not confined to the limitations of the present locomotive frame and wheel arrangement. Many of the objections on account of first cost and high maintenance expense of present day firebox design would be eliminated. The turbine-generator needs no endorsement or explanation because in itself it is a unit thoroughly tried out and well understood. Lastly, the transmission of the electric power to the driving wheels becomes simply a question of a flexible cable connection.

Such a locomotive should be able to render fairly continuous service, making, say, 800 miles daily in passenger service and 400 to 500 miles in freight service. And why not? In stationary and marine practice, boilers and generators such as we propose to use are frequently in continuous service.

FREDERIC A. DELANO.

Electric Freight Locomotives for Chile*

Speed on Heaviest Grade Will Be Doubled and Train Weights Will Be Increased

WORK on the 15 electric road freight locomotives for the Chilean State Railways is nearing completion.

The cabs for the first eight of the road freight locomotives have been delivered by the Baldwin Locomotive Works to the Westinghouse Electric & Manufacturing Company for the installation of the equipment. There will also be seven switching locomotives.

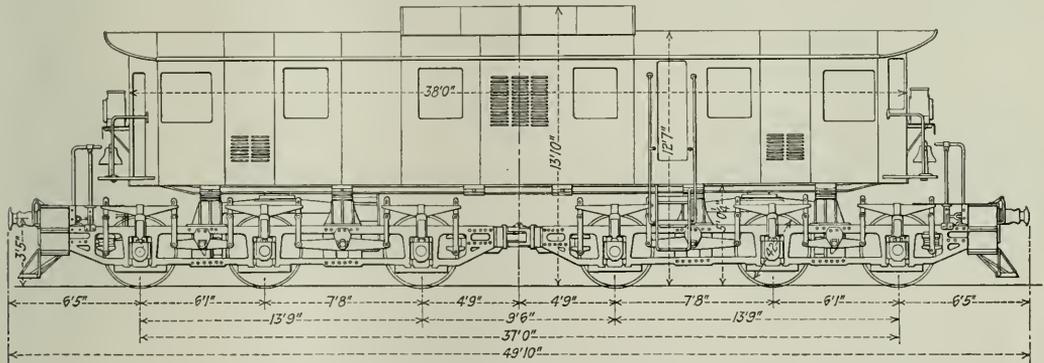
The road locomotive has a cab of the box type, carried on two articulated trucks, each having three driving axles with direct geared motors. The estimated weight is 226,000 lb. It will operate at 3,000 volts direct current.

This locomotive has a rating of 1,680 hp. at 3,000 volts and will be able to develop a maximum of 3,200 hp. for short periods. With natural ventilation the locomotive will deliver for one hour a tractive effort of 27,950 lb. at a speed of 22.6 miles an hour at 3,000 volts. The continuous capacity of the locomotive with forced ventilation is 20,880 lb.

tons. They are operated with a single steam locomotive, except on the heavy 12-mile grade southbound, and on a northbound grade of 6.8 miles. On these two sections a steam helper is now used to maintain speeds of from 10 to 14 miles an hour.

One electric locomotive will haul a trailing load of 770 short tons in either direction between Valparaiso and Santiago without assistance except on the Tabon grade. On level tangent track the speed with such a load will be 35 miles an hour. The average running speed on the Tabon grade will be approximately 24 miles an hour. The time saved by the elimination of delay to take fuel and water and by the higher running speed will shorten the time of a trip from four to five hours in each direction.

These locomotives are equipped with Continental spring buffers and M.C.B. couplers, arranged to take attachments for chain couplers temporarily. The two six-wheel trucks



Side Elevation of Road Freight Locomotive

tractive effort at 24.8 miles an hour. The maximum speed is 40 miles an hour.

The general dimensions and estimated weights of the locomotive are as follows:

TABLE I.
DIMENSIONS AND WEIGHTS OF ROAD FREIGHT LOCOMOTIVES

Track gage	5 ft. 6 in.
Length over buffers	49 ft. 10 in.
Length over cab	38 ft. 0 in.
Total Wheelbase	37 ft. 0 in.
Rigid wheelbase	13 ft. 9 in.
Height, top of rail to cab roof	12 ft. 7 in.
Height, top of rail to clerestory	13 ft. 10 in.
Width over cab sheets	10 ft. 0 in.
Height of coupler	41 in.
Wheel diameter	42 in.
Weight of complete locomotive	226,000 lb.
Weight of mechanical parts	140,000 lb.
Weight of electrical equipment	86,000 lb.
Weight per driving axle	37,670 lb.

The road locomotives will operate over the 116-mile route between Santiago and Valparaiso and the 28-mile branch between Las Vegas and Los Andes. The heaviest grade is 22.5 per cent for 12 miles from Llai Llai to La Cumbre. This is known as the Tabon grade. The maximum curvature is 11 degrees. There are six tunnels in the electrified zone.

The present main line freight trains average 550 short

tons. They are connected at the inner ends by a mallet hinge. The bar-type cast steel side frames are located outside of the wheels and are connected by cast steel bumpers and cross-ties. The semi-elliptic driving springs over the journal boxes on each side are connected to one another by equalizer beams. The ends of each set of three driving springs connected thus are attached to the side frames through coil springs.

The 38-foot box-type cab, including an engineman's compartment in each end and a central equipment compartment, is carried on center pins located approximately over the midpoint of each rigid wheelbase. One center pin is restrained both longitudinally and laterally and the other in the lateral direction only, which permits free longitudinal movement of the cab relative to one truck.

The locomotives are equipped with Westinghouse air brakes, which are standard for the Chilean Railways. The air brake is interlocked with the regenerative brake so that the latter may be supplemented by service application of the train brakes, if desired, without applying the air brake to the locomotive drivers.

Current is collected by spring-raised, air-lowered pantographs, controlled by compressed air and arranged to be mechanically locked in the lowered position. Individual switches mounted in banks establish the main circuit connections. Each switch is a complete unit in itself and may

*The Chilean electrification problem was outlined in the January 21, 1922, issue of the *Railway Age*, page 216, and the passenger locomotives were described in the issue of March 4, 1922, page 527.

be removed without disturbing adjacent switches. Compressed air controlled by electro-magnetic valves is used to operate the switches. For certain circuits where no current is broken and for low voltages, cam switches are used. These also operate by compressed air controlled by electro-magnetic valves. The cam group comprises a number of switches mounted on a single shaft, connected through a rack and pinion to a double-acting air piston.

Each axle of the locomotive is driven by a motor, wound for 1,500 volts and insulated to operate two in series on 3,000 volts. The nominal rating of this motor on short field is 280 hp. at 155 amperes and 1,500 volts. Field control is secured by the use of two separate field windings on the main poles. The motors are geared directly to the axles with a ratio of 3.94 to 1. The gear used is of the flexible type.

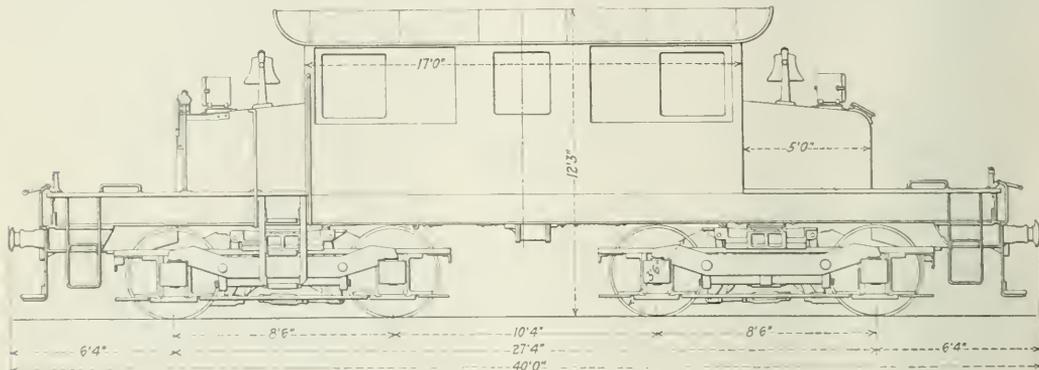
A motor-generator set provides low voltage power to compressors, blowers, control equipment and lights. This set has a single frame and two armatures carried by a common shaft. The 3,000-volt motor is a bi-polar double-commutator machine. The continuous rating of the generator is 35 kw. at 92 volts.

The following table gives the general dimensions and estimated weights of the locomotive:

TABLE II
DIMENSIONS AND WEIGHTS OF SWITCHING LOCOMOTIVES

Track gage	5 ft. 6 in.
Length over buffers	40 ft. 0 in.
Length over central cab	17 ft. 0 in.
Length over hods	27 ft. 0 in.
Total wheelbase	27 ft. 4 in.
Rigid wheelbase	8 ft. 6 in.
Height, top of rail to cab roof	12 ft. 3 in.
Width over cab sheets	10 ft. 0 in.
Height of coupler	36 $\frac{1}{2}$ in.
Wheel diameter	42 in.
Weight of complete locomotive	136,000 lb.
Weight of mechanical parts	86,000 lb.
Weight of electrical equipment	50,000 lb.
Weight per driving axle	34,000 lb.

The trucks are of the rigid bolster equalized type with rolled steel frames located outside of the wheels. A center pin is located at approximately mid-length of each rigid wheelbase. The central cab has an engineman's stand in each end and control apparatus centrally located and suitably protected. Buffers, couplers and air brake equipment are duplicates of those on the road locomotive. The control equipment also comprises apparatus similar to that already



Side Elevation of Electric Switching Locomotive

A master controller is located in each engineman's compartment to provide double-end operation, the same master controller being used for both motoring and regenerative braking. This controller provides 50 control notches in acceleration.

For regenerative braking, the main motor armatures are arranged for the same combinations as when motoring and the motor fields are separately excited by the motor-generator set. The range of speed in regenerative braking will be from 8 to 30 miles per hour.

Switching Locomotives

The switching locomotives will be the last ones built. The cab is of the steeple type and is carried on two swivel trucks. Two motors are mounted on each truck driving direct through helical gears. The estimated weight is 136,000 lb. The control is arranged for double-end operation.

The nominal rating of this locomotive is 560 hp. With 3,000 volts, and natural ventilation, the tractive effort for one hour is 19,600 lb. at a speed of 10.6 miles per hour and the continuous capacity is 11,400 lb. at 12.7 miles per hour. With 25 per cent nominal adhesion the starting tractive effort is 34,000 lb. The maximum speed is 35 miles an hour. For short periods the equipment is capable of developing 1,000 hp. In view of an expected increase in traffic these locomotives have been designed to handle trains of 1,200 short tons in yards with level tracks.

described for the road locomotives and the pantograph is of the same type.

The four motors are of the series type wound for 1,500 volts and insulated for operation two in series at 3,000 volts. Each motor has a one-hour rating of 140 hp. at 75 amperes and 1,500 volts.

The motor-generator set, to supply power for the compressor motor, lights and control circuits, has a two-part frame, each part containing two bearings in which runs a common shaft carrying two armatures, one a 1,500-volt motor (insulated for 3,000 volts) and the other a low voltage generator. With 3,000 volts applied to the motor, the generator will deliver 22.5 kilowatts at 92 volts.

The main control resistance, connected ahead of all motors, is designed with ample capacity for frequent, heavy accelerations and for a reasonable amount of emergency operation with one pair of motors cut out. The number of accelerating steps assures moderate changes in tractive effort in starting, which in turn tends to minimum wear and tear on the locomotive and rolling stock.

WHEAT SHIPMENTS from the port of Vancouver B. C. in March exceeded all previous records, a total of 11,850 tons having been shipped during the month to Great Britain, and 22,850 tons to China and Japan. The total quantity of wheat shipped through Vancouver during the winter season, November to March, 1921-1922 is in excess of 5,000,000 bushels.

Car Service Rules Improve Use of Equipment*

An Analysis of Empty Car Movement Shows Several Prevalent Impressions to Be Erroneous

By M. J. Gormley

Chairman, Car Service Division, American Railway Association

THE FOLLOWING CONCLUSIONS regarding the practical working out of the car service rules and the movement of equipment generally are based upon a study of the records we have compiled, supplemented by reports from 12 railroads on which 43 per cent of the traffic of the country was handled from January 1, 1919, to December 31, 1921. The more important aspects of this problem are: (1) Empty car mileage and its causes. (2) Car service rules in actual practice. (3) The importance of supervision of car movement.

The figures obtained from the 12 roads referred to show that the loaded car mileage east and north exceeded the loaded car mileage west and south from January 1, 1919, to December 31, 1921, from a minimum of 64,432,000 to a maximum of 152,698,000 miles per month. It is estimated that three-fifths of the population of this country reside east of the Mississippi and north of the Ohio and Potomac rivers. This explains the unbalanced traffic of the country. Even under normal conditions there is this greatly unbalanced traffic and it is accentuated in times of business depression and is due in a large measure to the greater fluctuations in the various classes of traffic.

As an example of what is meant by fluctuations in traffic we call your attention to the comparison between August, 1919, a period of low empty mileage and heavy traffic, and January, 1921, a period of very high empty mileage and greatly decreased traffic. In August, 1919, 5 per cent of the loading was live stock, 20 per cent coal and coke, 6 per cent forest products, 4 per cent ore, and 60 per cent merchandise and miscellaneous. In January, 1921, 7 per cent of the traffic was live stock, 2 per cent greater than it was in August, 1919; 26 per cent was coal and coke, 6 per cent greater than in August, 1919; 4 per cent was forest products, 2 per cent less than in August, 1919; 2 per cent was ore, a decrease of 2 per cent as compared with August, 1919; and 54 per cent was merchandise and miscellaneous, a decrease of 6 per cent as compared with August, 1919. This shows that the commodities moving largely in one direction increased while the traffic generally decreased, thereby creating a very unavoidable empty car mileage.

An important factor increasing empty car mileage in times of business depression is the light loading of equipment. We are now making an analysis of 1921 loading figures. The principal products of agriculture alone show a net total of nearly 130,000 cars used unnecessarily in 1921 on the assumption that the same average loading per car might have been attained as in 1920. These were long haul commodities and moved largely to the east and north in the direction of prevailing traffic, thereby adding just that many more cars to be handled back empty into the producing territories. These few commodities alone undoubtedly added from 40 to 70 million empty car miles to the year's total.

Obviously, there is no possible way to avoid empty car mileage that is due to unbalanced or fluctuating traffic or to light loading by shippers. Most certainly such empty mileage could not be avoided to any greater degree under a car pool than under the ownership principle. It is self-evident

that empty cars in excess of the requirements for west or south-bound loading must be moved empty to the producing territory and without any question it is most economical to return the equipment currently and automatically in accord with ownership rather than attempt to do it by the so-called fleet movements of miscellaneous cars without any regard to the character of cars required in the loading territories.

We further call your attention to the fact that the percent of home cars on home lines increased from 48 in January, 1921, to 74 in July of the same year with a concurrent decrease in the percentage of empty car mileage and in spite of a decrease in total car loading. That it has been an error to charge a considerable amount of empty car mileage to the relocating of cars to the owning line is, we believe, clearly proven by these facts. We believe transportation men generally are convinced that it is never economical to increase empty car mileage solely to save per diem expense for the reason that it will create a greater transportation expense than that would be the payment of the per diem.

To determine whether there was any parallel movement of empties in the direction of the preponderating loaded movement a check was made by our inspectors at the principal interior terminals on four of the larger eastern railroads. We checked 20,627 cars moving east and of that number only 290, or 1.4 per cent, were empty. We believe all railroads could make such checks profitably to determine whether there are unnecessary empty movements in the direction of the preponderating traffic. The above indicates a very good performance.

Car Service Rules in Actual Practice

We are frequently met with the statement that when there is a decided decrease in business with a consequent surplus of equipment there is an energetic effort on the part of all interested to move foreign cars off the line empty and load home cars to connections for the sole purpose of decreasing per diem expense. It is convincing from the studies made and from the reports of our inspectors that this conclusion generally is reached from off-hand opinions and without supporting data. The best evidence in our possession that the general views about this have been erroneous is the fact that an analysis of the reports of our inspectors covering a check of 82,156 cars over a three-months' period and including 142 railroads and 316 stations shows that the violations of Car Service Rule No. 1, which is the rule that says home cars shall not be used for the movement of traffic beyond the limit of the home road when the use of other suitable cars under these rules is practicable, has amounted to only 3.4 per cent, while violations of Rule No. 2 amounted to 7.8 per cent, and violations of Rule No. 3 amounted to 3.2 per cent, or a total violation of all the three rules of 14.5 per cent. In other words 96.6 per cent of these cars were handled in accordance with car service Rule No. 1 and 85.5 per cent in accordance with all the rules.

Of the 82,156 cars checked, 45,086 were loaded by the carriers with merchandise and of these cars only 1.7 per cent were loaded in violation of Car Service Rule No. 1. The investigations made by Car Service division into this phase of the subject have been very extensive. They show beyond any reasonable doubt that the carriers generally have ad-

*Abstracted from a paper presented before the annual session of the Transportation division of the American Railway Association at the Blackstone hotel, Chicago, on April 19, 1922.

hered to the rules and the integrity of the rules has been maintained. The natural consequence is that we in the Car Service division feel that the railroads individually may rely upon the integrity of each other in the maintenance of the general scheme of car service rules. We believe that another wrong impression has been created relative to the question of switching expense involved in the observance of the car service rules. It was our impression, as we assume it was the impression of most transportation men, that a considerable switching expense is involved in the observance of the car service rules. This question has been given special investigation at several important switching centers and competent local operating officers have reported that the observance of the rules has not caused any expense that could be eliminated if these rules were not in effect. It is undoubtedly true that some expense can be charged to this, but we are convinced from the analysis we have made and from observations made by our own inspectors that the extent of this cost has generally been greatly overestimated. The records of car loading at some industries where extra effort was made to observe the car service rules have shown very conclusively that it is possible to comply with them without adding anything to the switching expense. In the case of a particularly good sized industry we have in mind a very substantial improvement was made in the observance of car service rules, and a careful check demonstrated that not one cent of extra switching expense was incurred.

The enforcement of the car service rules involves establishing a proper relation with the shipping public. The lack of understanding by the shippers of the value from their own standpoint of loading the equipment in conformity with the car service rules is now more responsible than any other one cause for violating the rules. With a view to improving this condition our representatives have been devoting considerable time in conference with shippers and railroad officers and the Car Service division has recently issued a circular for distribution to shippers asking for their co-operation, in their own interest, in carrying out the car service rules. In the districts where the most intensive educational work has been done the records show that invariably when the shipper has a fair understanding of the purposes to be accomplished by the car service rules he has given unqualified support in carrying them out.

The Importance of Supervision of Car Movement

How many transportation men today realize that the car equipment of this country has a value of approximately five billion dollars and that it constitutes at least one-fourth of the value of railroad property? In order to secure the utmost efficiency from this vast investment intensive supervision of car handling is necessary. In our opinion there is no better field than this for the application of the old doctrine that intensive supervision pays one thousand per cent return. We believe that the ownership principle, under the present car service rules, all things taken into consideration, affords the most economical and workable method for car operation, distribution and maintenance.

It can be fairly stated that the present car service rules are a result of the gradual evolution in the handling of car equipment and are based on fundamentally sound principles from the standpoint of shippers and the railroads. We believe it unnecessary to look to new methods for greater economy in car handling in the future and it is our very firm belief that any additional economies which may develop in car handling will be entirely brought about by:

1. A more intensive supervision of the individual car loading and movement to the end that (a) car service rules will be observed; (b) cross-haul of empty equipment of the same class will be eliminated; (c) increased loading per car will be secured; (d) unjustifiable empty movement will be

avoided, especially in the direction of the preponderating loaded traffic; (e) terminal delays will be reduced to the minimum.

2. A system of recording car mileage by classes, by direction and by operating divisions, to provide a definite record to determine the cause, effect and remedy for empty mileage.

3. A well thought out plan of car maintenance with a view of avoiding empty car mileage due entirely to the condition of the car.

The last item does not mean that we recommend that all cars be maintained in condition suitable for all classes of traffic. A car fit for rough loading in one part of the country may serve the purpose in that territory just as well as a car that is in fit condition to handle high class traffic. To maintain all equipment in condition to handle any and every class of traffic would undoubtedly involve an unjustifiable expense.

The work that has been accomplished in the last year or two in the education of railroad officers and employees and of the shipping public in the merits of the car service rules and in their practical application is a foundation for the more difficult times ahead when business will be heavy, freight cars of all types in demand and the possible tendency to disregard ownership. The exceptionally heavy grain business handled last year in the west with a close adherence to these rules indicates what can be done even with heavy business. We firmly believe that a substantial adherence to the principle of these rules will accomplish the necessary distribution of equipment between different parts of the country in the most satisfactory and economical manner and will avoid the necessity for emergency orders for the movement of cars which are bound to be uneconomical in operation and unsatisfactory in results.

Gasoline Propelled Railway Coaches

AT A MEETING of the Society of Automotive Engineers held in Indianapolis, March 29, a paper was presented by Charles Guernsey, general manager, railroad division, Service Motor Truck Company, Wabash, Ind., on the subject of gasoline railway coaches.

Mr. Guernsey traced the early development of the gasoline propelled railway coach; the heavy, cumbersome type expensive to maintain, some driven by gas-electric motors, some with the gasoline engine mounted under the center of the car, all representing an attempt to use a gasoline motor in a car otherwise typical of steam train design.

Present day models are radically different. They have not lost the railroad point of view altogether but have chosen carefully from railroad practice those features which fit in with this new type of equipment.

The gasoline railroad motor coach will enable branch lines and short lines, which are now operated at an enormous loss, to convert passenger traffic to a money-making basis, due to the low cost of operation and maintenance. A 13-ton car can be operated for 25 to 35 cents per car mile, as against a cost of \$1 to \$2 per mile for steam operation. The initial cost is low. The railroad motor coach is primarily designed for service where steam operation is too expensive and where frequent service is desired.

An instance was cited where a branch line in the Blue Ridge mountains was only getting about \$30 per day in passenger revenue, while the operating cost with steam equipment was \$40 per day. With a gasoline propelled railway coach, this road is now running at a total operating cost of \$10 per day, making a profit of \$20 per day.

During the discussion of the paper an officer of the Illinois Central brought out the case of one railroad that had increased its income \$12,000 per year through the use of

gasoline propelled coaches on branch lines. His line, he stated, was investigating this type of car for use on its branch and short lines.

A representative from the Wabash made the assertion that the steam locomotive required nearly the same amount of fuel expenditure for one-half as for maximum load, a fact which makes branch lines so expensive. This is not true with light gasoline rail car equipment. It was his thought that the need is to build the gasoline propelled car as light as possible and as strong as possible.

The success of the motor coach, the speaker brought out, after all hinges primarily on the engine. The car must be designed with this thought uppermost. The engine must be one which will stand up under the severest kind of service, and it must be capable of operating continuously at high speed and under wide open throttle. It must operate with the minimum of vibration and every part must be accessible.

An interesting test was made by the Service Motor Truck

Company with the 434 in. by 6 in. Midwest engine which is standard in this company's railway coach. The results of the trials to determine acceleration in intermediate and high gear were as follows:

INTERMEDIATE TRANSMISSION				
0 to 21.72 m.p.h.	30 sec.	29 sec.		1,200 r.p.m.
0 to 25.34 "i.p.h.	42 sec.	42 sec.		1,400 r.p.m.
0 to 28.95 m.p.h.	55 sec.	59 sec.		1,600 r.p.m.
HIGH TRANSMISSION				
0 to 32.5 m.p.h.	1 min. 38 sec.	1 min. 32 sec.		1,400 r.p.m.
0 to 37.2 m.p.h.	1 min. 50 sec.	2 min. 6 sec.		1,600 r.p.m.

The detailed design of gasoline engines for use in railway motor coaches was discussed, considerable emphasis being placed on the necessity for high economy and efficiency. Some of the features advocated included large size crank shafts, special lubrication by oil forced to all bearings and lubrication controlled according to the load and not the speed of the engine. Large valves with high lifts are desirable to allow quick induction of fuel and scavenging.

Many Opportunities for Eliminating Hand Labor*

Great Savings to Be Made in Maintenance of Way Work Through the Use of Power Equipment

By Robert H. Ford,

Assistant Chief Engineer, Chicago, Rock Island & Pacific

TIME STUDIES of seasonal or extra-gang laborers engaged in similar classes of work made some years ago on various railroads, showed that their productivity ranged from 28 to 33 per cent. Although the regular section organization runs higher than this, the fact remains that on most railroads the productivity of maintenance labor has not been commensurate with that secured in other industries where other means have been used and some measure employed for gaging output.

While a great deal must yet be done in the selection, training and education of labor generally, the fact remains that before the railroads can lessen the cost of maintenance of their physical property devoted to transportation, means must be found that will permit them to take advantage of the most modern methods and facilities to decrease labor expenditures to a degree not heretofore considered possible. More attention will be paid ultimately to the design of railroad facilities to combine economical use with standardization of parts in conformity with recognized commercial practices. In place of specializing on the design of the composite, effort must be in the direction of interchangeability of parts as far as possible in order that they may be adapted to varied types and classes of facilities rather than to special classes as at present. This fact, of itself, will not only permit great reduction in maintenance costs but will also in turn affect the design and adaptability of labor-saving devices used in their up-keep. For example, locomotive cranes, motor cars and work equipment of all kinds should be so designed that their parts will be interchangeable with each other and with locomotive or car parts wherever possible and in conformity with M. C. B. standards.

Specialization in railroad maintenance has lagged behind nearly all other lines of industry. This is not due to a failure on the part of the railroads to appreciate the importance of such matters but because of the fact that for years the roads have been too poor to be economical, a fact that will as a rule be reflected in more or less expensive methods

of up-keep whether on a railroad, in a factory, or on a farm. The inability to keep pace with science and invention in providing proper appliances to replace obsolete methods and facilities prevails to a marked extent on our American railroads. Working conditions, legislation and higher costs of labor have served to accentuate this of late and as a result changes in methods of up-keep are sure to result. As evidence of this, more attention has been paid and more actual advance has been made in this direction in the last few years than in the previous 20 years and, from every economical and industrial standpoint, this development is bound to continue at an accelerated rate.

Last year about 460,000 men were required to maintain the roadways of the United States. This is equivalent to over 16 army divisions, which if marched in army formation, in columns of fours, would extend for 208 miles and require nearly nine eight-hour days to pass a given point. Approximately 360,000 of these men performed work that some day will be done either wholly or in part by mechanical means.

To maintain the railroads of the country, vast amounts of labor and material are consumed annually for which there is little or nothing to show at the end of the year. Three-hundred and fifty-four million dollars, or about 54 per cent of the maintenance outlay, was for roadway and track repairs, requiring a vast army of men.

Large Expenditures for Drainage

The roadway must be continually drained and ditched, approximately \$31,000,000 being expended annually for these purposes alone. Years ago such work could be done at a cost of from 10 to 25 cents per cu. yd., while to do the work today in the same manner costs from \$0.75 to \$2 per cu. yd. If performed by teams, the cost is from \$0.50 to \$1.75 per cu. yd.

The introduction, a few years ago, of the self-propelled steam ditcher working from a flat car, afforded great opportunities for labor reductions in this direction. One of these machines will perform the work of from 75 to 100 men and reduces the cost enormously. The flat cars have given way to

*Abstracted from a paper presented before the Western Society of Engineers, Chicago, April 20, 1922.

automatic air dump cars with a steam ditcher between them, the machine working from the track and loading and moving the material by a self-propelled device to the point of disposition.

A comparatively recent innovation in the list of ditching equipment is the ditcher-spreader, equipped with wings similar to ordinary spreaders but with the addition of a detachable cutting edge so shaped as to form the standard ballast section. This machine not only clears the ditches but it also shapes the sub-grade from the toe of the ballast to the shoulder of the roadbed and cuts and cleans the ditches beyond the roadbed in one operation, leaving a uniform and highly satisfactory appearance. The ditcher-spreader is pushed by a locomotive and will ditch complete from 10 to 25 miles of track per day, completing both sides of the roadbed where necessary. It does the work of several hundred men at a cost of from 2 to 6 cents per cu. yd. This machine will dig new ditches but its main advantage is to keep the sides clear of the annual accumulations while the steam ditcher, previously referred to, is most economical in long, heavy or sliding cuts. The steam ditcher costs about \$10,000 and the ditcher-spreader from \$15,000 to \$20,000, depending upon the size of the machine required.

For years it was customary to use flat cars with a work train, on which the material was loaded by hand or steam shovels and hauled out to the place of use, to be unloaded by means of unloading plows attached to the rear end of the train and drawn through the material by a Lidgerwood unloading machine. Changing conditions, have made this method, so expensive and cumbersome that it has now no place in economical maintenance and has been replaced by the automatic air dump car, operated direct from the locomotive and loaded by the locomotive crane, steam shovel or other appliances. These air dump cars cost approximately \$3,200 and there are several excellent types.

The Motor Car

Although the hand car is an obsolete and expensive factor in railway maintenance, it still continues to be used on a large part of the railway mileage. The section motor car replaces this and has now become an essential for track maintenance, both as a means of economizing labor and reducing expenditures. A section motor car costs about \$275, with an annual maintenance of about \$25, exclusive of fuel.

It has been customary for many years for all operations incident to replacing rail to be done by manual labor, but it is now entirely practical to do the greater part of this work by mechanical means, from the unloading to the final stage of the operation, until the released rail and fastenings are placed in cars ready for shipment. Pneumatic air machines for unloading, operated by two or three men in place of the 15 formerly required, gasoline or electric driven locomotive cranes or small hand-power machines operated by three or four men, will do the work that formerly required 5 to 10 times that number in laying rail, their cost ranging from \$400 to \$8,000 depending upon the size and type of the machine required.

Power driven pneumatic drills, power bonding machines and power track wrenches are some of the labor saving devices that operate to reduce the cost of this work and will permit increased efficiency and be productive of great economy in rail renewals. The labor cost of laying rail varies from \$700 to \$2,000 per mile, the large fluctuation being influenced largely by operating conditions and facilities. A fair cost today is probably about \$1,400 a mile. To my mind, the time is not far distant when it will be practical to do this work for about one-third this sum.

A pneumatic air machine, mounted or built on a flat car and equipped with two air derricks, one at either end and placed between two flat cars, will load the equivalent of two miles of rail at about one-tenth of the cost of former methods.

I do not believe that the average railroad man appreciates the wide-spread usage and great opportunity for savings from a properly designed locomotive crane. These machines will do about everything required in lifting, placing, transferring, pile driving, erecting, digging and in fact anything of this class where manual labor has been necessary heretofore. Their activities are predicated very largely upon the organization and method of control.

One of the expensive items of roadway maintenance is caused from the deteriorating effect of brine drippings and from salt air in the vicinity of the ocean on rail fastenings, spikes, bolts, tie plates, and even in some cases the rail itself. This requires that these metal parts shall be oiled periodically and the work is usually done by track labor. An oiling machine, introduced on the Delaware, Lackawanna, & Western by A. J. Neafe of that company has proven invaluable, both as a means of performing the work efficiently and decreasing labor costs.

Killing Weeds

The American railroads spend today about \$30,000,000 for clearing the weeds from their tracks, with about \$16,000,000 additional to keeping the right-of-way clear of brush and weeds. Track weeds give rise to one of the larger items of roadway maintenance. On important lines it is necessary that they be removed from the track in order that it may be properly maintained. It forms one of the principal jobs of section labor and requires the services of an average of over 100,000 men for five months of the year to clear the American railroad tracks of weeds. A weed burner, operating twice during the season, will remove the weeds at a cost of \$14 per mile per trip as compared with \$135 per mile for hand labor. This is only one of several devices that is entirely practical for the purpose.

On branch lines the ballast shoulders can be taken care of by the disc weed cutter which operates at a cost of about \$4.50 per mile as compared with \$25 per mile for hand labor. Track mowing machines which consists of a sickle bar attached to a heavy duty motor car can be used for this work. These machines operate at a speed of from four to six miles per hour, at a cost of \$5.50 per mile, as compared with \$40 per mile for both sides of the track by hand labor.

Destruction of weeds by chemicals is both possible and practical although the field is yet open for further development. Here again much remains for the inventive genius. The foundation for most chemical weed destroyers is arsenic in a soda solution. After a series of applications the interval between applications can be increased and the cost correspondingly reduced. It is possible by annual applications to sterilize the soil so that weeds will not grow.

Approximately 44 million dollars is annually expended for tamping ties, which is almost exclusively a labor item and is performed by the section and extra gang forces. There are now upon the market tie tamping machines, operated both electrically and by means of compressed air, in some cases the section motor being used to run the compressor. These machines cost about \$2,500 each, and reduce the cost of the work greatly. The tie-tamping machine is a practical, efficient tool. Its use, however, has not become as general as the circumstances warrant.

Ballast becomes foul by use and must be either shoveled out by hand and wasted on the adjoining slopes or cleaned by screening. It is customary for many roads to do the latter work by hand, using the old-fashioned screen (somewhat similar to a coal screen). Even at that they are enabled to show savings, principally because of the first cost of the ballast. While there is yet a great opportunity for an inventive genius to reduce costs of this nature there is now on the market a power-operated mechanical ballast screen that greatly decreases this cost over hand labor and conserves the ballast supply, a matter of special importance in certain localities.

A Simplified Analysis of the Railroad Problem*

The Goal Which All Roads Should Strive For and How They Are Failing to Attain It

By Harrington Emerson

I AM PRESENTING a theory which rests on a series of supports. Any one of these supports from the bottom up may be defective. The defects may be serious, in which case the next step should not be taken, or they may be unimportant and we can correct them without changing the higher steps. The theory is that we are striving for safety and that the safety of the whole is greater than the safety of any part.

Newton's first law of motion is: "Action and reaction are equal and opposite."

This is equally true of all industry that "revenues must equal expenses." Over a series of years there should not

world today is: How can railroad revenues be increased so as to cover expenses or how can we decrease expenses so as not to exceed revenues?

The revenues are not wisely levied. They are based on transportation and classification, omitting the ever-growing expenses of collection and of delivery. Terminal expenses increase much faster than population. This is evidenced by the increased number of switching locomotives compared to freight locomotives.

The public does not seem willing to permit the levying of fair rates. The Interborough Rapid Transit Company is an example, limited to a five-cent fare for what costs on lowest valuation nearly seven cents.

It is, however, within the power of railroad executives to lessen both perpetuation and operating expenses. It is pleasanter not to do in the present, even if it means ultimate ruin. The objections to reduction of expenses are not physical—they are psychological. They are of the nature of ex-President Wilson's plea when the Germans shot up our ships and sank visiting ships within sight of our shores, "We are too proud to fight!" Many railroads are too proud or too soft-hearted to reduce expenses.

When discussing this problem with the great president of a very great railroad I said to him, "There is only one reason why you do not operate at 60 per cent and that is because you do not want to."

He immediately gave me six excellent and valid reasons why he did not want to and not one of the six was a physical reason, and each one of the six was a psychological reason. Psychological reasons are the strongest reasons in all the world and the problem becomes one of changing the psychology of all concerned in order that the much easier physical changes may be made.

If revenues can not be increased, expenses can be lowered and in order to lower expenses with a minimum of antagonism and of delay, it becomes necessary to analyze expenses.

Operating and Perpetuation Expense

Railroads expenses are separated into those that perpetuate the railroads and those that operate the railroads. This can be better understood by considering the expenses of the little cousin of the railroads, the automobile. Any one who owns an automobile knows that certain expenses go on even if the automobile is in storage. These are the expenses I call perpetuation expenses. They are taxes, exactions, rentals, insurance, incollectible revenues, interest on debts, which have to be paid during the year in cash. There are six other classes of perpetuation expenses—the four shrink items, unpaid betterments and dividends—all of which can be deferred beyond the year. Operating expenses I limit to personnel and to materials for both operation and maintenance.

What is the relative proportion of perpetuation expenses and of operating expenses? They should be about 40 per cent and 60 per cent (respectively of gross revenues).

\$1,000 Gross for Each \$2,500 Invested

Let us take a newly projected road. The first question to ask is the projective volume of revenues. On the basis of the revenues how much can we afford to put into the railroad? Public opinion has something to say about it. I

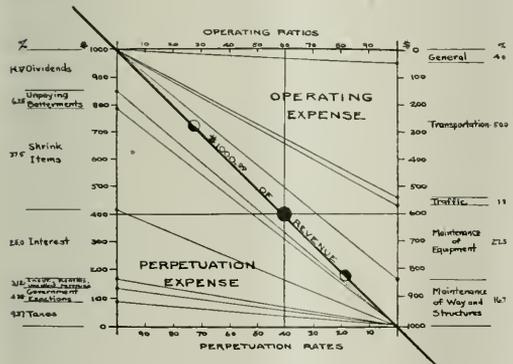


Chart I—Apportionment of Operating and Perpetuation Expenses

be any deficit nor any surplus. For all the railroads of the United States there was in 1921 a very large deficit and there was a greater deficit in 1920.

As far back as we go there has always been a deficit. Hitherto this deficit has been made up (1) by capitalizing

	1920	1921
Investment in billions	\$18.6	\$18.6
	Per cent	Per cent
Perpetuation ratio (to gross income)	47.8	53.5
Perpetuation ratio (to total expense)	34.8	40.5
Operating ratio (to gross income)	89.6	78.6
Operating ratio (to total expense)	65.2	59.5
Expenses to revenue 100	137.4	132.1
Revenues in billions	\$6.22	\$5.56
Perpetuation and operation	\$8.55	\$7.35
Deficit in billions	\$2.33	\$1.79

either perpetuation expenses or operating expenses or both, (2) by foreclosures and cancellations, (3) by assessments (4) by reduced dividends, (5) by deferred replacements, (6) by deferred depreciation, (7) by deferred obsolescence, or (8) in operating expenses by deferred maintenance.

As far back as we go there was always a deficit. The American people have always had their railroad transportation at less than cost. There have been other deficits caused by dishonesty. The question before the railroad

*From an address delivered before the New York Railroad Club on April 21, 1922.

assume that it would be difficult to get by with less than \$2,500 invested for each \$1,000 of gross revenues.

When we sum up the 12 different kinds of perpetuation expenses we find that they amount closely to \$160 for each \$1,000, (of gross revenue) or to \$400 yearly for an investment of \$2,500. This would leave only \$600 for operation. If you can whittle down your investment below \$2,500 you can get by with less than \$400 and there is more left for operation.

**Perpetuation Expense 16 Per Cent of Investment,
40 Per Cent of Revenue**

In order to have all the funds possible for operation, we should keep investment below \$2,500 and we should keep

The combination of rising perpetuation expenses and rising operating expenses, in spite of greatly increased revenues, has cost and will cost the United States railroads four billion dollars for the service of 1921.

Who received the unwarranted benefit? Partly the past and present rate payers and partly the wage and salary earners. Materials also cost too much, but the ratio to wages has remained constant. How can the recurring deficits be wiped out? By further rate increases of 30 to 35 per cent, which would suffice if tonnage and passenger miles kept up—of which I see scant prospect; or, by decreases in expenses—25 per cent in perpetuation expenses and also 25 per cent in operating expenses.

As I see it, if railroads are to live they must not have a

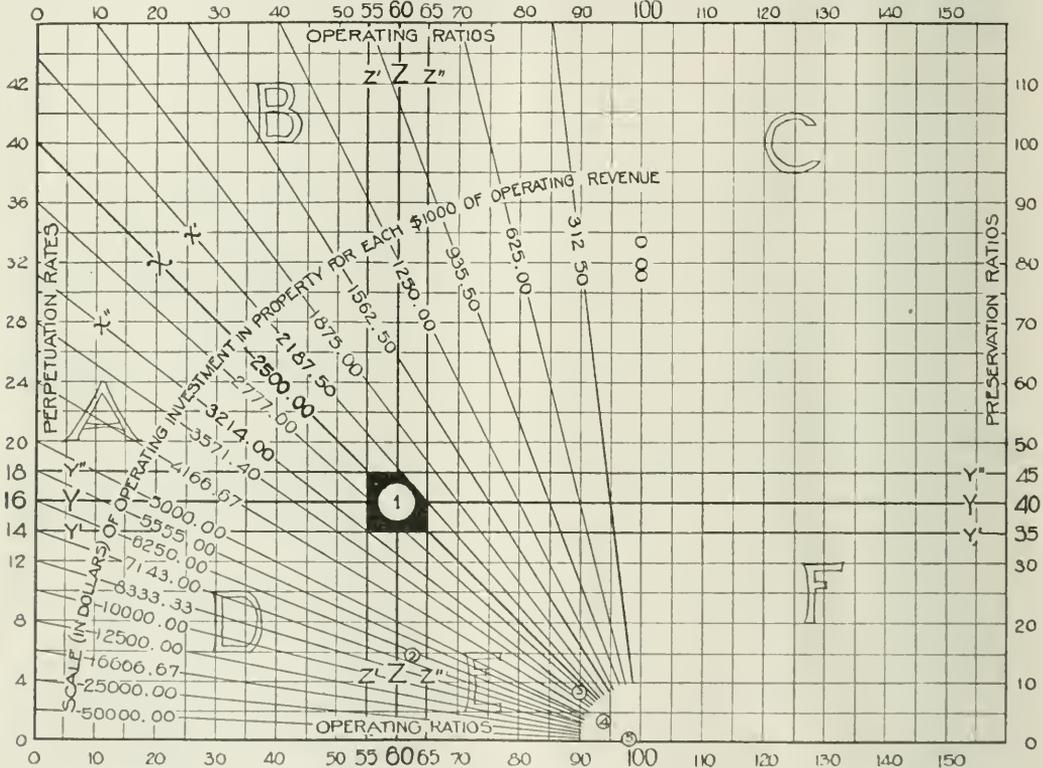


Chart II—The Target at Which Railroads Should Aim

- (1) The Goal the Railroads Should Attain. (2) U. S. Railroads in 1901. (3) U. S. Railroads in 1920. (4) Railroads of United Kingdom in 1920.
- (5) National Rys. of Mexico, First Half of 1921.

do the 16 per cent (of investment) ratio. It is difficult to do either.

On a new road the perpetuation rate is very low, can be as low as 8 per cent, but it steadily rises as the road grows older. The perpetuation rate based on physical investment is now about 16 per cent. It would require extraordinarily favorable conditions to be as low as 14 per cent, while an 18 per cent rate would be an evidence of unusually bad conditions. When the rate was down to 8 per cent one could get by with an investment of \$3,500 and an operating ratio of 65 per cent. Or in the days when operating ratios were down to 40 per cent and perpetuation rate at 10 per cent a railroad could carry an investment of \$6,000.

larger investment than two-and-a-half times their average gross revenues, provided they can operate at 60 per cent.

The Subdivision of Expenditures

Chart I, showing apportionment of operating and of perpetuation expenses, shows a graph of great practical value. All the expenses consist of perpetuation expenses and of operating expenses.

In railroad activities the perpetuation expenses are subdivided into 12 groups and there is closely normal percentage of perpetuation expenses for each group. This is not an apportionment of revenues; it is a sub-division of the perpetuation expenses which may be theoretically any part of

the revenues from zero to much more than 100 per cent.

The subdivision of operating expenses in the chart should also be noted. This means that transportation expenses will make up about 50 per cent of the total operating expenses whether they are more than all the revenues, or only 40 per cent of them.

In Chart I, which is separated into two parts by the heavy diagonal line, the perpetuation expenses are grouped on the left and the operating expenses on the right and the lighter lines radiating from the lower right corner enable us to read the normal perpetuation expense for any portion of \$1,000 of revenue; the light lines radiating from the upper left corner enable us to read the normal operating expenses from none up to 100 per cent of revenues, or dollars per \$1,000 of revenue. Operating expenses might be very high, 82 per cent of revenues, as indicated by the lower half-shaded circle. Perpetuation expenses might also be very high, 72 per cent of revenues, as indicated by the upper half-shaded circle. In such a case the total expenses would

annually to 16 per cent of the total operating investment. If the investment is \$6,000 for each \$1,000 of revenues, perpetuation would call for 16 per cent of \$6,000, or \$960, leaving practically nothing for operation. Not more than 40 per cent of revenues can be spared for perpetuation and if investment is \$2,500 and 16 per cent of this is required for preservation it amounts to \$400.

(3) The public will not willingly allow a railroad to operate for less than 60 per cent. The plea is again made that it would be difficult on less to give safe, decent, frequent, convenient and prompt operation. Managers would also agree that it would be difficult to operate as low as 60 per cent.

(4) The actual division between perpetuation and operation for all Class I roads in 1921 was 40.5 and 59.5, even if both summed to far more than actual revenues.

Therefore, all lines of argument agree in placing perpetuation at 40 per cent and operation at 60 per cent of gross revenues.

Assuming these as normal divisions we have \$1,000 of revenues apportioned closely as follows:

PERPETUATION EXPENSES		
Taxes	.....	\$37.50
Exactions	.....	17.50
Insurance, uncollectibles, rentals	.....	12.50
Interest	.....	100.00
Shrink Items:		
Deferred replacements, depreciation, obsolescence, amortization	.....	150.00
Unpaying betterments	.....	25.00
Dividends	.....	57.50
Total perpetuation	.....	\$400.00
OPERATING EXPENSES		
Maintenance of way and structure	.....	100.00
Maintenance of equipment	.....	165.00
Traffic	.....	11.00
Transportation	.....	300.00
General	.....	24.00
Total operation	.....	\$600.00

There is also a standard table of percentage on investment needed for preservation:

	Per cent	Per cent	
Taxes	1.5	Shrink Items	6.
Exactions	7	Unpaying Betterments	1.
Insurance, uncollectibles, rentals	5	Dividends on One-third	2.3
Interest on Two-thirds	4.		16

An unrefutable criticism made is that taxes are not always levied solely on property; they are especially at present often levied on earnings, therefore on operation. In such a case part of the taxes might be considered an item of operating material expense and not of perpetuation, but with equal justification they could be considered an exaction and be placed under that head. Whatever the method adopted it is important that it should be uniform and comparative.

In 1921 the corrected operating ratio was 78.6 and the perpetuation ratio was 53.5. The salvation of the roads, their perpetuation as the property of their owners and their expansion, depends on reducing operation to 60 per cent and reducing perpetuation to 40 per cent, thus eliminating nearly \$1,800,000,000 of loss.

Either the public received too low rates, or wages and salaries absorbed too much. On the basis of present rates this excessive absorption of revenues in personnel and material expenditures has nothing whatever to do with the question of living wage.

The Railroad "Bull's Eye"

Chart II is in the form of a target. From the intersection of the zero line of perpetuation and the 100 per cent line of operation radiate the investments for each \$1,000 of revenues. The part of the target outside the bull's eye is divided into fields lettered A to F. Field A is forbidden because it is under an operating ratio of 55 per cent. Field B is forbidden for two reasons. It is under an operating ratio of 55 per cent and under an investment of less than \$2,187.50.

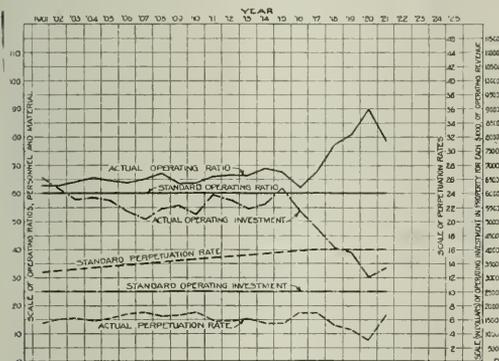


Chart III—Standard and Actual Attainments of Class I Railroads from 1901 to 1921

Standard Operating Ratio for Personnel and Materials, 60 Per Cent. Standard Perpetuation Rate Rises from 12.8 Per Cent in 1901 to 16 Per Cent in 1917. Standard Investment in Property \$2,500 for Each \$1,000 of Operating Revenues.

be 82 + 72 per cent of revenues, a total of 154 per cent, or \$820 for operation and \$720 for perpetuation, a total of \$1,540, registering a loss of \$540 above every \$1,000 of revenues.

On the other hand, in former days as to some new roads, it might have been that operating expenses were only \$280, perpetuation expenses only \$180—a total of \$460, leaving \$440 for surplus. Such conditions often exist in industrial plants or in commercial or producing activities, but never any more in railroads.

For a normal average railroad an approximate proportion of perpetuation expenses is 40 per cent of revenues and the approximate proportion of operating expenses 60 per cent of revenues.

Proportions of Operating and Perpetuation Expense Not Arbitrary

This is not an arbitrary or guessed at division. It rests on four facts, any one of which calls for the same division:

(1) Public opinion will not permit a lower investment in an operating railroad property than about \$2,500 for each \$1,000 of revenues. The plea, with some justification, is that a less investment will not provide adequately for safety, decency, frequency, convenience, promptness.

(2) The sums required for preservation amount closely

Field *C* is forbidden because the investment is less than \$2,187.50 for each \$1,000 of revenues. Field *D* is forbidden because the perpetuation rate is less than 14 per cent and the operating ratio is less than 55 per cent. Field *E* is forbidden because the perpetuation rate is less than 14 per cent. Field *F* is forbidden because the investment is less than \$2,187.50 and the perpetuation rate is less than 14 per cent.

There remains as a safe proposition as a bull's eye, only the irregular bull's eye, bounded by the operating ratios 55 to 65; the perpetuation ratios 14 to 18 and the investment ratios of \$3,214 to \$2,187.50. The advantage of this chart is that we can locate on it the actual condition of any road.

How Actual Conditions Compare With the Bull's Eye

Chart III gives the history of the United States railroads since 1901. There are three standard lines and the three corresponding actual attainments. The three standard lines are operating ratio 60 per cent; perpetuation rate gradually rising from 12.8 per cent in 1901 to 16 per cent in 1917; and standard operating investment of \$2,500 for each \$1,000 of revenues.

The actual operating ratio limped along under 70 per cent until 1916, then took a jump up to 89 per cent, dropping in 1921 to 78.6 per cent. Actual investment, which should not have exceeded \$2,500, was between \$5,000 and \$6,500 until passenger and freight rate increases brought it down to \$3,000 or \$3,500. The actual perpetuation rate which should have been from 12.8 to 16 has been between 3 and 7, and the difference is either already made up by bond and stockholders, or is yet to be made up by them.

Investment ratio should come down to \$2,500. There are some roads as to which this cannot be done. For most of them it is a possibility without strenuous action. The corrected operating ratio in 1921, 78.6 per cent, should come down to 60 per cent. It is a possibility for any road, not now over 80 per cent, if certain operating laws are applied. It can be done without ruction and need excite a minimum of antagonism.

The difficulties in the way of the return of the roads to normalcy, if complying with unescapable financial and operating laws, is not physical, it is psychical.

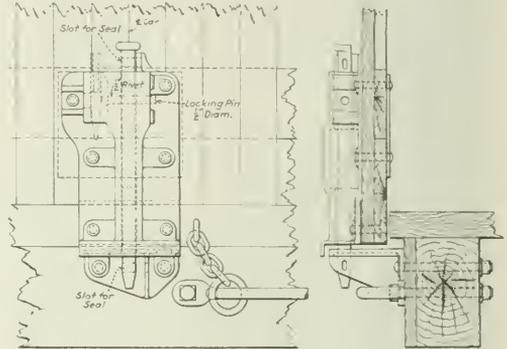
A New Type of Anti-Burglar Car Door Fastener

IMMENSE quantities of valuable freight are constantly being shipped on the railroads with no other protection from theft than a flimsy car seal. Occasionally padlocks are used to secure the doors, but these can usually be pried off with a small bar and offer little additional protection. Considerable losses are sustained from theft of valuable freight. Recently a freight train on an important main line was stopped by bandits who broke into every car and searched it for valuable shipments. It happened that the bandits topped the wrong train and the loss was small, but the incident emphasizes the fact that ordinary methods of securing car doors offer no obstacles to theft. Because of the frequent loss of valuable shipments, some railroads have placed armed guards on trains. Other roads have spiked with heavy nails the doors of cars containing valuable merchandise. If the nails are driven into the head, they cause delay in opening the cars and injury to the door. If allowed to protrude, they are easily removed and offer little resistance.

The Delaware, Lackawanna & Western for some time followed the practice of nailing doors on merchandise cars but because of the inconvenience and expense for repairs, J. C. Fritts, master car builder, designed a type of door lock which provides such effective protection that the railroads now dispense with the service of train riders.

This fixture which is both simple and effective is illustrated in the drawing. It takes the place of locks and handles and does away with the necessity for special opening and closing devices. The usual locking fixtures at the side of the doors are replaced by a special fixture placed at the center of the bottom edge of the door. The door guides and stops at the bottom of the door are eliminated and a short chain attached to a horizontal rod keeps the door from swinging out more than a limited distance.

The principal feature of the door is the bottom door fastening which is shown in detail in one of the drawings. The lock consists of a heavy locking bolt about one inch square working in a housing attached to the car door. The



A Simple Door Fixture Which Has Proved Effective in Preventing Theft

lower end of the locking bolt engages a bracket attached to the side sill and the bolt can be sealed either through the bracket or through a lug at the top of the housing. Near the top of the locking bolt is a 9/16 in. transverse hole which registers with corresponding holes in the housing. When it is desired to lock the door securely a 1/2 in. cold rivet is inserted through the housing and locking bolt. The head may be held in place by inserting a cold chisel, brake shoe key or any piece of iron of about the same size into the lugs on the housing while the opposite end of the rivet is upset with a hammer to prevent its removal. It is then necessary to cut the rivet with a chisel before the door can be opened.

Anyone attempting to remove the rivet would make so much disturbance as to attract attention and if an attempt was made to enter the car at night, it would be necessary to use a light which would betray the presence of the thief.

In addition to the anti-burglar feature, this fixture provides for locking the door in a slightly open position. This is useful for securing ventilation when handling certain commodities and is also a distinct advantage in facilitating checking empty cars in yards.

The chain door stop is advantageous in insuring that the door can be opened readily. In case the door posts are sprung or loads shifted against the door it can be swung out to clear the obstruction, preventing damage which results from forcing doors open.

An important advantage of this fastening is its simplicity and cheapness. It requires but 22 bolts per car while the ordinary fixtures require from 48 to 60. The total cost is considerably less than one-half of the usual type of door fixtures which include guides and corner brackets. Moreover, the whole door mechanism and side of the car are much less expensive to maintain after its application because there is no damage to either door or sheathing in forcing the doors open and closed as is in many instances the case with the ordinary door fixtures.

Joint Commission Reports on Transportation

Recommends Rate Reduction, Regulation of Highway Transport, Car Standardization and Central Control

WASHINGTON, D. C.

RECOMMENDATIONS as to government regulation of railroads to be made to Congress in the report of the Joint Commission of Agricultural Inquiry were outlined in an advance statement by the Chairman of the Commission, Sidney Anderson, who is obtaining publicity for the report by releasing its conclusions in sections.

"Rail transportation," he said, "is now operating under extensive and exacting regulation. The measure of good regulation is the minimum of laws necessary for the protection of the public, since the excessive interference of governmental agencies in the administration of our transportation system under private ownership and competitive operation results in restriction and curtailment of individual initiative and efficient management.

"Business and operating conditions on railroads, like business and operating conditions in other industries, are extremely sensitive to uncertainties and at the same time are often vitally restricted to the public injury by too drastic or too rigid public requirements. The governmental policy, therefore, should be as far as possible definite and permanent permitting at the same time sufficient flexibility of the administration to allow regulation to anticipate and conform to changed economic conditions. The basic legislation controlling transportation rates, facilities, service, security issues, wages and performances should, therefore, seek by definite policy to anticipate future operating conditions."

Regional Offices of I. C. C. Proposed

The commission, therefore, intends to recommend to Congress the establishment of regional offices of the Interstate Commerce Commission, whose duties it shall be to consider and adjudicate questions of regional application, and to co-operate with the state commissions with a view of minimizing conflicts between state and federal regulation as to rates, facilities and practices. In such regional agencies the state utilities commissions should have authoritative representation.

In explanation, the chairman said: "We have found that while a large part of the powers of the commission must be centralized in the capital, the practice of hearing cases in Washington involves great expenditure of time and money on the part of shippers and other interested parties who deem it necessary to come here to present their cases if the proper adjudication is to be had. This practice in general is to the advantage of more highly organized industries maintaining adequate traffic departments and able to pay for the preparation and presentation of cases in Washington, and militate against the adequate consideration of matters of less consequence from the standpoint of national concern but of equal importance to the interested parties. The need of such decentralization, especially in the matter of control of transportation rates, has become more and more apparent as the scope of the Interstate Commerce Commission's authority has been widened and the relation between intrastate and interstate rates more and more a matter of controversy."

This controversy between federal and state regulating authority is regarded by the Joint Commission as one of the important reasons for decentralization of the Interstate Commerce Commission. The report will also recommend that the Interstate Commerce Commission be directed by Congress as a continuing duty, to investigate the development and correlation of the various systems of transportation and their relation to agriculture, industry, trade, and

commerce, and report to the President and the Congress concerning this relation and its improvement.

It will be recommended that the Interstate Commerce Commission be exempted from the bill classifying civilian positions within the District of Columbia and field service and that otherwise due regard be had for the peculiar character of the commission's organization and of the classification and duties of its employees.

"We have found," the chairman said, "that the Interstate Commerce Commission appropriations have not been adequate. In this period of critical relationships between agriculture, industry and transportation, adequate appropriations for the work of the commission are peculiarly necessary. We believe that an agency should be created in the Interstate Commerce Commission to secure and correlate statistical and other information with reference to the related activities of transportation, trade industry and commerce and we shall offer to turn over to the Interstate Commerce Commission the charts and data which we have accumulated in the present inquiry."

The commission will find that wherever possible conflicts between persons, industries or localities and the railroads with respect to rates, facilities and practices should be settled by informal negotiation, thus reducing the necessity of resorting to formal complaint and adjudication before the Interstate Commerce Commission.

Should Give Greater Consideration

to Economic Conditions

"The Joint Commission will also recommend," said the chairman, "that in fixing the level of rates and class and commodity rates the federal and state regulatory bodies give greater consideration to the existing and prospective economic conditions and to the relationships existing between the price level of commodities and the level of transportation rates as well as to the relationship existing between the price of different commodities, the weight of such commodities and the space required for their transportation.

"The several horizontal advances in rates during recent years have in large measure distorted the relationship established by a long period of adjustment resulting from the experience of many years, and the effect of the application of rates upon movement, volume, and maintenance of competitive conditions. There has never been a satisfactory basis of rate adjustment or relationship between different commodities, because there was nowhere a sufficiently comprehensive basis of economic fact from which the relationships of commodity rates to each other could be determined.

"The commission has endeavored to establish as far as its limited time would permit the basic price relations between commodities and between the prices of commodities and freight rates. This basis should be amplified and should be kept up currently by the Interstate Commerce Commission or by some other agency with which it is co-ordinated in such a way as to make the information promptly and comprehensively available."

It has been found by the commission that the provisions of the transportation act with respect to recapture and consolidation have not been operating long enough to afford a basis of experience as to their effectiveness or to indicate how they should be modified. "No system has been or can be devised," the chairman said, "which will produce an identical rate on all railroads. No part of the earnings of

any railroad has so far been recovered by the commission under the recapture provision and the commission has no power to compel the consolidation provided for by the act. We believe, however, that the general plan of consolidation and recapture is sound in principle and in practice and should be given sufficient time for a fair test before an attempt is made to change the law or to provide for compulsory consolidation."

It has been found by the Joint Commission and will be reported that departures from the strict rule prohibiting a higher charge for a shorter haul than for a long haul over the same route in the same direction are necessary to provide for:

- (a) Water competition.
- (b) Market competition.
- (c) Circuitous route.
- (d) Competition as between ports on export and import traffic.
- (e) Competition between weak and strong lines.

"Citing the Wisconsin case, decided February 22, 1922, in which it was held that the Interstate Commerce Commission was authorized to require the general level of rates in a state to be equalized with the general increase in interstate rates," Chairman Anderson said, "we think it probable that no court will ever be able to lay down a rule defining the respective federal and state powers respecting transportation with sufficient exactness to avoid future conflicts in the exercise of their respective powers. The establishment of regional agencies of the Interstate Commerce Commission is in our opinion, a practicable means of securing co-operation between that commission and state authorities in the holding of joint hearings and removing conflicts of authority."

Greater Uniformity Desirable in State Regulation

"The commission will also report," said the chairman, "that greater uniformity is desirable in the requirements of state legislation and state regulatory bodies in regard to the length of trains, the number of men required to man trains of different lengths, and similar requirements affecting operation, which tend to impair the efficiency and operation of railroad systems.

"Efficient operation of steam lines at a minimum cost," the chairman said, "cannot be realized to the fullest extent under requirements as to operation which are different in different states and requires continual changes of operating methods, accentuating costly operating practice with resultant increase in operation expense."

Motor transportation, according to Chairman Anderson, will also figure conspicuously in the report. "Nothing since the advent of the railroads," he said, "has had so marked an economic and sociological effect upon the production life of the country as the motor vehicle. The commission will recommend that Congress continue to promote an adequate program of highway construction and maintenance, directed to the more effective correlation of highway transportation with rail and water transportation. Also that the program of highway construction and maintenance by states and counties be continued under the direction of qualified experts, with particular reference to the construction and maintenance of farm to market roads; that adequate funds should be appropriated for research and regulation of traffic based upon the facts so ascertained. Also that the several states co-operate in effecting a uniform basis for taxing motor trucks and other motor vehicles, which shall fairly represent the proportion of expense of highway construction and maintenance chargeable to such vehicles."

Revenue Return Should Be Sufficient

"The railroads are not self-sustaining and are therefore not on a sound credit basis. If this condition continues transportation service will be crippled, and the country will

suffer accordingly," the report will also find. "We intend to report," said Mr. Anderson, "that the revenue return to the railroads should be sufficient to enable them to sustain the value of their properties put to public use and to obtain the capital required for the expansion and improvement of property, facilities, and service; also that sound railroad finance requires that a larger part of the credit necessary for railway construction be secured by stock issues instead of by bond issues."

"We believe that the transportation facilities of the country must be placed upon a solid foundation. It will not do to make up deficits by appropriations of public funds. The railroad companies must be operated with the expectation that the gross revenues will be sufficient to cover operating expenses and leave a reasonable return upon the investment. It is of paramount importance to the public welfare that the transportation companies be made going concerns; that they be placed upon a substantial foundation in every respect; and that the operating expenses be reduced by careful and efficient management."

Figures in the report will show a progressive deterioration since 1916. In 1918, with an increase in gross revenue of 77.3 per cent over 1911, there was an increase of 109.3 per cent in total operating expenses, and an increase of only 5.8 per cent in the net operating revenue, while the net operating income decreased 11.9 per cent. In 1919 the gross revenue increased 86.9 per cent, but the steady upward trend of costs is reflected in an increase of 131.2 per cent in the total operating expense. The net revenue, therefore, shows a decrease of 12.3 per cent and the net operating income a decrease of 37.2 per cent. In 1920 the situation was still worse. The gross operating revenue shows an increase of 124.5 per cent over 1911, the total operating expense an increase of 206.4 per cent, net operating revenue a decrease of 59.2 per cent, while the net operating income shows a decrease of 97 per cent.

Money Should Not Be Raised Through

Constant Government Aid

In view of the present obligations upon the Congress and the country at large, and as a matter of economic policy, the commission believes that new money for railroad improvement should not be raised through constant government aid. "Our position," Mr. Anderson said, "is that the government should not be called upon to guarantee that the principal of railroad securities is safe and that the interest and dividends thereon will be regularly paid. In the public interest the railroad industry must rest upon its own foundations, and its revenues must be so constructively regulated that their operations will produce enough to pay fair wages, cost of materials, taxes, meet the fixed charges, pay a fair dividend, and leave a margin to attract investors of new capital. In other words, to obtain new railroad capital, the opportunities to earn and pay regular dividends must exist, and railroad managements must be encouraged to exercise the greatest initiative in improving and extending transportation facilities. Furthermore, conditions should be created whereby the sale of capital stock by the principal roads will become possible and the continued increase in funded debt will be minimized."

The report will also show that in the last few years most railroads have done little financing through the sale of stock, but have raised money through the sale of bonds or the issuance of other evidence of indebtedness. "This method of financing cannot be indefinitely continued," Mr. Anderson said. "When the investor thinks that too large a percentage of the value of the property of a given company is represented by debt and not enough by stock, he will decline to buy further bonds of that company, or if he takes them it will be only at an unduly high interest rate. Stock, being junior to debt and having no lien on the property or equip-

ment, naturally must bring a larger return in order to be attractive."

Taxes Increased 175.7 Per Cent Since 1911

Attention will be called by the report to the tax burden of the railroads. In 1911, railroad taxes amounted to \$98,026,848. In 1913 this had increased to \$118,386,859, of which \$113,660,997 was paid as state taxes and \$4,725,862 as federal taxes. In 1920 state taxes had risen to \$223,291,201, and federal taxes to \$48,619,308, a total of \$271,910,509, or an increase of 175.7 per cent over the total for the year 1911.

"New and varied forms of taxation are constantly being levied," said Mr. Anderson. "Some of them are intended to reach railroads to the exclusion of other forms of business. Railroads should, of course, pay a proper amount of taxes, but it should be remembered that whatever they pay is passed on to the public through rates.

"The capital fund of the country loaned by the investors and the banks is the surplus derived from the enterprise, thrift, and sacrifices of all hard-working, prudent citizens and conservatively managed corporations, and is a species of general reservoir from which all forms of industry must draw. It is important to the agricultural industry, which depends on that reservoir in the same way as the railroad industry, that the rate of interest should not be unduly raised to the railways because of reduced net earnings or because of large issues of tax-free securities. If the interest rate to the railways rises, the interest rate to the farmer will also increase, for the capital market is on a competitive basis, and what affects the interest rate for one industry affects the rate for all industries.

"The Joint Commission has, therefore, concluded that the issue of tax-free securities and large expenditures for non-productive purposes by the federal, state, and municipal governments be reduced to the smallest possible limits, so that taxation can be reduced and capital funds be allowed to increase for the use at fair interest rates by agriculture, industry, and the railroads, and thereby help to promote prosperity."

Another recommendation regarding management will be that the railroads establish regional traffic executives, and organize public relations departments, to bring about closer contact and a better understanding between themselves and the public.

Private Management More Efficient

The Joint Commission has agreed that the period of federal control was too short and the conditions then and since too abnormal to permit of a sound comparison of efficiency between government and private operation. "However," said the chairman, "an examination of the operation of government-owned railroads in foreign countries during the post war period affords some basis for estimating the relative efficiency of private management in this country and government management in foreign countries in meeting the dislocations and abnormal conditions which followed the war period. It may be said that, measured by the relative performance and cost of service, private management in this country shows greater efficiency than governmental management."

The Joint Commission will report that the increase in efficiency of transportation is shown by the fact that in 1890 for every \$100 investment in property 98.3 tons of freight were carried one mile and 163 passengers carried one mile; whereas in 1920 for every \$100 investment in property, 2,085 tons of freight were carried one mile and 239 passengers were carried one mile, an increase of 112 per cent in freight and 57 per cent in passenger traffic for each \$100 of property investment. Property investment has increased 185.82 per cent, the tons carried one mile 442.83

per cent, and the passengers carried one mile 300 per cent, in the same period.

Standardization of Cars Recommended

Complete standardization of freight cars and central control of distribution of all classes of freight cars will also be recommended to Congress in the forthcoming report as among the remedies for the constantly recurring car shortage evil.

In outlining this part of the report, Chairman Anderson said: "We have found that the number of locomotives operating and owned by some railroads is inadequate to meet the need during business activity and it should be augmented; that the supply of box cars, coal cars, stocks cars, and refrigerator cars is inadequate to meet the demand during normal periods of activity and should be rapidly augmented.

"If the carriers do not supply sufficient equipment to reasonably meet the demands, an artificial situation economically unsound is created. Failure to supply cars in adequate numbers during any considerable period usually results in an inflation of prices. The commission is of the opinion that a sufficient number of cars should be added to the supply to meet the demand for cars wherever ordered and in whatever quantity they may be required.

"The commission has therefore concluded to recommend to Congress complete standardization of all freight car equipment except with respect to cubical and weight carrying capacity in order to reduce initial cost, reduce the number of necessary repair parts, facilitate the repair of cars, to make possible economies in maintenance of freight equipment and to reduce unnecessary empty car mileage."

The report will show that the number of freight cars owned and operated by the railroads has increased 6.7 per cent over 1911. The aggregate capacity has increased 18.2 per cent and the net ton mileage for 1920 showed an increase of 62.4 per cent over 1911, the traffic handled during 1920 being greater than any previous year.

Central Control and Distribution of Freight Cars

The commission, according to the chairman, will recommend to Congress as a further remedy for car shortage, prompt consideration and adoption of a comprehensive plan for central control and distribution of freight cars: (a) To meet currently and in full the requirements of shippers in each and every section of the country, (b) To eliminate all empty-car mileage except that made necessary to protect originating territory, (c) To meet demands in originating territory currently by balancing movement of loaded and empty cars.

"When the volume of shipments of a commodity in strong demand is restricted by car shortage," said Mr. Anderson, "a stiffening of prices results, and when the restriction is removed by an ample supply of cars the market at once reacts. During each period of general car shortage it is found that in some portion of the country carriers report a surplus of equipment; conversely, during periods of largest car surplus a car shortage exists on lines of certain carriers and in certain districts. More efficient handling of equipment and the construction of additional equipment to the extent required to prevent car shortage will make action by governmental authority unnecessary.

"It is, however, clearly apparent that with respect to freight car control and distribution, and the co-ordination and unification of terminal facilities, the carriers have not progressed. In fact, there is a strong tendency toward reaction in this important matter, and unless prompt and adequate action is taken emergency conditions with all of the attendant harassments to business will certainly result."

The commission has convinced itself that in so far as adequate car supply is concerned all lines of transportation must be placed upon the same basis. "It will not do," the chairman said, "to take cars away from stronger lines and

turn them over to weaker lines, thus depriving shippers served by the stronger lines of the service which they could reasonably expect for the benefit of less fortunate shippers served by the weaker lines. This is a problem which must be considered in its nation-wide application. Some plan should be devised which will aid the weaker lines by enabling them to purchase and properly maintain sufficient equipment to supply the present reasonable needs of shippers, together with a margin to meet a normal development of business activity."

The commission has found that the American Railway Association, whose Car Service Division is empowered to order relocation of equipment between railroads, is not fitted to prevent emergency conditions and that any plan which may be adopted for the handling of equipment must contemplate current relocation of empty cars. It believes that no railroad or district should be permitted to become short of equipment before steps are taken to meet the situation.

"It might be," the chairman said, "that the only effective plan will be the pooling of equipment under a central control having sufficient power to require railroads to immediately execute any orders given. We feel certain that whatever plan is adopted, it must be based upon the premise that each individual shipper, each group of shippers, each of the several producing or originating districts throughout the country must be fully supplied with freight equipment at all times."

Refrigerator Car Supply

Discussing the dependence of shippers of fruits and vegetables and other perishables upon the refrigerator car supply, which has been found to be now seriously inadequate, Mr. Anderson said that the commission would recommend the following definite plan for improvement:

(a) Extensive and prompt additions to present refrigerator car equipment by each carrier in accordance with its needs or extension of the equipment and activities of private-line car companies handling fruits and vegetables.

(b) A central control of refrigerator-car supply.

(c) Progressive retirement of the older and inefficient equipment.

(d) Co-ordinated investigation by the United States Department of Agriculture, Interstate Commerce Commission, shippers, and the carriers.

It is intended by this plan to bring about the following results: Improved methods of harvesting, packing, handling, storing, and refrigeration in transit; development of a more efficient protective service against cold; co-operation between shippers and carriers; reduction of peak movement by adding to storage facilities when such additions are practicable and by such other methods as may be advisable and practicable; prompt loading and unloading and elimination of unnecessary delays in transportation; utilization of equipment to safe carrying capacity, securing maximum service.

Unification of Facilities

The commission will definitely recommend to Congress the unification and joint operation of facilities at terminals wherever such unification and joint operation will result in economy and better service. Since March 1, 1920, these unifications of terminal facilities and joint operation at terminals have been in large part abandoned. The chairman commented: "Many railroads do not desire to join with other railroads in the common use of terminals and their joint operation feeling that they will thereby lose some of their competitive advantages. We have found, however, that where consolidations have been made large sums of money are saved annually in operating expenses, with the added advantage of making possible the handling of a larger volume of traffic without additional expenditures for new tracks and other facilities."

The commission believes that the carriers should carry

out the spirit of the law and effect these consolidations wherever possible and it will recommend that the Interstate Commerce Commission investigate and point out to the carriers such consolidations as may be feasible.

Further recommendations to Congress will be made as follows:

That the railroad and shippers co-operate to secure the full utilization of the carrying capacity of cars wherever possible; that permanent joint railroad and shippers' committees, be organized to carry on a nation-wide campaign to reduce loss and damage to goods in transit; that freight-revenue divisions should be promptly revised to the basis of two-figure percentages; that regional clearing houses be established for the current settlement of debits and credits growing out of rate divisions; that the railroads should adopt universal through way-billing of interline freight; that the railroads maintain complete cost data covering each item of expense with particular reference to the maintenance of equipment; that the railroads adopt better systems for checking the extent and value of repairs to equipment when made by lines other than the line owning the car.

Labor Board Censures the Interstate

PUBLIC CENSURE—the most drastic sentence the Labor Board can impose—was recently invoked against the Interstate Railway. Some time ago a switchman and a fireman were dismissed by the carrier, according to the Labor Board's summary of the case, because "in response to the request of the chief executive of their organization, they had furnished certain information relative to the status of wage questions on that line, the chief executive having been previously asked for this information by the Labor Board."

"It appeared," the Labor Board's decision continues, "that the officials of the carrier obtained a copy of the message sent by these employees and thereupon called them to the offices of the carrier and informed them that Mr. Miller, president of the road, had ordered their discharge. On the following day the employees were again called to the office and an endeavor was made by the officers of the company to secure from them a pledge that they would not in the future take up any similar questions with the executives of their organizations. The men declined to make such promises and were thereupon discharged from the service.

"The carrier refused to appear before the board at the subsequent hearing and in a letter said 'we do not deal with our employees through representatives of labor organizations.'"

The board subsequently ordered the employees restored to service and compensated for the time lost. Later the board instituted proceedings under Section 313 of the Transportation Act and, as a result, rendered its decision.

In this proceeding the carrier again refused to appear before the Labor Board, and in a letter from its attorney, J. F. Bullitt, Philadelphia, made the following statement: "I beg to state that the Interstate Railroad Company is of the opinion that the Labor Board has only advisory powers in matters of this kind."

The question thus presented in this case is a most important one. Here is a carrier which arbitrarily and unfairly denies to its employees the simple right to perform their duties as members of their organizations, which is equivalent to a denial of their right to become members of such organizations. This action is taken in the teeth of the Transportation act passed by the Congress of the United States which expressly recognizes the right of employees to organize and to function as organizations.

The fact that this carrier is a small road down in the Virginia mountains makes its conduct none the less reprehensible. It connects with other carriers and the irritating effect of its disregard for the rights of its men and for the authority of the law extends to employees on other roads.

The Railroad Labor Board therefore decides that the Interstate Railroad Company and its responsible officials have violated Decision No. 528 of the Board as hereinbefore indicated.



Cedar Hill Yard of the New York, New Haven & Hartford

New Haven Should Soon Realize on Improvements

Result of New England Divisions Case an Important Factor—
Changed Methods of Operation

THE NEW YORK, NEW HAVEN & HARTFORD has realized only partly as yet on the extensive program of rehabilitation which it began a few years ago and which was substantially completed in 1920. Like other roads it has suffered in a general way from the many special circumstances of federal control, and to the increased costs during and following the war. Increased costs hit the New England carriers more severely than they did the railroads as a whole (as we have heard from the arguments in the New England divisions case). The factor of increased costs was intensified because of the large proportion of terminal expense, by the fuel costs and by the large per diem debit balances which now result, the New Haven contends, from the basis on which payments are made for cars at a rate relatively high for all days, both moving and standing, in comparison with relatively low mileage rates when the car was moving only, as was the case when the basis of divisions were established quite a number of years ago.

Any analysis of the New England railroad problem must take into consideration the fact that the New England carriers have several problems which are distinctly their own. These include the factors of terminal expense, fuel costs and per diem already mentioned and, in general, the fact that the New England lines are terminal carriers, which facts, of course, are not new to those who have followed the discussion which has taken place in connection with the matter of increased divisions.

The New England lines have an extremely high proportion of passenger business. This is the case with the New Haven in particular, for its revenues from passenger service actually exceed 50 per cent of its total operating receipts, and this proportion has been gradually increasing over a term of years.

The New Haven showed, in the New England divisions case, that it had a lower operating ratio in connection with its passenger than it did with its freight business, which is brought about by a density of travel. It is a question whether this argument will appeal particularly to western railroad men, some of whom are inclined

to pride themselves on the fact that because their passenger business is of small proportions, they are able to operate their freight service with considerably greater facility; but when the unusually large mileage of double, third and fourth tracks of the New Haven is taken under consideration, together with its splendid equipment of interlocking and block signals, the ability of the New Haven to now handle both freight and passenger to advantage, is realized.

At present, discussions of the New Haven resolve themselves into analyses of the effects of the pending New England divisions case (the Interstate Commerce Commission's decision in which is now threatened to be held up by injunction proceedings), or else the analyses devote a great deal of attention to the New Haven's financial structure which, when all is said and done, is a very serious problem. The result has been that a comparatively small amount of attention has been given to the large amount of work which the New Haven has been carrying on over a period of years to make it a more modern railroad and a more efficient freight carrying facility.

The New Haven, of course, has some main routes of extremely high traffic density, combined with which it has an extremely large proportion of branch line mileage, most of which is carrying a small traffic, but in nearly every case, sufficient traffic, so that abandonment would be entirely out of the question.

The density of traffic of the main lines is made particularly heavy because of the large proportion of fast passenger business. In former years the railroad had an entirely different scheme of freight operation than that which it has worked out more recently. The change which has taken place has given the railroad more modern operating methods and a brief analysis of what has been done may be of interest.

Improvement Program Begun in 1916

The rehabilitation program, if such is not too strong a term, was begun, in reality, in 1916. It included the acquisition of a larger power, the building, extension or remodeling of engine terminals, including the building and equipping

of more adequate shops in connection therewith, to take care of this power while in service. Large sums were spent on bridges as, for example, on the \$2,500,000 project over the Thames river at New London. Considerable was done in the way of extending and constructing new passing tracks at different points.

The projects which have probably received the most attention are the Cedar Hill yard near New Haven, which is to have an ultimate capacity for receiving, classifying and forwarding about 5,000 cars per day, the Northrup Avenue yard at Providence, R. I., which is to have a similar capacity of about 2,500 cars per day. New freight transfer facilities, improvement in freight house facilities and operation, etc., were also included.

The Use of Larger Power

One of the most distinctive changes in the method of operation which was made by the New Haven is in connection with motive power. Prior to the spring of 1916, the larger part of the New Haven freight traffic was handled by saturated steam engines of the K-1 or Mogul type, these locomotives having a tractive effort of 30,200 lb. The change which has taken place since that time can be best realized when it is pointed out that many of these locomotives today are in suburban service out of South Station, Boston, where they are handling local trains of 10 wooden cars and are considered capable of a speed of 50 miles an hour. There were also in service prior to the spring of 1916, 15 Consolidation locomotives with a tractive effort of 44,800 lb., and Pacific of 37,000 lb. traffic effort were also occasionally used.

More recently the New Haven has secured a considerable number of Mikado, Mountain and Santa Fe type locomotives. In other words, whereas prior to 1916 it was entirely a small engine road, today it has adopted more modern methods of heavy train loading for its lines of large volume and has put itself more or less in the van of progress. Much of the side line, branch, and local service, is handled by what were the former heavy engines, that have been released by the new power.

The larger part of the New Haven's freight traffic on the New York Division is moved west of New Haven with electric engines. From New Haven, or Cedar Hill yard, to Providence or Boston, Mountain type locomotives are in service.

These have a tractive effort of 53,900 lb., and in summer are rated at 3,500 tons. Mikados of 58,372 lb. tractive effort are being used in the service to Bay Ridge over the New York Connecting Railway, the electrification of which is planned but not yet completed.

Between Hartford and Boston, New Haven and Northampton and on various lines of similar character, the power consists of Mikados of 45,535 lb. tractive effort. The Santa Fe type locomotives were secured in 1918. They are 50 in number, have a tractive effort of 72,000 lb. and are operated on the New Haven-Central New England route over the Poughkeepsie bridge route between New Haven and Maybrook and between Waterbury and Maybrook. These figures are given in detail because not a great deal has been said about the New Haven's motive power or about the important change which has been taking place under the guiding hand of President F. J. Pearson.

Engine Houses

A great deal might be said about the changes in engine house facilities which have taken place in connection with the acquisition of the larger power. The projects have been extensive. They have included the construction, extension, or modernization through the installation of more efficient equipment of engine houses at Cedar Hill, Midway, Providence, Boston, East Hartford, Waterbury, Danville, Maybrook etc.

Some of the Results

President Pearson in the annual report gives some interesting details concerning the improved results affected through the changes which have been made. "The property," he says, "now possesses a marked increase in capacity. The main arteries of heavy traffic eastward from New York and Maybrook, the Shore Line, and the other more important lines, are now adequate for the demands of the increased all-rail transportation which has been crowding these routes for many years. Congestion has been eliminated, through runs have been substituted for short runs, the movement of freight both carload and less-than-carload has been expedited, and the service as a whole in quantity and character has been



Photo by Kadel & Herbert

One of the Two Motor Cars Used by the New Haven in Branch Line Service

improved. The management confidently states that with reasonable promptness in loading and unloading on the part of the public, the requirements of southern New England for transportation will be met, not only in larger volume than is now moving but in a volume exceeding that of war times."

1921 and 1915 Compared

President Pearson also points out that the total ton-miles in 1921 were 10.20 per cent greater than in 1915, which traffic was handled with a reduction under 1915 of 21.15 per cent in freight train miles and 22.90 per cent in freight switching miles. A great deal more might be said concerning the actual details of the improvement which has taken place but this will require a more extensive treatment than space permits at this time. Enough has been said, it is believed, to bring out that the manner in which the New Haven is operated today is very much different from that in which it was operated before the extensive improvement program was begun.

These facts have great importance and must be taken into consideration in any analysis that is made of New Haven operations.

It is hardly necessary to enlarge considerably upon the peculiar traffic considerations with which the New Haven is confronted. These details were given considerably in detail in the New England divisions case and it is believed that readers of the *Railway Age* are familiar with the large proportion of passenger business, similarly the large proportion of manufactured products, the amount of l.c.l. and local traffic, the difficulties occasioned by the terminal character of the business, the short haul and other such factors. The amount of attention which has had to be given the situation because of the New England divisions case is an indication that the New Haven's problem is not a simple one. Because of the injunction proceedings brought to restrain the Interstate Commerce Commission's decision in favor of the New

England lines from becoming effective the case still remains to be decided. The decision naturally, in view of the amounts involved, will have a far-reaching effect upon the New Haven's operating and financial results.

A Deficit of \$14,121,623 in 1921

The New York, New Haven & Hartford Railroad in 1921 had a net corporate deficit of \$14,121,623. This looks extremely serious and is made all the more serious when it is realized that this deficit was \$9,500,117 greater than in 1920. The operating results of the road, however, did not reflect a drop quite as severe as is shown in the corporate income account because, of course, in 1920 the road was able to count on standard return for two months and the guaranty for six, which it was not able to count on in 1921. The actual figures of earnings and expenses as indicated by the figure of net after rentals show a very decided improvement which is quite a contrast with the result indicated by the corporate deficit. The net after rentals for the year, as reported in the December statement to the Interstate Commerce Commission, was \$740,034. This is very different from the standard of earnings (the New Haven's standard return was about \$17,000,000) prior to federal control, but it was a marked improvement over 1920, for in that year there was a deficit after rentals of \$12,575,137. There has been a marked improvement in recent months. The operating ratio in 1921 was 91.41. In 1920 the operating ratio was over 100. In November, 1921, the ratio was brought down to 77 per cent. The figures for the first two months of 1922 show a ratio of 80.40 per cent.

The New Haven did not have the great boom in traffic

in 1920 which many other railroads had, so any comparisons between 1921 and 1920 must be made with that in mind. However, the freight revenues for 1921 totaled \$53,593,929, a decrease of but 3.17 per cent from 1920. The decrease in revenue ton-miles was 11.23 per cent. Passenger revenues totaled \$50,934,294, a decrease of 2.56 per cent from the preceding year. The total operating revenues were \$116,405,232, which amounted to \$7,107,077 or 5.75 per cent less than in 1920. As compared with this decrease of about \$7,000,000 in operating revenues, there was a decrease of \$19,944,089 in operating expenses, the operating expenses for the year being \$106,402,295. Maintenance-of-way expenses were decreased 15.97 per cent, maintenance of equipment, 24.64 per cent and transportation, 19.19 per cent.

These changes tell us the familiar story of drastic economy which took place on all of the railroads in the country. It should be noted, however, that the New Haven's reductions in maintenance of equipment were rather severe and that the percentage of bad-order cars and unserviceable locomotives at the present time is high and very much above the average for all of the railroads of the country. The New Haven's percentage of bad-order cars on March 15, 1922, the latest available figure, was 26.5 per cent as compared with the country's average of 14.5 per cent. The percentage of unserviceable locomotives on the same date was 24.0 per cent, as against the country's average of 20.2 per cent.

At the close of 1921 the total number of employees on the railroad was 29,835, or 7,347 less than at the close of the preceding year. The wages paid during the year totaled \$59,305,824, a decrease of \$19,193,328 or 24.43 per cent as compared with the preceding year.

Pennsylvania Wins Verdict Against Labor Board

Court Sustains Carrier's Position and Upholds Constitutionality of Transportation Act

THE RAILROAD LABOR BOARD exceeded its authority in specifying the manner in which employees' representatives should be elected on the Pennsylvania Railroad and the manner in which conferences on rules and working conditions should be held, according to a decision by Judge George T. Page, of the United States District Court at Chicago. The ruling was made in the legal dispute between the Pennsylvania and the Labor Board, as a result of the motion of the latter to dismiss the temporary injunction issued to the carrier some time ago and restraining the board from publishing a decision which the carrier believed would be detrimental to its interests. Judge Page at the same time upheld the constitutionality of the Transportation Act under which the board was created.

One of the most interesting parts of Judge Page's decision holds that the only power in the Labor Board under Section 301 of the Act, is to hear and decide disputes that are jointly referred to the board by the interested parties.

The case was an outgrowth of an order by the Labor Board directing the Pennsylvania to hold an election of employees' representatives and prescribing the ballots to be used in this election. The railway did not comply with the order, insisting upon its right to deal directly with its employees. When it became apparent that the board was about to hand down a decision censuring the Pennsylvania publicly for its conduct, the carrier obtained a temporary injunction, restraining the board from publishing such a rebuke.

Representatives of the board and several of the members thereof, have publicly stated that if an adverse decision

was rendered in this case, the board would be shorn of all of its power inasmuch as the labor provisions of the Transportation Act contain no penalty clauses, enforcement of the board's decisions being possible only through the pressure of public opinion.

Judge Page's ruling said in part:

Two claims are urged: (1) that the act is unconstitutional if, and in so far as, it attempts to impose compulsory arbitration; (2) that the act gives the Board no right on ex parte submission, nor on its own motion, to do any act under Section 301.

Defendants move to dismiss the bill and urge: (1) that the Labor Board is an administrative arm of the government over which the courts have no jurisdiction; (2) that the Board had the power exercised by it under Decisions 119 and 218.

The Board Is Subject to the Jurisdiction of the Federal Courts

In my opinion the Labor Board is a body corporate, subject to the jurisdiction of the federal courts, and may sue and be sued. This does not mean, however, that the courts have any general authority over the exercise of a discretion vested in an administrative body or officer.

That law (the Adamson law) has been the subject of wide discussion, and it is not necessary to dwell upon it here, except to note that Congress there provided for an eight-hour day, and made other provisions that resulted in the actual raising of the wages of the employees of carriers. The Supreme Court sustained that act (Wilson v. New, 243 U.S. 332). The majority opinion was presented by the Chief Justice. Strong dissenting opinions were written, denying the constitutionality of the act.

Not only because of the diversity of opinion expressed in the New case, but because of its wide public discussion, Congress must have had clearly before it the question as to the conditions

under which it had the right, if at all, to establish machinery by which to compel the compulsory fixing of wages, rules, etc., as between carriers and their employees.

Board Has Authority Only in Disputes Jointly Submitted by Interested Parties

I am of the opinion that when Congress framed and adopted Section 301, it did so with the deliberate intention of imposing, as the plain language of the act indicates, the duty on all carriers and their officers, employees and agents, to exercise every reasonable effort and adopt every available means to avoid any interruption of the business of any carrier growing out of any dispute between the carriers and their employees, and that Congress intended that all such disputes should be considered, and, if possible, decided in conference solely between a carrier and representatives of its employees directly interested in the dispute, and that, as hereinafter noted, the only power given to the Labor Board under that section was to hear and decide a dispute which the conferees provided for in Section 301 were unable to decide, and then only in the event that the parties jointly referred the matter to the Board.

The further conclusion is inevitable that the Labor Board was without power to intervene in any way in the proceedings contemplated by Section 301 preceding a reference to it jointly by the parties, except that the Board might on its own motion suspend the operation of a decision by the parties if it was of the opinion that such decision as to salaries and wages would make a readjustment of the rates of any carrier necessary, and thereupon as soon as practicable affirm or modify such suspended decision (Section 307 b).

It is, in a general way, claimed that the Board has the right to direct or control the method of selecting the representatives of the employees under Section 301 under the provisions of Section 308 (4), which is as follows:

The Labor Board "may make regulations necessary for the efficient execution of the functions vested in it by this title."

The appointment or method of election of conferees under Section 301 not one of the functions delegated to the Board, and therefore, it had not the right to make the regulations provided for in Decision No. 218. I am of the opinion that the purpose of Section 301 was to leave to the carrier and its employees full liberty to get together in their own way.

Section 307 (b) authorizes the intervention of the Labor Board in precisely the same manner as provided in Section 307 (a) for the purpose of deciding "all disputes with respect to the wages or salaries of employees or subordinate officials of carriers, not decided as provided in Section 301."

Decisions of the Labor Board Are Only Advisory

In considering the intent of Congress as to the force of the Labor Board's decision as to other matters than those jointly submitted to them under Section 301, there are two views pressing upon the mind of the court for consideration.

(1) Do the provisions of the act authorize the Labor Board merely to hear, determine and publish in an advisory decision that which in its opinion would be a fair and just wage, or what would be a fair and just solution of disputes involving grievances, rules or working conditions, or:

(2) does the act authorize the Labor Board to make such findings, and to render such decisions and judgments as will make its determination upon those questions final and binding so that a rule, determined to be a fair and reasonable rule by the Board, shall thereafter be a governing rule between the parties, and so that a wage determined to be a fair and reasonable wage shall thereafter be the wage that shall be paid by the carrier and that shall be accepted by the employee, and that may be recovered in the courts?

There is no direct provision in the act that decisions by the Board shall be final and have the binding force of decrees to be performed. Nor is there any provision that that which is determined to be a just and reasonable wage or rule shall thereafter be the wage, or the rule, as between the carrier and its employees and upon which either may maintain an action in the courts. There is no provision for the enforcement of the terms of the decisions, nor any penalties for their violation, except the publication provided for in Section 313, if that may be considered a penalty.

All those matters seem to me to indicate that the decisions are only advisory.

On the other hand, Section 307 (d) provides that: "All decisions of the Labor Board . . . shall establish rates of wages and salaries and standards of working conditions which in the opinion of the Board are just and reasonable."

Nevertheless, I have reached the conclusion that it was the belief of Congress that the results desired by the legislation could be attained through the force of public opinion and that that public opinion would follow the publication made as provided in Sections 307 (c) and 313, and would support the decisions of a Board, composed of men each of whom would have special knowledge of

the difficulties within and the necessities of the group that he was chosen to represent. I am further of the opinion that, acting upon that belief, Congress provided in Section 307 (d) for a wide and searching investigation so that the Board would have before it all the facts necessary to enable it to reach just and reasonable decisions upon every dispute.

The Constitutionality of the Transportation Act

The remaining and of course fundamental, question in this case is whether or not the act is within the constitutional power of Congress to regulate commerce.

Undoubtedly some character of intercourse by transportation is involved in every completed commercial transaction. Boys trading upon the playground or men trading in the market places make and lay the basis for their transactions by discussion or correspondence, but the commercial transaction must somehow, somewhere be completed by delivery. It may be the mere passage of the commodity involved in the trade from the pocket of one by hand to the hand of another, or it may be the carrying across the continent of bulky commodities involving every kind and character of handling and transportation devices and of men engaged in many kinds of employment, but whatever be the character of the transaction, whether it is great or small, the instruments of intercourse and transportation are indispensable elements in every commercial transaction.

The commerce dealt with in the act in question involves the main transportation systems both for passengers and freight for the people of the whole United States. It reaches, touches and carries for every city, village and town and is the instrument by which food, clothing and fuel and every other commodity of commerce is carried for and between the people. There is nothing in existence that could be substituted for it, and it represents the growth of years. If its operation were to be discontinued for even a short space of time the loss and hardships necessarily consequent thereon would be almost incalculable; and if it were discontinued for any considerable length of time the whole fabric of the nation's commerce and the foundations of our manufactures which are the basis of the great growth and development of our country and of our business prosperity, would be almost irretrievably wrecked.

Neither bigness nor emergency can bestow or add to the constitutional power to regulate commerce, and I have set out the matters immediately foregoing for the sole purpose of illustrating the large place which the agreements and disagreements between carriers and their employees occupy in the transportation element of interstate commerce and how inadequate must be the regulation if Congress does not have the power to control such agreements and disagreements.

It is of the fundamentals of a common carrier system that it shall be as efficient as the conditions in business will permit, that it shall be continuous, that it shall give equal service to all of the people upon equal terms, that it shall have fair and reasonable compensation for the services rendered.

I can see no difference in character between those regulatory powers sustained and in operation under the Interstate Commerce Act for more than 40 years and the power to ascertain just and reasonable wages and working conditions as contemplated in Title III of the Transportation Act. If the power to regulate commerce is a power to prescribe rules by which commerce is to be governed, then Congress must have the power to prescribe every regulatory or governing measure necessary to keep the commerce of this country alive and the common carriers going concerns.

If the common carrier system of this country may lawfully be stopped for one hour by the carrier or by the employees, organized or unorganized, not by reason of any necessity in the business of common carrying, but because either party wills it, or through the disagreement of the parties, then it may be stopped for the same reason or for no reason at all for an indefinite time or perpetually, and the constitutional power of Congress would be as impotent and useless as a dead hand upon the ship's rudder in a storm.

In the case of *Wilson v. New*, the constitutionality of the Adamson Act was challenged by some of the dissenting justices upon the ground that it violated the Fifth Amendment, first, because an attempt to fix any wage is in violation of the right of private contract, and second, that the provision in the Adamson Act that only an eight-hours' service by an employee should be given for ten hours' pay was in violation of the inhibition in the constitution against taking property without due process of law. The argument there was that the act, without any investigation on the part of Congress or under its authority as to the conditions of pay and employment in the carrying trade, wrongfully and arbitrarily gave to the employees some \$400,000,000 of the carriers' money. The method that was there asserted to have been an arbitrary exercise of power is not present in this case. The act here, on the contrary, makes very careful provision, as hereinbefore shown, for the selection of a well qualified board, prescribes a wide field of investigation and a careful consideration of every

element involved, to the end that conclusions may and shall be reached by the Labor Board which shall be just and reasonable.

Upon the question of the right to prescribe compulsory arbitration or to fix wages, the majority opinion of the court in the case of *Wilson v. New*, determines that question, supports the power exercised by Congress and consequently sustains the constitutionality of the act.

There is, and can be, no conflict between the Fifth Amendment and the commerce regulation clause of the constitution because whenever men and property enter into and become a part of an interstate common carrier system, they so far lose their private character that they become wholly subject to all reasonable regulatory measures prescribed by Congress.

Members of the Labor Board have declined to comment on Judge Page's decision, the feeling being that the next move is up to the Department of Justice which handled the case for the Board.

Mississippi Supreme Court Upholds Labor Board

Another important court decision, bearing on the authority of the Labor Board and the constitutionality of the labor provisions of the Transportation Act, was handed down recently by the Supreme Court of Mississippi in a case involving a section laborer and the New Orleans Great Northern. In this case the section laborer sued the road for the difference between his rate of pay and the amount due him if a decision of the Labor Board had been applied. The case was appealed to the Supreme Court of Mississippi where it was contended that:

(1) The labor provisions of the Transportation Act, creating the Labor Board, are unconstitutional and in violation of the Fifth Amendment of the Constitution in that they deprive the carrier of its property without due process of law;

(2) That the Labor Board's order of July, 1920, fixing the wages of track laborers is contrary to the Fifth Amendment in that it would deprive the carrier of its property right to contract with its employees for services; and

(3) That the court has no jurisdiction inasmuch as the Transportation Act does not impose any penalty upon or authorize any suit against carriers for failure to obey or comply with any order of the Board and no jurisdiction, power or authority is conferred on any court to render judgment in any suit to enforce any order of the Labor Board.

Referring to the last contention the court's ruling decision said in part:

In our view the act creates a system of compulsory arbitration with notice to the parties and a right to produce evidence, and the finding of the Board in the cases provided for in the act has the effect of an award. The purpose of Congress was to prevent the possibility of tying up the transportation of the country during disputes as has been done heretofore in numerous cases and has been threatened in cases of such magnitude as to seriously jeopardize the business and welfare of the country. The living and business conditions of the great public are dependent upon the carriers for the transportation of the necessaries of life, as well as ordinary articles of utility. The legal effect of the action of the Board is to fix, for the time being, (a temporary period) the wages and salaries of the employees until the parties can agree upon such wages or salaries, or can make other arrangements with other men for the carrying on of the business of the carrier. It has the effect, in our opinion, of giving a right of action against the carrier by the employee or official for the salary so fixed under the provisions of the act if services are performed thereunder, and the courts are open for the enforcement of this obligation. The courts are open to the carriers also. Of course it is within the powers of Congress to fix the conditions upon which suits could be brought, or the courts in which the obligation could be enforced. But Congress having designated no tribunal to take cognizance of the matter, any court having jurisdiction of the parties and subject-matter may enforce the obligation as in the case of any other money obligation or contractual right.

After discussing the constitutionality of the labor provisions of the Transportation Act, the court's ruling says in part:

Congress has been given the power to regulate interstate commerce in broad and comprehensive terms. This power, being

given by the Constitution, is only limited by other provisions of the Constitution. The act in question seems to us to have been drawn under the decision of *Wilson vs. New* (U. S. Supreme Court), in which case the court considered the power of Congress under the Adamson act to legislate with reference to a grave situation, involving, among other things, the right to fix wages and hours for employees, and upheld the power of Congress so to do. The power conferred in the present act to fix wages is not a fixing of wages permanently, but a temporary fixing of wages with full power of the Labor Board to modify its orders as exigencies may arise.

We deem it unnecessary to go into an elaborate discussion of the subject but the power of Congress to regulate interstate commerce has been upheld and applied to many situations, and must, in the nature of things, be sufficient to meet the demands of the age and conditions with which Congress, from time to time, is called to deal. The powers conferred must be brought into exercise in many situations and conditions which the framers of the Constitution did not foresee. When dealing with a power of this kind we must remember that conditions change from age to age. The carriers of the country have been organized into huge transportation systems, employing hundreds of thousands of employees; and labor has been organized into organizations containing many hundreds of thousands and even millions of men. With the growth of commerce the public have become dependent in a large measure throughout the country and a strike or the up of the transportation systems would result in untold suffering and loss to the public.

The power of the government must be capable of meeting these changed conditions and is sufficient when called into power through appropriate legislation to protect commerce and transportation from suspension or interruption. The means by which the object is accomplished must be left to the judgment and discretion of the legislative branch of the government. The act here under review is adapted to this purpose and logically tends to the prevention of the suspension or interruption of interstate commerce.

We do not think the act here under review unconstitutionally abridges the freedom of contract, nor that it deprives the defendant of its property without due process of law. As pointed out in *Wilson vs. New*, and numerous other cases, the fact that a business is affected with the public use makes it different from, and its right of contract also different from, that of ordinary business. This is pointed out clearly in the majority opinion in *Wilson vs. New*; Mr. Justice McReynolds in his dissenting opinion closes his opinion with this language:

"But, considering the doctrine now affirmed by a majority of the court as established, it follows as of course that Congress has power to fix a minimum wage for trainmen; to require compulsory arbitration of labor disputes which may seriously and directly jeopardize the movement of interstate traffic; and to take measures effectively to protect the free flow of such commerce against any combination, whether of operatives, owners, or strangers."

Shopmen Again Threaten to Strike

Another strike threat, involving the members of the railway employees department of the American Federation of Labor, developed April 21, when representatives of these employees, in convention at Chicago, voted to send out strike ballots and took steps to launch a nation-wide strike of shop men.

B. M. Jewell, president of the railway employees department, said in commenting on the proposed strike:

If there is a strike—and I feel sure our men will vote solidly for it—it will be in protest of the action of railways in ignoring decisions of the Labor Board. The carriers have arbitrarily reduced wages, in defiance of the board, have restored the piece work system, and have resorted to the "farming out" system, which is a mere subterfuge by which they dodge labor board rulings.

A year ago our membership voted overwhelmingly in favor of a walkout in protest against the 12 per cent wage reduction already then announced and given effect last July. When the strike date, came, however, we favored peace, because of assurances given by the Labor Board that no further wage reduction would be considered for some time.

But this time, I am sure, the issue will come to a showdown. So far as we are concerned, it is a fight for existence. The precise wording of the strike ballots is yet to be determined, but the question will be: To strike or not to strike? The ballots probably will be sent out within a short time and the results should be known within 60 days.

The roads are dodging the board's rulings by letting out entire shops to contractors technically not within the jurisdiction of the labor board. But they have done not only this, but, in several instances, have pointedly refused to abide by the board's rulings, without so much as resorting to this obvious subterfuge.

The carriers have been "getting away with it" thus far. We

are going to find out whether they can continue to do so. The board, it must be remembered, has no real power to enforce its decisions. It must rely solely upon the influence of public opinion.

It was pointed out by some of the labor leaders that before the employees' strike referendum is completed, the Labor Board will probably hand down its ruling in the present controversy over proposed wage reductions and the coal strike will have reached an acute stage. These factors, together with Judge Page's decision in the Pennsylvania case, it is contended, indicate that trouble is, beyond any reasonable doubt, inevitable.

Hearings in the cases in which certain carriers have been charged with violating orders of the Labor Board by contracting the operation of shops, were held some time ago and later the whole question of the contracting of portions of the carriers' operations was re-opened, the board ordering a further investigation of recent contracts on the Erie. No decision has been rendered in any of these cases, probably because of the absence of Albert Phillips, the board desiring a full vote on this important question. Inasmuch as the board has not ruled in any case involving the contracting of shops or other work, the proposed strike of the shop employees is directed solely at the Labor Board.

It is also reported that the executive committee of the railway employees department has been authorized to arrange for a conference with the Labor Board, in regard to the question of contracting and that if this conference ends unsatisfactorily to the employees, to issue the strike ballot within 60 days after the close of the convention.

Wage Hearings Ended

Hearings before the Labor Board in the controversy over proposed reductions in wages, were completed on April 25, after several days of testimony for and against further cuts in the rates of pay of telegraphers. There were no closing statements by either representatives of the carriers or of the employees. While all of the evidence from the contending parties is now before the board, it is probable that some time will be allowed the National Industrial Traffic League and similar organizations to present their views on the proposed reductions before the case is definitely closed.

Now is the Time to Prepare for Heavier Business*

By Colonel F. G. Robbins,

Director, Bureau of Service, Interstate Commerce
Commission

STATISTICS SHOW that increased population requires increased transportation. There is a relation between the factors of population increase and transportation increase. For example, the population increased 20 per cent from 1890 to 1900 and the net tons moved one mile increased 86 per cent; the population increased 21 per cent from 1900 to 1910, and the net tons increased 80 per cent; the population increased 15.7 per cent from 1910 to 1920 and the net tons increased 61 per cent, which indicates that the two have kept increasing at pretty much the same ratio. In fact, it will be noted that by ten-year periods, the net tons moved one mile increased about four per cent for each one per cent increase in population.

I do not believe there is any doubt but that we are now over the worst of the business slump and that car loadings will increase gradually. We seem to have hit the low point in car movement the first week in January when the average loads moved per railroad per day were 6,300. This has gradually increased until March 12 when 8,800 loads per

day were being moved per railroad. Since then the movement has decreased owing to the coal strike, but excluding coal and coke, car loadings increased 6 per cent in January, 8 per cent in February, and 11.5 per cent in March this year over the same months last year.

Knowing this and also that when the coal strike is out of the way the car loading line will point steadily upward, we can well take stock at this time to make proper preparations to meet the increased transportation demands that will be made at no distant date. We know that during 1920 there were certain points of saturation and that these points were practically all confined to terminals. We know that little, if any, has been added to these facilities. With any increase in car units will come increased congestion and likewise decreased movement, which increases car shortage and simultaneously complaints from shippers become more caustic.

It is well, therefore, at this time, before we are actually in the thick of a congestion of traffic, to make such arrangements as will best promote the handling of the increased business with the least friction when it does come. With cars in bad order and without increased facilities, it is a foregone conclusion that the situation demands intensive and better use of that which we have. Have we developed to the extent that the situation demands proper supervision over each freight car? Does not such supervision begin with the yard clerk in assembling data for the use of transportation officers?

Is it not a fact that during periods of depression, the yard clerk is the first one to be laid off and among the last to be put on when business revives, and is this not usually done when all hands are too busy to see that such men are properly trained, thereby resulting in erroneous, unreliable and inadequate information being furnished transportation officers for the proper handling and distribution of equipment? Have you ever thought how much more supervision is given a passenger car as compared with a freight car?

Another method through which increased mileage can be made and delays decreased is by reducing the duplication of switching of trains at division terminals. This requires a scientific study of the through traffic movement in connection with the local movement and always meets with opposition by division forces. Every so often a campaign is launched on various railroads, but as a rule, it ends when each division begins requiring greater classification on the part of its neighboring division; such back-fire, as a general proposition, stopping the whole investigation. Some day, however, it will be found so necessary that an agency, independent of any division prejudices and limitations will be set up to see that through traffic is so arranged that it will be put in through trains and local traffic confined to local trains. The efficiency of division yards will be measured by the number of main trackers or trains that are put together to go through other terminals without a switch. This practice will increase car movement, decrease congestion, car shortage and loss and damage claims, but it will not be accomplished until divorced from division competition, unless, in the meantime, human nature is completely transformed. One railway executive, when testifying recently before the Interstate Commerce Commission, stated that last year four million dollars was saved on his railroad by reason of this improved method of handling cars alone.

What is being done towards reducing back-hauls at terminals, elimination of light switch engine mileage by joint arrangement with other lines, cutting out the duplication of switching and the establishing of joint interchange inspectors? Now is the time to correct these practices, when business is light, and to establish right habits before business gets heavy and the time is inadequate for the proper training of employees.

*Adapted from a paper read before the annual meeting of the Transporters' Union, American Railway Association, at the Blackstone Hotel, Chicago, April 19.

I. C. C. Consolidation Hearing Postponed

Railroads Not Prepared to Submit Evidence Except by Way of Objections—Will Consider Procedure

WASHINGTON, D. C.

THE HEARING before Commissioner Hall of the Interstate Commerce Commission on April 24 on the commission's tentative plan for the consolidation of railroads was adjourned after a brief session because most of the railroads concerned were not prepared to submit evidence except as to points in the tentative plan to which some of them desired to offer objections or comment. The commission had expected the roads to furnish basic data to make up a record upon which it can formulate a definite consolidation plan. After some discussion it was decided to postpone hearings for approximately 30 days pending the appointment of committees representing the railroads to confer with the commission and formulate a program covering the character of the evidence to be presented by the carriers.

Most of the roads involved were represented by executives or counsel, while many representatives of roads in other parts of the country were present as observers, but those who spoke for individual roads had evidently expected that the tentative plan issued by the commission, based with some alternatives on the report prepared by Prof. W. Z. Ripley, was to be taken as the basis for discussion and that the commission would ask for such information as it desired. Their attitude suggested that they regarded the idea of consolidations as involving an element of trading in which neither a company contemplating the purchase of another line nor a company desiring to sell its property would be expected to reveal too keen an interest in the result, and the discussion indicated some obstacles in the way of making an artificial consolidation plan.

B. B. Cain, vice-president of the American Short Line Railroad Association, pointed out that the tentative plan makes no disposition of the short lines and asked if it was desired that they be heard. Mr. Hall replied that in his opinion it was essential that the short lines give their views as to where they should lodge in the general plan.

Forney Johnston, representing the National Association of Owners of Railroad Securities, asked permission to file a memorandum based on a report of its Board of Economics and Engineering, indicating the character of the basic data which it considered should be supplied by each railroad and without which, according to the association, it is not practicable to attempt to define specific plans for consolidation.

Florida Commission Opposed to Consolidation

J. E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, said he was uncertain as to the extent to which the state commissions will take part in the hearing, but asked that three copies of all exhibits be supplied for their information. He read statements which two commissions had asked him to put into the record. The Department of Public Works of the State of Washington expressed the opinion that any plan of consolidation which does not contemplate through service between the Atlantic and Pacific coasts will not be satisfactory and the Florida railroad commission stated its position as opposed to a consolidation plan on the ground that it believes no good purpose can be served, nor economies brought about by consolidation that will benefit the users of transportation. The merger of the express companies was cited as an example of the "bad effect of consolidation"; as having resulted in a less co-operative spirit toward the public and higher rates. The commission stated that it was just as much opposed to

centralization of railroad management in a few hands as to centralization of railroad regulation at Washington.

When Commissioner Hall asked for expressions relating to System No. 10 of the tentative plan, which includes the Southern and its subsidiaries and the New Orleans Great Northern and Alabama & Vicksburg, L. E. Jeffries, vice-president and general counsel of the Southern, said the company did not desire to offer any evidence, but would like the privilege of offering evidence or a statement in rebuttal if other testimony should make it appear necessary.

When Commissioner Hall said that this would leave a blank in the record he offered to submit any information the commission may desire, but said he had not understood just what form the proceeding would take and had nothing prepared.

Mr. Hall said the commission needs information as to the Southern and while it might dig it out of its own records, this would take a long time and it would prefer to have evidence furnished by the road.

Mr. Jeffries said he did not want to be shown as assenting to or opposing the proposed group, but that it would be groping in the dark to file information without knowing what was desired.

Mr. Hall said the question before the commission is not so much whether the plan is opposed or not, but one of information needed, including facts regarding the company's physical plant, traffic, etc., which would not get into the record unless the company put it there.

Forney Johnston, for the Seaboard Air Line, said, this company had some evidence to present but that time would be saved if its observations on System 10 were to be withheld until after evidence had been submitted as to System 12, which groups the Illinois Central and the Seaboard.

No one appeared for the New Orleans Great Northern, but L. A. Jones, president of the Alabama & Vicksburg, said that although he was not prepared to offer any definite evidence, he wished to oppose the idea of including this road in System 10 because it would break up a system which has always been under one management, including the Vicksburg, Shreveport & Pacific, which lies west of the Mississippi river. This separation he thought would be inadvisable and improper because as the two roads make a system operating both east and west of the river they have some effect in breaking down the "Chinese wall." When Mr. Hall asked if he were prepared to state the facts about his road and its traffic, he said it would be better to have that prepared and furnished later.

Commission Looks to Carriers for Basic Data

When it appeared that no one else desired to speak as to System 10, Commissioner Hall made a brief statement on behalf of the commission pointing out that it is not the inventor of the idea of consolidation but that it is required by statute to formulate a plan and that the carriers should furnish it with information to enable it to act wisely and not unwisely. It desires data as to the physical characteristics and the part each railroad performs in the work of the whole national system and for this information it looks to the carriers of the country who, if anything is to be done under this statute, will have to do it. He said the commission could ask for certain information, but does not know what is available as well as the carriers do and it does not desire to embarrass any carrier by asking for information

that might be involved in any negotiation which may now be under way. He pointed out that the law represents a change of policy as compared with the former restrictions and said the question involved is as to how shall it be permissible for carriers to come together as new entities through the consent and desire of the constituent parts.

Mr. Jones said that after hearing this statement he would furnish the information desired and that he had no intention of combating the commission's work, but he had no previous knowledge of the scope of the hearing. Mr. Hall said that he was not talking to Mr. Jones any more than to any one else, but that there is nothing in the record as to System 10, although the roads placed in that system might be profoundly affected.

E. C. Bailly, secretary of the Carolina, Clinchfield & Ohio, submitted a brief statement saying that as strong reasons exist for putting the Clinchfield in System 10 as in System 11 as proposed by the tentative plan, or in System 12, and he requested that the plan shall permit as an additional alternative that it may be included in System 10. It might also be advisable, he said, to include the road in System 8, the Chesapeake & Ohio, or System 9, the Norfolk & Western, with which roads it has considerable interchange of traffic.

When witnesses were called for as to System 11, including the Atlantic Coast Line and the Louisville & Nashville, George B. Elliott, vice-president and general counsel of the A. C. L., said he was not prepared to submit any evidence nor to protest against the plan nor the policy of the act. The tentative plan, he said, except as to two or three points, seems to be along logical lines.

W. L. Mapother, president of the Louisville & Nashville, said his road had no particular recommendations to make or evidence to present, although it would be glad to supply all available data. He read a brief statement saying that the desirability of further consolidations is very generally admitted, but there are many problems to be solved and difficulties to be overcome. The tentative plan for System 11 has much to commend it, but if it is to be made obligatory its success depends upon the terms and conditions. Any plan of consolidation involves the question of credit and the raising of capital, for which the present is an unpropitious time, because most of the carriers are not in a satisfactory financial condition. A permissive plan of consolidations, he said, is highly desirable as a reversal of the restrictions of the past which have hampered railway development and the Louisville & Nashville desires to offer to assist the commission in its study in any way.

W. R. Cole, president of the Nashville, Chattanooga & St. Louis, said that the proposed placing of this road in a system with the Atlantic Coast Line and the Louisville & Nashville is entirely logical, but he had not understood the scope of the inquiry and was not prepared to offer any evidence.

R. F. & P. Asks to Retain Present Status

Eppa Hunton, Jr., president of the Richmond, Fredericksburg & Potomac, asked that the original recommendations of Prof. Ripley be adhered to and this road be permitted to remain as at present and not be made a part of any system. He outlined the history and described the traffic conditions of the road, which is owned by the State of Virginia, four Southern and two Northern lines, saying that to leave it in its present situation would leave its competition freer and leave the business with the same lines as at present. He said that most of the roads which own its stock are also of the same opinion. The road now represents an absolutely important bridge line between four Southern roads and two Northern roads.

Prof. Ripley asked whether there would be any advantage or disadvantage in making this road a main stem for the Southern lines without any ownership by the Northern lines.

Mr. Hunton said that the professor's original suggestion represents a better plan, because the road is now a main stem in both directions. Prof. Ripley said it had been suggested that if the ownership of this road be confined to lines south of Washington the delimitation of the Southeastern region would be more distinct.

R. V. Fletcher, general solicitor of the Illinois Central, said his company was prepared to go ahead with some information along the lines indicated by Commissioner Hall, whereupon Mr. Hall asked if results could not be obtained by the appointment of a committee representing the railroads or an informal discussion of the record as to the kind of information that would be useful. He said the commission is not requesting anything, but merely obeying the statute and desires the aid of the judgment of the railroads as to what would be of value. Mr. Fletcher then suggested that Mr. Johnston be appointed chairman of a committee and the hearing was adjourned for a time for an informal conference among the representatives of the railroads.

Regional Committees to Meet

In the afternoon Mr. Fletcher reported that the conference had come to the conclusion that it would not be advisable to continue with the hearing at this time since the roads were not prepared but that five or more committees should be appointed to represent the roads in different sections, and that these should form a general or executive committee to meet with the commission and suggest the character of the evidence deemed most useful, etc. A committee representing the Southeastern roads had been appointed at the conference.

Mr. Hall said the plan would be agreeable to the commission and suggested that the hearing should be resumed as near to May 20 as possible, but not before that date, because of other engagements of the commission. He also said it was not proposed to have all the hearings at Washington, but that efforts would be made to arrange an itinerary so that communities affected or any one having a substantial interest might have an opportunity to be heard.

The Southeastern committee appointed consists of counsel for the Southern, Atlantic Coast Line, Louisville & Nashville, Seaboard Air Line, Norfolk Southern, Illinois Central, and a representative of the short lines.

Before adjournment the testimony on behalf of the R. F. & P. was continued. W. D. Duke, general manager, described its method of dividing unrouted traffic between the owner lines. Mason Manghum, representing the Virginia Corporation Commission, and John R. Saunders, attorney general of Virginia, expressed the opposition of the state authorities to a merger of the road with any other because the state owns about one-sixth of the stock of the road and its dividends are placed in a sinking fund to be used to retire bonds issued by the state. They said a merger would jeopardize the state's holdings, would not be necessary or desirable for any purpose of the Transportation Act, and might tend to destroy free competition. Mr. Manghum said the city government of Richmond and the Richmond Chamber of Commerce and other shippers' organizations had gone on record as opposed to consolidating the R. F. & P. with any other road.

Vice-President Elliott of the Atlantic Coast Line said his company had not changed its views since the time when it had practical control of the road, but thought the entire situation would be served better by a joint ownership of a properly equipped road between Richmond and Washington than by two roads between the same points.

Frank Gwathmey, appearing for the trustees of the Flagler estate now operating the Florida East Coast, said they felt they had no authority to present any evidence as to the future disposition of the road because the trust expires next year.

Great Western Suffers from Adverse Conditions

These Include High Joint Facility and Car Rentals. Deficit
in 1921 of \$592,601

THE CHICAGO GREAT WESTERN'S annual report for the year ended December 31, 1921, is to be commended for the frank manner in which the officers of the road admit the difficulties with which that road is at present confronted. The difficulties are evidenced in a deficit after fixed charges of \$592,601. This represents improvement of a sort, because in 1920 the road reported a deficit of \$1,548,375. In 1921 the company had larger freight revenues than in 1920; it made large reductions in expenses but the changes thus made were not sufficient to keep the final figures from being in red. The figure given above for 1921 is after the deduction of \$480,000, representing interest on the bonds of the Mason City & Fort Dodge accrued but not paid.

The Chicago Great Western's major difficulties are apparently three in number. One is a large per diem balance. Another is the large sums paid in rentals for joint facilities. The third results, according to President Felton, from the rerouting of traffic during the federal control period whereby the Great Western was deprived of lucrative traffic built up over a long term of years and which traffic it has thus far been unable to regain in its entirety. Increased wages and material costs are not numbered in the three factors given because they apply to all roads.

Rentals

The following quotation from President Felton's remarks in the annual report is characterized by its clean-cut statements and frank manner of expressing the situation as to rentals:

"Among the causes contributing to the deficit this year are the high wages and the heavy charges for equipment rents and payment for joint facilities. Reference is made hereinafter to the high wages and equipment rents. As to joint facilities: It is well-known your corporation uses the properties of other companies for entrance into Chicago, Minneapolis, Des Moines, Kansas City and Omaha. The rentals of these properties are constantly increasing and your company is obliged to pay them. The total net rents paid during the past year was \$792,496. This is equal to 4 per cent on approximately \$20,000,000; an amount only a little short of the bonds outstanding on the entire Great Western road. In other words, the company is required to pay for the use of about 85 miles of other companies' tracks and terminals an amount almost equal to the interest on the entire issue of Great Western bonds representing 1,035 miles of road. Thus it becomes plain why the Great Western road cannot make a more favorable showing."

The Great Western's freight revenues in 1921 totaled \$17,522,200, the largest in the company's history and 9.58 per cent in excess of 1920. The reason was the increased rates which applied during the year, the earnings per ton-mile in 1921 being 1.130 cents, as compared with 0.961 cents in 1920. The revenue tons totaled 5,427,973. This figure compared with 6,067,713 in 1920 and was the lowest of any year since 1912. The revenue ton-mileage was 1,550,484,653, the lowest since 1915. The passenger revenues for the year totaled \$4,884,562, a reduction of 14.19 per cent for 1920. The total railway operating revenues were \$24,219,937, an increase of .78 per cent over those of 1920.

Operating Ratio of 89.33

The road's figures show the usual drastic reductions in operating expenses. Expenses in 1921 totaled \$21,636,139. In 1920 the expenses were \$26,452,243. There was a reduction of 18.21 per cent in total operating expenses. Maintenance of way was reduced 37.64 per cent; of equipment, 21 per

cent and transportation, 11.03 per cent. In 1921 the road had an operating ratio of 89.33. This figure is too high to show favorable results in the corporate income account. It did, however, represent a considerable improvement over 1920 because in that year the ratio was 110.07 per cent. Prior to federal control the Great Western operated at about 75 per cent, a figure too high to overcome the disadvantages of the heavy joint facility rentals with which the road is confronted. In 1916, which was the one year in which the Great Western really began to show any signs of prosperity the ratio was brought down to 69.74 per cent.

Economies Effectuated

The economies secured in transportation expenses in 1921 were due to decreased traffic, to lower wage and material costs, to savings in fuel, etc. Operating expenses per revenue train mile were reduced from \$4.55 in 1920 to \$3.77 in 1921, or 17.14 per cent. The savings in fuel were evidenced in both quantity and cost. In 1921 the pounds of coal per 1,000 gross ton-miles were 196; in 1920, 228, a reduction of 14 per cent. The cost per ton of coal was reduced from \$4.28 in 1920 to \$4.17 in 1921. The road also shows savings in handling coal. To quote from the report: "The cost of handling coal at our mechanically operated coaling stations was reduced from 20.3 cents per ton in September, 1920, to 6.9 cents in December, 1920; a reduction of 13.4 cents per ton. This is equal to a saving of \$86,000 per annum, based on the total coal consumed by locomotives in 1921." The road also showed savings of \$136,678, or 27.5 per cent, in loss and damage and of \$153,149, or 42.6 per cent, in personal injury claims. Loss and damage claims in 1920 totaled 3.95 per cent of the freight earnings; in 1921 this was reduced to 2.83 per cent.

The Great Western has a serious bad order car situation, its percentage of bad order cars for the month of December averaging 28.7, which was too high. The road borrowed \$1,633,300 from the revolving fund to rebuild bad order cars, which amount proved insufficient. The large proportion of bad order cars, President Felton explains, required the road to use more foreign cars in place of those lying on side tracks in bad order. The result was a debit balance for car hire of \$776,908. In the year prior to federal control the receipts for car hire exceeded payments by \$307,281; the difference between the two periods being \$1,084,190. This seems a rather pointed explanation of another of the Great Western's difficulties.

The Mason City and Fort Dodge

Much might be said concerning the Mason City & Fort Dodge situation. This road is leased by the Great Western, and constitutes its lines from Oelwein, Iowa, to Omaha, Neb., from Hayfield, Minn., to Clarion, Ia., with a branch from Fort Dodge, Ia., to Lehigh. The M. C. & F. D. has bonds outstanding of \$12,000,000 paying four per cent or \$480,000 annually. The interest has not been paid since December 1, 1920, at which time the money was advanced by the Interstate Commerce Commission. The Great Western has refused to pay the interest since on the ground that the M. C. & F. D. has not earned it. "Although your company," says Mr. Felton, "has continued to operate the property, the bondholders have been advised that the Great Western will not advance in the future any funds to pay unearned interest on the Mason City bonds."

Freight Car Loading

WALTER P. S. D. C.

IN SPITE OF A DECREASE in coal loading of 71,195 cars as compared with the corresponding week of last year, the total number of cars loaded with revenue freight in the week ending April 15 was still somewhat greater than it was last year, 706,713 as compared with 702,116. It was also much greater than it was for the corresponding week of 1920, when, due to the switchmen's strike, the loading dropped to 601,695. To make up for the loss in coal loading, there was an increase as compared with the corresponding week of 1921 of 28,595 cars in the loading of merchandise and of 39,596 in miscellaneous freight. Increases in these were shown in all districts except the Southwestern. As compared with the previous week there was a slight decrease

in coal loading, from 69,456 to 62,851. In the Pocahontas district, however, as in the previous week, there was an increase in coal loading as compared with last year. As compared with last year there were decreases in the loading of grain and grain products, livestock and coal, but increases in all other classes. The summary as compiled by the Car Service Division of the American Railway Association is given in the table below.

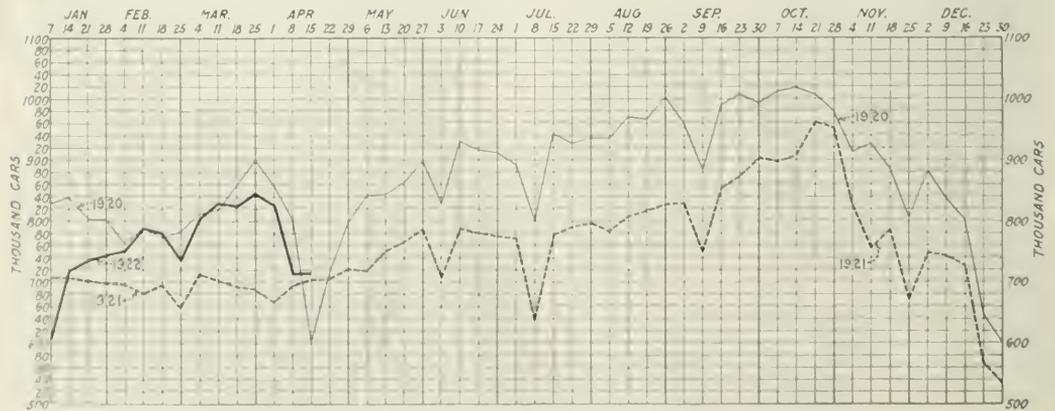
The freight car surplus during the week ending April 15 showed another large increase, due to the lack of demand for coal cars, to 333,393, of which 98,686 were box cars and 187,918 were coal cars. Of the surplus 88,351 were in the Allegheny district.

The surplus during the week ended April 8 had increased from 206,746 to 259,605, of which 122,359 were coal cars and 92,393 were box cars.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEAR AGO, WEEK ENDED SATURDAY, APRIL 15, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdsc. L. C. L.	Miscellaneous	Total Revenue Freight Loaded		
										This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	6,004	2,709	5,850	1,190	4,570	948	70,361	75,011	166,654	.....	.....
	1921	5,233	2,880	38,758	798	5,749	798	57,336	62,558	.....	174,110	111,041
	1920	1,995	2,297	15,258	4,513	2,818	2,246	51,102	63,241	143,470	.....	.....
Allegheny	1922	2,125	3,161	40,324	2,349	2,306	954	41,851	46,438	.....	140,508	110,082
	1921	214	73	21,947	238	1,301	28	6,043	4,281	34,125	.....	.....
	1920	121	108	16,584	167	1,287	23	5,100	3,543	.....	26,942	30,208
Pocahontas	1922	2,911	.....	12,973	455	18,985	711	38,309	44,855	121,280	.....	.....
	1921	3,067	1,932	16,226	456	13,859	705	35,376	39,708	.....	111,336	122,363
	1920	7,295	6,293	2,732	1,309	15,016	1,037	29,610	30,575	93,867	.....	.....
Southern	1922	7,303	6,645	3,511	406	13,217	869	27,265	28,933	.....	88,156	99,163
	1921	7,785	8,807	2,625	154	5,078	1,547	32,598	34,983	93,577	.....	.....
	1920	10,728	10,078	14,417	115	5,132	1,157	30,812	30,678	.....	103,117	83,151
Northwestern	1922	3,675	2,744	1,466	213	7,137	647	16,204	21,654	53,740	.....	.....
	1921	4,977	2,076	4,216	95	6,048	499	16,874	23,162	.....	57,947	45,687
	1920	18,755	17,844	6,823	1,676	27,231	3,231	78,412	87,212	241,184	.....	.....
Central Western	1922	23,008	18,799	22,154	616	24,397	2,525	74,951	82,270	.....	249,220	228,001
	1921	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	.....	.....
	1920	33,554	26,880	134,046	4,386	47,598	5,005	315,633	235,011	.....	702,116	.....
Southwestern	1922	22,276	16,944	135,886	6,781	55,686	12,154	129,173	221,795	.....	.....	601,695
	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Western Districts	1922	18,755	17,844	6,823	1,676	27,231	3,231	78,412	87,212	241,184	.....	.....
	1921	23,008	18,799	22,154	616	24,397	2,525	74,951	82,270	.....	249,220	228,001
	1920	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	.....	.....
Total all roads	1922	33,554	26,880	134,046	4,386	47,598	5,005	315,633	235,011	.....	702,116	.....
	1921	22,276	16,944	135,886	6,781	55,686	12,154	129,173	221,795	.....	.....	601,695
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	3,685	1,866	71,195	.....	.....	.....	.....	.....	4,597	.....	.....
Decrease compared	1920	7,593	8,070	.....	1,291	.....	.....	115,055	51,815	105,018	.....	.....
Increase compared	1920	.....	.....	73,035	.....	781	4,990	.....	.....	.....	.....	.....
Decrease compared	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
April 15	1922	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	702,116	601,695
April 8	1922	31,598	25,024	69,456	8,599	54,680	8,259	243,718	272,934	714,268	694,881	801,559
April 1	1922	35,034	25,935	184,952	10,652	54,016	5,811	341,037	269,574	827,011	663,171	858,827
March 5	1922	38,066	25,958	204,586	8,676	54,814	5,283	239,846	268,807	846,035	686,567	895,386
March 18	1922	39,896	16,721	190,683	8,502	54,500	5,310	237,538	260,119	823,366	691,366	855,060



Revenue Car Loading Up to April 15

Short Line Association Holds Annual Meeting

President Robinson Calls Attention to Attacks on Transportation
—Anderson Addresses Meeting

WASHINGTON, D. C.

THE ANNUAL MEETING of the American Short Line Railroad Association was held at Washington on April 25 and 26.

President Bird M. Robinson submitted his annual report, containing a general review of the railroad situation and the development of matters of particular interest to the short lines. He said in part:

"We are impressed with the belief that the present situation in Congress is fraught with difficulties and great danger for the public, as well as for the carriers. Great pressure is being brought upon Congress to induce it to reverse the constructive policy adopted in the Transportation Act. If Congress should yield to that demand, it would be incalculable injury to the public and to the carriers. It would greatly impair, if not make impossible, the successful operation of the roads by their owners, and as an inevitable result would force upon the government the necessity of acquiring railroads at a cost of many billions of dollars, and compel it to thereafter furnish transportation at an enormously increased cost, which, by the very force of circumstances, it could not avoid.

The Attack on the Transportation Act

"The attack upon the Transportation Act was prompt and vigorous. It was led by the radical element and was engineered by the former leaders who made their living fighting the carriers. They maligned that act as a crime and announced that they would use every means to defeat members of Congress who prepared it; and unfortunately they succeeded in defeating some of the strongest, most conscientious and upright men who had ever been in Congress. They have announced that they will defeat other members of Congress who supported the Transportation Act or who refused to vote to repeal most, if not all, of the fundamental principles incorporated therein. That condition is most serious, for it will—to the extent that it is successful—punish the faithful, intelligent, courageous public servants for daring to do their duty, and it may have the effect of intimidating others.

"The objective sought in the attack being made by a large part of the public, is to attain a reduction of rates, and to accomplish that result, bills have been introduced and are now pending in Congress to repeal Section 15a which provides that rates shall be sufficient to pay to the carriers a fair return upon their properties held for and used in the public service. Other bills are pending to repeal Section 13, which confers upon the Interstate Commerce Commission final jurisdiction as to both inter and intrastate rates, insofar as the latter may be found to result in placing upon interstate commerce an undue burden.

"Numerous other bills seeking to limit the rights of the carriers, or imposing additional burdens and restrictions, are pending, and in view of the strength and influence of the parties advocating these various bills, we are impressed with the belief that the situation is fraught with great danger.

"If Congress, in response to the great pressure now being brought to bear upon it, reverses the constructive policy adopted in the Transportation Act, it will in all probability result in a renewal and a continuation of the restrictive policy which was in effect prior to the federal control period. In my opinion there can, and will be, but one result of such a condition, and that is that the government

will be forced, within a comparatively short period, to acquire the railways and to furnish transportation.

"The Transportation Act is probably more misunderstood by the public than any important constructive act ever passed by Congress. The public has apparently but a very limited true knowledge of that act. On the contrary it has been saturated with misinformation as to its provisions. It is probably not to blame for that condition for the reason that there are a large number of active, unscrupulous individuals who are publicly and constantly misstating its provisions, while on the other hand many conscientious people misunderstand it. For example, certain members of Congress persistently proclaim that that act gives to the railroads a guaranty of a certain per cent of return, and that the taxpayers must meet that alleged obligation. The truth of the matter is just the reverse of what they assert.

"The mis-understanding of the act applies to a number of other important features, to approximately the same extent that it does as to the so-called guaranteed return.

"The attempt to obtain a reversal of the constructive policy of the Transportation Act is not limited to the radical or unscrupulous element, but is strongly supported by a large body of conscientious and reputable people, hence the great danger that now confronts the people with reference to their transportation problem. In view of that danger we have called you here for conference and for the purpose of enabling you to confer with your senators and representatives with the hope that you can give them necessary information and aid them in preventing the reversal of the helpful, constructive policy now in existence.

"It is true that the public at large, and the main lines, have a far greater interest in the situation than have the short lines, but it is apparent that the public has been misinformed, and is being misled, and that the main lines do not possess the strength and influence that you have. Speaking generally, we have the confidence and influence of a large part of the members of Congress, and we should not only do our full duty but we should do more, if and to the extent that we can.

Railways and Politics

"The railways are practically helpless in a political campaign. Public opinion is such that it will not permit them to participate in the election of officials and this notwithstanding it is a well known fact that labor and the radical organizations, in fact, almost any kind of interested organization, may publicly or privately participate. They not only disseminate misinformation, but they expend large sums of money, much of it in an illegal way, in their efforts to elect representatives that pledge themselves to vote for measures intended to either restrict the railways or impose additional burdens upon them.

"Some plan must be found to get the facts to the public so that they may know that the transportation problem is their own and that they must deal with it intelligently or suffer. It is quite apparent that the railway people have, from the very beginning, utterly failed to get the public to understand that great problem. The public, without doubt, does not understand it and it is apparent that the railway people have not and do not understand the public, and judging from the past, we are forced to conclude that present plans of procedure will continue to produce like results.

"To speak frankly, I may say that the ignorance of the

public with reference to the great transportation problem is far more dense than with reference to any other important problem with which it has to deal.

Proposes National Transportation Institute

"Recognizing that the public has, and will continue to exercise, almost unlimited control over the various transportation facilities of the country; that it greatly misunderstands that problem and fails to comprehend the ill effect that its antagonistic attitude is having upon itself; that it has a transportation system unequalled in the world, which has been provided by private capital and initiative, and that it is without any adequate educational facilities or impartial source of information on that subject, I have proposed the establishment in Washington, of a National Transportation Institute, under the supervision and control of some men of pre-eminent ability, standing and learning with reference to transportation, that there are in the country; that Institute to be based upon the broad and firm foundation that all parties interested, (a) the public, and (b) private enterprise, which furnished the transportation facilities and (c) the skill which renders the service, have equitable and legal rights, and that justice, equal and exact justice, must be accorded to all. The plan contemplates that the Institute shall conduct necessary research; and thereafter teach its students and the public, through its staff officers and the press.

"Present conditions demonstrate that the plans and work of the rail carriers, in their effort to educate the public to a full and clear understanding of that problem, have not succeeded. Viewed in the light of that long, varied and unproductive experience, I can see little on which to base a hope of real success if the efforts to accomplish that vitality necessary object are only to be continued along the same general lines.

"I am convinced that a complete change of plans is necessary. That the carriers should earnestly endeavor to take the public, through its leading men, into partnership with them, in the educational work to be done, and that all of such efforts ought to be based upon the highest and broadest plane, free from any propaganda or purely selfish motives.

"As a result of an extended investigation, I am convinced that the proposed Institute can now be established by and with the support of men who not only have the confidence of the public, but who are specially qualified to teach the principles of transportation in all of its aspects."

Consolidated Purchasing Agency

Regarding the consolidated purchasing agency Mr. Robinson said:

"The last annual meeting of the association adopted a resolution directing me to establish a consolidated purchasing agency for the use and benefit of the members, with instructions to obtain the necessary capital from private sources so that the association would not have to contribute any money or become responsible for the financial operation of such an agency. In due time I made an arrangement with certain individuals, myself included, whereby they contracted to furnish the necessary funds to establish the agency and maintain it under my general supervision, as president of the association.

"That agency was established and began business about June 1, 1921, and the money necessary to conduct the business has been advanced by the individuals so that the association has neither advanced a single dollar or become liable for any amount in connection therewith. That agency, when established, proceeded, in the most intelligent way, to make contracts and otherwise provide for the purchase of many of the articles used by practically all of our members, at substantially reduced prices. Notwithstanding

that fact, only a comparatively limited number of members have taken advantage of the opportunity thus afforded them.

"That agency adopted the plan of sending to members full information as to prices obtained and we have been astonished at some of the developments. It has been demonstrated that the purchasing agents of many of our members have taken advantage of the lower prices thus made possible, by using them to induce the concerns with whom they had formerly been dealing, to meet such lower prices, thereby ignoring the agency that had made such reduction possible. We are of the opinion and we feel that we can demonstrate the fact, that the agency has benefited the members of this association to the extent of saving to them a very large amount of money on supplies which they have purchased, and this notwithstanding they have not supported the agency itself with their patronage.

"The parties who have supplied the money, created the agency and have conducted the business, feel that they have not received the co-operation of the members to the extent that they should have and they will ask an opportunity to discuss that situation with the delegates at this meeting, with a view to ascertaining whether the members desire the continuance of that work, and whether they can rely upon real co-operation in the future."

Consolidation Plans

Mr. Robinson said he feared the owners of the short line railroads do not appreciate the importance of the plans to be adopted. "Short lines that have only one connection must, of course, be assigned to the system to which their connecting line becomes a part, hence they are interested in the composition of that proposed consolidation system," he said.

"Member lines that connect with two or more main lines are vitally interested in the assignment of their properties to one or the other of the systems, provided for, in the commission's permanent plan. The assignment of any road to a particular system at once limits the right of the owners of that property to sell or to merge it with some other system, and it would seem that the owners of all properties are vitally interested in the plans to be adopted by the commission.

"It is true that the law does not compel consolidation, but the powers of the commission over the roads are such that it can, if it so determines, practically force the consolidation of many if not most, of the carriers; hence the problem cannot now, with any degree of propriety, be ignored or neglected."

Traffic Department Report

Vice-President L. S. Cass presented the report of the Traffic Department which included the following:

"The success and prosperity of a short line primarily depends upon the revenue it receives from the volume of traffic which is available to it; and it is the conception of the Traffic Department that this is the key to the real solution of the problem of the short and weak roads; and its program, which is the program of the association, of course, may be summarized briefly as seeking—

First: To provide enough provender to so nourish all the "weak animals" in the nation's railroad barn lot, so they may haul the products of Uncle Sam's farms and factories to his nephews, nieces, kinfolks and customers in the most efficient and economical manner. (This means Section 15 A)

Second: To have such provender as is available, fed fairly and justly to the "animals" so that the yearlings may grow up strong and healthy, and not be starved and stunted by being trampled upon or thrust away from the feed racks by the older and stronger live stock. (This means the

Rule for Divisions, Paragraph 6 of Section 15; and also the Rule for Routing—Paragraph 10 of Section 15).

To succeed in this is to solve all our real problems; for if they can get adequate earnings, the short lines can get the money to buy equipment, make needed improvements, can keep up a proper degree of maintenance, can pay officers the salaries they earn and deserve for the devoted service and diverse duties they render; and it will give those patriotic investors who put their money into these enterprises, an opportunity to get some return on their savings; and to get a fair price for their holdings when consolidation eventuates.

So, in a broad way of speaking, from the viewpoint of the Traffic Department, the Interstate Commerce Commission may be said to be like the banker who has just two troubles, one to get his money out, and the other to get his money in; the Interstate Commerce Commission has but two troubles—first to promulgate rates that are fair to the shippers and travellers and at a level that will give the carriers in a given group a fair return upon the value of their property as a whole; and second to so divide the joint rate among the carriers that each shall receive the amount of revenue required to pay their respective operating expenses, taxes, and a fair return on their railway property held for and used in the service of transportation.

Even though the rates provided in Ex Parte No. 74 applied to the volume of business in 1921 failed to produce more than 45 per cent of a fair return on the value of the railroad property of the country as a whole, this does not change the duty of the commission to divide in a legal manner the income that is produced from interline traffic and it is now well conceded on the part of unbiased students of railway economics that Article 6 of Section 15 of the Transportation Act of 1920, which was prepared and introduced in Congress by the American Short Line Railroad Association, imposes upon the commission the duty and gives them the authority through which the weak railroads may and will ultimately be stabilized.

It is now the belief of the executive officers of the American Short Line Railroad Association that the trunk roads do not propose to voluntarily grant increased divisions to the short lines; therefore there would seem to be little or nothing for any line which needs relief to gain by any longer withholding filing their application with the Interstate Commerce Commission for increases in their divisions, especially as it is within the power of the commission to make its decision retroactive to the date on which your petition is filed. The controlling principles, and the yardstick for measuring divisions, are now fairly well defined so that you can see just about how your case will probably stand.

Vice-President B. B. Cain also presented a report outlining the work of the Law Department during the year.

Sydney Anderson Addresses Meeting

Representative Sydney Anderson, chairman of the Joint Commission on Agricultural Inquiry, addressed the association regarding the investigation which the commission has just conducted. He also endorsed President Robinson's recommendation for a transportation institute.

On motion of the committee on resolutions, the association adopted a resolution endorsing the proposal for the establishment of a national transportation institute at Washington and also a resolution opposing any change in the transportation act. On motion of the valuation committee a resolution was adopted urging the members to devote more attention to valuation matters to see that their protests against tentative valuations served by the Interstate Commerce Commission are properly filed. It was decided that the consolidated purchasing agency should be continued and the members were urged to induce their purchasing agents to

make use of the agency. A motion had been offered that the association pay the deficit incurred during the first year, but President Robinson, speaking for those who had provided the funds, stated that they did not want financial assistance but the co-operation and patronage of the membership. It was decided to establish an office for the traffic department in New York under the direction of R. A. Belting, regional traffic manager. On motion of the committee on electric lines, a resolution was adopted providing for a method of securing freight carrying electric lines as members. At the request of the membership committee, the members present pledged themselves to renew efforts to increase the membership of the association.

The present officers were re-elected for the ensuing year, as follows: President, Bird M. Robinson; vice-presidents, L. S. Cass, B. B. Cain, B. S. Barker and F. J. Lisman; secretary-treasurer, F. T. Whittlesey. Vice-president L. S. Cass in addressing the meeting, pointed out that \$18,000,000 has been distributed to short line railroads as the result of the efforts of the association and he predicted that the sum would amount to \$100,000,000 ultimately.

The Celilo Collision

THE COLLISION of passenger trains on the line of the Oregon-Washington Railroad & Navigation Company near Celilo, Oregon, on December 1 last (briefly reported in our issue of December 17, page 1217), was investigated by the Interstate Commerce Commission and also by the Public Service Commission of Oregon. The report of the Bureau of Safety, I. C. C., dated March 2, has just come to hand.

The trains were westbound No. 17 and eastbound No. 12, both far off their schedules. They met at about 12:30 a. m. The total of the killed was seven (including one trespasser) and of injured 73. Chief W. P. Borland, who signs the



Oregon Trunk Connection—Looking East.

Telephone Booth at the Right

report, finds four individuals immediately responsible, and condemns severely various irregular practices for which operating officers are responsible and of which they appear to have been fully cognizant. This report, carefully condensed, fills nine pages, nearly 5,000 words, and we can give only an abstract of the conclusions.

Referring to the sketch, the westbound train was running on the eastbound track, on an order which had not been sent to the eastbound train. The eastbound train, Conductor Allison and Engineman Allen, had been detoured over the Oregon Trunk Railway and re-entered its normal route at the telephone booth. It proceeded eastward expecting to get orders at Biggs, with no better authority for this than the opinion or assumption of Pilot Conductor Clark that it could do so, and the knowledge that such informal instructions had

on prior occasions been acted on in that way. Detouring had been of frequent occurrence.

Pilot Clark was conductor of a helper engine which assisted trains up to the Oregon Trunk road and he also acted as switch tender. He seems to have been the only person stationed at this telephone booth. There was no train register there. The dispatcher's office was temporarily established at The Dalles because of serious obstruction of the road west of there. Night chief dispatcher Walsh had issued the order to the westbound train, expecting the conductor of No. 12 to stop at the telephone booth and call for orders. He claimed also to have told Dispatcher Stiles to have Clark hold No. 12, but this was contradicted by Stiles. The westbound train was run on the south track to save time (the cross-overs at Celilo and west of there being inconvenient), and this practice had been common, though a standing rule forbids it, except when the normal track is obstructed.

Allison and Allen are held responsible for not calling the dispatcher before proceeding east from the booth, and Walsh for moving the westbound train without protecting the movement. Clark is held to share the responsibility, he having by his actions led Allison and Allen to believe that he had been authorized by the dispatcher to allow No. 12 to proceed. Further, Allison ought to have had a clearance card as this was his initial station on this subdivision.

Dispatcher Walsh is censured for other irregular practices, and in particular for moving the westbound train on

were not familiar with the forms; and even Walsh did not succeed in making a proper order. Moreover, he appears to have been on duty longer hours than is lawful.

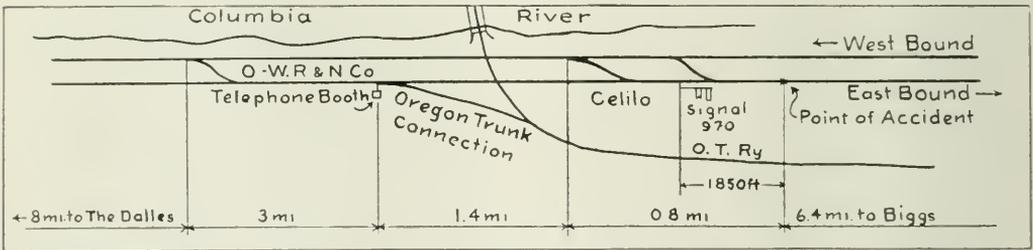
"The operating officials cannot be too severely criticized for their failure to provide a safe method of operating trains between Oregon Trunk connection and Biggs. . . . This is not an isolated case. . . ."

Action of Oregon Commission

The Public Service Commissioners of Oregon, F. A. Williams, H. H. Corey and F. G. Buchtel, following their investigation of this collision, which was made in conjunction with that of the inspectors from the Interstate Commerce Commission, made a report which ended with the following recommendations:

- "1. That the operating officers of this railway, through strict supervision, ascertain that all rules are fully and specifically complied with and that each executive and every employee should be held responsible for non-compliance therewith to the degree of the responsibility placed in them.
- "2. That the rules relating to single tracking in double track territory be absolutely adhered to, and that in cases of emergency requiring the detouring of trains, all orders should be transmitted by operators placed at the point of connection.
- "3. That there should be a cross-over established at the point known as Oregon Trunk Junction for the safe and convenient operation of trains."

This was followed by an order requiring that within 60 days the Oregon-Washington Railroad & Navigation Company should file a statement indicating such action as would be taken with reference to the foregoing recommendations. The company replied on February 2, in a letter signed by



Track Layout at and Near Oregon Trunk Junction, Oregon-Washington Railroad & Navigation Company

a 19 order when the rule requires the use of Form 31. This rule, requiring, in a case like this, signatures from all trains liable to use the eastbound track, is held by the inspector to be essential to safety.

Discussing general conditions, the report says that good railroad practice requires, when detouring trains, that every precaution should be taken; a competent operator should have been stationed at the Oregon Trunk connection to receive orders. But this was not done; neither were there any special instructions prescribing a method of procedure.

"The practice of requiring train employees to perform the exacting duties of an operator is dangerous and cannot be too strongly condemned. . . . As a rule, train employees are not fitted by training and the nature of their work does not adapt them to perform the duties of an operator. In this instance, there was no emergency; trains had been detoured for several days.

The practice of running trains against the current of traffic is dangerous. . . . but it was customary to run trains over the opposing tracks at this point for no other reason than to save time. The division officers must have been cognizant of this practice."

The dispatchers at The Dalles had incomplete facilities and had to send calls by telegraph while dispatching by telephone. Dispatcher Dolan, a new man, was technically on duty, but orders were being issued by Stiles, another new man, who was being broken in; and the order to the westbound train was issued by Walsh because the other men

C. E. Cochran (no title given), to the effect that (a) "the operating officers will in the future, as they have in the past, through strict supervision endeavor" to carry out the injunction of Paragraph 1; (b) that "positive instructions have been issued" to carry out the first clause of Paragraph 2; (c) that "where possible" an operator will be placed at junctions in detouring operations like that here under consideration but that (d) "it is not necessary that all orders [in such cases] should be transmitted by telegraph operators." A crossover has been put in at Oregon Trunk Junction.

IN THE FEDERAL DISTRICT COURT at Elkins, West Virginia, on April 22, a sweeping temporary injunction was issued, restraining striking shopmen and all citizens of West Virginia from acts of violence, picketing, interfering with the operation of the railroad, intimidation and threats in connection with the strike. The injunction was granted on petition of the railway company. The order also prohibits importuning, arguing with or threatening any person desiring to enter the shops to secure positions abandoned by the strikers. M. C. Byers, president of the Western Maryland, issued a statement to the effect that since the strike began on March 25, there have been many acts of violence and intimidation which have resulted in large numbers of men who were seeking employment being afraid to accept the positions made vacant by the strikers, particularly at Elkins, Thomas and Cumberland.

General News Department

Movies in St. Louis Union Station

A motion picture exhibition has been established at one end of the main waiting room in the St. Louis (Mo.) union station. It is in continuous operation from 10 a. m. until 10 p. m.; admittance 22 cents. The arrival and departure of all trains is announced in the show. Storekeepers in the vicinity of the station have protested against this amusement feature, claiming that it keeps railroad travelers off the streets, but so far their protests have been of no avail.

National Chamber to Discuss Transportation

The program for the annual meeting of the Chamber of Commerce of the United States, to be held at Washington, May 10 to 16, provides for the discussion of the following topics relating to transportation: experience under the Transportation Act in the regulation of railroad rates; railroad security issues and capital expenditures and railroad wages and working conditions; transportation and communication abroad; cost of transportation and the geography of distribution; and also highway transport.

The Pullman Porters' Chorus

The Pullman Company is preparing plans for the organization of a large chorus, with an orchestra and band auxiliaries, among its 1,000 porters. The company has divided the states into eight zones, in each of which there will be a picked chorus of 50 men, although in the Chicago and New York districts, it is probable that this number will be doubled. When the entire organization has been completed it is planned to hold a grand concert each year, similar to the annual Welsh festival. Major N. Clark Smith, one of the leading colored musicians of this country, will train the Pullman Porter Chorus.

Mr. Williams' Offices

The Interstate Commerce Commission has issued an order on the supplemental application filed by William H. Williams relating to holding positions with more than one carrier, in which Mr. Williams is authorized to retain his office as vice-president and member of the board of managers of the Delaware & Hudson and also offices and directorates with subsidiary companies; also chairman of the board of the New Jersey, Indiana & Illinois, and director of the Hudson & Manhattan; and either the positions of chairman of the board, director and chairman and member of the executive committee of the Wabash and director of the Missouri Pacific and of the Texas & Pacific, or director of the Kansas City Southern.

Transportation Division of A. R. A. Meets in Chicago

The Transportation Division of the American Railway Association met at the Blackstone Hotel, Chicago, on April 19, J. J. Bernet, president of the New York, Chicago & St. Louis, and chairman of the division, presiding. This was the first meeting of this division which has been held for two years. After a review of the problems of the Transportation division by R. H. Aishton, president of the Association, papers were presented by Colonel F. G. Robbins, chief of the Bureau of Service of the Interstate Commerce Commission, on the work of that organization, and by M. J. Gormley, chairman of the Car Service Division of the American Railway Association, on the results which have been secured by that division. Reports were also presented by the general committee and by the committees on Car Service; Demurrage, Storage, Reconsignment and Diversion; Freight Handling Service; Railroad Business, Mail and Records.

Valuation Hearings

The Interstate Commerce Commission has announced a number of hearings on valuation reports to be held in Washington during the month of May, in addition to those which were mentioned in last week's issue. The program includes the Western Pacific and Texas Midland cases on May 11; the Atlanta, Birmingham & Atlantic case on May 13 before the full commission; the Norfolk Southern and Mobile & Ohio on May 15; the St. Louis Southwestern on May 18; the Toledo, St. Louis & Western and Ann Arbor on May 22, and Chicago, Rock Island & Pacific and Green Bay Western on May 25.

Carefulness Among P. R. R. Employees

The Pennsylvania Railroad reports a reduction of 55 per cent in fatalities and 37 per cent in injuries among employees during 1921 as compared with 1920. After making allowance for a decrease of 25 per cent in the average number of employees in the service during 1921, the net reduction in the accident frequency was 40 per cent in fatalities and 15 per cent in injuries.

Nine operating divisions and five shops, with a total of 19,000 employees, passed through the year without a fatal accident to an employee. The divisions are Cresson, Delaware, Norfolk, Schuylkill, Wheeling, Logansport, Richmond, Zanesville and Peoria, and the shops are Trenton, Hoboken, Altoona Car Shop, South Altoona Foundry, and Juniata. The reduction was primarily due to dull times, a light labor turnover, and few inexperienced men in the service, and to the effect of the safety movement. Many dangerous conditions have been removed, safeguards for machines installed, and working conditions generally improved.

Number of Employees Decreases

The Interstate Commerce Commission's summary of wage statistics for January, 1922, shows a decrease of 85,137 in the number of employees compared with the number reported for December, 1921, and 252,808 less than for January, 1921. The reductions from December are principally as follows:

Professional, clerical, and general	5,627
Maintenance of way and structures	29,146
Maintenance of equipment and stores	34,311
Transportation (other than train, engine, and yard)	7,626
Transportation (yardmasters, switch tenders, and hostlers)	407
Transportation (train and engine service)	8,043

The number of employees, with their compensation, for six months (omitting the Detroit, Toledo & Ironton) was as follows:

Month	Number of employees	Total compensation
August, 1921	1,679,927	\$27,745,895
September, 1921	1,718,330	23,972,822
October, 1921	1,754,136	23,602,959
November, 1921	1,732,353	25,304,006
December, 1921	1,637,151	24,921,396
January, 1922	1,552,014	205,178,639

State Commissions Not Hopeful of Legislation

A gloomy view as to the prospects for action by Congress on any of the various bills being agitated by the state railroad commissions to repeal the rate-making provisions of the Transportation Act and to restore the former independent status of the state railroad commissions in relation to rate-making, is expressed in a bulletin which has been addressed to the state commissions by John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners. This reports that the House committee hearing on the Hoch and Sweet bills has not yet been resumed. It was interrupted by hearings on the interchangeable mileage book bills and the proposed purchase of the Cape Cod Canal, although witnesses in support of these bills were

desirous of being heard. Clifford Thorne, for the Farm Bureau, and Chairman Webster of the legislative committee of the state commissions were obliged to content themselves with filing statements to be printed in the Record; and the bulletin says that Chairman Webster "has started back to Iowa, saying things that would not look well printed in the Record." Mr. Benton also says that in the Senate "no observable progress toward a report on our amendments has been made since the end of the hearings on the Capper and Nicholson bills on January 5." It is also stated that the conference with the Interstate Commerce Commission on the subject of closer co-operation between the state and federal commissions was to be resumed on April 28.

A Sample Letter

[Sent March 23 to employees of the classes named by H. L. Hungerford, Superintendent of the Southern Railway at Greenville, S. C.]

A word to Cashiers, Assistant Cashiers, Receiving and Delivery Clerks and Yard Clerks:

Without customers there would be no business. Therefore, the most important thing, first, last and all the time, is the customer. About nine-tenths of any shipper's opinion of a Railroad is based on the way it is taken care of, at the freight office, warehouse or yard. Every shipper is your customer. The customer may be cranky, eccentric, peculiar and hard to get along with; but remember you are not here to change the customer's disposition or to find fault with it; you are here to serve the shippers for the reason that they have come into our place of business and have favored us with their patronage.

The cashier's or clerk's job is not an easy one. He has to be a diplomat and a gentleman; he has to have tact and patience and an easy working smile, if he is to be a good clerk. You have to remember that you are never doing people a favor to deliver the service they have paid for and are entitled to.

Shippers are invited to favor us with their business and they have every right to expect courteous and cordial interest in their wants. Every person who buys and transportation of us represents bread and butter to every one connected with our railroad.

You should meet and care for people in this spirit. Be courteous, and helpful, and gracious, and pleasant at every step of your work; and this with your fellow employees as well as with the public.

A Record Reduction of Freight Claims

The classified summary of the freight loss and damage expenditures for the year ended December 31, 1921, which has just been prepared and promulgated by the freight claim division of the American Railway Association, shows a marked reduction in claim payments over previous years. The total freight loss and damage account for 1920 exceeded \$120,000,000, while for 1921 the total fell to \$96,730,376. This is based on reports from 228 carriers, representing 95 per cent of the railroad mileage of the country. The amount paid out in claims in January, 1921, was \$10,375,196, while in January, 1922, it was only \$5,070,566. The number of claims presented decreased in eleven months 24.1 per cent or from 305,816 in January, 1921, to 232,233 in December of that year; and the number of claims paid decreased 32.1 per cent. The claims on hand, undeducted were reduced in 12 months 53 per cent, or from 578,525 on January 1, to 273,018 on December 31, 1921.

Unlocated damage was charged with 36.1 per cent of the entire claim payment. The following table shows the number of claims paid monthly, and the number on hand at the close of each month for 1921, with the percentage of decrease, each month as compared with January.

	No. paid	Decrease from Jan.	Amount paid	Decrease from Jan.	On hand undeducted Jan.	Decrease from Jan.
January	314,178		\$10,375,196		542,393	
February	222,867	29.1	9,112,574	12.2	425,286	21.6
March	241,939	1	6,776,394	5.7	408,629	24.7
April	244,189	2	7,790,873	5.6	380,909	29.7
May	229,115	-7.6	8,333,200	19.7	347,419	35.9
June	214,911	-11.0	8,130,657	21.7	317,680	43.1
July	199,864	-14.1	8,004,007	22.8	305,075	41.7
August	166,684	-24.4	7,723,170	25.5	290,275	46.4
September	195,558	-17.7	6,640,573	35.9	283,410	47.7
October	171,712	-33.9	6,641,911	35.9	281,068	48.1
November	204,581	-14.9	5,781,143	44.7	278,731	48.6
December	211,169	-18.1	6,438,476	38.0	273,018	49.7
Total	2,701,197		\$86,730,376			

Traffic News

The St. Louis-San Francisco has started its "Strawberry Special," and expects to move north during the season over 1,700 carloads of strawberries.

J. P. Haynes, commissioner of the Traffic Bureau of the Sioux City (Iowa) Chamber of Commerce, has been appointed traffic director of the Chicago Association of Commerce, effective June 1, to succeed H. C. Barlow, deceased.

The Louisville (Ky.) Board of Trade does not agree with the recent resolution of the Kentucky Railroad Commission that the people are unanimous in their request that Congress restore the pre-war authority of the state commissions. The Board of Trade's directors went on record as unanimously opposed to the transfer of authority from the Interstate Commerce Commission to the state railroad commissions and voted to call this matter to the attention of the Kentucky delegation in Congress.

City passenger agents of railroads from all over the United States and Canada met in St. Louis, Mo., on April 15, and organized the National Association of City Passenger Agents. The following officers were elected to serve during 1922: president, H. L. McCaughey, Canadian National and Grand Trunk, Chicago, Ill.; vice-president, J. C. Hamilton, Atchison, Topeka & Santa Fe., Pittsburgh, Pa.; secretary, White B. Owens, Atchison, Topeka & Santa Fe., St. Louis, Mo.; treasurer, E. M. Mattes, Union Pacific, Kansas City, Mo. The annual meeting of the association will be held at the Stalder Hotel, Buffalo, N. Y., on October 6 and 7, 1922.

The Northern Pacific has announced reduced fares between its Pacific coast points and eastern destinations, the tickets to be on sale from May 25 to September 1, good for the return trip until October 31. From Spokane, Wash., and related territory, the round-trip fare to Chicago will be \$81; to Denver, Colorado Springs, and Pueblo, \$64; St. Paul, Minn., Minneapolis, Duluth and Superior, \$67, and with corresponding reductions to cities east of Chicago. From Montana points the round trip fare to St. Paul and other Minnesota resort points will be \$62, and to Chicago, \$76, with corresponding reductions to points east.

Representatives of the sand and gravel interests appeared at a hearing before Chairman Cummins of the Senate Committee on Interstate Commerce on April 25, to advocate the passage of the bill introduced by Senator Calder, S. 690, to amend the transportation act to eliminate the emergency powers of the Interstate Commerce Commission under which it has issued car service and priority orders. Commissioner Eesch, for the legislative committee of the commission, had sent a letter to Chairman Cummins opposing the bill, on the ground that the emergency powers are necessary at times when there are not enough cars to go around.

Shippers in various lines of business, testifying before the shipping board committee, which is holding hearings in New York city, to determine the adequacy of American shipping facilities, declare that a disastrous ocean rate war would immediately follow an attempt to enforce Section 28 of the Jones act, providing preferential railroad rates for shipments destined for export in American ships. William Heyman, representing the Shippers' Conference of Greater New York, said a rate war would result from the efforts of foreign lines to overcome the rail rate differential, which would be \$2.13 a ton on steel shipped from the Pittsburgh district, or the difference between the domestic and export rate. He said that exporters of several hundred thousands of tons of steel yearly, gave preference to American vessels whenever possible. R. F. Bausman and others protested the section on behalf of flour exporters.

Witnesses representing chambers of commerce from various sections of the country who have been testifying at the hearing be-

fore Congressional committees on the proposed ship subsidy bill have expressed some concern because they have interpreted the language of the bill to amend present laws in such a way as to permit railroads to operate boat lines on the Great Lakes and inland waterways. Representatives of the Shipping Board, however, have stated that this was not their intention in drafting the bill, but that they intended only to make it possible for railroads to operate steamships in foreign commerce. Some representatives of shippers have also expressed concern that sections of the proposed bill would impair the authority of the Interstate Commerce Commission, but at the hearing on April 25 there was put into the record a letter from Commissioner Lissner of the Shipping Board to W. H. Chandler as president of the New England Traffic League, stating that the Shipping Board will be glad to support the amendment which the New England and other organizations were to propose, stating that sections 801 and 803 are not to be construed as in any way impairing the authority of the Interstate Commerce Commission to regulate rates, rules, regulations or practices as provided in the act to regulate commerce or the transportation act of 1920.

Northern Pacific to Spend \$1,000,000 in Montana

The Northern Pacific will spend in excess of \$1,000,000 on its Montana lines during the next few months, according to J. M. Rapalje, vice-president. This program will include the erection of a \$200,000 station and office building at Glendive, the replacing of the Yellowstone river bridge at Livingston with a \$125,000 double track structure, the construction of a \$25,000 storehouse at Butte, the erection of a 5-stall roundhouse addition at Billings, the construction of a \$35,000 boiler washout plant at Forsyth and the rebuilding of water stations at Pompeys Pillar, Sanders and Zero.

Proposed Reductions in Transcontinental Freight Rates Made Public

The Interstate Commerce Commission has made public a tentative report by Attorney Examiner Disque in the transcontinental rate cases covering a large number of fourth section applications. The report recommends the denial of authority to disregard the fourth section on rates from eastern defined territories to Pacific Coast terminals on iron and steel, linoleum and a long list of general commodities; also on sisal and ixtle from New Orleans and Galveston to the Pacific Coast. The examiner recommends relief from the fourth section as to rates on sulphur from Louisiana, coffee from New York, New Orleans and Galveston to the Pacific Coast, and also relief for the Southern Pacific as to rates on canned goods, asphalt, barley, beans, rice and dried fruit from Pacific Coast terminals to New York; also a continuation of rates on wool from the Pacific Coast terminals to the east without regard to the fourth section, provided existing disparities against intermediate points are not increased.

Coal Production, Second Week of Strike

A decrease in the production of bituminous coal marked the second week of the coal strike, according to the weekly bulletin of the Geological Survey. Anthracite production as before was practically zero.

The revised figures for the week of April 15 are 3,675,000 tons of bituminous coal and 6,000 tons of anthracite. Reports for the week of April 17-22 indicate again no change in anthracite, and a further decrease in the output of soft coal, as follows:

First week, April 3-8	Second week, Apr. 10-15	Third week, Apr. 17-20
Monday 11,445	Monday 10,772	Easter Monday, 7,917
Tuesday 11,019	Tuesday 10,658	Tuesday 9,967
Wednesday 11,437	Wednesday 10,961	Wednesday 11,053
Thursday 11,090	Thursday 11,482	Thursday 11,040
Friday 11,296	Good Friday 10,714	
Saturday 8,888	Saturday 8,501	

Lack of demand remains the limiting factor in most of the non-union fields. The number of loaded cars unconsigned at the mines is still large, though now decreasing. More coal could be produced if the demand increased. Consumption is being met largely from storage. At the present rate of output the draft upon consumers' stock piles is not less than 4,000,000 tons a week.

When the strike began, the accumulation at the mines of un-

billed cars loaded with coal was large, the average daily number of loads unconsigned being as follows:

Week ended	Cars bituminous	Cars anthracite	Total cars
March 4	14,126	1,548	15,674
April 1	28,867	2,506	31,373
April 8	30,730	2,815	33,545
April 15 (preliminary) ..	26,790	1,655	28,445

Reports of railroad car loading for the first week of the strike show that the different roads were variously affected. In the New England group of the Eastern district, all roads except the Bangor & Aroostook had an increase in coal loading as compared with the corresponding week of the year before, the total for this group being 1,596 cars as against 1,141. In the balance of the Eastern district, practically all of the roads suffered heavy loss in loading, and the total for the Eastern district was 6,940 cars, as compared with 37,467 the year before. In the Allegheny district the total loading for that week was 19,955 cars as against 38,688 last year, the largest loss being shown by the Pennsylvania System, 10,614 cars as against 18,188 last year. The Baltimore & Ohio's coal loading was 6,234 as against 8,178. In the Pocahontas district, the Chesapeake & Ohio, the Norfolk & Western, and the Virginian show increases in loading, that of the Norfolk & Western being 11,446, as compared with 6,076. In the Southern district there was a reduction from 15,253 to 12,351, most of which was on the Illinois Central. The Southern handled 1,934 cars as against 1,737 the year before. In the Northwestern district there was little change. The Chicago & North Western, the Great Northern and the Minneapolis, St. Paul & Sault Ste. Marie and the Northern Pacific show increases. In the Central Western district there was a decrease from 12,900 to 3,856. The loading of the Chicago, Burlington & Quincy was only 250, as compared with 3,315, that of the Chicago & Eastern Illinois only 434 as compared with 1,744, that of the Chicago & Alton only 229 as compared with 1,105, and that of the Chicago, Terre Haute & Southeastern being nothing as compared with 1,588. In the Southwestern district the loading was 1,572 as compared with 3,531, the largest reduction being shown on the St. Louis-San Francisco.

Pennsylvania Refrigerator Traffic

The Pennsylvania Railroad has discontinued the operation of its separate refrigerator car lines, and is to merge all of its refrigerator cars, numbering 5,927, with those of the Fruit Growers' Express. This will more than double the number of refrigerator cars operated by the Fruit Growers' Express. These now number 5,209. The Fruit Growers' Express is a co-operative organization owned and managed by the leading railroads of the South and East.

It was organized two years ago and has made a particularly successful record in handling Southern products. The Pennsylvania established the first refrigerator lines through the South more than 30 years ago.

New York Central's Guide to Industries

The New York Central has issued a shippers' guide and index to the industries of the cities and towns that are reached by its 13,000 miles of railroad which apparently justifies the editor's claim that it is the largest book of its kind ever printed. Its pages, 8 in. x 10½ in., number about 1,000, and there are 20 maps and 400 half-tone illustrations. A part of the thousand pages is made up of advertisements, enough of them to pay for the paper and printing, no doubt. Copies of the book can be had on application to general or local freight agents.

It contains the names of more than 50,000 business concerns, all classified by commodities, localities and railroad facilities, with detailed information to enable shippers to direct their traffic and to aid new enterprises in locating their plants most advantageously. Cities and towns are described and pictured as in a general gazetteer, with special reference to advantages they offer for industries. The indexed lists include manufacturers, wholesalers, jobbers, contractors, retail merchants, grain elevators, electric light and power plants, coal dealers, agricultural producers, stock yards and packing plants; business organizations, with the names of their presidents and secretaries and all banking institutions.

Copies of the book are being sent to public libraries.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from April 27 to August 25 the operation of schedules which propose revised class and commodity rates between Ruston and related points in Louisiana, on the one hand, and all points in Texas on the other.

The commission has suspended until August 22, the operation of schedules which propose restriction in routing on classes and commodities from points in the Pacific Northwest to points in Texas located on the Ft. Worth & Denver City and the Wichita Valley.

The commission has vacated its order as to intrastate rates in Illinois, the Illinois commission having set aside its order which authorized the railroads to make a smaller increase in rates than was allowed by Ex Parte 74. This abates the discrimination against interstate commerce against which the federal commission's order was directed.

The commission has suspended to August 20 the operation of schedules which propose to increase the rates on building stone, from various points in the state of Indiana to Beaumont, Galveston, Houston and Orange, Texas, and points taking the same rates, from 52 cents to 60 cents per 100 lb., and the rates on coal tar paving cement from Birmingham, Ala., to the same destinations from 37½ and 40½ cents to 43 cents.

The commission has suspended until August 22, the operation of schedules which propose the cancellation of the application via Virginia Cities in connection with the Chesapeake & Ohio, Norfolk & Western and Virginian, of through rates on apples from Pacific coast territory to points in Carolina territory and the Southeast. The effect of the proposed restriction will be the elimination of the application of through rates to points in the territory described via these lines, and the application instead, of combination of rates which will be considerably higher than present through rates.

Court News

Suits for Damages—Roads Under Federal Control

Following the decision of the Supreme Court of the United States in *Missouri Pacific v. Ault*, 41 Sup. Ct. 593, holding that no liability arising out of the operation of railroads by the Director General under the Federal Control Act is imposed by the common law upon the owner companies, the following rulings have since been made by state supreme courts.

A railroad company is not liable for an injury to a person at a station received during federal control.—*Masteller v. Rock Island (Iowa)*; 185 N. W. 107;

Or for loss of a mule shipped while the road was under federal control.—*Arkansas Central v. McClen (Ark.)*, 234 S. W., 617;

Or for failure of the Director General's agent to order a car for cattle, resulting in loss from delay.—*Arkansas Central v. Walker (Ark.)*, 234 S. W., 619;

Or for damages for a loss caused by fire through the operation of a railroad under federal control.—*St. Paul Fire & Marine Ins. Co. v. Hines (Kan.)*, 202 Pac. 582.

But an order of a Public Service Commission to compel the stopping of interstate trains at a certain station, if otherwise justifiable, in proceedings against the railroad and the Director General, was held by the Missouri Supreme Court to be a continuing one until lawfully changed, and to bind the company after termination of federal control.—*State ex rel. St. Louis San Francisco (Mo.)*, 235 S. W. 131.

The Texas Court of Civil Appeals holds that under the acts of Congress of August 29, 1916, and March 21, 1918, a rate filed by a railroad under government control, limiting the amount recoverable on passengers' baggage to \$100, superseded state statutes on the subject and an owner could not recover more on an

intrastate shipment under the state law (*Vernon Sayles' Ann. Civ. St. 1914, Art. 708*).—*Payne v. McConnell (Tex. Civ. App.)*, 234 S. W. 942.

United States Supreme Court

Free Transportation of Coast Guard as Troops

The Supreme Court of the United States holds that members of the Coast Guard are to be deemed troops within the meaning of the land-grant acts providing for free transportation of troops, when serving as part of the Navy, but not at other times, when the Coast Guard operates under, and at the expense of, the Treasury Department. Therefore transportation of coast guards furnished before the declaration of war on April 6, 1917, is not within such provisions.—Opinion by Mr. Justice Brandeis. *L. & N. v. U. S.* Decided April 10, 1922.

Presumption that Damage Occurred

on Delivering Carrier's Line

Affirming a judgment of the Nebraska Supreme Court, the Supreme Court of the United States holds that when goods moving in interstate commerce upon a through bill of lading are delivered in bad condition and the evidence shows that they were sound when received by the initial carrier, but does not affirmatively establish where the loss occurred, a presumption arises that the injury occurred on the delivering carrier's line. The action was against the delivering carrier for damages by frost to two carloads of apples transported from points in New York State to one in Nebraska. This holding is in accordance with the common law rule of liability, which the court holds does not conflict with the Carmack Amendment, requiring issuance of a through bill of lading by the initial carrier and declaring it liable for damage occurring anywhere along the route, as interpreted and applied by the Supreme Court, or with any other federal legislation.—Opinion by Mr. Justice McReynolds.—*C. & N. W. v. C. C. Mutnick Produce Co.* Decided April 10, 1922.

Terminal Carrier Not Liable—

Cummins Amendment Interpreted

Reversing a judgment of the Circuit Court of Appeals for the Ninth Circuit, the Supreme Court of the United States holds that a terminal carrier is not liable for injury to horses caused by the negligence of a prior and independent carrier from whom they were received. The suit was for damages against the delivering carrier, the allegation being that unwholesome food and water were given to the animals while in transit over the route of an intermediate carrier, at a station specified. The contract expressly declared that "no carrier shall be liable for damages for loss, death, injury or delay to said animals not caused by it."

The Circuit Court of Appeals construed *G. F. & A. v. Blish*, 241 U. S. 190, as holding that under the Carmack (now Cummins) amendment, the terminal carrier is bound by the contract precisely as the initial carrier is bound.

The Supreme Court holds this to be error and says: "The settled federal rule is that, in the absence of statute or special contract, each connecting carrier on a through route is bound only to safely carry over its own line and safely deliver . . ."

"The Cummins Amendment deals with and modifies the common law liability only of the initial carrier. It renders that carrier liable for loss or damage throughout the entire route by which the property is billed, but it leaves the relation of all connecting carriers to the shipper or consignee and to each other entirely unaffected. In the *Blish* case, above mentioned, the terminal carrier was liable for failure to make delivery because by the terms of the bill of lading each carrier was under obligation to make final delivery. The present suit was not for misdelivery, but for the alleged fault of a prior connecting carrier.

"The Carmack and Cummins Amendments were enacted to enable the holder of a bill of lading to sue the initial carrier and thereby to relieve him from the necessity of searching out and proving a case against a terminal or intermediate carrier. It may have been important to have given like rights against others of connecting carriers, but either from design or accident, the terms of the amendment limit its application to the initial carrier." Opinion by Mr. Justice Carke. *O. W. R. & N. Co. v. McGinn*. Decided April 10, 1922.

Labor Board Decisions

Second Shift Requires Overtime Pay

A case was recently presented to the Labor Board for its determination as to what is the proper compensation (under the rules of the National Agreement of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees) for a clerk, who, employed in a department where conditions require continuous service throughout the 24 hours, was requested to work an extra shift following the one he had just completed, to replace an absent employee. The employees contend that in such cases, men should be paid time and one half in accordance with rule 57 of the clerks' national agreement; whereas the road in question, the Gulf, Colorado & Santa Fe, maintains that such clerical help is temporarily assigned to another position and as such should be paid in accordance with rule 72 of the same agreement, which provides that employees temporarily assigned to lower rated positions shall not have their rates reduced. The Board decided that the service performed by the employee was not a temporary assignment and sustained the contention of the employees.—*Decision No. 839.*

Composite Mechanics and Signal Maintainers

A controversy arose on the Chicago & Alton with regard to the application of the minimum rate of composite mechanics to signal maintainers with less than four years' experience who were considered composite mechanics because of the ruling of the United States Railroad Administration. The carrier contended that the employees were men of less than four years service prior to the date of issuance of Supplement No. 4, to General Order No. 27. The employees claimed that no distinction was made in this supplement between electrical workers and signal maintainers and in view of the fact that the men involved in this dispute received the minimum rate of their craft prior to the date of issuance of the supplement, they should have been paid the minimum rate for composite mechanics with four years' experience. The Labor Board decided that employees receiving an amount equal to or in excess of the minimum rate paid prior to the issuance of Supplement No. 4 should be paid the minimum rate of the highest rate of craft represented in such composite service and that such employees receiving a lower rate than that paid any of the craft of which they were the composites should receive the step rate in accordance with their experience.—*Decision No. 795.*

Pay of Employees Required to Travel

A case was raised with respect to a water service repair gang on the Southern Pacific Lines in Texas and Louisiana which has no established headquarters but is moved from place to place as occasion requires and is not provided with boarding cars. These men have been paid in accordance with Section I, Article V, of the maintenance of way agreement which is as follows:

"Employees temporarily or permanently assigned to duties requiring variable hours, working on or traveling over an assigned territory and away from and out of reach of their regular boarding and lodging places or outfit cars, will provide board and lodging at their own expense and will be allowed time at the rate of 10 hours per day at pro-rata rates and in addition pay for actual time worked in excess of eight hours on the bases provided in these rules, excluding time traveling or waiting. When working at points accessible to regular boarding and lodging places or outfit cars, the provisions of this rule will not apply."

The employees contended they should be paid in accordance with section *m* of Article V which is as follows:

"Employees not in outfit cars will be allowed straight time for actual time traveling by train, by direction of the management, during or outside of regular work period or during overtime hours, either on or off assigned territory, except as otherwise provided for in these rules. Employees will not be allowed time while traveling, in the exercise of seniority rights or between their homes and designated assembling points or for other personal reasons." The Board sustained the railroad.—*Decision No. 794.*

Foreign Railway News

Rumanian Railway Repair Shops Increase Output

LONDON.

The Rumanian railway repair shops, it is reported, are daily increasing their locomotive repair output. At present they are turning out 100 to 120 locomotives a week and it is believed that this figure will soon be exceeded.

British Ordnance Works Built

100 Locomotives as Yet Unsold

British ordnance works built 100 locomotives following the armistice in order to prevent a complete shutdown and the sudden discharge of thousands of men, according to the Times (London). These locomotives are as yet unsold and until they can be disposed of represent an investment of some \$2,500,000 of the government's money on which there is no return.

Australia Delays Gage Unification

The unification of the gage of the various state railways of Australia is being delayed, according to the Times (London), because of the hesitance of the states of South Australia and Victoria in agreeing to meet their shares of the necessary expense. Plans for gage unification were made by a commission of which F. M. Whyte of this country was a member. It is not considered likely that the plan will be allowed to slumber indefinitely, since the government of the Commonwealth is thoroughly impressed with the importance of the project.

French Railways Authorized to

Issue \$930,200,000 of Bonds

The French railways are permitted under present legislation to issue \$930,200,000 (francs to dollars at par) of bonds during 1922, according to Commerce Reports. The maximum allotment to each road is as follows:

Railway	Allotment	Railway	Allotment
State	\$207,800,000	P. L. M.	\$122,000,000
Alsace-Lorraine	57,600,000	Orleans	216,800,000
Northern	150,000,000	Midi	100,000,000
Eastern	70,000,000	Belt Lines	6,000,000

Railway Extension and Electrification in Java

Steady progress is being made on the construction of the railway line between Martapoera and Banjoeberang, Java, according to Commerce Reports. One section of this line was opened to traffic in October, 1921. A new line is projected between Macassar and Boni Plain in Celebes, but this project has not yet taken definite form.

The estimates made in the Netherlands Indian budget for the electrification of the railways of Java have been accepted, but no time has been set for the beginning of the work. A German concern has recently sent a special representative to Java for the purpose of studying the plans and making competitive bids on machinery and supplies.

Government Investigation of Irish Railways

As a result of the conference held between the Ministers of Labor of the Irish Provisional Government and the Northern Parliament, the railway managers, and the representatives of the railwaymen's unions, an agreement was reached to set up a government commission to inquire into the entire working of the Irish railways, according to Commerce Reports. Finances, consolidation of the railways, wages, conditions of service, and steps looking toward the building and repair of rolling stock in Ireland will be considered.

The main features of the settlement so far arrived at are: An 8-hour guaranteed day and a 48-hour guaranteed week;

an increase in pay of 4 shillings a week to all employees whose pay was reduced on January 1, 1922; a reduction in pay of 2 shillings a week on May 1, 1922, and no further reductions within six months from February 15, 1922; reductions in pay for night and Sunday duty; rates of pay prescribed for women clerks.

Further Reduced Rate Concessions in Britain

LONDON.

The railway companies of Great Britain will in the future in the case of guaranteed excursions by special trains, where the fare is not less than 10 shillings (£2.43 at the normal rate of exchange), accept a guarantee of 200 adult fares instead of 300 as previously. These excursions are usually organized by societies, schools, works and even whole towns.

A concession has also been made to the relatives of fallen British officers and men who wish to visit graves in France and Belgium, by the issue of cheap tickets to parties of 12 adults and over, traveling under the auspices of recognized associations. This concession will not apply, however, in the months of July and August.

Indian Railways to Spend Half a Billion

A definite program of expenditure has been mapped out for the railways of India, according to the Times (London) Trade Supplement. This plan involves capital improvements to the extent of some \$100,000,000 per annum for the next five years.

During the first year \$50,000,000 will be used to provide additional second main track, remodeling yards, strengthening bridges and the building of branch lines into coal fields. The remaining \$50,000,000 will be spent as follows: For passenger cars, \$25,000,000; for locomotives, \$12,500,000; and for freight cars, \$12,500,000.

It seems unlikely that funds for these improvements, which will be raised for the most part in England, will require that the materials be purchased in England. Obviously, then, American manufacturers have a fighting chance at some of this business if they will go after it with sufficient zeal.

Distinguished Swiss Railway Officer Retires

Robert Winkler, the director of technical service of the Swiss Federal Railways and director-general of the International Technical Commission, has retired from active service. Mr. Winkler was the vice-president of the Swiss section of the Permanent Commission of the International Railway Association which organized the Berne Congress of the association in 1910 and was also chairman of the local executive committee. On his retirement the Swiss Federal Government issued a public announcement which reads in part as follows:

"Owing to the state of his health, Mr. Robert Winkler has retired from his duties as director of technical service of the Swiss Railway Department after 21 years of distinguished work. The Swiss Federal Council addressed to him on this occasion are really not a simple formality.

"In 1901 Mr. Winkler, at that time manager of the Pilatus Railway, was appointed to the above mentioned office by the federal councillor. He has often influenced in a decisive manner the solution of international railway questions."

British Engineering Strike

LONDON.

A complete cessation of production in the engineering trades, long threatened in England, has been avoided by the decision of the trade unions, apart from the Amalgamated Engineering Union to resume negotiations with the employers on the basis of a memorandum signed by Sir Allan Smith representing the employers and Arthur Henderson, secretary of the National Joint Labor Council, representing the employees. The lockout notices posted some time ago, which affected the members of about 51 unions, excepting the Amalgamated Engineering Union, have been suspended and negotiations were to be resumed on April 10. These negotiations may last about five or six days and at the close of the discussions 14 days are to be allowed to enable the unions, if necessary, to take a ballot on a joint recommendation which it is hoped will result from the conference.

The Amalgamated Engineering Union is to maintain its

determination to stand aloof from these proceedings and the skilled members of this organization will remain during the period without employment.

New Line in Poland Takes Business

Away from Danzig and Germany

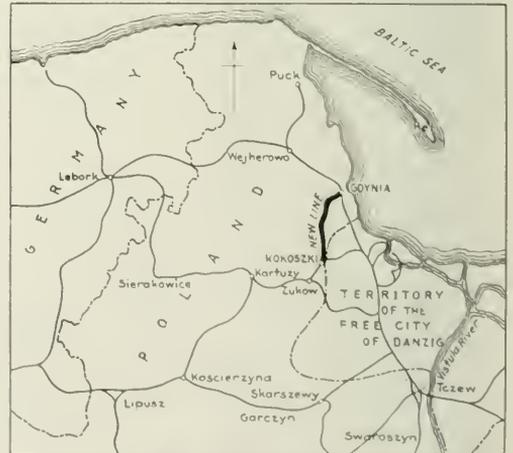
A recently completed line, 14 miles in length, in Poland, will facilitate the movement of Polish traffic to and from Poland's new port, Gdynia, which traffic formerly passed through Danzig or German ports. For this reason the line has an importance quite out of proportion to its length. The details published



A Fill and Culvert on the New Line

herewith have been furnished by J. Stecwicz, chief of construction of the Polish Railways, through the courtesy of Col. A. B. Barber, technical adviser to Poland. The line has an estimated capacity of 24 trains of 310 tons each in either direction.

The line has a single standard gage track. Maximum curvature is 300 meters and maximum gradient 1.5 per cent. The



Map Showing New Line

ground traversed is a terminal moraine, a very broken formation, making the layout difficult in places.

The earthwork amounted to 450,000 cubic meters. From 500 to 1,000 men were employed daily, the average earth moved per man per day being approximately 2.5 cubic meters. Considering the unfavorable weather conditions and the wooded character of the ground, the results as regards the output of labor appear satisfactory and up to pre-war standards. Thirty culverts, from

0.6 to 4.0 meters in width, were required, 1,850 cubic meters of concrete and reinforced concrete being used.

Exceptionally noteworthy were the low labor costs of the line. The pay of laborers for an 8-hour day varied during the period of construction from 160 to 800 marks, while during the same period the Polish mark-dollar exchange rate fell from 850 to 3,400. No appreciation in kind was furnished to these laborers. The extremely low wages are in part explained by the fact that the labor was drawn locally from an agricultural district where wage increases are very slow to follow currency depreciation.

The cost of the whole line, including the branch leading to the port amounted to 140,000,000 marks, or, at the average exchange rate for the period, \$67,000, a cost of \$2,630 per kilometer. About half of the expenses were for labor. The rail and plates were taken from old reserves and their value is not included in the cost of construction. All material used was of Polish manufacture. If the cost of new rails and plates were added to the figures given above the cost of this line would appear as approximately \$9,000 per mile.

The United Kingdom as a Market for American Ties

The present possibilities for selling American railway ties in the United Kingdom are not as good as they probably will be in the future, according to Commerce Reports. It is essentially a question of price. The factors which govern the situation are given below.

Nearly all ties used in the United Kingdom are imported. During the past two years importations amounted to about 8,644,976 railway ties. This is larger than the normal average consumption, and was due to the fact that during the war the railway beds had got in rather bad condition and repairs were not kept up. Ties were imported in the expectation that conditions would permit a large amount of repair work to be done. These repairs, however, were not made as rapidly as anticipated, and consequently rather large stocks of ties are still on hand. Most of those imported during the war and since have been American ties.

The competition which American ties have to meet is the importation of Baltic pine from Riga, Danzig, and Memel. It is reported that Finnish ties are also coming into the market. At present the price c. i. f. London of Baltic pine ties is about \$1.36 per tie; the price of longleaf yellow pine is \$1.58 and of Douglas fir \$1.41. This price is for a tie 9 feet by 10 by 5 inches. For many years the trade has been accustomed to the Baltic wood, and it is generally believed that, the price being equal, the railway companies prefer the Baltic wood. Opinions differ as to why this is so, but the following are some of the reasons given:

(a) It is stated that, under equal conditions and with 180 pounds pressure to the square inch, Baltic pine will absorb 8 to 10 pounds of creosote per cubic foot, longleaf yellow pine will absorb about 5 to 6 pounds per cubic foot, and Douglas fir about 4 pounds per cubic foot. Consequently Baltic pine is preferred on account of its greater power to absorb the creosote.

(b) Another objection brought forward against Douglas fir is that it splits more readily than the Baltic pine. It is the British practice not to drive a dog-eared spike in the tie, but to bore a hole one-thirty-second inch less in diameter than the trammel which is driven into the tie, it being claimed in England that the Douglas fir ties split when driving in the trammel. Usually railway specifications state that, if southern yellow pine is furnished, not more than 20 per cent shall be shortleaf pine and at least 80 per cent shall be longleaf pine.

Another factor influencing the possibilities for selling American ties is the Railways Act of August, 1921, according to which the railways must amalgamate into four principal groups. Owing to this act, the buying departments of the various railways hesitate to make any commitments, since each purchasing agent is not exactly sure as to what his status or powers will be when the amalgamation is completed. This will probably cause a restriction in buying for the next year or two, but at the end of that time it is expected that the railways will have to come into the market for rather large quantities of ties and that, while the supply of a Baltic wood might at that time be cheaper, it is believed that there will not be sufficient supplies of Baltic pine available to meet the demand.

American species, such as oak, beech, larch, southern yellow

pine, Douglas fir, California redwood, and western hemlock, are included in the official and semi-official tenders.

Due to the scarcity of timber during the war, the standard tie specifications have been 8 feet 6 inches by 9 by 4½ inches, and some railways are still taking these specifications. However, the general dimensions now are 9 feet by 10 by 5 inches.

All softwood ties are creosoted and all the larger railways have their own creosoting plants, although some of the smaller railways have their ties treated either by the importing timber merchants or in the plants of the larger railway companies. A small amount of imported and home-grown hardwood ties are not creosoted.

There are no peculiar conditions in the United Kingdom which affect the life of the tie beyond the fact that the climate is possibly slightly more humid than in the United States. The usual life of a well-creosoted tie is from 15 to 17 years. Some of the railways still import a certain amount of jarrah ties from Australia, which are laid down without creosoting and which are said to last about 30 years. American ties have not been down long enough to make a fair judgment as to their length of life in the United Kingdom.

Since the railways have been decontrolled each railway has its own specifications, which may vary slightly from those used by the central committee, although generally they still apply. It will be noted that formerly 8-foot 6-inch lengths were called for, whereas at present railways are calling for 9-foot lengths. In England ties are called "sleepers."

New Rail Regulatory Body in France

LONDON

The minister of public works, France, is at present organizing the "Conseil Supérieur des Chemins de Fer," which will in future be the governing body for the six great railway systems of France. Under the law of November 12, 1921, this council is made up of 18 members of the committee of management (three directors from each railway system), 12 delegates of the employees (two from each railway system) and 30 representatives of the general interests of the nation. A decree has been issued defining the last-named representatives as follows:

1. The senior permanent officials and, as such, members of the Conseil d'Etat, of the following ministries or sections of ministries: Public works, agriculture, commerce, industry, posts and telegraph, labor and public health.
2. Three delegates from the technical staff of the ministry of public works.
3. One delegate each from the ministries of finance, war, and commerce and industry, to be chosen on the advice of the ministries concerned.
4. A member of the Chamber of Commerce of Paris and six of other chambers, one of whom must represent exporting and colonial interests.
5. A representative from each of the regularly constituted associations for the following industries: Mines, metallurgy, electricity, railway construction, and local railways.
6. Four delegates from the regularly constituted agricultural associations.
7. Three representatives of the merchant marine and inland waterways.
8. Four representatives of regular organizations for the tourist traffic, the press and travellers, including a physician and a commercial traveller.

Lists of candidates for the four last mentioned categories are to be submitted to the minister of public works, three names being allowed for each seat and the minister making the final choice. Rules have also been drawn up and published for the election of the men's delegates.

M. Mahieur, general secretary of the ministry of public works, is to be president of the council. A technical and commercial committee, with two sections, has also been created by decree, to comprise 167 members, to help the president.

The first task of the council will probably be the revision of the rates, standardization of signalling devices on all lines, extension of electric lighting to all passenger coaches, and adoption of continuous brakes and automatic couplings for all freight trains. Electrification will not figure prominently, as the various lines have already drawn up their plans in this respect, and now only desire to be left free to carry them out.

Equipment and Supplies

Locomotives

THE MT. HOOD RAILROAD has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE SAN ANTONIO & ARANSAS PASS has ordered 4, 0-8-0 type locomotives from the Baldwin Locomotive Works.

THE NORTHWESTERN PACIFIC has ordered 5, 10-wheel type locomotives from the Baldwin Locomotive Works.

THE BROOKS-SCANLON LUMBER Co., Bend, Oregon, has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE AKRON, CANTON & YOUNGSTOWN, reported in the *Railway Age* of March 4 as inquiring for 5 Consolidation type locomotives. has renewed its inquiry for this equipment.

Freight Cars

THE PERE MARQUETTE is reported to be in the market for a number of cars.

THE CHICAGO, NORTH SHORE & MILWAUKEE is inquiring for 10 merchandise dispatch cars.

THE CENTRAL SAN ANTONIO, Cuba, has ordered 10 cane cars from the Magor Car Corporation.

THE HAMMOND LUMBER Co., San Francisco, Cal., is inquiring for 60 freight cars of 30 tons' capacity.

THE NORTHWESTERN RAILWAY OF BRAZIL has ordered 70 freight cars from the Standard Steel Car Company.

THE VOTH HARDWOOD COMPANY, Voth, Texas, is in the market for 100 all steel flat cars of 80,000 lb. capacity and 41 ft. long.

THE FEDERAL RAILWAYS OF BRAZIL are inquiring, through the car builders, for 46 single sheathed box cars, 131 freight cars and 32 gondola cars.

LEONARD KENNEDY & Co., Inc., 67 Wall Street, New York City, has ordered 40 air dump cars from the Magor Car Corporation. These cars are for export to Brazil.

THE UNITED FRUIT COMPANY has ordered 50 flat cars of 20 tons capacity from the Magor Car Corporation. These cars are for use on the Truxillo Railroad, Honduras.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of March 25 as inquiring for 300 ballast cars, has ordered this equipment from the Rodger Ballast Car Company.

THE MERRIMAC CHEMICAL COMPANY, Boston, Mass., has ordered one car of 40 tons' capacity for carrying muriatic acid tanks from the General American Tank Car Corporation.

THE VIRGINIAN RAILWAY is asking for prices on a number of 120-ton coal cars, for estimating purposes only. The company has several thousand coal cars now stored on account of the inactive coal market.

THE NEW YORK, CHICAGO & ST. LOUIS, reported in the *Railway Age* of April 22 as contemplating asking for bids on 400 refrigerator cars, is now inquiring for this equipment. The cars are to be of 40 tons capacity.

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of April 8, as inquiring for 1,500 box cars and 200 stock cars, has ordered 1,400, 40-ton plain box cars; 100, 40-ton automobile cars; and 200, 40-ton stock cars from the American Car & Foundry Company.

THE CHICAGO & NORTH WESTERN has ordered new freight cars as follows: 625 box and 500 flat from the Western Car & Foundry Company; 625 box from the Standard Steel Car Company; 500

stock and 250 gondola from the Pullman Company; and 250 refrigerator from the American Car & Foundry Company.

PICKANDS, MATHER & COMPANY, Cleveland, Ohio, has ordered from the Kilbourn & Jacobs Manufacturing Company, Columbus, 22 all-steel automatic air dump cars for shipment to the Balkan Mining Company, Bovey, Minn., and 12 cars of the same type for shipment to the Bennett Mining Company, Keewatin, Minn.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of March 26 as inquiring for 2,000 automobile box cars, has ordered this equipment from the General American Car Company. The cars will be 50 ft. long with side doors staggered, of a width of 10 ft., 5½ in., and with folding end doors of a width of 7 ft., 9¾ in., arranged to afford special facilities for handling automobile shipments. The inside measurement of the cars will be 50 ft. long, 9 ft., 2 in. wide and 10 ft., 5¼ in. high.

Passenger Cars

THE ILLINOIS CENTRAL is inquiring for 5 passenger cars, 72 ft. long.

THE EL PASO & SOUTHWESTERN is inquiring for 2 coaches and 2 combination baggage and express cars.

THE METROPOLITAN WEST SIDE ELEVATED, Chicago, is inquiring for 100 steel, double-end, passenger motor cars.

Iron and Steel

THE SOUTHERN PACIFIC is inquiring for 800 tons of pig iron.

THE PERE MARQUETTE is inquiring for 3,500 tons of steel rails.

THE TERMINAL RAILROAD ASSOCIATION of St. Louis has ordered 800 tons of steel rails from the Illinois Steel Company.

THE ATCHISON, TOPEKA & SANTA FE is in the market for 100 tons of reinforcing bars for miscellaneous bridge work.

THE TOLEDO, ST. LOUIS & WESTERN has ordered 4,000 tons of rails from the Carnegie Steel Company, and has an additional 1,000-ton inquiry pending.

THE JAPANESE GOVERNMENT RAILWAYS are inquiring through export houses in New York City for 10,000 tons of 75 lb. rail and for a small quantity of splice bars.

THE NEW YORK CENTRAL LINES will receive bids until 12 o'clock noon, May 10, for the requirements of these lines of steel wheels for locomotives and passenger car and tender repairs.

Machinery and Tools

THE NEW YORK, ONTARIO & WESTERN is inquiring for a 10 or 15-ton pillar type crane.

THE DELAWARE & HUDSON has renewed its inquiry for a 10-ton, 100 ft. span, overhead traveling crane.

THE DELAWARE & HUDSON has ordered a 600-ton wheel press from the Niles-Bement-Pond Company.

THE LAKE ERIE & WESTERN is inquiring for nine saws of miscellaneous type, two mortisers, one planing and matching machine, two 3-spindle boring machines and four motors, ranging from 5 to 15 h. p.

THE COLUMBIA TERMINALS COMPANY, St. Louis, Mo., will install freight-handling and conveying machinery, industrial trucks, etc., in its one-story terminal building to be erected at 400 South Broadway street, in that city.

Track Specialties

THE SOUTHERN PACIFIC is inquiring for 20,000 kegs of spikes and bolts.

THE MISSOURI, KANSAS & TEXAS is reported to have placed orders for 4,000 kegs of spikes and bolts.

Supply Trade News

The Chicago Bridge & Iron Works has removed its Chicago office from the Old Colony building to the Transportation building.

The Davis Brake Beam Company, Johnstown, Pa., has removed its sales office from the Frick Annex to 1619 Oliver building, Pittsburgh, Pa.

S. F. Bowser, founder and president of S. F. Bowser & Co., Fort Wayne, Ind., whose retirement from the presidency of the company to become chairman of the board has already

been noted in these columns, served for 37 years as the head of the business which was started by him in March, 1885. A change of organization was effected so that he could transfer to others some of the responsibilities he had carried for such a long time and he was made chairman of the board of directors and S. B. Bechtel was elected president. The company has its home plant at Fort Wayne, Ind., a Canadian plant at Toronto, Ont., and a third plant at Milwaukee, with tank assembly plants at Albany, N. Y., and Sydney, Australia. The company makes oil and gasoline tanks and pumps and other allied products including a high grade system of oil filtration. S. B. Bechtel, the new president, entered the employ of the company in 1899, in the collection department; two years later he was appointed assistant superintendent of salesmen and, the following year, manager of the mail order sales and advertising departments. In 1906 he was appointed assistant to the general manager and subsequently served consecutively as secretary, assistant general manager, general manager and since 1920, as vice-president and general manager until his election as president.



S. F. Bowser

Leslie G. Lamborn has been appointed manager of the Sheet Metal and Wire Works division of the Parker Rust-Proof Company, Detroit, Mich.



S. B. Bechtel

C. K. Lassiter, vice-president in charge of manufacturing of the American Locomotive Company, New York, has resigned, effective about May 1. Official announcement to this effect will appear later.

Newcomb Carlton, president of the Western Union Telegraph Company, has been elected a director of the United States Rubber Company, New York, to succeed Col. Samuel P. Colt, deceased.

W. F. Robinson, assistant sales manager of the Edward Hines Yellow Pine Trustees, Lumberton, Miss., has been promoted to general sales manager, effective May 1.

The National Tube Company will erect a tube mill at Gary, Ind., at an estimated cost of \$15,000,000, to be completed for operation by the end of 1923. The plant will manufacture lap and butt weld tubes and will have a capacity of 350,000 tons per year.

Wright Little Watchman, Inc., has received orders from the Southern Railway for 1,000 "Wright Little Watchman" to be installed on 500 passenger cars, and also from the Atlanta, Birmingham & Atlantic to equip all of its passenger cars, requiring 120 appliances.

A. W. Preikschat has been appointed western manager of the car hardware department of the National Lock Washer Company, Chicago. After graduating from high school, Mr.



A. W. Preikschat

Preikschat received his technical training at Armour Institute of Technology. He then served with the Pullman Company for four years, in the drafting and template departments and then for five years as assistant to the engineer of tests in charge of physical inspecting and testing with the same company. He was with the Steel & Tube Company of America, for one year and a half, as mechanical representative in the purchasing department and then for two years with the Liberty Steel Products

Company, Inc., as assistant mechanical engineer. He later served for one year and a half with Templeton, Kenly & Co., Ltd., Chicago, as special engineer in its railway sales department.

The Allis-Chalmers Company

The financial results of the Allis-Chalmers Manufacturing Company for the year ended December 31, 1921, revealed net earnings, after federal taxes, of \$2,125,467. This was equal to 4.11 per cent on the common stock, and may be compared with \$3,564,248, or 9.39 per cent, earned in the previous year. This showing was made after the establishment of liberal reserves and writing off \$1,070,228 in inventories.

The company entered the current year with its financial position materially strengthened. The balance sheet, as of December 31, 1921, shows cash on hand amounting to \$1,152,769, or an increase of more than 41 per cent in comparison with the previous year. In addition, investments in marketable securities amount to \$7,592,278, nearly three times those of 1920, and of this amount, \$6,518,018 was invested in Liberty bonds, Victory notes and treasury certificates. Current assets amounted to \$27,985,200 against current liabilities of only \$3,990,358, while the net working capital was \$23,994,842, the equivalent of more than 97 per cent of the total amount of sales billed in the last year. "The conditions which obtain at the commencement of 1922 make it extremely difficult to forecast the results for the current year," said Otto H. Falk, president. "In common with other industrial organizations this company has suffered a substantial contraction of business as a result of the prevailing general depression. The decrease in unfilled orders on hand December 31, 1921, as compared with those at the beginning of that year, for a period doubtless will be reflected in reduced billing and earnings. It is expected, however, that during 1922 there will be some increase in the volume of new business as compared with the preceding year."

The income account for 1921 and the balance sheet as of

December 31, 1921, together with comparisons with the figures of the previous year are as follows:

	INCOME ACCOUNT	
	1921	1920
Sales billed	\$24,685,257	\$31,516,309
*Production costs	19,996,810	24,315,809
Manufacturing profit	\$4,688,447	\$7,200,400
Net selling, admin. and general expenses	2,862,638	3,023,272
Operating profit	\$1,825,808	\$4,177,128
Other income	549,658	487,121
Gross income	\$2,375,467	\$4,664,249
Reserve for fed. tax and gen. contrib.	*100,000	1,000,000
Net income	\$2,215,467	\$3,564,249
Preferred dividends	1,145,641	1,143,919
Common dividends	1,040,000	773,123
Surplus	\$29,826	\$1,647,207
Provision surplus	11,936,795	10,289,588
Total surplus	\$11,966,622	\$11,936,795
Indicated Earnings—		
On av. pf. stk. on which divs. paid	13.41%	21.81%
On \$25,770,750 common stock	4.11%	9.39%

	INCOME ACCOUNT	
	\$2,000,000	\$1,000,000
Preferred stock	6,619,890	6,832,190
Common stock	1,262,372	2,151,824
Accounts payable	9,000	396,288
Accrued dividends	.....	2,975,000
Notes payable	23,119	431,121
Contingent liabilities on notes	458,530	431,121
Accrued expenses	1,053,067	1,497,442
Reserve for taxes, etc.	15,061,836	19,411,207
Surplus	.....	.....
Total	\$26,264,696	\$35,586,072

General Electric Company

The report of the General Electric Company for the year ended December 31, 1921, shows a net income of \$28,155,667 as compared with \$35,420,616 for 1920. Cash dividends of 8 per cent on the stock aggregating \$13,409,522 in 1921 and \$10,651,306 in 1920 were paid. In addition, 4 per cent dividends were paid in stock in both years. The surplus for the year 1921, was \$8,243,290, as against \$11,476,065 for the previous year.

During the year 1921 the orders received by the General Electric Company were \$179,722,000 as compared with \$318,470,438 for 1920. For the first quarter of 1922, orders received have been at an annual rate in excess of \$200,000,000. Unfilled orders at the close of the year, after eliminating cancellations, were \$45,391,000 for large apparatus, as against \$111,778,000 at the end of 1920. Net sales billed were \$221,007,992 as compared with \$275,758,488 for 1920.

The balance sheet as of December 31, 1921, shows total current assets of \$190,344,634, and total current liabilities of \$23,760,949. Inventories at that date were marked at \$64,848,189, as against \$18,109,174 at the close of the previous year.

C. A. Coffin, chairman of the board, in his remarks to the stockholders said that the year 1921, with its contraction in business and the unavoidable processes of re-adjustment made necessary thereby, had been exceptionally trying and difficult.

Obituary

Robert H. Illingworth, whose service as a director and vice-president of the Crucible Steel Company of America, prior to April 1, when he resigned, died on April 23 at his home in Newark, N. J., at the age of 61.

Trade Publications

LISTING JACKS.—The Templeton, Kenly & Co., Ltd., Chicago, has issued a 24-page booklet illustrating and describing its line of Simplex jacks for track and bridge work, car repairing, pulling and straightening poles, etc. Considerable space is also devoted to an explanation of the theory of jack operation.

ALUMINUM ROOFING.—Aluminum roofing is the title of a 15-page booklet issued by the American Aluminum Architecture Company, Aurora, Ill., on aluminum as a roofing material. This booklet discusses the adaptability of aluminum for building purposes, and describes in detail the Ridgdown aluminum shingles and other roofing products which this company manufactures.

SHAY GEARED LOCOMOTIVE.—The Shay Locomotive Works, Inc., New York has issued an interesting comparison showing the characteristics of a Mallet and a Shay geared locomotive of equal tractive effort. This points out the advantages of the Shay type due to the fact that all the weight is concentrated on driving wheels and the dead weight is much smaller than for the Mallet type. It is pointed out that on a six per cent. grade the Shay type will haul 138 per cent more trailing load than a Mallet locomotive of the same rated tractive effort.

RAILROAD CROSSING ACCIDENTS have been included among the items broadcasted from the Chicago City radio headquarters, being the subject of an address made on April 14 by E. M. Saffler, chairman of the Safety Section of the American Railway Association, acting in connection with the publicity committee of the Chicago Safety Council. Some lessons on safety, including those related to railroads, were given also recently by William Ott, president of the Chicago Safety Council, in a radiophone address.

Fairbanks, Morse & Co.

The annual report of Fairbanks, Morse & Co., Chicago, for the year ended December 31, 1921, shows an operating deficit of \$1,330,417, as compared with a profit of \$4,144,921 for the previous year. After paying dividends on the preferred stock the total deficit for the year was \$4,349,371, as compared with net earnings amounting to \$1,110,983 in 1920. No dividends were paid on the common stock.

The sales for the year were \$16,525,920, as compared with \$34,549,718 for 1920, a reduction in money value of 52.17 per cent. Part of the reduction was, however, due to lower prices, the decrease in sales on the basis of units being about 46 per cent. Several plants were closed during the year and a loss was shown in the majority of the branch offices operating in foreign countries. Noteworthy is the fact that the Fairbanks, Morse Company (Australasia), Limited, was organized during the past year.

Details of the annual statement are as follows.

	LIABILITIES	
	1921	1920
Preferred stock	\$1,300,417	*\$4,144,921
Common stock	61,437	254,414
Reserve for profit and loss	73,142	91,641
Reserve for depreciation	53,735	.....
Contingency reserve	36,867	.....
Profit and loss surplus	1,870,470	.....
Provision for taxes	114,500	114,500
Provision for working capital	.....	100,000
Contingent liabilities	.....	1,411,207
Total	\$4,349,371	\$11,110,983
Preferred stock	19,411,207	19,411,207
Common stock	1,068,836	1,068,836
Total	.....	.....
Assets	.....	.....
Real estate, buildings, machinery, etc., less depreciation	\$4,106,850	\$3,416,850
Other physical property	586,415	616,919
Patents, good will, etc.	19,287,753	247,860
Treasury securities	87,894	211,862
Current assets	\$27,985,200	\$30,487,240
Total assets	\$60,431,953	\$64,020,681
LIABILITIES		
Preferred stock	\$16,500,000	\$16,500,000
Common stock	26,000,000	26,000,000
Reserve for liab. (Compen. act)	260,226	247,860
Contingency reserve	1,214,746	2,732,467
Profit and loss surplus	11,966,622	11,936,795
Current liabilities	\$3,990,358	\$6,603,379
Total liabilities	\$60,431,953	\$64,020,681
Net working capital	\$23,994,482	\$23,883,861
Ratio net w. cap. to sales billed	97.2%	75.8%

Railway Construction

CHESAPEAKE & OHIO.—This company recently opened for bids a project for the erection of a freight station at Norfolk, Va., to cost approximately \$125,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded to the Railway Water & Coal Handling Company, Chicago, a contract for an 18,000-gallon per hour water treating plant at Estherville, Ia.

DENVER & RIO GRANDE WESTERN.—This company is now erecting a temporary double-track steel bridge over the Arkansas river at Pueblo, Colo., to replace a pile structure until the city has decided between alternate plans of enlarging or relocating the present river channel, when a permanent steel structure will be erected.

GRAND TRUNK.—This company is engaged in negotiations with the city of Detroit in contemplation of the separation of grades along De Quindre street, involving about \$4,000,000. Plans have been agreed upon and it is expected that an agreement will be reached in the near future leading to a partial undertaking of the work this year.

ILLINOIS TRACTION.—This company has authorized the construction of about three miles of passing tracks including a number of new 30-car tracks and the extension of others as well as the construction of yard tracks at Springfield, Peoria and Granite City, Illinois. The cost of this work will be approximately \$83,000.

MICHIGAN CENTRAL.—This company has awarded a contract to the Dominion Construction Company, Toronto, Ont., for the construction of the greater part of the second unit of its freight terminal and classification yard at Niles, Mich., the first unit of which, comprising the locomotive terminal and westbound yard, was completed in December, 1919, and described in the *Railway Age* of January 23, 1920. A current authorization of \$500,000 has been made to cover principally 320,000 cu. yd. of excavation, the construction of the eastbound hump and eight 100-car receiving tracks, 400,000 cu. yd. of embankment and twelve 100-car tracks of a 25-track classification yard, together with a permanent connection with the South Bend division tracks. It is intended to complete the entire project in 1923.

PENNSYLVANIA RAILROAD.—This company is asking for bids on the construction of a reinforced concrete overhead highway bridge over the tracks of the Turtle Creek Branch extension to Saltsburg, Pa.

PHILADELPHIA & READING.—This company has awarded a contract to F. W. Van Loon, Philadelphia, for the construction of a passenger station at Fourteenth street, Ocean City, N. J.

UNION PACIFIC.—This company is preparing plans for a \$1,000,000 freight station at Denver, Colo., one half of which is contemplated for this year, and has let a contract for the grading for an extension to the present Whittier branch of the Los Angeles & Salt Lake through the towns of Lahabra and Fullerton to Anaheim, Cal. The company has also under consideration extensive harbor improvements in the vicinity of San Pedro, Cal., to be undertaken jointly with the public authorities and has acquired property for a freight classification yard at Los Angeles.

UNION PACIFIC.—This company is planning to construct this year a substructure of a \$1,000,000 bridge across the Columbia river near Attalia, Wash., and has obtained authority for the construction of a \$500,000 tie treating plant at The Dalles, Ore., to replace the existing plant near Wyeth, Ore. The company is also contemplating very considerable improvements to its store department facilities at Pocatello, Idaho, Rawlins, Wyoming, and Grand Island and Omaha, Nebraska.

YAZOO & MISSISSIPPI VALLEY.—This company, which was reported in the *Railway Age* of March 18 as accepting bids for the construction of the passenger station at Webb, Miss., has decided to do this work with company forces.

Railway Financial News

ANN ARBOR.—*Equipment Trust Notes Offered.*—Schibener, Boeming & Co., of Philadelphia, are offering \$456,000 6 per cent equipment trust notes at prices to yield from 5.60 to 5.75 per cent, according to maturity. The notes are dated January 15, 1920, and mature \$52,400 each January 15, 1923 to 1935, inclusive. They are the balance of an original issue amounting to \$786,000.

ATCHISON, TOPEKA & SANTA FE.—*Asks Authority to Acquire Line.*—This company has filed an application with the Interstate Commerce Commission for authority to acquire control of the Eldorado & Santa Fe by lease of its property and purchase of the capital stock.

BALTIMORE & OHIO.—*New Director.*—George M. Shriver, senior vice-president, has been elected a director to succeed Hugh L. Bond, Jr., deceased.

CAROLINA & YADKIN RIVER.—*Receiver.*—The Commercial & Financial Chronicle states that L. H. Hole, Jr., has been appointed receiver on petition of the North Carolina Public Service Commission. Mr. Hole was formerly secretary and treasurer of the company, with headquarters at High Point, N. C. The Carolina & Yadkin River operates between High Point and High Rock, N. C., 35 miles.

CHICAGO & WESTERN INDIANA.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied that part of this company's application for a loan which applies to the request for \$2,000,000 for additions and betterments. The company originally applied for a loan of \$18,000,000. The commission allowed it \$8,000,000 for maturing indebtedness and the company requested that the application for \$2,000,000 for additions and betterments be withdrawn.

CHICAGO GREAT WESTERN.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Great Western Suffers from Adverse Conditions."

CHICAGO, MILWAUKEE & ST. PAUL.—*Equipment Trust Notes Sold.*—Freeman & Co., Hayden, Stone & Co., the New York Trust Company and the Equitable Trust Company of New York have sold \$9,500,400 6 per cent equipment trust notes at prices to yield from 5.35 per cent to 5.75 per cent, according to maturity. The notes are dated January 15, 1920, and are part of an original issue of \$16,444,500.

CINCINNATI, INDIANAPOLIS & WESTERN.—*Authorized to Pledge Bonds.*—The Interstate Commerce Commission has authorized this company to pledge and repledge from time to time all or any part of \$400,000 of first mortgage 5 per cent gold bonds as collateral security for short term notes.

COLORADO & SOUTHERN.—*Equipment Trust Authorized.*—This company has been authorized by the Interstate Commerce Commission to assume obligation and liability in respect of \$1,425,000, 5½ per cent equipment trust certificates in connection with the procurement of 1,000 gondola cars and 200 refrigerator cars.

DELAWARE & HUDSON.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of \$7,500,000 of 15-year, 5½ per cent gold bonds to be sold at not less than 95.

DENVER & RIO GRANDE.—*Deposit Date Extended.*—The Perkins Committee at the Farmers' Loan & Trust Company announces that the time has been extended for the deposit of the Denver & Rio Grande refunding 5 per cent bonds of 1955, under the plan of reorganization, to May 22, inclusive.

ERIE RAILROAD.—*Offers to Extend Coal Bonds.*—J. P. Morgan & Co. have mailed letters to holders of the New York, Lake Erie & Western Coal & Railroad Company first mortgage 6 per cent bonds, due May 1, announcing an offer to extend the issue until May 1, 1942, with interest at the annual rate of 5½ per cent. The offer also includes the payment of \$40 per \$1,000 bond to such holders as present their bonds for extension by April 28,

1922, thus making the net yield of the extended bonds about 5.84 per cent. When deposited, the coupon due May 1, 1922, will be cashed if presented with the proper tax certificate. On or prior to May 1, J. P. Morgan & Co. have agreed to buy at par and accrued interest the bonds of holders who do not desire to avail themselves of the extension privileges.

The bonds now outstanding in the hands of the public, aggregating \$1,100,000 face amount are to be extended as Series A bonds pursuant to the terms of a supplemental indenture to be made between New York, Lake Erie & Western Coal & Railroad Company, the Metropolitan Trust Company of New York, as trustee, and the Erie Railroad. Under the terms of the supplemental indenture, Erie Railroad will covenant to guarantee by endorsement the due and punctual payment of the principal and interest of said Series A bonds. The present mortgage security of the bonds is to remain unimpaired.

FORT WORTH & DENVER CITY.—Equipment Trust Authorized.—This company has been authorized by the Interstate Commerce Commission to assume obligation and liability in respect of \$750,000 of 5 1/2 per cent equipment trust certificates, in connection with the procurement of 500 box cars and 100 refrigerator cars.

GULF FLORIDA & ALABAMA.—Six Months Guaranty Certified.—The Interstate Commerce Commission has certified to the Treasury Department that the amount of this company's guaranty for the six months of 1920 is \$253,684, of which \$6,684 remained to be paid.

ILLINOIS CENTRAL.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized the Illinois Central and the Chicago, St. Louis & New Orleans to issue \$1,924,400 of joint first and refunding mortgage 5 per cent bonds to be delivered by the trustee to the C. St. L. & N. O. to be by it delivered to the Illinois Central in reimbursement of advances and to be pledged and repledged from time to time as collateral security for short term notes. The Canton, Aberdeen & Nashville was authorized to assume obligation and liability in respect of the bonds.

Annual Report.—The annual report issued last week shows the following income account for the year ended December 31, 1921:

	19-1	1920
Operating revenues	\$141,127,066	\$121,804,579
United States government guaranty period claim		19,499,887
Rental from United States Railroad Administration		3,399,635
Total operating revenues	141,127,066	144,704,101
Operating expenses	109,997,791	*121,991,985
Excess of revenues over expenses	31,129,275	22,712,115
Taxes	8,119,935	7,172,262
Operating income	22,989,920	15,516,534
Equipment rents—net credit	1,614,027	3,196,849
Joint facility interest debit	203,178	191,297
Net operating income	4,396,770	18,522,085
Non-operating income	5,039,238	7,219,882
Gross income	29,436,008	25,741,967
Deductions from gross income	19,735,213	12,170,845
Net income	9,700,795	13,571,122
Total operations—Income	44,219	136,281
Income balance transferred to credit of profit and loss	9,656,275	13,434,841

*Includes operating expenses, car rate for the months of January and February, 1921, amounting to \$117,658 not assumed by the United States Railroad Administration, which was stated separately in the report for 1920.

New Directors.—R. A. Connelly, New York, and Stanley Field, Chicago, have been elected directors in place of J. Ogden Armour, resigned, and Walter Lutzgen, deceased.

INTERNATIONAL & GREAT NORTHERN.—Partial payment of Guaranty Certified.—The Interstate Commerce Commission has certified to the Treasury Department the partial payment on account of this company's guaranty for the six months following the termination of federal control of \$28,210.

LAKE ERIE & WESTERN.—Six Months Guaranty Certified.—The Interstate Commerce Commission has certified to the Treasury Department the amount of this company's guaranty for the six month period in 1920 as \$509,918, of which \$140,918 was still to be paid.

LONG ISLAND.—Annual Report.—The annual report issued last week shows the following income account for the year ended December 31, 1921:

	1921	*1920
Operating revenues		
Freight	\$8,083,614	
Passenger	18,084,144	
Total, including other	26,167,758	
Operating expenses		
Maintenance of way and structures	3,170,691	
Transportation	4,939,878	
Taxes	731,478	
Transit	11,696,486	
General	737,996	
Total operating expense	20,716,989	
Net revenue from railway operations	5,450,769	

Railway tax accruals	1,535,276
Railway operating income	3,965,489
Net railway operating income	3,311,214
Total non-operating income	1,158,377
Gross income	4,469,591
Interest on funded debt	2,546,851
Total deductions from gross income	3,869,972
Net income	599,189

*Operation during 1920 having been for two months under federal control, for six months under the government's guaranty, and for four months without government relationship, no comparison of items of railway operating revenues, expenses, etc., are shown in this statement.

MISSOURI-ILLINOIS.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$225,000 of first mortgage, 7 per cent gold bonds, to be sold at 92 1/2 and accrued interest, the proceeds to be used to pay for the construction, equipment and delivery of a steam car ferry across the Mississippi river between Kellogg Landing, Ill., and Little Rock Landing, Mo., and for the equipment and betterment of approaches to be used by the ferry when placed in service.

MISSOURI, KANSAS & TEXAS.—Payments Called For.—J. & W. Seligman & Co. and Hallgarten & Co., reorganization managers, have announced that a cash installment of \$5 a share on this company's common stock and \$4 a share on its preferred would be payable on or before May 10 on the stock deposited with the Equitable Trust Company of New York. At the time of payment of the cash installment participation warrants issued for the deposited stock must be presented for the necessary notation thereon.

MORGANTOWN & KINGWOOD.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$40,500 of first mortgage 5 per cent, 30-year bonds for the purpose of refunding a like amount of first mortgage 5 per cent, 20-year bonds which matured on January 1

NASHVILLE, CHATTANOOGA & ST. LOUIS.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	*1920
Operating revenues:		
Freight	\$14,323,243	\$16,873,107
Passenger	5,113,363	5,661,011
Total operating revenues	20,924,602	24,491,175
Operating expenses:		
Maintenance of way and structures	3,065,616	5,009,805
Maintenance of equipment	5,501,899	6,617,204
Traffic	833,828	711,819
Transportation	9,465,005	11,905,482
General	678,288	722,762
Total operating expenses	19,607,276	25,037,952
Railway tax accruals	550,000	625,500
Total operating income	758,338	Def. 1,173,169
Total non-operating income	882,933	1,066,715
Gross income	1,641,371	Def. 108,454
Interest on funded debt	832,894	837,012
Total deductions	1,901,373	1,848,389
Net deficit	**259,802	1,956,843

* Combined corporate and federal figures used for 1920 for comparison.

** The annual report to the Interstate Commerce Commission shows a net deficit of \$411,399. It includes revenues and expenses accruing prior to January 1, 1918, amounting to \$151,597, which in this report is entered in the profit and loss account.

NEW YORK, LACKAWANNA & WESTERN.—To Increase Capital.—The stockholders have voted to increase the authorized stock from \$10,000,000 to \$15,000,000 and to authorize a mortgage bond issue of \$25,000,000.

NEW YORK, LAKE ERIE & WESTERN COAL & RAILROAD.—Offers to Extend Bonds.—See Erie Railroad.

NEW YORK, NEW HAVEN & HARTFORD.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "New Haven Should Soon Realize on Improvements."

PAULISTA RAILWAY (BRAZIL)—Bonds Offered.—Lee, Higginson & Co., Ladenburg, Thalmann & Co., and Marshall Field, Gore, Ward & Co., have sold a new issue of \$4,000,000 Paulista Railway Company 20-year first and refunding mortgage 7 per cent sinking fund gold bonds, series A, due March 15, 1942. The bonds are offered at 99 and interest, yielding slightly more than 7 1/2 per cent. The principal and interest are repayable in United States gold coin. The loan is repayable through a sinking fund or at maturity at 102 and interest.

RICHMOND, FREDERICKSBURG & POTOMAC Annual Report.—The income statement for the year ended December 31, 1921, compares as follows:

	1921	*1920
Operating revenues	\$10,002,076	\$8,998,220
Operating expenses	7,859,005	7,125,686
Net revenue from railway operations	2,143,070	1,872,534
Railway tax accruals	401,566	359,445
Total operating income	1,740,504	1,513,089
Total non-operating income	382,962	407,063
Gross income	2,123,890	1,879,687
Interest on funded debt	390,077	330,822
Total deductions from gross income	1,138,401	1,002,578
Net income	985,489	877,109
Income applied to sinking and other reserve funds	885,489	62,964
Income balance	985,489	814,146

*Figures for ten months, March 1 to December 31.

The operating revenues and expenses in detail and the principal traffic statistics for 1921 compare as follows:

OPERATING REVENUES		
	1921	1920
Freight	\$5,069,361	\$5,239,368
Passenger	3,577,332	3,883,019
Total operating revenues	\$10,002,076	\$11,049,884
OPERATING EXPENSES		
	1921	1920
Maintenance of way and structures	1,505,957	1,209,078
Maintenance of equipment	1,686,962	1,838,339
Traffic	95,817	89,887
Transportation	4,057,651	4,815,523
General	539,808	334,211
Total operating expenses	\$7,859,005	\$8,424,295
Net from railway operations	2,143,070	2,625,589
Railway tax accruals	401,566	450,811
Railway operating income	1,740,504	2,174,290
PASSENGER TRAFFIC		
	1921	1920
Number of passengers carried earning revenue	1,696,896	1,887,906
Number of passengers carried one mile	99,401,561	107,574,338
Average distance carried—miles	58.58	56.98
Average receipts per passenger per mile—cents	3.59	3.061
FREIGHT TRAFFIC		
	1921	1920
Number of revenue tons carried	3,337,874	3,809,511
Number of tons carried one mile	202,073,000	328,729,970
Average distance hauled of ton—miles	60.50	86.29
Average receipts per ton per mile—cents	1.678	1.330

NOTE.—Traffic statistics for 1920 are from March to December.

SEABOARD AIR LINE.—Authorized to Assume Obligations.—The Interstate Commerce Commission has authorized this company to assume obligations and liabilities in respect of equipment notes to be issued by the Seaboard-Bay Line Company and to guarantee by endorsement its obligations to the United States in the amount of \$4,400,000. The Baltimore Steam Packet Company not being a carrier within the meaning of section 20-a of the Interstate Commerce Act, its application for authority to assume obligations and liabilities was dismissed for want of jurisdiction.

SEABOARD-BAY LINE.—Loan Authorized.—The Interstate Commerce Commission has authorized a loan of \$4,400,000 to this company, together with its approval of the company as an organization or agency through which the loan may be made to enable it to provide equipment for sale or lease to the Seaboard Air Line. The security offered was the unconditional guaranty of the Seaboard Air Line and the Baltimore Steam Packet Company, full title to the equipment to be acquired and full title to two freight and passenger steamers to be acquired. The commission eliminated from the application \$90,000 for the purchase of three dining cars and it also imposes certain conditions, one of which is that the applicant shall provide \$200,000 in cash in addition to an investment of \$1,285,000 for the steamers and shall pay the cost of the rebuilt cars in excess of \$1,030,000. Commissioner Daniels wrote a vigorous dissenting opinion saying that to certify the loan is to give indirectly to the beneficiary, the Seaboard Air Line, that which it is conceded the commission could not grant to it directly and that the proposed loan, in addition to those already made to the Seaboard, \$8,698,400, seems to allot a wholly disproportionate amount of the revolving fund to this carrier. He also said that the condition heretofore insisted upon in the way of self-help from carriers is in this instance almost totally abandoned and that "the circuitous character of the financing involved" inclines him to doubt the wisdom of the plan apart from the objections as to the validity and merits of the loan itself. The equipment proposed to be acquired consists of 25 locomotives at \$40,000 each, 1,250 box cars at \$1,554.79; 300 flat cars at \$1,085.63; 200 phosphate cars at \$1,453.58 and 3,000 rebuilt freight cars to be purchased from the Chickasaw Shipbuilding & Car Company, which will acquire them from the carrier, thereby releasing them from the lien of its mortgages.

SILVERTON.—Abandonment of Line Recommended.—The Interstate Commerce Commission has made public a tentative report of one of its examiners recommending that the commission issue a certificate authorizing the abandonment of its narrow gauge line from Silverton to Joker Tunnel, Colo., 15½ miles.

TENNESSEE, ALABAMA & GEORGIA.—Sold.—This road was sold to C. E. James, of Chattanooga, on April 7, for \$130,000 by Special Commissioner D. L. Grayson. The Sage estate was the former owner of the road, which extends from Chattanooga, Tenn., to Gadsden, Ala., 92 miles. It has been in the hands of receivers since December 15, 1920, and has been offered for sale several times.

TOLDO TERMINAL.—Authorized to Draw Down Bonds.—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery to the treasurer of \$400,000 of first mortgage gold bonds.

WINSTON-SALEM TERMINAL.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$3,000 of stock and \$700,000 of first mortgage 5 per cent gold bonds, the proceeds to be used for the construction of a union passenger station and other terminal facilities at Winston-Salem, S. C.

WABASH.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Operating revenues:		
Freight	\$45,688,528	\$43,324,700
Passenger	9,931,246	11,218,051
Total operating revenues	59,217,692	59,982,282
Operating expenses:		
Maintenance of way and structures	9,160,930	10,541,360
Maintenance of equipment	11,812,085	14,735,801
Traffic	1,431,678	1,169,383
Transportation	25,309,317	30,023,953
General	2,028,804	1,999,814
Total operating expenses	50,007,815	58,859,395
Net operating revenue	9,209,877	11,218,887
Railway tax accruals	1,860,487	1,574,473
Total operating income	7,705,235 Def.	154,103
Net railway operating income	4,372,358 Def.	3,817,671
Total non-operating income	974,546	562,454
Gross income	5,346,904 Def.	3,255,217
Interest on funded debt	3,629,804	3,660,796
Total deductions from gross income	4,065,543	4,114,610
Net income	1,281,361 Def.	7,369,827
Government guaranty	736,215	8,063,775
*Compensation accrued under federal control Federal operations—January and February, 1922		971,135
Total	736,215	318,860
Credit income balance transferred to profit and loss	2,017,576	9,353,769
	2,017,576	1,983,943

*Subject to change when contract is executed definitely fixing the amount of annual compensation.

Equipment Trusts Sold

The director general has announced additional sales at par plus accrued interest, of railroad equipment trust certificates maturing January 15, 1923 to January 15, 1935, inclusive, held by the government, to:

Dillon, Read & Co., New York City, GRAND TRUNK WESTERN	\$1,790,100
Schibener, Boening & Co., Philadelphia, Pa., ANN ARBOR	3,000,000
Biddle & Henry, Philadelphia, Penna., WESTERN MARYLAND	494,000
	\$2,740,400

The sales comprise approximately two-thirds of all the maturities of these equipment trust issues. The balance of one-third of all maturities will be stamped as subordinated, in accordance with the agreement as amended under the plan recently announced. The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$251,950,700.

Dividends Declared

Delaware & Hudson	2½ per cent, quarterly, payable June 20 to holders of record May 27.
Illinois Central	—1¾ per cent, quarterly, payable June 1 to holders of record May 5.
Pennsylvania Railroad	—1 per cent, quarterly, payable May 31 to holders of record May 1.
Pullman Company	—\$2.00, quarterly, payable May 15, to holders of record April 29.
Reading Company	—First preferred, 1 per cent, quarterly, payable June 8, to holders of record May 23.

Trend of Railway Stock and Bonds Prices

	Last Week	Last Year
Average price of 20 representative railway stocks	65.96	64.99
Average price of 20 representative railway bonds	86.62	85.82
		73.44

Railway Officers

Executive

S. A. Wilder, assistant to the general manager of the Northern Pacific with headquarters at St. Paul, Minn., has also assumed the duties of John Wynn, assistant to the general manager, whose death was reported in the *Railway Age* for March 11, and Mr. Wynn's position has been abolished.

Financial, Legal and Accounting

J. B. Hill, whose election as treasurer and appointment also as assistant to the president of the Nashville, Chattanooga & St. Louis with headquarters at Nashville, Tenn., were reported in the *Railway Age* of April 22, was born in Spencer, Tenn., on November 14, 1878. Immediately following his graduation from the George Peabody College for Teachers at Nashville, Tenn., in June, 1898, he entered the service of the Nashville, Chattanooga & St. Louis as a clerk at Sparta, Tenn. He continued as a clerk and operator at Sparta until January, 1900, when he entered the division superintendent's office at Tullahoma, Tenn., where he was employed first as a stenographer and operator and later as a clerk until June, 1901, when he was transferred to the office of the division superintendent at Nashville, Tenn. From June, 1901, to January, 1903, he served in the consecutive capacities of stenographer, clerk and assistant chief clerk at Nashville and in January, 1903, he became a clerk in the treasurer's office at Nashville and later served as private secretary to the secretary and treasurer until 1915. From 1915 to 1918 he was transfer agent and assistant secretary and from 1918 to March, 1920, was chief clerk in the office of the federal manager of the Nashville, Chattanooga & St. Louis, and the Tennessee Central at Nashville, Tenn., following which he served in the capacities of transfer agent, assistant secretary and chief clerk to the president which positions he held at the time of his recent promotion.

Operating

A. G. Mitchell, whose appointment as secretary of the Association of Transportation Officers of the Pennsylvania was announced in the *Railway Age* of April 22, was born at Madison, Me., on February 3, 1855. He was graduated from the University of Maine in 1875 and entered the service of the Somerset (now Maine Central). In February, 1880, he entered the employ of the Pennsylvania as a rodman. The following year he was promoted to transitman and, a few months later, to assistant engineer. In 1882 he went with the H. C. Frick Coke Company as assistant to the chief engineer. Mr. Mitchell re-entered the service of the Pennsylvania in 1884 as assistant engineer in the office of the engineer in charge of way. A few months later he was appointed constant supervisor at Huntingdon, Pa. He served in a similar capacity at Spruce Creek, Pa., and Philadelphia and was promoted to supervisor at Monongahela City, Pa., in 1887 and transferred to Gallitzin in 1888. In 1891 he was promoted to assistant engineer of the Monongahela division and was advanced to superintendent of the same



A. G. Mitchell

division in 1901. In 1918 he was transferred as superintendent of the West Jersey & Seashore Railroad and the Camden Terminal division, which position he held at the time of his recent promotion.

O. H. Frick, district engineer of the Middle district of the Chicago, Milwaukee & St. Paul with headquarters at Milwaukee, has been promoted to superintendent of the La Crosse division with headquarters at Portage, Wis., succeeding **W. H. Thurber** who has been transferred to the Dubuque division. Mr. Thurber succeeds A. J. Hasenbalg, resigned.

Traffic

S. C. Berghaus, chief clerk to the general passenger agent of the Chicago, Indianapolis & Louisville at Chicago, has been promoted to the newly created position of supervisor, mail, express and milk traffic, with the same headquarters.

Mechanical

Eldred Byron Hall, principal assistant superintendent of motive power and machinery of the Chicago & North Western, with headquarters at Chicago, has been promoted to superintendent of motive power and machinery, with the same headquarters, to succeed **Harry T. Bentley**, who has been promoted to general superintendent of motive power and machinery, with the same headquarters, succeeding **Robert Quayle**, who will retire April 30. The position of principal assistant superintendent of motive power and machinery has been abolished.

Engineering, Maintenance of Way and Signaling

C. U. Smith, assistant engineer of the Chicago, Milwaukee & St. Paul at Milwaukee, Wis., has been promoted to district engineer of the Middle district, with headquarters at Milwaukee, effective May 1, succeeding O. H. Frick, who has been promoted to Superintendent of the La Crosse division, with headquarters at Portage, Wis.

Purchasing and Stores

R. M. Nelson has been appointed purchasing agent of the Chesapeake & Ohio and **A. W. Hix** has been appointed assistant to the director of purchases and stores.

Obituary

Grant W. Taylor, assistant to the vice-president of the Southern Railway, died on April 18 at Washington, D. C. Mr. Taylor was born June 20, 1863, in Solon, Ohio. He entered railroad service in 1879, when he became telegraph operator on the Pennsylvania. He served in various capacities on that road. His first connection with the Southern Railway, with which he was connected at the time of his death, began November 12, 1885, when he entered the employ of the Richmond & Danville line, which was soon after absorbed by the Southern system. From that time on Mr. Taylor made his home in Washington. He served in many capacities, including traveling secretary to the general manager, chief clerk and general superintendent. In 1903 Mr. Taylor left the Southern, but returned to it again three years later, becoming superintendent of transportation. During his three years' absence he was connected with the Chicago & Alton. In 1917 he was appointed assistant to the vice-president of the Southern and was so employed up to the time of his death.

MODESTY IS A VIRTUE but bashfulness is a vice. This we quote from the last public circular of the Buffalo, Rochester & Pittsburgh, which railway has resolved not to be excessively modest in the future. Carrying out this resolve, the circular gives extracts from letters from a number of passengers and other patrons of the road telling of instances of exemplary courtesy manifested by the conductors, trainmen and other employees of the road.

EDITORIAL

Railway Age

EDITORIAL

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The degree of efficiency with which a locomotive performs its work day after day is largely dependent upon the standard of maintenance which the management had set and to which the forces at the terminals are held. The selection of a general design and the working out of details which are capable of keeping down costs of operation is only the first step. Neither will it be possible to obtain adequate returns on the original capital investment if the management simply establishes a standard of maintenance and then fails adequately to see that this standard is consistently followed. Standards, like laws, are worse than useless if they are not enforced. In these days when it is necessary to make every saving possible and hold costs to a minimum, there is a strong tendency to consider a dollar not spent as a dollar saved. As a consequence many a locomotive in service today is in operation with the valve motion not properly adjusted, cylinder or valve packing leaking, draft appliances in the front end not in proper shape, engine not steaming freely; although it manages to take its train over the road, the coal consumed is considerably more than necessary. It is to be feared that quite a percentage of the savings which have been effected by reducing expenditures for locomotive maintenance have simply resulted in saving at the spigot and wasting at the bung hole. This false economy may not show as accounts are now kept but there are large and unnecessary bills for fuel and oil which have to be met even though they are buried out of sight.

Economies from Better Locomotive Maintenance

The Van Sweringen interests of Cleveland have purchased for \$3,000,000 the majority stock interest held by the New York Central in the Lake Erie & Western. They now control the New York, Chicago & St. Louis, the Toledo, St. Louis & Western and the Lake Erie & Western, three lines having a total mileage of approximately 1,700 miles. It is too early as yet to ascertain just what is behind the gathering in of these three lines under one control. The Lake Erie & Western operates 738 miles. Its main lines extend from Sandusky on Lake Erie to Peoria; and from Indianapolis to Michigan City, and from Fort Wayne, Ind., to Connersville, the latter two lines crossing the first at right angles. That the three roads should be brought under one control seems to be a consistent development. The Nickel Plate has made a place for itself in fast freight service between New York and Chicago over its own line and to St. Louis via connections, one of which is the Clover Leaf, connecting with the Nickel Plate at Continental, Ohio. The importance of the Lake Erie & Western in the group will presumably be because of its connections at Peoria and because of its being a feeder line for the group. The grouping, further, is in accordance with the tentative plan of consolidation proposed by Professor Ripley and by the Interstate Commerce Commission. Professor Ripley, for instance, suggested that the Lake Erie & Western might better be joined with the Nickel Plate rather than with the New York Central as it has been for several years. The I. C. C. plan included in its System No. 5, the Wheeling & Lake Erie, the Pittsburgh & West

Virginia, the Bessemer & Lake Erie, etc. Professor Ripley gave this group as its main stem the Lackawanna; the I. C. C. changed this in its tentative plan to the Lehigh Valley. The question now arises as to how much farther the Van Sweringen plan will be carried, if it is to be carried farther.

The police power of the state is constantly up against a task that is too much for it; the task of repressing innumerable offenses against the safety, the decency, or the comfort of the public, which offenses are too small to be punished; or, in more exact phrase, so small that society has found no practicable way of punishing them, except spasmodically. For example, playing ball in the streets; speeding (by automobiles), which is not bad enough to be susceptible of proof in court the next day; smoking in railroad waiting rooms, varied noise nuisances, and so forth. The crime of crossing a track carelessly must, usually, be included in this class; and this paragraph is written to call attention to a new law in Virginia, noticed on another page. This law requires every driver to stop before going over a track, with certain exceptions. It is a good law. But the exceptions weaken it; and exceptions conceived in the driver's mind will weaken it still further. At a track which is traversed by only a very few trains each day the majority of drivers may be expected to break the law. These obvious considerations will serve to remind us that the value of such a statute as this must be largely in its remote or indirect effect on the public mind. It must be posted, and be talked about; and its principle must be got into the people's minds in whatever ways may be found feasible. It deals with a very old problem; and to find new ways to settle old problems requires endless ingenuity. A good point for the well-disposed autoist to remember is that although the statute only mentions one thing for him to do, the courts will require him to take whatever precautions ought to be taken by a level-headed, intelligent, unexcited, unselfish citizen. That is to say, except where there is ample reason for suspending the rule, he must do three things:—

STOP, LOOK AND LISTEN

Under the influence of increased traffic Henry Ford's "model" railroad, the Detroit, Toledo & Ironton, is making a more satisfactory showing than it did last year. For the month of March it reported to the Interstate Commerce Commission a net operating income of \$176,659, an increase as compared with last March of \$116,889. For the three months of 1922 the net operating income was \$334,556, an increase of \$582,957 as compared with last year, when there were deficits in January and February. The report shows an increase in operating revenues of \$960,338 for the three months and an increase in expenses of \$240,340. Maintenance of way ex-

A Crossing Law in Virginia

Ford Railroad Shows Increased Net

penses were reduced but there was an increase in maintenance of equipment of \$104,530 and in transportation expenses of \$213,406. If the increase in traffic should continue at this rate Mr. Ford might be able to pay a dividend this year but last year there was a considerable slump toward the end of the year which wiped out the net for several months and left a balance for the entire year representing less than one good month's business, far short of enough to pay interest charges.

It is evident that for every car moving loaded in the direction of heavy traffic, a car must be moved, either empty or loaded, in the opposite direction. It is also evident that for every fully loaded train moving in the direction of heavy traffic, an engine and crew must be moved in the opposite direction, even though tonnage is not available. How, then, should these two balancing movements be combined to produce the most economical operation—by the accumulation of empty cars for fleet distribution from market to producing territories, or by the nearest possible approach to a car for car exchange? Since there can be no delay in balancing train movements, is not the latter likely to produce the best results? It is evident that every fleet movement must actually effect an increase in train mileage which would be avoided by the current movement of empty cars as a part of the light trains which must be run in either case. These are pertinent facts which should be kept clearly in mind in discussing the merits of any system of car service, whether it be founded on the principle of individual ownership or of central ownership and distribution control.

Balancing Car Movement

April saw the placing of more orders for cars and locomotives than has been the case for any month for an extended period of time. The number of locomotives ordered for domestic service totaled 272; of freight cars, 29,345 and of passenger cars, 540. There were ordered in April more freight cars and more passenger cars than were ordered in all twelve months of 1921. The April figure of 29,345 freight cars compared with total domestic orders placed in 1921 of 23,346. The April passenger car figure of 540 was double the entire 1921 total of 246. This shows the degree of contrast between the activity of the railway supply field at present and the lack of activity in 1921. It evidences a decided improvement—to put it mildly—and indicates that the equipment market has succeeded in climbing out of what in 1921 seemed to have all the aspects of a bottomless pit. But a more interesting feature is that the 1922 orders

Equipment Orders in April

DOMESTIC ORDERS

	Locomotives		Freight Cars		Passenger Cars	
	1922	1916	1922	1916	1922	1916
Jan.	5	231	7,960	14,613	235	
Feb.	8	272	14,771	9,233	160	
March	76	634	6,550	14,233	25	
April	272	178	29,345	7,228	540	
Total 4 mos.	161	1,315	58,626	45,397	960	683

in the first four months of 1922 have been 960, over half of which were ordered in April. This compares with a total of 683 in the first third of 1916 and shows the degree of effort which the railways have been using to make up for the lack of new passenger equipment acquisitions since the beginning of federal control. Locomotives do not show the same results as cars. The total for the first four months was 361, as compared with 1,315 in the first four months of 1916. But the outstanding factor in the case of locomotives is that of the 361 for January to April, 1922, 272 were ordered in April, which means that the locomotive orders are coming in at a rapid rate but have been slower in getting started than has been the case of cars. All these details confirm the opinion of those who have been preaching optimism about the industrial revival.

Statistics prepared by the United States Forest Service in co-operation with the American Wood Preservers' Association, show that 55,383,515 ties were given preservative treatment in 1921. This represents an increase of 26½ per cent over the number of ties treated in 1914, the high point in timber preservation before our entry into the war. Subsequent to 1914 the timber preserving industry suffered a marked decline so that ties subjected to preservative process in 1918 reached the low figure of 30,609,209. Since that date, however, there has been a steady recovery and the results for 1921 indicate not only a complete restoration of all the ground lost during the war period but also a marked extension in the use of treated ties by the railroads. The past year has seen considerable developments in this industry, including the construction of a number of new treating plants and a greater utilization of treated ties by roads which hitherto had not considered the treated tie with much favor. Unfortunately no figures are available for the total consumption of cross ties by the railroads. Consequently, it is impossible to give any accurate comparison between the number of treated and untreated ties used, but it is apparent that the volume of treated ties now represents close to one-half of the total consumption of cross ties.

The *Railway Age* is pleased to publish elsewhere in this issue the clearest, most succinct account of conditions as they are in Russia which has come to its notice. A considerable literature in the form of books and magazine and newspaper articles has grown up on this subject. Many of these articles and books absolutely condemn the present regime and just as many, or maybe more, concern themselves with the white-washing of the activities of the Soviets. The article we publish does not deal with politics as such. Instead it tells of the economic condition of the country—not only of the railways, but of agriculture and industry in general—and how the present government is absolutely powerless in improving conditions. Our correspondent, who has but recently returned from extensive travels in the country, believes that Russia is a land of opportunity for capitalists who are willing to take great risks in return for prospective gains enormous in proportion. Naturally America is the country where one looks not only for capital in sufficient amount but for financial leaders with sufficient daring to undertake such a venture. The writer, who must unfortunately remain nameless, will, we believe, leave our readers with the hope that American financial leadership will interest itself in Russia's problem, for the benefit of all concerned. According to recent news from Europe, British capital seems already to be interested

Timber Treatment on the Increase

Russia, the Land of Opportunity

to date are back at their pre-war level, as indicated, for instance, in such a year as 1916. In the first four months of 1922 the total orders for domestic freight cars totaled 58,626, one-half of which orders were reported in April alone. The total for the first four months of 1916 was 45,397. The orders in April were double those of the best month in the first third of 1916. The total domestic passenger car orders

The station agent or conductor to whom is addressed a criticism of his railroad must reply to it; and the nature and tone of his reply may make or lose a friend. Indeed, the thousands of such replies that will be made within the next week, taken as a whole, will be a material element in the public sentiment which will rule the railroads of America for the next year, or series of years. This connection between a casual conversation and an imponderable thing like public sentiment, seems too vague to be dealt with seriously; every officer, station agent and conductor finds things more immediately practical with which to busy himself. But why not deal with it seriously? In fact we do, in lectures and circulars. But lectures and circulars are nothing but words; how can we get down to brass tacks? These thoughts arise on reading the last circular of W. A. Winburn, president of the Central of Georgia, which says in part:

"To render efficient service, should the anticipated revival in business mark the harvest season, will be no easy task. Alertness, energy, courtesy and a whole-hearted willingness to be of service must characterize our efforts to have the human equation supply any deficiencies that may appear in mechanical equipment. When business is dull the public is inclined to feel that transportation rates are burdensome and we of the Central of Georgia have not been able to prevent that feeling, or to offer a remedy. Should business become brisk, the demand will be for quick, sure and adequate service. This we can and must supply. A personnel that can 'weather a storm,' can likewise 'make hay while the sun shines.'"

Or, concretely, if the locomotives on your best trains are not equal to making time; or, because there are too few locomotives, the switching service at your station is half a day behind time, your explanation must be *adequate and sympathetic*. As the local representative, how will you word it? How can you meet these little emergencies unless you rehearse them over, in imagination, beforehand?

The Coal Strike and Railroad Earnings

THE coal loadings for the week ended April 8 were 69,456 cars; for the week ending April 15, 62,851 cars, and for the week ending April 22, 63,445 cars. These loadings are at a rate about one-half those for the corresponding period of 1921 when business was poor. They are about one-third those for the early part of 1920 when business was good, and about one-half those of the weeks in 1920 in which occurred the outlaw strike of the railroad switchmen. The March, 1922, loadings ran about 200,000 cars a week, due primarily to the heavy movement of coal in anticipation of the coal strike, which began according to schedule on April 1.

No one seems to be worried very much about the coal strike. One of the reasons is that a very large quantity of coal moved in anticipation of the cessation of work in the union districts. Another is the manner in which fuel supplies are being received from the non-union fields. There is another reason also in that the operators—and the same applies to the miners—have not seen fit to say much about the strike, which may be due to the fact either that they do not want to do so or do not know how.

Another interesting feature is that the stock market seems to have paid little or no heed to the strike. Although the financial centers were well aware that the elimination of a large share of the coal tonnage would have a somewhat unsatisfactory effect on railroad earnings, the trend in railway shares throughout the month of April was upward. The *Railway Age's* average of the prices of 20 representative railway stocks stood on March 28 at 60.60; on May 2, it had risen to 65.26.

It is, of course, true that the strike will not last forever. It is also presumably the fact that as soon as the strike is ended the movement of coal will be heavy, due to the continuing revival in industry and the need of catching up on depleted stocks of fuel. The situation as a whole resolves itself into a presumption that railway earnings will continue

to increase gradually throughout the year except as concerns the months in which the strike remains effective. The railway earnings now being reported for March are very favorable. However, it is necessary to bear in mind that these earnings do not paint a true picture. There will be those who will try to show that they indicate a return to normalcy. If this is done it will be far from the facts. The March earnings were affected by the increased coal tonnage anticipatory to the strike. The April earnings will be much poorer and may be very disappointing because of the importance which the coal traffic bears to the total, and particularly will these things be true in the case of the roads which derive a large part of their tonnage from coal.

It is interesting to examine the situation as it is affecting the leading coal railroads. The details show the practical elimination of coal traffic on many of them. The roads serving the non-union coal areas, fortunately offer a few exceptions, and presumably will have to be regarded as supplying the silver lining to the cloud in the situation. The roads in the Pocahontas district, including the Chesapeake & Ohio, the Norfolk & Western and the Virginian are loading more coal than ever. The Norfolk & Western, to take the leading example, is doing especially well, serving as it does the non-union Thacker, Tug River, Kenova, Pocahontas and Clinch Valley coal fields. In the week ended April 8 it loaded 11,446 cars, or more than one-sixth the total coal loadings for the entire country.

Another road which is doing well in the coal strike is the Louisville & Nashville, serving mines in Kentucky. In fact the roads in the south are, on the whole, not seriously affected by the strike. The figures for the district include those for the Illinois Central, the traffic of which has been seriously cut. Nevertheless, the coal loadings for the week ended April 22 in the southern district totaled 15,698 cars, as against 17,646 in the corresponding week of 1921.

COAL LOADING ON SOME OF THE LEADING COAL ROADS

Railroad	Week Ended April 8, 1922	Corresponding Week 1921	Week Ended April 15, 1922	Corresponding Week 1921
Eastern District:				
B. R. & P.	471	1,371	622	1,100
Delaware & Hudson....	1,283	4,804	838	4,739
D., L. & W.	320	1,234	234	5,170
Eric	60	4,076	3	4,305
Lehigh Valley.....	353	6,571	256	6,479
New York Central....	182	1,229	173	1,528
C. C. & St. L.	1	1,816	0	1,667
Hocking Valley.....	1	770	0	912
W. & L. E.	156	1,463	162	1,469
Allegheny District:				
Baltimore & Ohio.....	6,234	8,178	5,742	8,715
Central of N. J.	0	3,086	0	3,136
P. R. R.	10,614	18,188	6,774	18,579
P. & R.	1,547	5,823	1,374	6,195
Western Maryland....	368	1,388	380	1,403
Pocahontas District:				
C. & O.	7,798	7,516	8,471	8,437
N. & W.	11,446	6,076	20,010	2,071
Virginian.....	1,943	1,577		
Southern District:				
Southern	1,934	1,737	1,784	1,907
I. C.	1,337	3,925	1,133	4,285
L. & N.	7,076	7,468	8,165	7,722
Western District:				
A., T. & S. F.	383	813	340	1,189
Chicago & Alton.....	229	1,105	60	1,906
C., B. & Q.	250	3,315	201	3,788
C. T. H. & P.	0	1,388	2	1,411
Missouri Pacific.....	106	911	69	1,096
St. L.-S. F.	928	1,276	828	1,422

The roads which are being most adversely affected are the anthracite carriers because no anthracite is being mined at all. The figures for these roads and those for the others shown—excepting possibly the Baltimore & Ohio and to a lesser extent, the Pennsylvania—are striking and show that the cessation of work in the coal mines is having a potent effect.

It is, of course, true that these figures do not give a complete story. The Hocking Valley, for example, is loading no coal on its own lines; it is, however, receiving business from the Chesapeake & Ohio. The Big Four similarly is loading no coal; it receives, however, a large tonnage in interchange from the Louisville & Nashville. However, it is evident that most of the roads mentioned other than those,

such as the Norfolk & Western, the Louisville & Nashville, etc., are going to show the results of decreased coal tonnage in their earnings statements. The tonnage involved is great, as is the gross revenue to be derived therefrom.

These facts indicate the railroad interest in the coal strike, and tend to make those interested in railway matters feel somewhat concerned that the strike is receiving so little attention or that little or no progress is being made towards its settlement.

Some Thoughts on Valuation

THE HISTORY of the discussion and legislation regarding valuation of railways might be made the subject of an amusing disquisition. It would be highly diverting if the question of valuation were not so serious. It is difficult to become facetious regarding a problem the solution of which may result in the recognition or in the confiscation of equities in property amounting to billions of dollars. The way this problem is solved is going to put to the test the intelligence and integrity of the American people. If some of the principles advocated should be adopted those who have invested in good faith in railways would be subjected to legalized robbery. If such a precedent were set in the case of the railways no kind of property in this country could be regarded as safe from seizure under the forms of law.

It is time to recall the developments which have produced the present situation with respect to valuation. Many seem to think the railways asked for it. They did not. Their spokesmen always contended that valuation was not the right basis for making rates. The agitation for legislation to require the Interstate Commerce Commission to make a valuation was carried on mainly by those who alleged that the railways were grossly overcapitalized. They contended that the railways charged excessive rates to earn a return on vast amounts of "water." They argued that a physical valuation would prove their charge of over-capitalization and that the valuation should be made in order that rates might be fixed which would yield only a "fair return." They seemed confident that a valuation would justify wholesale reductions of rates.

The valuation bill finally passed by Congress in 1913 was originally drafted by Senator LaFollette of Wisconsin. He had alleged over-capitalization against the railways oftener than any other man in the country. His original bill designated the Interstate Commerce Commission to make the valuation. The enemies of the railways both got the legislation passed and selected the body to do the work.

The sequel seems to show that they did not so much want to find the true value of the railways as to cause confiscation of a large part of them. When the Transportation Act of 1920 was passed the commission had been working on the valuation over six years. It had inventoried the physical properties of most of the railways and had the records in its office. The Transportation Act directed it in regulating rates to take into consideration the information it had gathered. The commission for the purpose of the rate case of 1920 placed upon the railways a tentative valuation of \$18,900,000,000. Its members repeatedly have told members of congressional committees that this was based mainly upon the results of their investigation under the valuation law.

Nevertheless, the very people who got the valuation law passed have been amongst the loudest and most active in disseminating propaganda to discredit the commission's tentative valuation as grossly excessive. It was to be expected that the railway labor leaders would attack it. They want to see the earning capacity of the railways destroyed as the shortest way of bringing about government ownership and employees' management under the Plumb plan, and they

have contributed to the discussion some remarkable impromptu valuations of their own. William H. Johnston, president of the International Association of Machinists, took a few minutes from other duties one day and made a valuation of \$8,610,000,000. President Markham of the Illinois Central showed that Mr. Johnston's valuation defied the ordinary rules of arithmetic and that if it had conformed to those rules it would have been \$4,640,000,000 bigger. Glenn E. Plumb then rushed to the rescue and offered for consideration one valuation of \$9,400,000,000 and another of \$10,100,000,000. Meantime an anonymous "eminent economist" contributed to the Firemen's Magazine a valuation of \$13,000,000,000. These labor leaders differed among themselves to the extent of \$4,400,000,000. But what are a few dollars between friends working for the same cause?

Most astonishing, however, has been the attitude of men such as Senator LaFollette and Clifford Thorne, who were among the most earnest advocates of the valuation legislation passed in 1913. They both advocated having the valuation made by the Interstate Commerce Commission and both now indignantly repudiate the commission's own findings. The man who repudiates the findings of an arbitrator selected by himself can hardly be called a good sportsman, whatever else he may be.

Mr. Thorne's inconsistencies are the most glaring of all. They cannot be ignored because he has been counsel of the American Farm Bureau Federation, and his views are widely circulated among the farmers.

Soon after the commission's tentative valuation was made he got the American Farm Bureau Federation to adopt a resolution setting forth that it was \$5,000,000,000 too large. This apparently was based upon computations, by which he had ascertained that the total value of railway securities measured by their market prices in 1920 was less than \$13,000,000,000. In the recent rate hearings he put an accountant on the stand before the Interstate Commerce Commission to present an estimate that, based on the valuations of individual railways already made public, the total valuation of all the railways should not exceed \$16,000,000,000.

Mr. Thorne seems to have forgotten, or to think other people have forgotten, that he began making valuations of railways some years ago. He made one in 1913, and some light may be thrown on his consistency and sincerity by comparing what he says now with what he said then. Over eight years ago, in a public address, he gave the results of a computation regarding the value of the railways which he had based upon the market prices of their securities as indicated by stock exchange quotations in October, 1913. His estimate of the valuation of the railways then was exactly \$13,969,173,383. Mr. Thorne is nothing if not exact in his figures. The new capital which has been invested in the railways since 1913 exceeds \$4,500,000,000. Therefore, if Mr. Thorne's estimate of the value of the railways was right in 1913 their value at present must be at least \$18,500,000,000, or less than one-third of a billion dollars less than the valuation placed upon them by the Interstate Commerce Commission. We shall only remark in passing that in the fall of 1913 the market prices of railway securities were the lowest that they had been for some years. Of course, this was not the reason Mr. Thorne used them as a basis for his computations.

The most notable fact regarding these ready-to-wear valuations which have been made by various persons not previously recognized as "experts" upon the subject is not that they differ from that of the Interstate Commerce Commission but that they differ so much among themselves. Mr. Thorne's accountant's valuation is \$7,400,000,000, or 86 per cent bigger than that of William H. Johnston, although both are based upon the valuations of individual railways already made public by the commission. It can hardly be expected that the commission will be much influenced by them.

But what about the effect upon public opinion? The labor leader's estimates are being widely disseminated among railway employees. Mr. Thorne's estimates—not his 1913 estimate, but the recent ones—are being widely disseminated among the farmers. They are all a part of the propaganda to discredit private ownership and management of railways. They are intended to prevent the railways from being allowed to earn sufficient net return to make adequate improvements and enlargements of their properties. They are intended to help not only to make the success of private management impossible, but to create a public sentiment which would cause confiscation of a large part of the investment in railways if government ownership should be adopted.

We do not expect the propaganda to be successful. We believe the public is gaining constantly a better understanding of its true character and purpose. But no reasonable effort should be spared to make sure that the public will understand its true character and purpose.

New Books

The Firing of Locomotives. By J. F. Cosgrove. 368 pages, illustrated. 6 in. by 9 in., one chart. Book Service Department, Simmons-Boardman Publishing Company, New York.

The railroads of this country use in locomotive service practically every kind, grade and size of coal produced. The characteristics of these fuels vary widely; some coke in burning, some clinker, some are very high in gaseous content others have excessive ash. The variations in the characteristics of the coals make it necessary to use different methods in firing them if the best results are to be obtained in each case. Because of the wide variety of conditions, it is extremely difficult to prepare a book that will deal satisfactorily with firing practice in various sections of the country. Mr. Cosgrove has had the benefit of long and varied experience and his book is undoubtedly the most authentic and comprehensive work of its kind that has been published.

The book treats the subject of firing in a logical manner. The composition of the various types of coal and their principal characteristics are first discussed. This is followed by a section on the principles of burning coal in locomotives. The general theory of combustion and the chemical processes involved in the burning of coal are explained in simple language. Thus the first section of the book gives the fundamental principles that underlie correct firing practice.

The remainder of the book is devoted to a detailed consideration of the various conditions met in actual service and the methods to be used under each condition to obtain the best results. The locomotive boiler and appliances are described with particular reference to their influence on firing methods. Several chapters are devoted to a detailed discussion of the proper methods of handling the fire—such subjects as the thickness of the fuel bed, shaking of grates and the prevention of clinkers are discussed fully. The proper practice when firing the various types of coal is treated and instructions are given for firing under adverse conditions. The last subject discussed is the operation of stoker locomotives. Detailed instructions are given for the operation of the stoker engine to obtain uniformly good results under various conditions of operation.

The coal chart accompanying the book lists the coals mined in every state, giving the principal characteristics, such as heating value, fusing temperature of ash, and the proportion of the various constituents.

The proper methods of firing are of the utmost importance in securing fuel economy irrespective of the equipment or the grade of coal used. Mr. Cosgrove's book is a valuable contribution to this important subject. It has a place in the library of everyone who is interested in saving coal, from the purchasing agent and superintendent of motive power to the engineer and fireman.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

Motor Truck Competition in New England

LONDON, England

TO THE EDITOR:

Slason Thompson's letter in your issue of April 1 demands from me the courtesy of an answer. It shall be very brief.

No conceivable reduction of wages can enable the railroads of New England to reduce their rates sufficiently to prevent motor trucks abstracting a considerable proportion of their traffic under present conditions. Motor truckage will always be cheaper in certain cases so long as the railway rate has to cover capital cost, maintenance cost and movement cost; while the truckage rate has to cover movement cost only. Sooner or later, the public will have to make up their minds to put a stop to the present unequal competition, either by charging the motor truck for the use of the road, or by assuming as a public charge some portion at least of the cost of provision and maintenance of the railroad. Possibly the "sooner" may come when the Interstate Commerce Commission is invited to sanction an increase in New England rates on traffic for which the motors cannot compete, because the railroads have been deprived of the profit which they formerly made on the traffic which the motor trucks have taken away.

W. M. ACWORTH.

Why Not Have a Joint Bureau of Research?

TUCSON, Ariz.

TO THE EDITOR:

Most of the larger industrial companies in the United States maintain departments of research for the purpose of improving their product, or of reducing its cost. We are also familiar with the reports of what Germany has done to commercialize the results of scientific investigation. These facts, together with the financial and competitive difficulties experienced by the railroads of late years, and which threaten to become worse rather than better, have suggested to my mind this question:

Why do not the railroads of the country club together and jointly maintain a department of research for their mutual benefit?

The object of such a department would be: To search out all possible ways of improving service and reducing costs of operation; to co-ordinate the work already being done by the roads independently; to co-operate with those roads already engaged in some special lines of investigation, and to seek aid and co-operation from the laboratories of the technical institutions and universities of the country. This last would appear to be a reasonable return for the taxes paid by the railroads, and would assuredly be welcomed by those in charge of such laboratories because of the practical contacts thereby afforded.

To illustrate the work of such a department of research one might consider these questions. What would be the net saving in operating expenses if the draw-bar pull for a

given train could be cut in half, or even reduced 25 per cent of its present amount? Might not a new type of car bearing be developed that would accomplish this without materially increasing the financial hazard of wrecks due to journal troubles? Or again since the present type of locomotive has about reached its maximum development in respect to size and economy, is it possible to evolve any other type that would be more desirable and satisfactory?

In order to stimulate the inventive thought of its employees and keep them actively alert for the betterment of this work it would be merely good business policy financially to reward those responsible for accepted improvements by a certain percentage of the savings effected during some period of time such as say ten years.

What do your readers think about this suggestion?

A. J. WIECHARDT,

Professor of Mechanical Engineering, University of Arizona.

Effects of Electric Power Used for Traction

SEATTLE, Wash.

TO THE EDITOR:

In the March 18, 1922, issue of the *Railway Age* there appears on page 727 an article entitled, "Effects of Electric Power Used for Traction" which deals with the question of inductive interference and electrolysis as related to railroad electrification. Various references were made in this article to the electrification of the Chicago, Milwaukee & St. Paul, and we feel it necessary, in order that there may be no misconceptions regarding the conditions actually experienced on this electrification with respect to the features discussed in the article, that the following statement be made; this as such alone and without reference to any question of the relative merits or demerits of the different systems of electrification.

The C. M. & St. P. has approximately 650 miles of main line electrification. This includes 550 miles of three-phase, sixty-cycle, 100,000-volt transmission line, which for the greater part of its length is located on the railroad right-of-way, in general about 100 ft. in width, opposite the pole line supporting the railway company's telegraph, telephone and secondary signal circuits. The latter are of the usual open wire construction and, of course, extend the full length of the railway, including the electrified zone. Between the telegraph, telephone and signal lines and the transmission line is the 3,000-volt direct current trolley system, on the poles supporting which are located 3,000-volt trolley feeders, a 4,400-volt single-phase, 60-cycle primary signal supply circuit, and the power indicating and limiting circuit. The latter is operated at 1,200 volts d.c. on the Rocky Mountain and Missoula divisions, and at about 3,000 volts alternating current on the Coast division, the current in both cases being very small.

The telephone and telegraph lines consist of metallic dispatcher's telephone and block circuits and the usual grounded railway telegraph circuits. The dispatcher's telephone circuit is regularly used for all train movements, the dispatcher's office on the Rocky Mountain and Missoula divisions being located at Deer Lodge, 226 miles from the eastern end of the electrification and 211 miles from the western end of the electrification. Before electrification the dispatcher's offices were located at about the middle points of the respective divisions and the length of railway controlled by one set of dispatchers was only about one-half the present length. On the Coast division the dispatcher's office is located at the extreme west end of the 209 miles of electrified line. Train orders are given over these dispatcher circuits the full length of the line. The dispatcher's circuit is transposed at intervals of about 200 ft. and telegraph and telephone wires where

they enter stations are fused and provided with simple standard protectors.

Electrical operation began on the Rocky Mountain division in December, 1915. At that time the feeders extending east and west from the respective substations, instead of being tapped directly at the latter to the trolley, were tapped a mile away from the substation so as to interpose a resistance which would diminish the liability of flash-over of substation motor-generator sets in case of short-circuit on the trolley. This arrangement existed pending the final development and manufacture of the so-called high speed circuit breakers which, during the year 1917, were installed in the various substations in the negative connection to the rail. The function of these breakers is, in case of short-circuit, to very rapidly interpose a small ohmic resistance in the trolley circuit, limiting the magnitude and duration of the short-circuit current to a value which will not cause flash-over of the generators and which can readily be handled by the regular feeder breaker.

Previous to the installation of these circuit breakers, flash-overs of the generators were of comparatively frequent occurrence. These resulted in very little if any damage to the generator, but at times produced a rather severe acoustic shock to those using the dispatcher's telephone circuit, so that a few of the telephones connected thereto were provided with a megaphone horn connected directly to the original receiver. No loud-speaking telephones have ever been installed on the electrified zone on account of inductive interference as stated in the article. The installation of the high speed circuit breakers, though not primarily installed for this purpose, resulted in the elimination of this trouble.

Any effects due to short-circuits on the 100,000-volt transmission system, which are of infrequent occurrence, have, as far as acoustic disturbances are concerned, been reduced to a point where they are considered negligible, largely as the secondary result of the installation of an improved relay system for high tension line, which provides a satisfactory selective action with respect to the rapid and positive isolation of the particular portion of line in trouble. Depending on the severity and location of the short-circuit, the fuses in the telegraph and telephone wires, as referred to above, will or will not blow, but they are found thoroughly to protect the apparatus.

The article in question also states that the noise conditions were such under normal operation as to require changes in the generator construction and the installation of resonant shunts. Under normal operation there has never been interference with the telegraph and telephone circuits of any magnitude sufficient to interfere with the operation of either the telegraph or telephone circuits. Under emergency conditions, such as those above referred to, the means described have taken care of the noise conditions by doing away with the acoustic shock and the undesired operation of the protective apparatus. No changes have ever been made in the generator construction, nor have such changes been considered or contemplated.

With respect to the installation of resonant shunts referred to in the article, three such shunts were installed in the substations on the Rocky Mountain and Missoula divisions at the instance of one of the telephone and telegraph companies, which found by tests the existence in some of their circuits of a harmonic of frequency corresponding to the tooth frequency of certain of the railway company's motor-generator sets supplying the trolley system. The shunts were found practically to eliminate this harmonic from the trolley circuit, and though those in charge of the railway telegraph and telephone circuits felt that the effect of the shunts in the operation of their own circuits was inappreciable, the railway company, in its desire to exercise such co-operation as it deemed reasonable and proper, and to take advantage where warranted of any means of possible improvement, per-

mitted the installation of these shunts and included them in the contracts for apparatus specifications for subsequent electrification of the Coast division. The request with respect to the installation of the shunts on the Rocky Mountain and Missoula divisions applies to those three of the 14 substations in which 1,500 kw. units were installed. In the case of certain of the 2,000 kw. sets of the other stations, the suggestion was made that the already comparatively minor effect of any harmonic due to these sets could be reduced to the very favorable average of the other sets by the simple expedient of shifting the generator couplings so as to secure the best relative position of the two respective generator armatures.

The article states that 60-cycle transmission lines, used in connection with the power supply to direct current trolley systems, give rise to inductive interference which is greater than that caused by transmission lines of 25 cycles serving the alternating current systems. Under exactly the same conditions, a 60-cycle, three-phase transmission line would, naturally, produce greater disturbance than a 25-cycle, three-phase line, but the actual facts with respect to the C. M. & St. P. are that inductive effects under normal operation are not such as to affect the practical operation of the telegraph and telephone circuits. In fact, when different sections of the transmission line were placed in operation, some of these sections being 100 or 200 miles in length, those listening in on the dispatcher's telephone circuit at the time were unable to tell when the current was switched on and off the line.

The writer of the article makes the statement that the conditions on the Chicago, Milwaukee & St. Paul are not comparable with those, for instance, on the New York, New Haven & Hartford electrification, but in what respect this is the case is not stated in sufficient detail to enable a definite idea of the conditions to be derived, either as to length, proximity, etc., of exposed circuits or the effect of conditions of traffic. It is not clear how the fact that fewer trains are run on the C. M. & St. P. than on the New Haven necessarily affects the question.

The simplicity of the interference problem in connection with the C. M. & St. P. electrification, both as regards the conditions to be met and their solution, is one upon which many visitors to our electrification have particularly and enthusiastically commented, both during their visits and in such subsequent reports as we have noted. In this connection it may be permissible for me to refer, as has been done before by others, to the following extract from a report prepared by the French commission which was sent to America in 1919 to study the principal electrified systems in this country:

"A considerable advantage of the direct current system is that it does not seem to have any but the slightest interference with the telegraph and telephone lines—in fact insignificant. We are well able to report that one may telephone very easily on the various lines of the railroad placed all along the tracks on an aerial wire without any protection.

"A multiplex printing apparatus for the telegraph service worked between Spokane and Helena with an earth return, was diverted especially for us in such a fashion as to use a wire placed on the poles of the electric railroad for a distance of 270 kilos. This operated perfectly during eight days without even being troubled by three short-circuits made very complete intentionally between the trolley wire and the rail in the course of the telegraph wire."

With respect to electrolysis, this is recognized to be a question which in the case of the d.c. system should receive careful consideration. Its practical importance, as determined on basis of the protective measures necessary, will depend on the circumstances surrounding the individual case.

In the case of the C. M. & St. P. electrification, the cases of electrolysis which have arisen have been of comparatively minor importance and have required only simple and inexpensive means of correction. For instance, regarding the

substation piping, particularly referred to in the article, it was found about one year after commencement of electrical operation, that at a few of the substations a small water pipe running parallel to the tracks between the substation building and the operators' bungalows was being attacked by electrolysis. As a result of tests, a copper leakage cable was installed and bonded to the pipe and the track rail, which construction was made standard at all stations. The small amount of pipe which had been severely attacked at three or four stations was removed and replaced by new pipe, with the result that it has been unnecessary to replace any pipe during the five years of service which has since elapsed.

R. BEEUWKES,

Electrical Engineer, Chicago, Milwaukee & St. Paul.

The Future of the Steam Locomotive

NEW YORK.

TO THE EDITOR:

The communication by Frederick A. Delano, which appears on page 1,004 of the *Railway Age* of April 29, presents some tremendously important subjects which railroad officials will think about most carefully. Coming from him, every railroad official will take these suggestions most seriously.

In connection with the steam locomotive, however, such remarkable improvements are available, exactly to meet the requirements of the times, as to justify the suggestion that before going to electrification or to other forms of motive power, the steam locomotive should be developed to its logical limits. Being a rather close observer of locomotive progress, the subscriber holds the conviction that the steam locomotive has never yet been brought to anywhere near its logical limits.

To accomplish this, it is necessary to know what has happened to the steam locomotive during the past few years, to make use of the opportunities available for its improvement and to ask the operating officials to use the new locomotive to the best advantage as manufacturing managers use their expensive machinery.

This is simple enough when locomotive improvements are thoroughly understood. It is most important to recognize the fact that the steam locomotive can be made to be something that it has never been before and that it can be made to do things which it has never been made to do. When this fact is accepted we shall see instantly that the steam locomotive has not yet even approached the limit of its capacity, efficiency and economy.

No one can be in better position than is Mr. Delano to realize and point out the necessity for locomotive improvement. The object of these paragraphs is to show that we have overlooked factors in the steam locomotive problem which will answer the criticisms made of it. It is my belief that several efforts which are now being made in the improvement of both boiler and machinery of steam locomotives on a number of the most progressive railroads will in a short time answer the criticisms and lead to the attainment of the specifications briefly outlined by him. G. M. BASFORD.

Red Tail Lights on Automobiles

CHICAGO.

TO THE EDITOR:

Referring to the editorial in the *Railway Age* of January 14, page 166, and to the letter to the editor by "P.S.C." in your issue of February 11, page 362, relative to the use of red tail lights on automobiles: Many things have been accomplished that seemed to have less likelihood of success than has the substitution of another color for red on the rear of automobiles. The cost per machine is not more than 35 cents to an automobile driver who will do the work him-

self. Certainly each individual automobile driver should be willing to do that much because of the good which can be accomplished by the change.

"Red has always been recognized as an indication for "danger" and should be reserved for that purpose only; otherwise, what color have we left to use for protecting open ditches, material piled in the road and other things of like nature, to say nothing of our railroad crossings?"

Actual experience has shown that the placing of red lights at various heights and locations in the vicinity of crossings does not improve the situation. Red lights on the rear of automobiles and trucks vary in height from the axle to the top of the body and there are no laws or regulations, to my knowledge, which govern this height. Assuming for the purposes of discussion, that a height for the gate lights on highway crossing gates was determined on, different from that of tail lights on automobiles, there would still be no reference point from which to gage this height. If "P.S.C." will go out on the highway some dark night and observe the red lights going up and down hill he will be convinced that there is no elevation which cannot be duplicated in appearance with an automobile. There is therefore no distinctive height which could be selected to distinguish lights on gates from those on automobiles.

The restriction of the use of red to points of actual danger will certainly increase its value where it is used. The most dangerous part of an automobile is its front end but we are sufficiently warned by the white lights used, even when the low power parking lights used in cities are displayed. It is therefore clear that what is required on the rear end is not a danger signal but a marker so that a driver may know which way an automobile is going and where it is. Therefore the use of any other distinctive light will answer the purpose as well as red.

We have received complaints from enginemen relative to the red tail lights of automobiles on highways adjacent to the main line. These lights, moving back and forth, often appear like a red light being waved as a danger signal to an engineman, and this is particularly true on a curve. Under these conditions, enginemen may become so accustomed to this condition that they may overlook a flagman or other's danger signal.

The use of red, green and yellow and the meaning of each light is becoming familiar to automobile drivers, particularly in the cities where these three lights are being used to indicate "Stop," "Caution" and "Proceed." The use of red with the word "Stop" as installed on a good many automobiles and showing only when the automobile is stopping is not objectionable and could be continued.

Red should be reserved for "Danger Here—Stop."

J. A. PEABODY,

Signal Engineer, Chicago & North Western.

A Plea for the Station Agent

CHICAGO

TO THE EDITOR:

I have read with interest and amusement the article entitled "A Plea for Recognition of the Traveling Auditor" which appeared in the *Railway Age* of January 21, page 239. I don't believe that the average agent at an exclusive or supervisory station will agree with many of the arguments put forth by the traveling auditor. His article would indicate that it is customary, on his road, to secure traveling auditors from the employees in the clerical departments. To say that such men are qualified to pass upon the question of who shall, or shall not, be promoted to the agency position is rather far-fetched, and contrary to the well-established custom of promoting men from the ranks of the department in which they have served their apprenticeship.

The traveling auditor is well qualified, as a rule, to pass upon the question of accounts, but if he comes from the ranks of the clerical department, as stated by the writer referred to, he certainly is not capable of deciding who would make a competent agent. The accounting work to be done at a station is only one of the many phases of the business that an agent has to look after and while equally important with his other duties, is not more so. The soliciting of business, and the manner in which he meets the public are the most important features of his work; for the agent must be in close contact with the public in the community which his line serves, and he reflects the policy of his railway to a greater extent than any other employee in the service. Then, from an operating standpoint, the agent should be well qualified to handle men, have a certain amount of executive ability and be able to keep the operating costs down to the lowest possible minimum, and, at the same time, give the public the highest class of service that may reasonably be expected from a common carrier. The agents are as much a separate and distinct class of employees as are the dispatchers, yardmasters, roundhouse foremen, etc., and they have in most cases, or should have, gained their positions through successive promotion, after having served the necessary apprenticeship in their particular line of work.

It is true, as the writer referred to states, that some traveling auditors come into a station with an air of great importance (which deceives few old heads), and treat the average agent or cashier as if he were a criminal. However, after 40 years of service as an agent, I have never felt that his superior officers required him to do this. The traveling auditor is supposed to make a thorough and complete check of the station, seeing that every item is correct and calling the agent's and cashier's attention to anything that is not being handled according to the rules and regulations of the company. He is expected to co-operate with the station forces in bringing the work up to the highest possible point of efficiency. The station employees, and particularly the agent, should be glad to have the auditors check their station, for they are just as anxious to keep their accounts in proper shape as the auditing department and more so perhaps, for they are personally responsible for them. It is only the inexperienced traveling auditor who does some of the things that the writer referred to.

I have never been able to understand why the managements of our railways have given so little thought to their agents and why they do not place an old experienced agent in charge of the agents and the stations on their respective lines. It is probable that the managements have been so absorbed in their technical departments and so fully occupied with the apparently endless contentions of the more radical organizations that they have not given due consideration to their agents, whose department is the producing end of the railway and whose duty it is to see that every pound of traffic in the territory is secured for their line. Some few railways have realized the importance of the agents as a class to a certain extent and have appointed what are known as supervising agents, working directly under the superintendents. The supervising agent is appointed from the ranks of the agents and is generally a man of wide experience in that line of work. In selecting a man for this position, consideration is usually given to his years of service and experience, and to his standing with his fellow agents. The agents in his district report direct to him on all matters pertaining to the proper handling of their department. This is a step in the right direction.

AN AGENT.

THE NORTHERN PACIFIC will sell week-end excursion tickets, at one and one-tenth the one way fare, from Minneapolis, Minn., to Taylor Falls, Big Lake, St. Cloud, Chicago City, Pine City, Rush City, and Lindstrom beginning May 19.



Farm Scene in the State of Michoacan

Mexican Railways Prepared for Improved Business

Roadbed and Motive Power in Splendid Condition—Shortage of Rolling Stock a Handicap

By Charles W. Foss

Part I

THE MEXICAN RAILWAYS have returned to something like pre-revolution standards. The roadbed is in excellent shape—the National Railways are to be congratulated for the manner in which they have restored the lines destroyed during the revolution and for the excellent manner in which these lines are maintained.

Because of the acquisition of a large number of new

some new lines are being constructed. These details will be discussed later.

During 1921 the National Railways had severe labor troubles, the outstanding feature of which was a general railroad strike in February and the first half of March. This strike tied up the railways completely and the resulting congestion was indeed serious. It ended on March 19 in a victory for the men. Labor conditions are at present quiet.

Light Traffic

Referring again to the shortage of equipment, it should be stated that the lack of cars is at present not as serious a factor as might otherwise be the case. The reason is the lack of traffic. There is, in fact, much ground for the



A View in Mexico City

locomotives in 1921, the motive power situation is satisfactory. There is, however, a serious shortage of rolling stock. The Mexican railways lost some 10,000 cars because of the wide-spread activities of the various warring elements during the past few years, which cars they have not been able as yet to repair or to replace. The result for one thing has been a large per diem debit balance with the United States lines which, however, is gradually being reduced as the United States cars are returned across the border. The narrow gage lines are particularly short of cars and the statement was made to the writer that if these lines had more cars they could increase their traffic materially.

The rehabilitation of the Mexican lines has included great activity in the way of new stations and shops. At present



At Torreón

opinion that, if anything, the Mexican railways are in reality rehabilitated to a greater extent than the rest of Mexico. Business conditions in that country today are exceedingly poor; it is suffering from business depression in considerably greater degree than the United States. Whereas business in the States is everywhere showing signs of improvement and the optimist is coming into his own, this is not the case in Mexico. The result is that the railways, even with the

shortage of rolling stock, are prepared to handle a much greater business. If traffic increases, however, they are likely to suffer from car shortage acutely.

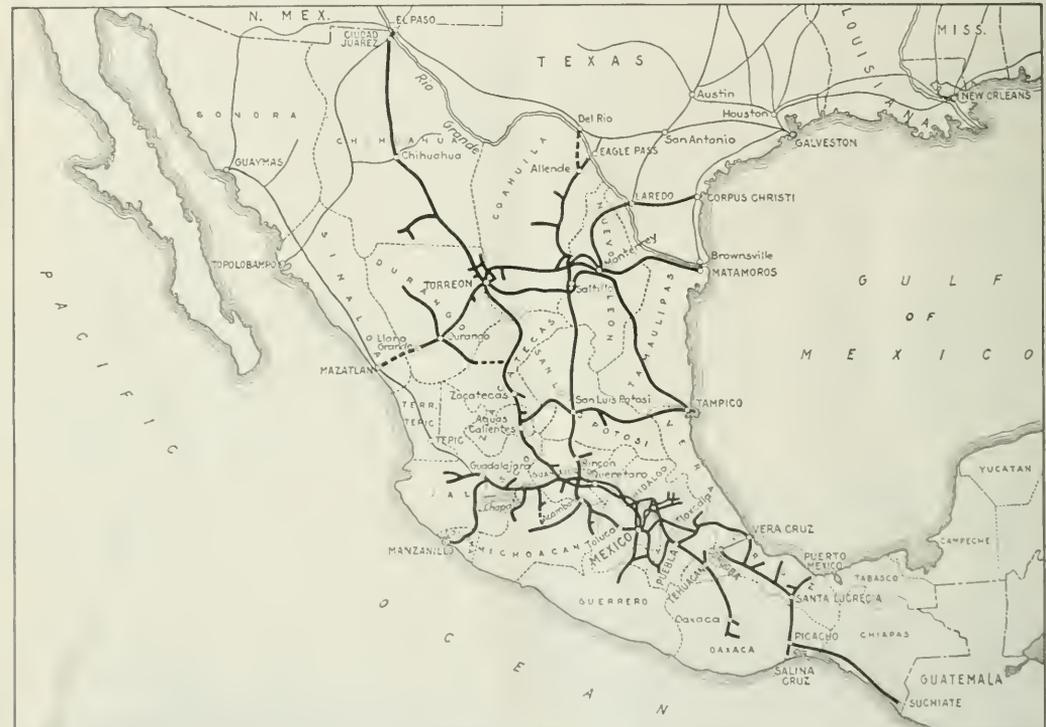
4½ or 5 Days to the Border

With their rehabilitated plant, the National Railways of Mexico are supplying at present excellent service. From the Rio Grande to Mexico City is about 800 miles. Freight is moving from the border to Mexico City in 4½ or 5 days. There has been a sizeable movement this year from the Lake Chapala district of perishable vegetable traffic destined to Kansas City, Chicago, etc. This traffic, moving in refrigerator or ventilated cars, is also reaching the border in 4½ or 5 days with the result that the growers have been

aggregated and made more alarming by all kinds of conflicting rumors. If President Obregon can gain and continue to hold the respect of the business classes improvement will come rapidly.

Mexico an Extremely Rich Country

Mexico is a rich country. It has extremely promising agricultural areas. Its advantages for the raising of stock are practically unexcelled. Its mineral resources are such that prior to the revolution it led the world in the production of silver and was among the leaders in the production of gold. It has large resources in copper, tin, platinum, lead, etc. In Coahuila there are large deposits of bituminous coal. Iron ore is found in several states of the republic, and



Map of the National Railways of Mexico

realizing handsomely on the advantage of having their crops ready about a month ahead of the growers in Florida and southern Texas.

Business Revival Depends Upon Government Stability

The acute business depression in Mexico today, is partly due to the fact that there is a world-wide depression, but it is also partly the result of the unsettled conditions in Mexico. The question, when all is said and done, resolves itself into one of the stability of the present government. It should be said also that a great deal depends upon whether the United States is going to recognize the present Mexican government or not. President Obregon in his term of office has succeeded in restoring in Mexico a more stable state of affairs than has existed at any time since the start of the revolution in 1910. In recent months there have been sporadic outbreaks here and there, which outbreaks have been duly ex-

Tampico is so famous that it is hardly necessary to speak of the resources in oil.

The Tropic of Cancer crosses Mexico about midway of its length, which at its greatest dimension is over 1,900 miles. The total area of the country is about 767,000 sq. miles, equivalent to that part of the United States east of the Mississippi and south of New York. The climate of the country is of many varieties as is to be expected from the fact that the republic extends through so many degrees of latitude, and because of the varying altitudes.

A large part of Mexico is included in the low lying areas adjacent to the coast and in the south. The central portion of the country is a plateau, while to the west of the center is the Sierra Madre range.

Inhabiting this vast area is a population of about 15,000,000 people. Mexico City, the capital and largest city—incidentally it is 7,349 ft. above sea level—has a population

of about 1,000,000. The second city is Guadalajara with about 120,000; the third, Puebla, with about 100,000. Other important cities are Monterrey, 85,000; Saltillo, 35,000; San Luis Potosi, 83,000; Queretaro, 40,000; Durango, 34,000; Chihuahua, 39,000; Torreon, 34,500; Aguascalientes, 45,000; Vera Cruz, 47,500; Oaxaca, 40,000, etc. It is interesting to observe that several of these cities are mile-high cities in the true sense of the term. San Luis Potosi is 6,123 ft. above sea level; Saltillo, 5,200 ft.; Queretaro, 6,000 ft.; Durango, 6,200 ft.; Torreon, 3,742 ft.; Chihuahua, 4,634 ft.; Aguascalientes, 6,181 ft.; Oaxaca, 5,069 ft., etc. A

Agricultural Resources

In referring to the relationships between the Mexican railways and the resources of the districts served by the various lines, one is impressed rather by the potential than by the actual. There is one instance, however, that is something of an exception and that is the Lake Chapala district, which, as will be noted from the map, lies west of Mexico City on the line to Guadalajara. This district is at present shipping perishables destined for markets in the United States, such as Chicago, Kansas City, etc. The movement has not been large. Up to the end of February some 22 cars had moved to points in the States and there were then about 20 or 25 more cars expected for similar movement. The traffic consisted of tomatoes and onions, the growers of which are able to reach their market about one month earlier than the growers in California or Texas. There has also been some movement of cantaloupes although not a large one. Next year a large early movement of cantaloupes is expected, to reach the market about one month or six weeks ahead of the California product.

This traffic in perishables from the Lake Chapala district to points outside of Mexico is being offered this year for the first time. In other words, it is not traffic which moved prior to the revolution and which is now being restored. Its possibilities look good because of its being so far ahead of the producing areas to the north. Refrigerator cars, ventilated but not iced, are used and the time required to Laredo averages 4½ or 5 days.

Formerly there was a movement of early vegetables and onions from the territory on the line between Tampico and Monterrey. There was no such traffic this year, but it is understood that arrangements are under way looking to the planting of a large acreage for next year.

Torreon is the center of another important agricultural district—in this case, the Laguna cotton district. This cotton has a staple 1 or 1¼ inches in length and the crop formerly



A View at Zacatecas

glance at the map showing the location of these various cities will give an adequate idea of how extensive is the central plateau.

The Railway System

The railway lines of Mexico center upon the City of Mexico. What are termed the main lines of the National Railways are the lines from Mexico City to Nuevo Laredo, 803 miles, and from Mexico City to Juarez, 1,223 miles. On the line to Nuevo Laredo are the cities of Queretaro, San Luis Potosi, Saltillo and Monterrey; on the line to Juarez, Zacatecas, Aguascalientes, Torreon and Chihuahua. A transverse line extends from San Luis Potosi to Tampico on the east and to Aguascalientes on the west. From Torreon, there are similar transverse lines to Saltillo and Monterrey to the east and to Durango on the west. Eagle Pass is served by a connecting line. From Monterrey there is a connecting line eastward to Matamoros opposite Brownsville, Tex., and also a line to Tampico.

The south is served by various subsidiary lines, some of standard and some of narrow gage. These include among others the Guadalajara division to the city of that name, to the Lake Chapala district, etc.; the Pacific division to Toluca, etc., and the Cuernavaca division to the south. The line to Vera Cruz is known as the Inter-oceanic branch. On this line are the important cities of Puebla and Jalapa. The Mexican Southern, operated also by the National Railways, is a narrow gage line between Puebla and Oaxaca. The Vera Cruz & Isthmus extends from Vera Cruz to Cordoba. From Santa Lucrecia on this line the Tehuantepec National extends to Puerto Mexico on the Gulf of Mexico and to Salina Cruz on the Pacific Ocean. The Pan-American Railroad extends from Gamboa, on the Tehuantepec National south-easterly to the Guatemala border. The lines mentioned are all operated by the government. The National Railways operate a total of 8,302 miles, including 6,885 miles of standard gage and 1,417 of narrow gage.

The privately operated lines in Mexico include the Southern Pacific of Mexico and the Mexican Railway. The latter extends from Mexico City to Vera Cruz and has only been returned to its owners for operation within a comparatively recent period.



One of the Parties Visiting Mexico at President Obregon's Invitation Assembled before the Colonia Station, City of Mexico

approximated 150,000 bales yearly. The crop this year is estimated at only 20,000 bales.

Mexico City itself is the center of an important truck garden area. The line to Guadalajara serves a corn and wheat country which, in recent years, has also seen a development with reference to vegetables. Around Puebla also there is a grain country. Iraquato is adjoined by a strawberry and cantaloupe district, but the products are used mainly in local consumption; no effort is made to ship strawberries to the States. Oranges are grown near La Barca, but these also are for local consumption only.

Considerable might be said concerning Mexico's agricultural prospects with irrigation in what is now desert country. The Rio Grande valley is an example, the possibilities of

which one can only appreciate by seeing what has been done through irrigation on the United States side of the river. At present there is a big irrigation project under way at Santa Rosalia in Chihuahua. Water from the Rio Conchos will be used and a large yield of wheat is expected.

Mexico has large lumber resources, including pine and fir in Chihuahua and Durango and the tropical woods in the south.

Grazing

Prior to the revolution Mexico was a grazing country of first importance. Because of revolutionary activities the herds were dispersed or destroyed. Although it formerly exported large quantities of cattle, it is now importing a sizeable proportion of its meat supply. The cattle country was constituted in a vast area in which are the cities of Chihuahua and Durango. Cattle were shipped out through El Paso to northern ranges for fattening, or south to the cattle country adjacent to the railway line between Tampico and San Luis Potosi.

The Mexican railways at one time relied on a large traffic in this connection and also on a sizeable business in cattle moving from the last named district and from the Isthmus of Tehuantepec to the packing houses at Mexico City, but the herds have been so depleted that this traffic has long since ceased. Cattle are now being brought into the northern ranges but not much is being done as yet with reference to restocking the ranges in the south.

Oil

Tampico is an important source of crude oil for refineries in the United States. In addition to the oil exported in tankers, there is also an important movement inland over the National Railways. Mexico's fuel is oil, a statement which applies both to the railroads and to industries in general. New sources of oil supply are being found as far north as the state of Nuevo Leon and in the extreme southeast in the state of Chiapas.

Mineral Resources

Mention has been made above of Mexico's enormous mineral resources. The majority of the states in the republic have extensive mineral deposits of one kind or another. There were many important mineral developments prior to the revolution but it seems to be the general impression that Mexico had hardly begun the exploitation of her vast natural wealth. At any rate, the mineral industries are generally idle today and the railroads are not carrying their former mineral traffic. The most important lines in this traffic were the main lines themselves. There was formerly a heavy movement of iron ore to smelters at Monterrey and Aguascalientes. Saltillo had smelters for silver, lead and copper and there were also such smelters at Aguascalientes, Torreon, Vallardenia, San Luis Potosi and Monterrey. Large mines also were worked at many points other than along or adjacent to the main lines. There were a large number of mines in the territory west of Guadalajara and around El Oro, Oaxaca, etc. The movement of the products of the smelters north to the border interchange points formerly represented a very considerable traffic, which at times reached the proportions of solid trainload lots.

Interchange With United States Lines

With further reference to Mexico's enormous oil resources, one must not fail to notice that Mexico also has enormous bituminous coal deposits in the state of Coahuila.

While what has been said concerning Mexico's resources is necessarily brief, it should give a good idea of the large traffic which the Mexican railways formerly had and of the present potentialities upon which these railways will be able to realize with a return to business confidence and stability.

The National Railways of Mexico interchange business with the railroads in the United States at Laredo, Juarez,

Eagle Pass and Matamoros. Laredo is the more important of these four and secures a considerably larger portion of the Mexican business than either of the other three. At Laredo connection is made with the International & Great Northern and via the Texas-Mexican, a property lying in Texas, operated independently but owned by the National Railways, with the Gulf Coast Lines, with the San Antonio & Aransas Pass and through the latter with the Missouri, Kansas & Texas, etc.

Eagle Pass is a Southern Pacific connection. At Juarez, or El Paso, connection is made with the Southern Pacific, the Santa Fe and the El Paso & Southwestern, etc. The connection at Matamoros or Brownsville is with the Gulf Coast Lines. Interchange and per diem arrangements with the United States lines have been effective since January 1, 1921, but through billing has not yet been restored nor have arrangements been made for the quotation of through rates.

Cars on Road 6 or 7 Months as Result of Strike

At the time the per diem arrangements were restored the Mexican railways were suffering from a severe shortage of



Main Offices of the National Railways of Mexico, City of Mexico

power, which situation was relieved by the loan to the Mexican lines of a large number of locomotives. The congestion at the border points at that time was acute and the situation was made much more severe by a general strike of the Mexican railway men which took place in February and March. The strike tied up the railways completely, although there were instances where shippers secured their own locomotives and crews and operated trains themselves.

At the end of the strike, which was finally settled in favor of the unions, the Mexican railways were in a condition so poor as to be almost beyond belief. This condition lasted for some time and at one period it was a familiar thing for cars to be on the road no less than six or seven months. The improvement which now provides a service of from 4½ to 5 days from Mexico City to the border represents the measure of recovery which has since taken place. One American railroad man said to the writer: "I have never seen a greater improvement in the same length of time in any country, such as that which has taken place in Mexican railway conditions since July 1, 1921."

Private Operators

Besides the improvement in relieving the congestion of the early part of 1921 there was also an important factor of improvement in the elimination of the private operating companies. These had been operating trains for some time, although they did not succeed in getting very far during the strike. The scheme was for the private operator to secure his cars from the United States roads under a bonding ar-

rangement, the bond required varying with the type of car. Thus, for a steel underframe or all-steel car a larger bond was required than for a wooden car, etc. The private operator leased his locomotives and paid his own crews. His charges were from 25 to 50 per cent above the regular tariffs and for a time the operators did a thriving business. The extent of the business may be realized when it is noted that in July, 1921, private companies operated approximately 170 locomotives. At present few private individuals are operating in this manner and this part of Mexico's railway history is nearing its close.

Present Traffic

The difficulty of the Mexican railways at present is their lack of traffic. The figures show that in the month of Feb-



Desert Lands in Coahuila—Typical of Much of the Land Seen From the Train on the Central Plateau

ruary this year the northbound movement was 37,347 cars; the southbound, 53,527 cars, and the total, 90,874. The trade with the United States is normally of large proportions. In January, 1922, however, there were imported only 1,500 cars, the lading being principally of coke, lumber, lard, wheat, corn, cattle, coal and miscellaneous. It will be noted that the commodities mentioned include in great measure traffic that should originate in Mexico rather than from import trade. The exports were especially small and amounted in January only to about 150 cars, made up of bullion, fibre, tomatoes, hides and miscellaneous.

Reference has been made to the car situation. The figures relative to the number of cars in service are given in a table. On February 15 there were in service 924 foreign and 11,653 system cars, a total of 12,537 cars. This total number of cars is considerably smaller than the Mexican railways will need with reviving business. However, it is some improvement over July, 1921, when there were no less than 9,000 foreign cars on the Mexican lines.

198 Locomotives Purchased

The reasons for the improvement in operating conditions which gradually began to take place after July 1 were pri-

marily three—one, the improvement of morale of the officers and men; two, the acquisition of a large number of new locomotives, and, three, the smaller amount of traffic since presented for transportation. The Mexican railways leased from American lines about 40 locomotives, including 11 from the International & Great Northern, ten from the St. Louis Southwestern, nine from the Illinois Central, eight from the Katy and three from the Gulf Coast Lines.

The next step was to place large orders for locomotives, including 68 new standard gage and 20 narrow gage locomotives built by the Baldwin Locomotive Works; 27 standard and two narrow gage locomotives built by the American Locomotive Company and 110 second-hand standard gage locomotives purchased from the Illinois Central, the El Paso & Southwestern and the General Equipment Company. Thus, they acquired 95 new standard gage, 22 new narrow gage and 103 second-hand standard gage locomotives, which additions to the motive power put a very different aspect on the situation than had previously been the case. It is not meant to imply that the motive power situation at present is ideal. The latest figures show a total of 505 standard and 102 narrow gage locomotives in service and 510 in shops.

In Excellent Physical Shape

The Mexican railway lines are in excellent physical shape, which fact is all the more interesting when one is told about the manner in which the lines were torn up and destroyed during the revolution. The writer was advised that all of the track which had been torn up had been rebuilt and that the entire mileage of the National Railways was now in operation. It was further added that the lines had succeeded in rebuilding one-half of the section houses and stations which had been destroyed.

Track standards on the various lines vary considerably. There is much 56 and 60-lb. rail still in track on the standard gage lines. This was noted particularly on the line out of Matamoros where 56-lb. rail was found laid on mesquite ties. The main line from Mexico City to Laredo is now laid with 75 and 85-lb. rail for practically its entire length. Work is now proceeding in this respect on the line from Mexico City to El Paso. South of Aguascalientes is now generally provided with the heavy steel, but much of the lighter rail still exists north of that point. Pine ties are generally used on the lines on the central plateau, and hardwood ties on those nearer the coast. Tie plates are used on curves. But few treated ties have been used, although at Aguascalientes there is a tie-treating plant with a capacity of about 120,000 ties a month. The tie situation on the railways is not as good as the Mexican railway officers would like it to be. At present some 500,000 to 600,000 new ties are being put in monthly; on some stretches the tie replacements have run as high as 40 per cent. The ballast conditions vary widely; considerable of the main line is ballasted with rock, but this is not general. Because of the lack of water and of freezing maintenance conditions on the central plateau are favorable.

[The second and concluding part of this article will appear in an early issue of the *Railway Age*.]



Division Terminal at Vanegas

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ended April 22 showed increases both as compared with the previous week and with the corresponding week of last year, in spite of the light coal loading on account of the strike. The total was 714,088 as compared with 704,632 in 1921 and 717,772 in 1920. In 1920 the loading was light on account of the switchmen's strike. Coal loading during the week of April 22 showed an increase of 594 as compared with the week before but a reduction of 74,944 as compared with last year. However, the increase in merchandise and miscellaneous as compared with last year was 69,807, or nearly enough to make up for the decreased coal movement. As compared with last year there were also increases in the loading of grain and grain products, coke, forest products and ore, but a decrease in livestock. Although the principal reductions in freight rates made since Ex Parte 74 have been on grain and grain products and livestock, larger increases in the loading have been shown on other commodities which have had little or no rate reduction. The summary for the week as compiled by the Car Service Division of the American Railway Association follows:

The decrease in coal production also accounts for a further increase in the freight car surplus during the period from April 15 to 23 from about 333,000 to 371,764, of which 229,892 were coal cars and 98,406 were box cars. The number of surplus box cars was about the same as the week before, most of the increase being in coal cars.

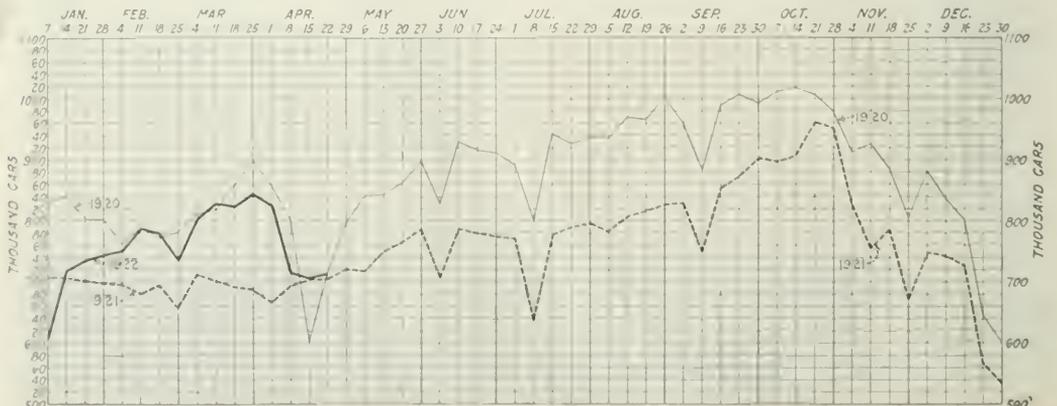
A TRAVELING ROPE, 23 miles long is one of the things boasted of in British Columbia. It is the "aerial tramway," 11½ miles in length, from the Premier Mine to the dock at Stewart. This tramway has a drop of 1,400 ft. from leading to discharge terminals, and it cost \$300,000. The rope is operated by a 60 h.p. electric motor; there are 153 towers in the line, 12 tension stations and 3 angle stations.

ONE OF THE AIRPLANES of the post office department was flown from Chicago, Ill., to Washington, D. C. on April 13 in six hours, two minutes. The distance is calculated at 715 miles, making the average speed 119 miles an hour. On April 17 a seaplane was flown from Palm Beach, Fla., to New York City, 1,210 miles, in 11 hours 16 minutes, including a stop of one hour 20 minutes. A part of this flight was made in a dense fog in which the aviator was obliged to steer by compass.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, APRIL 22, 1922.

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdsc. L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	6,747	2,798	6,109	1,160	4,765	1,100	67,361	73,942	166,183	174,499	156,355
	1921	5,605	2,765	39,356	841	5,466	543	56,316	63,007	107,137	141,840	141,704
	1920	1,925	2,465	11,436	4,083	2,676	2,368	50,324	62,016	137,393	141,840	141,704
Allegheny	1922	1,986	3,185	42,340	2,293	2,320	826	42,526	46,364	97,441	84,454	29,769
	1921	186	92	22,594	243	1,183	30	6,043	4,083	34,454	28,142	29,769
	1920	99	92	17,526	149	1,157	17	5,072	4,030	32,142	28,142	29,769
Pocahontas	1922	2,943	2,042	15,698	514	18,359	682	37,758	42,664	120,660	111,331	123,447
	1921	2,848	2,044	17,646	576	13,601	796	35,311	38,509	111,331	111,331	123,447
	1920	8,485	6,716	2,776	1,273	16,403	3,146	29,389	31,664	99,852	87,831	110,001
Southern	1922	7,864	7,117	3,058	529	12,920	1,751	26,313	28,279	77,466	77,466	110,001
	1921	9,257	10,536	3,321	161	5,349	1,820	32,390	37,113	99,947	103,523	100,821
	1920	9,744	12,101	14,190	155	5,551	960	30,933	29,889	55,399	57,466	55,927
Northwestern	1922	3,728	3,464	1,311	175	7,124	624	16,119	23,054	47,124	47,124	47,124
	1921	4,525	4,428	4,273	139	6,152	545	16,717	22,687	47,124	47,124	47,124
	1920	21,470	20,716	7,408	1,609	28,876	5,590	77,898	91,831	255,398	248,820	266,749
Central Western	1922	33,271	21,646	21,521	823	24,623	3,256	73,963	80,855	714,088	704,632	717,772
	1921	32,728	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772
	1920	32,671	29,732	138,389	4,682	47,167	5,838	213,388	232,765	714,088	704,632	717,772
Southwestern	1922	36,265	31,657	155,765	8,684	60,072	21,257	139,760	274,312	714,088	704,632	717,772
	1921	600	1,618	74,944	2,927	8,692	3,932	26,090	43,771	9,456	9,456	9,456
	1920	7,006	1,618	74,944	2,927	8,692	3,932	26,090	43,771	9,456	9,456	9,456
Total Western Districts	1922	33,271	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772
	1921	32,728	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772
	1920	32,671	29,732	138,389	4,682	47,167	5,838	213,388	232,765	714,088	704,632	717,772
Total all Roads	1922	36,265	31,657	155,765	8,684	60,072	21,257	139,760	274,312	714,088	704,632	717,772
	1921	600	1,618	74,944	2,927	8,692	3,932	26,090	43,771	9,456	9,456	9,456
	1920	7,006	1,618	74,944	2,927	8,692	3,932	26,090	43,771	9,456	9,456	9,456
Increase compared	1921	33,271	3,543	92,320	1,075	4,213	11,487	239,484	276,536	3,684	704,632	717,772
Decrease compared	1921	29,869	25,014	62,851	8,072	7,164	24,225	274,610	274,610	706,713	702,116	601,695
Increase compared	1920	31,598	25,024	69,456	8,399	54,680	8,259	243,718	274,334	714,268	694,881	801,559
Decrease compared	1920	35,034	25,935	184,952	10,652	54,016	5,811	241,037	269,574	827,011	603,171	858,837
March 25	1922	36,066	25,958	204,586	8,676	54,814	5,282	239,846	268,807	846,035	686,567	893,386



Revenue Freight Car Loadings Up to April 22, 1922

Group Insurance as Applied to Railroads

A Brief Outline of Its Advantages and as to How Some of the Railroads Are Using It

By William F. Chamberlin

Superintendent, Group Department, the Travelers Insurance Company

A WIDE INTEREST prevails among railroad managers and employees in group insurance. One railroad after another is taking up the investigation of the subject with the result that there are now several cases of group insurance which have been adopted by railroads in one of the various possible forms best suited to the factors and circumstances within the particular organizations. Among the railroad companies that are carrying group insurance at the present time are: the Lehigh Valley; Union Pacific; Bangor & Aroostook; Delaware & Hudson; Delaware, Lackawanna & Western, and the Erie. Group insurance is so flexible that it may be made to reach with its protection every individual or any class of employees in an organization. Herein lies its chief appeal and satisfaction to organizations of railway employees.

The legal definition of group insurance states: "Group life insurance is that form of life insurance covering not less than 50 employees with or without medical examination, written under a policy issued to the employer, the premium on which is to be paid by the employer or by the employer and employee jointly, and insuring only all of his employees, or all of any class or classes thereof determined by conditions pertaining to the employment, for amounts of insurance based upon some plan which will preclude individual selection, for the benefit of persons other than the employer, provided, however, that when the premium is to be paid by the employer and employee jointly and the benefits of the policy are offered to all eligible employees not less than 75 per cent of such employees may be so insured."

Group life insurance must always be written according to some definite formula. The following plans have been found to be practical:

1. An unchanging amount of insurance such as \$1,000 or some other fixed amount for each employee.
2. An amount of insurance based upon wage or salary, such as 75 per cent or 100 per cent of salary.
3. A progressive amount depending upon length of service. For example:

At the end of 3 mo. service—\$500 of insurance
 At the end of 1 yr. service—750 of insurance
 At the end of 2 yr. service—1,000 of insurance
 and thereafter increasing by \$250 a year until a maximum of \$1,500 or \$2,000 has been attained.

A short waiting period, such as three months, six months or one year, serves to eliminate the class termed "floaters."

The amounts of group life insurance in force as reported by the various companies to the state insurance commissioners on January 1, 1922, were as follows:

The Travelers	\$424,443,627
Equitable	376,107,369
Aetna	318,085,180
Metropolitan	289,499,073
Connecticut General	73,106,346
Prudential	45,382,350
Missouri State	14,038,783

The larger amount of this total in excess of one billion and a half is written for employees in industrial enterprises.

Railroads Adopt Group Insurance

Group insurance is the cheapest form of indemnity for loss of life or for accident and sickness. There are several reasons for this. The life insurance is written on a one-year renewable term plan and has the wholesale nature of trans-

action. The premiums on each individual are collected as one. All records and correspondence go to and from the insurance company through one channel only—the employer. The elimination of all personal medical examination further reduces the cost of group insurance.

The amounts of group insurance for the various railroads carried in the insurance companies alluded to vary from \$500 to \$3,000 per individual. The amount of an individual's insurance may depend upon his classification as an employee, or the length of his time of service. Some railroad employers have paid 100 per cent of the premium; other roads have arranged for co-operation with their employees by furnishing the machinery for collecting the premiums and participating therein.

The Lehigh Valley has recently arranged a plan of life and accident insurance as follows:

	Amount of Life Insurance	Principal Sum of Accident Insurance	Total Insurance
Class A—Engineers, conductors, shop foremen and supervisory forces	\$2,000	\$2,000	\$4,000
Class B—Trainmen not included in Class A	\$1,500	\$1,500	\$3,000
Class C—Employees not included in Class A or Class B	\$1,000	\$1,000	\$2,000

In the Lehigh Valley plan the option was submitted to the employees as to whether or not they would be covered under the insurance. This required the solicitation of the entire 20,000 employees, and was successfully accomplished by the Travelers Insurance Company in 10 days.

The Union Pacific is insured under a plan of group life insurance with the Equitable Life Assurance Society of America and for group disability insurance with the Continental Casualty Company. The life insurance is based upon one-year's wage not to exceed \$2,500, or to be less than \$500. Premiums are paid entirely by the company.

Under the plan used by the Delaware & Hudson, insured by the Metropolitan Life Insurance Company, every employee with two years' length of service receives \$500 life and total disability insurance, the premium being paid for by the railroad. By co-operation with a sufficient number of his class and by contribution an employee of the Delaware & Hudson can have a total life insurance of from \$1,000 to \$5,000.

The Delaware, Lackawanna & Western has arranged for group life insurance on the co-operative basis for an amount of \$2,000. This insurance is understood to cover train dispatchers, yardmasters and other supervisory forces in all departments. The Lackawanna group policy is with the Aetna Life Insurance Company.

The Bangor & Aroostook carries group life insurance in the Travelers Insurance Company according to the following formula. The employer pays all of the premium.

	Class I Locomotive Engineers	Class II Locomotive Firemen
3 mo. and less than 6 mo.	\$1,000	\$500
6 mo. and less than 1 year	2,000	1,000
1 year and over	3,000	2,000

The Erie has a group insurance policy in the Travelers Insurance Company covering certain classes of office employees for \$1,000 and \$2,500, and with the Aetna covering shop employees. Announcement was made on January 1, 1922, of the coverage for operating employees, but it is

understood that this has not as yet been placed into effect.

Reasons Why Railroads Have

Adopted Group Insurance

There have been many cases of employee relief organizations that for one reason or another have not been wholly successful. One railroad president is reported to have said: "Another reason why a railroad company might well provide insurance to its employees is that they are constantly creating forms of co-operative insurance, which are not organized on a sound basis, which become insolvent or require the employee to pay abnormally high rates. The employee who is dependent upon co-operative insurance of this sort managed by his associate employees has lost in a large degree his independence and individuality. Such insurance may constitute the only provision for his family. To make that provision sure he is compelled to make his judgment and his views accord with the judgment and views of a majority of the co-operative associates. This may be very prejudicial to a railroad company as well as very prejudicial to an employee."

The group plan must automatically overcome any opposition. It is insurance at the lowest known rate with the most liberal terms, and in the case of death the claim is paid no matter what the cause or where the occurrence. There is no need for physical examination because one of the chief features of group insurance is that no employee shall be excluded because of an adverse condition of health. No man in any occupation carries a sufficient amount of insurance. A railroad employee should retain insurance that he has obtained from any source, and should take advantage of an opportunity to buy additional insurance at the lowest cost.

Group insurance is entirely distinct from workmen's compensation insurance and in no way affects it. In the usual group contract there is protection for death occurring at any time and covering any cause, even that of suicide. No existing legal rights are impaired as they now stand under the state and federal liability laws. Group insurance works independently of any other contract, and the fact that it will become part of the resources of an employee will have no influence on the strength of his claims to any other rights or indemnities.

It is evident to an insuring company that wherever group insurance makes its way, an organization is tempered throughout by good-will. A group insurance policy enlists the interest of the dependents and the family of the employee. The employee feels a connecting tie between the employer and his own nearest interests. Good-will is bound to result. There enters into the relationship between employer and employee the element of human interest over and above that of pay for work.

Group insurance is a measure of undeniable justice. Adequate insurance such as is provided under the group plan cannot be procured at the same low cost in any other way. It must be secured to employees through their employer—otherwise they forego its benefits.

The physical comfort of employees has for many years past been the concern of management. Not only healthful conditions, but comfortable—even restful and pleasing surroundings—are found in many places of employment of men and women. Quite as important as physical comfort is the peace of mind that comes with a sense of security created by protection and provision. More and more is economic security coming to be regarded as a necessity in the life of every individual—whether he possesses great wealth or depends entirely on a wage for the maintenance of life.

Group insurance, when it is carried by an insurance company equipped to render a highly developed service, cooperates with the assured in the attainment of the safest possible working conditions through a service of inspection. Very often a company, because of years of familiarity, is

blind to certain conditions of hazard that are immediately evident to an outside inspector. Unguarded transformers, switchboards and high tension apparatus; unguarded engine flywheels and belts; linemen working on high tension lines with only the inadequate protection of a pair of gloves—such conditions as these are frequently existent and do not seem to impress the people in continual contact with them with their great element of danger. Inspection should rightfully be given to conditions outside the plant, including poles and transmission lines and whether or not the linemen and other outside employees are equipped with the proper protective clothing and devices so that they may reasonably be protected against accident when working on the lines. A great source of danger lies in the carelessness of people who become accustomed to dangerous conditions, especially when such thoughtlessness admits, for instance, of the neglect of shutting off a current from lines when repair must be done on them.

A recent accident, although happening in England, well illustrates this point. Eight men out of a track gang of nine were killed while working on the line. In this case the foreman, a railroad man with 19 years' experience, depended upon hearing approaching trains when a train was passing the gang on an adjacent track. Group insurance is effective because it encourages safety effort along positive lines. It is found that men work with greater freedom and better accomplishment when assured of a thoughtful protection from such fatal danger.

Engineering inspection should be supplemented by sanitary inspection. Railroads have complied with the standards of the insurance company regarding toilet and washing facilities, the distribution of drinking water, the installation of a standard first aid kit and elementary instruction in resuscitation. It is a remarkable fact that at certain points on uninspected lines (uninspected when related to high standards of inspection) where there is the greatest danger of shock from electricity and where the cases are actually numerous, there is no provision made for resuscitation either through the personal efforts of some instructed co-worker or by the application of remedies and devices usually required in a first aid kit.

At the time of the award to the Pennsylvania Railroad of the Travelers insurance medal as the American employer who during the current year did the most for the protection of the lives and limbs of its workmen by the chairman of the jury of award of the American Museum of Safety, W. W. Atterbury of the Pennsylvania Railroad said:

"In accepting the Travelers medal for industrial safety, the Pennsylvania Railroad desires to express its earnest appreciation of the honor. Its great value is the incentive to our officers and employees to still further achievement. Industrial safety is an important branch in the broad humanitarian scheme that has characterized the policy of the Pennsylvania Railroad for many years in the conservation of human life and energy.

The Status of Group Insurance

No one has obliged any of the group insured railroads to extend to employees the opportunity of access to adequate life, accident and sickness insurance. There is no law requiring such a measure; there is but little precedent. The basis of this course of action is a desire to see simple justice done. Economic security is one of the principal needs of labor today. It ranks with those other questions which determine the temper of industry and cause the violence of its pulsations—wages, hours, industrial status and a fair share in profits.

Economic security is a condition of relief from the fear of an unprovided-for old age, unemployment, sudden unprovided-for death, illness or accident. To remove fear is to remove the first cause of human restlessness and discontent.



A Partial View of the Tie Treating Section of the Yard

A New Timber Treating Plant at Minneapolis

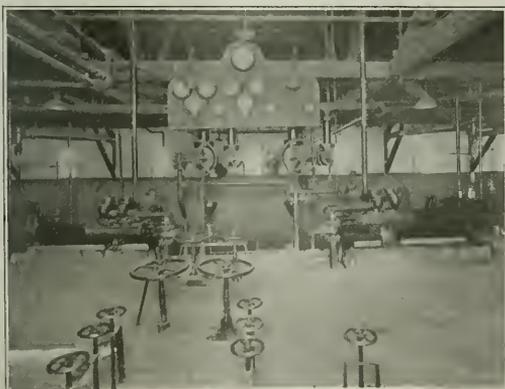
Advantageous Location and Substantial Construction Characterize
Project Completed Near That City

IN THE ERECTION of a new timber treating plant at Gilkey, near Minneapolis, Minn., lies one of the interesting timber treating developments of the past year. This plant is owned by the Walsh Tie Company of Minneapolis and is located $7\frac{1}{2}$ miles from that city. Here have been established

standard gage tracks connected at both ends with a track tributary to the Minnesota transfer yard. As a glance at the map will show, these tracks are parallel, the first six being spaced 112 ft. apart, the two serving the pole plant 66 ft. apart and the remaining 100 ft. and 120 ft. apart. These tracks are inter-connected at logical points to provide standard gage connections between the several plants, and in the tie treating section of the yard are supplemented by a system of five narrow gage tracks parallel to and between the standard gage tracks and connected at one end in such a way as to permit of their operation independently of the standard gage system.

The Tie Treating Plant

All of the buildings and structures entering into the project are situated in this yard with the exception of the living

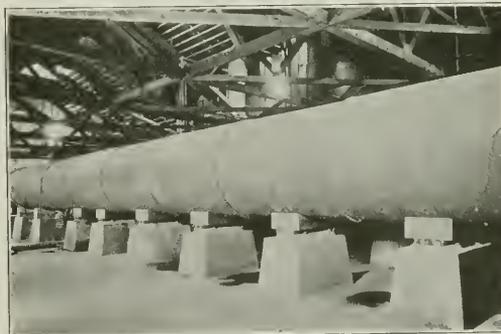


How the Operating Valves Are Arranged in the Retort House

facilities for the pressure treating of a million or more ties annually, with extensive facilities for treating telegraph and telephone poles, and a plant for sawing, splitting and trimming fence posts. The buildings are of unusually substantial construction, and are arranged and equipped in a way that shows close attention to detail. The project includes a sanitary sewage disposal system, comfortable housing facilities for employees, and aside from providing ample arrangements for future expansion, is so situated that the facilities are readily accessible to all railroads entering the "Twin Cities."

General Layout

At present the project occupies about 100 acres of a 284-acre tract owned by the company and available for timber treating use, and consists in general of a yard of 11



The Retorts Are Carried on Roller Bearings

quarters for the employees, which are just outside at the end nearest the tie and pole plants. All of the plants are connected by underground electric conduits extending from a transformer station near the tie plant, and the pole and tie plants are also connected with steam lines from a central power station.

The tie treating plant is located at the west end of the

yard and along the north side of that section devoted to the tie industry. It comprises a retort house, a 500-ft. loading platform for tram cars, a two-stall narrow gage engine house and machine shop, and a laboratory, storehouse and storage tanks for the preserving solutions. The loading platform is directly ahead of the retort house on the line of one of the narrow gage tracks, which upon reaching the platform, branches into three parallel tracks which extend throughout the length of the platform and thence directly to the retort house. The loading platform is elevated to the height of a flat car and is served on each side by a spur track extending from the nearest standard gage track; and the three narrow gage tracks, as they leave the platform in the direction of the retort house, accommodate a cross-over system whereby tram cars that are loaded on one side of the platform may be switched to the opposite side of the retort house.

The retort house is a frame structure with concrete foundation and floor, the roof of which is supported on trusses substantially cross-braced and carried on the sidewalls. The roof itself is shingled and the walls are finished in stucco. In this house are two retorts, each 6 ft. in diameter and 123 ft. long, with additional space for a third retort when needed. The retorts are supported on roller bearing iron saddles, each carried on one of 15 concrete piers. The anchors for holding the retorts are placed at the middle to provide for ample expansion and contraction in the cylinders.

There are two working tanks in the building, each 14 ft. in diameter and 21 ft. high, and two storage tanks situated just outside of the building to one side of the retort house tracks, one 20 ft. in diameter and 20 ft. high, the other 40 ft. in diameter and 40 ft. high. All of the pipes and valves connecting the retorts with these working and storage tanks

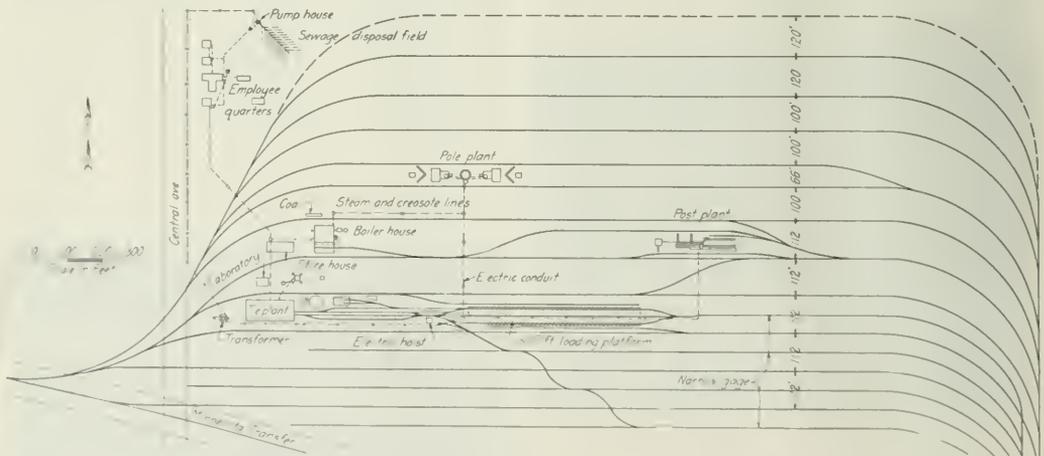
and about the tie storage yards. The machine shop for the narrow gage equipment is located within a short distance of the retort house and is reached by a turn-out from one of the narrow gage tracks leading to the retorts. This house is of frame construction finished in stucco, as are the laboratory and storehouse, which are also located near the retort house.

Steam for operating the pumps in the tie treating plant



A Side View of Half the Pole Treating Plant

and for heating the solutions at both the tie and pole plants, as well as for heating the buildings, is obtained from a nearby power house, while the water supply for the power house and for other purposes, especially for fire protection, is obtained from a 50,000 gal. elevated steel tank adjacent to the retort house. The power plant is a brick structure



The Ground Plan of the Timber Treating Plant

are carried in an open basement in the retort house and in concrete connecting conduits, the handles on all valves required in operating the retorts being extended above the floor. Two pressure pumps, two air compressors, one vacuum pump, two oil pumps, one fire pump, and one zinc chloride pump, all situated in the operating room of the retort house within easy reach of the operator, constitute the mechanical equipment for performing the tie treating operations; and one 21-ton steam locomotive and 150 tram cars, together with a stationary electric hoisting engine, itself situated at the narrow gage track cross-over between the loading platforms and the retort house, provide the equipment for hauling and otherwise handling the ties or other timbers in and out of

48 ft. wide, 54 ft. long and 42 ft. high in which are four 150 hp. boilers, which furnish ample capacity for all requirements at the tie and pole plants and at the employees' quarters. This plant is served by a spur from one of the standard gage tracks, this spur terminating in an elevated timber trestle in the rear of the building for the purpose of dumping the coal cars.

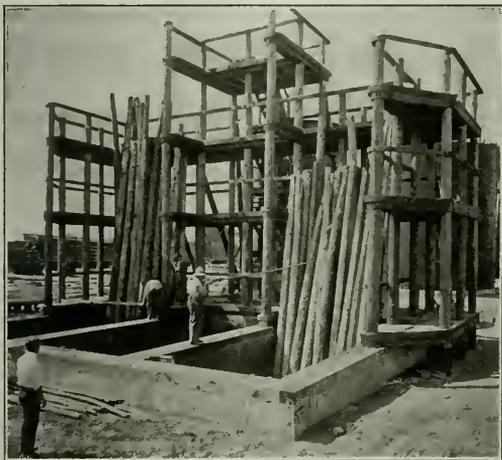
The source of the water supply from which the steel tank is filled is a well 453 ft. deep, situated some distance from the yard. From this well the water is pumped by an air lift system having a capacity of 750 gal. per minute, this equipment together with the fire pump in the retort house providing fire protection for all of the property within 200

ft. of the retort house as well as protection for the employee buildings.

The Pole Plant

The pole treating plant is situated between two standard gage tracks and is constructed in two units, having a common storage tank. Each unit consists of a 30,000 gal. working solution tank, 14 ft. in diameter and 20 ft. high; three depressed immersing pits equipped with heating coils on the bottoms and sides and, above the ground, with timber racks for supporting the poles in an upright position while the butts are being treated. It also includes an electrically-operated crane for loading and otherwise handling the poles. The storage tank, common to both units is 27 ft. in diameter and 30 ft. high with a capacity for 130,000 gal. of creosote oil. The three pits are each 10 ft. by 22 ft. in cross section and 11 ft. deep each with capacities for one carload of poles. The entire plant is thus capable of handling six carloads of poles at one time.

Each unit has its own operating equipment which is located in a concrete room under the pit and consists of two 250 r.p.m. centrifugal pumps operated by a 240-hp. motor, together with the necessary valves for controlling the flow



A Close-Up View of One of the Pole Treating Units

of the creosote. These pumps are large enough and the valves and piping arrangement are sufficiently flexible to enable a constant circulation of oil to be maintained in any one or all of the pits and to permit changing the oil from hot to cold within three minutes. For the purpose of handling the poles there is in addition to the electric hoists (the machinery for which is housed in a frame structure finished in stucco) a locomotive crane; and the plant is further equipped with a puncturing machine for making whatever holes are desired in the poles. Connected with this machine is a 500 ft. roll-way laid in such a manner that poles unloaded from cars at the puncturing machine may be transferred directly to the treating tanks.

The Post Plant

As shown on the map, the post plant is located at some distance from the tie and pole plants, whereby post manufacturing operations may be carried on independently of all other work in the yard. This unit, similarly to the pole plant, is located between two standard gage tracks, which in this case are only 66 ft. apart. It is constructed to handle

all sizes of fence posts and is operated entirely by electricity, three motors being installed for this purpose. The posts are loaded from the cars directly into a conveyor which carries them to the saws where the ends are trimmed. After trimming, the posts are inspected and separated into different sizes, then dropped into baskets which are handled by a locomotive crane and unloaded in the yard for storage or loaded into tram cars for treatment, a cross-over to the track in the vicinity of the treating plant having been provided for this purpose.

While not connected directly with the tie treating, one of the interesting features of the project lies in the facilities which have been provided for the employees. As stated elsewhere, a colony of houses has been established just outside of the yard at one end for this purpose. This colony consists of three stucco finished cottages, a combined kitchen and mess hall and a combined lavatory and bath house. The mess hall has a capacity for 125 persons and is provided with a combined refrigerator and ice storage house. The buildings are comfortably arranged, are equipped with steam heat and electric lights and hot and cold water, and are served by a sanitary system of sewage disposal, the latter terminating in a septic tank and tile drains distributed through a disposal field.

As mentioned at the outset, the project provides facilities for treating a million or more ties annually and may readily be expanded as the demand for its use increases. It is owned by the Walsh Tie Company.

Less Politics in Canadian Railways

“THERE ARE 100 BODIES for the regulation of the railroads on the North American continent. Only one of these is in Canada, the other 99 are in the United States.” This fact was ascribed by D. B. Hanna, president of the Canadian National Railways as responsible for the success of government ownership under the plan effected by the Canadian government, in an address at a dinner given in his honor by the Mid-Day Luncheon Club at Springfield, Ill. on April 28. Mr. Hanna was followed on the program by Francisco P. de Hoyos, general agent of the National Railways of Mexico, New York City. The speakers were introduced by William H. Finley, president of the Chicago & North Western, who served as toastmaster.

An abstract of Mr. Hanna's address follows:

Address by President Hanna

There are six essential points of difference between the conditions under which government ownership is conducted in Canada and those under which government operation was tried in the United States during the period of federal control. These are as follows:

(1) In the United States the government took possession of the roads over night as a war measure. In Canada the government acquired the railways by construction and purchase, step by step for economic reasons. (2) In the United States the object was unified service, regardless of cost. In Canada the government's object was to insure adequate and efficient railway service. (3) In the United States, federal control was recognized as a temporary condition. In Canada the plan of a national railway system was designed to be permanent. (4) In the United States the method of management adopted was political with a cabinet minister in charge, whereas in Canada, on the creation of the National Railways, a corporate form of administration was established and the appointment of a new board for the Canadian National Railways on its acquisition by the dominion government in the fall of 1918 was made the occasion of taking away from ministerial or political control, those lines formerly administered by the Department of Railways and Canals.

These lines were also placed under the new board, composed of outstanding business men and railway officers. Thus the entire system owned at that time by the dominion government was placed under an organization of a corporate character. Subsequently the management of the Grand Trunk Pacific, of which the minister of railways and canals was appointed receiver, was also placed in the hands of what is known for convenience as the Canadian National Railways' Board.

The fifth difference is that under the United States plan competition was eliminated and a great monopoly was established. In Canada competition was preserved. The effect on the employees is a sixth point of difference, although actually the result of the first five. In the United States the indifference that generally accompanies monopolistic operation was definitely felt. Competition is the spur to endeavor and the result has been that our own employees have been "on their toes"—keen to advance the interests of the system for which they work—enjoying the contest for the nation's business.

There are many in Canada who were opposed to public ownership of railways; in fact, public ownership has not been adopted as a plank in the platform of any one of the large political parties. The form of public ownership adopted in Canada was one which followed logically the policy of assisting the construction of railways which successive governments had adopted. (Mr. Hanna then roughly sketched the history of the main sections of the national system).

This national system serves the nine provinces of Canada—and competes with the Canadian Pacific for the trans-continental and other business of the nation. In a few months the Grand Trunk is to be taken into this system and will add 4,776 miles and give the national system a total mileage of 22,375 miles.

I am not discouraged by the record of the nationally owned lines in the last three years. While the losses in operation had been large 1921's performance was 20¾ million dollars better than in the previous year, and during four months of 1921 there was an actual net return. Traffic was below normal and it was well known that a disproportion between expenses and earnings has existed since 1918 (and even before) and had most adversely affected the operation of the roads in the United States in 1919, 1920 and 1921. In 1921 the C. N. R. stood alone as a transcontinental line that had an increase in gross earnings. The increase was just over one million dollars; and during the same period the privately owned competitor experienced a shrinkage of 23½ million dollars in its gross revenues. While traffic density was light on the Canadian National, the train load was relatively good and steadily improved. Also a fine passenger service was maintained.

During the period of high prices and low rates the Canadian National had had to make large expenditures to take up deferred maintenance and was under the necessity of spending large sums of money for improvements and betterments and new equipment. The principal trains are now made up of modern steel cars.

Two consolidations of staff have been effected with an entire absence of friction, and four groups of lines, all more or less designed as competitors, have been made into a smooth working though complex transportation machine. A preponderance of main line mileage has increased the difficulties of the management. Much of the mileage was new—the main lines were completed in the second year of the war; in fact over 15 per cent of the national system's mileage has been taken over for operation since the outbreak of the war. Canada with a population of 8¼ millions added to its railway system in the 10 years ending with 1921 a total of 14,650 miles of railway, whereas the United States with a population of 108 million added in the same period but 10-

280 miles. In population Canada had only 2.3 persons per square mile of area. The United States had 40. To support each mile of railway Canada had 233 persons to the United States' 430. However, there is promised a growth of Canadian population such that Canada will soon provide enough business to support its entire railway mileage. Canada has all the basic materials in great quantities that have contributed to the great development of the United States; forests, fisheries and mines, as well as agricultural lands, and particularly the greatest hard wheat producing areas in the world.

Much has been said of politics interfering with efficient operation of government owned lines. That is ancient history. Under the present form of corporate administration I stand here and tell you that in the last three years there has been no political interference. During this period we passed through an election and quite an intense affair it was, and yet at no stage nor at any point on the system can anyone state that anything was done by the management to serve political ends. The directors have taken a firm stand that no one employed by the railways should take a greater interest in politics than to exercise his franchise. It was laid down as a rule that anyone who identified himself with a political party to the extent of accepting a nomination as a candidate automatically severs his connection with the system.

At the election referred to, the government changed and it is announced that it will continue the present plan. If this is done I can see no reason why the nationally owned lines in Canada should not prove to be self-supporting eventually under normally adjusted expenses and earnings. From the shippers and consignees' point of view the plan of dual competitive service to every important community is ideal. There is no competition in service and in principle of ownership—the one system is nationally owned while the other was at its inception nationally endowed—the two systems compete for the nation's business. Both systems are strong and in good physical condition; both have a capacity considerably beyond normal traffic movement—at present business is sub-normal.

Canada can therefore face a period of expansion with confidence that her railways are in a position to assist in the development work. In the past the railways have played a great part in the national progress and in the period immediately ahead I am confident that the Canadian National will be a big factor in the upbuilding of the country and will ultimately be recognized as one of Canada's greatest assets.



Photo by University of Columbia

A Part of the American Army of Occupation Entraining to Leave Germany

A Reply to Some of Frank J. Warne's Charges

Facts Were Neither Fairly Presented Nor Logically Interpreted
—Conclusions Therefore Not Valid

WASHINGTON, D. C.

C. S. DUNCAN, an economist who was statistician for the United States Shipping Board at the Paris Peace Conference, testified before the Senate Interstate Commerce Committee, on April 29, as a witness for the railroad executives that accusations made by Frank J. Warne, representing the train service employees, against the railroads, were not only unfounded but that Mr. Warne repeatedly misstated facts and drew illogical conclusions from his own arguments. Mr. Duncan quoted extensively from the decisions of the Interstate Commerce Commission and other official reports to show the falsity of certain of Mr. Warne's statements.

"The railway executives," said Mr. Duncan, "in asking that a reply be made to Mr. Warne's testimony, have naturally felt that the charges and accusations there made are not true, that the facts are neither fairly presented nor logically interpreted and that the conclusions are therefore not valid. Let me say at the outset that I agree in general with that statement, and because I agree I feel fully justified in coming before this committee as a disinterested witness. I have confidence that I can demonstrate to you that Mr. Warne is wrong in all of his major conclusions."

Taking up the policy of the Railroad Administration during federal control, Mr. Duncan said the witness misstated the facts when he said that "the governmental policy as to revenues was not based upon economic principles of having earnings exceed or even meet expenses and that general taxation out of the United States treasury was depended upon to meet any resulting deficits."

"That it was the policy," said Mr. Duncan, "of the Railroad Administration under Director General McAdoo and Director General Hines until far on into 1919, to make revenues pay expenses and rentals, and that Director General Hines relinquished the policy with reluctance and as a matter of expediency when it became clear that the roads were going back to private control, is proven by their own statement. The Railroad Administration attempted to operate the roads on the same economic principles as private management must do. It endeavored to make income equal outgo with 'a margin of safety.' It failed because its judgment was in error as to costs, the largest element of which was wages."

Mr. Duncan called attention to "the apparent desire of the witness" in an exhibit filed with the committee "to have the observer draw the conclusion that the railroads made one final grab into the treasury bag just before the so-called government guarantee period ended with the month of August, 1920."

"The striking increase in operating expenses in 1920 does not represent an orgy of expenditures at government expense, but an avalanche of wages at the railroads' expense," said Mr. Duncan. He added that two facts of outstanding importance have received no mention in the exhibit; namely, the increase in wages made on July 20, 1920, and retroactive to May 1 and the increase in rates effective August 26, 1920, but not retroactive. "These things the witness knew perfectly well when he constructed the exhibit and when he presented it for record." Continuing, Mr. Duncan said:

"The increase in rates failed to secure sufficient operating revenues to pay operating expenses and the rental agreed upon in the standard contract or the return provided for as to the roads not signing the contract. This deficit of \$711,947,242 had to be paid out of the federal treasury.

"This deficit does not include the tremendous sum necessary to liquidate the claims of the roads under the upkeep

section of the federal control act or the amount required for an adjustment with the so-called short lines, or the amount involved in the claims of 'third persons' against the Railroad Administration. These sums have been estimated by Director General Davis at \$1,100,000,000.

"The amount due the roads under the guarantee for six months, March to August, inclusive, 1920, now stands at \$653,539,001. The total appropriation made by Congress to the Railroad Administration to date has been \$1,750,000,000. The return on railroad property investment account under federal operation, disregarding the rental and guarantee was for 1918, 3.76 per cent; for 1919, 2.75 per cent and for 1920, 0.32 per cent. The percentages of return on property investment actually realized from rental and guarantee was for 1918, 5.05 per cent; for 1919, 5.05 per cent, and for 1920, 4.29 per cent. The return to the roads has been strictly limited for the period of unprecedented prosperity for industry generally, thus preventing the accumulation of reserves to meet the period of depression."

Replying to statements made by Mr. Warne challenging the accuracy of sworn information furnished the Interstate Commerce Commission by the railroads, Mr. Duncan quoted from the commission's decision in the 15 per cent rate case, as well as from other utterances of that body in which the commission said that it had checked the statistical reports of the carriers and that there was no question about their accuracy. Despite this record, Mr. Duncan said "the witness maintains his charge of duplicity and deception as a deliberate policy of the railroads."

Referring to "the charge of inordinate expenditures for maintenance, at least on certain roads by regional directors during federal control" made by Mr. Warne before the Senate committee, Mr. Duncan read for the purpose of disproving the accusation, statements made at various times by the Interstate Commerce Commission relative to maintenance. "The commission certainly had all the data available for anyone to use," said Mr. Duncan. "It had heard both sides without partisan interest. It had been made fully acquainted with the bad as well as the good in railway managements, the inefficiency as well as the efficiency. By a most searching investigation the Interstate Commerce Commission found no such excessive expenditures prior to federal control. There is nothing in the reports of the directors general for the period of federal control that indicates anything in their opinion but an inadequacy of transportation facilities when the roads were taken over.

"From all of these sources, certainly not biased in favor of the carriers, an analysis of the same data presented by Mr. Warne leads to the conclusion: The roads were not overmaintained, but rather undermaintained to meet the transportation needs of the country, prior to federal control, at the time of federal control, during federal control and when the roads were returned to private control. The charge, therefore, of expenditures running riot, of excess expenditures, of over maintenance will not hold against this evidence."

In reply to the accusations that the railroads during the first six months after their return to private control on March 1, 1920, had padded their operating expenses, particularly the maintenance accounts and attempted to secure money from the federal treasury for the purpose of building up their properties, Mr. Duncan charged that Mr. Warne "by deceptive charts and misleading, insinuating statements has sought to impute dishonesty to railroad managers."

While there was an increase in maintenance expenditures during that six months period, Mr. Duncan said that it was due to the condition in which the properties were returned at the end of federal control, and the fact that costs were abnormal. Mr. Duncan added that the Transportation Act of 1920 contains a specific provision to protect the federal treasury for the six months guaranty period and continued:

"The Interstate Commerce Commission is directed under that act to determine and has been busied at a determination of, the expenditures that in its opinion properly belong in operating expenses. The carriers were fully cognizant of this provision at the time expenses were being made. If there had been a temptation on their part to inflate expenditures unduly, the specific provision in this act would have restrained them. The carriers knew that all of their expenditures on maintenance would be fully and carefully reviewed. They have presented to this committee precisely the same data that they gave to the commission for review.

"It seems clear that the witness has again fallen into error by comparing varying money costs when he should have compared physical and service units. He can find no corroborative evidence for his charge either from the Railroad Administration or the Interstate Commerce Commission. The latter calls attention in its annual report for 1920 to a shortage in equipment; in its own words to an 'impaired transportation machine' with which to meet the abnormally heavy traffic requirements.

"When the roads came back," continued Mr. Duncan, "they were not being run on an economic basis. Expenditures were greater than receipts and expenditures had been much restricted by orders from Washington. For January and February, 1920, the net income ran below the standard return by \$153,000,000. Private management had set before it the stupendous task of restoring the economic equilibrium. The Railroad Administration and the government virtually said: 'Here, take this impaired machine; apply it effectively to the greatest volume of traffic on record; 75 per cent of your freight cars are on foreign roads; find them, repair them, but don't delay traffic; your employees are discontented but we have imposed upon you expensive rules and regulations and we expect to add over 618 million dollars annually to your payroll to satisfy them; there is no program for the year, make one; repair your locomotives and your roads; haul the biggest movement of grain known in history with box cars, 50 per cent of which are not fit for such service; get your cars on your own roads, send empties to areas needing them; haul coal and haul coal longer distances where industry needs it to forestall any possible shortage; you will pay more for your own coal and it will not be of as good quality; your fuel bill will be increased above ours in 1919, which was 396 million dollars, to more than 566 million dollars, an increase of 170 million dollars or 43 per cent on this one item; traffic will overload the impaired machine until you will be driven beyond the point of diminishing returns; sometime along we'll set a value on your property and attempt to increase your revenues to secure a fair return on it—but meanwhile your treasuries are empty because the government took away your ready cash at the same time with the control of the roads and has not returned it; you have not been permitted to share along with other industries the prosperity of the war period; you have no reserves with which to meet a business depression; you must face a public who will resent heavier freight and passenger rates; you will be compelled to ask higher rates and fares when the universal demand for the public is for lower rates and fares; we'll police your accounts and judge your expenditures by the test period. Go and justify yourselves."

"All of the economic distress of the world cannot be laid at the door of the railroads," said Mr. Duncan. "Mr. Warne claims that purchases of supplies and materials, especially in the six months' guarantee period, March-August,

1920,—created an artificial prosperity and the stoppage of such purchases brought on the business depression. But this does not surely account for the fact that a break in the rubber market came as early as February, 1920, followed quickly by distress throughout the automobile business. It does not account for the break in the silk market in May, 1920, followed within a few weeks by cotton and wool. It does not account for the indefinite 'vacation' given its employees by the American Woolen Company beginning July 1, 1920, when its mills were closed. It does not account for the break in the sugar market in July, 1920. It does not account for the rapidly rising tide of cancellations throughout the last four months of this guarantee period. It does not account for the slump in farm prices nor the break in wholesale and retail prices in 1920.

"The break in prices, the demoralization of markets, the beginning of liquidations, the advent of unemployment, the onset of business depression all took place either prior to or during this guarantee period. Purchases by the railroads of supplies and materials, not only did not cause artificial prosperity but also failed to prevent or even postpone deflation. The railroads were not, as asserted by Mr. Warne, the cause of inflation and the cause of depression, but, much more than other industries, because of government regulation and the consequent slow processes of adjustment, they were caught in the 'fell clutch of circumstances.'"

Mr. Duncan told the committee that the compensation paid general and division officers represents only 2½ per cent of the total wage bill of the railroads. The increase in compensation paid general officers from 1916 to 1920 inclusive was 42.1 per cent, Mr. Duncan said, while to division officers it was 125.3 per cent, of which, however, 60 per cent represented increases granted the lowest paid officials. Contrasted to this, however, the increase in the total wage bill paid all employees in 1920 over 1916 was 151.8 per cent. Eliminating the pay of general and division officers shows, however, according to the witness, that railroad employees, excluding general and division officers received an increase in pay of 154.9 per cent.

Statistics issued by the Interstate Commerce Commission show that the average annual compensation paid employees in 1920, including general and division officers, was \$1,820. Excluding these officers, Mr. Duncan said, the average annual compensation for employees was \$1,794 or a difference of \$26.

Mr. Duncan denied statements made originally before the Senate committee by Mr. Warne and subsequently reiterated by Samuel Gompers, president of the American Federation of Labor in a speech before the National Agricultural Conference in Washington, to the effect "that over \$1,250,000,000 has been placed to the cost in wages of the railroads and placed by them to the railroad workers more than is properly or ought to properly be charged."

"There is no overstatement of total compensation and he knew it," said Mr. Duncan, in referring to Mr. Warne's testimony. "As a matter of fact he has made no claims that the items were not actually correct or that the sums were not actually paid to the classes specified and in the years under review. For this witness to have stated his conclusions in such equivocal terms as to be generally misunderstood is reprehensible. The vast wage bill of \$3,698,216,351 was actually paid to railroad employees in 1920."

A witness for the National Association of Owners of Railroad Securities was to follow Mr. Duncan on Thursday. It is understood that Chairman Cummins hopes to be able to get out a report as a result of this investigation, which has been continuing for about a year, within about three weeks. It is hoped also to have a report within that time on the Capper and other bills to amend the transportation act. It is expected that the report of the committee will be unfavorable.



The Model 55 Service Coach Drives on All Four Wheels of the Leading Truck

New Features in Service Railway Motor Coach

Unique Type of Truck with Cushioned Wheels—High Seating
Capacity Combined with Light Weight

A MOTOR COACH especially designed to meet the requirements of railway service has been built by the Service Motor Truck Company, Wabash, Indiana, and is now being operated on demonstration trips over the lines of the Big Four between Wabash, Indiana, and Benton Harbor, Michigan. The power plant and details of the transmission follow regular motor truck practice, but the design of the running gear as well as of the car body is a complete departure from the motor bus type of construction.



Interior of the Passenger Compartment

A seating capacity of 38 passengers is provided in the body of the car and there are seats for 8 additional passengers in the baggage compartment, which may be folded up against the sides of the car.

Although the total weight of the car does not exceed 13 tons the body is of rugged construction built up on an underframe of four 6-in., 8-lb. channels and it is carried on two four-wheel trucks with power transmitted to both axles of the forward truck. The body is 42 ft. 5 in. long over the bumpers and 8 ft. 6 in. wide over the posts. The frame is of steel construction throughout and is finished on the outside with steel sheeting. The engine hood, with the ex-

ception of the radiator is included in the baggage compartment, which is 8 ft. long back of the hood, and is served by a sliding door on either side. The passenger compartment is entered through a vestibule at the rear end of the car which is fitted with trap and side doors in accordance with steam railroad practice. Each window has two sashes, the lower one of which can be raised, and is fitted with a Pantecote curtain. Suction ventilators are also provided in the roof. A saloon with a dry hopper and an alcove water cooler is located in the forward left hand corner of the passenger compartment. The car is heated by exhaust gases from the engine carried back through the passenger compartment in thin wall steel tubes, one on either side. The body was built by the J. G. Brill Co., Philadelphia, Pa.

The power plant is a four cylinder, four cycle, valve in head motor with $4\frac{1}{2}$ -in. by 6-in. cylinders. This motor has a safe constant operating speed of 1,500 rev. per min. at which it has a rating of 61 hp.; its maximum speed is 1,800 rev. per min. at which it has a power rating of 66 hp. The clutch and transmission are mounted in a unit with the engine and provide three speeds with gear ratios of 4.09 to 1, 1.76 to 1, and 1 to 1. The power plant is mounted between the channel sills at the front of the car and is removable as a unit. The fuel tank has a capacity of 50 gals.

Power is transmitted from the main transmission through an auxiliary transmission mounted in the cast steel swinging bolster of the forward truck, by means of a motor truck type propeller shaft having two universal joints. The auxiliary transmission provides two gear ratios for forward operation, one for 30 miles an hour maximum speed and the other for 40 miles an hour maximum speed. One ratio is provided in reverse, designed to give a maximum speed of 30 miles an hour. This makes a total of six speeds forward and three in reverse. From each end of the auxiliary transmission a motor truck propeller shaft provided with two universal joints transmits the power through a pinion and bevel gear drive to one of the axles of the forward truck.

The most unique feature of this car is the type of truck construction used. The trucks are of the four-wheel type, the axles having inside bearings of the Timken roller type.

The truck frames are built up of 6-in. I-beam side rails on which are placed the channel cross members that carry the swing motion bolster. The ends of the side rails are also joined by cross channels with gusset plate connections. The axles are of alloy steel, heat treated and are 3 in. in diameter. The ends are tapered to receive the wheels which are also secured by keys. The axle bearing housings carry the semi-elliptic springs the ends of which are shackled to and support the truck frames.

The wheels on both the driving and trailing truck are of unique construction. The centers are of cast steel with tires of rolled steel 30 in. in diameter over the treads. Between the center and the tire is placed a rubber cushioning element consisting of two rings of rectangular section one on either side of a metal web cast integral with and projecting outward from the middle of the wheel center face. The lateral thrust between the wheel center and the tire is taken by inwardly projecting flanges attached to both sides of the tire, which overlap the wheel center.

Each truck is provided with four brake shoes operated by a link arrangement similar in principle to that formerly employed on the driver brakes of American type locomotives. These brakes are operated by a hand wheel through an irreversible worm and gear, with a pawl for locking the wheel when the car is unoccupied. An independent emergency brake, operating on the propeller shaft drum is also provided. Although not included as regular equipment on the car, Westinghouse traction brake equipment can be installed.

The motorman's seat is located at the left of the engine hood. The controls consist of a foot operated clutch, a hand



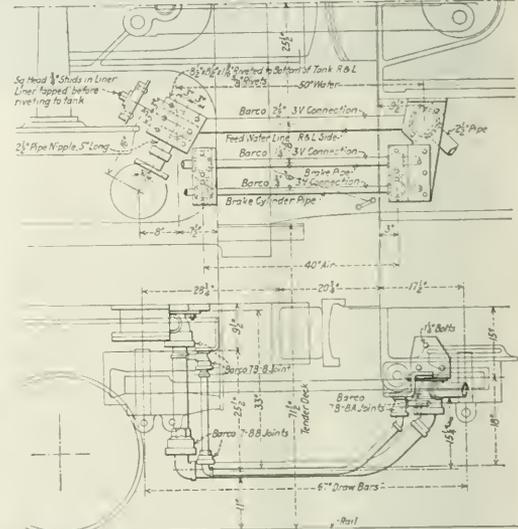
The Front End of the Service Coach

operated gear shift, hand operated spark and throttle controls with a foot operated auxiliary throttle, and the hand brake wheel, or brake valve if the car is equipped with air brakes.

On a recent run from Wabash to Elkhart, Indiana, a distance of 68.6 miles the trip was made with an average speed of 28.6 miles an hour and a maximum speed of 45 miles an hour, the total time of the run being 2 hours and 24 minutes. The average fuel consumption was at the rate of 5.3 miles per gallon of gasoline, while the total oil consumption was less than one quart for the round trip of 137 miles. From a standing start the car accelerated to 25 miles an hour in 30 seconds, 29 miles an hour in 1 minute, 35 miles an hour in 2 minutes and 41 miles an hour in 2 minutes and 40 seconds.

Flexible Pipe Feed Water Connections Between Engine and Tender

THE FIRST APPLICATIONS of flexible metallic connections to the feed water line between the engine and tender were applied in a single large pipe line on the center line of the locomotive, through which both injectors were fed. This type of connection met with some objection because of the possibility that a failure of this connection would entirely cut off the feed water supply and cause a complete engine failure. The drawing shows an application of Barco joints



Application of Barco Flexible Metallic Connections to the Feed Water Line Between Engine and Tender

to the feed water line which provides a separate connection for each injector.

At the tender end these connections are attached by two studs each to plates riveted to the bottom of the tank, and the upper joints are each connected by a short nipple to one of the tank wells. By thus applying the connections directly to the tank instead of to the tender frame the possibility of leakage developing as the result of any slight shifting of the tank is eliminated, and the connections are raised well above the rail. Similarly, the terminal joint on the locomotive end of the connection is secured to the deck, with a pipe connection leading from the joint to the strainer box at lower end of the injector feed water pipe.

As is indicated in the drawing, the feed water connection is carried well in toward the center of the locomotive.

Connections of this type, with feed lines 2 in. in diameter, have been in service on six Consolidation type locomotives on the Bangor & Aroostook for several months during the past winter during which time the locomotives have averaged about 30,000 miles with no maintenance required to the feed water line. The severe climatic conditions prevailing during the winter months on this line require almost constant use of the heaters when the injectors are not working, and it is estimated that the same service would have required at least one and probably two renewals of the ordinary hose connections. In addition to the reduction in the cost of maintenance the pipe connections also insure against injector failures through the collapse of loose hose linings.

Frisco Improves Financial and Physical Condition

Interest on Income Bonds Earned with Wide Margin.

Operating Ratio of Only 74.61

A YEAR AGO the question as to the St. Louis-San Francisco was as to whether the property operating on its own resources would be able, under the adverse conditions of 1921, to earn the interest charges on its cumulative adjustment mortgage bonds and its income bonds. The opinion at the time was optimistic. That this optimism was justified is now indicated in the Frisco's annual report, which shows sufficient net earnings to provide for payments of the interest on both issues of bonds and a balance after this interest of \$3,225,680. In 1920 the standard return and guaranty enabled the road to pay its interest in that year and to leave a balance of \$1,743,231. These figures, because of the inclusion of standard return and guaranty, do not indicate the degree of improvement which actually took place in the fortunes of the Frisco during the past year. The following analysis will give a better idea of the situation:

	1921	1920 Including std. return and guaranty	1920 Eliminating std. return and guaranty
Income available for interest.....	\$17,394,829	\$15,826,405	\$2,863,086
Interest on fixed charge obligations.....	9,665,879	9,630,761	.....
Balance	\$7,728,950	\$6,195,644	.....
Interest on adjustment mortgage bonds	2,391,750	2,340,893	.....
Balance	\$5,337,200	\$3,854,751	.....
Interest on income mortgage bonds..	2,111,520	2,111,520	.....
Balance	\$3,225,680	\$1,743,231	.....

These figures show that it was standard return and guaranty which enabled the Frisco to earn the interest charges on its income bonds in 1920. In 1921, because of the manner in which the Frisco improved its operating results, it earned sufficient net to rival its 1920 corporate result. The measure of improvement which took place is best shown in the income available for interest, \$2,863,086 in the third column, as compared with the figure in the first column of \$17,394,829, an increase of 507.6 per cent.

22.05 Per Cent Less Tonnage

The story is told in another way. The revenue freight carried by the property was 22.05 per cent less than in 1920. The total operating revenues were 12.6 per cent less. As against a decrease of \$12,430,455 in operating revenues, however, there was a decrease of \$25,500,838, or 28.4 per cent in operating expenses and a resulting increase in net operating revenue of \$13,070,883, or 147.9 per cent. The road had an operating ratio in 1921 of 74.61; in 1920 it operated at a ratio of 91.05 per cent. The reasons for the improvement in the balance available for interest should, therefore, be evident as well as the manner in which the property, operating on its own resources, was able to com-

pensate for the lack of the governmental guarantees in 1920.

The Frisco system operates a total of 5,256 miles of line. Included in this total is 93 miles of double track, notably on the sections between St. Louis and Oklahoma City and between Kansas City, Mo., and Arcadia, Kan. The system, as a whole, serves a wide area because of its having lines south from both St. Louis and Kansas City, including lines into Oklahoma and also to Fort Worth, Tex., and beyond, and also to the southeast or to Memphis, Tenn., and Birmingham, Ala. The road has a large branch line mileage and, incidentally, many grades, both of which factors must be reflected in the final operating results.

Diversified Traffic

Naturally, under the conditions, the system's traffic is quite diversified. The figures for 1921 show that products of agriculture made up 16.04 per cent of the total tonnage; products of animals, 2.78 per cent; products of mines, 37.45 per cent; products of forests, 11.17 per cent and manufactures and miscellaneous, 28.76 per cent. Some of the leading commodities carried are bituminous coal, petroleum, livestock, lumber, lead and zinc and wheat and perishables.

Bituminous coal in 1921 made up 4,176,715 tons—or 30.3 per cent less than in 1920—and constituted 24.24 per cent of the total tonnage. This coal is derived from three fields: the Oklahoma field near Henrietta; the Arkansas district and the Kansas district centering at Pittsburg. The Frisco also secures some coal from the Birmingham, Ala., district, but this coal moves mainly east. The Frisco has been hit by the coal strike but it is our understanding that in spite of the strike it is still loading coal in considerable quantity, although not as much as its pre-strike average.

Refined petroleum and its products constituted 13.39 per cent of the total tonnage in 1921; crude petroleum, 0.79 per cent. In 1921 the system suffered a loss of 65 per cent in its crude petroleum tonnage and 16 per cent in refined petroleum. Nevertheless, the Frisco derives some 20 per cent of its total freight revenues from oil or oil products in one form or another. The reason is that it taps some of the best oil fields in Oklahoma, notably the mid-continent field centering on Tulsa. This oil moves principally through the St. Louis gateway. The Frisco has a fast freight schedule by which the oil is carried from Tulsa to St. Louis, 414 miles, in about 26 or 28 hours, the trains being allowed a 35-mile an hour maximum speed.

The lead and zinc is secured from the Joplin, Mo., district, in which area the Frisco, because of its many branch lines and strategic location, is probably the best fixed of any carrier serving the district.

Lumber and its products, which in 1921 constituted 11.17

ST. LOUIS-SAN FRANCISCO OPERATING RESULTS, 1912-1921

Year ended June 30	Freight revenue	Total operating revenue	Operating expenses	Net operating revenue	Operating ratio	Revenue tons	Rate per ton per mile, cents	Revenue, ton miles	Average haul	Revenue train load	Revenue car load
1912	\$27,505,798	\$42,100,364	\$28,709,589	\$13,390,775	68.19	16,985,882	1.01	2,714,876,424	160	255	16.15
1913	31,272,807	46,050,290	30,711,094	15,339,196	66.69	19,739,790	1.00	3,126,717,306	158	281	17.13
1914	30,202,499	44,923,669	33,270,600	11,653,069	74.06	19,906,151	1.00	3,027,900,826	152	297	17.80
1915	29,485,596	42,974,573	29,839,038	13,135,534	69.45	18,762,319	0.95	3,100,939,639	165	330	19.26
1916	33,547,466	48,403,390	32,775,759	15,627,631	67.71	20,459,901	0.97	3,452,384,669	169	334	19.31
Year ended Dec. 31											
1916	36,555,444	53,119,999	35,646,779	17,473,220	67.11	21,270,024	0.99	3,697,396,315	174	337	19.24
1917	39,421,538	59,676,657	39,610,818	20,065,839	66.38	23,011,162	0.99	3,963,259,492	172	382	21.58
1918	47,161,818	72,475,313	57,807,310	14,668,004	79.76	22,998,106	1.13	4,155,542,672	181	392	23.45
1919	53,558,494	82,202,919	64,069,624	18,133,295	77.94	21,419,266	1.33	4,036,818,931	188	380	21.77
1920	66,338,422	98,723,040	89,896,545	8,826,495	91.05	24,718,345	1.44	4,621,380,827	187	398	23.44
1921	59,088,309	86,292,584	64,385,707	21,906,879	74.61	19,266,914	1.69	3,502,727,271	182	363	21.62

per cent of the total tonnage, is secured primarily on the line paralleling the Red river and extending eastward to Hope, Ark. The road has a large livestock movement primarily to East St. Louis and originating in the territory in Texas beyond Fort Worth; this traffic, therefore, receives a long haul. From Kansas City, Wichita and Oklahoma City there is a considerable eastbound tonnage in dressed meats. Northeastern Arkansas and southeastern Missouri give the system a sizable and growing traffic in such commodities as cotton, grain, cantaloupes, watermelons, etc. These details give a rough idea of what the Frisco's business really is. The Frisco is noted for its fast freight service. From St. Louis to Fort Worth, 735 miles, this service gives a third morning delivery; from St. Louis to Oklahoma City, 542 miles, third day, and from Kansas City to Birmingham, 733 miles, 50 hours.

The revenue tonnage carried by the Frisco in 1921 totaled 19,266,914 as compared with 24,718,345 in 1920—in other words, a reduction of 22.05 per cent. The reductions were general. They were especially severe in lead and zinc. There were increases in wheat, in citrus fruits and in potatoes and also in products of animals. The freight revenues for 1921 totaled \$59,088,309 as compared with \$66,338,922 in 1920, a reduction of 10.9 per cent. The reason for the smaller proportionate decrease in revenues as compared with tonnage was an increased rate per ton-mile. The rate for 1921 was 1.69 cents as against 1.44 cents in 1920; there was a decrease in the average haul. Passenger revenues totaled \$21,360,570, a decrease from 1920 of 18.9 per cent. The total revenues of \$86,292,584 compared with \$98,723,040 in 1920, a decrease of \$12,430,455 or 12.6 per cent.

Operating Expenses Decreased 28.4 Per Cent

In 1921 operating expenses totaled \$64,385,707 as compared with \$89,886,545 in 1920, a decrease of \$25,500,838 or 28.4 per cent. There were decreases of 39.2 per cent in maintenance of way; of 33.5 per cent in maintenance of equipment, and of 24.4 per cent in transportation.

With reference to maintenance, President J. M. Kurn says in his remarks: "The property of the company has not only been adequately maintained during the year, but, in fact, its physical condition has been materially improved. The adequacy of maintenance expenditures cannot always be accurately gaged by the mere money amount thereof. Several factors have contributed in 1921 to the ability of the company to secure greater results from a given amount of money expended for maintenance. Wage rates were reduced as a result of the decision of the United States Labor Board, effective July 1, 1921. The price of some materials, of which there is a relatively large consumption in maintenance work, has receded from the peak which grew out of war conditions. The efficiency of labor has shown a decided improvement, as the weakening of morale and the generally disturbed conditions, which were the aftermath of the war and federal control, have been gradually disappearing. This is particularly true with respect to labor employed in maintenance of equipment. The excess of maintenance expenditures in 1920 over similar expenditures in 1921 was chargeable also, in a considerable measure, to the inclusion in the 1920 charges of large sums lapsing over from previous periods, which were incurred in connection with additions and betterments work during federal control, the accounting for which had not been properly closed out by the federal management of the property."

The figures show, with further reference to labor, that the average number of employees in 1921 was 24,459 and in 1920, 30,671, a decrease of 6,212. Of the decrease, 1,827 was in section men. The maintenance expenditures per mile in 1921 totaled \$2,126 as compared with \$3,501 in 1920. This was partly due to savings in wage and material costs; there was also less material applied. The tie renewals for

the year totaled 1,333,812 as against 1,785,099 in 1920. In the case of rail, 6,717 tons, or 47.49 miles of new 90-lb. rail, were laid as against 28,154 tons or 199.07 miles in 1920. Ballast was applied on 118.34 miles of track; in 1920, on 208.70 miles.

Equipment Rehabilitation and Repair Costs

The maintenance of equipment, in which there was a total reduction in 1921 as compared with 1920 of 33.5 per cent showed some interesting figures of costs per unit. Thus, freight car repairs per unit owned in 1921 were \$107.68 the lowest figure since 1917. In 1920 the cost per car was \$229.81; in 1919, \$168.93; in 1918, \$187.51 and in 1917, \$103.10. The number of cars rebuilt or overhauled in 1921 was not as great as in 1920; in 1921, 1,501 cars were rebuilt complete and in addition 1,680 were reinforced with steel ends, etc. In 1920, 2,337 cars were rebuilt complete; in both years a large amount of work was done on refrigerator cars. Of course, part of these charges were to addition and betterments. At any rate, the Frisco had on April 1, 1922, a percentage of bad order cars of 8.2, which figure is low comparatively and indicates a favorable equipment condition.

During the year 496 locomotives were given classified repairs as compared with 506 in 1920; in view of the 1921 falling off in traffic, this result looks good. Steam locomotive repairs per unit owned during the year averaged \$8,795. The savings as against the preceding year are indicated by a 1920 figure of \$11,380. The Frisco's percentage of un-serviceable locomotives at present is about the same as the average for the country as a whole. Concerning this matter of equipment maintenance, Mr. Kurn says: "Elsewhere . . . there is set forth the extensive accomplishment in renewal and rehabilitation of rolling stock equipment during the year. The large expenditures made therefore to capital account have had a direct effect in reducing the expenditures necessary for adequate maintenance."

Frisco improvements during 1921 were many. Some of the important work was the completion of the construction of 28 miles of double track, namely: Eureka, Mo., to Pacific, 6.89 miles; Sleeper, Mo., to Lebanon, 8.82 miles; Monett, Mo., to Globe, 1.37 miles; Spring Hill, Kans., to Olathe, 9.62 miles and between Amory, Miss., and Aberdeen Jct., 0.81 miles. The road at the end of the year had a total of 93 miles of double track. The total additions and betterments charged to capital account during the year were \$5,019,293, of which amount \$2,033,966 was in improvements to existing equipment and \$674,835 to additional main tracks. For power plants, machinery and tools there was expended \$489,812, which indicates a realization of the importance of this essential factor.

For 1922 the road has a program calling for the expenditure of an additional \$5,000,000. Some of the important items are: Completion of double track, Spring Hill, Kan., to Paola; double track, Webster Groves, Mo., to Valley Park, including a reduction in grade from 1.5 per cent to .85; grade revision work near St. Johns, Mo., reducing the grade from 1.25 to 0.6 per cent and a change of line at Garnsey, Mo., with a grade revision from 1.5 to 0.8 per cent. It is also proposed to lay 170 miles of 90-lb. rail in place of present 85-lb.; to spend \$250,000 for steel underframes, etc., for passenger equipment; \$350,000 for additions and betterments to locomotives and \$1,400,000 for additions and betterments on freight cars. Ten stalls were added to the roundhouse at Fort Smith and five at Fort Worth.

The evidence on the whole is that the St. Louis-San Francisco during 1921 improved both its financial and physical condition to a marked extent and that this improvement should be continued into 1922. The property is apparently prepared to handle a much larger volume of business than at present and should be able to realize on any improvement in its territory during the coming year.

Extent of Russia's Ruin and Chances of Recovery

Famine Ridden and Bankrupt, Her Only Hope Is in Aid From
Financiers Who Dare to Risk Fortunes

By a Special Correspondent

Moscow.

IS RUSSIA coming or going?

The answer to this question is not in the hands of the Russians but of the western world, and particularly of the business men of America. If they are bold enough and have the money to risk and want the big earnings that may result, the opportunity is there.

The Genoa Conference gathered to answer this question, but without Americans, Britain and France and all the other nations represented are powerless. They have neither the money nor the means to reconstruct Russia, nor have they the goodwill of the Russians in the sense that the Americans, not interested in internal politics, have it. The important facts about Russia, as gathered first hand by the writer, after traveling some 10,000 miles on her soil, are the following:

The Facts About Russia

First, *she is beset by an immense famine* that will, unchecked, last for another year at least, taking a toll of a million or two of lives. I have seen with my own eyes many hundreds of her dead, scattered here and there, and indicative of thousands and thousands of others to be seen if anyone took the trouble to seek them.

Second, *communism is dead* in Russia. The Soviet government has utterly failed in realizing one of the biggest and noblest and oldest dreams entertained by humanity. Her intellectuals, largely mixed with Jews, and influenced by Germans and socialists of every school, and helped by the great war, pulled down the reasonably good government of the Czar. In their turn they have shown themselves incapable of government. They floundered for three years, in an experiment so tragic that but for its tragedies it would be ludicrous. Now they have learned that water cannot be made to run uphill.

Third, *the present Soviet government is making an effort to hold on*, though its members are tired out and would, in many instances, welcome or consent to stepping down if a reasonably and sufficiently socialistic government could be found to succeed them and spare their lives. The notable exception in the government is probably Trotsky, who is an ambitious opportunist. But this government, like all others, is changing in personnel and in point of view, and is bound to go. Should Lenin die, it might go overnight, as he is its dictator and backbone. For this government to go out like a candle might mean a new revolution in Russia, and this few in Russia want. All they want is peace and a chance to live.

Fourth, *Russia's ruin is far more moral and social than material*. I have seen the majority of her cities, her business centers, and nowhere is to be encountered anything like the absolute destruction such as I have seen in France's war wrecked northern provinces. Her railways function reasonably well, all things considered, and within a year or so could be revived as have been those of Roumania, which two years ago were in an apparently hopeless condition.

Fifth, *there is no disposition to attempt to use the Red Army against Europe*. The best proof of this statement is that the Red Army is incapable of such an adventure. It is a fairly good police service, and could do some damage to the armies of such countries as Poland and Roumania, but not in any serious degree. From a military point of view, any such adventure would be pre-doomed to failure.

Sixth, *the Soviet government is virtually bankrupt*. It has

on hand in gold coin and in diamonds and odd bulks of gold and silver bullion a total value of possibly \$150,000,000. Against this it has issued to date upwards of ten trillions of paper roubles and by the end of the year will have printed double that amount. A dollar bill is worth today in Russia about two million of these roubles. The rate of depreciation may be judged by the fact that last September a dollar bill was worth fifty thousand roubles. Banking is in the hands of the government.

Seventh, hand in hand with the famine *there is a frantic and fantastic effort at trade in Russia*. As there is little real production, this trade takes the form of speculation. Everybody is doing it—men, women and children. Internal free trade was allowed last August by Moscow decree, and it has grown apace. External trade is in the hands of the government, and this stifles what little trade there might otherwise be with the outside world, through the Baltic and Black seas and over the Polish and Roumanian borders. As no one trusts the government banks, every man is his own banker, and as fast as he gets hold of roubles, in trade, he converts them into foreign paper moneys, especially dollars.

Eighth, *there is good order, at least so far as concerns the foreigner, throughout Russia*. His life and property are safe. Americans are treated with a peculiar deference, partly as a result of the Russian's general hospitable attitude toward a foreign visitor, partly due to the knowledge that the government will protect these people from whom they hope so much. This good order is also due to the presence of the American Relief Administration. Its offices and agents are in every city center and Soviet officials, under the eye of decent people on whom they are dependent for the precious daily bread, are loth to commit their former deeds.

Quo Vadis?

The above are the facts, looked at from the point of view of business. It may be that already the tide is turning in Russia, that she has hit the bottom of distress and disease and disaster, and is on the upward grade; that the mysterious forces of circumstances have relented.

If not, and if left to herself Russia may be doomed to disappear from the face of normal life as did in the third and fourth centuries A.D. the great lands of northern Mesopotamia, rich in agriculture and wonderful cities. It will be remembered that after the breaking of the Roman grip on these lands, a grip that guaranteed law and order and good highways, chaos came and has remained. It has long been one of the dreams of active minds to restore that ancient prosperity, but to this day the dream is unrealized.

As in those days the fields of Mesopotamia helped to feed the Roman Empire, so in modern days Russia helped to feed Europe. Other ways were found of getting food for the Romans and other peoples of the Mediterranean. Europe may have to find other ways of feeding herself without Russia.

Left to herself, at best, Russia, from a business point of view, will become for the next few years the prey of the small trader, carrying his goods in a grip, so to speak, exploiting his customers rather than improving their trade. Then, with no more gold and diamonds and second-hand furs with which to barter, she might well die out. Her cities might cease to serve any useful purpose, as seems already

the fate awaiting Petrograd and her imperial palaces, and the peasants remain to miserably till the soil, rid of the thin veneer of culture forced on them from the townfolk during the past 200 years. Through sheer fatigue and inertia, her railways might cease to function at all.

The Essentials of Reconstruction

If big business decides to take the plunge, it must wade in with boots, not slippers. It must not go in gingerly, grab a stake and make a getaway. It must not expect returns for five years. Also, it must arrange matters so it will make, if it does make anything, its hundreds of per cent in profits, to offset the risk. It must work through the government, so its hand will not be seen too publicly and increase its risks by stirring up a hostile sentiment.

The Russians are susceptible, ready to believe anything. This very winter, it was commonly stated by the crowd that the American Relief Administration was exploiting Russia. How? No one could say just how, in the face of the food shipped in, but the very people receiving the food were ready to believe this nonsense. Torn for years by civil war and murder, suspicion is the breath of life in Russia.

When Litvinoff, under-secretary of state, signed at Riga last summer an agreement making it possible for American charity to come into Russia, he did so with fear and trembling. He made a remark then that caused much good-humored comment among the Americans. "Food is a weapon," he argued, showing that he feared the food might in some way be used to undermine the Soviet government. Just how he could not explain to himself, yet he believed what he said. Working through the government involves making an agreement with it. Despite all that has been said, and of all of the facts, it is probable that any agreement the Soviet government makes it will keep, so far as it can. It kept its agreement to pay indemnity to Poland, for the war waged a couple of springs ago. It has so far as able kept its agreement with the American Relief Administration, which is patently an opening wedge for American business, if Americans care to take advantage of this fact. In the early months it was uphill work to help the Russians, due to an ignorant government, beset with internal politics and ambitions, and tied up, hard and fast, in its own reams of paper, of red stamps and tape, a machinery far more complicated and ridiculous than anything evolved by the Czar's old government, or any other government with which I am familiar. But this must be said of the Soviet government—it does not mind breaking its own laws. It, too, had a prohibition law, but when convenient it broke or changed the law and let its citizens do the same.

Those who go into Russia with fear and trembling will not travel far. There is the German bogey. The Germans so far have done little but try to make some highly profitable get-rich-quick speculations in Russia. They have not sufficient capital to exploit Russia, as is so commonly feared.

The first essential of reconstruction involves, on the part of Soviet Russia, the recognition of private property and the freedom of its citizens in foreign trade. Both these points have long since been settled in principle. As to recognition of its old debts, this too will be done, though it matters little to the present generation, as they are too huge to be paid now. Houses and lands may be sold to all comers and be used for government revenue.

When the brushwood is cleared away, it remains for big business to organize itself in some such manner as the old Vanderlip syndicate attempted to do.

The other essentials, in their order, are food, the restoration of agriculture, the repair of the railways and a better money. This is a large order, and will cover years, but the start and the end of the reconstruction will come far quicker than might be judged from the outside. One has not to consider that France today is accomplishing, how she is fighting

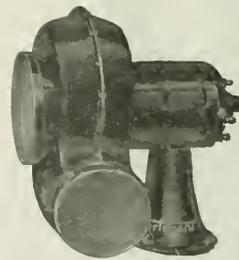
back to commercial independence despite her tremendous losses; how little Hungary is living, despite the treaty imposed by the Allies taking away two-thirds of her lands; what Serbia has done to get back to normal life, although her lands were occupied by the enemy and her people forced to evacuate during the general war.

"Our land is great and fruitful, but there is no order in it. Come and reign and rule over us." This was the message and invitation sent by the Slav republic of Novgorod to the invading Norsemen, in the ninth century.

Under Bolsheviks or Imperialists or New Democrats, Russia is now a country to be worked as a colony. It is a country comparable to our West of the post Civil War days, say in the late 'eighties or the early 'nineties, when the Cherokee strip was opened, a little later to become part of the great state of Oklahoma. Colonizing means work and money and time and patience and courage and hardship. Who will undertake this Russian job?

Locomotive Cab Ventilating Set

THE PROBLEM of locomotive cab ventilation is a more or less serious one, especially on roads where steam locomotives are required to operate in tunnels. An unusually interesting method of solving this problem has been developed by the B. F. Sturtevant Company, Boston, Mass., the essential part of the apparatus being the ventilating set illustrated. These sets have been applied in one case to the locomotive cabs of Mallet locomotives operating in districts where tunnel clearances are close and the grade adverse to the movement of trains. According to an officer on the road in question the transfer of Mallet locomotives to one of the branch lines where the conditions described above existed resulted in forcing attention to the problem of locomotive



Sturtevant Cab Ventilating Unit

cab ventilation. Experiments were conducted in an effort to provide better ventilation and it was found by using the Sturtevant electrically-driven ventilating sets, two units to the locomotive, the atmospheric conditions in the cab could be materially improved.

The ventilating sets were operated electrically by an electric headlight turbo-generator installed for the purpose. Two sets were applied to the locomotive, located under the boiler ahead of the firebox. The intake from the fan gathered the air at a point about 6 in. above the track. One fan delivered air to the right side of the locomotive immediately in front of the engineman and the other to the left side.

In order to get the best results, it was found necessary to make the cab nearly air tight so that the fresh air delivery inside the cab would create a pressure in excess of that surrounding the cab, preventing foul gases from entering.

Sturtevant portable ready-to-run ventilating sets are made in five sizes running at speeds up to 3,400 r.p.m. and delivering from 58 to 1,440 cu. ft. of free air per min.



Maintenance Reserve Items Hurt I. C.'s Showing

Net After Fixed Charges for 1921, \$9,656,275 as Compared
with 1920 Figure of \$13,434,841

THE ILLINOIS CENTRAL's figure of net after fixed charges in the corporate income account in the annual report was, for the year ended December 31, 1921, \$9,656,275. This was a reduction of \$3,778,567 from the figure for 1920—\$13,434,841. It does not, therefore, evidence the improvement for the year which was to have been expected from the favorable monthly reports of earnings and expenses. The Illinois Central did, however, show improvement in its net in 1921 as compared with 1920. This improvement was shown in the figure of net railway operating income which in 1921 was \$17,542,228 and in 1920, \$6,343,246, the increase as between the two years being \$11,198,982. The reason this improvement is not reflected in the corporate income account is the method of accounting followed, which factor it is advisable to point out so that incorrect impressions may not be gained.

Reserve for Maintenance

The outstanding changes in the corporate income account, other than those made necessary to show properly the standard return and guaranty, were a reduction of \$2,180,644 in non-operating income and an increase of \$7,564,368 in deductions from gross income. Non-operating income in 1921 was \$5,039,238, as against \$7,219,882 in 1920, the reduction being primarily due to the non-receipt of interest on Louisville, New Orleans & Texas second mortgage income bonds from which in 1920 there was received \$2,081,014. Deductions from gross income totaled \$19,735,213, an increase, as above noted, of \$7,564,368 over 1920. The important factor in this account was in "Miscellaneous Income Charges" which in 1921 increased \$7,788,083, of which \$6,851,542 was due to charging this account the amount named and crediting an account in the general balance sheet, "U. S. Government Guaranty under Section 209. . ." in reduction of the company's claim against the government, made necessary by the cancellation of a reserve for maintenance. In further explanation of this item, the annual report states:

"In explanation of this reserve it should be stated that last year there was in 'Maintenance of Way and Structures Expenses' \$2,744,698 and in 'Maintenance of Equipment Expenses' \$4,109,844, a total of \$6,854,542, to cover the additional amount which it was understood your company was entitled to expend for maintenance

. . . during the guaranty period and which it was necessary to state on the books in order that the amount would be available for these purposes. The amounts so charged to expenses were carried as a reserve to be expended in the future and were shown on the general balance sheet in the account, 'Other Unadjusted Credits' under the heading 'Unadjusted Credits.' The Interstate Commerce Commission, in an order dated December 15, 1921, entitled, 'In the matter of Final Settlement under Section 209 of the Transportation Act, 1920' prescribed a different method for adjusting maintenance expenses of the guaranty period. As a consequence the entries made on the books in the preceding year were reversed in the current year and 'Railway Operating Expenses' was credited and 'Other Unadjusted Credits' was debited a like amount. These entries necessitated an additional entry debiting 'Miscellaneous Income Charges' \$6,854,542, and crediting the same amount to the general balance sheet account 'U. S. Gov't Guaranty under Section 209 . . .'"

Santa Fe Showed Equalization Reserves Better

Because of the inclusion of the reserve items in the 1920 accounts, the total for maintenance of way in that year is shown in the 1920 annual report as \$29,034,954—this amount being corrected (because of the elimination of the reserve) in the 1921 report to \$25,870,907. Maintenance of equipment was given in the 1920 report as \$42,028,103, which item was corrected in the 1921 report's comparative statement to read \$37,344,277. The result of the inclusion of the reserves was shown further in total expenses which were given in 1920 as \$143,208,180, or 98.39 per cent of the operating revenues. This figure is corrected in the 1921 accounts to be \$134,181,514 which makes the 1920 operating ratio not 98.39 as previously stated but only 92.44. All this arrangement is a bit unfortunate particularly because the 1920 annual report did not make it clear that reserve items were included in the maintenance expenses as given in that report.

The Atchison, Topeka & Santa Fe, which similarly established maintenance reserves, made rather a better job of it in its annual reports for 1920 and 1921. In the Santa Fe annual report for 1920 the road showed a sum of \$13,374,976, representing what the Santa Fe called an equalization reserve "for the purpose of approximating the amount of the maintenance expenditures to which the company was entitled under the Transportation Act." "The setting up of these equalization accounts," the Santa Fe's 1920 report continued, "which has not heretofore been customary for this company

is reflected in the amount of \$14,030,036 in the decrease in the net railway operating income. . . for the year 1920." Further than that, in the statement of the primary accounts, there appeared, as there did not appear in the 1920 Illinois Central report, items as follows: Under maintenance of way, "Equalization,—way and structures, \$8,711,056" and under maintenance of equipment, "Equalization—Equipment, \$4,668,919." The final result was that when corrections had to be made in the Santa Fe's 1921 report, the accountant did not have to re-state but instead the equalization figures were shown as debits or credits and the matter in both the 1920 and 1921 reports was clear at all times.

The Illinois Central by its method of showing the reserve items suffered the unfortunate result—which the Santa Fe did not suffer—of making its 1920 accounts look actually poorer than they really were. A false impression might have been gained which would have been regrettable in the case of a carrier like the Illinois Central which has been so careful, fair and above-board in taking the public into its confidence. We doubt not that there may be misrepresentation of this situation in various quarters which explains why so much space is here devoted to keeping the record straight.

Illinois Central Leader in Public Relations Work

The attention which the Illinois Central has given to taking the public into its confidence is one of the most pleasant developments in modern railroading. A whole volume might be written about the methods followed by the road and about the success which it has been having. Generally speaking, one of the most important factors in the method followed is to publish in the form of paid advertising in every newspaper published in the territory served interesting and informative details about the railroad problem and the Illinois Central's activities. The result of this and the accompanying parts of the plan has been an extremely favorable public opinion towards Illinois Central in the communities through which it runs, in which respect the road is in a much better position than most other of the country's railroads. The Illinois Central is recognized for its efficiency in management and operation generally. Its success in its public relations work shows it to be efficient in this also and very much in the van of progress as regards its realization of the importance of this feature of its activities.

Revenues and Expenses

The Illinois Central in 1921 had freight revenues of \$107,092,091, an increase of \$913,205 over 1920. Its revenue ton- and ton-miles were less than in 1920 but its receipts per ton-mile were greater. The tonnage carried was 40,415,089 as compared with 49,233,079 in 1920. The ton miles in 1921 totaled 11,084,095,960, a reduction of 19.24 per cent from 1920. The heaviest decreases were in bituminous coal—coal constitutes about 40 to 45 per cent of the total traffic—in lumber and forest products, in manufactures and miscellaneous and in merchandise. The tonnage of grain was greatly increased and, to a lesser extent, that of perishables. With reference to the receipts per ton mile the figures show for 1921, 0.966 cents—which incidentally is a comparatively low figure—as against 0.771 in 1920.

Because of a reduction of 8.51 per cent in passenger revenue, the increase in freight revenues was not reflected in total railway operating revenues. These totaled \$141,127,066 as against \$145,154,372 in 1920 a reduction of \$4,027,306 or 2.77 per cent. As against this reduction of over \$4,000,000 in revenue, there was a reduction of \$17,229,181 or 12.91 per cent in operating expenses, the expenses in 1921 being \$116,852,851 as compared with \$134,181,114 (including the charge for maintenance reserve) in 1920. Maintenance of way and structures was decreased 15.37 per cent, maintenance of equipment, 7.37 per cent and transportation, 17.35 per cent. The savings were due to lessened

traffic, decreased wage costs, lower material and fuel costs, etc. There is no evidence of decreased maintenance. In 1921 there were 219 miles of track laid with 90-lb. rail.

Additions to Equipment

During the year the road made important changes in its motive power as is evidenced by the fact that the total number of locomotives increased 17, but the total tractive effort of all locomotives, 5,911,927 lb. The reason was the acquisition of 100 Mikado and 25 eight-wheel switching locomotives while 108 smaller locomotives were disposed of. As to passenger cars, the details show 55 new cars added and 10 disposed of. In the case of freight cars 3,620 cars were added and 3,161 dropped, a net increase of 459. It is interesting and important to note that in December the Illinois Central had an average percentage of bad-order cars of but 6.6 per cent. It is understood that the average is slightly higher at this time.

I. C. C. and State Commissions Adopt Plan of Co-operation

WASHINGTON, D. C.

A PLAN of co-operation between the Interstate Commerce Commission and the State commissions in cases involving conflicts of jurisdiction, which provides for joint conferences and in some cases joint hearings, was announced on May 3 by Chairman McChord of the Interstate Commerce Commission and President Jackson of the National Association of Railway and Utilities Commissioners in the form of a report of a joint committee of the federal and State commissions which has been holding conferences recently. The report of the joint committee follows in part:

Public regulation of our railroads is performed in part by a commission representing the federal government and in part by commissions representing the various states. Conflicts of jurisdiction between the two systems of public regulation have arisen from time to time, resulting in litigation and action by the courts; but the federal and state commissions were alike created in the public interest and have a common purpose, namely, the maintenance of a transportation system which will in all respects best meet the public needs. In view of this common purpose they should, and we believe they can, work together for its attainment without conflict or resort to litigation. Such co-operation is contemplated by the Interstate Commerce Act as interpreted by the Supreme Court and is highly desirable in the public interest.

The prime essential to such co-operation is realization of the nature and difficulties of the common problem. The state commissions realize that the railroads form a national transportation system which is not split into parts by state lines and that the public interest demands a rate structure, state and interstate, as simple and harmonious as practicable. The Interstate Commerce Commission realizes that there is danger in over-centralization of authority, that the field of regulation is vast, and that the state commissions are often better informed than itself in regard to local conditions and local needs.

Following the general rate increase of 1920 the Interstate Commerce Commission, in certain instances where corresponding increases did not become effective within the states issued orders affecting intrastate rates. Following the decision of the Supreme Court of the United States in the Wisconsin Passenger Fare case, action has been taken by several state commissions which has enabled the Interstate Commerce Commission to vacate certain of its orders affecting intrastate traffic within those states. It is anticipated that similar action will follow in other states.

In a yet more important aspect co-operation looks forward to and lies in view the avoidance, so far as the public interest will permit, of such orders in the future. Paragraph 3 of section 13 of the Interstate Commerce Act authorizes the Interstate Commerce Commission to avail itself of the co-operation, services, records, and facilities of state commissions, to confer with them with respect to the relationship between rate structures and practices of carriers, and to hold joint hearings with them "where the rate-making authority of a state is or may be affected by the action taken by the commission." Our common purpose is to give the utmost force and effect to this provision of the law.

It is appreciated that time and experience may be required for the full development of methods and rules of procedure. Pending

the establishment thereof, and for the purpose of making such co-operation immediately effective, it is the opinion of representatives of the Interstate Commerce Commission and of the state commissions that, except as in special cases it may be found desirable to deviate therefrom, the following procedure be followed:

Where petitions are filed with the Interstate Commerce Commission alleging that intrastate rates unjustly discriminate against interstate commerce, or persons or localities engaged therein and asking the Commission to remove such discrimination, if either a state commission having jurisdiction over rates thus attacked, or the federal commission, desires a conference it should notify the other without delay and thereupon such a conference should be arranged, likewise without delay. If the case goes to trial, a joint hearing by the Interstate Commerce Commission and the commission of the state affected should be held, provided a proceeding or proceedings be pending before the state commission in which action can be taken by it upon the common record. Such joint hearing should be followed by a conference to consider the facts developed of record so as to provide opportunity for the removal of the unlawful discrimination, if any, by agreement.

Joint conference should be held on complaints attacking interstate rates in those cases where the decision of the Interstate Commerce Commission appears likely to affect, in substantial and important respects, the relationship between state and interstate rate structures; likewise, conferences should be held in the case of complaints attacking intrastate rates in those cases where the decision of the state commission appears likely to affect, in substantial and important respects, the relationship between state and interstate rate structures. Participation in the ensuing hearings, or in conferences following submission, will be upon invitation of the Interstate Commerce Commission, if the complaint is filed with it, or of the state commission if the complaint is filed with it. Joint hearings will be appropriate where similar issues are pending before the Interstate Commerce Commission

and a state commission, or conferences pending the decision of cases where there has been no participation in the prior hearings.

In joint hearings involving interstate rates, the rules of practice prescribed by the Interstate Commerce Commission shall govern in so far as applicable.

The federal and state commissions should feel free to suggest to each other, and the state commissions to hold among themselves, conferences on matters arising under their respective jurisdictions, with a view to harmonizing in so far as practicable rates and practices in neighboring states by appropriate action of the commissions of those states without proceedings before the federal commission.

It is desirable that there be continued, in so far as practicable, the practice of the Interstate Commerce Commission of calling upon a state commission to hold hearings for it upon applications for certificates of public convenience and necessity, involving construction of new lines or abandonment of old lines. In such matters joint conferences between the Interstate Commerce Commission and a state commission may also be held upon request of either commission.

The interstate commerce act and the rules of the Interstate Commerce Commission provide for notice to the states in certain matters affecting them, and the Interstate Commerce Commission has been complying therewith. The state commissions should develop methods of keeping the Interstate Commerce Commission advised on matters before them in which it may have an interest such as is indicated by the foregoing text.

It is realized that the co-operative action here provided for will be productive of delay in disposing of important matters unless the federal and state commissions respectively act with the utmost promptitude compatible with the circumstances.

Applying the co-operative principle, conferences may be arranged for the development of car service, distribution and administration.

Wabash Shows Increases in Fast Freight Traffic

Net After Rentals in 1921 \$3,863,340, as Compared with Deficit of \$3,817,671 in 1920

THE WABASH reports for the year ended December 31, 1921, a net after fixed charges of \$2,017,576. This compares with a net in 1920 of \$1,983,943—an improvement of \$33,633 as between the two years. The 1921 income account, however, includes in non-operating income a credit of \$1,245,233 "to offset debit items in this statement pertaining to the guaranty period," of which amount \$509,018 "represents unaudited items which are included in accordance with order of Interstate Commerce Commission dated December 15, 1921, finance docket No. 1606." The net for 1921 is the best since 1917, in which year the Wabash reported a net after fixed charges of \$4,172,045; in 1916 it reported \$5,306,498. All these figures mean that the Wabash in 1921, operating on its own resources, did not restore its corporate earnings to their pre-federal-control or standard return level.

The revenue tonnage carried by the Wabash in 1921 was 13.44 per cent less than in 1920. In spite of this reduction in traffic, the road did show much better operating results than those of 1920, although this improvement is not reflected in the corporate income account because of the fact that comparisons with 1920 must take into consideration the factors of standard return and guaranty. The improvement in actual operating results is best shown in the figure of net railway operating income. In 1921 this figure was \$3,863,340. It compared with a figure in red in 1920 of \$3,817,671 which deficit, of course, was compensated for by the standard return and guaranty. The Wabash had a standard return of about \$5,800,000. In 1918 it earned for the government about \$3,700,000; in 1919, about \$800,000. Thus it appears that the 1921 result was the best since the commencement of federal control, but that it was not as good as the results prior thereto. The striking improvement as between 1921 and 1920, which changed a deficit of \$3,817,-

671 in 1920 to a net of \$3,863,340, is further evidenced in an operating ratio of 84.45 in 1921 as against a figure for 1920 of 98.18. In 1917 the ratio was 70.34; in 1916, but 65.94.

Perishables and Packing House Products Increase

The Wabash operates a total mileage of 2,473, of which it owns 2,034 and operates the remainder under trackage arrangements. Of the total owned mileage 322 is double track. The principal lines extend from St. Louis to Chicago and from Buffalo to Kansas City. In the case of the latter line the Wabash uses the Grand Trunk between the Niagara frontier and Delray, a distance of 228 miles. The Wabash also serves, among other important centers, Toledo, Omaha, Des Moines, etc., in some of which cities it has to use trackage rights to secure entrance. The Wabash tonnage is diversified. It serves a coal area in Illinois between St. Louis and Decatur, but bituminous makes up only 25 to 30 per cent of the total tonnage. There is also a sizeable business in anthracite coal received from the anthracite carriers at the Niagara frontier.

The Wabash has an enviable reputation for fast freight service. It receives from connecting carriers at the Niagara frontier a large tonnage of manufactures and miscellaneous freight for westbound movement. Eastbound it moves a heavy traffic in fresh fruits and perishables received from connections at Kansas City or St. Louis. It has a sizeable eastbound business in packing house products from Kansas City, this traffic receiving in the summer months a fourth morning delivery at New York. The road has the advantage on this Kansas City business, incidentally, that the traffic does not have to move through the terminals at St. Louis.

The Wabash is not a rich road. It has not been in a position to spend the money that it might like to have spent

for capital improvements to enable it to operate with utmost economy. It suffers, as will be noted below, from having a high debit per diem balance and from rentals. The road, however, seems to be well provided with motive power and its power is in good condition. It is using Santa Fe locomotives between East St. Louis and Chicago, these engines being rated at 5,500 tons from the coal district centering at Staunton and Mt. Olive, south of Decatur. From Kansas City to Hannibal, Mo., and also from Decatur east to Detroit, Mikados are used; between Hannibal and Decatur, Consolidations; and in Canada, east of Detroit, Prairie type locomotives. The main shops of the road are at Decatur. These were built in 1912 and 1913 and have a capacity of 60 classified repairs per month although they are not worked to that capacity. The shops at Moberly, Mo., have a capacity of 15 classified repairs.

The revenue tonnage carried by the Wabash in 1921 totaled 14,581,966, as noted above, 13.44 per cent less than in 1920. Of the 1921 tonnage, 21.61 per cent was in products of agriculture; 6.04 per cent products of animals; 35.22 per cent, products of mines; 6.68 per cent, products of forests and 25.49, manufactures and miscellaneous. It is interesting to observe in connection with what has been said above, that although the total tonnage decreased, there were increases of 6.99 per cent in products of agriculture and of 14.67 per cent in products of animals. The tonnage of fresh fruits and vegetables does not bulk large in the total but there were increases of 73.31 per cent in citrus fruits; of 24.20 per cent in other fresh fruits; of 69.40 per cent in potatoes and of 47.76 per cent in other fresh vegetables. Under products of animals there were increases of 18.42 per cent in packing house products; of 73.18 per cent in poultry; of 86.33 per cent in eggs, etc. These facts presumably represent the result of the efficiency with which the fast freight service is conducted and of the efforts of the traffic department in soliciting the business.

The Coal Tonnage

The bituminous coal carried by the Wabash in 1921 totaled 3,369,218 tons or 29.18 per cent less than in 1920. The anthracite tonnage totaled 498,950. The Wabash is one of the roads hit by the effects of the coal strike. Presumably it is at present moving practically no anthracite. Its bituminous loadings the week ending April 8 totaled only 92 cars. Its loadings in March and April, 1921, approximated about 500 to 600 cars weekly. Because of the relative unimportance of the coal traffic in the total tonnage, it is evident, however, that the Wabash will not be seriously hurt by the strike.

The freight revenues of the Wabash in 1921 totaled \$45,688,528, an increase of \$2,363,828, or 5.46 per cent over 1920. The increase, with a decrease in revenue tonnage, was partly due to the changed character of the tonnage whereby there was a greater quantity of manifest freight moved, both relatively to the total tonnage and actually. The revenue per ton mile in 1921 was 1.17 cents; in 1920, but 0.95 cents.

Savings in Expenses

The total revenues for the year were \$59,217,692, a reduction of \$764,590, or 1.27 per cent from 1920. As against this reduction in operating revenues there was a reduction of \$8,851,521 in operating expenses. The expenses in 1921 totaled \$50,007,874, in 1920, \$58,859,395. There were reductions of \$1,380,430 in maintenance of way; of \$2,923,716 in maintenance of equipment, and of \$4,714,637 in transportation, which reductions point out the drastic nature of the economies which were put into effect during the year.

The savings in maintenance of way totaled \$1,380,430, or 13.10 per cent, the largest savings being made in track laying and surfacing—namely in labor. The expenses for this purpose were reduced \$768,397. With reference to mate-

rial the figures show that the road laid in 1921, 10,788 tons of 90-lb. rail as compared with 21,178 tons in 1920, but double the amount laid each of the years immediately preceding 1920. Ties laid in main track totaled 831,237 as compared with 797,576 in 1920. Ties laid in side track totaled 281,606, or more than the average for 1920 and preceding years. There were 178 miles of track rebalasted as compared with 165 in 1920 and lesser amounts in preceding years. These figures, on the whole, do not show that maintenance was cut unduly.

Maintenance of equipment was reduced \$2,923,716, or 19.84 per cent. On April 1, 1922, the Wabash's percentage of bad order cars was 13.8 per cent. not as low as it should be, but about the country's average. The percentage of un-serviceable locomotives on the same date was 13.8, indicating an extremely good motive power condition; the country's average on the same date was 20.1 per cent. During the year 405 locomotives were given classified repairs as compared with 455 in 1920, but the condition of power based on mileage remaining in all engines before due for next classified repairs, was estimated to be on December 31, 1921, 49.93 per cent as compared with 44.52 per cent on December 31, 1920. The average cost of repairs per locomotive mile in 1921 was 33 cents as compared with 37 cents in 1920. During the year 1,419 cars were rebuilt entirely or given extensive repairs at contract shops.

Fuel Economy

The transportation ratio for 1921 was 42.74 per cent. In 1920 it was 50.06 per cent. The expenses for transportation in 1921 totaled \$25,726,606, or \$4,714,637 less than in 1920. The largest savings were naturally in fuel and labor due to the smaller business handled and to lessened wages and costs. There were also sizeable savings in freight loss and damage. The Wabash has been giving a great deal of attention to fuel economy. For one thing, there is an instruction school operated and maintained, not by the road but by the enginemen themselves. This school has two cars and the men are encouraged by their fellow employees to attend. Further than that the road encourages the men by means of talks and bulletins. Crews that do extra good work are complimented by a letter from the general manager, etc. In 1921 the pounds of coal consumed per 1,000 gross ton-miles was 184, a reduction of 15 pounds from 1920 in spite of the increased tonnage of manifest and light-weight freight and the reduced tonnage of such heavy freight as coal, etc. The average cost of coal on the tender in 1921 averaged \$3.24, as compared with \$3.52 in 1920. The coal consumed was 1,438,797 tons, a reduction of 236,356 tons from 1920.

Finances

The Wabash suffers from the standpoint of rentals. In 1921 it had a debit hire of freight car balance of \$1,349,405. This was \$362,582 less than in 1920 but still sufficiently large to be a handicap. Joint facility rents in 1920 totaled \$1,753,139, indicating the importance also of that item. The company has a compensating asset, however, in its low fixed charges. It has outstanding \$138,492,967 capital stock, but funded debt in the amount of only \$74,183,950. The interest on funded debt in 1921 totaled \$3,629,803. The stock is made up of profit-sharing preferred "A" stock, convertible preferred "B," and common. The "A" stock is entitled to five per cent non-cumulative dividends but none have been paid since April 30, 1918, and no dividends have been declared on the "B" or common. The preferred "B" is convertible into the other issues at the rate of \$50 par value of preferred "A" and \$50 par value of common for each \$100 par value of the "B" stock. During 1921, \$1,828,000 was so converted, making a total converted since August 1, 1918, of \$37,796,800. On December 31, 1921, there was outstanding \$62,463,125 of common, \$65,098,400 of preferred "A" and \$10,931,442 of preferred "B."

Labor Leaders Withdraw from Wage Cut Hearing

Heads of Sixteen Organizations Protest Against Testimony on
Behalf of Shippers and Public

REPRESENTATIVES of the sixteen railroad labor organizations withdrew on April 28 from hearings before the Railroad Labor Board on proposed reductions in their rates of pay, after filing a protest against the appearance of the National Industrial Traffic League and the National Industrial Conference Board. Sometime ago the board announced that it would permit representatives of these organizations to appear before the board and present evidence as to their interest in the wage problem. Representatives of the labor organizations held a meeting at Chicago prior to the date set for this hearing and authorized Frank P. Walsh, Donald R. Richburg and J. H. Stevenson to file a brief of protest against the appearance of these organizations and authorizing them to withdraw from "further participation in such illegal proceedings" in event their protest was overruled. Before this protest could be registered, J. S. Burchmore, representing the National Industrial Traffic League, filed a brief which had been prepared. However, before representatives of the National Industrial Conference Board could begin their presentation, Mr. Walsh presented the employees' protest and after the chairman of the board ruled that, in accordance with a resolution adopted by the board, the parties would be heard, all of the labor leaders present withdrew.

Wage Cut Disputes Should Be Remanded

The board's hearings in the present controversy over the proposed reductions in the wages of railway employees have been so burdened with incompetent and irrelevant testimony that the whole question of readjustment of railway wages to meet present conditions should be remanded to the companies and their employees, Mr. Burchmore contended.

"The National Industrial Traffic League submits," he said, "that when the Labor Board fixes wages by an order entered otherwise than after a public hearing, at which competent testimony is offered under oath, and the scope of the hearing is confined to matters material to the controversy, it infringes upon the right of the public to receive an intelligent, unbiased and correct expression from the board as to the merits of the controversy."

Witnesses appearing before the board are not put under oath, nor is their testimony limited in any way, Mr. Burchmore pointed out. The relevancy or competency of much of the testimony has not been judged according to the ordinary standards as commonly applied by the Interstate Commerce Commission, boards of arbitration and judicial or quasi-judicial tribunals, he said. This failure is "prejudicial to the paramount right of the public as the silent third party in interest to every dispute before the Labor Board," he added.

"The National Industrial Traffic League does not suggest that the board should adopt the technical rules of evidence and practice applied in courts of law, but suggests that it should conform its practice to that commonly employed by state and federal bureaus and commissions, namely, to require all testimony to be given under the sanctity of the oath, and with reasonable formality to exclude matter clearly incompetent, irrelevant or immaterial."

N. I. T. League Favors Varying Wage Scales

In outlining the position of the National Industrial Traffic League on the question of wages, Mr. Burchmore said:

"It is the view of the league and of the shippers on whose

behalf it appears, that the railroads should not be required by any order of the Labor Board to pay or to continue paying a higher scale of wages to that general class of labor which is used alike in railroad and commercial industry than is paid currently in commercial industry for such comparative employment, and that the wages for such classes of labor vary so widely in different parts of the country and in different towns and cities that they do not lend themselves to uniform treatment.

"We do not contend that all railroad employees are receiving wages that are greater than paid by industries in the same section for comparable employment. Indeed, as against a considerable degree of uniformity in the wages of men employed by particular railroads, there is no such uniformity in the wages paid by industries along the lines of those railroads.

"It is a matter of common public knowledge that railroad labor in many instances has become a preferred class, receiving wages out of harmony to those paid to comparative employment in commercial industries, and this is neither right nor in the public interest."

"Hands Off" Policy Urged

In defending the right of the public to be heard in connection with wage disputes, Mr. Burchmore said:

"The public has a large interest in the outcome of any dispute involving the wages of railroad employees because of the effect thereof upon operating expenses, upon freight rates, passenger fares and transportation charges of the carriers, and finally upon industry throughout the nation. The public interest ought to be heard and considered by the board. The National Industrial Traffic League may fairly claim to speak for a substantial portion of the shipping public.

"As a result of orders entered by the director general during federal control, and former decisions of the railroad labor board," Mr. Burchmore said in discussing the present wage controversy, "the wages of many classes of railway employees have been so 'frozen' that a carrier which is unable in the opinion of its management to continue paying those wages or finds them higher than that class of labor commonly commands in that particular section could not effect a reduction, and could make no progress with its own men toward an agreement upon a reduction in wages. The practical result of this situation is that there has been no real opportunity for the management of the railroads to regulate the wages of their own men, and for those who desired to avoid any readjustment of the war-time wages such as already has occurred in industries, it has been simple to stand pat.

"In order to restore some semblance of freedom of action to the parties, it is necessary that the government take its hands off this situation. In other words, the so-called disputes now pending before the Railroad Labor Board are not bona fide disputes of the character which Congress intended should be the basis for the action of that board. It will not remedy any situation now existing for this board to enter into wages to be accepted by the carriers and the men for use throughout the country or on the lines of most of the principal either a blanket order or an elaborate detailed schedule, fix-carriers."

The employees' protest was summarized by them as follows:

No person other than carriers and employees should be permitted

to intervene 30 minutes before the Railroad Labor Board because:

First. Intervention is the act of proceeding by which one on his own motion becomes a party to a suit pending between others.

Second. To intervene a person must be competent to be a party.

Third. To be competent to intervene as a party a person must have a personal interest.

Fourth. Generally the right to intervene is purely statutory.

Fifth. The Transportation Act specifically limits those entitled to a hearing to parties to the dispute. (Section 309.)

Sixth. The disputes over which the board has jurisdiction are limited to disputes between carriers and employees and it is only of such disputes that the board has jurisdiction. In these disputes no other persons can be parties.

The organizations seeking to intervene cannot be given standing as witnesses, because witnesses must be individuals capable of being sworn.

The individual representatives of the organizations seeking to intervene cannot appear as witnesses in their own behalf because they cannot be made parties.

Therefore if such individuals are heard they must be called as witnesses by either:

(a) The carrier; or (b) The employees; or (c) The board.

The order of the board apparently permitting organizations to present witnesses is therefore improper and invalid and violative of the rights of the employees as parties to the proceedings before the board because:

First. The organizations are not parties and can not present witnesses.

Second. The individuals to be heard have not been called by any of the parties or by the board.

Third. The hearing of evidence to affect the rights of parties to a proceeding, volunteered by individuals having no standing in the proceeding, is contrary to such established orderly procedure as constitutes "due process of law" and in deprivation of the rights of the parties to the proceeding to a "hearing" such as authorized by statute.

The "hearing" which the board proposes to conduct is:

First. Outside the statutory powers of the board; and therefore an unlawful proceeding.

Second. If such a "hearing" affects in any way the rights of a party it will operate to invalidate as to such a party any decision of the board based in whole or in part upon such a hearing.

If it is the meaning of the board's ruling that evidence may be filed without a hearing, such evidence would be wholly inadmissible and the receiving of it by the board a violation of its obligations as an arbitrating body.

The board should not summon as its witnesses representatives of organizations not parties to the proceeding because:

1. Such organizations represent private partisan interests and are in no wise representatives of the public.

2. If the board permits one organization to be heard representing private or special interests there will be no reasonable basis for excluding any organization and the board will be required to hold extensive hearings of little value affording every organization, which desires to advance a special interest, or some general program of political or social reform, opportunity to be heard, thus imposing an unfair burden of time and expense on the parties and the board.

The purpose of referring disputes to the board is largely to crystallize and define issues between carriers and employees and to obtain an impartial judgment upon those issues. To clutter up the record with a mass of other issues and evidence will defeat the main purpose for which the board was created.

Statistics under partisan handling are notoriously unreliable and it is equally notorious that expert opinion follows a fee. Statistical information and expert opinion, if brought into the record by action of the board, should proceed from official representatives of the public and not from partisans masquerading as members of the public.

The Transportation Act specifically provides that officers and employees of the United States shall supply the board with any data or information necessary, and that specific provision for the production of such data by representatives of the public exclude the board from the right to receive information from private individuals who desire to present public opinion by means of statistics.

Also, information and statistics are clearly obvious from the nature of the transportation industry they represent. The parties to a dispute are not compelled to accept testimony from the public.

The order of the board as a government administrator of public affairs, with respect to the subject matter, is subject to the approval of the United States.

B. M. Jewell Assails Labor Board

Expressing the approval of the Labor men from the board, because B. M. Jewell, president of the Railway

Employees Department of the American Federation of Labor, issued a statement which said in part:

The refusal of labor organizations to continue in the hearing before the board was a protest against a long continued procedure by which the board has gradually deprived the employees of their right to have wages fixed as "just and reasonable" compensation, in accordance with the law and natural justice.

About a year ago the board violated an unbroken line of precedence of courts and arbitrators and allowed testimony of the ability of a railroad to pay wages to affect the fixing of a fair wage. Today the board went a step further in receiving testimony of the financial ability of the customers (shippers) of a railroad to pay.

Congress established the labor board to fix "just and reasonable" wages. The board has no authority to listen to evidence and to make its decisions on evidence which has nothing to do with what are "just and reasonable" wages.

The decisions of the board, if based on such evidence, will have little value, and hearings are merely a waste of time and money of the carriers and their employees.

Board Assumes Jurisdiction in Katy Dispute

Acting under the provisions of Section 307 of the Transportation Act, giving the board authority to assume jurisdiction over disputes that seem likely to interrupt commerce, the board, on April 27, dispatched the following telegram to the officers of the Missouri, Kansas & Texas and the representatives of the shop craft organizations on that road:

Credible information having come to the board that a dispute exists between the M. K. & T. and its shop craft employees, growing out of the alleged contracting by said carrier of its work in certain shops, the discharge of a large number of its employees and the placing of certain of its shop work on a piece-work basis, which action of the carrier, the employees contend is a violation of the law and the decisions of the board, but which the carrier contends is legal and not in violation of the rights of employees; and it appearing to the board that said dispute is likely substantially to interrupt commerce, and it further appearing that disputes involving this same question are now pending before the board and will be decided at an early date, the board, therefore, assumes jurisdiction of said dispute and sets same for hearing May 4, at 10 a. m. This action must not be construed as indicative of the board's position on the merits of this or similar controversies now pending before it. The parties will maintain the status quo, as of the date prior to the alleged contract, until the dispute is passed upon by the board.

The action of the board in assuming jurisdiction over this dispute, is especially significant because of the recent announcement of the shop crafts that it would take a strike vote primarily because of the action of the carriers in contracting certain portions of their operations. The labor leaders have already charged that this contracting is merely an attempt to evade the board's ruling as to wages and working conditions, but because of the absence of one member of the board and the importance of the question, the board has not ruled on this subject.

Reports from Sedalia, Mo., where the Katy shops had been "farmed out" to the A. S. Hecker Company of Cleveland, O., indicate that these shops have again been closed awaiting the board's ruling.

B. W. Hooper Elected Chairman of the Labor Board

Ben W. Hooper, a member of the public group on the board, and vice-chairman of that body, was unanimously elected as chairman on April 27, to succeed Judge R. M. Barton, who has held that position since the board was created. Mr. Hooper's name was placed in nomination by Judge Barton. G. W. W. Harger, also a member of the public group on the board, was elected to succeed Mr. Hooper as vice-chairman.

Prior to his appointment as a member of the labor board, Mr. Hooper served one term in the Tennessee House of Representatives and in 1910 was elected governor of Tennessee on a fusion ticket. He served two terms, devoting most of his time to problems of prison reform and the enforcement of 1901 prohibition laws. He was subsequently defeated for a third term and was given an honorary nomination for election to the United States Senate in 1916, but

was defeated. At the time of his appointment to the board, Mr. Hooper was practising law at Newport, Tenn.

Following his appointment as chairman, Mr. Hooper indicated that the Labor Board would immediately enter into two fights, one to repulse assaults upon its authority as a federal arbitration party and the other to forestall the threatened strike of shop craft employees announced in last week's *Railway Age*. He intimated that the legal battle between the Pennsylvania and the labor board over the authority of that body to prescribe the manner in which representatives of the men should be elected, would be a "finish fight." Later Chairman Hooper and Judge Barton conferred with Attorney General Daugherty and Solicitor General J. M. Beck at Washington, in regard to the next step in this legal controversy.

As a further sequel to this controversy, Judge C. B. Heiserman, general counsel of the Pennsylvania, speaking before the Academy of Political Science at New York on April 28, said that the Pennsylvania is willing at all times to abide by the decisions of the board "when its decisions are legal."

Testimony of J. H. Libby, Representing National Industrial Conference Board

J. H. Libby, representing the National Industrial Conference Board presented a series of charts to the board dealing with the actual earnings of railway employees, both hourly and weekly, their wages in relation to the cost of living and a comparison of railroad wages with the wages of employees performing the same or similar service in manufacturing industries. The first chart presented by Mr. Libby showed that between 1914 and the middle of the summer of 1920, the total payroll increased 271 per cent, the total operating expenses 237 per cent, the total operating revenues 251 per cent, the number of men employed 58 per cent and the number of men hours worked 41 per cent.

"After the business depression set in in 1920," Mr. Libby said, "and the wage decrease had been made by the labor board on July 1, 1921, the total payroll showed a net gain of 151 per cent over 1914, total operating expenses 136 per cent and total operating revenues 124 per cent, while the total number of men employed showed an increase of 26 per cent and the total number of men hours worked showed a net gain of only 10 per cent over the number in 1914."

Several other charts dealing with the "real" earnings of railway employees, defined by Mr. Libby as "the index of a man's wages divided by the index of the cost of living

representing his purchasing power over any given period. . . ." "On account of the rise in the cost of living," he said, "the 'real' earnings of all railroad wage earners fell below the 1914 level, until nearly the end of 1917. Then the increases that were awarded under the Adamson law and by the Director General of Railroads brought those earnings up, but in 1919 and in the early part of 1920, the 'real' earnings did not pay for the changes in the cost of living. Finally as the cost of living dropped after the middle of 1920, the 'real' earnings, based on the average hourly earnings, amounted to 144 per cent of the 1914 level, and the 'real' earnings, based on the average weekly wage, 120 per cent. That is a net gain of 20 per cent in the 'real' weekly earnings over 1914."

Mr. Libby also showed that the "real" earnings of skilled shop labor increased 63 per cent based on the average hourly earnings and 24 per cent based on the average weekly earnings adding that "the average employee at the end of the week January 1, 1921, was 24 per cent better off in purchasing power than he had been in 1914."

Similar testimony was introduced showing that the real earnings of machinists, boilermakers and blacksmiths had increased 25 per cent on the basis of their average hourly earnings and 9 per cent on the basis of their average weekly earnings.

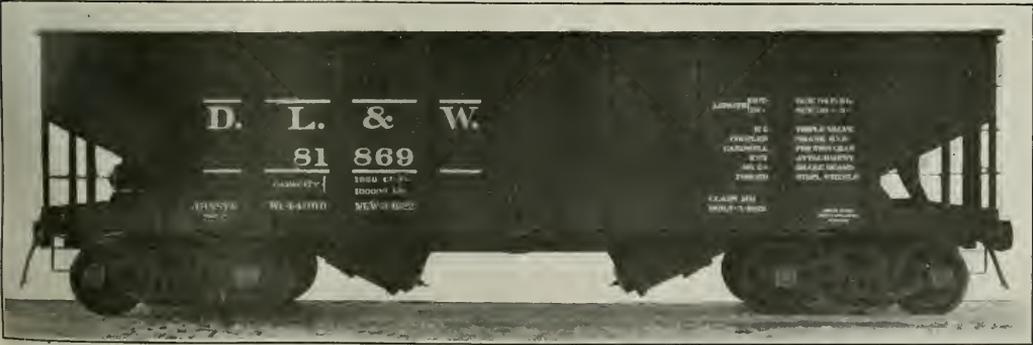
For car men, the "real" earnings were increased 76 per cent computed on their hourly earnings and 34 per cent computed on their weekly earnings.

The "real" earnings of unskilled labor, based on their average hourly earnings, show an increase of 46 per cent, and, based on the average weekly earnings, an increase of 17 per cent over 1914.

For clerks, the increase in "real" earnings based on the average hourly earnings showed an increase of 30 per cent and, based on the average weekly earnings, of 16 per cent over 1914.

For telegraphers, the increase in "real" wages was 41 per cent over 1914 based on the average hourly earnings and 35 per cent based on the average weekly earnings.

Mr. Libby also presented the results of an investigation covering 24 manufacturing industries employing approximately 700,000 men and showing that "until the middle of 1921, unskilled labor in the manufacturing industries was paid at a rate uniformly higher than paid railroad unskilled labor," but that in June, 1921, this situation was reversed, the unskilled labor in the manufacturing industries receiving average hourly earnings of but 38.3 cents while the unskilled labor in railroad service was receiving 44.8 cents.



New Hopper Cars for D. L. & W.

The 1,500 hopper bottom coal cars ordered by the Delaware, Lackawanna & Western in 1921 are being delivered. Order was equally divided between Cambria Steel Co., American Car & Foundry Co., and Standard Steel Car Co. These cars are of 100,000 lb. or 1,950 cu. ft. capacity; weight 44,000 lb.; are 33 ft. 3 in. long inside, and are equipped with forged steel wheels.

General News Department

The Western Railway Club will hold its annual meeting and dinner at the Drake hotel, Chicago, on the evening of May 15. United States Senator McKinley of Illinois and James C. Davis, director general of the United States Railroad Administration, will be the speakers.

The Illinois Central has furnished its employees in Mississippi with cards containing a statement of the road's annual operating costs in that state. The number of employees in the state is 9,424 and the amount paid out yearly in wages is given as \$13,645,052. Material and supplies purchased and taxes paid amounted to \$3,003,572. This statement will be, in the words of a prominent railroad president, a "talking point," for employees who come in contact with the public.

The Southern Railway System's new double track bridge across the Ohio river at Cincinnati designed to carry the heaviest locomotives and cars now in use was opened on May 1 for movement of heavy freight traffic. The restrictions as to the weight of cars which have been in effect during construction and previously have been modified so that the Southern can now handle into or out of Cincinnati any car moving in the course of normal business. This will greatly facilitate the movement of heavy loading freight through the Cincinnati gateway. The new bridge is 4,300 ft. long, consisting of 1,600 ft. of truss work, 1,600 ft. of plate girder work and 1,100 ft. of fill between concrete retaining walls. A draw span of the vertical lift type 365 ft. long with a clearance of 53 ft. above high water mark for river navigation, takes the place of an old fashioned swing span of the old bridge.

Another Brotherhood

The Union of Skilled Railway Maintenance of Way Employees has been organized at Macon, Ga., men of that class being present. It is said, from every important railroad in the southern states. J. O. Raley of Macon was elected president and E. N. Hutt of Enterprise, Miss., secretary. It is said that it is the purpose of this union to take in all employees of the maintenance of way department above common laborer.

Pennsylvania-Labor Board Case to be

Appealed to Supreme Court

Attorney General Daugherty has announced that the Department of Justice will support the position of the Railroad Labor Board in an appeal from the decision of Judge Page adverse to the board in the Pennsylvania case. Chairman Hooper and R. M. Barton of the Labor Board had conferred with the attorney general on May 1 on the subject.

New England Railroad Club Meeting

The New England Railroad Club will meet on Tuesday, May 9 at the Copley Plaza Hotel, Boston. Dinner will be served at 6.30 P. M. E. S. Jones, official photographer of the Boston & Maine, will deliver the address of the evening on "Maine, the Sportsman's Paradise." The lecture will be illustrated by colored lantern slides which Mr. Jones has been collecting for years. In addition to the lecture there will be an entertainment during the dinner.

Automobiles Must Stop

The General Assembly of Virginia has passed a law under which drivers of automobiles and other vehicles using the public high ways must stop to a full stop before crossing a railway track at grade. The law provides that drivers of all vehicles on approaching any track crossing of a main line railway track outside an incorporated town must stop at a point not less than 10 ft. for more than 10 ft. from the nearest rail, penalty for violation, ten dollars.

To Investigate Pacific Great Eastern

John G. Sullivan, formerly chief engineer of the Canadian Pacific, has been retained by the Province of British Columbia to investigate and report on the Pacific Great Eastern, which is owned and operated by that province, and which has for some time, been showing a deficit. He will advise the government as to the best methods of maintaining the line already constructed, and also recommend the route for the continuation of the railroad to Prince George. W. P. Hinton, formerly general manager of the Grand Trunk Pacific, is preparing a report on the operating and traffic conditions of this carrier.

Annual Meeting of Safety Section

The second annual meeting of the Safety Section of the American Railway Association was held in Chicago this week, Wednesday, Thursday and Friday, with an attendance of about 125.

Final steps were taken to launch the "Careful Crossing Campaign" which is to be conducted this summer for four months throughout the country. Among other subjects discussed were: goggles; the posting of accident and injury bulletins; control of injuries resulting from riding on locomotive footboards; injuries from motor cars; responsibility of supervisors for injuries sustained by their men.

A further report of the doings of this meeting will be given in a subsequent issue.

The International Locomotive Association

The International Locomotive Association is now being promoted, having for its object the history and development of the locomotive; and the preservation of records pertaining thereto. In carrying out these aims the co-operation of all interested will be welcomed.

Information in regard to the activities of the association will be made available to the members through the agency of a bulletin, in which articles of a suitable nature will also appear.

The Organization Committee consists of Arthur Curran, 16 Ballard street, Newton Center, Mass.; Charles B. Chancy, 97 Lafayette avenue, Brooklyn, N. Y.; and Norman Thompson, 340 Spence street, Winnipeg, Manitoba.

Signalmen of U. P. Sue for Back Pay

Alleging that approximately \$300,000 is due them as wages earned during federal control of the railroads, January, 1918, to February, 1920, signalmen on the Union Pacific System have filed suit in federal court against the director general of railroads and the Union Pacific for the recovery of this sum. The attorney for the Brotherhood of Railway Signalmen states that his clients were awarded 68 cents an hour for the first 16 months of federal control of the railroads and 72 cents an hour for the balance of federal control, but that the maximum amount paid to them during federal control was 58 cents an hour for the first 16 months and 62 cents an hour for the remaining period. The plaintiffs also allege that the director general on April 7, 1922, ordered the Union Pacific to pay their claims for back pay but that the road refused to do so.

Development Association at Denver, May 10

The fourteenth annual meeting of the American Railway Development Association, representing the industrial, immigration, real estate, agricultural, publicity and marketing agencies of the railroads will be held in the Brown Palace Hotel, Denver, Colorado May 10 11 and 12. The officers of this association are: President, G. E. Bates, assistant to the general manager of the Delaware & Hudson; vice-president, J. R. Lamson, agricultural development agent of the Chicago, Burlington & Quincy; second vice-president, J. F. Fox, teaching immigration agent of the

Northern Pacific, and secretary and treasurer, J. F. Jackson, agricultural agent of the Central of Georgia. A large attendance is expected. Arrangements have been made for addresses by J. H. Young, president of the Denver & Rio Grande Western; Oliver H. Shoup, governor of Colorado, and H. R. Safford, vice-president of the Chicago, Burlington & Quincy.

Refrigerator Cars to Be Discussed by American Society of Mechanical Engineers

A joint meeting on the subject of refrigerator cars will be held by the Railroad Division and the Metropolitan Section of the American Society of Mechanical Engineers with the American Society of Refrigerating Engineers in the Engineering Societies' Building, 29 West Thirty-ninth street, on the evening of May 16. Two papers will be presented; the first entitled, Some Notes on Railroad Refrigerator Cars, by W. H. Winterrowd, chief mechanical engineer of the Canadian Pacific; the second entitled, Mechanical Refrigeration Processes Applicable to Railway Cars, by W. H. Baxter of the Balsa Wood Company, Chicago. The data at present available regarding refrigerator cars is fragmentary and scattered. Mr. Winterrowd's paper brings together facts of interest, and importance to car designers, manufacturers and users. It contains a discussion of numerous factors affecting efficient refrigeration, including air circulation, method of loading, ice containers, insulation, car construction and maintenance. Tabular comparisons of numerous designs of refrigerator cars are included and methods of calculating heat transmission and relative values of insulation are given.

Net Return for March 5.83 Per Cent

The net railway operating income of the Class I railroads for the month of March was at the annual rate of 5.83 per cent on their valuation, according to a preliminary compilation of the returns made by the Bureau of Railway Economics. This is the largest percentage of return earned by the railroads in any single month since the passage of the transportation act. It reflects not only an improvement in general traffic conditions and reductions in expense, but particularly the increase in coal handled during the month of March for storage in anticipation of the coal strike in April, which will correspondingly reduce the earnings for April. The effect of the coal movement is particularly shown in the Eastern district, where the roads earned at the rate of 7.8 per cent. The net operating income for the Class I roads for the month was \$83,510,888 as compared with \$30,807,066 in March last year. For the three months of 1922 the net operating income was \$160,998,907 as compared with \$27,574,407 last year. For the three months the rate of return on an annual basis was 4.51. For the month operating revenues increased 3.4 per cent, in spite of an increase in traffic, but operating expenses were reduced 9.8 per cent. For the three months there was a decrease in revenues of 4.8 per cent, while expenses were reduced 16.6 per cent. The compilation is as follows:

Fuel Association Convention Program

The International Railway Fuel Association has announced details of the program for the sessions at the annual convention to be held in the Auditorium Hotel, Chicago, May 22-25. A comprehensive list of papers and addresses has been prepared and it is expected that there will be a large attendance of railroad men from all departments concerned with the economical purchase and use of fuel. Several subjects of joint interest to railroad officers and coal operators will be considered on the last two days of the convention and it is anticipated that there will be a good representation from the coal operators, especially since the annual meeting of the National Coal Association will be held at the Congress Hotel, Chicago, May 24-26. The complete program is as follows:

- Monday, May 22—10:30 a. m.*
- Invocation
 - Opening Address L. W. Baldwin, vice-president, Illinois Central.
 - Address by President W. L. Robinson, superintendent fuel and locomotive performance, Baltimore & Ohio.
 - Report of secretary-treasurer J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy.
 - Appointment of committees, unfinished and new business
 - Colloidal Fuel Linton W. Bates, Mt. Lebanon, N. Y.
 - Report of Special Committee on Locomotive Feedwater Heating ... E. E. Chapman, chairman, engineer tests, Atchison, Topeka & Santa Fe.
 - Report of Standing Committee on Firing Practice M. A. Daly, chairman, general fuel supervisor, Northern Pacific.
- Monday, May 22—2:00 p. m.*
- Lignite Carbonization Dr. E. J. Babcock, dean, Mining Engineering Department, University of North Dakota
 - Fuel Conservation from the Standpoint of a Division Superintendent S. U. Hooper, superintendent, Baltimore & Ohio.
 - Fuel Conservation from the Standpoint of Representatives of Department Operating Coaling Stations ... W. S. Burnett, district engineer, Cleveland, Cincinnati, Chicago & St. Louis.
 - Fuel Conservation from the Standpoint of Locomotive Engineer ... C. J. Barnett, locomotive engineer, Illinois Central.
 - Effect of Tonnage Rating and Speed on Fuel Economy J. E. Davenport, engineer dynamometer tests, New York Central.

- Tuesday, May 23—9:30 a. m.*
- The Economic Considerations Governing the Use of Oil as a Locomotive Fuel M. C. M. Hatch, mechanical engineer, Missouri, Kansas & Texas.
 - Locomotive Fuel the Life Blood of Transportation G. M. Basford, consulting engineer, Lima Locomotive Works.
 - Incentives for Promoting Fuel Economy—A survey of existing and proposed practices O. S. Bever, Jr., consulting engineer, New York.
 - Report of Standing Committee on Front Ends, Grates and Ash Pans ... E. C. Schmidt, chairman, professor of railway engineering, University of Illinois.
 - Report of Standing Committee on Fuel Accounting J. N. Clark, chairman, chief Fuel Bureau, Southern Pacific Lines.
 - Educational Work Along Fuel Economy Lines D. C. Buell, director, Railway Educational Bureau.

	March			Three Months		
	1922	1921	Per cent of increase	1922	1921	Per cent of increase
Total Operating Revenues:						
Eastern District (incl. Poca. Reg.)	\$242,565,480	\$230,257,772	10.1	\$643,533,691	\$646,545,534	d 0.5
Southern District (excl. Poca. Reg.)	62,009,728	60,484,458	2.5	166,878,389	176,944,917	d 5.7
Western District	170,094,420	178,306,097	d 4.6	461,119,303	512,839,368	d 10.1
Total—United States	474,669,628	459,048,327	3.4	1,271,531,383	1,336,329,819	d 4.8
Total Maintenance Expenses:						
Eastern District (incl. Poca. Reg.)	80,858,621	82,658,709	d 2.2	220,063,279	254,920,366	d 13.7
Southern District (excl. Poca. Reg.)	20,716,840	22,492,737	d 7.9	57,154,949	67,236,739	d 15.0
Western District	57,797,276	64,201,138	d 10.0	162,938,363	193,566,845	d 15.8
Total—United States	159,372,737	169,352,584	d 5.9	440,156,591	515,723,950	d 14.7
Total Operating Expenses:						
Eastern District (incl. Poca. Reg.)	181,212,909	196,193,978	d 7.6	508,954,382	608,381,664	d 16.3
Southern District (excl. Poca. Reg.)	47,137,912	53,203,622	d 11.4	133,107,669	160,964,267	d 17.3
Western District	132,577,622	150,713,589	d 12.4	380,856,485	457,599,375	d 16.8
Total—United States	360,928,443	400,111,189	d 9.8	1,022,918,536	1,226,945,306	d 16.6
Net Railway Operating Income:						
Eastern District (incl. Poca. Reg.)	47,863,471	11,827,161	...	96,669,107	4,271,777	...
Southern District (excl. Poca. Reg.)	11,093,394	4,016,643	...	23,797,965	6,361,245	...
Western District	24,554,023	14,963,262	...	41,531,835	16,941,385	...
Total—United States	83,510,888	30,807,066	...	160,998,907	27,574,407	...
Rate Earned—Annual Basis:						
Eastern District (incl. Poca. Reg.)	7.80	1.93	...	6.44	0.28	...
Southern District (excl. Poca. Reg.)	4.99	1.81	...	4.03	1.13	...
Western District	4.12	2.51	...	2.76	1.12	...
Total—United States	5.83	2.15	...	4.51	0.77	...

d Denotes decrease.

Wednesday, May 24—9:30 a. m.

- The Government and the Coal Industry T. H. Watkins, president, Pennsylvania Coal & Coke Company.
- Effect of Circulation on Locomotive Boiler Efficiency F. G. Lister, mechanical engineer, El Paso & Southwestern System.
- The Various Items of Saving by Using a Better Quality of Coal Earl Cobb, president, Southwestern Coal Company.
- Assigned Cars for Railroad Fuel G. L. Hall, general manager, Walter Bede-Se & Co.

Thursday, May 24—2:00 p. m.

- Report of Standing Committee on Storage Coal H. H. Stock, chairman, professor mining engineering, University of Illinois.
- Comparative Practice—United States, United Kingdom, France and Germany Harrington Emerson
- Report of Standing Committee on Fuel Stations W. E. Dunham, chairman, assistant superintendent motive power and maintenance, Chicago & North Western.

Friday, May 25—9:30 a. m.

- The Relation of Overdevelopment of the Bituminous Coal Industry to Transportation C. E. Leshar, editor, Coal Age
- Standard Rail and Coal Contract W. J. Tapp, fuel supervisor, Denver & Rio Grande
- The Railroad Fuel Problem from the Standpoint of the Coal Operator F. S. Peabody, president, Peabody Coal Company.

Thursday, May 25—2:00 p. m.

- Business Session
- Report of Auditing Committee
- Report of Committee on Constitution and By-Laws T. Duff Smith, chairman, lake forwarding agent, Canadian National.
- Report of Committee on Thanks, election of officers, balloting for place of 1923 meeting.

Supplement to 1921 Rules of Interchange

A supplement to the 1921 Rules of Interchange has been prepared by the Arbitration Committee and the Committee on Prices for Labor and Materials of the Mechanical Division of the American Railway Association. This supplement includes several interpretations of the Rules of Interchange as rendered by the Arbitration Committee and the following modifications of the rules relative to prices for labor and materials:

- Rule 101.—Entirely revised on account of present market prices and labor per hour revised to \$1.10 per hour. Revision effective May 1, 1922.
- Rule 107.—Several items revised on account of revision of labor rate, effective May 1, 1922.
- Rule 112.—Reproduction cost per pound prices for settlement for cars destroyed reduced 30 per cent, effective May 1, 1922.
- Passenger Car Rule 22.—Material allowances revised on account of present market conditions.

Meetings and Conventions

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

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, June 19, 1921, Haddon Hall Hotel, Atlantic City, N. J. Exhibit by Air Brake Appliance Association
- AIR BRAKE APPLIANCE ASSOCIATION.—J. F. Gettruff, The Ashion Valve Company, 318 W. Washington St., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pothous, Superintendent of Demurrage and Storage, C & N W Ry., Chicago.
- AMERICAN ASSOCIATION OF DIXING CAR SUPERINTENDENTS.—J. A. Stone, C & F E Ry., Chicago. Annual meeting, Oct. 15, 1921, San Francisco, Cal.
- AMERICAN ASSOCIATION OF ENGINEERS.—C. E. DeLoe, 63 E. Adams St., Chicago.
- AMERICAN ASSOCIATION OF GENERAL RAILWAY AGENTS.—J. L. Duffin, 33 S. Madison Ave., Chicago. Next meeting, June 1, 8, 9, 10, 11, 1922, Minneapolis, Minn.
- AMERICAN ASSOCIATION OF PASSENGER TRAVEL OFFICERS.—W. C. Howe, P. O. Box of N. J. 117, Trenton, N. J.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 100, Union Station, St. Louis. Next convention, August 14-17, 1922, Kansas City, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welch, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER MECHANICS' ASSOCIATION AND PEEBODYS' ASSOCIATION.—H. H. Stock, 11 North Hudson Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fitch, General Secretary, 75 Central St., New York. N. Y. Annual meeting, November, 1922, New York City.
- ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
- Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.
- Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association). J. C. Caviston, 75 Church St., New York, N. Y.
- Telephone and Telegraph Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.
- Safety Section. J. C. Caviston, 75 Church St., New York.
- Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III—Traffic. J. Gotschelsky, 75 Church St., New York.
- Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Exhibit by National Railway Appliances Association, Construction and Maintenance Section. E. H. Fritch, Electrical Section. E. H. Fritch.
- Signal Section (including former activities of the Railway Signal Association). H. S. Ballet, 75 Church St., New York, N. Y. Next meeting, March 13 and 14, Drake Hotel, Chicago. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.
- Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
- Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). L. P. Murphy, General Store Keeper, New York Central, Collinwood, Ohio. Annual meeting, June 19-21, 1922, Hotel Traymore, Atlantic City, N. J.
- Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, C. of Ga. Ry., Savannah, Ga. Annual meeting, May 10-12, 1922, Denver, Colo.
- AMERICAN RAILWAY ENGINEER ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittless, Union Trust Bldg., Washington, D. C. Annual meeting, May 10, Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisman, 1600 Prospect Ave., Cleveland, Ohio. Sectional meeting, May 25-26, Bureau of Mines Auditorium, Pittsburgh, Pa. Annual convention, Oct. 2-7, 1922, General Motors Building, Detroit, Mich.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26-30, 1922, Chalfonte-Haddon Hall, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 8-11, Atlanta, Ga.
- Railroad Division, A. F. Stuebeling, Managing Editor, Railway Mechanical Engineer, Woolworth Bldg., New York. Next meeting, May 16, 1922, 29 W. 39th St., New York.
- AMERICAN TRAIN DISPATCHERS ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill. Next convention, June 18, 1923, Chicago.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—S. D. Cooper, A. T. & S. Fe R. R., Topeka, Kan. Next meeting, January 23, 1923, New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morrie, Northern Pacific R. R., St. Paul, Minn. Next meeting, May 17-19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—J. A. Andreacetti, C & N. W. Ry., Room 111, C & N. W. Sta., Chicago. Next meeting, June 19, Dennis Hotel, Atlantic City, N. J. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATES OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—D. J. Higgins, American Valve & Meter Company, 332 S. Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Ass'n
- CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrook St., Montreal, Que.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—AYDEN KLINE, 676 North Pine Ave., Chicago. Regular meetings, 3d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—THOMAS B. KNEEKE, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.—HARRY D. VOUGHT, 6 Cortlandt St., New York. Regular meetings, 1st Thursday in January, March, May, September and November, Hotel Trumbull, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesan Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C. Annual meeting May 11, 1922, Railroad Club of New York.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, August 15-17, Hotel Sherman, Chicago. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. C. Crawford, 702 E. 51st St., Chicago. Next annual meeting May 22-25, 1922, Auditorium Hotel, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wahasha Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Annual convention, 1922, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortland St., New York. Next convention, May 23-26, 1922, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, September 26, 1922, Detroit, Mich.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 10-12, Philadelphia, Pa.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortland St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wolner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 7, 1922, Hotel Cleveland, Cleveland, Ohio.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Arch Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, at Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting October 10-13, 1922, Pittsburgh, Pa.

RAILWAY SIGN ASSOCIATION.—(See A. R. A., Division IV., Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Annual convention, September 19-21, 1922, Hotel Staller, Cleveland, Ohio. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, West 4th Ry. of Atl., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Rampapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS ASSOCIATION.—W. O. Thompson, Marine Trust Building, Buffalo, N. Y. Annual convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crabbell, 14 E. Jackson Boulevard, Chicago. Annual dinner, May 15, Drake Hotel, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

The Transportation Club of Louisville, Ky., has moved its club-rooms to 630 South Fourth street in that city.

The Gulf, Mobile & Northern has inaugurated a new through freight service between Jackson, Tenn., Mobile, Ala., and New Orleans, La.

The House committee on interstate and foreign commerce has postponed consideration of the mileage book bills, on which it recently held hearings, for an indefinite period.

The Northern Pacific, to accommodate travelers to the Yellowstone National Park, will establish new sleeping car service on June 19, between St. Paul and Gardiner, Mont., on its Pacific Express, trains 3 and 4.

The Chicago & Alton has announced the inauguration of a new solid Pullman no-stop passenger train between Chicago and St. Louis, Mo. A feature of this train is a sleeper exclusively for men and another for women only.

The Illinois Central has announced the opening of a freight and passenger traffic office at 2946 East Ninety-second street, Chicago, to serve South Chicago, Calumet and Gary, including also East Chicago, Hammond, Hegewisch, Indiana Harbor and Whiting. This is said to be the first city freight and passenger office to be opened by any railroad in the "South Chicago" business district.

The concrete fireproof grain elevator of the Pennsylvania Railroad at Baltimore, Md., is to be enlarged this summer to a total capacity of 4,250,000 bushels. The work remaining to be done consists of the construction of bins to add 1,300,000 bushels to the present storage capacity. This portion of the construction was unavoidably suspended during the war. The old wooden Elevator No. 1 is to be torn down. When finished the new elevator will represent a total investment of \$5,500,000. The plant is electrically operated throughout. The elevator has accommodation for loading four of the largest ships simultaneously. It has four mechanical unloading machines which empty the grain from box cars by turning them on their sides and rocking them from end to end. The unloading capacity of the four machines, operating together, is 40 cars an hour. The elevator's working capacity for loading grain into ships exceeds 120,000 bushels an hour.

Coal Production Increases

In the fourth week of the coal strike (April 24-29) production has turned upward, according to the weekly bulletin of the Geological Survey. The output of bituminous coal is expected to pass the 4,000,000-ton mark. Production of anthracite, however, remains practically zero.

The revised figures for the third week (April 17-22) are 3,560,000 tons of soft coal and 6,000 tons of anthracite, a total for all coal of 3,566,000 net tons. The same week of the 1919 strike saw 5,344,000 tons of bituminous and 2,055,000 tons of anthracite produced, a total of 7,399,000 tons. The current output of hard and soft coal combined is therefore some 3,800,000 tons short of that in the corresponding period of the 1919 strike.

Telegraphic reports indicate a definite increase in production of soft coal during the week of April 24-29. Loadings on Monday, April 24, were 12,131 cars. This was the highest since the strike began, yet it was exceeded on Tuesday and again on Wednesday, when 12,520 cars were loaded.

The increase of last week has come largely from the non-union districts of the Middle and Southern Appalachians, the bulletin says. It is not due to the return to work of striking miners, either union or non-union, but rather to increased demand resulting in greater activity in those districts which have remained at work.

The quickening of the market has not yet absorbed the accumulation of unbilled cars, but the number of these unconsigned loads is steadily decreasing. Consumption is still being met largely from storage.

There is no change in the anthracite situation.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until August 31 the operation of schedules published by the Denver & Salt Lake, which propose increases in rates of 13½ cents a ton on soft coal from Curtis Mine, Colo., to points in Colorado, Iowa, Kansas, Missouri, Nebraska, South Dakota and Wyoming.

The commission has suspended from May 1 until August 29 the operation of certain schedules which propose a reduction from 10 cents to 7 cents per 100 lb. in the rate on cement from cement producing points in Pennsylvania and New Jersey to New Jersey tidewater terminals, applicable on shipments destined beyond by water to points in the lighterage limits of New York Harbor.

The commission has suspended, until August 29, the operation of certain schedules which propose increases in rates on lumber from producing points in California to destinations in Minnesota and Wisconsin. The present rate from the so-called Coast Group is 66½ cents, and from the Truckee and Hawley Groups, 62½ cents per 100 lb., and it is proposed to establish a rate of 73 cents from the Coast Group and 70 cents from the Truckee and Hawley Groups.

The commission has suspended until August 30 the operation of schedules published in supplements to Agent F. A. Leland's tariff which propose new rates on petroleum from Cushing, Muskogee and Vinita, Okla., to destinations in Kansas. There are at present no through rates between the points involved, except in a few cases, and it appears that the proposed rates are being established partly in anticipation of the proposed cancellation of the rules for constructing combination rates from the tariffs of individual carriers and partly because this rule has already been cancelled from some tariffs, which tariffs are used in figuring the factors used in constructing combinations as a basis for through rates.

The commission has issued a decision finding the Brimstone Railroad & Canal Company to be a common carrier of property subject to the Interstate Commerce act and that it may lawfully participate in joint rates with other common carriers or have its charges on interstate shipments absorbed under appropriate tariff provisions. The divisions received by the company are found to be unjust, and, to the extent that they exceed the cost of the service and a fair return upon the property, to be excessive and in fact a rebate to the Union Sulphur Company. The respondents are required to make a study of the cost of the service performed by this railroad, after which the case will be set for further hearing.

Court News

Excessive Demand Will Bar Recovery of Double Damages

The Iowa Supreme Court holds that a railroad's right to resist payment of double damages, under Code sec. 2055, for killing cows, is not conditioned on its ability to show bad faith in the plaintiff. It is enough if the demand made is clearly excessive.—*Lister v. Chicago, M. & St. Paul (Iowa)*, 186 N. W. 8.

I. C. C., Approving Issuance of New Securities, Not Pass Upon Reorganization Plan

The Federal District Court for the Southern District of New York, dismissing a petition to set aside an order of the Interstate Commerce Commission approving the issuance of new securities by the Chicago & Eastern Illinois, holds that the commission, before making such an order on reorganization, does not pass upon the reorganization plan, but upon the propriety of exchanging new securities for old property; if the property be adequate, it is unnecessary to go into the validity of its acquisition by the railroad company.—*Miller v. United States* 277 Fed. 95.

Foreign Railway News

Frozen Signals Cause Collision in England

A railroad system of 20,000 miles is pretty sure to have weak spots, howsoever great the skill and faithfulness of the men who work it; and Great Britain, with its unsurpassed record for railroad safety, appears to be no exception. One of the latest government accident reports received from London, signed by Major G. L. Hall, tells of a rear collision in a tunnel, due to two signals being frozen in the proceed position!

It was near Littleborough, a short distance from Rochdale, on the London & North Western on February 6, a passenger train running into a freight which had broken in two. It was at about 5 o'clock on a Monday morning. The passenger train was nearly empty, and no person was killed, though the train was moving at 30 to 40 miles an hour. The signals had been left in the proceed position over Sunday, the block station being closed; and the signalman who came on duty at 4:50 a. m. began operations in disregard of the rule to see that all of his signals were in working condition. He pulled the levers all right, but the blades remained fast in the horizontal position. How he could do this without breaking the wires (or rods) is not explained.

The inspector also passes silently over other features of the case, a thing which was very rare in the days before the war, when the accident investigations were made under the auspices of the Board of Trade. All that we are told about the weather at Littleborough on February 6 is that there was a severe frost. Whether it was snow, or ice or sleet, or mere frozen fog, is left to conjecture. The track foreman came on duty at 3 a. m. and he loosened these signals as soon as he got to them; but not in season to prevent the collision.

Plan for Private Ownership in Germany

The opponents of government ownership of the railways in Germany have made a further move towards the denationalizing of the railways by bringing forward a definite plan for their acquisition and reconstruction as a corporation, according to the Times (London).

The new scheme proposes a company, the principal shareholders in which would be associations of agriculture, trade (including banks), industry, trade unions, and communes. The central government is to have the right of inspection and a share in the profits, the right of inspection being limited to seeing that the railways are kept up to the standard of public needs and that the commercial policy of the company is not in opposition to the interests of the government. The railways are then to be reorganized into four departments, each with its own separate accounts.

As the problem of making the railways pay is one which the government has failed to solve, the deciding influence in financial matters is to rest with the leading personages of German industry. It is proposed to divide profits up to 6 per cent among the shareholders, profits in excess of this amount to go one-half to the shareholders and the other half to the government. The initial share capital is to be as small as possible; 5,000,000,000 marks is suggested.

In the difficult question of personnel the scheme proposes that existing contracts between employees and the government shall be engaged on conditions similar to those obtaining in private industrial undertakings. In other words, the privileged position of the servant is to be abolished. Whether he would continue to work at his present low pay when his status has disappeared is not discussed.

Railway Electrification in Holland

The proposal to electrify the Dutch railway system is meeting with considerable opposition, according to the Economic Review (London) and M. J. J. W. van Loenen Martinet, who was a member of the commission appointed in July, 1918, to study the question, lecturing before the Dutch Royal Institute of Engineers, argued against immediate electrification of the system as a whole. In countries possessed of ample water power,

like Switzerland, Sweden and Austria, which moreover suffered severely from a shortage of coal during the war, it was a reasonable proposition, but not in a flat country like Holland, which had no water power.

The coal consumption of the two Dutch railway companies in 1913 amounted to about 800,000 tons. Had the entire system been electrified there would have been a saving of 40 per cent, as against which there would have been the cost of construction and the purchase of rolling stock, also the cost of central power stations and the loss on scrapped locomotives.

Judged by this data the proposition was an absurd one. If a careful selection were made of lines to be electrified, there might possibly be a saving of from 50 to 60 per cent on the coal consumption, but even that would not justify the scheme. Only in Germany and in Switzerland were they carrying out a complete electrification of the railway system on a uniform principle, the one-phase alternating current system. After considering the various systems of the different countries, the Dutch Commission had pronounced against the rotary current system as wholly unsuited to Holland. The main question to be considered was the possibility of obtaining from the central power stations a sufficient constant tension, and the likelihood of the high tension system on the railways admitting of a regular supply of electric current. The commission also contemplated the possibility of a portion of the electric plant eventually being manufactured in Holland, but, to begin with, they would require foreign supervision in the starting of their motor industry.

Comparative Costs of Repairs in New

South Wales and the United States

Comparative statistics have their limitations even when applied only to railroads of this country and railway officers have learned the futility of drawing conclusions from them without complete knowledge of the circumstances. It is doubtful whether any fair comparison of repair costs in New South Wales and the United States can be drawn. Nevertheless the statistics recently given out by A. D. J. Forster, assistant chief mechanical engineer of the New South Wales Government Railways, are of interest. Mr. Forster quoted figures for a leading American railroad company and similar figures for the New South Wales System, as follows:

"In 1910 the total cost of repairing 1,686 locomotives owned by the American company was \$2,831,230; the total cost of repairing the 891 locomotives owned by the New South Wales Railways in that year, expressed in dollars, was \$1,824,830. In 1920, however, the American company owned 1,866, which cost \$17,468,777 to repair, while the total cost of repairing 1,299 locomotives owned by the New South Wales Railways was \$6,115,600.

"Thus the cost of repairing double the number of locomotives in America in 1910 was \$1,000,000 more than was spent in New South Wales while in 1920 the added cost in America was about \$14,500,000, including 180 additional locomotives; whereas in New South Wales we had increased our number by 408 locomotives and the total additional cost of repairs for the year was about \$4,250,000.

"In 1910 the locomotives in New South Wales traveled an average of 21,992 miles each, as against 28,084 miles of service rendered by the American locomotives. In 1920 the American locomotives' average fell to 26,696 miles, whereas the New South Wales locomotives' average increased to 22,022 miles.

"Again, with regard to the repairs, the cost per locomotive mile in America in 1910 was 5.98 cents. In New South Wales, reduced to the same coinage, it was 9.313 cents. By 1920, however, the cost in America had risen from 5.98 cents to 34.38 cents; whereas in New South Wales it had risen from 9.313 cents to 21.727 cents."

Belgian Market for American Railway Ties

If railway tie exporters in the United States can make proper selling connections, they should be able to supply a fairly good portion of the annual consumption of oak ties in Belgium, according to Commerce Reports. Since the armistice oak ties have been difficult to procure, and most of the offers received by the government railways have been from speculators who have not been able to deliver the goods when called upon. At present the railroad administration, before passing a contract, requires a statement from a government official in the country of origin that

a stock of ties actually exists and is in the possession of the party or parties submitting bids.

Under pre-war conditions Belgium consumed from 700,000 to 800,000 ties annually, 100,000 of which were secured in the country. For the next two or three years it is to be expected that the annual consumption of ties will amount to little under 1,000,000, as much tie renewal is becoming necessary on the state railroads. The internal production can not help to balance this increased consumption, as the Belgian forest reserves in oak are limited and have been drawn on to the limit since the armistice. The severest competition will be encountered from France, which now furnishes most of the oak ties imported by Belgium. Poland also ships small quantities to this country. Exact figures are not available on tie imports, as Belgian trade statistics do not consider railway ties separately.

White oak is practically the only kind of railway tie now accepted by the Belgian state railroads, the one exception being German deliveries of beech and pine ties (the latter in very small quantities), in accordance with the Versailles treaty. The annual consumption of ties is limited by Belgian facilities for creosoting. Government and private creosoting installations combined can not handle more than 1,000,000 ties yearly. The state railroads formerly employed oak, beech, southern yellow pine, and jarrah (Australian), but at present only white-oak ties are being accepted. The standard Belgian dimensions for ties are: Half round, 2.60 meters long, 0.28 meter wide, 0.14 meter thick; and squared, 2.60 meters long, 0.26 meter wide, 0.13 to 0.14 meter thick. [A rough sketch showing other dimensions (French standards) which are accepted by the Belgian Railroad Administration may be obtained from the Lumber Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C.]

American exporters can deal directly with the Belgian government, but for large orders, especially when the American exporter wishes to obtain an entire or the greater part of a tender, it is better to go through a Belgian house. The government pays within 30 days after receipt of merchandise. In case of delay after this period, the furnisher can claim interest on the amount of money involved.

Further Consolidations in England

The directors of the London & North Western and Midland Railway companies have, subject to the approval of the stockholders of the two companies, entered into a provisional agreement under which the two companies will be amalgamated as from January 1, 1923, into a new company, the name of which will be subsequently decided upon, according to Modern Transport (London). During the current year, the two companies will continue under separate management, but will work in the closest co-operation with a view to economy, and with the object of facilitating the complete amalgamation as from the date named. The provisional agreement will be carried out by a preliminary scheme of amalgamation as provided in the Railways Act.

The terms on which the several stocks of the two companies will be exchanged for stocks in the new company are as follows:

1. The debenture, guaranteed and preference stocks of the two companies existing at the date of amalgamation shall be converted *pari passu* into similar stocks of the new company, such amount to be issued as will give the stockholders the same income as they receive at present.
2. The preferred ordinary stock of the Midland Company shall be converted into a new preference stock to be known as the 1923 preference stock of the new company, such amount to be issued as will give the holders of the Midland stock the same income as they receive at present.
3. Ordinary stock of the new company to be issued in exchange for the existing Midland preferred ordinary stock at the rate of £68 for each £100 Midland preferred stock.
4. Ordinary stock of the new company to be issued in exchange for the existing London & North Western ordinary stock at the rate of £100 for each £100 London & North Western stock.

It is proposed that the new board shall consist of twelve directors of the London & North Western and eight of the Midland. Meetings of the proprietors and debenture stockholders will be summoned at a later date, when the proposed scheme will be submitted for their approval.

It will be remembered by readers of these columns that the Lancashire & Yorkshire was amalgamated with the L. & N. W. on January 1 of this year.

Equipment and Supplies

Locomotives

THE PEORIA & PUDEX UNION is asking for prices on 6, 6-wheel switching locomotives.

THE MISSOURI & NORTH ARKANSAS will spend approximately \$185,000 for repairs to its locomotives.

THE PATAGONIAN RAILWAY has ordered 25 Mikado type locomotives from the Baldwin Locomotive Works.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of April 22 as inquiring for 20 Pacific type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

THE NORFOLK SOUTHERN, reported in the *Railway Age* of April 15 as contemplating buying 5 locomotives, is asking for bids until 12 o'clock noon, May 10, at Norfolk, Va., for 5 consolidation type locomotives.

THE SOCARANA RAILWAY (Brazil) has ordered 10 Mikado type locomotives from the American Locomotive Company. These locomotives will have 19 in. by 20 in. cylinders and a total weight in working order of 129,000 lb.

THE MORGANA RAILWAY (Brazil) has ordered one Pacific type locomotive from the American Locomotive Company. This locomotive will have 17½ in. by 20 in. cylinders and a total weight in working order of 113,000 lb.

THE BOSTON & MAINE has ordered 2 switching locomotives from the American Locomotive Company. This is in addition to the order for 2 Mallet type and 20 switching locomotives reported in the *Railway Age* of April 22.

THE WAYNE COAL COMPANY, Pittsburgh, Pa., has ordered two 4-wheel switching locomotives from the American Locomotive Company. These locomotives will have 11 in. by 16 in. cylinders and a total weight in working order of 43,000 lb.

THE BUFFALO SLAG COMPANY, Buffalo, N. Y., has ordered one 4-wheel switching locomotive from the American Locomotive Company. This locomotive will have 16 in. by 24 in. cylinders and a total weight in working order of 99,000 lb.

THE STANDARD SLAG COMPANY, Youngstown, Ohio, has ordered one 4-wheel switching locomotive from the American Locomotive Company. This locomotive will have 16 in. by 24 in. cylinders and a total weight in working order of 99,000 lb.

THE NEW YORK, NEW HAVEN & HARTFORD, reported in the *Railway Age* of April 22 as having ordered 15, 0-8-0 type locomotives from the American Locomotive Company, has ordered 5 additional 0-8-0 type locomotives from the same company. These locomotives will be used in the joint service of the Central New England and the New Haven.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of April 22 as inquiring for 20 Mikado type locomotives, 20, 6-wheel switching locomotives and 10 Pacific type locomotives has ordered this equipment from the American Locomotive Company. The Mikado locomotives will have 27 in. by 32 in. cylinders and a total weight in working order of 304,000 lb. The switching locomotives will have 21 in. by 28 in. cylinders and a total weight in working order of 171,000 lb. The Pacific locomotives will have 25 in. by 28 in. cylinders and a total weight in working order of 209,000 lb. All these locomotives will be equipped with six axles.

Freight Cars

THE SOUTHERN SOUTHERN is inquiring for 30 70-ton open-top 7000 M-class freight cars and inquiring for 2,000 automobile cars.

THE BURLINGTON (in Chicago) is inquiring for 450 gondola cars.

THE UNITED VERDE COPPER Co., Jerome, Ariz., is inquiring for 24 ore cars.

THE ERIE contemplates having repairs made to a large number of freight cars.

THE ELGIN, JOilet & EASTERN is inquiring for steel reinforcements for 80 gondola cars.

THE PENNSYLVANIA ENGINEERING WORKS, Newcastle, Pa., is inquiring for 8 pairs of arch bar trucks.

THE EMPIRE REFINERIES, INC. have awarded a contract to the North American Car Company for repairs to 600 steel tank cars.

THE MISSOURI & NORTH ARKANSAS will spend \$277,600 on either, or both, new equipment and repairs to the old.

THE NORTHERN PACIFIC will purchase 1,000 box cars, 250 convertible work and coal cars, 250 steel coal cars, and 250 stock cars.

THE ATLANTIC COAST LINE reported in the *Railway Age* of April 22, as inquiring for 750 single-sheathed box cars, is now inquiring for 700 box cars of 40 tons' capacity.

THE NEW YORK CENTRAL will have 1,000 refrigerator cars of 35 tons' capacity for its own lines and 500 for the Michigan Central built in the shops of the Merchants Despatch at East Rochester, N. Y. Mention was made in the *Railway Age* of April 8 that these cars would be built by the Merchants Despatch.

Passenger Cars

THE NORTHERN PACIFIC will purchase 70 passenger refrigerator cars.

THE MISSOURI & NORTH ARKANSAS will spend \$22,000 on its passenger equipment.

THE FRANKFORD ELEVATED RAILWAY, Philadelphia, Pa., is asking for bids until 12 o'clock noon, May 25, for 50 steel passenger cars.

THE NORFOLK & WESTERN reported in the *Railway Age* of March 11 as inquiring for 7 dining cars, has ordered this equipment from the Pullman Company.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of April 22 as contemplating buying a number of cars for passenger service, is now asking for 20 all-steel express cars 70 ft. long, and 10 all-steel coaches 74 ft. long.

THE INTERBORO RAPID TRANSIT Co. has been directed by the Transit Commission, New York, to buy 350 new subway cars. The order calls for the purchase of 100 cars at once, for 50 cars on Aug. 1, and for 200 cars within 6 months after approval of contracts for necessary storage yard.

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of March 25 as inquiring for 63 cars for passenger service, has ordered 22 undivided coaches, 8 divided coaches, 8 combination passenger and baggage, 5 express with automobile doors and 20 straight express cars, from the Pressed Steel Car Company.

Iron and Steel

THE KANSAS CITY SOUTHERN has ordered 6,000 tons of rail from the Illinois Steel Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has ordered 3,000 cars of rail from the Illinois Steel Company.

THE SOUTHERN SAN FRANCISCO has placed an order with the Wisconsin Bridge Company for four deck girder spans totaling 123 tons of structural steel.

THE LEHIGH VALLEY is reported as having ordered about 400 tons of bridge steel from the American Bridge Company, about 800 tons from the Phoenix Bridge Company, and 500 tons from the Bethlehem Steel Bridge Company, for use at various places on its lines.

THE IMPERIAL GOVERNMENT RAILWAYS of Japan, reported in the *Railway Age* of April 29, as inquiring for 10,000 tons of 75-lb. rail and a small quantity of splice bars, has ordered, through Mitsubishi Shoji Kaisha, Ltd., New York City, 10,000 tons of 75-lb. rail and 830 tons of splice bars from the United States Steel Products Company

Supply Trade News

Track Specialties

THE CHESAPEAKE & OHIO is reported to have ordered 2,200 tons of tie plates.

THE NORTHERN PACIFIC has ordered 2,400 continuous insulated joints from the Rail Joint Company.

THE CHICAGO & NORTH WESTERN is reported to have ordered 8,000 to 10,000 kegs of bolts and spikes.

THE PERE MARQUETTE has ordered 5,000 "100-per cent" joints from the Rail Joint Company for 85-lb. rails.

THE MICHIGAN CENTRAL has placed an order with the Rail Joint Company for 10,000 "100-per cent" joints for 100-lb. rails.

Machinery and Tools

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for a five-foot radial drill.

THE WESTERN MARYLAND is inquiring for a number of machine tools including lathes and punches.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for a 44-in. vertical boring mill, and a 36-in. lathe.

THE PENNSYLVANIA RAILROAD is inquiring for a number of tools for repair work, including hydraulic riveters.

THE GULF & SHIP ISLAND is reported to have ordered a number of machine tools, including a driving wheel lathe, wheel press, radial drill and a car wheel borer.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a car wheel lathe, a 6-ft. radial drill, a single-end angle-iron shears, a single-end punch and shear, a 20-ft. plate bending roll, two single-end punches, a double-end punch and shear, a splitting shear, and an angle-iron bending roll.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, May 16, for its requirements of steel bars, steel shapes, steel plates and track materials.

THE CHICAGO & NORTH WESTERN will accept bids until May 6, for requirements for the year ending March 31, 1923, of incandescent electric lamps of the following types: carbon filament; tungsten filament-vacuum; tungsten filament-gas filled; and miniature.



On the Wheeling & Lake Erie

R. S. Wensley has been elected a vice-president of the G. M. Basford Company, New York.

Daniel M. Brady has removed his office from 95 Liberty street to 90 West street, New York City.

The Allen-Bradley Company, Milwaukee, Wis., has established a branch office in 1318 Chemical building, St. Louis, Mo.

A. H. Hudson has been appointed district manager of the railroad division, Service Motor Truck Company, with eastern headquarters.

The Sharon Pressed Steel Company has removed its office from 66 Broadway to its new warehouse at 47 West Broadway, New York City.

The Chicago-Cleveland Car Roofing Company has moved its general offices from the Railway Exchange building, Chicago, to the Kimball building.

A. G. Shaver, chief engineer of the Regan Safety Devices Company, New York, with headquarters at Chicago, has resigned effective May 1.

Howard Yeomans has been elected president of the Bishop & Babcock Company, Cleveland, Ohio, succeeding E. S. Griffiths, who has resigned due to ill health. F. R. Pleasanton has been elected vice-president and general manager.

W. T. Tyler, formerly director of the Division of Operation of the Railroad Administration and more recently vice-president of the Northern Pacific, has been appointed director, vice-president and general manager of the National Safety Appliance Company, San Francisco. Mr. Tyler will be located in Chicago with temporary offices in the People's Gas building. A photograph and biographical sketch of Mr. Tyler were published in the *Railway Age* in the issue of February 13, 1920.

The Walsh Tie Company has just completed a new timber treating plant at Gilkey, near Minneapolis, Minn., a description of which appears in this week's *Railway Age*. P. R. Walsh, St. Louis, Mo., is president of this company; J. C. Kirkpatrick, Escanaba, Mich., vice-president; and H. S. Gilkey, Minneapolis, secretary and treasurer. A. Meyer, formerly superintendent of the Chicago, Burlington & Quincy's lumber treating plant at Galesburg, Ill., is superintendent of the tie and post plants, F. G. Moore is assistant superintendent of these plants, and L. A. Furlong is superintendent of the pole treating plant.

E. A. Langenbach was elected president of the Alloy Steel Corporation, Canton, Ohio, at the annual meeting held on April 18, succeeding H. R. Jones, resigned; Mr. Langenbach also being re-elected chairman of the board of directors. John McConnell, who recently returned to the company, and Elton Hoyt, of Pickands, Mather & Co., Cleveland, Ohio, were elected directors, succeeding E. L. Hang and J. A. Buell, while George H. Clark was elected vice-president and general manager, and C. W. Kreig, vice-president, secretary and treasurer, succeeding Mr. Hang as treasurer. Mr. McConnell was elected vice-president in charge of operations at the meeting.

Obituary

William A. Greaves, a retired machine tool manufacturer, Cincinnati, Ohio, died in that city on April 18. He was the organizer of Greaves-Klusman & Co., lathe manufacturers.

William S. Reid, manager of the railroad department of the Minneapolis, Minn., branch of the Dearborn Chemical Company, Chicago, died at St. Barnabas hospital, Minneapolis, on April 25, from the effects of blood poisoning.

Railway Construction

CANADIAN PACIFIC.—This company has obtained appropriations of \$331,000 and \$410,000, respectively, from the province of Alberta to construct a 13-mile extension of the Peace river branch and a 15-mile extension of the Grand Prairie branch of the Edmonton, Dunvegan & British Columbia, a line which it now operates under a five-year agreement with the Province of Alberta. Negotiations are being made at the present time for the proposed extension and it is expected that an agreement will be reached permitting the undertaking of this work in the near future.

CHICAGO & NORTH WESTERN.—This company, which was noted in the *Railway Age* of April 15, and April 22, as receiving bids for the construction of a 450-ton coaling station and ash handling facilities in Chicago, to cost \$100,000, has awarded a contract for this work to the Roberts & Schaefer Company, Chicago.

CHICAGO & NORTH WESTERN.—This company has awarded a contract to the White Construction Company, Milwaukee, Wis., for the construction of two subways in connection with track depression work in that city, the cost of which will approximate \$60,000.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded contracts to the Ogle Construction Company, Chicago, for the construction of a 150-ton coaling station at Bridgeport, Neb., and for the construction of 100-ton coaling stations at Fairmont, Neb., and Benkleman.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has resumed work on its Chicago and Evanston division track elevation between Irving Park boulevard and Howard street and contemplates finishing the balance of the program comprising the construction of a fourth track with necessary bridge slabs and seven stations to cost \$700,000.

DODGE CITY & CIMARRON.—This company, which was reported in the *Railway Age* of February 11 as applying to the Inter-state Commerce Commission for authority to construct a 56-mile extension to its line from Satanta, Kan., through Haskell, Grant and Stanton counties, has obtained this authority and awarded the contract for the work to the Scott, White Company, St. Louis, Mo., which is now undertaking this work.

GULF, COLORADO & SANTA FE.—This company has awarded a contract to H. D. McCoy, Cleburne, Tex., for the construction of a freight station at Brenham, Tex., to consist of a two-story head house, 32 by 36 ft., and a 32 by 80-ft. warehouse, together with covered and uncovered platforms.

GULF & SHIP ISLAND.—This company is now building with company forces at Gulfport, Miss., an all-steel combined engine house, boiler shop and blacksmith shop and a masonry and steel machine shop, together with cinder handling facilities and new track, the construction of which will involve an expenditure of \$250,000.

ILLINOIS CENTRAL.—This company, which was reported in the *Railway Age* of July 16, 1921, as having closed bids for the construction of a 20,000 gal. per hour capacity pumping station at Ramsey, Ill., and which decided later to postpone the work, has awarded the contract to Joseph E. Nelson & Sons, Chicago.

ILLINOIS CENTRAL.—This company will close bids early in May for the construction of a \$75,000 brick freight station at Baton Rouge, La.

KETTLE VALLEY.—This company has now under way the construction of approximately 17 miles of line from Okanagan Falls to Oliver, in the southern district of British Columbia. This work constitutes the third link of a rail and lake system to connect the town of Pentton with irrigated land which the provincial government of British Columbia has prepared for settlement by ex-soldiers. The work is being performed by A. E. Griffin & Company Vancouver, B. C.

LACOMBE & NORTHWESTERN.—This railroad, which was acquired by the Province of Alberta, Canada, a few years ago, will be extended this season for a distance of about twelve miles. A sum of \$265,000 has been authorized for the purpose and all work will be carried out by contract, bids for which will be called in the near future.

LEHIGH & NEW ENGLAND.—This company has awarded a contract to F. H. Clement & Company for labor and materials for concrete masonry required for four bridge replacements in the state of New York and two in New Jersey and for the temporary support of tracks during construction. The estimated cost of this work is \$58,000.

LOS ANGELES & SALT LAKE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a branch from Delta to Fillmore, Utah, 35 miles.

MICHIGAN CENTRAL.—This company, which was reported in the *Railway Age* of March 25 as having closed bids for the construction of a \$35,000 brick passenger station at Hastings, Mich., has awarded a contract to the Ehle Construction Company for this work.

MISSOURI PACIFIC.—This company, which was reported in the *Railway Age* of April 1 as receiving bids for the replacing of 10 wooden trestles with concrete structures and earth embankments near Aurora, Mo., has awarded contracts for this work to Jerome Moss, Chicago; Roach & Stansel, Memphis, Tenn.; and Walter Denison, Cushman, Ark., who will handle the work jointly.

MISSOURI & NORTH ARKANSAS.—This company has appropriated \$750,000 of a \$3,500,000 loan recently secured from the government for placing its property in normal condition. Of this amount, it is estimated that approximately \$9,000 will be expended for renewals of water stations and \$82,000 for bridge renewals. The major portion, if not all of this work, is to be done by company forces.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company is undertaking with company forces the construction of two bridges over the Harpeth river, each bridge to consist of three 96-ft. deck plate girders, with crossoted timber ballast decks supported on concrete piers and abutments, which work will cost approximately \$160,000. The contract for the steel work was let to the American Bridge Company.

NEW YORK CENTRAL.—This company has awarded a contract to the Walsh Construction Company, Davenport, Iowa, for the Garrison tunnel improvement work near Garrison, N. Y. The estimated cost is about \$500,000 and will consist of the excavation for an open cut in rock for two tracks to the east of the existing tracks and on line for a permanent four-track development.

NORTHERN PACIFIC.—This company has awarded a contract to Grant Smith & Co., St. Paul, Minn., for a new bridge over the Mississippi river at Minneapolis, Minn., to cost \$400,000 and has awarded a contract to the Campbell Construction Company, St. Paul, Minn., for a permanent bridge at Maryland street, St. Paul, to cost approximately \$60,000, and has closed bids on construction work on dock No. 6, Duluth, Minn., to cost \$77,000.

OKLAHOMA NORTHERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line from Vinita, Okla., to Coffeyville, Kans., 42 miles.

PENNSYLVANIA.—This company will this summer build an addition to its concrete, fireproof grain elevator at Baltimore, Md., to take care of an additional 1,300,000 bu. of grain.

SOUTHERN PACIFIC.—This company has entered into an agreement with the city of Houston, Tex., for the construction of a subway in that city, the contract for which has been awarded to Walling-Haralson & Adams Company, Houston, Tex.

WESTERN PACIFIC.—This company has placed an order with the McClintock-Mitchell Company for structural steel for one 210-ft. through riveted electrically operated draw span, one 100-ft. through plate girder, and one 80 ft. through-plate girder for the renewal of a bridge crossing the San Joaquin river near Stockton, Cal., this work to be undertaken by company forces during the latter part of July.

Railway Financial News

CHESAPEAKE & OHIO.—Asks Authority for Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to issue \$7,635,000 of 5½ per cent, 15-year equipment trust certificates which have been sold to Kuhn, Loeb & Co., at 98.

CHICAGO & ALTON.—New Directors.—E. M. Richards connected with the Boston office of Hayden, Stone & Co., and Samuel W. Moore, general counsel for the Kansas City Southern, have been elected directors of the Chicago & Alton to succeed Charles Hayden and M. L. Bell, chairman of the board and vice-president, respectively, of the Chicago, Rock Island & Pacific. The latter resigned in compliance with the decision of the Interstate Commerce Commission that the Rock Island and the Chicago & Alton are competing roads.

CHICAGO & EASTERN ILLINOIS.—New Director.—Will H. Hays, former postmaster general, has been elected a director.

CHICAGO, MILWAUKEE & ST. PAUL.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Railway operating revenues.....	\$146,765,766	\$141,643,202
Railway operating expenses.....	127,957,002	134,087,532
Net railway operating revenue.....	18,808,764	7,555,670
Railway operating income.....	9,763,129	*3,372,519
Non-operating income.....	4,371,858	29,755,776
Gross income.....	14,134,987	31,128,295
Interest on funded debt.....	18,767,681	17,593,581
Total deductions from gross income.....	25,205,596	26,762,224
Net income.....	Def. 11,070,609	4,366,071

*March 1 to Dec. 31, inclusive.

CLEVELAND UNION TERMINALS COMPANY.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue and sell 100 shares of capital stock to the owning companies and \$12,000,000 of first mortgage 5½ per cent, 50-year sinking fund gold bonds guaranteed by the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis and the New York, Chicago & St. Louis, and the proceeds to be used to pay for real estate acquired and to be acquired and for construction work on the proposed passenger terminal.

DULUTH, SOUTH SHORE & ATLANTIC.—Annual Report.—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920*
Total operating revenues.....	\$4,452,424	\$5,142,519
Total operating expenses.....	4,601,855	4,606,212
Net operating revenue.....	Def. 149,431	536,307
Railway tax accruals.....	352,895	250,435
Operating income.....	Def. 502,768	285,865
Total non-operating income.....	47,378	792,023
Gross income.....	Def. 455,190	478,023
Interest on funded debt.....	873,755	876,770
Total deductions from gross income.....	1,127,662	1,111,706
Net loss.....	1,582,852	329,683

*Operating revenues and expenses, March 1 to Dec. 31.

The principal statement of revenues and expenses and the principal traffic statistics for the year ended December 31, 1921, follow:

OPERATING REVENUES		
	1921	1920
Freight.....	\$2,722,401	\$3,576,909
Passenger.....	1,161,074	1,369,903
Total, including other.....	\$4,464,863	\$5,949,891
OPERATING EXPENSES		
	1921	1920
Maintenance of way and structures.....	\$866,807	\$1,153,841
Maintenance of equipment.....	970,809	1,063,839
Traffic.....	80,128	65,572
Transportation.....	2,420,943	3,076,865
General.....	147,831	151,078
Total, including other.....	\$4,365,202	\$5,998,701
Net operating revenue.....	Def. \$100,339	\$31,189
Taxes accrued.....	357,084	356,028
Operating income.....	Def. 457,869	Def. 5,275
PASSENGER TRAFFIC		
	1921	1920
Number of passengers carried earning revenue.....	730,974	908,473
Number of passengers carried one mile.....	33,881,290	46,641,206
Average distance carried, miles.....	46.35	51.34
Average receipts per passenger per mile.....	\$0.343	\$0.294

FREIGHT TRAFFIC

Number of revenue tons carried.....	2,092,935	3,755,912
Number of tons carried one mile.....	201,427,248	355,596,169
Average distance haul of one ton, miles.....	96.24	94.68
Average receipts per haul per mile.....	\$0.142	\$0.113

GULF COAST LINES.—Annual Report.—The annual report of the New Orleans, Texas & Mexico issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Operating revenues.....	\$11,090,101	\$13,435,246
Operating expenses.....	8,215,473	11,141,034
Net from railway operations.....	2,874,628	2,294,212
Railway tax accruals.....	326,094	378,875
Railway operating income.....	2,448,249	1,911,251
Net railway operating income.....	2,141,708	1,008,431
Total non-operating income.....	861,946	891,190
Gross income.....	3,003,655	1,899,621
Interest on funded debt.....	1,114,390	1,060,582
Total deductions from gross income.....	1,190,387	1,161,571
Net income.....	1,813,268	738,050
Dividend appropriations of income (dividend on capital stock).....	890,848	297,370
Income appropriated for investment in physical property.....	323,107	694,210
Balance transferred to profit and loss.....	599,312	Def. 253,531

ILLINOIS CENTRAL.—To Issue Stock.—The directors have authorized the issuance of \$10,929,600 6 per cent convertible preferred stock, subject to the approval of the Interstate Commerce Commission. It will be offered for subscription at par to stockholders of record at the close of business May 16 to the amount of 10 per cent of the common stock registered in their name as of that date, and fractions of shares in like proportion.

One-third of the outstanding common stock of the Illinois Central is owned by the Union Pacific and that road has agreed to take its proportion of the new issue. The remainder will be underwritten by Kuhn, Loeb & Co. Payment for the stock will be required before June 26, 1922.

This issue by the Illinois Central is part of the \$50,000,000 issue authorized by stockholders at the annual meeting held on April 19. It is preferred both as to dividends and to assets and is entitled to receive non-cumulative dividends at the rate of 6 per cent a year from June 26, 1922, payable semi-annually, on March 1 and September 1. The stock will be convertible into common stock at the holder's option after September 1 next, share for share, and will be subject to redemption as a whole on any semi-annual dividend date after September 1, 1927, on 60 days' notice at a premium of 15 per cent and accrued dividends. Stock called for redemption shall continue to be convertible up to 30 days prior to the redemption date.

Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Maintenance Reserve Items Hurt I. C.'s 1921 Showing." See also excerpts from annual report on adjacent pages.

LAKE ERIE & WESTERN.—Van Sweringen Interests Buy Control.—The New York Central has sold its majority interest in the Lake Erie & Western to the Van Sweringen interests of Cleveland for \$3,000,000. Albert H. Harris, vice-president of the New York Central, stated that \$35 a share, or \$2,075,500, was received for its 59,300 shares of preferred stock. The balance of \$924,500 is at the rate of \$15.57 a share for the 59,400 shares of common.

The Lake Erie & Western had an operating mileage on December 31, 1920, of 738 miles. Its main line runs from Sandusky, Ohio, to Peoria, Ill.

The Van Sweringen interests last March purchased the control of the Toledo, St. Louis & Western. These interests also control the New York, Chicago & St. Louis. See editorial in this issue entitled "The Van Sweringen Group."

MATTAWAMKEAG & EASTERN.—Asks Authority to Issue Securities.—This company, which proposes to build a line in Maine as an extension of the proposed line of the Eastern Maine, has filed application with the Interstate Commerce Commission for authority to issue \$80,000 of stock and \$500,000 of 30-year 7 per cent gold bonds.

MISSOURI PACIFIC.—To Pay Bonds.—This company has announced that in accordance with the terms of the mortgage securing its first and refunding 5 per cent bonds, all of the Series B bonds under that mortgage will be paid on August 1, next. Payments will be made at the Guaranty Trust Company, New York City.

NEW ORLEANS, TEXAS & MEXICO.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to procure authentication and delivery to its treasurer of \$457,400 of first mortgage bonds and to issue \$991,100 of such bonds to be sold at not less than 98 or to be pledged as security.

NEW YORK, LAKE ERIE & WESTERN.—Authorized to Extend Bonds.—The Interstate Commerce Commission has approved a

joint application of this company and the Erie for an order authorizing the extension of the date of maturity of \$3,000,000 of first mortgage bonds of the New York, Lake Erie & Western from May 1, 1922, to May 1, 1942, and to reduce the interest rate from 6 to 5½ per cent. The Erie is authorized to assume liability as a guarantor in respect of the bonds.

PERE MARQUETTE.—Annual Report.—The annual report issued this week shows a corporate income account for the year ended December 31, 1921, as follows:

	1911	1920
Operating revenues	\$38,303,029	\$35,032,787
Operating expenses	30,036,300	30,350,542
Net operating revenue	8,266,729	4,672,245
Non operating income	690,654	1,761,120
Gross income	8,957,383	6,433,365
Taxes	1,408,481	768,407
Interest on bonds	1,987,754	1,687,760
Total deductions	5,191,502	5,039,392
Surplus	3,765,880	1,393,973

*Operating revenues and expenses, March 1 to December 31.

RAPID CITY, BLACK HILLS & WESTERN.—Six Months' Guaranty Certified.—The Interstate Commerce Commission has certified the amount of this company's guaranty for 1920 as \$23,685, of which \$8,685 was still to be paid.

SAN ANTONIO & ARANSAS PASS.—Bonds Offered.—P. W. Chapman & Co., New York, are offering a block of first mortgage 4 per cent bonds, dated December 20, 1892, and due on January 1, 1943, to yield more than 5.70 per cent. They are non-callable and their principal and interest are guaranteed by the Southern Pacific Company's indorsement.

ST. LOUIS-SAN FRANCISCO.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Frisco Improves Financial and Physical Condition." See also excerpts from annual report on adjacent pages.

Bonds Offered.—A syndicate composed of Lee, Higginson & Co., Guaranty Company of New York, Speyer & Co., and J. & W. Seligman & Co., are offering a new issue of \$6,932,000 St. Louis-San Francisco Railway Company prior lien mortgage 5½ per cent gold bonds, series D. The bonds are dated January 1, 1922, due January 1, 1942, and are offered at 95, to yield 5.95 per cent.

These bonds are part of an issue of \$10,932,000, authorized by the Interstate Commerce Commission, in substitution for an equal amount of 6 per cent bonds now in its treasury. The remainder are to be pledged and repledged from time to time as collateral security for short-term notes.

VIRGINIA RAILWAY.—New Director.—James H. Perkins, president of the Farmers' Loan & Trust Company of New York, has been elected a director.

WESTERN MARYLAND.—Annual Report.—The corporate income account for the year ended December 31, 1921, compares as follows:

	1911	1920
Operating revenues	\$7,619,977	\$17,310,764
Operating expenses	11,820,664	16,863,404
Net operating revenue	3,799,308	447,360
Tax accruals	777,462	533,600
Total operating income	3,021,846	109,760
Gross income	8,142,828	11,363,247
Interest on funded debt	3,843,814	3,744,463
Total deductions	2,500,370	2,412,812
Net income	3,371,188	8,196,899
Dividends of 1921 paid to January 1, 1921	474,338	77,565
made by I. S. R. A.	54,204	10,830
Unpaid income balance	471,96	87,735

*Includes standard return for months of January and February 1920, less partial payments in amount of claim for guaranty.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements and has paid out to the several roads the following amounts:

Western	\$1,860,000
Intermountain & Great Northern	100,000
Rockford, Fredonia & Pomona	94,000
Rockford, Fredonia & Pomona Railroad Co.	100,000
Washington Southern Railway	100,000

Lexington Union Station	67,800
Wool River Branch	1

Tentative Valuations

The Interstate Commerce Commission has issued additional tentative valuations giving the final value as of the valuation dates, as follows:

	Owned	Used
Danville & Western	\$1,978,347	\$1,979,127
Lake Champlain & Moriah	853,020	.....
Augusta Southern	140,376	.....
Bay Point & Clayton	136,000	138,800
Troy Union	1,084,045	1,082,305
Elkin & Allegheny	335,046	335,080
North Western Coal Railway	775,000	.....
Tallulah Falls	1,808,832	1,808,954
Middletown & Unionville	389,847	.....
Hill City	301,104	343,104
Augusta Belt	55,000	.....
Williamson & Pond Creek	1,222,044	.....

Treasury Payments to Railroads

The treasury department announced on May 1 that since last announcement, dated April 1, payments under Sections 204, 209, 210 and 212 of the Transportation Act of 1920, as amended, have been made by the Treasury as follows:

Section 204:	
Elwood, Anderson & Lapelle	\$ 15,693.35
Kenwood & Eastern	8,764.96
Kenwood Greensburg & Southwestern	52,423.22
Ursina & North Fork	3,094.98
Section 209:	
Buffalo, Rochester & Pittsburgh	61,093.21
Deering Southwestern	3,623.67
Detroit, Bay City & Western	13,313.36
Gulf, Florida & Alabama, Receiver	6,684.92
Lake Erie & Western	140,918.65
Lufkin, Hemphill & Gulf	10,851.76
Rapid City, Black Hills & Western	8,685.30
The Ulster & Delaware	69,450.00
Western Allegheny	39,226.17
Section 210:	
Missouri & North Arkansas	3,500,000.00
The Seaboard-Bay Line	1,100,000.00
Section 212:	
International & Great Northern, Receiver	5,801.15
Total	\$5,561,833.70

The total payments to April 30, 1922, have been:

(a) Under Section 204, as amended by Section 212 for reimbursement of deficits during Federal Control:	
(1) Final payments, including partial payments previously made	\$13,344.33
(2) Partial payments to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	1,718,413.37
Total payments as reimbursement of deficits	3,747,418.50
(b) Under Section 209, as amended by Section 212, for guaranty in respect to railway operating income for first six months after Federal Control:	
(1) Final payments, including advances and partial payments previously made	\$ 612,321.17
(2) Advances to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	25,570,874.00
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above	164,510,485.27
Total payments account of and guaranty	433,168,776.37
(c) Under Section 210, for loans from the revolving fund of \$300,000,000 thereon repaid:	
.....	803,078,717.00
Total	\$7,309,646,583.87

Dividends Declared

Canadian Pacific—Common, 2½ per cent, quarterly, payable June 30 to holders of record June 1.
 Central Railroad of New Jersey—\$, quarterly, payable May 15 to holders of record May 10.
 Cleveland & Pittsburgh—Regular guaranteed, \$0.87½, quarterly, special guaranteed, \$1.50 quarterly both payable June 1 to holders of record May 10.
 Norfolk & Western—Common, 1 per cent, quarterly, payable June 19 to holders of record May 11.

Trend of Railway Stock and Bonds Prices

	Last	Last
	May 2	Week
Average price of 20 representative railway stocks	65.2	65.96
Average price of 20 representative railway bonds	86.58	86.62
		73.73

Annual Report

Illinois Central Railroad Company—Seventy-Second Annual Report

To the Stockholders of the Illinois Central Railroad Company:

The Board of Directors herewith submits the following report of the operations and affairs of your company for the year ended December 31, 1921. The number of miles of road operated as of December 31, 1920, was 4,799.40. There was a decrease in miles of road due to the construction of a new bridge in a new location over the Chicago River on the St. Charles Air Line and to the reconstruction of the South Chicago Branch at 67th Street, Chicago, of 0.03

The average number of miles of road operated during the year, and the number of miles operated December 31, 1921, was 4,799.37

INCOME

A summary of the income for the year ended December 31, 1921, as compared with the previous year is stated below.

	1921	1920	INCREASE— DECREASE+
Average Miles Operated During Year	4,799.37	4,799.44	— 0.07
Operating Revenues	\$141,127,065.71	\$121,804,579.25	+\$19,322,486.46
United States Government—Guaranty Period Claim		19,499,886.56	— 19,499,886.56
Rental from United States Railroad Administration		3,399,634.99	— 3,399,634.99
Total, Operating Revenues	141,127,065.71	144,704,100.80	— 3,577,035.09
Operating Expenses	109,997,791.08	*121,991,985.37	— 11,994,194.29

Excess of Revenues over Expenses	31,129,274.63	22,712,115.43	+ 8,417,159.20
Taxes	8,119,035.43	7,172,261.96	+ 946,773.49
Uncollectible Railway Revenues	24,318.81	23,319.80	+ 999.01

Operating Income	22,985,920.37	15,516,533.67	+ 7,469,386.70
Equipment Rents—Net Credit	1,614,026.69	3,196,849.02	— 1,582,822.33
Joint Facility Rents—Net Debit	203,177.54	191,297.36	+ 11,880.18

Net Operating Income	24,396,769.52	18,322,885.33	+ 5,874,684.19
Nonoperating Income	5,039,238.05	7,219,881.91	— 2,180,643.86

Gross Income	29,436,007.57	25,741,967.24	+ 3,694,040.33
Deductions from Gross Income	19,735,213.43	12,170,844.96	+ 7,564,368.47
Net Income	9,700,794.14	13,571,122.28	— 3,870,328.14

Disposition of Net Income: Income Applied to Sinking and Other Reserve Funds		118,200.00	— 118,200.00
Income Appropriated for Investment in Physical Property	44,519.31	18,080.85	+ 26,438.46
Total Appropriations of Income	44,519.31	136,380.85	— 91,761.54

Income Balance Transferred to Credit of Profit and Loss	9,656,274.83	13,434,841.43	— 3,778,566.60
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*Includes operating expenses, corporate, for the months of January and February, 1920, amounting to \$117,657.90, not assumed by the United States Railroad Administration, which was stated separately in the report for 1920.

During the current year your railroad was operated under corporate management, and the preceding year the property was under Federal control the first two months, under corporate management with a Federal guaranty the following six months, and under corporate management without guaranty the remaining four months. As a consequence the only items which are comparable are Net Operating Income and Deductions from Gross Income as during the first two months of 1920 when the properties were under Federal control all "Net Railway Operating Income" items were borne by the Government and your company received a rental which, in the income account, is shown opposite "Rental from United States Railroad Administration" and, therefore, the operating accounts comprising "Net Railway Operating Income" include the results for ten months only, while the figures for 1921 are the totals for the year.

To afford a proper comparison of operating results for the two years the figures have been prepared and will be found below a table headed "Transportation Operations," which for 1920 combines the Federal operations for the first two months of the year and the corporate operations for the balance of the year; and in which the charges to "Maintenance of Way and Structures" and "Maintenance of Equipment" in connection with a reserve for maintenance in 1920 and its cancellation in the year 1921 have been omitted, as explained below.

NONOPERATING INCOME

"Nonoperating Income" this year amounted to \$5,039,238.05 as against \$7,219,881.91 last year, a decrease of \$2,180,643.86. The decrease was due to a reduction of \$100,000.00 in dividends received on Madison Coal Corporation stock; to the nonreceipt this year of interest on Louisville, New Orleans & Texas Railway Company Second Mortgage Income Bonds, whereas in the previous year there was received from this source \$2,081,014.38; and to a decrease in other interest received from the Yazoo and Mississippi Valley Railroad Company of \$447,115.26. As against these decreases there was found to be due and included in this amount for 1921 \$113,270.44 for rental for the Federal control period not previously included in your company's income. There was an increase in other items entering into "Nonoperating Income" amounting to \$334,215.34, consisting largely of increases in interest on funds on deposit with bankers and others, miscellaneous rent income and minor miscellaneous income items.

DEDUCTIONS FROM GROSS INCOME

"Deductions from Gross Income" amounted to \$19,735,213.43, an increase of \$7,564,368.47 over the previous year. There was an increase of \$966,487.11 in "Interest on Funded Debt." This increase was due to the

inclusion of interest for an entire year on securities issued last year, in addition to interest for portions of the year on securities issued during the current year, less interest on equipment trust and other securities retired, as compared with a part year's interest on securities issued during 1920, a comparison of which may be made from Table 8 of this year's report and Table 9 of last year's report. "Interest on Unfunded Debt" decreased \$1,313,795.12. This decrease was due to including in this account for the previous year an adjustment in favor of the Director General of Railroads of interest accrued on open accounts, etc., estimated at \$809,496.39, and, in addition, including \$217,333.88 covering interest on loans principally from banks and trust companies, making a total of \$1,026,850.27. In the current year the adjustment of interest due the Government was found to have been over-estimated, and "Interest on Unfunded Debt" was credited \$406,902.00; and, as miscellaneous interest on loans from banks and trust companies was \$119,957.15, this resulted in a net credit to the account named of \$286,944.85.

"Miscellaneous Income Charges" increased \$7,788,082.72, of which \$6,854,541.96 was due to charging this account the amount named and crediting an amount shown on the general balance sheet, Table No. 5, "United States Government—Guaranty under Section 209 of Transportation Act, 1920," in reduction of your company's claim against the Government, made necessary by the cancellation of charges to "Maintenance of Way and Structures" and "Maintenance of Equipment" referred to under the head of "Railway Operating Expenses" below. In addition to the amount named, \$63,288.02 was due to an adjustment further reducing the deficit in "Net Railway Operating Income" for the guaranty period and \$370,252.74 to loss in operation of the Dubuque & Sioux City Railroad for the current year. Less minor miscellaneous adjustments.

TRANSPORTATION OPERATIONS

The results of transportation operations this year, compared with last year, referred to above, are as follows:

	1921	1920	INCREASE + DECREASE —
Freight (including bridge tolls and miscellaneous freight)	\$107,092,090.55	\$106,178,885.96	— \$913,204.59
Passenger (including bridge tolls and miscellaneous passenger)	24,740,350.62	27,041,377.53	— 2,300,927.11
Mail	2,505,671.37	3,976,419.71	— 1,470,748.34
Express	2,326,832.50	3,057,446.68	— 730,614.18
Other passenger train	864,517.13	864,654.58	+ 15,862.55
Other transportation	1,413,524.02	1,359,123.41	+ 54,400.61
Incidental and joint facility	2,676,079.52	2,666,465.74	+ 508,384.22
Total railway operating revenues	141,127,065.71	145,154,271.81	— 4,027,206.10

Railway operating expenses: Maintenance of way and structures	22,437,587.08	25,870,907.11	— 3,433,320.03
Maintenance of equipment	34,591,449.68	37,344,276.57	— 2,752,826.89
Traffic	1,887,711.35	1,848,463.91	+ 39,247.44
Transportation	53,603,439.42	65,017,065.61	— 11,413,626.19
Miscellaneous operations	1,009,049.13	1,217,729.61	— 208,680.48
General	3,679,022.93	3,560,290.35	+ 118,732.60
Transportation for investment—Cr.	Cr. 355,927.52	Cr. 177,219.28	— 178,707.29

Total railway operating expenses	116,852,333.04	134,181,513.88	— 17,329,180.84
Net revenue from railway operations	24,274,732.67	10,922,757.93	— 13,301,974.74
Railway tax accruals	8,119,035.43	8,183,911.96	— 64,876.53
Uncollectible railway revenues	24,318.81	31,179.51	— 6,860.70

Railway operating income	16,131,378.41	2,757,666.46	+ 13,373,711.95
Equipment rents—net credit	1,614,026.69	3,772,201.89	— 2,158,175.20
Joint facility rents—net debit	203,177.54	186,622.69	+ 16,554.85

Net railway operating income	17,542,227.56	6,343,245.66	— 11,198,981.90
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RAILWAY OPERATING REVENUES

"Railway Operating Revenues" amounted to \$141,127,065.71 this year as compared with \$145,154,271.81 last year, a decrease of \$4,027,206.10, or 2.77 per cent.

The increase of \$913,204.59, or .86 per cent, in "Freight Revenue" is due to the higher freight rates during the current year, largely offset by the decline in the volume of traffic handled as a result of the prevailing business conditions. The increase in business existing throughout the year. The revenue passengers carried one mile decreased 12,665,685, or 17.57 per cent. The decline in the volume of traffic was offset in part by increased rates which were in effect during the year as against only four months of the previous year, the average revenue per passenger per mile being 3.053 cents, an increase compared with last year of .203 cent, or 11.02 per cent. The decrease of \$1,470,748.34, or 36.99 per cent, in "Mail Revenue" is due principally to the inclusion in mail revenue for 1920 of \$1,711,715.58, which was a portion of the amount of back mail pay for the years 1916 to 1919, inclusive, of \$1,862.35, or 1.83 per cent, of the Interstate Commerce Commission in December, 1919; as against this amount there was included from the same source in the mail revenue for the current year \$248,418.64, resulting in a decrease in mail revenue from this source for the current year of \$1,463,292.94.

The decrease of \$2,300,927.11, or 8.51 per cent, in "Passenger Revenue" is due to the substantial falling off in passenger travel which was affected by the general decline in business existing throughout the year. The revenue passengers carried one mile decreased 12,665,685, or 17.57 per cent. The decline in the volume of traffic was offset in part by increased rates which were in effect during the year as against only four months of the previous year, the average revenue per passenger per mile being 3.053 cents, an increase compared with last year of .203 cent, or 11.02 per cent. The decrease of \$1,470,748.34, or 36.99 per cent, in "Mail Revenue" is due principally to the inclusion in mail revenue for 1920 of \$1,711,715.58, which was a portion of the amount of back mail pay for the years 1916 to 1919, inclusive, of \$1,862.35, or 1.83 per cent, of the Interstate Commerce Commission in December, 1919; as against this amount there was included from the same source in the mail revenue for the current year \$248,418.64, resulting in a decrease in mail revenue from this source for the current year of \$1,463,292.94.

The decrease of \$730,614.18, or 23.90 per cent, in "Express Revenue" is due in part to a smaller volume of express traffic handled, but more largely to the inadequate rates received for the transportation of express.

The increase of \$946,773.49, or 1.83 per cent, in "Other Passenger Train Revenue" is due to the higher rates in effect for transportation of milk

St. Louis-San Francisco Railway Company

TO THE STOCKHOLDERS

Your Directors submit herewith the annual report for the year ended December 31, 1921.

The average mileage operated during the year was 5,256.07 miles, an increase over the previous year of 3.39 miles, due to additional track laid between Tyronea, Ark., and Track 40.

RESULTS FOR THE YEAR

Operating Revenues were.....	\$86,292,584.22
Operating Expenses were.....	64,385,706.61
Net Operating Revenue was.....	\$21,906,877.61
Taxes were.....	3,672,703.08
Operating Income, Taxes deducted, was.....	\$18,234,174.53
Miscellaneous Income was.....	397,980.31
Rentals and Other Payments were.....	\$18,632,154.84
	1,237,326.16
Income for the year available for interest was.....	\$17,394,828.68
Interest on Fixed Charge Obligations was.....	9,665,878.62
Balance.....	\$7,728,950.06
Interest on Cumulative Adjustment Mortgage Bonds was.....	2,391,749.71
Balance.....	\$5,337,200.35
Interest on Income Mortgage Bonds was.....	2,111,520.50
Balance.....	\$3,225,680.35

In the report for the year ended December 31, 1920, you were advised of the status of the Company's negotiations with the United States Government looking to the settlement with the United States Railroad Administration of matters growing out of the operation of the property during Federal control and also with the Interstate Commerce Commission on account of claims filed by the Company, for itself and its affiliated and subsidiary Companies, under the guaranty provisions of Section 209 of the Transportation Act, 1920.

During the year final settlement of the account with the United States Railroad Administration was effected. This settlement embraces all of the System Lines parties to the Standard Form of Contract with the Director General of Railroads, as well as the Omaha, Aene & Pacific Railway Company and the Kansas City, Clinton and Springfield Railway Company. The account with the Director General was somewhat complicated, involving many entries of both debits and credits of varied character. However, a summary of the final settlement may be briefly stated as follows:

As the beginning of Federal control on January 1, 1918, the Director General took over current cash and collected outstanding accounts receivable of the Company, thus receiving funds of the Company amounting to.....	\$10,004,480.49
The Director General assumed all the Company's current obligations on said date, amounting to.....	13,975,624.15

The Company therefore owed the Director General, as a result of the foregoing cash transactions, a net balance of.....	\$3,971,143.66
Its amount on account of the operation of "Standard" return for the 26 months of Federal control: total \$29,537,987.24, of which the Director General paid \$26,229,569.32, leaving due.....	3,298,417.72

Net amount owed by Company to Director General.....	\$672,725.94
The Director General continued to prosecute the addition and betterment work in progress on Jan. 1, 1918, and the work done and paid for by the Director General amounted to.....	6,020,432.03

Amount owed by Company to Director General, not disputed by either party, except for certain improvement charges to which the Company objected.....	\$6,693,157.97
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Against which the Company set up claims, which were disputed in whole or in part by the Director General, amounting to \$7,123,212.28 for maintenance and \$6,897,493.15 for various items such as depreciation, property retired, etc., totalling \$14,020,705.43. The Director General allowed in respect of these claims \$7,243,157.97, offset in part by \$6,693,157.97 owed by the Company as above stated, and paid the balance of \$550,000 to the Company in cash.

Settlement has not yet been effected with the Interstate Commerce Commission of the claims filed by the Company under the guaranty provisions of Section 209 of the Transportation Act, 1920, as amended by Section 212 thereof, but a final claim has been prepared, which was filed with the Commission March 1, 1922.

SECURITIES ISSUED, SOLD OR PLEDGED

In the Annual Report for the year ended December 31, 1920, you were advised that the Company had issued at par to the Director General of Railroads \$14,029,500.00, principal amount, Equipment Notes, dated January 15, 1920, in payment of the cost, as tentatively certified, at the time of such issue, of the following equipment purchased from the United States Railroad Administration:

- 33 Light Mikado Locomotives,
- Light Switcher Locomotives,
- 3,500 Double Sheathed 40 Ton Box Cars,
- 1,000 Composite 50 Ton Gondola Cars.

During the year the Company issued to the Director General of Railroads an additional \$354,000 principal amount, Equipment Notes, dated January 15, 1921, bearing interest at the rate of six per cent per annum, payable semi-annually and maturing serially from January 15, 1921, to January 15, 1935, inclusive. These notes were issued at par in payment of the difference between the tentatively certified cost (\$14,029,500.00) of the equipment referred to, and the actual cost thereof as finally agreed upon.

During the year the Company issued to the Director General of Railroads Series C, were authenticated and delivered under the Prior Lien Mortgage, as follows:

Account Equipment Notes Retired.....	\$901,000
Account Additions and Betterments.....	5,785,500
Account Terminals and Terminal Facilities.....	13,500
Total.....	\$6,700,000

Prior Lien Mortgage Six Per Cent Bonds, Series C, in the face amount of \$2,664,000, were pledged during the year to secure temporary bank loans aggregating \$2,000,000, which since the close of the year have been paid off and the bonds returned to the Company's treasury. In addition to the above the Company held free in its treasury, at the close of the year, \$9,268,000 Prior Lien Mortgage Six Per Cent Bonds, Series C, as shown in the Condensed General Balance Sheet and included in the classification "Unadjusted debits."

Of the \$15,000,000 St. Louis and San Francisco Railroad Company Stock

Trust Certificates for The Kansas City, Fort Scott and Memphis Railway Company Preferred Stock, which in accordance with their terms, maturing October 1, 1921, holders of \$13,962,800 accepted the offer of exchange made under the plan of reorganization and received from the Reorganization Managers in accordance with the reorganization plan, \$10,472,100 of this Company's First Lien Mortgage Six Per Cent Bonds and \$3,490,700 of its Adjustment Mortgage 6% Bonds. \$34,300 par value of said Stock Trust Certificates have been exchanged for a like amount of the Preferred Stock of The Kansas City, Fort Scott and Memphis Railway Company.

EQUIPMENT

The Company during the year accounted for a total of 2,355 freight cars rebuilt, the appraised value of which as rebuilt is \$4,013,065.49. The reconditioning program during this period has been one of adjustment of a large number of cars which, as result of the neglect of repairs during Federal control, had either been standing idle, or been kept in service at a high current repair cost.

ADDITIONS AND BETTERMENTS

The amounts charged to Capital Account during the year for additional main track, described in detail under the head of "Double Track," other improvements of roadway and structures, shop buildings, etc., in the purchase of new equipment and for improvements to existing equipment, were as follows:

ROAD	
Widening cuts and fills.....	\$160,705.52
Ballasting.....	21,195.27
Rail and other track material.....	20,586,222.22
Bridges, trestles and culverts.....	75,257.28
Tunnels and subways.....	30,921.12
Elimination of grade crossings.....	441.49
Grade crossings and signals.....	518,886.22
Additional main track.....	674,835.18
Additional yard and industry tracks.....	8,590.50
Changes of grade and alignments.....	56,780.90
Roadway buildings.....	28,702.22
Fences.....	11,524.50
Freight and passenger stations.....	301,891.43
Shop buildings, engine houses, etc.....	114,218.26
Power plants, shop machinery and tools.....	589,811.52
Assessments for public improvements.....	100,300.65
Miscellaneous.....	36,577.15
EQUIPMENT	
New Equipment.....	12,329.42
Additional charges on new equipment purchased in prior years.....	503,432.26
Improvements to existing equipment.....	2,033,966.27
	\$5,019,293.19

DOUBLE TRACK

During the year the Company completed the construction of 27.51 miles of additional main track to provide double track in heavy traffic territory, including 1.57 miles between Eureka, Missouri, to Pacific, Missouri, 8.82 miles from Sleeper, Missouri, to Lebanon, Missouri; 1.37 miles from Monett, Missouri, to Globe, Missouri; 9.62 miles from Spring Hill, Kansas, to Olathe, Kansas; and 0.81 miles between Amory, Mississippi, and Abertole Junction, Mississippi. There is now in service a total of 93.03 miles of second main track.

MAINTENANCE

The property of the Company has not only been adequately maintained during the year, but, in fact, its physical condition has been materially improved. The extent of maintenance expenditures cannot always be accurately gauged by the mere money amount thereof. Several factors have contributed in 1921 to the ability of the Company to secure greater results from a given amount of money expended for maintenance. Wage rates were reduced as result of decision of the United States Railroad Labor Board, effective July 1, 1921. The price of some materials, of which there is a relatively large consumption in maintenance work, has receded from the peak which grew out of war conditions. The efficiency of labor has improved to such an extent as to offset the weakening morale and the generally disturbed conditions which were the aftermath of the war and Federal control have been gradually disappearing. This is particularly true with respect to labor employed in maintenance of equipment.

The excess of maintenance expenditures in 1920 over similar expenditures in 1921 was chargeable also, in a considerable measure, to the inclusion in the 1920 charges of large sums lapsing over from previous periods, which were incurred in connection with Additions and Betterments work during Federal control, the accounting for which had not been properly closed by the Director General's Management.

Elsewhere in the report there is set forth the extensive accomplishment in renewal and rehabilitation of rolling stock equipment during the year. The large expenditures made therefor and charged to Capital Account have had a direct effect in reducing the expenditures necessary for adequate maintenance.

INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1921

At the time of Reorganization, and the preparation of the Adjustment Mortgage and the Income Mortgage of the Company, the fiscal year for the making of the Annual Report to the Interstate Commerce Commission ended June 30. The same fiscal year was adopted in both the Adjustment Mortgage and the Income Mortgage.

This has since been changed by the Interstate Commerce Commission so that the period for making the Annual Reports is now the calendar year instead of the year ending June 30, and as a consequence the Annual Report filed with the Commission does not show income for the fiscal year ending June 30.

The following statement shows the income account for the fiscal year ended June 30, 1921, as certified by Messrs. Deloitte, Plender, Griffiths & Company, Certified Public Accountants.

Two months (July and August) Guaranteed under the Reorganization Standard Return on the Standard Return as finally certified by the Interstate Commerce Commission.....	\$2,340,676.90
Increased Compensation on account of equipment purchased and improvements, Additions and Betterments (Net) completed at March 1, 1920, and during Guaranty Period.....	229,104.61
Difference between Reorganization Standard Return taken into account and Standard Return as finally certified Jan. 1, 1918-Feb. 29, 1920.....	453,953.29
Net Operating Income, September 1, 1920: June 30, 1921.....	12,812,356.81

Railway Officers

Executive

George W. Lupton, whose promotion to assistant to the vice-president in charge of operation of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, effective April 1,



George W. Lupton

to succeed W. K. Etter, promoted, was announced in the *Railway Age* of April 8, was born in England, August 12, 1870. After attending a business college at Los Angeles, Cal., he entered railway service in 1887 as a telegraph operator on the Ohio & Mississippi (now the Baltimore & Ohio Southwestern). With which road he remained for four years as a telegraph operator and as an agent at various places on the St. Louis division. He entered the service of the Northern Pacific in 1891 as an operator and agent on the Yellowstone division. The following year he entered the employ of the Atchison, Topeka & Santa Fe where he worked consecutively as operator, station cashier and agent on the Los Angeles Division, stenographer in the treasury department on the same division, and agent and yardmaster on the Valley division until 1905. From that time until 1907 he was trainmaster on the Arizona and Albuquerque divisions, first at Barstow, Cal., and later at Winslow, Ariz. From 1907 to 1914, he was terminal agent at San Francisco and from 1914 to the date of his recent promotion, was superintendent of the terminal division, with headquarters at San Francisco.

William A. Colston, whose resignation as director of the Bureau of Finance of the Interstate Commerce Commission, and election as vice-president and general counsel of the



W. A. Colston

New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, effective May 1, was reported in the *Railway Age* of April 8, was born in Louisville, Ky., on November 3, 1873. He entered railway service July, 1891, as a mail messenger in the general office of the Louisville & Nashville at Louisville, Ky., and consecutively thereafter held various positions in the accounting department up to and including assistant controller in active charge of accounts and statistics. After the completion of law studies at the Jefferson School of Law (from which he was graduated in 1907, and in which he was afterwards an instructor in interstate commerce law) he was transferred to the law department as commerce attorney. He served in this capacity and later as a general solicitor until May 10, 1920, representing a continuous service with the Louisville & Nashville of 29

years, except for the period from 1898-1899, when he saw military service in Porto Rico as captain in the First Kentucky Infantry, U. S. Volunteers, and for the period from 1916 to 1919, during which he served first as colonel of the First Kentucky Infantry in Mexican border service and later as colonel commanding the 138th Field Artillery and the 63rd field artillery brigade in France. From May 10, 1920, until his election he was director of finance of the Interstate Commerce Commission.

Financial, Legal and Accounting

G. H. Nero has been appointed auditor in charge of all revenue, disbursement and general accounting matters of the New England Steamship Company, the Hartford & New York Transportation Company and the New Bedford, Martha's Vineyard & Nantucket Steamboat Company, with headquarters at New Haven, Conn.

J. J. Ward has been appointed assistant to the general auditor of the New York, New Haven & Hartford and the Central New England with jurisdictions over the general bookkeeping and statistical departments. **J. E. Baldwin** has been appointed auditor of disbursements and **H. V. Clemens** auditor of freight receipts. These changes were effective May 1 and the headquarters of all is New Haven, Conn.

J. H. Ambrose, treasurer of the Nashville, Chattanooga & St. Louis, whose retirement was reported in the *Railway Age* of April 22, was born at Wilton, England, January 22, 1850, and entered railway service in 1875 as a clerk in the superintendent's office of the Nashville, Chattanooga & St. Louis. After serving three years in this capacity he became secretary to the president, which position he occupied until 1880, when he was made chief clerk to the general manager. He served in this capacity and that of purchasing agent from 1880 to 1886. On March 17 of the latter year he was elected secretary and treasurer of the corporation, which position he occupied until his recent retirement, except from July 9, 1918, to January, 1920, during the period of federal control, when he was federal treasurer of the Nashville, Chattanooga & St. Louis, the Tennessee Central and the Birmingham & Northwestern. Mr. Ambrose will continue as a director and a member of the finance committee.

Operating

J. R. Folsom, chief dispatcher of the Erie at Marion, O., has been appointed acting trainmaster succeeding **C. P. Shaughnessy**, furloughed. **M. C. Murphy** has been appointed acting chief dispatcher succeeding Mr. Folsom.

Traffic

H. W. Bondurant has been appointed commercial agent of the Southern with headquarters at Nashville, Tenn., effective May 1.

John T. Stinson, director of agricultural development of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed agricultural and colonization agent, with the same headquarters, the office of director of agricultural development having been abolished.

Albert W. Noyes, whose promotion to assistant general passenger agent on the Chicago Great Western, with headquarters at Chicago, was reported in the *Railway Age* of April 15, was born at Lebanon, Conn., June 15, 1866, and entered railway service in 1885 as a telegraph operator for the New York, New Haven & Hartford. He continued in this position and as agent until 1888, when he entered the service of the St. Paul & Duluth in a similar capacity. After a year with the latter company he entered the service of the Chicago Great Western where he remained until 1892, first as agent operator and later as secretary to the general traffic manager, when he became assistant ticket agent of the Chicago Great Western at Des Moines, Iowa. A few years later he was promoted to traveling passenger agent on the same road and in 1907 became general traveling passenger agent in charge of

field offices, which position he held until his promotion on April 1, to assistant general passenger agent.

Mechanical

Robert Quayle, general superintendent of motive power and machinery of the Chicago & North Western, whose retirement effective May 1, after 54 years of service with this road, was reported in the *Railway Age* of April 29, page 1046, was born on the Isle of Man November 23, 1853, and entered railway service in 1868, as a machinist's apprentice on the Chicago & North Western in its Chicago Avenue shops. In 1872 he was transferred to the shops at Fortieth street, Chicago, where in October, 1877, he was promoted to assistant foreman. Three years later he was made foreman of the car and machine shops. On June 15, 1885, he was promoted to master mechanic with jurisdiction over all lines in Iowa. On April 1, 1891, he was promoted to general master mechanic of the Milwaukee, Lake Shore & Western, where he remained until December 1, 1894, when, following the absorption of this road by the Chicago & North Western, he was promoted to superintendent of motive power and machinery, with headquarters at Chicago. On November 1, 1913, he was promoted to general superintendent, motive power and car department and on March 1, 1920, he became general superintendent, motive power and machinery.



Robert Quayle

Harry T. Bentley, whose promotion to general superintendent of motive power and machinery of the Chicago & North Western, effective May 1, succeeding **Robert Quayle**, retired, was reported in the *Railway Age* of April 29, page 1046, was born in London, England, on June 4, 1862, and was educated at Dulwich College in that country. He entered railway service in 1877 as a machinist's apprentice on the London & Northwestern (England). After 10 years' service he became foreman of the enginehouse of the same road at Chester, England, where he remained until 1892, when he came to America and entered the service of the Chicago & North Western as a machinist in its Chicago shops. Shortly thereafter he was promoted to foreman in the shops at Boone, Iowa, and in 1895 he was transferred to Belle Plaine, Iowa, where he remained until 1898 when he became general foreman of the shops at Clinton, Iowa. Seven months later he was promoted to master mechanic of the Madison division and on December 30, 1899 he was transferred to the Iowa division. On August 31, 1902, he was promoted to assistant superintendent of motive power and machinery, with headquarters at Chicago and on October 31, 1913, he was promoted to superintendent of motive power and machinery, with the same headquarters, in which capacity he served until the time of his promotion to general



H. T. Bentley

superintendent, except for the period from February 2, 1918, to June 19, 1918, when he was assistant director of transportation of the United States Railroad Administration, in charge of mechanical matters, with headquarters at Washington, D. C., in which capacity he served as chairman of the committee organized to prepare plans and specifications for standard locomotives and cars. Mr. Bentley was president of the American Railway Master Mechanics' Association in 1911-1912; and president of the International Railway Fuel Association during the following year.

Elred Byron Hall, whose promotion to superintendent of motive power and machinery of the Chicago & North Western, effective May 1, succeeding **H. T. Bentley**, promoted, was reported in the *Railway Age* of April 29, page 1046, was born at Parkersburg, Iowa, December 31, 1870, and entered railway service on September 23, 1889, as an engine caretaker for the Chicago & North Western at Eagle Grove, Iowa. He served in that capacity and later as a machinist's helper until 1892, when he became a shopman at Hawarden, Iowa, where he served until 1898, when he became a locomotive fireman. After nine years' service as a locomotive fireman and three years' service as a locomotive engineer on the Sioux City and the Northern Iowa divisions he became road foreman of engines of the Sioux City division, in which capacity he continued until 1912, when he was promoted to master mechanic of the Wisconsin division, being transferred to the Sioux City and Northern Iowa divisions in 1914. In 1917 he became assistant to the general superintendent of motive power at Chicago, the duties of which office had to do chiefly with labor matters. In 1917 he was appointed assistant superintendent of the Wisconsin division, with headquarters at Milwaukee, Wis., and in 1919 he was promoted to assistant superintendent of motive power at Chicago, with jurisdiction over lines west of the Missouri river. A year later he was promoted to principal assistant superintendent of motive power and machinery with jurisdiction over the entire system.



E. B. Hall

Engineering, Maintenance of Way and Signaling

J. H. Snyder, roadmaster on the Michigan Central, with headquarters at Jackson, Mich., has been promoted to division engineer, with headquarters at Detroit, Mich., effective May 1, to succeed **John Evans**, who will assume jurisdiction over the Detroit-Jackson and the Detroit-Bay City divisions to succeed **E. C. Wurzer**, resigned to enter the firm of **F. Palma & Co.**, contractors, Detroit, Mich.

L. E. Nordholm, assistant signal supervisor on the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, has been promoted to office engineer in the signal engineer's office at Chicago, to succeed **J. H. Molloy**, who has been promoted to assistant engineer, with the same headquarters. **F. E. Kinney**, assistant signal supervisor, with headquarters at Joliet, Ill., has been promoted to signal supervisor, with headquarters at Cedar Rapids, Iowa, to succeed **J. T. Zahnen**, who has been transferred to Chicago, to succeed **R. R. Baker**, resigned to engage in other business.

Purchasing and Stores

J. E. Bollinger, secretary to the manager of purchases of the American Short Line Railroad Association, has been appointed assistant to the manager of purchases with headquarters at Washington, D. C., effective May 1.

EDITORIAL

Railway Age

EDITORIAL

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In spite of the extensive accommodations for employees provided by some roads at Y. M. C. A.'s and company bunk-houses, there are still entirely too many terminals where train and engine employees are forced to sleep in cabooses on the away-from-home lay-over. This situation is far from satisfactory and merits the attention of all railroad officers under whom it exists. With the advent of summer the caboose becomes even less desirable as a place to sleep. Caboose tracks are not as a rule located in the coolest spot available. The heat, flies (and perhaps even less desirable visitors from the insect world) and constant switching make for a minimum amount of rest away from home for train and engine men. Undesirable as a caboose is as a place of repose, however, it is only slightly worse than a noisy, dirty bunk-house. Bunk-houses should, without doubt, be provided wherever crews are required to lay-over, but they should be located where there is a minimum of noise and where the sun's rays may not beat down upon them with all their summer fury. Furthermore it costs no more to operate a clean sleeping place than a vermin-infested one. Some roads—we could mention several—provide their train and engine men with clean beds in private rooms and ample bathing facilities at a nominal charge. The *Railway Age* is of the opinion that if this practice were general the demands of the men for a quick return to the home terminal would be less insistent.

Sleeping in Cabooses

Signaling Single Tracks

The installation of automatic block signals is, in many cases, the most economical way of increasing the track capacity of important single track lines. Comprehensive data have been compiled to show the economies produced by certain installations. A certain road is now preparing to make a single track signal installation at a cost of not over \$3,400 a mile that, according to careful calculations based on actual results of the installation of automatics under similar conditions, should increase the average speed of freight trains over the division by 25 per cent, thereby producing a saving that will pay for the signal installation in a few years. On another road it is estimated that the construction of a second track over a certain division will cost approximately \$3,000,000 as compared with \$725,000 for a signal installation, which later expenditure is calculated to show a saving of 18 per cent on the investment. However, "the proof of the pudding is in the eating," which is evidenced by the recent action of the Northern Pacific in authorizing the installation of signals on 151 miles of single track, which will practically complete the signaling of the main line of that road from the Great Lakes to the Pacific Coast. The Great Northern has also let contracts for 165 miles of automatic signaling on single track in Montana and Washington. The reconstruction program of the Missouri, Kansas & Texas has included some 251 miles of single track signaling with satisfactory results and other installations are proposed. Operating and engineering officers not familiar with the possibilities of signaling are sometimes inclined to consider double tracking as the only solution of the problem of increasing track capacity.

However, before plans are completed the railroads cannot afford to overlook the possible economies derived from signaling.

Railroad Pole Lines and Sleet Storms

Sleet storms have been the cause of serious delays to trains and occasionally during the past season have halted the transaction of general railroad business on the northern roads because of the damage caused to pole lines. Although it may not be economical to build pole lines to withstand ice loads as exceptional as three pounds per lineal foot of wire, certain roads have taken precautions that have limited the damage so that communication has not been entirely cut off even during the heaviest sleet storms in history. The standard for new construction on one such road requires the use of 53 poles per mile as compared with 41 poles ordinarily considered as sufficient. Further, every sixth pole is side-guyed and special-fixture poles are located at intervals of a half-mile. Another road, which had 200 miles of signal department pole line loaded with heavy sleet recently, did not have a single pole broken by the load and attributed the strength of the line to the fact that not only were 52 poles used to the mile but that the line was also well guyed at frequent intervals. In the same state another road lost 370 poles in 190 miles of signal line. One fact noted concerning the line breaks, was that the iron wire broke at the insulators while the copper wire broke between spans. It was also noted that fewer breaks occurred at the insulators if smaller wire was used for tying. Railroads are vitally interested in the continuity of the service of their communication and signal pole lines and when estimating for new lines or renewals, they cannot afford to ignore the lessons learned by others.

"Waiting for Someone to Die"

The expression "Waiting for Someone to Die" is not a particularly pleasant one, yet it is often heard among railway men in reference to the possibilities of promotion. It is not, however, with the advancement of individuals that this expression has been most strongly impressed upon us but rather with the advancement of railroading itself. Now and then there are railway officers who, because of their beliefs, prejudices, misinformation, personal animosities and other reasons, are blocking the adoption of something of proved benefit—either an article or a method or a plan. Many of us can recall instances where certain methods were adopted and certain changes were made which had long been attempted by junior officers, but these were not made until after "someone had died." We recall a recent talk with a manufacturer of a product used by many roads to advantage, in which he stated that, although the department head and the latter's subordinates on a certain railroad desired to install it, he could not sell to that road. "We," he stated, meaning the railway officers concerned and himself, "have agreed that it is simply a matter of waiting until So-and-So dies." Speaking exactly it is *not* truthfully a case of waiting until someone dies, the man or men may resign or they may be trans-

ferred or even promoted—many are—to where they are no longer actively in charge of the details and where they see only the results. Some have learned that their pet beliefs have been dropped since they relinquished the details, yet can find no criticism with the results. Others have this experience yet to come.

The proceedings of the American Society of Civil Engineers for April contain discussions by a large number of bridge engineers and others on the specifications for steel railway bridges submitted as a progress report by a special committee of that association. In general, the tone of these discussions is one of criticism of the committee for presenting what is to all purposes a duplication of the specifications adopted by the American Railway Engineering Association in 1920. The general consensus of opinion corresponds to that expressed in these columns sometime ago, namely, that the adoption of these specifications by the A. S. C. E. would serve only to introduce a confusing duplication. It is clear from these discussions that there is little likelihood of the adoption of the specification in its present form by the association. However, a number of constructive suggestions are offered pointing to work which can be done with profit by the special committee of the A. S. C. E. on steel bridges. Attention is called to the fact that the A. R. E. A. specification is in reality a detailed set of rules covering almost every contingency that can possibly arise in the design of the usual types of railway bridges for spans under 300 ft. Therefore, rather than duplicate this work, it is suggested that the special committee formulate a set of specifications covering general considerations or principles relating to the design of steel bridges which would be applicable to all bridge construction. There would seem to be considerable merit in this suggestion as it offers a legitimate field for the work of the special committee which would in no way duplicate the detailed specifications of the A. R. E. A.

Railroad men are coming to appreciate more and more the power of an aroused public sentiment and the necessity of making that sentiment a friendly one. Somewhat limited attempts to broadcast the magnitude of railroad problems and needs have borne rich fruit in recent months, and the good work should be extended and intensified in all departments. Owing to the lack of any direct contact with shippers or the traveling public it is not commonly supposed that the mechanical department can influence public opinion, but let us see if this supposition is based on fact. In the first place the mechanical department employees, with their families and friends, form no inconsiderable portion of the public, and the opinions of all these people regarding the railroads are largely determined by the treatment accorded them as employees through their foremen. Here is a fine opportunity to start educational work and some railroads have already taken advantage of it. For example, Elisha Lee, vice-president of the Pennsylvania, recently talked before the Shop Foremen's Club at Pittsburgh, explaining (1) the vital relation between prosperous railroads and a prosperous country; (2) the functions and equal importance of railroad investors, workers and managements; (3) the economic necessity for reduced railway rates and wages, and (4) the important role that foremen play in representing the management, treating their men always with the most scrupulous fairness, and explaining personally as far as possible the reasons for policies which appear objectionable. In addition to this work the mechanical department can help

make friends with the general public by improving the quality and increasing the quantity of its work. If enough cars, properly maintained as to wheels, springs and upholstery, are available it is evident that each passenger will have a clean, comfortable seat. If locomotives are kept in good repair, with drawbars of the right length to eliminate unnecessary slack, and brake rigging properly maintained throughout, operation will be smooth, resulting in fewer shocks to equipment and passengers' nerves. If enough locomotives are available none need be overloaded, with resultant delayed shipments and rapid deterioration of motive power. These are but a few of the ways in which the mechanical department can help bring about a favorable and friendly public sentiment towards the railroads.

There is no doubt that advantage should be taken of the present opportunity to equip shops and enginehouses as completely as possible with new machinery and tools needed for efficient operation. That certain of the railroads are working along this line is evident from the growing number of requests for bids on machine tool lists recently issued. As a rule, the roads have been slow in accepting bids and definitely placing orders, and there is a general feeling that the delay may be caused by belief that machine tool prices have not yet reached rock bottom. In fact, in more than one case a road has definitely stated that it will not buy until prices are lower. There could be no justification for the railroads paying unnecessarily high prices for machine tools, or prices which were higher than those determined by a competitive market. On the other hand, certain standard makes of machines were not advanced in price during the war period proportionately to other products and what advances were made have now been offset by reductions until many present prices show little if any profit. Any attempt to take advantage of the extremity of manufacturers and force machine tool prices below a point representing a reasonable profit will be a boomerang and react to the disadvantage of the roads. Let us suppose that a railroad now in need of certain machines decides to hold out in the hope of further price reductions and is successful to the extent of saving a few hundred dollars after a wait of six months. Besides delivering what may be a severe blow to the relatively small machine tool manufacturer (who is incidentally a shipper), the railroad loses for a period of six months the increased efficiency which would have been possible by purchasing the machines in the first place. The total cost of this lost efficiency will undoubtedly equal, if not exceed, the saving in price. Moreover, the effective life of machine tools varies from 10 to 20 years and the entire first cost when spread over such a long period is relatively unimportant compared to the increased machine efficiency. In the long run more will probably be lost than gained by waiting for further reductions in the price of standard, high-grade machine tools.

How Low Should Machine Tool Prices Go?

The International Railway Congress at Rome began on April 18, and on another page of this issue is the first of a series of articles on the proceedings of the Congress and European railway affairs generally. These articles are being written for the *Railway Age* by its editor Samuel O. Dunn, who attended the Congress at Rome as a delegate of the American Railway Association and who presented to the Congress a report on Cost of Service in Relation to Rates. From the report of the opening of the Congress, which is published elsewhere in this issue, it seems that the meeting was a very successful one and the proceedings and recom-

Reports on the Rome Congress

mentations can well be followed with interest by American railway men. We do not have to admit that our railways are inferior in order to benefit from European experience. Since the convention, Mr. Dunn has been traveling in Europe. His observations on this tour will likewise be published in issues following those which contain the reports on the activities of the Congress. The *Railway Age* is confident that its readers will find much of interest and value in these articles.

Railroad Traffic and Earnings

STATISTICS of railroad earnings and traffic which are now available for the first quarter of 1922 tend to support the contention of railroad officers that what they needed was a reduction of wages and other expenses and more freight to move, rather than a reduction of rates. These statistics are attracting attention just now because the roads in March came closer to a 6 per cent return than they have in any month since the passage over two years ago of the Cummins-Esch law, which we are still solemnly assured in some quarters constituted a "guarantee" of 6 per cent, but those who notice the effect do not always give careful consideration to an analysis of the causes. As a matter of fact, the reason why the roads attained so near a 6 per cent return in March as 5.83 was that they carried a large tonnage of coal in that month that would not have been moved until April had it not been for the prospective strike to begin on April 1, and that was offset by the reduction in coal traffic in April.

However, most classes of traffic other than coal have recently been showing considerable gains as compared with last year, without any general reduction in rates, and expenses have been reduced both by the part-way reduction in wages made last July and by reductions in the prices of fuel, materials and supplies, so that the roads are making a much more satisfactory showing than they did last year. Important reductions have been made in the rates on livestock and agricultural products, but the number of carloads of livestock loaded thus far this year has shown a slight decrease as compared with last year, and the increase in the loading of grain and grain products accounts for less of the increase in the total traffic than other commodities on which there has been little or no reduction in rates.

It has been constantly claimed that reductions in rates would so stimulate traffic as to increase railroad revenues and in a recent issue of the Farm Bureau Weekly News Letter an attempt was made to attribute the increase in traffic already experienced this year to the reductions made in rates on agricultural products. But whatever has been the result of those reductions in rates, the effect has not been to increase earnings because for the first three months of this year total operating revenues were 4.8 per cent less than in the corresponding months of 1921, although the number of carloads of freight handled increased about 10 per cent, from 9,015,824 to 9,996,184.

The improvement in net railway operating income, which increased from \$27,574,407 to \$160,998,907 and represents an annual rate of return for the quarter of 4.51 per cent, was entirely due to the reduction in operating expenses of 16.6 per cent, which resulted both from such reductions as have been made in wages and in prices of materials necessary to railway operation and from the necessity for the most rigid economy.

An analysis of the increase in traffic up to April 1 this year as compared with last year shows that the loading of grain and grain products, on which rates were reduced from 10 to 17½ per cent about the first of the year, increased from 503,682 to 607,418 cars. There had also been an increase in 1921 over 1920 in spite of an increase in rates. The loading of livestock, however, was only 379,587 cars as

compared with 379,679 last year, in spite of a 20 per cent cut in rates made last summer. Coal loading was 2,173,291 cars as compared with 1,815,776 last year. The loading of forest products was 596,003 as compared with 594,140 last year. Merchandise l. c. l. loading was 2,608,377 cars this year as compared with 2,304,220 last year and miscellaneous freight amounted to 2,698,489 cars as compared with 2,593,535 last year. On the other hand, coke loading was less this year than last year, 96,375 cars as compared with 103,442, but it has recently been increasing, and ore loading was only 54,321 as compared with 92,911 last year, but has also been going up lately. Earnings reports for April will not be available for some time but the car loading reports show a considerable decrease as compared with March, due to the coal strike, which will, of course, be reflected in the revenues. As compared with last year, however, it is a noteworthy fact that increases in traffic other than coal have more than offset the reduction in coal loading.

At this writing the Interstate Commerce Commission has not yet announced its decision as the result of its investigation as to whether it may lawfully order further reductions in rates, and it is said that there is much difference of opinion among its members. In view of the improvement in traffic and in general business conditions that has already taken place, we believe the commission might well hold that no very general reductions in rates should be ordered until a longer time has been afforded to observe the effect of the present rates under an improved condition of general business, or until lower rates shall be warranted by further wage reductions. If the commission should find any considerable reduction in rates warranted under present conditions on the ground that it would tend to increase revenues, there would always be room for doubt as to whether the general increase in business which everyone is now looking for represented the result of lower rates or whether it would have come anyway.

Buying Paint on Specification

SPECIFICATIONS for various kinds of paint have been highly developed in recent years and they have been adopted by many railroads as the most satisfactory basis for the purchase of paint. This practice has many apparent advantages. Paint specifications allow free competition among paint manufacturers. If the composition and properties can be definitely determined, specifications insure uniform quality and a paint that meets the requirements of the railroads. The object of the paint specification is to eliminate every variable except price and to reduce the problem of buying paint to its simplest terms.

There are strong arguments in favor of buying paint on specification, but it should be recognized that this method also has its disadvantages. The physical condition of the paint is as important as the chemical composition and satisfactory working properties are not always obtained when ingredients are mixed in the same proportions. The oils used in paint are complex organic products and are not of uniform quality. For this reason experienced paint makers use formulas merely as guides and modify the composition to obtain the combination of properties desirable in a paint. There is always a question whether the particular formula adopted for a paint specification is the best that can be prepared, for the foremost authorities do not always agree as to the relative merits of various mixtures of oils or even as to the most satisfactory pigment. Paint specifications restrict the manufacturer and take away from him the opportunity to use various ingredients, forcing him to make paint of a certain analysis rather than allowing him to apply the skill gained through long experience to prepare a paint of the composition which has been found to give most satisfactory

results. Paint made to a specification must be limited to materials that can be readily analyzed and this eliminates the use of blended oils which are the basis of some of the most successful paints.

In one respect paint specifications unquestionably are successful. They result in extremely low prices for the standard grades of paint. In fact, it is often difficult to understand how the paint makers can offer the products at the prices quoted. A short time ago bids were requested on several specification paints and an estimate was prepared showing the cost of making these paints with reasonably good material and reasonable care in manufacture at the prevailing prices for labor and material. To this was added overhead plus ten per cent to represent a fair selling price.

A comparison of the price thus determined with the lowest bids received is of interest. On one paint the cost was 28 cents and the lowest bid was 16 cents. On another the estimated cost was 11 1/4 cents and the lowest bid 6 cents. Still another, estimated to cost 22 cents, was offered at 11 cents. In other cases the estimated figures and the actual figures were more nearly in agreement. Some of these paints were offered to the railroads for less than the ingredients would have cost if bought in large quantities in the open market. Why did the manufacturer not sell his raw material and take a profit rather than expend labor on the manufacture of the paint to sell at a lower price? There are only two explanations. Either the paint did not contain the ingredients called for in the specification or the manufacturer was anxious to give the railroad something for nothing. Which is the more likely, that paint makers are philanthropists or that they are able to get by with paint that is not up to the standard the specification is intended to insure? There is considerable evidence which indicates that paint specifications do not prevent substitution of inferior goods. If this is the case what reason is there for having a specification for paint?

Railway Age Not Represented at Foreign Trade Convention

THE *Railway Age* did not have a representative at the Ninth National Foreign Trade Convention at Philadelphia this week. The decision not to report the meeting was made after a careful study of the program which revealed that no matters relating to railroad transportation or to the railway supply business were to be considered.

Those responsible for the preparation of the plans for this convention seem to have a very hazy idea of the great importance of the railways in foreign trade. They do not seem to realize that an American financed railway abroad is a constant market for American goods and that its successful working is a perpetual advertisement for American goods in general. They fail to consider that the greater part of our export tonnage moves a great many miles by rail. They apparently do not give heed to the fact that one of the most acceptable methods of restoring exchange to normal levels is by extending loans for railroad development abroad. Instead they ask the delegates to spend their time listening to addresses on the public's interest in foreign trade and reasons why we should have foreign trade. As if a large number of exporting manufacturers had to be "sold" on the importance of this feature of their work!

But the convention did not only completely ignore the problems of the railways and the railway supply business. It did more than that. It turned the floor over to their competitors. One of the principal speakers was one W. H. Steven, "president of the Lake Erie and Ohio River Canal Board of Pennsylvania"—whatever that is. Let us examine for a moment some of the statements of this man,

whose message was thought more important than anything which could have been said about the railways or the railway supply business.

We quote from an advance copy of his address, which is headed "Transportation Costs Must Be Lowered."

"The railroads thus being unable to adequately supply the cheap and prompt transportation from the interior to the coasts so requisite for the securing of our proper share of the foreign trade, to what other agency must we look? The one great and feasible means of relieving our transportation facilities is by properly improving our rivers and harbors and building necessary canals, a policy which France, Germany and other European war-burdened nations are steadily pursuing. Now it is possible to provide within the next five years a complete connected system of internal waterways covering the whole nation for the small expenditure of \$100,000,000 a year.

"Such a system would carry 500,000,000 tons of freight annually at a saving of at least \$350,000,000 in direct freight charges alone. But it would also save the people many billions of dollars, for it would keep our farms and factories busy and would supply their products much cheaper to all our people. The one great vital connecting link in this nation-wide system of waterways is the Lake Erie and Ohio River Canal. This will connect the Ohio River with Lake Erie."

This convention, which had no time to give to the discussion of the interest of the railways in export trade, did, however, have time to listen to the arguments of a man whose thesis was that railroad transportation was inadequate and not sufficiently cheap.

Someone may perhaps desire to call to our attention the fact that railway equipment manufacturers were represented in the program of the convention. That is true—C. M. Muehnic of the American Locomotive Company, and F. D. St. Phalle of the Baldwin Locomotive Works were on the program, but to neither of these gentlemen was assigned a subject in any way related to the railway supply business as such. Moreover it is not our contention that a railway supply manufacturer or a railroad traffic man might not have profited from attending the convention. Quite the contrary. The consideration of credits and other financial matters relating to foreign trade was quite thorough and, it is probable, valuable. This does not vitiate our contention however, that in omitting a consideration of railway transportation and its allied industries the convention fell far short of the value which it might have attained.

It is the hope of the *Railway Age* that those in charge of preparing the program for the convention next year will not suffer from the inability to appreciate the railroad viewpoint and the bias in favor of inland waterways as have those who planned the Philadelphia convention.

New Books

Saward's Annual, by Frederick W. Saward. 6 in by 8 in in size. Bound in cloth. 256 pages. Published by *Saward's Journal*, 15 Park Row, New York. Price \$2.50.

This book has a sub title announcing it to be "A standard statistical review of the coal trade." The title page further says that the book embraces details relative to output, prices, freight and wage rates, transportation, exports, trade conditions, computing tables, and other details of importance to the coal man, wholesale and retail.

The book contains a wealth of information of considerably diversified character relative to coal production. It should be of value to railroad men and those interested in railroads because of the information it gives about shipments, classified by months for 1921 and previous years on

various selected roads; about exports through the important ports; production in various districts; commercial conditions in various markets; prices and various other details of like character. The book, of course, has a special value at this time because of the strike. It suffers, somewhat, however, for lack of orderly and consistent arrangement, although there is a good index which partly overcomes this fault.

E. H. Harriman. A Biography. By George Kennan. In two volumes, 6 in. by 9 in. in size. Illustrated, Bound in Cloth. Published by Houghton Mifflin Company, Boston and New York.

E. H. Harriman was born in 1848. He began his business career as a messenger boy at a wage of \$5 a week in a Wall Street brokerage house. From messenger boy he became what was then termed a "pad-shover," then a clerk and eventually managing clerk. In 1870 he opened a brokerage office of his own. It was with this kind of a start that Mr. Harriman rose to a position where he became one of the leading and most remarkable figures in American railroad history. Not the least of the many characteristics which made him remarkable was that to his skill as a financier he added a clear insight into railroad operating and traffic conditions. That he should have been able to obtain this insight without ever having been engaged in actual railway operation emphasizes the capabilities of the brain with which he worked.

"Harriman's phenomenal success in the field of transportation is attributable," says Mr. Kennan in his book, "not only to his extraordinary intellectual ability, which would doubtless have made him distinguished in any field, but also to his intimate acquaintance with both practical railroading and finance. 'If I were asked what is the key to Harriman's success,' said one of the greatest bankers in New York ten or twelve years ago. 'I should say it is a fact that he is the only man I have ever known who is just as familiar with the physical as the financial side of his properties. Morgan is a great banker, but he knows nothing about the physical side of a railroad. Hill is a great traffic man and railroad builder, but he is a baby when he gets into Wall Street. Harriman knows both ends of the game and knows them well. He started in life as a floor trader and developed into a banker, and when he took hold of the railroad business he put aside the banking and financial end and spent long, hard and patient years in learning the traffic and operating side. Then he took the two and counter-balanced them. Now he is his own banker and his own traffic manager, and the combination is irresistible.'"

Mr. Kennan, in his book, *E. H. Harriman, a Biography*, presents a story of absorbing interest written in a most readable manner. It is a complete and well-rounded story. The author sketches Mr. Harriman's career as a railroad man, as a citizen, and as a loving father of his family. He discusses Mr. Harriman's connection as a director of the Illinois Central, his entrance later into the Union Pacific, his acquisition of the Southern Pacific, his rehabilitation of these lines; his fight with Hill over the control of the Northern Pacific and the developments of the Northern Securities Company; the Alton episode; the saving of the Erie from receivership, etc. Interesting chapters deal with the development of the Imperial Valley, the work of the Southern Pacific at the time of the San Francisco earthquake, the saving of the Imperial Valley through the control of the Colorado river, etc. An especially interesting phase is the plan advanced by Harriman for the control of a line across Manchuria and Siberia—a line around the world. On the other hand, Mr. Kennan also tells of the Boys' Club on the East Side of New York, in which club Mr. Harriman took a special interest; of the home at Arden in the Ramapo mountains and the family life there. There is a combined picture of the financier and the man and the story is well worked in and co-ordinated.

Mr. Harriman was the subject of much criticism and

censure. His work was not always understood and at times it was regarded with ill-will in many quarters. The analysis made by Mr. Kennan of Harriman's character explains the reasons for these things.

For instance, in the preface to the book, he says: "Mr. Harriman was temperamentally disinclined to engage in personal disputes and controversies. He did not like the newspaper notoriety that accompanies quarrels carried on publicly, and he often refrained from making replies to injurious charges, even when he had a perfect and convincing defense. Then, too, he regarded public controversy as a waste of time. The work in which he happened at the moment to be engaged seemed to him more important than anything else, and he would not allow himself to be diverted from it by harsh criticism of his methods, or even by unjustified attacks upon his character and personal integrity. . . . This unwillingness to engage in controversies, however, was often misinterpreted. Some people, who did not know him personally, thought that it indicated callous indifference to public opinion, while others regarded it as evidence that no convincing reply to damaging accusations could be made. Neither of these suppositions, however, had any foundation. In fact, Mr. Harriman was not indifferent to public opinion, nor did he ignore attacks because he was unable to meet them. He simply did not care to spend in controversy time that he could employ more profitably in work. When an intimate friend once said to him that he certainly would be misjudged if he did not defend himself with the weapons that lay in his hand, he replied: 'The people will always find out what's what in the end, and I can wait. I need all my time and energy to do things.'"

The suggestion must be advanced, however, that the book suffers in the respect that in his explanations of many of the things done and in his answers to the accusations made against Mr. Harriman, Mr. Kennan tends in many instances to go too far. He seems, that is to say, at times, if anything, too laudatory to make his story sound convincing in all its aspects. The reader is inclined to feel that there is too much of this vindication and that the author must have been governed by the underlying idea that "the king can do no wrong." Harriman unquestionably made mistakes and serious ones, but no acknowledgment of this fact will be found in either of the two volumes. Some of the vindications go a trifle too far in their statements concerning Mr. Harriman's accusers. In one case he speaks of the Interstate Commerce Commission as an "incompetent commission" which, to say the least, is hardly in good taste. His comments about the late Theodore Roosevelt and about Professor Ripley of Harvard are similarly stated in extreme terms. One would suggest in the latter connection that there are two sides to the matters referred to. The other side of the Roosevelt episode will be found, for example, in J. B. Bishop's "Theodore Roosevelt and His Time, Shown in His Own Letters," notably in chapter II of volume II dealing with the panic of 1907. What Mr. Kennan would term Professor Ripley's "accusations" will be found in Ripley's "Railroads: Finance and Organization."

Nevertheless, whether or not the story is too laudatory of Harriman or too caustic in the criticism of those who took issue with Harriman, the fact remains that Mr. Kennan's work does prove Harriman a great man and it does explain the reasons for the financier's remarkable career. The story of the driving power behind the man, of the will power that secured the accomplishment of the impossible, of the success secured in getting others to work for and with him, of the manner in which the man remained in harness until his death in 1909, of the human characteristics shown in his family life, etc., is well told. The book is a real contribution to the history of American railroad finance and operation and will be read with profit by anyone, whether interested in railroads or otherwise.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

“Locomotive Engineer” Is Challenged

CHICAGO

TO THE EDITOR:

I am a poor dub train dispatcher, seeking knowledge whereby I may better serve my employer.

I refer to the letter by “Locomotive Engineer” in your issue dated April 8. Will you kindly have “Locomotive Engineer” advise the railroad and division, and when, they ran the 75 trains each way daily over the 95-mile single track division? I would like to brush up a bit and possibly they could give me some pointers out that way; also would like to shake hands with those train dispatchers; that is, if they have any left.

TRAIN DISPATCHER.

The Coal Strike and Publicity

KANSAS CITY, MO.

TO THE EDITOR:

In your publication of April 29, in an article “The Coal Strike Situation Needs Some Publicity,” I was interested in your statement that the operators should make their case, if they had one, and tell it to the public. Many efforts along this line, with a plain statement of facts, have been furnished to the daily press, but for reasons best known to them this has not been considered news and has had only scant, if any, publication. The public does not seem to realize the great importance of the present struggle or its ultimate effect on the industrial welfare of the country.

Briefly, coal and railroads were the only basic industries completely controlled by the government during the war. Five times during such control the wage scale contracts made between the miners and operators by collective bargaining were readjusted; and the amounts added to the cost of coal by such adjustments over and above the original contract have aggregated \$2,720,000,000 up to January 1, 1922. The last government award, in effect until April 1, 1922, will bring these war bonuses up to nearly three billion dollars.

The miners have refused to consider any readjustment back to a peace basis and have called a nation-wide strike in their effort to retain the war premiums. The operators are determined, in the interest of industrial welfare, to eliminate these war bonuses.

A fair adjustment of the present situation would be for the miners to accept the last contract made mutually by collective bargaining, plus any advance in the cost of living as it now appears compared to the cost of living at the time the contract was made. This would work out and justify the wage scale in effect as of May, 1917. If the miners would accept this and return to work, coal prices would be lowered to a point where industry could function. The railroads, having cheaper fuel, could more reasonably be asked to adjust freight rates on coal, which would in turn further cheapen the cost of coal to the ultimate consumer.

These are the facts the public ought to know, and I hope you, through your valued publication, will help along in the good work

H. N. TAYLOR,

Washington, Central Coal & Coke Co.

Common Sense in Branch Passenger Service

WASHINGTON, D. C.

TO THE EDITOR:

I have been in railroad service since 1898, both in the east and the west, and I see branch passenger runs losing money which used to make money before the days of the automobile.

Now, why are the steam roads losing money on these runs when they can stop losing money? Because they are too slow to adopt the tactics, the tools, of the automobile people. I mean by that (1) the gasoline traction, (2) the light cars, and (3) the more frequent service.

As to the first, the traction, I have seen the roads stick to the little old steam locomotives of 30 up to 50 tons, just because they want to wear them out and the work of dragging a light branch train is all that can be found for them to do. And to wear them out it is necessary to pay an engineer and fireman instead of a chauffeur, and some tons of coal instead of some gallons of gasoline.

As to the second, the cars, I have seen the roads stick to the old coaches, not because they best serve the purpose but because, like the old engines, the coaches must be worn out somewhere and this is where, even if a 90-ton train has to be run a hundred miles or so a day to give poorer service than would be given on the highways by a baggage truck and driver and a passenger bus and its driver against a five-man crew on the corresponding steam unit.

As to the third, the frequency of service, I have seen the roads stick to one train a day on branches because that train costs \$50 or more a day to run and who wants to run more trains just to lose more money?

And what have the roads done to better the existing way of doing it? So far as my travels have led me, mainly in the west, the Harriman lines built, some ten years ago, a number of McKean motor cars and put them in service pretty widely (three or four runs in each state) on branch lines. These identical motors seem to be still in service with no improvements visible to the eye of the people not directly concerned. Why no improvements on these? Are they satisfactory as they run today? They seem to me to be too heavy and they require, or their power requires, too much shopping.

Why are no more attempts being made to run light equipment on branch lines? Is now not a time when every road is seeking less operating expense? Do not a few objections loom up too large—what to do with old motive power and old passenger coaches, and “we can not run equipment that is too light to be hauled in road freight trains if necessary.”

But can not these objections be reasoned with? If it can be proved that it costs more to wear out the old equipment than to scrap it and buy and operate new, would not that end the first objection?

And why must new branch equipment be heavy enough to be hauled in freights? Haven't we seen light equipment run on the branches in France? If there, why can we not do it here? I have seen the Hetch Hetchy R. R. in California running the light 20-passenger busses with crew of one man among freight trains on mountain grades. Stopping a light bus at every crossing to get the business is as easy as stopping to pick up your neighbor on the way to the office in the morning. And freights would still continue to clear the time of this passenger train and protect against it.

Then, as business required, a baggage truck and a second or third passenger bus can be added, with operating cost not greater than the present cost of the one steam train.

These are the natural comments of a civil engineer in railroad service, without reference to detailed operating cost, but—are they not common sense?

W. H. BARNES.



Permanent Commission at Opening of Congress—Mr. Riccio, Minister of Public Works of Italy, Speaking

International Congress Considers Many Subjects

Numerous Countries Represented in Great Railway Meeting
at Rome—King of Italy at Opening

By Samuel O. Dunn
Editor of the *Railway Age*

ROME, Italy, April 24,

THE NINTH CONGRESS of the International Railway Association has now been in session in Rome for four days. The last congress was held at Berne, Switzerland, in 1910. The association ordinarily, since its organization 25 years ago, has met at five-year intervals. It was to

affair. The King of Italy paid the compliment of being present. The convention hall was decorated with a portrait of the king back of the president's chair and flags of practically all the nations having railways which belong to the congress. The ladies were admitted, and all the seats in the large hall were taken, and many stood during the session.

The first address was made by Mr. Riccio, Minister of Public Works of Italy, under whose department the state railways of the country are operated. Mr. Riccio recalled that the second session of the association, at which its permanent organization was really formed, was held at Milan a quarter of a century ago, and was opened with an address by the Italian Minister of Public Works of that time. He presented some statistical data regarding the development of the Italian railways since then, showing, among other things, that the mileage has increased from about 7,000 miles, including secondary lines, to about 13,000 miles. Over 10,200 miles are owned and operated by the state. There are now under construction by the state 437 miles of standard gage and 118 miles of narrow gage lines, and 680 miles of line are being built by private companies. In addition, the construction of about 842 miles is projected.

Mr. V. Tondelier, of the Belgian Railways, president of the Permanent Commission of the Association, replied to the address of Mr. Riccio. He referred briefly to the history of the association and to the program of this congress. He was followed by Mr. Crova, Director-General of the Italian State Railways.

Electrification Progress in Italy

Some of the most interesting statements made by Mr. Crova were in reference to the electrification of the Italian lines. "The problem of electric traction," he said, "has been the subject of our most profound study. After the experiments on the Milan-Sondrio-Tirano lines and the Milan-Varese line, the first worked by an overhead wire at a tension of 3,000 volts, and the second by a third rail, experiments made by the former railway companies, the administration of the state railways decided definitely to adopt the system



Party of Delegates Visiting Hydro-Electric Works at Terni

have met in Berlin in 1915, but the war prevented this. In the 12 years that have elapsed since the last congress more important things affecting the welfare of mankind have occurred than in any equal previous period in history.

For one thing, the importance of railroad transportation as a factor in modern warfare has been strikingly exemplified. It is an illustration of the desire felt all over the world to forget about the war and return to "normalcy" that the program of the International Railway Association, which is meeting in Europe, where the effects of the war are seen and felt on every side, does not say a word about the use of railways in war.

The formal opening of the congress was at the Exposition Palace on Tuesday afternoon, April 18. It was quite a gala

of overhead wires even on the steepest gradients. They began with the two lines of the Giovi, which have become insufficient to carry the enormous traffic of the port of Genoa.

"The benefits obtained by this first application suggested the study of the vast problem of electrification. The difficulties of the war obliged us to delay the work already commenced. When hostilities ceased, these experiments were actively renewed; a vast plan of accurately organized work gives us the certainty that six or seven years hence it will be possible to work by electricity about 3,125 miles of heavy traffic lines in our country. Today the lines Bologna-Forlence, Faenza-Bologna, Genoa-Pisa, Rome-Tivoli, Rome-Anzio-Nettuno, are being electrified. The work on the Ronco-Trofarello line has recently been completed."

Because of its many mountains and the extremely high cost of coal, conditions in Italy are very favorable to electrification.

Following the opening session, the congress was divided into five sections. Each section has its own president, vice-president and secretaries. The subjects considered by the different sections are classified under the following general headings:

1. Way and Works.
2. Locomotives and Rolling Stock.
3. Operation.
4. General.
5. Light Railways.

The various reports which have been prepared are first submitted and discussed in the sectional meetings. Con-

"Special Steels," W. C. Cushing, Engineer of Standards, Pennsylvania System.

"Reinforced Concrete," G. A. Haggander, Chicago, Burlington & Quincy.

"Passenger Carriages," W. J. Tollerton, Chief Mechanical Superintendent, Chicago, Rock Island & Pacific, and Chairman of the Mechanical Section of the American Railway Association.

"Electrical Traction on Lines of Heavy Traffic," George Gibbs, Chief Engineer of Electric Traction, Long Island Railroad.

"Terminal Stations for Passengers," A. S. Baldwin, Vice-President, Illinois Central Railroad.

"Freight Stations," H. G. Kelley, President Grand Trunk Railway.

"Slow Freight Traffic," W. H. Williams, Vice-President Delaware & Hudson Company.

"Cost of Service in Relation to Rates," Samuel O. Dunn, Editor of the *Railway Age*.

"Interchange of Rolling Stock," C. W. Crawford, Chairman of the General Committee Section V (Transportation) American Railway Association.

"Workmen's Dwellings," A. F. Banks, president of the Elgin, Joliet & Eastern.

"Special Methods of Traction on Light Railways," H. B. Spencer, formerly director of purchases, United States Railroad Administration.

Of the American reporters mentioned, Messrs. Tollerton, Gibbs, Baldwin and Dunn are attending the Congress.



Section I—Way and Works

clusions regarding each question submitted for consideration are drawn up and adopted in the sections. Each set of conclusions will be reported next week to the general meeting and modified, rejected, or accepted by it.

George Gibbs, chief engineer of Electric Traction of the Long Island Railroad, was elected president of Section 2. General W. W. Atterbury, vice-president of the Pennsylvania Railroad, was elected vice-president of Section 4. These are the only officers of American railways who have been elected officers of the sections.

Participation of American Delegates

As might be expected, the railways of some countries which have had strong delegations in past congresses, are not represented in this one. For example, there are no delegations from the railways of Germany and Russia. The meetings of the sections have been well attended, and there have been some very animated discussions, especially on the subjects of electrification and light railways.

Among the Americans who prepared reports especially for this congress, and their subjects, are the following.

"Construction of Roadbed and Track," C. H. Ewing, Vice-President, Philadelphia & Reading.

"Maintenance and Supervision of the Track," Earl Stimson, Chief Engineer of Maintenance, Baltimore & Ohio.

Other American railway men here are J. E. Fairbanks, general secretary of the American Railway Association; Dr. D. Z. Dunott, of the Western Maryland, chairman of the Medical and Surgical Section of the American Railway Association; Hugh Pattison, electrical engineer, and Donald Rose, European traffic manager of the Illinois Central; Rollin H. Wilbur, vice-president and general manager, Lehigh & New England Railroad; J. V. B. Duer, electrical engineer; W. B. Wood, general superintendent, Illinois Division, Col. R. C. Morse, Jr., superintendent of freight transportation, Eastern Region, and J. O. Hackenberg, superintendent Schuylkill Division, all of the Pennsylvania System.

President A. T. Dice and General Manager F. M. Falck of the Philadelphian & Reading, who were here last week for part of the session, have departed.

General Atterbury has not come yet, but is expected this week. The same is true of L. A. Downs, vice-president and general manager of the Central of Georgia, who is chairman of the Engineering Section of the A. R. A.

D. I. Crawford, vice-president of the Locomotive Stoker Co. and president of the Westinghouse Union Battery Co., Walter F. Schleiter of Pittsburg, and John William Lieb, vice-president of the New York Edison Company, are attending as delegates of the United States government, appointed by the Secretary of State. Col. E. A. Simmons, president

of the *Railway Age*, also was appointed as a delegate of the United States government, but found it impossible to attend. Among the other Americans here are Andrew Fletcher, president of the American Locomotive Company; W. H. Woodin, president of the American Car & Foundry Co.; F. A. Poor, president of the P. & M. Company; George L. Bourne, president, and Fred Schaff, vice-president of the Superheater Company; H. P. Austin, Baldwin Locomotive Works; Messrs. Drysdale, Sullivan and Cullerton of the Worthington Pump

then been the recognized rendezvous of all the American railway men and railway supply men in Europe.

Entertainment Features

The Italian section of the congress has provided several forms of entertainment for the delegates and their ladies. One of the most remarkable was the dinner given on Wednesday evening, April 19, by the Italian government. This dinner occurred in the Baths of Diocletian, a vast structure



Section II—Locomotives and Rolling Stock, George Gibbs Presiding

Company; Walter J. Plogsted, General Railway Signal Company; F. K. Vial, consulting engineer Association of Manufacturers of chilled car wheels.

Important Men from Other Countries

While the attendance from the United States is small, the delegations from other countries are important and highly representative. For example, among the British railway officers here are Sir Herbert A. Walker, general manager of the London & South Western, who was the active chairman of the Railway Executive Committee during the War; Major General Sir Henry W. Thornton, formerly an American railway officer, now general manager of the Great Eastern, who has won a place in the foremost rank of British railway officers; F. J. C. Pole, general manager of the Great Western; Charles Booth, Chairman of the Midland; C. H. Dent, general manager of the Great Northern, and numerous others.

near the railway station which was built early in the fourth century A. D., and which is still in a fair state of preservation. The dinner was attended by about 2,500 persons, and considering the size of the crowd and the place where it was held was well handled. Short speeches were made by Messrs. Tondelier, Riccio and others, but the band insisted on playing during the speaking, and the acoustics were so bad and the crowd so big that the addresses could not be heard ten feet from the speakers.

A reception was given the visitors at the Capital on Thursday; and there have been several motor rides about the ancient monuments of Rome; and on Saturday, April 22, a large party went to Terni to visit the steel works, hydro-electric plants, and so on.

It would be entirely impossible even to summarize in a few short articles the proceedings of a congress that is working daily in five sections. All that can be done is to



Section IV—General

The French delegation is similarly constituted. The congress fully lives up to its title of "International," since the following is but a partial list of the countries whose railways are represented by delegates actually here and participating: Sweden, Italy, Great Britain, France, Norway, United States, Spain, Brazil, Mexico, Peru, Belgium, China, India, Greece, Portugal, Denmark, Uruguay, Siam, Switzerland, Belgian Congo, Nigeria, Argentina, Czecho-Slovakia, Luxembourg, Tunis, Algeria, Japan, Poland. Needless to say, the discussions frequently recall the tower of Babel.

Mr. Fairbanks, the ever efficient general secretary of the American Railway Association, arrived a few days before the congress began, and opened headquarters for the American delegation at the Grand Hotel; and this hotel has since

mention very briefly some of the high points brought out in the reports and discussions.

Construction of Roadbed and Track

There were five reports on construction of track and roadbed, two for America (by the late H. U. Mudge and by C. H. Ewing) one for Great Britain, one for Denmark, Norway and Sweden, and one for all other countries. These included reports prepared for the Congress that was to have been held in Berlin as well as especially for this congress.

The reports agreed that the maximum speeds of trains have not increased appreciably within the last ten years, the present maximum speeds being the greatest that are compatible with safety under the existing conditions of con-

struction of the lines. In Great Britain and America 80 miles an hour appears to be the maximum attained; in France, 74½ miles; in Denmark and Sweden, 56 miles, and in Norway, 37½ miles. There has been a substantial increase in the weight of passenger trains. The maximum loads on driving axles were found to be: America, 27.6 tons (passenger) and 30 to 34.3 tons (freight); Great Britain, 20 tons; France, 18 tons; Scandinavia, 17½ tons. In all countries efforts have been directed toward strengthening the track. Some of the most interesting facts given are those about the weight of rails. The unanimous opinion of the European reporters is that there is no advantage in increasing the weight of rail beyond 95 to 100 lb. per yard. On the other hand, it was shown that in America many important railways within the last five years have put into service sections weighing as much as 130 lb. per yard.

All the reports on the maintenance of track dwell especially on the increase in cost due mainly to advances in the wages of labor, and to the consequent necessity for better supervision of labor and the use of more labor saving machinery.

The adoption of gasoline motor cars for section work and of cars especially designed to handle ballast was emphasized in the American report. All the reports made more or less mention of applying the contract system to maintenance work. The recent adoption of the contract system was reported by

the other hand, in the United States the axle load approaches 30 tons, and under present day conditions of superheating, this is sufficient to utilize the output of the largest boiler that the loading gage allows. Thus it is that in America the tendency is to carry the superheat to a higher temperature and use higher pressures. This is notably the case on the Pennsylvania Railroad in its latest experimental locomotives constructed by the American Locomotive Company, which are fitted with the Locomotive Superheater Company's type F. superheater."

A large number of railways, M. Lacoïn points out, have found it desirable to superheat old saturated locomotives. One of the principal difficulties met with is the fact that many old engines have flat slide valves. Attention is particularly called, in this connection, to the very interesting application of superheating carried out by the Swiss Federal railways which have been successful in applying the superheater to engines with flat slide valves by providing oil ducts across the surface of the valve face.

The report mentions that feed water heating apparatuses have been much modified and improved since the last congress.

It says the types of apparatus in which a pump and surface feed water are used are the most numerous. Another variety mentioned is the pump in connection with the type of heater in which steam mixes with the feed water, as in the



Section V—Light Railways

some railways in Great Britain, India, France, Belgium, Italy and Portugal. The Italian state railways have made experiments with the contract system on a large scale. In some cases they have contracted with co-operative societies of workmen; in others with small and in still others with large contractors. It seems to be the general opinion that contractors can get better results from labor than the managements of either state railways or large private railways. The reports are a unit in favoring the introduction of more labor saving devices, and more extensive employment of those already in use.

Improvements in Locomotives

There were two interesting reports on the "Economic Production and Use of Steam on Locomotives." M. Lacoïn (Paris-Orleans Railway), summarizing these reports, said they show the superheater apparatus has now been brought to a degree of perfection that locomotives thus equipped can be employed as easily and with practically the same amount of maintenance as saturated engines, and that "a superheater allows a considerable degree of improvement to be realized both as regards fuel consumption and loads handled." He called attention to the fact that "the position of the problem of superheating does not appear to be identical in Europe and America. In Europe the maximum axle load being as a rule not greater than 20 tons, it is not possible to increase the power of the boiler without increasing the number of coupled wheels. Thus it is that the European Pacific class engines are as much limited by the adhesion necessary when starting as by their boiler capacity. On

Worthington heater. "The economics claimed by the various railways," says M. Lacoïn, "range from 10 to 20 per cent, but it is very difficult accurately to measure the results obtained. The time appears to have arrived for the use of feed water heaters to become general; but the trials carried out on numerous railways have not yet afforded sufficient information to allow definite opinions to be favored as to the superiority of one or the other types of apparatus."

Passenger Cars

The reports on passenger cars brought out rather strikingly some differences between the practice of American and other railways. W. J. Tollerton, the American reporter, noted that in the last eight years 19,900 passenger coaches have been built by American railways which answered his questionnaire, and that of these 90 per cent were entirely of steel, and the rest of mixed construction with steel frames. On January 1, 1921, about 60 per cent of American passenger cars were of wood, 10 per cent of wood with steel underframes and 30 per cent entirely of steel. Mr. Tollerton expressed the opinion that the time is not distant when all passenger cars (in America) will be built entirely or almost entirely of metal.

The other reports showed that passenger cars built entirely or even largely of metal are almost unknown outside of America.

Slow Freight Traffic

The four reports on "Slow Freight Traffic" dealt with the problems presented particularly in the United States, Bel-

gium, Great Britain and Italy. They showed that the general tendency, in the interest of maximum economy of operation, is "toward increasing the tonnage and capacity of wagons, with the object of increasing the useful load in relation to the tare." On the continent of Europe the capacity of freight cars seldom exceeds 20 tons. On the other hand, in America it always exceeds this. All the reports recognize the economy of using large cars where the conditions make it practicable to get large loads. There is also a tendency in Europe as in America, toward increasing the number of cars in a train, the figure of 80 cars being attained.

Costs of Service in Relation to Rates

The reports on "Costs of Service in Relation to Rates" caused an animated discussion in Section IV. Especial interest is being taken in several European countries now in the relationship of railway costs to rate-making—a subject which has long been under study and discussion in the United States. It is probably significant that the three reporters—M. Henry-Greard of the Orleans Railway (France), Fairfax Harrison, president of the Southern Railway, who dealt with conditions in the United States prior to 1915, and Samuel O. Dunn, who dealt with developments since 1915—all approached the subject in much the same way and reached practically identical conclusions. These conclusions were in substance: first, that operating expenses may be divided with approximate accuracy between freight and passenger service; second, that the allocation of capital charges between the two services offers far greater difficulties, and cannot be carried out at all except by resort to arbitrary hypotheses; third, that cost is not and cannot be made the determining factor in rate-making, although such knowledge of it as can be obtained is a useful aid. When the question is that of a modification of rates to develop new business, the cost that should be considered is not the average cost of handling the existing business, but the additional cost that will be caused by handling the extra business.

Views on Locomotive Cab Signals

The reports of M. Verdeyen of the Belgian State railways and M. Villa of the Italian State railways on "Locomotive Cab Signals" should be of unusual interest at the present time in the United States, where the subject of automatic train control is under consideration. M. Verdeyen recalls that the principle of the automatic train stop was condemned in France in 1913, and he still upholds this view. He argues against automatic train control on the ground that it will reduce the carefulness of the engine driver, "whose vigilance must always be the first factor of safety." He does, however, favor audible cab signals to warn the driver of the position of distant signals. There is some difference of opinion among the reporters as to whether the cab signals should be audible or visible. They agree in emphasizing that in no case should they be accepted as a substitute for visual signals beside the track. They favor speed recording devices on locomotives as measures of safety and aids to the drivers in accurately maintaining their running schedules.

The foregoing briefly summarizes only a part of the reports and discussions. The writer hopes later to send further information regarding the reports and discussions, and the formal conclusions reached by the congress.

A BETTER BULL TRAIN is the latest railroad device to aid the farmers. It is to be run by the Canadian Pacific this month over the company's lines in the province of Saskatchewan. It is to be operated in co-operation with the provincial government. In Manitoba, which is farther east and more conservative in its terminology, there is to be a similar excursion under the name of the "Livestock Improvement Special."

Intrastate and Interstate Rates Being Harmonized

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued a statement calling attention to the fact that its order issued on May 4 vacating its orders affecting Texas intrastate rates discontinues all outstanding orders in the Shreveport case and with the consent of all parties closes the proceeding which was initiated on March 7, 1911, more than 11 years ago, when the Railroad Commission of Louisiana filed a complaint with the Interstate Commerce Commission alleging that rates from Shreveport, La., to points in Eastern Texas were unreasonable and unduly prejudicial as compared with rates on like traffic from competing points in Texas to destinations in that state. This closes a case, the first of this kind, in which the Supreme Court has held that in regulating the rates of interstate carriers where their interstate and intrastate operations are so interwoven that the control over the one necessarily involves control of the other, it is the nation and not the state which is supreme within the national field.

The commission's statement says that under the present interstate commerce act provision is made for co-operation between the federal and state authorities and steps are being taken to minimize, if not eliminate, the occasions for conflict between state and interstate rates and gratifying progress has been made. This refers in part to the plan for co-operation between state and federal authorities made public in the report of a joint committee of state and federal commissioners published in last week's issue of the *Railway Age*. This report is the result of a number of conferences between the Interstate Commerce Commissioners and representatives of the National Association of Railway and Utilities Commissioners, which had also led to results prior to the announcement of the plan of co-operation which have been made manifest from time to time recently in the vacation by the Interstate Commerce Commission of its orders increasing intrastate rates by the amounts of the increases applied to interstate rates in Ex Parte 74.

The Supreme Court in the Wisconsin case having sustained the Interstate Commerce Commission's orders, a number of the state commissions have withdrawn or modified their orders which were intended to prevent the railroads from applying the Ex Parte 74 increases to state traffic or have issued other orders leaving the increased rates in effect by state authority. Following this action by state commissions, the Interstate Commerce Commission has withdrawn its orders applying to intrastate rates, thereby relieving the cause of complaint by the state authorities that their entire rate structure had been "frozen" because no adjustment in local rates could be made without application to the Interstate Commerce Commission. The state and interstate rates in these cases are now harmonized, but the state authorities are left free to make local adjustments providing they are such as not to discriminate against interstate commerce.

The notice issued by the commission reviews briefly the history of the Shreveport case and its various orders therein, the result of which was that a large part of the intrastate traffic in Texas has since November 1, 1916, moved on rates corresponding to the interstate rates found reasonable by the federal tribunal. Following the Supreme Court's decision in the Wisconsin case, the Texas commission on April 26 made an order prescribing intrastate rates for use within the state of Texas on the basis now in effect under previous orders of the Interstate Commerce Commission. The rates were those brought into harmony by the action of both commissions, and it was no longer necessary to restrain the Texas carriers by exercise of the federal authority in respect of these intrastate rates. The Interstate Commerce Com-

mission accordingly vacated on Thursday of last week its outstanding orders in the Shreveport case and discontinued the proceeding with the consent of all parties. The commission also has vacated its orders applying to Missouri intrastate rates, and it recently took the same action in the Illinois and Indiana cases.

Railroad Executives Asked to Confer With President

WASHINGTON, D. C.

IMPORTANT QUESTIONS of policy concerning railroad freight rates are to be discussed at a conference of some fifteen leading railroad executives with President Harding at a dinner at the White House on May 20, it was officially stated at the White House on Tuesday, although the exact nature of the questions to be discussed was not explained. The announcement that the President had invited the railroad men for a conference was called forth by a question regarding rumors that the Interstate Commerce Commission, having thus far failed to announce a decision as to whether and to what extent rates may be reduced under the law and in the present circumstances, had referred to the President in some way for an indication of policy. This was denied and it was pointed out that the commission is governed by a law on the subject and not by the wishes of the Executive. It is understood that the ideas to be discussed at the dinner emanate from Secretary Hoover rather than from the commission, but that the railroad men themselves were not informed of the purpose of the conference. No list of the executives was given out.

The indefiniteness of the information given to newspaper men, however, at once led to newspaper speculation as to whether, in view of the delay on the part of the commission in issuing a report as the result of its recent rate investigation, the commission had not become deadlocked and the railroads were to be asked voluntarily to reduce rates in the same way they were strongly urged to do last fall before the commission had reached the point where it was willing to order some reductions.

Another suggestion was that the railroad executives were to be asked to discuss the wisdom of an amendment of the revenue provisions of the transportation act to meet the views of those who feel that the intent of the law to provide "as nearly as may be" to a given percentage of return does not allow either the railroads or the commission sufficient flexibility in the adjustment of rates to meet general business conditions and the changes in the value of commodities. Secretary Wallace of the Department of Agriculture has publicly objected on several occasions because freight rates are so high in proportion to the value of agricultural products and Secretary Hoover of the Department of Commerce, who is understood to be particularly influential in the formation of administration policies relating to transportation, has also suggested the desirability of readjusting rates in more direct relation to commodity values even to the extent of advancing rates on high class articles if necessary in order to get lower rates on basic commodities or raw materials. One of his objections is that under the law the tendency is for rates to be higher in times of depression when traffic can less afford to pay them and lower in times of prosperity when people are less inclined to be critical of the amount of the rates.

In his statement before the commission on February 3, Mr. Hoover said:

"During the past eight months the railways have made many thousand readjustments of local rates in endeavoring to heal local distortions, but I am convinced that the whole railway rate structure needs a most systematic overhaul in the light of these new economic forces that have been brought

into play. We obviously must maintain the average rate that will support our transportation systems adequately and such an overhauling of rates might well mean the advancement of rates in certain commodities in order that compensation can be given to others where there is undue duress."

No intimation has come from the commission as to how soon a rate decision may be expected but there has been no indication that one would not be forthcoming soon. The commission has had the case under consideration for two months since the arguments were concluded on March 13 after three months of hearings. It has been understood that there was for a time a wide divergence of opinion among the eleven commissioners, some of whom it is said favored reductions on certain commodities, others of whom thought that any reduction ought to be general, while others insisted that the railroads should be allowed to get on their feet before rates are reduced. Those who favor reductions presumably have convinced themselves that lower rates will make it possible for the roads to earn a fair return sooner than will the present rates, but it is understood that there has been great difficulty in getting six of the eleven commissioners to agree on a list of commodities as to which they were prepared to say that lower rates would stimulate traffic. This does not mean, however, that the commissioners have not been able to reach any agreement.

There has been a widespread general assumption that the commission would order reductions on coal and other basic commodities such as possibly ore, iron and steel, lumber and building materials. Of the shippers who testified at the hearings, a large number preferred lower rates on coal to reductions even on their own commodities, but it is considered probable that some of the commissioners found difficulty in convincing themselves that lower rates would move more coal than the railroads would be called upon to move anyway after the strike and the recent large increases in the loading of miscellaneous freight and other commodities on which little or no reductions in rates have been made, tended to strengthen the arguments of those who believe that freight rates were a comparatively unimportant factor in causing the business depression.

The agitation in Congress for lower freight rates has died down to a considerable extent recently, whether because of the improvement in business conditions or because of the expectation of an early decision by the commission. Similarly there has been much less discussion of proposed amendments to the transportation act, although many bills for that purpose were introduced last year. The state railroad commissioners have kept the subject alive by pressing for amendments particularly intended to eliminate the enlarged jurisdiction of the Interstate Commerce Commission over their rates but the House committee on interstate and foreign commerce has displayed little interest in them and has repeatedly postponed its hearings on the Hoch and Sweet bills. The hearing was resumed on May 9 for the questioning of John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners' and Representative Hawes proposed that the subject be postponed until December, but the committee finally voted to continue hearings and representatives of the railroads are to be heard next Tuesday. Chairman Cummins of the Senate committee on interstate commerce has been trying to get a meeting of his committee to agree on a report on the Capper and similar bills on which hearings were concluded several weeks ago.

THE HOBOKEN MANUFACTURERS' RAILROAD, an industrial line operated by the War Department, is offering for sale some of its real estate holdings in Hoboken, N. J. This line was acquired by the government in connection with the army transport pier services during the war. With the end of the war, land acquired for expansion of the line was found superfluous and an attempt is being made to dispose of it.

Labor Board Disapproves Contracting of Repairs

Decision in Case of Indiana Harbor Belt Indicates Attitude Regarding Many Similar Cases

THE CONTRACTS made by the Indiana Harbor Belt for the operation of its shops are in violation of the Transportation Act and of decisions No. 119 and No. 147 of the Railroad Labor Board according to a decision adopted unanimously by the board and handed down on May 11. The decision also holds that the shop employees of the contractor in this case are under the jurisdiction of the Board and subject to the application of the Transportation Act and decision No. 147. The carrier is directed to take up the matter of reinstatement with any employee upon the latter's application.

The Board's Decision

"The Labor Board decides," the decision reads, "that the various contracts entered into between the Indiana Harbor Belt Railroad Company and the Burnham Car Repair Company for the operation of its shops are in violation of the Transportation Act insofar as they purport or are construed by the carrier to remove said employees from the application of said act, and that those provisions of the contracts affecting the wages and working rules of said employees are in violation of decisions No. 2, No. 119 and No. 147 of this Board."

After citing the history of this dispute the Board's decision says:

"The Board is of the opinion that the employees failed to substantiate their contention that the contracts are actually fraudulent and that they are mere subterfuges contrived to evade the act but the carrier contends that it is lawful evasion.

"This contract system is not an innovation recently born of the desire to circumvent the Transportation Act. It existed long before the Transportation Act was ever dreamed of. In fact it was practiced as far back as 1855 on the Philadelphia, Wilmington & Baltimore and it is pertinent to note that the actual operation of the trains on this road was let by contract.

"This leads up to the remaining and principal issue in this case; namely, had the carrier the right to enter into such contracts as takes this class of employees from under the application of the Transportation Act and the jurisdiction of the Railroad Labor Board. No more important dispute has ever come before this Board for adjudication. It goes to the vitals of the Transportation Act. If the carrier can legally do the thing which has been done under these contracts then the entire Transportation Act can be nullified and the will of the Congress of the United States set at naught. If one class of employees can thus be taken from under the application of the act there is no sound reason why each and every railroad employee in the United States cannot be given like treatment. One class of employment lends itself as readily to this method as another. Contracts have been recently entered into by various carriers purporting to turn over to so-called independent contractors the work of the following classes of employees. The six shop crafts, the maintenance of way, certain employees embraced in the clerks' organization, the firemen and oilers, the hostlers embraced in the engine service and signal department employees.

The Carrier's Argument

"It is intimated by the carrier that perhaps the actual operation of the trains could not be let to an independent contractor because that would be a violation of the carrier's charter, that it would not be permitted to transfer the very power for the exercise of which it had been created unless it delegated it to another common carrier. This is not a clear

distinction for the carrier in such case would still be answerable to the public for the performance of its functions as a common carrier and would not have contracted away this responsibility. It would merely have changed its method of paying its transportation employees as it has its shop employees in the case under consideration.

"When Congress in this act speaks of railroad employees it undoubtedly contemplates those engaged in the customary work directly contributory to the operation of the railroads. It is absurd to say the carriers and their employees would not be permitted to interrupt commerce by labor controversies unless the operation of the roads was turned over to contractors in which event the so-called contractors and the railway workers might engage in industrial warfare ad libitum. In other words, Congress did not say to the carriers 'you must not precipitate trouble by the adoption of arbitrary measures with your employees but you may delegate to a contractor the power to violate and annul all your agreements and if it happens to result in an interruption of traffic the public will be deprived of such protection as the Transportation Act could give.' As a matter of fact that is practically the sole effect of the contracts involved in this case. A strike by the employees of a contractor or contractor agent of a carrier would as effectually result in the interruption of traffic as if the men were the direct employees of the carrier."

The Function of the Contractor

The decision then cites the manner in which "the car repair department of this carrier has undergone no real change so far as the public is concerned."

"There need be no misunderstanding of this situation," the decision continues, "the contractor performs only one useful function in this operation. He is the medium or channel through which the piece work system was substituted for the lawfully established wage scale. The contractor's compensation for this is five per cent of the amount of the payroll and the rate of pay is carefully limited by the piece work provisions in the contract. The contractor takes absolutely no risk.

"In the able brief of the carrier's counsel several decisions of federal courts are cited which construe contracts more or less similar to those involved herein and which define and construe the relationship of the railroad company, the contractor and those who work for the contractor. These cases involve the question of the railroad company's liability for injuries incurred by the contractor's employees usually under the federal employers liability act. None of these cases are in point here because a different principle and a different statute are involved. The principle involved in all those cases is the duty and responsibility of the employer to the employee. The Federal Employer's Liability Act has for its purpose the compensation of employees injured in the service of the employer. That statute affected only the private relations between the employer and the employee. Naturally, it sought no purpose and contained no provision that could be construed as a denial of the carrier's right to contract its work and relieve itself of liability for injury to employees and others. On the other hand, the Transportation Act was not enacted primarily for the protection of the rights of either carrier or employee except insofar as such protection was involved in the paramount purpose of the act; that is, to insure to the public as far as possible efficient and uninterrupted railway transportation by protecting the people from the loss and suffering incident to the interruption of

traffic growing out of controversies between the carriers and the employees who do their work. This act is the Congressional assertion of a public right.

"It may seem immaterial to the public what method or arrangement the carrier adopts to secure the performance of the work essential to its operation. But it is immensely important to the public that this work be carried on in a peaceful and orderly manner. It may seem immaterial to the public for the carrier to contract out any of its work. But it is important if by such contract the carrier seeks to remove its employees from under the application of a law which the people have enacted for the purpose of maintaining industrial peace on the railways. There is a public interest in the carrier's methods greater than may appear on the surface. The contracts herein involved violate the spirit and purpose of the Transportation Act and in effect set aside the wage decisions of the Railroad Labor Board to which the carrier was a party and which the carrier put into effect.

"To all intents and purposes the contractor's operations constitute a department of the carrier with a piece work system which has been forced upon the men by the discharge of some and the dread of discharge and unemployment of others and which has never been submitted to the Railroad Labor Board in the form of a dispute as a compliance which the statute requires. The contractor is in effect merely an agent of the carrier.

"The Board can understand how the carrier reached the conclusion that it had the right to make such contracts because somewhat similar ones had been made through a long course of years; but those precedents have been robbed of their potency by the enactment of the Transportation Act which the courts of the country without exception so far have declared to be constitutional.

"This decision rests upon the facts of this particular case," the decision said in conclusion, "and the decision of each of the other contract cases pending before the Board will rest upon its own facts and the general principles herein declared."

Railway Wages Discussed by Agricultural Commission

WASHINGTON, D. C.

ONE OF THE FINDINGS to be made by the Joint Commission of Agricultural Inquiry to Congress in its forthcoming report will have reference to the railroad labor situation. Chairman Sydney Anderson, outlining the commission's conclusions on this subject, said: "We have found that the compensation paid to railroad employees increased 151 per cent in 1920 over 1916, and to 105 per cent in 1921 over 1916; that the increase in the number of employees in 1920 over 1916 was 384,830, and that in most cases the number of hours' work increased in much lower ratio than the number of employees.

"The price of transportation is necessarily governed by its cost of transportation. There is, therefore, a very definite relation between the price which the public pays for transportation and the cost which the railroad pays for labor, material and equipment.

"Certain elements which enter into this cost are now subject to regulation by the Interstate Commerce Commission or by other public bodies. The Interstate Commerce Commission now controls the issuance of railroad securities, and, to some extent the capital charges arising from them. It controls expenditures for new lines and extensions. In general, however, expenditures for material and equipment are within the province of management, subject to the same economic rules which apply in other industries. Wages paid by railroads are subject to initiation, determination, and

control by the Labor Board. Wages constituted 66.4 per cent of railway operating expenses in 1916, and 63.4 per cent in 1920, and are therefore the largest single factor in the cost of transportation.

"We thus have, therefore, the anomalous condition of one governmental body controlling the price of transportation and another governmental body controlling the major element of cost of transportation.

Adjustments Boards Not Created

"It has been found by the commission that adjustment boards have not been created by the carriers and the employees in all cases, and that where created they have not always functioned in the final settlement of disputes between carriers and their employees. They have not functioned to settle disputes finally because both employees and employers, having the right to resort to an appellate tribunal, almost invariably exercise the right on the chance that an appeal will result in a reversal and a determination of the adjustment board in their favor. In many cases the Labor Board has taken jurisdiction of disputes which have not previously been the subject of determination by adjustment boards.

"This has resulted in bringing before it a large number of disputes with respect to wages and working conditions applicable to individuals or small groups of individuals, which by their number tend to overburden the board and keep it from promptly considering the settling questions of larger aspect.

"The commission believes that in the settlement of ordinary disputes as to wages or working conditions the carriers and their employees stand upon an equal footing, and their disagreements should be settled by the ordinary process of adjustment applying in other industries. It is only where such disputes threaten to interrupt commerce that the paramount public interest justifies the interference of a governmental body.

"There is also a distinction between the general wage levels on railroads and those of other industries, and there are further distinctions between wage scales for classes of railroad labor and those applying to the same or comparable labor in other industries. These distinctions cannot well be preserved by rigid public regulation. Control over the details of the process of operation is essentially the province of management, while control over transportation rates is essentially governmental.

"The function of government is not to enter the field of transportation wherever it can, but only wherever it is needed to protect the paramount public interest in uninterrupted service efficiently performed at reasonable rates.

"Subject to the restrictions which flow from this principle, railroad management should be as free to exercise individual initiative and judgment in the determination of operating conditions as management in any other enterprise. Employees likewise should be as free to resort to the measure of organization or action necessary for their full protection as labor in other industries.

"Therefore the employment relations of carriers and their employees, whether individual or collective, should be primarily established on each road between man and management on terms mutually satisfactory, and they should be left free to reconcile their differences by adjustment methods of their own selection. Experience demonstrates that a continued arbitration body to which either party may refer these disagreements multiplies rather than minimizes these disputes."

Figures will be presented in the report showing the relation of wages paid several classes of railroad employees, industrial workers, and farm labor, together with indices of the wholesale commodity prices and the cost of living.

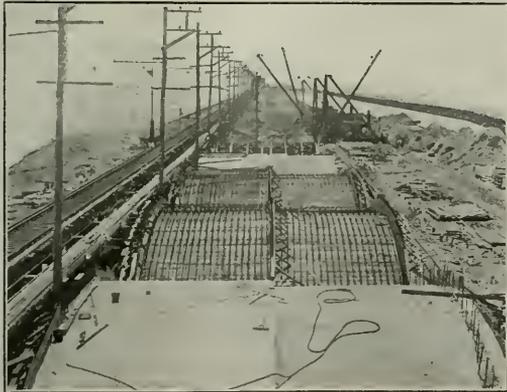


Putting the Finishing Touches on the New Causeway

Rebuilding of Galveston Causeway Nearly Complete

Railroads Bear Large Portion of the Expense of Restoring the City's Mainland Connection

WITH THE COMPLETION of the construction now in progress on the causeway at Galveston, Tex., another chapter will have been completed in the dramatic history of that city's connection with the mainland. As the sole means of rail and highway communication between Galves-



View of the Arch Construction in the First Stage. Railway Trestle on the Left and Highway Trestle on the Right

ton island and the Texas mainland this causeway has borne a vital relation to the city's welfare. Completed in 1912 as one feature of the city's program for restoration from the disaster of 1900, the causeway was severely damaged by a storm in August, 1915, and now, after nearly five years' work, is being completed a second time with such modifications in the original structure that its security against future storms is assured beyond reasonable question.

At the time of the storm in 1900, there were three railway trestles and a highway bridge across West bay and these were so badly damaged that only one, the Gulf, Colorado & Santa Fe structure, was restored. It was this trestle, 10,680 ft. in length, which was replaced by the causeway completed in 1912 after nearly three years of work at a total cost of \$1,750,000. The term causeway was applied because the struc-

ture comprised both a bridge and a sheathed embankment. There were 28, 70-ft. concrete arches and a 109-ft. Scherzer rolling lift span making up the bridge length of 2,455 ft., and two approach embankments having a total length of 8,220 ft. The arch structure was given a width sufficient to accommodate three railway tracks and a 19-ft. highway.

The embankment forming the approach at each end was for the most part 154 ft. wide and was capable of accommodating five railway tracks and a 38-ft. roadway. It was bordered at each side by a bulkhead composed of reinforced concrete piles 18 ft. long driven so as to project 3 ft. above water at mean tide and finished with a cap of concrete. The two bulkheads were tied together at intervals by 1 1/4-in. tie rods adjusted with turn-buckles. In addition to this, the side slopes were covered with a blanket of concrete six inches



Filling on Portion of the Arches First Completed Was Held by a Temporary Retaining While Remaining Section Was Being Built

thick, cast in place after the filling had been given an opportunity to settle. This projected embankment proved to be the vulnerable feature of the causeway.

On August 16 and 17, 1915, the Texas Gulf coast was

visited by a storm of greater magnitude than that of 1900, but the Galveston seawall measured fully up to expectations and the city was saved from disaster. The causeway was not so fortunate; 2,000 ft. of the embankment at the Galveston end and all of the embankment at the Virginia Point or mainland end was destroyed.

Severe storms on the Gulf Coast are accompanied by high tides at levels far exceeding the normal maximum. The water is virtually piled up against the coast. At such times a corresponding rise in the level of the water in the land locked bays behind Galveston island and the Bolivar peninsula can be effected only by an enormous inrush of water through the relatively narrow channels. The recession of the water at the close of the storm causes corresponding flows in the opposite direction. Flows of this nature occur in West bay with the changes in water level in that narrow channel which has connections with the main body of the gulf only at the two ends of Galveston island 25 miles apart.

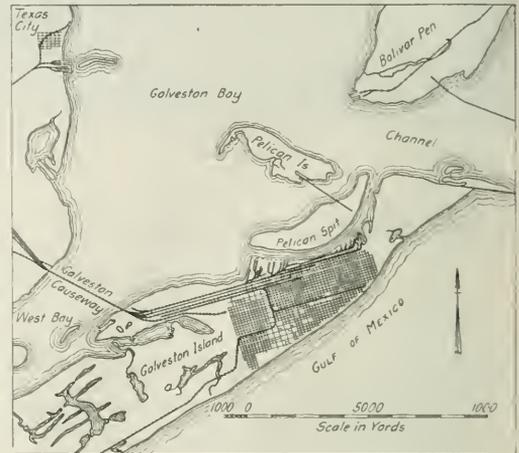
The terrific current that occurred here on the occasion of the 1915 storm demonstrates that the waterways afforded by the 28 arches were inadequate, with the result that the water piled up behind the causeway until it was several feet higher than on the opposite side. The result is well known. The embankment filling was washed away, allowing the concrete slope covering to collapse. It also resulted in the destruction of a 30-in. water main embedded in the embankment and of a similar main in the bed of West bay, the only sources of fresh water supply to the city. The concrete pile bulkheads, which enclose the embankment along each side were not injured. The arch spans also escaped harm, although subsequent soundings disclosed some scouring which for the time resulted in exposing some of the foundation piles to the attack of the marine borers, and it is believed that the scour might have been more serious had not the failure of the embankment served to reduce the discharge velocity through the arches.

Through heroic efforts on the part of the Santa Fe and Southern Pacific forces a temporary pile trestle was completed across the bay in 12 days, thereby restoring rail communication on September 1, 1915. At about the same time a temporary 8-in. water line was connected up across the damaged portions of the causeway to provide the much

needed water supply, but this was later replaced by a submarine pipe line. The 30 in pipe line in the causeway was restored also at a later date. A few months after the storm a pile trestle for a highway was also completed.

Restored Structure Provides Greater Waterway

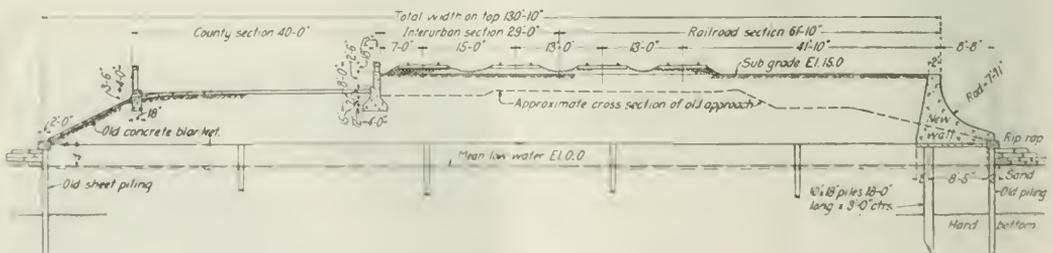
The failure of the large part of the causeway gave conclusive proof that much greater waterway was required and plans for reconstruction were undertaken on this basis but owing to a failure of the various interests to agree on the form of construction to use, the matter was submitted to a board of arbitration, consisting of A. N. Lalbot, George F.



Galveston Causeway in Relation to Its Surroundings

This left about 100 ft. of approach embankment at the west end and 2,600 ft. at the east end to be repaired or rebuilt.

The work of restoration has proceeded on this basis. The additions to the arch structure have been built to a width accommodating two railway tracks, an interurban track and a 21-ft. driveway, making an overall width of 63 ft. 3 in. to outside of parapets. The arches have a span of 60 ft. and a rise of 12 ft. and the piers have a thickness of 10 ft. The



Typical Section of the East Approach

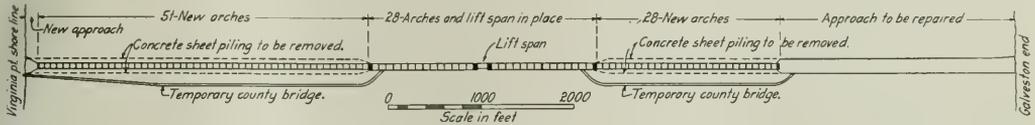
highway and railway arches are separated by a smooth joint, the former having a crown thickness of 14 in. and the latter one of 20 in. Each pier was designed to be stable in event of the destruction of either of the adjoining arches. The footings are supported on reinforced concrete piles with the bottom of footing about 10 ft. below low water level. The foundation piles are carried well into clay and the depth of each footing is also varied to some extent to avoid too great a distance between the bottom of the footing and the top of the clay stratum, which is covered by a variable depth of sand. The arches are of the filled spandrel type with a spandrel wall on the two other faces. The highway portion

is paved and the railway part is ballasted and laid with three tracks, two of them for the use of steam railroads and one for the electric line.

The embankment reconstruction at the Galveston end involves the restoration of the old concrete protection along the highway side and of the construction of an entirely new form of protection on the railway side, namely, a sea wall of mass construction with a curved face and wide base. The toe of the wall is supported on the existing concrete sheet piling,

conditions by utilizing the space between the two bulkhead walls as a dry working area.

A large part of the operations were conducted by three stiff-leg derricks, mounted on wheels and operated on a gantry track with rails spaced 40 ft. center to center, thus occupying practically all of the space between the bulkhead wall and the face of the arch structure. The first derrick was used to handle a clam shell bucket for excavating the pier sites, all soil being dumped either inside or outside the



How the Original Bridge Was Extended with Additional Arches

while the heel is carried on a row of concrete piles spaced 3 ft. center to center. For this purpose sheet piling taken from the old bulkheads were used, as soon as sufficient of these were removed from the length of causeway occupied by the new arches.

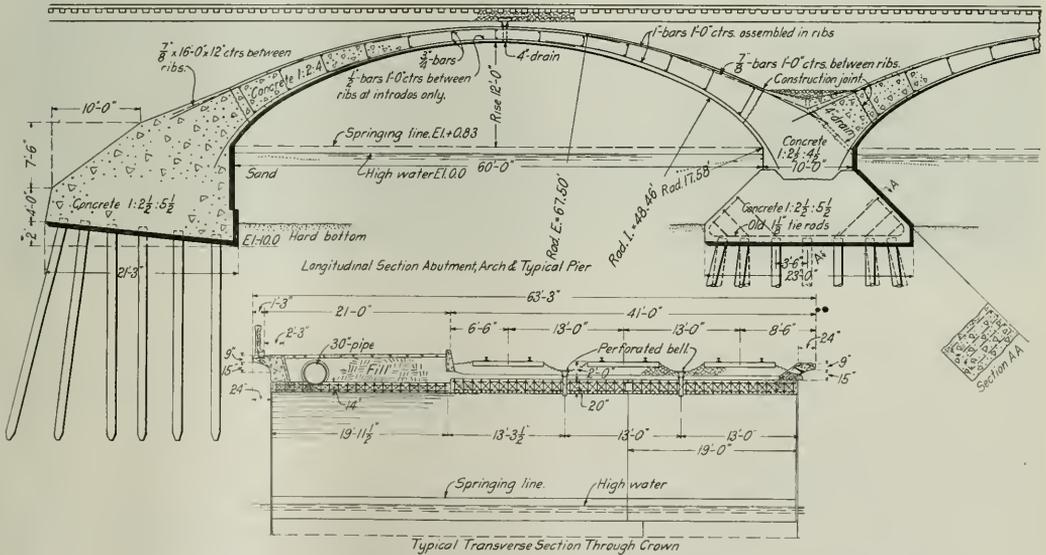
Construction

Construction was begun September 15, 1917. The program adopted for the work provided for the construction of two-thirds of the arch structure first, namely, all of the high-

bulkhead; the second was used to support a pair of pile driving leads for driving the foundation piles; and the third handled the forms and other operations of the concreting.

Pile Driving

The concreting was conducted from plants located at the extreme ends of the causeway with a third plant north of the tracks at the Virginia Point end for casting the concrete piles. The length of piles required to give the required penetration into the clay was determined by at least three



Details of the Arch Construction

way portion and sufficient of the railway portion to carry one track (the interurban track). This was followed by the construction of the remaining portion of the arch structure, after which release of the sheet piling in the flanking bulkheads permitted work to proceed on the restoration of the embankment, the only portion of the work now not completed. The additional arches being in two groups, separated by nearly half a mile of the existing arches, naturally divided the work into two units which have been handled by independent plants. The contractor also adapted the work to the local

soundings taken at the site of each pier. The pile casting yard occupied a space large enough to accommodate 200 piles at one time, the piles being allowed to cure not less than 45 days before driving. The mixing plant was located at one end with an elevating tower to deliver the concrete to a traveling hopper which operated over an elevated track placed at a sufficient height so that the concrete could be spouted from the hopper to any form in the yard. A traveler, equipped with two stiff-leg derricks, handled the forms and the concrete piles. The work of manufacturing the concrete

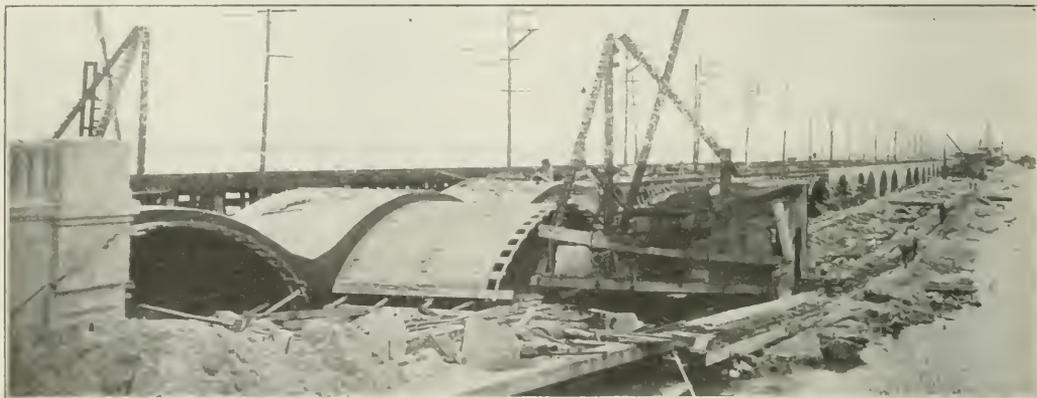
work was conducted at intervals during the course of the construction whenever the force could be spared for this work, although most of the piles were finished well in advance of the other work. Stone and cement was delivered to the concrete plant in cars for which sidings were provided. The sand was delivered on barges.

At the two concrete plants for the structure proper the concrete was delivered through a spout into cars which hauled it out to the point of placing in the bridge on narrow-gauge tracks. The concrete going into the piers was hauled over a track supported on brackets attached to the side of the railroad trestle, from which it could be spouted to any point in the piers. Concrete for the arches and spandrel walls was hauled out in buckets placed on cars moving over a track laid outside the derrick track to a stiff-leg derrick opposite the point of placing, where the buckets were hoisted over and dumped into the forms.

The arch forms consisted of wooden lagging supported by steel centering. The forms, of which 18 sets were provided, were built only wide enough for one-half of the width of the first unit of the bridge constructed. In concreting the arch, the first operation was to pour the pier footing and haunch and follow this with a second run for the arch ring complete

22 per cent; and Galveston County, 33 per cent. The Board of Managers is responsible for the management and financing and the Board of Engineers for the design and construction. The chairmanship of these boards has been vested in turn with the representatives of the various interests, the present chairman of the Board of Managers being G. S. Waid, vice-president and general manager, Southern Pacific Lines, and of the engineering board, H. M. Lull, chief engineer of the Texas and Louisiana Lines of the Southern Pacific. F. G. Pettibone, vice-president and general manager of the Gulf, Colorado & Santa Fe, was chairman of the Board of Managers, and F. Merritt, chief engineer of the same road, was chairman of the board of engineers until May, 1917. A. F. Robinson, bridge engineer of the Santa Fe System, is consulting engineer for the Board of Engineers.

The original estimate for the restoration work was about \$1,500,000, but during the time that the work was in progress the cost of labor increased in such large proportion that the final cost will be much larger. Larkin & Sangster, of Buffalo, N. Y., were the contractors, the contract being awarded on a cost plus basis with an upset price, but the contractors were unable to complete the work within the limit set and it was necessary for the board to take the work out



Moving Out Arch Centers Preparatory to Using Them in a New Position

between the haunches. This required 116 cu. yd. of concrete for the rail section and 75 cu. yd. for the highway portion. After completing the work at one set of arches, the centers were moved out, cut in two at the crown and shifted ahead for use at other arches without removing the lagging.

After the completion of the first unit of work on the arches, a temporary spandrel wall was built along the incomplete side of the railroad arches, the spandrel filling was placed and one track was laid over the new arches and the county highway portion paved with brick on a concrete foundation. As soon as this was placed in service the railway trestle was removed, thereby clearing the space along the Galveston bay side of the bridge so that the arches could be completed. To carry out this portion of the work the plant was transferred over to the other side of the structure and the work prosecuted in much the same way as it was for the first portion.

The work of restoration of the Galveston causeway is conducted by a Board of Managers and a Board of Engineers, representing the interests which bear the expense. These are the Galveston, Harrisburg & San Antonio (Southern Pacific) which bears 15 per cent, the Gulf, Colorado & Santa Fe (Santa Fe), 15 per cent, the Galveston, Houston & Henderson, 15 per cent, the Galveston Houston Electric Railway,

of their hands, and it was turned over to H. F. Jonas for completion, Mr. Jonas having previously served as supervising engineer representing the board on the ground. William Mueser, consulting engineer of the Concrete Steel Engineering Company, New York City, designed the causeway and prepared the plans and specifications.

NUMEROUS VIOLATIONS of the car service and interchange rules intended to protect freight cars against the attachment of advertisements, having been reported to the American Railway Association, R. H. Ashton, president of the association, has issued a letter to members urging the railroads to enforce these rules. This matter is covered by Car Service Rule 12 (recommended practice) which reads as follows: "The placing of advertisements or placards of any kind by the shippers upon freight cars is prohibited." Interchange Rule 36, which is mandatory by agreement, reads as follows: "Rule 36. Delivering company responsible. Temporary advertisements tacked, glued, pasted, varnished or secured to cars by screws, wire, or any other manner." The penalty is a defect card against the delivering line which permits a charge of one-half hour for the advertisements tacked, screwed or wired to car, and one hour for the advertisements pasted, glued or varnished on cars, the rate per hour being \$1 20.

Duncan Replies to Charges of Lauck and Warne

A. G. Hagerty, a Washington Lawyer and Former Examiner for
I. C. C., Also Speaks for Executives

WASHINGTON, D. C.

IN CLOSING his statement on May 4 before the Senate Interstate Committee, C. S. Duncan replied to charges made before the committee and elsewhere by W. Jett Lauck, that large financial interests control the railroads and that they deflated the farmers and undertook to deflate labor.

Farmers Blame Reserve Bank

"There is no contention," said Mr. Duncan, "that the Federal Reserve Bank is controlled by this financial group and yet it is a well-known fact that it is blamed by the farmers for 'deflating' them. It is to be remembered that the automobile industry suffered no less than cotton growers or wool growers or raisers of cattle and grain. Of course, the record is clear that the farmers were not free from the mad spirit of riotous spending and wild speculating of recent years. No financial coterie of bankers saved the most powerful meat packers from tremendous losses through deflation, as shown by their annual reports. And if general reports have a foundation in fact, there was no financial power strong enough to save the large banks themselves from very heavy losses.

The farmers, according to the Joint Commission of Agricultural Inquiry, buy over 30 per cent of the steel products produced and used in this country. Would financiers wantonly kill the goose that lays this golden egg? It is not reasonable to believe so.

"The statement has been made that Wall Street bankers control the policies of the roads, financial and otherwise. But no facts have been advanced to prove it. A more pertinent inquiry is as to the effect upon public welfare of what has been and is being done.

"Mr. Lauck has employed charts and graphs which picture a situation of inter-relationship through directorship between railroads and banks. He has given no concrete facts to prove his conclusions. There remains, therefore, in his argument this broad hiatus between his chart and his conclusion. He has nowhere shown that bankers as directors have exerted a dominant control over politics. He argues solely by inference. I submit that such an argument is neither valid nor conclusive.

Fictitious Securities and Fixed Charges

"Another witness for railway employees contended that fictitious securities had been made a fixed charge upon the net operating income of the railroads and thus the public was compelled to pay sufficiently high rates to meet such unfair charges. The reply to this contention was, that these charges were not against net railway operating income at all and that rates were based upon two factors unaffected by such charges; namely, the valuation of railroad property for rate making purposes by the Interstate Commerce Commission and the net railway operating income.

"There is no proof given of the further statement that the coterie of financiers had marked labor as its next victim. As to the 'open shop' drive, it is a question of fact and requires proof, not assertion. But it would seem a common sense thing for the banks to desire good business.

"The witness is in error when he says that issues of fictitious securities have imposed a perpetual drain on railroad operating revenues because the securities of the roads do not under the law influence or in any way affect the amount either of operating revenues or net operating income. Unwise financing may continue to be unfortunate for a given railroad cor-

poration but it does not affect the public through rates or the employees through wages."

In concluding the part of his statement in which he replied to Frank J. Warne, statistician for the train service employees, Mr. Duncan said:

"I am convinced that this testimony not only does not prove the contention set forth but also was presented with a view to the effect it would have elsewhere than upon the minds of this committee. That it has been misused in the public forum has been shown. That it does not meet the purpose of the Senate resolution under which the railroad inquiry was instituted is also apparent. That it is not helpful in meeting the present railroad problem has also been made clear. That it tends to engender bad feeling where harmony should prevail, that it is an attempt to discredit railway management and to harm railway credit is likewise evident. It is neither constructive or fair, neither sound nor judicially considered, neither wise nor just. The witness has used his ability as an economist and statistician for the purposes of a partisan and an advocate, and not as a scientist and serious student of business problems."

The Railway Business Risk

Few, if any, industries face as great a business risk as the railroads of the country under existing conditions, Mr. Duncan, told the committee. Under governmental regulations the carriers as a whole, he said, are restricted in prosperous times from making profits in excess of six per cent on their tentative valuation by which they would be enabled to provide a surplus for lean years, while they have no guarantee of revenue and no protection against financial losses.

"From an economic point of view," said Mr. Duncan, "this is a consideration which ultimately must be given due weight. There are now many regulations and restrictions to prevent the railroads from making high profits, but there is no guarantee of revenue and no protection against losses. In the great uncertainties of traffic revenues, there is a business risk that the railroads are compelled to assume without protection. Investors in railroad property can shoulder the burden of this risk, as compared with other investment opportunities, only if they are given a chance to share in higher return when there is prosperity, as is the case in other industries.

"The time-consuming method of adjustment of rates and expenses in operation today makes quick reaction impossible. It would seem a fair principle that just as regulations restrict the free exercise of managerial judgment, to that extent responsibility must be shared by the powers promulgating the restrictive regulation.

Capitalization of Social Values

"Farmers, manufacturers, merchants, owners of mines and real estate are permitted to capitalize their exceptional opportunities, such as advantages of location, fundamental human needs for their products—all the so-called social values. Many, however, want to deny all these things to the carriers. To this extent their position is ill-defined and anomalous.

"There has been a great deal of talk about watered stock in connection with the railroads. It should be clearly understood in regard to this subject: first, that railway property is being valued on a basis wholly independent of security issues; second, that this value when arrived at will be used

for rate making purposes; third, that the public will not be made to carry the burden of rates to secure revenues for the realization of a return on any inflated value; fourth, that since 1907 all additions and betterments have gone into the capital account at the value actually expended; fifth, that all issues of securities have been for nearly two years and will for the future be under the supervision of the Interstate Commerce Commission. The public and the investor are thus thoroughly safe-guarded. So far as the railroads' relations to the public are concerned, the 'watered stock' issue has been met."

Says Warne's Charges Should Be Stricken from Record

Another analysis of the Warne brand of statistics, which were characterized as "fairly screaming with misconceptions," was given the committee on May 6 by Alfred G. Hagerty, a Washington lawyer who was for 12 years an examiner of the Interstate Commerce Commission and who said he had been asked by the railway executives to testify before the committee because of his close association with the development of the uniform system of railroad accounts established by the Interstate Commerce Commission. As so large a part of Mr. Warne's testimony before the committee had been based on the assertion that the statistics based on compilation of railroad reports to the Interstate Commerce Commission are useless and worse because of manipulation and fraudulent accounting, Mr. Hagerty went into a detailed explanation of the accounts and reports and the commission's methods of using and checking them, in relation to the charges made by Mr. Warne.

"The accusations by Mr. Warne that the railroad executives and their statistical staffs have misrepresented the results of railroad operation to the committee, I find to be without foundation," he said.

In reply to general charges of manipulation made by Mr. Warne, Mr. Hagerty cited the fact that in checking the returns of the companies for 1915, 1916 and 1917 for the purpose of certifying the amount of the standard return, the commission had examined the accounts of 478 carriers which resulted in corrections increasing the total standard return by only \$155,766, a difference of less than 2/100 per cent as compared with the reports, and in favor of the railroads rather than in favor of the government. "Bearing in mind that the accounts covered three years," he said, "it seems to me that in the net result we have quite conclusive proof that the railroads of this country are not making false returns to the commission. As a result of these examinations, which were most sweeping and comprehensive, the commission did not find a single instance of manipulation, falsification or fraud on the part of the railway accounting officers. Most of the errors were errors of judgment in the interpretation of the commission's accounting regulations or purely clerical errors."

Mr. Hagerty said that "the most pernicious of Mr. Warne's many unjust accusations" was the alleged manipulation of maintenance charges to conceal the true earnings from the public and that "he bases these accusations upon a statistical compilation of dollars expended from month to month and from year to year without regard to the quantity of maintenance applied or to increases in prices of both labor and materials."

No Manipulation of Maintenance Accounts

"The same charge was made and almost in the same language," Mr. Hagerty said, "by counsel for certain shippers in the 5 per cent rate case and as the truth or falsity of these charges had an important bearing on the question of the revenue requirements of the carriers the subject was thoroughly investigated and given serious consideration by the commission. In both the 5 per cent and 15 per cent cases the evidence disclosed a tendency toward insufficient

maintenance rather than too much maintenance and in neither case did the commission, after exhaustive investigation, find either over-maintenance or manipulation of maintenance accounts.

"The most unjust and misleading part of Mr. Warne's statement," Mr. Hagerty said, "has general reference to the alleged padding of expenses during federal control and more especially during the six months' guaranty period." Regarding this he said: "His graphic charts are dangerous in deception and likely to influence the uninformed to accept his deductions, inferences and accusations as facts when they fairly scream with misconceptions.

"No such misunderstanding should be left in the minds of the members of this committee," he said, referring to a part of Warne's statement regarding the accounts for the six months' period, "because padding or inflation was neither the intention nor the result."

He pointed out that the commission's officers and the railroad officers had co-operated in working out a method of stating the accounts for this period and added that "to avoid confusion Mr. Warne's statement should be earmarked and stricken from the record."

"If the railway operating returns presented to this committee by the carriers—including revenues, expenses, net revenues and railway operating income—for any given time, are inaccurate, then the reports of the Interstate Commerce Commission to Congress also are inaccurate, which means that the commission is open to the same charges of misrepresentation as that laid by Mr. Warne against railroad officials.

"I say this because, as a whole, the data presented by the railroads are identical with those reported by the commission to Congress."

Mr. Hagerty testified that not only are the various accounts of the carriers "carefully policed and kept free from misuse" by the Interstate Commerce Commission but that their annual reports each year are compared with those of previous years, and if any wide or disproportional difference in any of the items are found an immediate explanation is demanded by the commission.

"Where the situation justifies it, accounting examiners are put to work on the carriers' books," the witness said, "this leaves little or no room for manipulation or falsification, even if the carriers were disposed towards such evil.

"Nothing was done in the dark," said the witness. "There was no purpose or intention on the part of the railway accounting officers to manipulate, falsify or misrepresent. If there has been any misrepresentation to this committee of the operating results, or the ratio of railway operating income to investment, it has been in the efforts of Mr. Warne to confuse and mislead."

Senator Cummins announced during the hearings of Mr. Duncan's testimony that he proposed to insist that the director general of railroads furnish the committee with information showing the amounts allowed, in the various settlements made with railroad companies for the federal control period, on account of under-maintenance. He said it was understood that allowances were being made on this account and that no railroads had thus far been required to pay anything for over-maintenance, although the former director general had estimated that over-maintenance would about balance any under-maintenance. The Railroad Administration had thus far steadfastly declined to furnish such information not only on the ground of policy but also on the ground that when lump sum settlements are agreed upon it is impossible to state definitely the exact items involved.

The hearing was again temporarily postponed with probably four witnesses yet to be heard, including R. S. Lovett of the Union Pacific, L. F. Loree, of the Delaware & Hudson, and one or two representing the National Association of Owners of Railroad Securities.

Mexican Railways Prepared for Improved Business

Improvements Now Under Way—Labor Conditions—Relations
With U. S. Lines

Part II*

By Charles W. Foss

IN ADDITION to their acquisitions of new motive power the National Railways of Mexico are also effecting other important improvements, notably with respect to the construction of new lines, the building of new stations, shops, etc.

A new branch line under construction from Allende, Coahuila to Las Vacas (opposite Del Rio, Texas), has just been completed and is in operation as far as San Carlos, which is 18 miles from Del Rio, Texas—a total distance of approximately 40 miles. This is rather an important feature, as its extension to the United States border, when the trunk line is completed to Las Vacas, means the establishment of a connection of the National Railways of Mexico with the Southern Pacific which passes through Del Rio, and eventually with the Kansas City, Mexico & Orient.

Stations and Shops

When traveling on the main line one is impressed by the large number of new stone stations and groups of section houses. The small stations are simple in design. The section houses which lie along the right-of-way on each side of such stations are usually cubical in shape and of a type of architecture, so lacking in the ordinary trimmings which an American is accustomed to, as to look most unusual. One notices also a considerable number of stone water tanks, although at many points the water facilities are rather crude.

per cent and at Tampico about 20 per cent. The project at Saltillo is estimated to cost about 1,000,000 pesos or \$500,-

SHOPS ON THE NATIONAL RAILWAYS

	Capacity engines per month	Capacity cars per month	Capacity coaches per month
First Class Shops:			
Aguascalientes	20	2,400	400
Monterrey	20	3,700	450
Nonoalco	20	2,650	1,520
Puebla	10	140	20
Second Class Shops:			
Acámbaro	8	450	120
Cárdenas	4	432	20
Chihuahua	6	1,250	150
Doña Cecilia	7	400	160
Durango	4	490	90
Gómez Palacio	4	550	60
Guadalajara	8	350	60
Piedras Negras	10	1,480	70
Rincon Antonio	4	180	35
San Luis	12	2,000	280
Tierra Blanca	3	40	5
Tonalá	4	60	5
Peralvillo	4	830	35
San Lázaro	4	120	85
Ijalapa	6	415	20
Oaxaca	1	280	140

000 and includes a 30-stall roundhouse and accompanying facilities.

The most important shops of the National Lines are at Aguascalientes, Monterrey, Nonoalco and Puebla. A table is given showing the capacities of these shops and also the



Cathedral and Plaza de Constitución, Mexico City

In connection with the larger stations, attention should be drawn to the new stations and terminals now being built at Saltillo, Durango and Tampico. The facilities at Saltillo are now about 75 per cent completed; at Durango, about 90

location and capacity of the less important divisional shops. The shops at Aguascalientes are considered the most important on the system. These are at present rebuilding locomotives. In January, 12 locomotives were given general repairs and complete rehabilitation. The executive board of the National Railways has made extensive plans for the improve-

*Part I of this article was published in the *Railway Age* of May 6, page 1055.

ment of shop facilities. It proposes to enlarge the shops at San Luis Potosi, Saltillo, Aguascalientes, Acambaro and Puebla—adding new buildings and machinery and tools—and to make these the main shops and use the others for division shops. The statement is made with reference to the other shops that they are sufficiently supplied with machinery and tools to care for present requirements.

Organization

The National Railways of Mexico are headed by an executive board. The actual operation of the railways is in the

of rates in the States. The United States Labor Board scale is paid, however, to train and engine crews, dispatchers, station agents, operators and shop mechanics. That is, where the rate in the States is 50 cents an hour, the Mexican rate would be one peso an hour. The National Railways are now endeavoring to readjust wages to the same extent as in the United States. With reference to section labor rates per day run about as follows in pesos (one peso is equivalent to about 50 cents U. S.): At the border, \$2.50 to \$3.00; coast,



The National Railways Station at Guadalajara

DIVISIONS	Miles Standard Gage	Miles Narrow Gage
Aguascalientes	582.8	.....
Cardenas	296.8	.....
Chihuahua	473.4	.....
Durango	548.7	.....
Guadalajara	659.9	.....
Hidalgo	340.2	162.8
Istmo	.....	274.3
Jalapa	750.1	.....
Mexico-Queretaro	413.2	.....
Monclova	421.7	.....
Monterrey al Golfo	443.4	.....
Norte	.....	363.7
Oaxaca	248.5	175.0
Pacifico	284.5	.....
Pan-Americano	.....	439.6
Puebla	450.9	.....
San Luis	188.3	.....
Tehuantepec	732.5	.....
Torreon	39.0	.....
Terminals of Mexico	10.9	.....
Terminals of Monterrey	10.4	.....
Terminals of Tampico	.....	.....
Grand Total	6,885.2	1,417.4
		8,302.6

hands of a general manager to whom all departments report except the traffic, accounting, treasury and express. These report directly to the executive board of directors.

Labor Conditions

Much might be said concerning labor conditions. Prior to the revolution the larger part of the enginemen and con-

\$3.00 to \$4.00; central plateau, \$1.50 to \$2.25 and in the tropics, \$2.50 to \$3.00. With the high rates in effect for railway labor, it is quite natural that railroading in Mexico should be regarded as a very desirable occupation by the average citizen.

Opinions vary regarding the efficiency of the Mexican workman. It is fairly generally stated that the Mexican

STATEMENT SHOWING THE LOCOMOTIVES RECENTLY ACQUIRED IN THE UNITED STATES BY THE NATIONAL RAILWAYS OF MEXICO

STANDARD GAGE				
Total	Class	Type	Weight Engine	Purchased From
3	E-22A	Ten-wheel	143,300	El Paso & Southwestern
3	M-14	Pacific	210,981	El Paso & Southwestern
20	M-15	Pacific	256,090	Baldwin Loco. Works
20	G-45	Consolidation	166,000	American Loco. Co.
20	G-45	Consolidation	166,000	Baldwin Loco. Works
6	G-42	Consolidation	71,192	General Equip. Co.
5	K-10	Mikado	180,000	Baldwin Loco. Works
8	K-11	Mikado	270,000	Baldwin Loco. Works
7	K-11	Mikado	270,000	American Loco. Co.
15	K-11	Mikado	270,000	Baldwin Loco. Works
57	F-40	Ten-wheel	159,394	Illinois Central
30	G-43	Consolidation	145,936	Illinois Central
2	G-44	Consolidation	192,397	Illinois Central
2	G-44	Consolidation	187,454	Illinois Central
198				
NARROW GAGE				
Total	Class	Type	Weight Engine	Purchased From
23	C-033	Consolidation	110,265	Baldwin Loco. Works
1	C-034	Consolidation	84,656	American Loco. Co.
1	D-010	Mogul	77,491	American Loco. Co.

Total engines in service	Standard	Narrow Gage
	505	102
Total engines in shops		510

Total cars in service	Box	Refr	Coal	Stock	Various	Flat	Total
Foreign	678	10	80	127	2	18	924
Western (standard gage)	6,486	29	2,275	677	1,465	1,181	12,113
System (narrow gage)	1,295	2	131	152	177	28	2,044
Grand Total							15,081
Total cars in shops							2,910



A Business Street in Guadalajara, Mexico's Second City

ductors were Americans; train orders were issued in English. This is not the case today. The operating rank and file is entirely Mexican. The employees are strongly unionized and their power is evidenced by what has already been said about the strike which took place last spring and which ended with a complete victory for the employees, and with complete recognition of the unions and the entire granting of their demands.

Salaries and wages in general run about 75 to 90 per cent

shop mechanic is painstaking and careful, but slow. It is difficult to measure the comparative efficiency of the train and engine crews; it is a fact, however, that Mexican trainloads are much less than ours. The Mexicans do not get the service out of a locomotive that a United States road would secure.

Passenger Service

The Mexican passenger service, like the freight service, is at present running rather light. Mexico has two classes of passenger traffic, first and second. First-class fares are at a rate of about 3.75 cents (United States currency) per mile and second-class at a rate of about 1.5 cents. As has been noted in the *Railway Age*, through Pullman cars are run over the International & Great Northern from San Antonio to Mexico City and over the Gulf Coast Lines from Houston to Mexico City and Tampico via Matamoros and Monterrey. Dining car service is in the form of a cafe club car run in the one case from San Antonio to Mexico City (the Houston sleeping car is picked up at Monterrey), and in the other from Houston to Tampico.

The service is satisfactory. An American will always find himself in the company of other Americans. No passports are required and almost the only difficulty presented is the inability to secure through tickets across the border. From Nuevo Laredo to Mexico City, 803 miles, requires 36 hours; from Matamoros, slightly longer. An interesting feature is the coach full of soldiers which is carried on every train.

The Mexican railways are endeavoring to encourage the travel of Americans in Mexico. Plans are under way looking



A Scene on the Main Line Between Mexico and Nuevo Laredo

to the publishing of booklets on Mexico for distribution in the United States. President Obregon is understood to be taking a great interest in the matter of relationships with United States business men and several parties have been made up in the southwestern states and carried as the guests of the Mexican government to Mexico City and other parts of the Republic.

Through Billing Under Consideration

It is the testimony of the American railroad men whose lines connect with the National Railways of Mexico that their relations with the Mexican railway officers have been cordial and satisfactory. The difficulty with interchange business at present is that there is no through billing across the border and that through rates are not quoted. These matters are now being given consideration, although it is too early, as yet, to say what success will attend the negotiations, or how far they will be carried. The American lines have a good realization of the possibilities of Mexican traffic. For example, traffic representatives are maintained in Mexico City by the International & Great Northern (which office also acts for the Missouri Pacific and Texas & Pacific) by the Gulf Coast Lines, by the Missouri, Kansas & Texas, by the Southern Pacific and by the Atchison, Topeka & Santa Fe.

The writer, in conclusion, desires to say that he found the Mexican railway officers whom he met cordial and helpful. They were frank and did not act as if they had anything

to conceal. They talked enthusiastically concerning the good things about their railways, but did not play the part of the censor with the bad. Naturally, things are not done in Mexico in the same manner as they would be done on a railroad in the United States, but one could not help but feel that the Mexican railways are prepared for the revival which we all hope is about to come about in Mexican business conditions.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight showed a large increase during the week ended April 29 both as compared with the week before and as compared with the corresponding week of the previous year, in spite of the light loading of coal. The total was 758,286 as compared with 721,084 in 1921 and 800,960 in 1920. The previous week the total was 714,088. All classes of commodities except coal showed increases in loading as compared with the corresponding week of the previous year, especially large increases being shown in miscellaneous freight and merchandise l.c.l.

Coal loading also showed an increase of 12,000 cars as compared with the preceding week. If coal loading had been normal, the total loading would have been considerably in excess of that of 1920 at the time when the roads were just recovering from the switchmen's strike. The summary as compiled by the Car Service Division of the American Railway Association is given in the table appearing in the middle of the next page.

In a series of charts issued by the Car Service Division there is shown by circular diagrams a comparison of revenue freight loading by totals, by detailed classifications, and by districts, of the entire United States for the period January 1 to April 8, 1922 and 1921. The outstanding fact of the total loading is the comparative increase in the Eastern, Allegheny and Pocahontas Districts in 1922 compared with the previous years, with a converse situation in the Southern and Western Districts. A survey of the various charts for each of the different commodities displays some interesting facts contributing to the comparative result of the total. Thus, in the great grain originating districts (the Northwestern, Central Western and Southwestern) the 1922 loading is comparatively less of grain and grain products than the loading of the same commodities in 1921. The other large item of agricultural tonnage, livestock, shows a similar situation in the Central Western District, which loads the largest proportion of this commodity, although in the Northwestern and Southwestern Districts, slight gains were made.

Peculiarly, despite the increase of total loading in the Eastern and Allegheny Districts, coal and coke loading was relatively lighter in 1922 than in the previous year. To the contrary, there is a heavy relative increase in the Pocahontas District. To a considerable extent, the coal loading in the Eastern and Allegheny Districts is competitive with that loaded in the Pocahontas District, and the conclusion would therefore seem to be that the increase in Pocahontas production was at the expense of production in the Eastern and Allegheny Districts. This is accentuated by the fact that the period covered includes the first week of the present bituminous and anthracite miners' strike during which relatively greater coal production has been lost in the Eastern and Allegheny regions than in the Pocahontas region, where loading has continued much more nearly normal.

The outstanding feature of the forest products loading is a very heavy increase in the Southern District and a somewhat lighter increase in the Central Western and Southwestern Districts. These include the entire Southern and Southwestern lumber loading lines, and the figures would seem to indicate a relatively heavier movement of this lumber

in 1922 than in 1921. Contemporaneously the Northwestern District, a heavy producer, and also the Eastern, Allegheny and Pocahontas Districts, all suffered a relative decrease.

The record of ore loading is of particular note because of the extraordinarily heavy decline in 1922 compared with 1921. Ore loading as a whole, however, is usually at a very low ebb during this particular period, and the movement is not of sufficient volume to permit deductions from the relative showing of the different districts in the two years.

The loading of merchandise l.c.l. and miscellaneous revenue freight shows a very significant upward trend in the Eastern, Allegheny and Pocahontas Districts. In these three, which originate much of this class of freight the 1922 per-

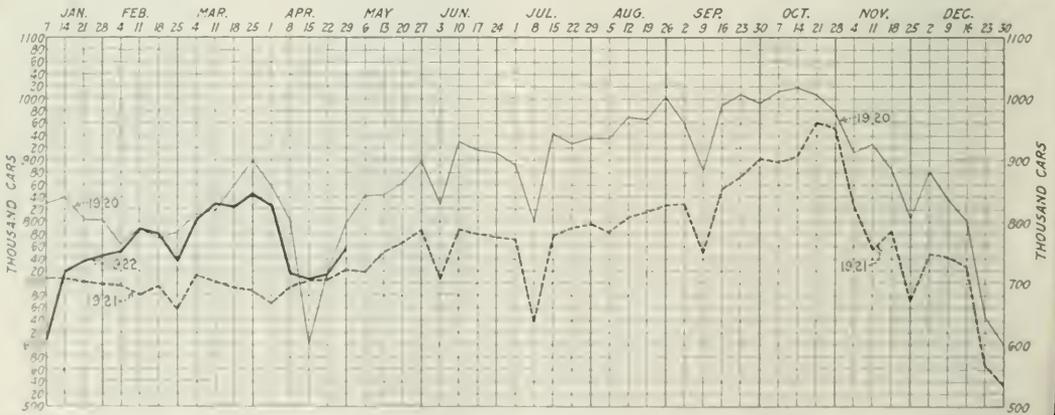
The number of surplus freight cars during the week ending April 30 showed a decrease of 126 to 371,538. This included 235,077 surplus coal cars, an increase of 5,185 within the week and 94,653 surplus box cars, a decrease of 3,753. There is also a decrease in the surplus of stock and miscellaneous freight cars.

A SERIES OF LECTURES on the electrification of the Chicago, Milwaukee & St. Paul is being conducted by the mechanical department of that railroad at a number of colleges and universities throughout the country. The lectures are illustrated by lantern slides and also by over 2,000 ft. of moving picture film, and,

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, APRIL 29

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	6,749	2,991	7,616	1,258	5,441	1,408	69,431	83,427	178,321	.....	.....
	1921	6,400	2,733	39,420	901	5,589	889	57,351	65,610	.....	178,893	183,650
	1920	2,110	2,747	12,733	4,163	2,667	2,574	50,892	66,567	144,453	.....	.....
Allegheny	1922	2,271	2,972	43,415	2,392	2,324	949	43,265	46,569	144,157	.....	167,099
	1921	190	82	26,565	241	1,344	32	6,163	4,469	39,086	.....	.....
	1920	118	86	18,996	197	1,253	25	5,326	3,812	.....	29,813	28,667
Pocahontas	1922	3,302	2,190	19,457	564	19,213	816	37,530	42,938	126,010	.....	.....
	1921	2,967	1,889	18,386	552	14,554	816	35,238	35,812	.....	110,214	127,347
Southern	1922	10,012	8,224	4,241	1,411	17,811	6,807	30,265	34,831	113,602	.....	.....
	1921	8,057	8,230	3,785	445	13,035	3,650	27,220	29,392	.....	93,814	122,340
Northwestern	1922	10,071	11,505	3,669	167	5,473	1,734	32,796	37,564	102,979	.....	.....
	1921	9,856	11,426	15,426	158	5,479	786	31,068	32,504	.....	106,703	111,593
Central Western	1922	3,964	2,749	1,351	148	7,163	682	15,488	22,290	53,835	.....	.....
	1921	4,428	2,391	4,432	132	5,851	661	16,719	22,876	.....	57,490	60,264
Southwestern	1922	24,047	22,478	9,261	1,226	30,447	9,223	78,549	94,685	270,416	.....	.....
	1921	22,341	22,047	23,643	735	24,365	5,997	75,007	84,772	.....	258,007	294,197
Total Western Dist.	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	.....	.....
	1921	34,097	29,727	143,860	4,777	48,085	7,776	216,187	236,575	.....	721,084	.....
	1920	29,522	30,385	168,718	10,942	66,439	28,814	151,241	314,899	.....	.....	800,960
Increase compared	1921	2,301	761	.....	.....	11,027	6,277	26,378	55,511	37,202	.....	.....
Decrease compared	1921	.....	.....	68,228	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	6,876	103	.....	.....	.....	.....	91,324	.....	.....	.....	.....
Decrease compared	1920	.....	.....	93,086	2,990	.....	7,327	14,761	.....	22,813	.....	43,674
April 29, 1922	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	.....	721,084
April 22, 1922	1922	33,271	28,114	63,445	7,609	55,859	9,770	239,884	276,536	714,088	.....	704,632
April 15, 1922	1922	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	.....	702,116
April 8, 1922	1922	31,598	25,034	69,456	8,599	54,680	8,259	243,718	272,934	714,268	.....	694,881
April 1, 1922	1922	35,034	25,935	184,952	10,652	54,016	5,811	241,037	269,574	827,011	663,171	858,827



Revenue Freight Car Loadings Up to April 29, 1922

centage of the entire country's loading, was 50.9 against 46.9 the year before. Contemporaneously, all other districts suffered a decline, this being particularly marked in Central Western territory.

while given primarily for engineering students and faculty, they are open to all who are interested in the subject. Supplementary dates are also being arranged, on application, for addresses before other organizations in the vicinity of the schools.

Delaware & Hudson Earns 11.62 Per Cent on Stock

Gross in 1921 Exceeds 1920 Figure in Spite of Sharp Reduction in Tonnage—More Coal Carried

THE DELAWARE & HUDSON'S net income available for dividends for the year ended December 31, 1921, was \$4,937,452 as compared with \$4,933,163 in 1920. The 1921 net income was equal to 11.62 per cent on the capital stock; the 1920 net to 11.61 per cent. In 1920 the carrier's corporate income account included standard return for two months and guaranty for six. In 1921, operating on its own, the road was able to obtain approximately the same net income because of an increase, as compared with 1920, of \$422,561 in operating revenues, a decrease of \$3,300,801 in operating expenses, a marked increase in receipts for car hire and increases also in dividend and miscellaneous income.

The Delaware & Hudson was fortunate in 1921 in being able to secure an increase in operating revenues over 1920. It is one of the small list of roads which will show a similar result. Its being able to secure that result permitted it to realize on its economies in the way of reduced expenses, which reductions were due to decreased wages costs, improved efficiency in operation, etc.; there is no evidence, however, that the reduction in expenses was due to cuts in maintenance.

Freight Revenues Increased 1.08 Per Cent.

The total operating revenues in 1921 were \$45,776,859 as compared with \$45,354,299 in 1920. There was an increase of 1.08 per cent in freight receipts. This was due to an increased rate per ton-mile, the ton-mile earnings in 1921 being 1.236 cents, or 0.318 cents more than in 1920. There was an actual reduction in ton-miles of 24.90 per cent, the 1921 figure being 3,203,759,305 as compared with the 1920 total of 4,265,734,874. The decrease in freight movement was most marked in bituminous coal, iron ore and its products, clay, gravel, sandstone, pulpwood, lumber and general manufactures. There was, however, a substantial increase in the tonnage of anthracite coal. The Delaware & Hudson shows separately its revenues derived from the transportation of merchandise and those from coal. These figures show that in 1921 the revenues from merchandise were \$2,779,608 less than in 1920, but that in the case of coal there was an increase over 1920 of \$3,201,912. Coal transportation revenues in 1921 totaled \$24,876,089, or 54.93 per cent of the total transportation revenues. This percentage in 1920 was 48.38 per cent.

Largest Anthracite Tonnage in History

This improvement in coal transportation revenues was partly due to an increase in earnings per ton-mile. There

was, however, an actual increase in coal tonnage. This can be put on a mined basis, or on a carried basis. The anthracite coal produced by companies affiliated with the Delaware & Hudson Company during 1921, including the product of washeries, totaled 9,122,408 long tons, an increase of 1,033,226 tons or 12.77 per cent above 1920. This output was 13.01 per cent of the year's total production of all Pennsylvania anthracite mines and washeries, estimated at 70,117,000. The real news in these figures is that the total anthracite production in the state of Pennsylvania was 1.5 per cent below 1920, but that the D. & H. production was 12.77 per cent over its 1920 figure.

The favorable circumstances which enabled the D. & H. affiliated companies to increase their production, while the other collieries suffered a reduction in production, are further shown in the coal transportation figures. The anthracite coal carried by the D. & H. in 1921 totaled 13,007,505 net tons as compared with 12,388,943 net tons in 1920. There was an increase of 618,562 net tons in 1921 as compared with 1920; but there was an increase of 2,527,352 tons as compared with the annual average for the test period, or the three years ended June 30, 1917.

The Delaware & Hudson annual report gives some extremely interesting and useful comparisons of one kind and another with previous years. One of these is in the form of a table showing the classified commodity tonnage for the years 1912 to 1921. This table shows that the total tonnage of all commodities in 1912 was 20,824,568; in 1921, 25,310,664, an increase in these years of 4,486,096 tons. The coal tonnage in 1912 was 8,009,596, in 1921, as above noted, 13,007,505, an increase of 4,997,909. The 1921 tonnage of all commodities has been exceeded in various former years, notably 1920, 1918 and 1917. The anthracite coal tonnage carried in 1921 was the greatest in the company's history; in fact, each succeeding year in this period has shown an increase over the preceding year with a single exception—1916. The result, therefore, is that the increase in total tonnage for 1921 over 1920 is entirely in anthracite coal.

We believe these facts to be important for a number of reasons. They indicate, first, a growing relative importance of the D. & H. in the anthracite coal carrying business. Second, they serve to emphasize that the D. & H., in a measure, lacks that trunk line character of such roads as the Lackawanna or Lehigh Valley, which is natural in view of the fact that the D. & H. does not have one of the through routes between New York and the Niagara frontier. Third, they

FREIGHT TRAFFIC STATISTICS—YEAR 1921 COMPARED WITH 1920 AND AVERAGE PER ANNUM FOR TEST PERIOD

Items	Year 1921	Comparison with 1920		Comparison with average per annum for test period (July 1, 1914 to June 30, 1917)	
		Increase	Decrease	Increase	Decrease
Mileage operated	908,25				
Number of tons carried (revenue freight)	23,304,775		3,056,038	542,220	
Number of tons carried one mile (revenue freight)	3,203,759,305		1,061,975,569		25,973,423
Number of tons carried per mile of road (revenue freight)	25,659		4,328	609	
Number of tons carried one mile per mile of road (revenue freight)	3,527,393		1,164,863		26,954
Average distance each ton was carried, miles (revenue freight)	137.47		19.01		4.42
Total freight revenue	\$39,585,947.59	\$422,303.97		\$18,470,138.68	
Per cent of total revenue	86.48	.13		3.59	
Average amount received for each ton of freight	\$1.69862	\$.26199		\$.77096	
Average revenue per ton per mile	\$.01236	\$.00318		\$.00582	
Freight revenue per mile of road (revenue freight)	\$43,584.86	\$50,528		\$20,346.71	
Freight revenue per revenue freight train mile	\$9.301	\$1.574		\$5.072	
Loaded cars in each train	24.29		.59		.87
Empty cars in each train	15.77		3.44		3.94
Tons to each loaded car (revenue freight)	30.98		2.85		3.35
Tons to each loaded and empty car (revenue freight)	18.79		3.83		.44
Train loads in tons (revenue freight)	752.74		88.85		105.82
Revenue freight train mileage	4,256,137		812,549		736,347
Revenue freight train mileage per mile of road	4,686		890		808

show how important is anthracite coal to the D. & H. and indicate that the road is likely to be hit rather severely by the present 100 per cent tie-up in anthracite coal mining.

Operating Expenses Reduced \$3,300,801, Principally in Transportation

The Delaware & Hudson's operating expenses in 1921 totaled \$38,825,529 as compared with \$42,126,330 in 1920; in other words, there was a reduction of \$3,300,801. The way in which this was accomplished is of special interest. There was not a decrease in maintenance expenses but an increase. Maintenance of way and structures increased in 1921 over 1920, \$395,082, and maintenance of equipment, \$64,216. The savings were made in transportation expenses, which totaled \$17,880,423, representing a reduction from 1920 of \$3,789,245.

The expenses for maintenance of way in 1921 were 7.72 per cent over 1920. The principal reason for the increase was the putting in track of 2,866 tons more rail and 112,418 more ties than were put in in 1920, the expenses relative to ties and rail being increased \$806,505; other track materials and maintenance of interlockers and signals added \$322,063. There were, of course, decreases in labor and material costs which partly balanced these increases.

Expenses for maintenance of equipment were \$64,216, or 0.5 per cent over 1920. The Delaware & Hudson reported on April 15, 1922, had order cars totaling 7.1 per cent of its cars on line as compared with the country's average of 13.9 per cent. Unserviceable locomotives totaled on the same date 10.4 per cent, one of the lowest percentages of any road. During the year the road broke up 900 cars, resulting in an increase in \$757,757 in the item of retirements of freight cars.

17.49 Per Cent Decrease in Transportation

The reduction in transportation expenses was, as noted, \$3,789,245—17.49 per cent. This decrease was due to lower wages and fuel costs, etc., and to improved operation. The revenue train load in 1921 was 752.74 tons, or 88.85 tons more than in 1920. The annual report points out that there were increases in the gross freight train loads northbound in the heavy tonnage districts. We quote from the report: "The average gross freight train load from Carbondale was 3,765 tons, an increase of 486 tons or 12.9 per cent, and from Oneonta it was 3,601 tons, an increase of 413 tons or 11.5 per cent. The average delay to cars passing through yards was reduced from 11 hr. 42 min. in 1920 to 8 hr. 35 min. in 1921, or 26.5 per cent."

Although not a matter reflected in the operating expenses, attention should be drawn to the improvement in the D. & H.'s per diem situation which took place during the year. In 1920 the road had a debit hire of freight car balance of \$79,556; in 1921 it had a credit balance of \$915,595, an improvement of \$955,151. This evidently reflects in large measure the success of the efforts this road has been devoting to this most important factor.

Additions and Betterments

The annual report shows a sizable list of additions and betterments made during the year. The most important item is the new third track between Schenevus and Richmondville Summit, an important link in the Susquehanna division grade revision work. This was completed for operation on December 7, 1921; the total amount charged to capital was \$1,500,574. Other items included grade changes and track realignment between Cobleshill and Barnerville Summit, the remodelled and enlarged roundhouse at Oneonta now completed, etc.

The Delaware & Hudson annual report is to be commended because of the wealth of figures it gives relative to previous years' operations. Times change so rapidly that comparisons

between one year and the preceding year too often give only a distorted and wholly incomplete picture. The Delaware & Hudson report overcomes this factor by giving in a readily comparable form the complete figures for the preceding year and also for the test period from July 1, 1914, to June 30, 1917. As an illustration the freight traffic statistics are reproduced in this review. They give some interesting comparisons.

Labor Board Appeals Adverse Court Decision

THE DECISION of Judge George T. Page of the United States District Court at Chicago, upholding the Pennsylvania in its controversy with the Railroad Labor Board, and abstracted in the *Railway Age* of April 29, page 1021, has been appealed by the board and hearings in the Circuit Court of Appeals at Chicago have been set for June 2. This action follows the conference recently held at Washington between Attorney General Daugherty and Solicitor General J. S. Beck and Chairman W. E. Hooper and Judge R. M. Barton of the board and indicates that the controversy will be settled in the courts rather than by changes in the Transportation Act itself.

Court Makes Pennsylvania Injunction Permanent

The court order issued by Judge Page following hearings in this case, which have been described in previous issues of the *Railway Age*, perpetually enjoins the board from:

"(1) Assuming any authority or taking any action of any kind or character under Section 301 of the Transportation Act, unless and until there has been a joint submission of the dispute by the carrier and the employees, which has been the subject matter of conference between them. Upon such joint submission the board may proceed to hear and determine disputes only under and in accordance with the general provisions of Title III of the Transportation Act.

"(2) From making publication of any matter based on action taken by the board not in harmony with Item 1 hereof."

Chairman Hooper Discusses Federal Court's Ruling

The attitude of the Labor Board toward Judge Page's decision is outlined in a memorandum prepared by Chairman Hooper. This memorandum says in part:

The judge held, in substance, as follows:

1. That Congress had the constitutional right to confer upon the board the power to render decisions that would have the binding force of decrees, and to fix wages and working conditions that would be enforceable.

2. That Congress had not, in fact, conferred such power in the Transportation Act, but had only empowered the board to render decisions that are merely advisory and with no provision for their enforcement, except the persuasive power of public opinion.

3. The court did not hold, as has been stated in a portion of the press, that no dispute could be brought before the board, except by the joint submission of the parties.

The court did hold, however, that some disputes could be brought before the board only by joint submission, and that certain other disputes might be brought to the board by either party upon an *ex parte* submission.

The court held that the Pennsylvania dispute as to how the representatives of the shop crafts should be selected to negotiate with the carrier a revision of rules was a dispute that could be brought before the board only by joint submission, and that it was not properly before the board on the *ex parte* submission of the employees. The court held that the board's decision was invalid, that the board would not be permitted to issue a decision censuring the carrier for violating said invalid decision and that the board's motion to dismiss the carrier's bill must be denied.

Of course, the practical result of this holding is that when a conference is sought to be held in regard to a disputed rule or other question, either party may bring about a preliminary dispute that will prevent a conference; that this preliminary dispute

may be withheld from submission to the board by the refusal of one party to join in the submission; and that the original dispute as to rules or wages will thus be kept from the board.

It may be truly said that this would not often happen, but the fact remains that, in the present case, it has happened and that in connection with a question affecting the entire schedule of rules for an army of employees.

This decision permits the Pennsylvania to set up a schedule of rules negotiated with a minority of its shop craft employees, contrary to the letter and spirit of the Transportation Act.

With all due respect to the learned court, the construction of the statute to the effect that the submission to the board of the dispute in this case or any other dispute between the carrier and its employees growing out of their relationship as such, must be a joint submission is strained and unnatural.

Section 301 provides for the conferences to be held between the representatives of the carrier and the representatives of the employees for the adjustment of any dispute that may arise.

Sections 307 (a) and 307 (b) provide the methods of submitting disputes to the Labor Board, after the conference has failed to effect an agreement.

These two sections must be considered together.

Section 301 does not prescribe the manner or method of submitting disputes to the board. It does say that "if any dispute is not decided in such conference it shall be referred by the parties thereto to the board," etc.

This is a mandatory provision. It directs that any dispute not decided in such conference shall be submitted to the board. No choice or discretion is left to the carrier and the employees as to whether any dispute shall be taken before the board. The taking of any dispute not decided in conference to the board is imperative and is not made subject to defeat by the whim of either party by requiring a joint submission. The mere fact that Section 301 says that the dispute shall be referred to the board "by the parties thereto" should not be strained to mean a joint reference by the parties, in view of the fact that Section 301 is dealing with conferences between the parties and that Section 307-a and Section 307-b specifically prescribed the manner of making submissions to the board.

Sections 307 (a) and 307 (b) provide the methods of submitting disputes involving grievances, rules and working conditions.

Section 307 (b) defines the method of bringing before the board disputes with respect to wages and salaries.

It is evident that these two sections are intended to cover any and every dispute that may arise between carriers and their employees and all that are covered by Section 301.

It is quite unreasonable to suppose that the act intends to exclude from Sections 307 (a) and 307 (b) any manner of dispute whatever, when no such intimation is given by its language and when no provision is anywhere made for a joint submission of a dispute.

There can be no dispute growing out of the contract relations of a carrier and its employees that does not arise either from rules, wages or grievances. The dispute in question arose from the general dispute in regard to the revision of rules and it directly involved the particular rule as to the conduct of conferences and negotiations. The Transportation Act guaranteed to the employees the right to select their representatives to negotiate for them in the proposed conference, and it became necessary to have a rule of some sort prescribing a method for the selection of such representatives. It was upon this rule that the dispute arose which came to the board. Before and since the passage of the Transportation Act, it has been customary for the schedules of rules agreed upon between carriers and their various classes of employees to contain rules regulating the manner and procedure for changing or revising the rules. It is also a matter of common knowledge that serious disputes sometimes arise in regard to rules that do not directly, but only, incidentally, affect a question of wages or working conditions.

The present docket of the Labor Board is comparatively clear and it is planned to go into executive session for some time to dispose of the important contract cases and wage reduction disputes, hearings on all of which have been completed.

Repair Shop Contracts on the Katy

Hearing on the question of contracts entered into by the Missouri, Kansas & Texas, for the repair of equipment in shops at Sedalia, Mo., Parsons, Kan., and Dennison, Tex., was held before the Labor Board on May 4. The board took jurisdiction over the dispute as one likely to interrupt commerce, on the prayer of the railway employees' department of the American Federation of Labor. A repetition of the argument made at the time the board consented to review

the affair constituted the case of the union at the hearing.

The M. K. & T., it was alleged, contracted for work in its own shops with the A. S. Hecker Co. of Cleveland, the new arrangement to begin April 24. All men hitherto employed by the carrier in those shops were to be discharged and rehired, so far as possible, by the contracting company. The employees pointed out that that would mean the loss of seniority, free transportation and hospital benefits, all of which the carrier admitted, saying only that those things were beyond its control.

W. E. Williams, assistant to the chief operating officer for the M. K. & T., asked that the board dismiss the case. He said the dispute could not be called one likely to interrupt commerce because the shops in question had been closed since January 1, 1922, and because, in spite of that fact, the railroad had been rendering satisfactory service. It could not be supposed, he said, that the few days necessary for the contractor to hire men to fill the places of those who might strike would cause the railroad any major inconvenience. Over 400 men, he said, which were all that were needed, had already signed with the contractors for employment at the Sedalia shops.

White Gasoline Rail Car

A NEW DESIGN of gasoline propelled motor passenger car, having a seating capacity for 41 persons and a baggage compartment, has been developed by the White Company, Cleveland, Ohio. The first car of this type, built for the Union Transportation Company, recently made a demonstration trip over the Pennsylvania Railroad from Philadelphia to Washington, where it was on exhibition during the annual meeting of the American Short Line Railroad Association. The car made daily runs during the



Interior of the Passenger Compartment

convention over the tracks of the Washington & Old Dominion Railway, carrying as passengers representatives of the various short line roads.

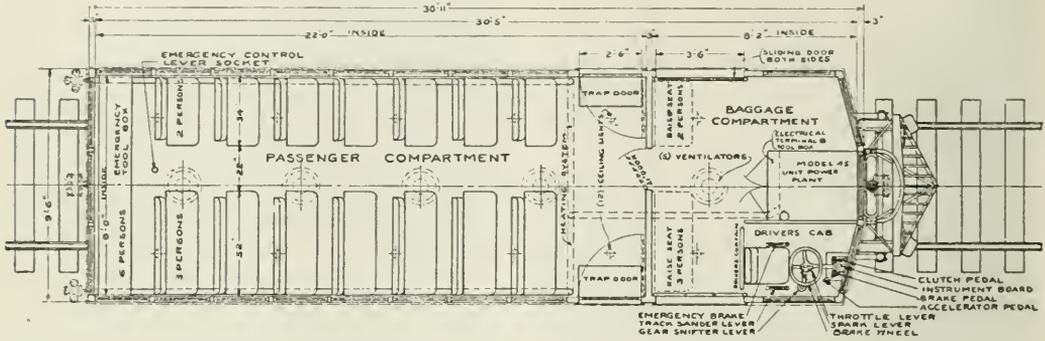
The trips over the Great Falls division of the Washington & Old Dominion were considered a severe test for the car as the road is a succession of grades and curves, the grades running as high as $3\frac{1}{2}$ to 4 per cent and the curves up to 10 deg. The car ascended the grades with ease and a fair speed was maintained even under the most severe conditions. To demonstrate its reserve power the car was brought to a stop on some of the heaviest grades and again started. Under these conditions it accelerated readily and continued to the top of the grades without difficulty.

The new White gasoline rail car has a seating capacity

of 41, with a baggage compartment directly in the rear of the driver who controls the car from the right hand side. The body is of semi-steel construction built by the J. G. Brill Company, Philadelphia. It is mounted on a specially designed White rail car chassis with an I-beam frame. The car has a four-wheel pivotal truck in front and two driving wheels in the rear. It is designed for a speed of 33 miles an hour. This speed was maintained with ease on the

After being exhibited at Washington, the rail car was placed in operation on the line of the Union Transportation Company on a 25-mile run between Pemberton, N. J., and Hightstown.

This same company placed a 29-passenger rail car in service several months ago and its successful operation led to the purchase of the second car of larger capacity. The experience of the Union Transportation Company shows that



Floor Plan of the Car, Showing Arrangement of Compartments and Controls

demonstration run. The speed in reverse is 9 miles an hour. The motor and transmission are identical with those used in the White motor truck, the engine, clutch and transmission being embodied in a unit power plant. The engine has four cylinders, cast "en bloc," with a 4 1/4-in. bore and a 5 3/4-in. stroke. The transmission is of the selective type with three speeds forward and one in reverse. The operating controls are located on the extreme forward right hand side of the coach. The foot throttle, clutch and drive shaft brakes are operated by pedals. The rear wheel brake and sander mechanism are controlled by levers and the brakes

passengers prefer to ride in gasoline rail cars rather than in steam trains. For this reason the gasoline rail car has been adopted because it offers an opportunity of giving more frequent service at a cost far below that resulting from the operation of short steam trains.

VERY VARIED VALUES.—Interesting examples of unusual sources from which scrap can be reclaimed are furnished by the practice of the Southern Pacific at its central reclamation plant. Sealing wax is obtained from worn-out dry cells; tin drinking cups



Exterior View of the White Rail Coach

on the pivotal truck by a hand wheel. Means are provided in the rear of the coach to disengage the clutch and apply the brakes in emergency. The rear axle has double reduction gear drive. The gears are entirely enclosed and run in oil. The rear wheels are of cast steel with locomotive type steel flanges and annular ball bearings. The seating arrangement and general dimensions of the body are shown in the drawing

and grease cans are made from coffee cans, scrap boiler tubes are threaded or welded and used for water dram lines, air lines and conduits, old shovel blades are made into washers, parline, a by-product of Phisich gas plants, is used for painting the underframes of cars; scrap rope is unwound and used for binding company shipments instead of twine, sediment from acetylene generators is used in place of lime for whitewashing and in the company's steel foundry

C. M. & St. P. Deficit After Charges \$11,070,609

Improves Position Nevertheless by Acquisition of New Lines and Large Amount of Equipment

THE YEAR 1922 PROVED an extremely arduous one for the Chicago, Milwaukee & St. Paul. The final result was a deficit after fixed charges of \$11,070,609. In 1920 the system had a net after fixed charges of \$4,366,071, but in 1920 the road had the advantage of standard return for two months and guaranty for six.

The St. Paul's troubles in recent years have been many. They were evidenced in striking fashion during federal control as is shown by the fact that whereas the property had a standard return of about \$28,000,000, it earned for the government in 1918 a net railway operating income of not quite \$4,000,000, and in 1919 only slightly over \$3,000,000. For 1920 it reported a deficit of \$15,000,000, which had to be made up partly by standard return and guaranty. For 1921 it reported in its December statement to the Interstate Commerce Commission a net railway operating income, or net after rentals, of \$5,117,329, an improvement over 1920, but by no means a sufficient one to keep the corporate net after fixed charges from showing a figure in red of \$11,070,609, as noted above.

Readers of the *Railway Age* are familiar with the St. Paul's outstanding difficulties. They have resulted in great measure from its former policy of over-expansion, the two most important factors of which were its building of the Chicago, Milwaukee & Puget Sound line to the Pacific Coast, and its electrification. It is now generally admitted that both of these projects were carried out away ahead of the demands of traffic. On the other hand, it is also now beginning to be realized that the St. Paul will probably be able to realize on its Puget Sound extension and its electrification as business increases sufficiently. The Puget Sound extension puts the road in a position to handle more business, and gives it an outlet to the west. Electrification will presumably put it in a position to handle this business more efficiently, and the savings in fuel costs will be considerable and important. It still remains the fact, nevertheless, that the St. Paul has thus far not had this increase in traffic, or, to be more exact, the desired increase in traffic density. The increased costs under federal control and the period immediately following, and also the falling off in business in 1921, which for the St. Paul was very severe, therefore, had to be met while the property was still handicapped by having to carry the costs of its greatly increased investment. The result we have seen in the figures which have been given above. Nor is it yet evident that conditions have changed sufficiently in the St. Paul's territory to put an especially favorable aspect on the St. Paul's present operating results.

Showing for 1921

The showing for 1921 was, in brief, as follows: By way of introduction, it should be noted that the St. Paul leased effective July 1, 1921, the lines of the Chicago, Terre Haute & Southeastern, owning 361 miles of line and operating 48 under trackage rights. The earnings and tonnage of this property are included in the St. Paul figures from July 1, 1921.

The St. Paul, in 1921, had freight revenues of \$104,894,848 as compared with \$117,183,815 in 1920, a reduction of \$12,288,968. This reduction was in spite of an increase in the rate per ton mile from 1.029 cents in 1920 to 1.266 cents in 1921; the reduction in tonnage, in other words, was in greater proportion than the reduction in freight earnings.

The passenger earnings totaled \$26,915,456, a reduction of \$4,118,138. The total operating revenues totaled \$146,765,766 as compared with \$168,156,734, or \$21,392,968 less than in 1920. As compared with this reduction in revenues, there was a reduction of \$36,740,119 in operating expenses. The 1921 expenses totaled \$127,957,002 as compared with \$164,697,212 in 1920. The 1921 operating ratio was 87.18. Although too high to indicate a favorable state of affairs, it compared with a ratio in 1920 of 97.64. In connection with the reduction in operating expenses of about \$37,000,000, it should be noted that the reduction in maintenance of way was \$10,823,341; in maintenance of equipment, \$6,013,301, and in transportation, \$19,396,821. The St. Paul does not show figures in its annual report as to the amount of new rail, ballast or ties laid or put in track, so comparisons of this nature must be omitted. With reference to equipment maintenance, it may be said that the condition, as shown by the figures of bad-order cars or unserviceable locomotives, is about average with the rest of the country in the case of cars, and better than average in the case of locomotives.

Reduction in Tonnage

The St. Paul's total revenue tonnage in 1921 was 34,067,136 as compared with 45,041,277 in 1920. The 1921 figures show that the St. Paul's traffic was divided in that year as follows: Products of agriculture, 19.8 per cent; products of animals, 6.1 per cent; products of mines, 33.7 per cent; products of forests, 17.9 per cent, and manufactures and miscellaneous, 17.4 per cent. The most pronounced reductions in tonnage were in products of mines, including particularly bituminous coal and iron ore, in "other ores and concentrates," in lumber, in pig iron and in building materials of one kind or another. The bituminous coal tonnage, which constituted in 1921 19.4 per cent of the total tonnage totaled 6,594,041 as compared with 8,196,798 tons in 1920. The item of "other ores and concentrates" in 1920 showed 3,265,895 tons, or 7.2 per cent of the total. In 1921 this traffic had decreased to but 875,401 tons, or to only 2.6 per cent of the total tonnage. Products of forests showed a reduction from 9,010,252 tons to 6,086,767 in 1921.

It is evident that what the St. Paul needs is tonnage. It did not have this tonnage in 1921. The question next arises as to whether the road's tonnage may have begun to pick up recently. The answer is that it has—slightly. The St. Paul's car loadings are reported separately for the St. Paul and for the Chicago, Terre Haute & Southeastern. The St. Paul's weekly loadings have shown increases in nearly every week of the past few months over the corresponding weeks of last year. The C., T. H. & S. E. is predominantly a coal road and it has been affected by the strike. It showed increased loadings up to April 1, but in the week ending April 15 it loaded only 2 cars of coal as against last year's corresponding figure of 1,411 cars. Insofar as concerns the St. Paul's own increased loadings, the increase in lumber loadings has been especially noticeable—running about 50 per cent. There have also been increases in manufactures and miscellaneous. There is no particular conclusion that can be drawn from all these figures except that it is apparent that conditions at present look better than they were a year ago, although not strikingly better. It may be further noted that the St. Paul had a deficit after rentals in the first three months of 1922, although its March earn-

ings were good. In March there was a net of \$1,055,902, for the three months a deficit of \$287,903. In the first three months of 1921 there was a deficit after rentals of \$2,473,-236.

Acquisition of New Lines

The picture that has been painted of St. Paul conditions is by no means a favorable one. There are, however, some favorable aspects of its activities. These include primarily the lease of the Chicago, Terre Haute & South-eastern, the acquisition of the Chicago, Milwaukee & Gary and the large acquisitions of equipment, all of which should have a favorable effect on the fortunes of the property. As noted above, the Chicago, Terre Haute & Southeastern was leased effective July 1, 1921. This company's lines extend from Chicago Heights south to Terre Haute, Ind., and thence east to Westport. Trackage rights give the line its entrance into Chicago and to Franklin Park, Ill., where connection is made with the Illinois division of the parent company. The line is a coal carrier and gives the St. Paul a traffic in that commodity as well as helping it secure a more favorable fuel supply. To supplement the acquisition of the C., T. H. & S. E., the St. Paul has also acquired by stock ownership the Chicago, Milwaukee & Gary, a line about 100 miles in length. This property is in the nature of an outer belt line around Chicago. It connects with the C., T. H. & S. E. at Delmar and with the St. Paul itself at Kirkland on the Illinois division and at Rockford on the Racine and Southwestern division. Besides permitting the movement of coal from the C., T. H. & S. E. without its going through the congested Chicago terminals, the road is also of value because it connects at Delmar and Mokenca, Ill. with the New York Central and Chicago & Eastern Illinois, thus facilitating the interchange business between these two carriers and the St. Paul.

New Equipment

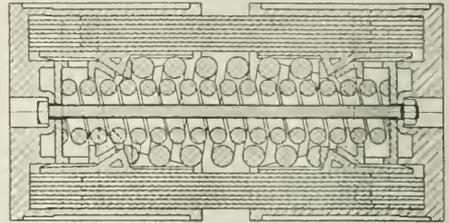
The St. Paul's acquisitions of new equipment have been one of the striking developments of their kind. It is not generally realized just how much the road has done in this connection. The system was allocated by the Railroad Administration 100 Mikado locomotives and 4,000 box cars. In 1920 it ordered from the Baldwin Locomotive Works an additional 100 Mikado locomotives, of which 71 were received that year and 29 early in 1921. There were also received in 1920, 15 electric locomotives. The road then supplemented all these acquisitions with orders placed, in 1921, with the Haskell & Barker Car Company for 1,500 and the Bettendorf Company for 1,000 50-ton steel under-frame gondola cars. It has recently placed additional orders for 25 Mikado locomotives and 4,000 box cars for 1922 delivery. Except for the electrical equipment the new cars and locomotives so far delivered have represented in large measure not so much additions to the former equipment as replacements of old small or weak locomotives or cars. This is shown by the fact that in 1920—in which year the road received 171 steam locomotives, 15 electric locomotives and 4,000 box cars—it eliminated 5 steam locomotives and 3,103 cars. In 1921 it retired 46 steam locomotives and 1,512 cars. The road has also been converting a number of compound to simple type superheated locomotives. It has been devoting considerable attention to improved water stations. The system should be able to make all these things show in reduced operating expenses.

THE CAR-REPAIR SHOPS of the Missouri, Kansas & Texas at Sedalia, Mo., have been reopened under a contract with A. S. Hecker Company, of Cleveland, Ohio. The workmen are to be paid on a piece-work basis. Not many former employees reported for duty.

Hall Multiplate Friction Draft Gear

AFTER MANY experiments and tests to develop a draft gear with the maximum resistance to wear, high capacity, a moderate and positive release, sturdy in construction, simple to manufacture, and easily handled on application and repairs to rolling stock, the Hall Draft Gear Corporation has placed on the market the Hall multiplate friction draft gear.

A friction draft gear of proper design and manufacture



Cross Section Showing Working Parts of the Gear

should meet the following conditions: The resistance to wear should exceed the life of the equipment to which the draft gear is applied. The high resistance should build up uniformly without sticking and jumping so as to keep the sill stresses at a minimum for the shocks absorbed. The release should be moderate and positive so as not to return more shock than necessary to the rolling stock, but at the

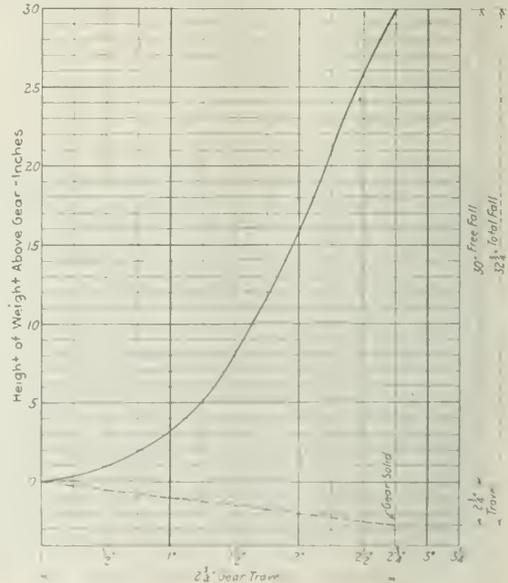


Diagram of Drop Tests of Hall H-2 Gear

same time insure a positive release in order that the draft gear will be ready for operation at any position of the coupler. Sturdy construction is necessary if the draft gear is to give continuous service without repairs, as there is always more or less liability of rough handling of rolling stock. The first cost should be kept down to the minimum; this likewise applies to application and repairs. The draft gear

should be a self-contained unit, as application is much simplified if there are no bothersome loose pieces.

It is a well-established fact that friction tends to increase uniformly with the pressure up to the point at which the surfaces in contact begin to seize and abrasion starts. If the friction pressure is low enough there will be practically no wear and if any occurs, the surfaces will be smooth and uniform.

If the friction pressure is too high, scoring, irregular wearing and rapid breaking down of the friction surfaces takes place, which greatly reduces the capacity and life of the draft gear.

Steel in sliding contact without lubrication will show abraded surfaces at approximately 800 lb. per sq. in. frictional pressure. This will be more or less depending on the hardness of the surfaces; therefore, in order to obtain a high capacity draft gear, using low friction pressure per square inch, it is necessary to have an extremely large friction area. This has been accomplished in the Hall multiplate gear by using soft spring steel plates in multiple.

The Class H draft gear, 9 in. by 12¾ in. by 2½ in., illustrated, has 2,300 sq. in. of friction surface and a maxi-

um amount of this pressure being determined by the pressure of the friction spring, which compresses as the draft gear is closed. The inner spring shown is the release spring, while the outer spring is the friction spring.

As soon as the buffing or pulling load on the housing terminates, the release spring forces the wedges out of contact with the wedge plates, thereby relieving the pressure on the friction plates. The friction spring then moves the housings, friction plates, draft gear attachments and coupler back to position. The release spring is also arranged to work in unison with the friction spring on release.

Due to both ends of the friction spring acting against a pair of wedge plates at each end of the draft gear, and both pairs of wedge plates being forced against the same friction plates, the arrangement allows a comparatively small capacity friction spring to be used in order to obtain a high friction resistance in this draft gear. The lateral pressure, tending to burst the housing, is comparatively small, due to the multiplicity of the friction plates and the small wedging pressures necessary for a high capacity.

In buffing or in pulling, the force is transmitted to the draft gear housings, tending to force one housing against the other. The resistance to this movement is offered by the internal or frictional parts of the draft gear up to the resistance capacity of the gear. With a force beyond this capacity the draft gear housings come in contact and resist further applied forces. The general design of these housings permits making the parts of sufficient strength to protect the frictional elements of the draft gear from damage, and at the same time to resist high buffing or pulling forces which may occur in the handling of rolling stock. The cross-sectional area of the casing is 23 sq. in. and the solid contact area 30 sq. in.

The draft gear is practically weather proof with all wedge arrangements well away from the central opening and can be applied to cars or locomotives with any design of draft yoke or draft attachments that provides a draft gear pocket of the standard dimensions or various existing draft gear pocket dimensions.

The results of tests of the H-2 gear under the A.R.A. 9,000 lb. drop test machine are shown in one of the drawings. A free fall of 30 in. or a total fall of 32¾ in. was required to close the gear. The work done was 24,500 ft. lb. and the work absorbed 23,000 ft. lb.

Car impact tests of the H-2 gear were also made on the Synnington test plant at Rochester, N. Y., using the same 143,000 lb. cars and equipment used by the United States Railroad Administration, so that comparison could be made with published data. The closing speed was found to be 5.23 m.p.h. Slow speed, solid speed and over-solid speed trials were made to study the draft gear action under various conditions. The gear showed favorable results as regards car movements, velocities, energy absorbed, smoothness of action and sill stresses set up.

A Self-Supporting Corrugated Steel Freight Car Roof

A NEW DESIGN of freight car roof of the heavy gage, all-metal type, has been placed on the market by the Sharon Pressed Steel Company, Sharon, Pa. The roof is made of pressed sheets, continuous for the entire width of the car. The sheets are of 14 gage steel, black or galvanized, and 20 to 40 in. wide, the length being made to suit the distance over the eaves. Each sheet has corrugations 1¼ in. deep and 5 in. between centers, extending transversely across the car. These corrugations act as stiffeners and give sufficient strength to support the roof without the use of ridge poles, carlines or purlines, so these



The Hall Multiplate Friction Draft Gear Is a Self-Contained Unit

mum pressure of 250 lb. per sq. in. setting up friction. This gives a mechanical combination which shows very little wear, high capacity and smooth action.

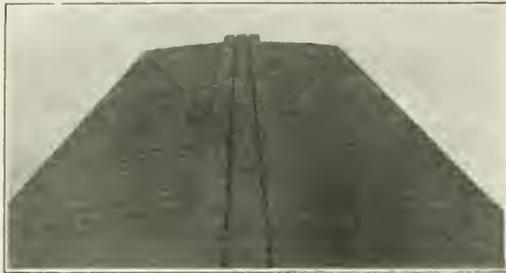
The cross-sectional drawing of the draft gear shows the arrangement of the wedges, wedge plates, springs, friction plates and housings. This draft gear is a self-contained unit without followers or loose pieces. It is symmetrical with respect to all axes and cannot be applied improperly. The standard draft gear is 9 in. by 12¾ in. by 2½ in.; special draft gears 9 in. by 12¾ in. by 18½ in., 8½ in. by 12¾ in. by 15½ in. and 12¾ in. by 15 in. by 2½ in., are built to interchange with existing sill pockets. The latter size is for 100 ton and heavier equipment, the spring capacity having been doubled and the friction area greatly increased in order to give approximately double the capacity of the standard draft gear.

The draft gear casing may be described as two identical cast steel housings with open ends towards each other, separated 2¾ in., or whatever travel the draft gear is designed and set up for. The friction plates are rolled steel of 0.60 to 0.70 per cent carbon content, alternately arranged to move in unison with the housings due to contact at one end of each plate. The weight of the standard gear is 470 lb.

Frictional resistance is created by pressure applied on these friction plates when the draft gear housings are forced towards each other. This pressure is applied by a wedge at each end of the draft gear which moves with the housing, forcing a pair of wedge plates against the friction plates,

parts are omitted except for one carline at each side of the door opening to stiffen the car frame.

The pressed steel sheets are laid with an overlap of one corrugation at each end. They are attached at the sides of the car to a pressed side plate, being riveted with short



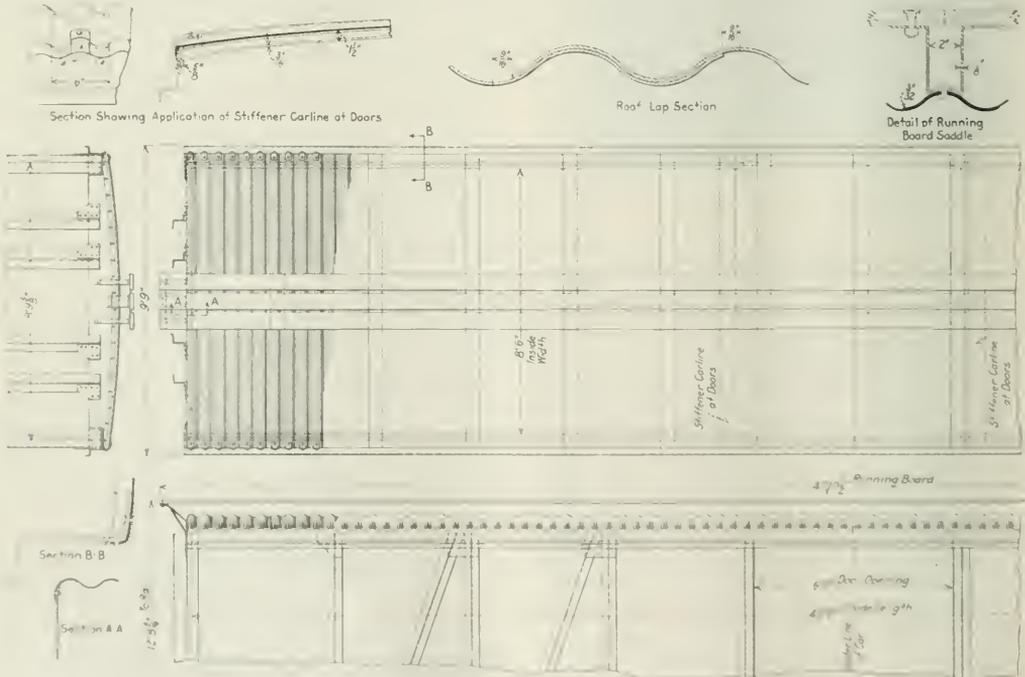
Sharon Pressed Steel Roof as Applied to the Car

length. Each 40 in. sheet of 14 gage steel when securely fastened at the side plate will carry the following loads concentrated at the center or eaves: for cars 9 ft. wide, 940 lb.; for cars 9 ft. 6 in. wide, 890 lb., and for cars 10 ft. wide, 845 lb. The tensile strength to resist spreading at the sides is 40,000 lb. per sheet. The roof has sufficient play to take care of weaving of the car frame due to uneven track or unbalanced loading. The surface provides a firm foothold in case it is necessary for trainmen to walk at the side of the roof. The overlapping sheets make a watertight construction. No leakage was found even when the roof was tested with a heavy stream from a hose. In case a sheet needs to be replaced, it is only necessary to remove the rivets along each side, cut four rivets in the overlapping sheet and four in the clips.

For new cars this roof can be assembled at the manufacturer's plant and shipped as one piece ready for application to the car frame. When used for repairs the roof is applied in sections and, if desired, can be furnished with sheets of 22 gage steel to be put on over the existing carlines and purlines.

angle clips outside the sheet, as shown in the drawing. The side plate is of 3/16 in. or 1/4 in. material and is made continuous from end to end of the car. The design can be adapted to any type of car construction. A side plate of this type is approximately four times as strong as the 5/16

TRANSPORTATION WILL HAVE a prominent place in discussions at the tenth annual meeting of the Chamber of Commerce of the United States to be held in Washington May 15-19. The railroad group session will be held on the afternoon of Tuesday, May 16, and experience under the transportation act, with special ref-



General Arrangement and Sections of the Sharon Roof

in by 4 in by 4 in angle commonly used for this part, and is also lighter by about 120 lb. per car. The special end flange used with the roof is of one piece, pressed to engage the end roof sheet, and riveted to the side plates. The running board is supported by light pressed steel saddles.

The roof complete weighs about 70 lb. per foot of car

erence to the rate-making provisions and the financial provisions of the act, will be the topic. On the same day two other groups will discuss transportation, one dealing with highways and the other the merchant marine. All of these three groups will combine on the second day to talk of the international phases of the transportation situation.

Safety Section of A. R. A. Holds Meeting in Chicago

Large Attendance Discusses Plans Preparatory to Launching Nation-Wide Crossing Campaign

WITH THE INAUGURATION of a four months' campaign of nation-wide scope for the prevention of deaths and injuries at highway crossings as its chief topic, the Safety Section of the American Railway Association met at the Congress Hotel, Chicago, on May 3, 4 and 5. This was the second convention of this section, it having been established on June 27, 1921. E. M. Switzer (C. B. & Q.), chairman of the section, presided and J. C. Caviston, New York City, secretary of the section, acted as secretary. There were about 200 members and guests in attendance. W. M. Jeffers, general manager of the Union Pacific, addressed the meeting on the first day and C. H. Markham, president of the Illinois Central, on the second day. Two hundred twenty-three roads, operating 289,546 miles of line, are members of the section.

The Committee of Direction is to adopt a standard design of a proper end guard for gang motor cars and has endorsed the recommendation of the Mechanical Division Committee, to the effect that freight cars with drawbar yokes not equipped with lips should be rejected in interchange; this in view of accidents resulting from the bolts or rivets holding the yoke to the drawbar shearing off and permitting the coupler to fall to the track. The committee is making a canvass of the injuries sustained by employees in handling uncrated disk harrows, with a view to recommending that the crating of such shipments be required. The committee approved the proposal to provide proper means to permit men to pass over open top cars loaded with boxed automobiles, or similar freight.

This last point aroused considerable discussion. R. C. Richards (C. & N. W.) contended that little climbing over cars is done when a train is in motion; that the proposed rule was impracticable and that few accidents are attributable to such causes. R. J. Clancy (S. P.) and M. A. Dow (N. Y. C.), coincided in this view; and, after further discussion, the proposal was disapproved.

The Goggle Question

Secretary Caviston presented the report of the sub-committee on goggles, which had sent out a questionnaire. It appears that 74 of the 75 roads making replies require or request employees to wear goggles when doing work dangerous to the eyes. Of these, 27 reported the enforcement of the requirement through discipline. The majority of the 74 roads furnish goggles to each workman for his exclusive use. About 15 different makes of goggles are in use, there usually being three styles, one for welders, one for boiler-makers and one for other crafts. The committee concludes that general provisions for education and compulsion are not entirely successful; it is necessary to remove the objections to goggles in each individual case.

Discussing experiences, L. F. Shedd (C. R. I. & P.) said that while some injuries have been sustained on his road when goggles were worn, no eyes have been lost. J. W. Kreitter (D. M. & N.) said that among the 1,200 men engaged in hazardous occupations on his road, of whom 99 per cent wear goggles, no eye accidents have occurred in five years. On some roads trainmen are required to wear goggles. L. G. Bentley (B. & O.) strongly advocated providing individual goggles and grinding of lenses to suit the eye as determined by optical tests. E. S. Chapin (Penn.) explained how the objections of men could be met by modifications in the goggle. C. O. Cott (H. V.) said that the change from

the ear type fastening to the elastic headband fastening had removed the main objections.

Report on Statistics

In presenting the statistical report, T. H. Carrow (Penn.) stated that this committee is working in close touch with the Bureau of Statistics, I. C. C., and has already obtained a number of desired modifications of the government requirements; accidents in maintenance of way work are to be separated from others. The committee has compared the accident reports of different roads and has taken measures to overcome what appears to be a lack of uniformity in reporting.

R. C. Richards (C. & N. W.) cited a record where, in 1920, fourteen of the employees killed and 1,840 of the injured were new men. Accident reports should show the number of accidents to such men.

Mr. Carrow said that such figures will be valuable in explaining the increase in casualties which will probably occur when traffic revives.

F. N. Metcalfe (N. P.) suggested that statistical information should show in detail what accidents cost; but this did not find favor.

The Committee on Publicity and Education made a report. Its chief activities have been the preparation of bulletins from time to time pertaining to particularly dangerous practices. Articles for employees' magazines and for newspapers have been prepared. Progress has been made in establishing a motion picture library as recommended at the first convention. These films will be obtained from a number of roads, from manufacturers of railway supplies and by purchase. It is planned to obtain 30 films as a nucleus for the library. M. A. Dow (N. Y. C.) presented this report.

C. H. Markham Addresses the Section

One of the most interesting features of the convention was the address, at the opening of the second day's session, by C. H. Markham, president of the Illinois Central. He opened with the statement that no branch of railway organization has been more successful in its work than the safety section and emphasized the fact that there were fewer accidents on American railroads in 1921 than in any previous twelve-month in 32 years, notwithstanding an increase in the number of employees of 130 per cent, in passenger traffic of 223 per cent, and in freight traffic of 346 per cent. This is one of the most helpful things being said about railways at the present time. Referring to accidents at highway crossings, "the weakest spot," Mr. Markham showed that in 30 years fatal injuries occurring at railroad crossings have increased 345 per cent and injuries, 632 per cent. Of the 1,907 persons killed and the 4,961 injured in crossing accidents in 1920, about 70 per cent resulted from automobile accidents. Records kept by the Illinois Central for several years disclosed the fact that more than half of the automobile accidents originated on the fireman's side of the train. Mr. Markham pointed out the small amount of improvement possible by the construction of bridges; it would take over 600 years to complete the work if it were conducted on the basis of the 339 crossings eliminated in 1919. The public must cooperate in bringing pressure to bear upon all drivers of motor cars. In the crossing campaign conducted by the Illinois Central in 1916, seventeen towns and cities passed crossing ordinances and one state enacted a law. It is astonishing, said Mr. Markham, that "Stop, Look and Listen"

laws, with teeth in them, have not been passed by all states, towns and cities. He expressed the hope that this organization would accomplish important results along these lines.

The Careful Crossing Campaign

Following Mr. Markham's address the section spent the greater part of the remainder of the day in the discussion of plans for the campaign to prevent accidents at highway crossings. H. A. Rowe (D. L. & W.) presented the report of the committee, submitting a complete plan of organization. "Cross Crossings Cautiously" will be the campaign slogan for use on all bulletins, circulars and posters. The conspicuous feature of the campaign will be a universal three-color poster bearing a picture of an impending crossing disaster. Four sub-committees are provided for, one of which will co-operate with all national organizations. A second one will prepare all matter for printing, including the obtaining of articles from prominent persons throughout the country, while a third will arrange for the distribution of all the printed matter. A fourth will receive and handle all suggestions relative to the physical condition of crossings and movements over them. It is the plan also to make frequent observations at important crossings, to direct personal notices to all persons found careless at such points, and to receive and disseminate statistics on the progress of the campaign.

Mr. Rowe contended that the success of accident prevention at crossings cannot be looked for from legislation exclusively; the railroads must try to enlist the personal interest of every citizen.

The discussion was devoted chiefly to the details of the proposed work and contained little for record, aside from certain remarks made by T. H. Carrow (Penn.), who reviewed interesting studies made on his road relative to the speed of trains in crossing accidents. Of 366 accidents, two-thirds happened where trains were running at speeds of less than 30 miles an hour.

The Foreman's Responsibility

The last day's program was devoted to a general discussion of several prearranged subjects relating to safety work, the first being the question of the responsibility of foremen and others in supervisory positions for injuries to men working under them. In opening the discussion, F. H. Babcock (P & L E.) contended that the foremen must be relied upon to set the example for the others in safety work. It is only proper, in holding foremen responsible for the regular work in their department, to hold them also responsible for safety supervision. E. S. Chapin (Penn.) cited instances wherein insurance companies definitely asserted themselves with respect to proposed changes of foremen; and A. V. Rohweder (D. M. & N.) told of the results obtained on his road when responsibility was fixed upon foremen for safety results. While endorsing these opinions, M. A. Dow (N. Y. C.) cautioned against fixing responsibility upon foremen without at the same time arousing in them a personal interest in the safety work; a sentiment which was warmly applauded.

Motor Car Accidents

The second subject presented for discussion was that of controlling injuries arising in the use of motor cars. A. O. Ridgway (D & R G W.) told how an extended study on his road had disclosed that most accidents occurred at the starting of cars. This problem was largely met by equipping every car with a sufficient number of grab irons. Other steps which proved effective were the supplying of suitable hand holds for use while riding, and guards at the edge to prevent tools from falling off while the cars are in motion, also the placing of restrictions on speed. At this point Chairman Switzer stated that as a result of the section's recommendation last year concerning the use of end guards on cars, 1,000 cars had already been so equipped, to his knowledge. Fol-

lowing Mr. Switzer, F. C. Hunter (U. P.) told how, after an unusually large number of accidents on a certain division, personal visits were made to every motor car driver; each was given to understand that he was to be held strictly accountable for accidents arising from his car; and the trouble was completely overcome. Also, all motor cars were equipped with safety devices, including wheel guards; and for a time all cars were required to be brought to a full stop at grade crossings. The latter order was amended three months later to require stops only at obscure crossings, while requiring speed to be controlled at all others.

L. F. Shedd stated that the Rock Island had put railings upon all of its 1,800 cars, since which there has been a marked reduction in motor car accidents. He suggested that the Interstate Commerce Commission be requested to segregate motor car accidents from others.

Miscellaneous Topics

The remaining subjects discussed by the section pertained to the control of injuries arising from riding leading foot-boards on locomotives, the advisability of posting names in accident bulletins, the control of injuries to car repairers, and the control of injuries in handling rails. Some were opposed to a rigid rule against riding on foot-boards, but there was a general agreement that there should be some restriction. A poll disclosed that a dozen or more roads have rules, more or less strict, regarding this practice.

No disagreement was expressed regarding the claim that names of the injured should not be bulletined unless in peculiar instances and with the injured man's permission, but some controversy arose in regard to the protection of car repair men while at work. Attacking the statement of Robert Scott (A. C. L.) that the adherence to the blue flag rule causes a loss of time, L. G. Bentley (C. & O.) insisted that its rigid observance should be adhered to. W. D. Lending (B. & O.) contended that the blue flag rule was not sufficient in itself; all repair tracks should be kept locked. Enlarging upon this, S. J. Campbell (C. G. W.) pointed out the value of guarding against faulty jacks and of making regular inspection of carmen's tools.

The discussion of the subject of handling rails concluded the proceedings of the convention. Team work among the men in any task of this kind is of the first importance; also constant watchfulness on the part of the foreman and close co-operation on the part of the power operator. J. F. Grodzki (O-W. R. & N.) emphasized the importance of instructing green men and of holding meetings for this purpose immediately after receiving a report of an accident.

The following officers were chosen to serve during the coming year: Chairman, J. T. Broderick, superintendent, safety department, Baltimore and Ohio; first vice-chairman, Isaiah Hale, safety superintendent, Atchison, Topeka & Santa Fe; second vice-chairman, D. H. Beatty, superintendent of safety, Southern Railway System, and secretary, J. C. Caviston, 30 Vesey street, New York City.

THE CITY OF BUFFALO proposes to take action in the courts to compel the New York Central to install gates at four grade crossings; those at Genesee, Church, Erie and Seneca streets. These are now guarded by flagmen.

F. F. GRABLE, president of the United Brotherhood of Maintenance of Way employees and railway shop workers, has called a conference, to be held at Atlanta on May 16, to discuss the withdrawal of the skilled men in that branch of the service in the south-east. The invitation has gone to all general chairmen and vice presidents on the different railroads in the southeastern and Pocatamos districts. J. O. Raley, formerly an international vice president of this organization, who was chosen president of the order of skilled railway maintenance of way employees at a meeting held in Atlanta a few weeks ago, is looked upon as an outlaw.

General News Department

J. E. Fairbanks, general secretary, announces, on behalf of the Committee on Relation of Railway Operation to Legislation, of the American Railway Association, that the law of Maryland which repeals the full-crew law of that state, will go into effect on June 1, and that the similar law in New Jersey goes into effect on July 4.

The House committee on interstate and foreign commerce on May 3 reported favorably without amendment the bill recently passed by the Senate, S. 539, to strike out of the valuation act the requirement that the Interstate Commerce Commission shall ascertain and report the so-called excess cost of acquisition of railroad lands.

The New York Sectional Committee of the signal section of the American Railway Association will meet at Hotel McAlpin, Broadway and 34th street, New York City, on Thursday evening, May 18, to listen to an address by Robert C. Johnson, signal engineer, Brooklyn Rapid Transit Company, on "A Scientific Method of Locating Automatic Block Signals for a Railroad of Heavy Traffic."

An Assistant Railroad Engineer is one of the positions named by the Civil Service Commission of the State of New York in announcing examinations for candidates, to be given on June 3. An appointment to this position is to be made by the Public Service Commission; salary \$3,200. Candidates must have had six years' experience in connection with the maintenance and construction of steam railroads, or equivalent qualification. Graduation from a civil engineering course of a school of the highest standing will be counted as two years of experience. Applications should be sent to the Civil Service Commission, at Albany, before May 22.

May Meeting of New York Railroad Club

W. L. Bean, mechanical assistant of the New York, New Haven & Hartford, will deliver a lecture on Some Recent Developments in Gasoline Driven Passenger Rail Cars before the New York Railroad Club on May 19. The meeting will be held at the Engineering Societies' Building, New York, at 8 p. m. Mr. Bean's lecture will be illustrated by slides and motion pictures.

Special Train from Chicago for June Convention

For the convenience of persons going to Atlantic City to attend the convention of the Mechanical Division of the American Railway Association, which meets from June 14 to 21, inclusive, the Pennsylvania System will run a special train leaving Chicago at 1 p. m., central time, on June 12 and arriving at Atlantic City at 10:45 a. m., eastern time, on the following day. The train will consist of club, open section, drawing room and compartment cars, and a dining car.

Stone and Shepard Urge Election of

Right Men to Avert Walkouts

Strike at the ballot box and you will not have to strike in your employment was, in substance, the advice given to the Order of Railway Conductors at their annual convention held in Cleveland, Ohio, last week, by L. E. Shepard, president of that organization, and Warren S. Stone, president of the Brotherhood of Locomotive Engineers. Both speakers also urged the members of the Ladies' Auxiliary to enter politics.

"I warn politicians, I warn any administration, state or national, that attempts by legislation to tie the hands of the workers is fraught with dangerous possibilities," President Shepard said, while Mr. Stone stated: "The place to strike and the time to strike is on election day at the ballot box. When you do that and send men to Washington to represent you and not misrepresent you, you will not need to strike."

Former Secretary of War. Newton D. Baker, said the "civiliza-

tion of America is a railroad civilization." He complimented railroad workers for their service within the firing zone during the war.

Fuel Association Convention

The International Railway Fuel Association has adopted a novel plan for the sessions of the annual convention to be held at the Auditorium Hotel, Chicago, May 22-25, which it is thought will add to the value of the meeting. Following the presentation of the papers, written discussions will be read after which an open forum will be conducted giving all who are present at the meeting an opportunity to speak. No stenographic report of the informal discussion will be made but opportunity will be given to submit written discussions to the secretary of the association which must be sent in not later than June 15. The officers of the association anticipate that this plan will call forth freer discussion, speed up the program and expedite the issuing of proceedings.

"Summer Time"

Changes in the time of passenger trains made on April 30, to accommodate the large number of cities and towns that adopted "Summer Time" on that day, were so numerous that the Official Guide was obliged to reset about 25 per cent of its time-table pages for the May issue; but the book came out on May 10, nevertheless. The total number of time-tables received for correction in that issue of the Guide was about 500, something less than 400 of these taking effect on April 30. Most of the changes in the United States were east of the Mississippi river, but in Canada the change took effect from ocean to ocean.

On the Long Island Railroad and on the eastern division of the Erie, time-tables were not changed on account of daylight saving time, the clocks being set to the Sixtieth meridian, to correspond with the clocks used by citizens generally.

A Look Ahead

The people rule the railroads; if they appreciate their responsibility they will take up this duty seriously at its primary stage, the ballot, by which must be selected the right agents to carry out the people's wishes. This was the burden of an address by Elisha Lee, vice-president of the Pennsylvania Railroad, before the Transportation Club of New York city, on May 5.

Mr. Lee presented a hopeful view of the future of American railroads. Motor and air transport competition is more likely to be beneficial than harmful. He believes the people will retain private ownership and will learn how to regulate constructively. He sees a trend away from paternalism and in the direction of restoring the initiative of management. In closing, he said: "The neglect of the ballot is the peril of Americanism. How is it that we have permitted ourselves to be dragged so far into communistic and socialistic experiments in the last few years? Why do we permit thrift, industry, enterprise, and intelligence to be robbed of their fruits? . . . A large proportion of the people who ought to be our most solid and substantial citizens fail in the primary obligation of citizenship—that of exercising the right and the duty of the ballot. And we particularly need to exercise jealous care in the place where so many of us fail—at the primary elections. Often barely one voter in four or five takes part in them. Yet it is at the primaries that the office-holders are really chosen. If we get good Americans on all tickets the country cannot very well go far astray in the final elections. We must preach everywhere the importance of getting substantial thinking people to go to the polls at every election and to pay especial attention to the primaries. . . . I do not think Providence intended this great country of ours to be run by, or chiefly in the interest of, the disgruntled, the envious, the failures, the incompetents, the lazy, the indifferent, the culls, the resentful, the inefficient, or the visionary. . . ."

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1922

Name of road.	Average mileage operated per month.		Operating revenues.				Operating expenses.				Net operating income (or loss).	Net after all rentals.	Net after all 1921.		
	Freight.	Passenger.	(Inc. misc.)	Maintenance of way and structures.	Traffic.	Transp.	General.	Total.	Operating.	Net.					
Alabama & Virginia	141	\$188,217	\$55,867	\$16,646	\$42,655	\$40,284	\$8,472	\$27,135	\$11,861	\$197,130	75.50	\$64,136	\$41,687	\$31,324	\$31,097
Albany & Vermont	141	52,227	231,113	116,338	146,649	26,492	395,171	35,171	50,884	63,003	84.70	113,545	50,884	63,003	37,075
Albany, Shrewsbury & East	171	60,585	258,962	87,347	172,143	28,101	357,328	39,765	37,379	47,865	77.50	156,379	47,865	71,506	37,379
Albany, Utica & Vermont	171	178,131	1,651,866	14,644	19,680	5,572	46,885	9,046	95,607	511,000	11,799	82,299	48,619	16,499	16,499
Albany, West & Vermont	171	375,751	4,213,411	341,001	55,338	16,752	1,019,729	32,388	38,475	7,600	102,718	281,255	154,623	54,623	54,623
Albany, West & Vermont	93	1,066,341	12,653,141	1,414,536	130,343	28,584	4,681,881	162,500	182,500	80,291	2,920,340	1,625,000	98,273	281,249	281,249
Arden, Uperes & S. F.	8,855	9,843,907	3,424,667	14,501,623	2,187,923	3,498,828	255,259	4,681,466	359,855	10,979,155	77.40	3,424,268	2,413,600	2,600,346	2,283,598
At. & N. E.	8,8	2,952,212	9,854,851	38,975,255	5,311,096	10,459,176	779,040	13,630,918	1,019,670	31,569,723	91.40	7,806,002	4,762,452	5,033,577	2,201,102
At. P. & N. E.	19,7	1,984,239	286,061	4,113,118	451,360	39,239	60,634	65,656	61,624	348,061	99.30	148,062	73,221	62,433	44,730
At. P. & N. E.	1,07	1,659,454	848,951	1,433,107	1,227,002	1,453,653	115,431	216,461	4,099,881	99.30	31,186	1,286,000	30,231	41,331	41,331
Baltimore & Annapolis	857	7,020,121	1,584,748	1,534,428	1,534,428	1,534,428	1,534,428	1,534,428	1,534,428	1,534,428	95.30	65,000	42,571	37,045	37,045
Baltimore & Annapolis	31	88,134	62,604	179,477	2,191	41,719	7,525	66,089	10,160	136,088	86.20	23,339	14,098	6,423	1,181
Baltimore & West Coast	91	259,513	194,373	521,474	128,217	23,239	215,040	30,362	40,436	1,171,102	92.20	40,601	12,789	10,357	10,357
Western of Alabama	133	114,140	60,620	201,085	27,607	49,275	10,611	70,529	10,553	171,102	85.10	2,983	33,258	23,872	1,881
Albany & Vermont	133	309,397	1,544,096	75,703	184,853	25,840	203,827	45,833	48,833	80,850	85.273	35,098	37,384	1,680	1,680
Albany & Vermont	619	7,515,143	95,702	1,070,312	1,070,312	1,070,312	1,070,312	1,070,312	1,070,312	1,070,312	111.40	127,500	189,499	131,305	131,305
Albany & Vermont	4	4,869,241	1,607,349	788,332	699,300	1,276,884	122,093	2,720,117	138,332	4,613,908	165.30	4,671,139	2,186,437	2,051,822	1,080,400
Albany & Vermont	4,23	1,610,038	4,888,001	18,402,722	1,965,993	3,448,823	354,052	6,259,745	418,582	12,278,420	73.00	5,233,952	4,740,330	4,440,260	2,327,914
Albany & Vermont	34,2	2,094,616	14,643,749	2,094,616	4,597,938	306,650	6,803,551	496,006	1,454,578	77,060	4,161,171	3,413,591	3,081,212	2,338,653	
Albany & Vermont	5,15	15,576	39,297,488	6,010,111	6,010,561	6,010,561	6,010,561	6,010,561	6,010,561	6,010,561	90.60	5,616,644	26,134	2,885,288	2,885,288
Baltimore & Ohio	91	1,260,212	85,517	202,844	38,461	31,196	1,882	113,348	15,148	200,045	98.60	1,809	12,557	27,543	42,815
Baltimore & Ohio	23	24,675	241,622	5,280,338	111,755	108,715	5,384	331,692	41,728	599,532	113.50	21,404	119,742	160,538	151,211
Baltimore & Ohio	6	9,304,734	82,104	21,539	108,016	132,447	31,370	231,257	17,995	431,338	54.06	419,101	341,681	339,054	91,178
Baltimore & Ohio	253	1,607,723	23,810	2,289,186	317,145	389,928	10,910	648,937	55,425	1,431,225	62.06	367,463	708,357	715,681	233,492
Baltimore & Ohio	12	1,581,127	95,767	248,137	5,241	2,907,221	5,241	2,907,221	5,241	2,907,221	66.00	504,972	302,818	244,366	244,366
Baltimore & Ohio	235	721,004	32,728	175,168	119,471	102,712	12,833	261,456	24,338	726,152	93.70	49,016	16,404	67,995	28,700
Baltimore & Ohio	1	1,014,356	241,985	843,642	40,543	54,688	41,309	5,384	4,572	1,064,485	102.60	50,129	188,343	53,857	33,946
Baltimore & Ohio	34	10,748	11,163	21,311	4,181	3,409	5,384	4,572	1,064,485	3,760	5,410	11,489	27,236	22,159	
Baltimore & Ohio	34	9,979	30,663	57,535	9,906	3,856	13,153	13,137	13,137	31,010	107.171	85,311	81,705	30,500	
Baltimore & Ohio	2,27	1,620,310	18,552,963	2,613,281	3,606,933	3,606,933	3,606,933	3,606,933	3,606,933	3,606,933	88.60	2,207,930	1,753,141	1,010,317	1,618,985
Baltimore & Ohio	9	169,766	401,692	58,449	61,623	58,834	155,204	5,735	36,322	66,923	56.86	73,272	66,923	30,346	30,346
Baltimore & Ohio	253	165,674	29,104	53,482	88,649	157,191	463	155,204	14,990	248,321	60.30	163,351	144,304	144,304	71,254
Baltimore & Ohio	1	1,241,118	113,157	1,704,765	120,722	591,830	18,730	609,520	38,434	1,724,477	80.51	312,288	294,038	283,156	8,639
Baltimore & Ohio	313	3,616,666	18,343,700	2,111	1,016,626	4,332	338,320	110,846	70,710	6,000,000	71.60	91,400	75,490	62,280	21,810
Baltimore & Ohio	313	708,416	101,883	669,622	68,626	176,609	12,855	11,095	740,242	80.40	2,741,700	1,694,381	1,090,285	1,090,285	
Baltimore & Ohio	241	614,311	35,273	879,316	166,679	165,609	93,214	170,667	19,027	4,940,300	66.20	2,974,600	189,689	234,174	100,156
Baltimore & Ohio	291	1,729,437	103,689	1,864,148	429,527	62,546	489,466	50,817	1,245,311	67,900	616,637	495,851	466,588	41,242	
Baltimore & Ohio	1,213	1,427,151	187,763	1,982,445	228,650	350,575	62,049	85,607	1,454,198	72,900	537,277	444,337	460,547	89,408	
Baltimore & Ohio	1,650	8,801,381	1,192,066	5,136,539	667,906	991,010	9,240	2,026,800	238,830	4,178,310	81.30	1,558,909	1,028,608	669,346	161,130
Baltimore & Ohio	945	1,066,341	139,457	2,304,670	197,336	328,550	489,730	69,005	1,434,051	76.00	530,638	464,594	485,866	226,647	
Baltimore & Ohio	845	4,065,471	1,066,219	6,138,242	609,310	1,552,190	131,531	2,589,477	201,452	9,088,134	79.10	1,348,008	1,091,262	1,063,787	338,760
Baltimore & Ohio	8402	8,124,300	2,426,265	11,698,484	1,071,035	2,426,927	147,988	5,800,794	330,172	9,976,317	76.70	2,400,372	1,669,317	1,533,676	443,839
Baltimore & Ohio	8,402	2,916,651	81,570,365	3,156,207	7,149,486	458,632	15,480,053	948,200	97,376,317	86.20	4,933,548	1,991,144	1,712,169	1,201,337	
Baltimore & Ohio	9,134	10,812,040	9,077,623	13,969,610	1,514,502	2,024,530	174,288	4,993,200	32,2735	10,050,406	71.00	8,979,134	3,008,180	2,806,358	2,532,054
Baltimore & Ohio	1,409	1,491,666	6,406,147	3,761,115	66,427	1,613,163	1,613,163	1,613,163	1,613,163	1,613,163	80.70	384,483	305,166	169,572	169,572
Baltimore & Ohio	1,496	3,959,685	1,011,299	5,374,131	453,413	1,407,575	194,843	2,517,273	165,676	6,178,383	88.90	597,478	341,145	12,391	146,962

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Freight, Passenger, etc.), Maintenance of way and structures, Traffic, Trans-shipment, General, Total, Operating ratio, Net railway operating, Net after other, Net after 1921.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Maintenance of way and structures, Equip. ment, Traffic, Trans- portation, General, Total, Operating ratio, Net from way operations, Operating income (or loss), Net after rentals, Net after interest.

REVENUES AND EXPENSES OF RAILWAYS

MONTHLY BY MONTH AND THREE MONTHS UP CALENDAR YEAR 1942—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Operating revenues (Freight, Passenger, Mail, etc.), Maintenance of Way and Equipment, Traffic, Operating expenses (Fuel, Oil, etc.), Net operating ratio, Net from operations, Net after depreciation, etc.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.	Average mileage during period.	Operating revenues				Operating expenses			Total.	Operating ratio, %	Net railway operations.	Net after rental.	Net after rentals, 1921.
		Freight, Passenger.	Total (inc. misc.)	Way and Equip. ment.	Maintenance of Road.	Traffic.	Trans- portation.	Gen. ad- vances.					
Houston & Tex. Central.....	923	\$842,326	\$209,812	\$213,046	\$227,093	\$231,155	849,603	\$949,560	77.50	\$73,695	\$29,412	\$103,860	\$41,566
Houston, East & West Tex.....	923	1,637,611	891,179	921,972	685,253	709,117	1,354,888	1,293,669	76.60	366,619	73,139	589,172	253,944
Louisiana Western.....	797	522,643	108,630	141,607	148,837	153,622	310,728	251,412	88.90	31,745	2,509	17,727	45,983
Morgan's La. & Tex. R.R. & S.S.....	400	802,533	257,188	125,951	198,159	227,557	323,324	557,785	72.90	305,370	223,469	212,038	132,650
Texas & New Orleans.....	507	543,576	130,253	155,166	185,512	192,035	268,530	202,601	94.40	109,720	26,124	84,107	193,269
Spokane International.....	165	1,718,743	432,498	420,428	529,464	34,377	1,006,317	1,006,317	83.70	372,346	300,637	186,218	224,657
Spokane, Portland & Seattle.....	549	395,632	123,574	64,685	79,807	97,233	191,067	183,233	70.50	80,766	64,278	43,768	46,962
Tennessee Central.....	308	1,171,500	426,764	490,376	549,748	47,366	974,816	88,176	87.90	298,862	173,640	145,187	47,885
Term. R.R. Assn. of St. Louis.....	37	1,684,659	727,005	1,322,414	1,570,786	139,467	2,908,442	279,046	86.00	1,016,118	640,652	403,644	302,949
E. St. Louis Connecting.....	308	1,000,800	199,610	113,881	133,881	3,052	389,195	213,533	67.10	324,997	276,323	332,549	141,135
St. L. Mohts. Pr. Term.....	9	995,055	119,444	6,253	113,697	2,772	453,338	147,266	76.30	44,473	66,014	78,569	18,171
St. Louis Transfer.....	6	200,077	200,077	28,753	13,890	539	104,459	156,002	76.30	66,014	69,906	78,569	18,171
Texas & Pacific.....	1,052	1,717,500	550,592	2,460,587	490,376	549,748	47,366	974,816	88.176	298,862	173,640	145,187	47,885
Toledo, Peoria & Western.....	308	1,684,659	727,005	1,322,414	1,570,786	139,467	2,908,442	279,046	86.00	1,016,118	640,652	403,644	302,949
Toledo, St. Louis & Western.....	154	788,028	262,823	113,728	138,319	26,951	279,346	46,113	87.90	251,557	205,434	161,083	34,704
Trinity & Brazos Valley.....	308	2,622,693	205,659	291,471	381,938	627	1,287,814	1,287,814	89.80	710,146	578,520	478,906	135,586
Union.....	45	2,020,455	156,073	156,073	320,876	667	330,243	596,204	83.60	177,256	104,252	107,913	6,954
Union Pacific.....	3,665	6,134,177	1,298,881	8,151,140	1,771,901	2,071,177	31,574	5,379,900	65.90	2,771,159	2,295,996	2,183,740	2,069,535
Oregon Short Line.....	2,472	5,259,012	1,169,551	8,299,354	1,620,389	1,620,389	333,065	3,352,532	66.10	1,068,365	791,872	4,708,836	3,456,569
Oreg. Wash. R.R. & Nav.....	2,218	4,507,555	1,194,368	6,214,900	972,768	1,212,376	2,829,406	2,705,760	75.90	509,140	34,883	267,534	145,763
St. Joseph & Gr. Isl.....	258	235,861	73,180	49,776	47,476	118,543	118,543	118,543	81.10	137,565	48,927	39,377	11,246
Utah.....	104	332,476	113,550	33,543	48,628	191	26,300	41,908	65.05	48,631	43,040	37,403	7,856
Virginian.....	526	1,754,448	639,490	1,899,880	508,731	1,107,4	391,010	29,844	58.50	803,705	707,379	722,923	204,980
Wabash.....	2,472	4,210,486	679,613	5,169,547	1,174,146	2,784,751	3,460,62	1,451,321	60.20	1,947,748	1,654,314	1,696,422	731,437
Western Maryland.....	804	1,329,721	70,328	1,503,216	338,957	311,498	528,999	44,904	82.10	2,504,650	956,241	1,691,595	386,803
Western Pacific.....	1,042	589,159	144,697	784,889	132,395	312,220	353,639	734,462	92.60	50,127	36,100	87,177	5,042
Wheeling & Lake Erie.....	511	1,171,065	357,632	473,004	357,632	473,004	428,071	216,949	92.60	171,327	87,177	13,408	269,130
Western Maryland.....	804	1,329,721	70,328	1,503,216	338,957	311,498	528,999	44,904	82.10	2,504,650	956,241	1,691,595	386,803
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Wheeling & Lake Erie.....	5												

Wage Statistics for February

The Interstate Commerce Commission reports that the number of employees reported by Class I roads for the month of February, 1922, compared with January returns, shows a decrease of 6,974. Compensation decreased \$10,655,212. Compared with the same month last year the employment shows a decrease of 131,503. A comparison of the number of employees and their compensation, by months, for the period covered by the new classification follows:

CLASS I STEAM ROADS

Month	Number of employees	Total compensation
July, 1921	1,634,872	\$214,339,385
August, 1921	1,679,927	227,745,895
September, 1921	1,718,330	223,972,822
October, 1921	1,754,136	237,602,959
November, 1921	1,732,353	225,394,006
December, 1921	1,637,151	214,921,396
January, 1922	1,552,014	205,178,639
February, 1922	1,545,040	194,523,427

*Excludes Detroit, Toledo & Ironton Railroad.

Two Years' Work of the Labor Board

During the first two years of its existence the United States Railroad Labor Board passed upon 632 questions, according to a report which it has just prepared. In the calendar year 1920 it issued 42 decisions, 14 interpretations, and 6 addenda, while in 1921 it prepared 539 decisions, 17 interpretations, and 14 addenda. During the latter year the board issued two major decisions applicable to rules governing the working conditions of employees, Nos. 222 and 501, the first covering shop craft employees and the latter maintenance of way workers. Since the first of the present year the board has rendered additional decisions governing the working conditions of clerical workers, signalmen, train dispatchers, express employees, trainmen and oilers, supervisors of mechanics and telegraphers.

Decision No. 2 of the board, which was issued on July 20, 1920, and was retroactive to May 1 of that year, covered 140 parent companies and their subsidiaries, and several terminal companies, the exact number not being known. Decision No. 33 (electric lines decision) affected 11 companies, while Decision No. 108 (short line decision) was applied to 67 companies, the three decisions enumerated above totaling 235 companies in all. It is estimated by the board that the annual increase in payrolls due to Decision No. 2 amounted to \$558,180,134.56, this figure covering straight time earnings for all employees except those engaged in train and engine service for whom all time was taken into consideration. The estimated annual decrease in the payrolls due to Decision No. 147 amounted to \$378,004,675.80, this figure also covering straight time earnings for all employees with the exception of those in train and engine service as mentioned above.

The number of employees in the service of the companies has fluctuated widely. The compensation report compiled by the Interstate Commerce Commission for the month of December, 1921 shows that there were then 1,372,151 men in service, while the report for August, 1920, gives the number as 2,197,784, these figures indicating the minimum and maximum employment. The decisions rendered by the board during 1920 and 1921 involved 45 employees' organizations.

Wage Statistics for Last Half of 1921

The Interstate Commerce Commission has issued a consolidated statement of its wage statistics of American railroads for the six months July-December, 1921, during which its new classification of railroad employees was in effect, as well as the reduction of wages ordered by the Railroad Labor Board effective on July 1. The average number of persons in the employ of the railroads for this period shows a decrease of 416,384, or 19.7 per cent, as compared with the same period of 1920. Compensation decreased \$60,829,775 or 33.9 per cent. The average number employed at the middle of the month was 1,692,794 and the average number of full-time positions was 1,592,755, while the total compensation for the six months was \$1,343,886,463, of which \$70,478,076 represented overtime and \$55,487,464 "other compensation." In the next column a table is shown giving a recapitulation, to which has been added a column showing the average earnings per employee per month

COMPENSATION OF RAILROAD EMPLOYEES, HALF YEAR

Group	Straight time actually worked	Per cent of total compensation earnings	Overtime paid for	Per cent of total compensation earnings	Daily or other compensation earnings	Average earnings per employee per month
I. Executives, officials, and staff assistants..	Daily basis \$37,994,940	99.62	\$1,959	....	\$142,791	\$38,139,600
Daily basis	48,741,518	6.73	258,405	1.69	5.13	1,196,263
Hourly basis	153,962,347	93.20	3,110,484	1.69	58	167,299,445
II. Professional, clerical, and general.....	Daily basis	8.73	7,087	2.94	6.63	6,531,766
Daily basis	6,486,128	96.87	6,122,288	2.94	49	364,801
Hourly basis	195,539,531	96.87	41,556	4.08	7.55	464,965
III. Maintenance of way and structures....	Daily basis	94.06	15,835,933	3.92	6.6	22,122,210
Daily basis	341,419,517	94.06	884	3.20	76.21	367,040,702
Hourly basis	21,615,688	95.24	101,456	3.92	64	16,033,511
IV. Maintenance of equipment and stores..	Daily basis	3.54	5,613,171	1.93	8.55	390,038
Daily basis	15,763,344	95.38	36,436	1.93	73	9,062,693
Hourly basis	125,298,071	95.38	429,568	12.11	1.00	131,053,849
V. Train or other than train, engine, and yard.	Daily basis	8,636,219	76.99	73	38,527,733	318,269,883
Daily basis	14,439,053	76.99	73	747	2,309,320	142,086,056
Hourly basis	8,636,219	90.63	538,899	4.01	80	9,175,119
VI (a). Transp. station, yardmasters, switch tenders, and bottlers.....	Daily basis	747	69,939,177	5.24	....	1,201,800,407
Hourly basis	1,078,683,086	....	70,478,076	....	....	1,343,886,463
VI (b). Transportation (train and engine service.	Daily basis	139,237,837	....	....	....	....
Hourly basis	1,078,683,086	....	....	....	....	....
All employees	1,592,755	....	....	....	....	....
Total number of employees and compensation	1,692,794	....	....	....	....	....

**Railroad Committee Makes Recommendations
Regarding Consolidation Hearings**

Railroad counsel from all parts of the country met at Washington on Tuesday to consider recommendations to the Interstate Commerce Commission as to the character of the basic data which should be furnished by the railroads in the hearings on the commission's tentative consolidation plan. The recommendations of the roads were then presented on Wednesday to Commissioner Hall by a sub-committee of six, headed by R. V. Fletcher, general solicitor of the Illinois Central, and including S. T. Bledsoe, general counsel of the Atchison, Topeka & Santa Fe; J. P. Blair, general counsel of the Southern Pacific; L. E. Jeffries, vice-president and general counsel of the Southern; E. S. Jonett, vice-president and general counsel of the Louisville & Nashville, and B. B. Cain, vice-president of the American Short Line Railroad Association. The date for the resumption of hearings was also considered. The hearing on April 24 on that part of the tentative consolidation plan applying to the Southeast was adjourned because the railroads had not understood what information the commission desired and most of them had nothing to offer except as they had objections to point out to the tentative plan.

Bureau of Mines Investigating Coal Storage

The obvious importance of a clear understanding today of all elements involved in the storage of coal, for industrial and other purposes, has led the Bureau of Mines, in conjunction with the Department of Commerce to undertake an investigation of the question in which co-operation and advice of the railroads is earnestly requested.

While there has been much agitation of the possibilities of coal storage in the way of giving more regular mining and movement of coal, but little exact information is available especially regarding costs of handling and transportation in and out of storage, as well as of the investment, fixed charges, etc., involved.

The bureau requests therefore that the railroads give it the benefit of their views and conclusions on the various items listed below, calling attention particularly to the value of exact data and actual working costs. The various items to be covered are as follows:

- Method of storage.
 - Under water or not—
 - Closed sheds or in the open—
 - Kind of floor or ground.
- Location of storage with reference to point where coal is to be used.
- Quantity stored, maximum—average.
- Spontaneous combustion, methods of preventing.
- Handling fires, method of
- Devices used for observing temperature and inspection.
- Danger point as regards temperature.
- Deterioration in sizes and also in heating value in stored coal.
- In your practice what tonnage can be stored per acre of available space.
- Depth of pile, maximum allowed.
- Kind of coal stored.
- District from or trade name.
- Size stored.
- Is coal screened before storing.
- How long coal must be stored.
- Best time of year to store.
- Cost of storage plant and cost of maintenance.
- Cost of handling in and out of storage.
- Transportation to pile.
- Transportation from pile to point of use.
- Effect of climate on stored coal, if any.
- Costs of unloading and reloading.
- Method of handling in and out of storage.
- Cost of investment and fixed charges.

Compliance with this request will be greatly appreciated and any data furnished will be treated as confidential, if so desired. All communications should be addressed to F. R. Wadleigh, commercial engineer, Bureau of Mines, Chief, Coal and Coke Section, Fuel Division, Department of Commerce, Washington, D. C.

E. F. GRABLE, president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, has called a conference, to be held at Atlanta on May 16, to discuss the withdrawal of the skilled men in that branch of the service in the southeast. The invitation has gone to all general chairmen and vice presidents on the different railroads in the southeastern and Pocahontas districts. J. O. Raley, formerly an international vice president of this organization, who was chosen president of the Order of Skilled Railway Maintenance of Way Employees at a meeting held in Atlanta, Georgia, a few weeks ago, is looked upon as an outlaw.

Traffic News

The Chicago & North Western and the Union Pacific announce that the Denver Special, between Chicago, Ill., and Denver, Colo., will be restored on May 28.

The Marion (Ohio) Traffic Club elected the following officers at its annual meeting on April 13: President, D. R. Biggert, Marion National Mill; vice-president, M. B. Lindsay, Ohio Locomotive Crane Company; secretary, W. R. Ankland, Marion Steam Shovel Company, and treasurer, S. D. Ross, Huber Manufacturing Company.

The New York, Chicago & St. Louis has put on a new through daily passenger train each way between Chicago and Buffalo, with sleepers to and from New York over the Delaware, Lackawanna & Western. The eastbound train (No. 6) leaves Chicago at 2:40 p. m. and the westbound train connects with Lackawanna train No. 7, leaving New York at 6:30 p. m.

The Wisconsin State department of markets, Madison, has begun a movement to organize shippers for the purpose of "shipping intelligently," and incorporation papers of the "Wisconsin Agricultural Traffic Association" have been made out and filed. A campaign has been started to enlist the shippers of the state, especially farmers, as members. The state railroad commission, the federation of cheese-producers, the state branch of the American Society of Equity, the Wisconsin Farm Bureau Federation and other agricultural organizations are co-operating with the marketing department. W. P. Jones is in charge of organization. Memberships are being sold to individuals and corporations engaged in shipping farm products for \$25 a year. It is proposed to furnish members with complete information as to routes, tariffs and other transportation essentials; to provide for the adjustment and collection of overcharges in transportation of freight, baggage, express, or passengers; adjustment of claims for loss or damage, and prosecution of proceedings before rate committees or commissions.

Cheaper Sleeping Car Privileges

The railroads west of Chicago have modified their tariffs so that now only one railroad ticket is required from a passenger desiring to hold a section in a sleeping car; and two fares will be sufficient for a drawing room. Hitherto a passenger occupying a section had to have one and a half railroad tickets. The eastern lines have filed tariffs making the same change which, it is expected, will be allowed to go into effect on May 15.

Coal Production

Production of coal has struck a temporary level a little above the 4-million-ton mark, according to the weekly bulletin of the Geological Survey. The output for the week of April 29 was 4,150,000 tons, and early reports indicate that the week of May 1-6 will show a like amount. Production of anthracite remains practically zero.

The total output of all coal—anthracite and bituminous—in the fourth week of the strike (April 24-29) was 4,156,000 tons. In the fourth week of the 1919 strike 5,334,000 tons of bituminous coal, and 1,759,000 tons of anthracite were produced, a total of 7,093,000 tons. Current weekly output of all coal is therefore running some 3,000,000 tons short of the 1919 experience.

Much the same rate of production obtained last week (May 1-6), the fifth of the strike. No significant break in the ranks of striking miners has occurred, although a small number of men have gone back to work in Texas. The number of non-union men on strike has not changed materially. The accumulation of unbilled cars of coal is slowly decreasing, but is still above normal. Demand is stiffening, and the latest district to report improvement is the Middle West, but the market is still not active enough to call out full production from mines remaining at work.

Day	1st week	2d week	3rd week	4th week	5th week
Monday	11,445	10,772	7,898	12,131	11,919
Tuesday	11,019	10,658	10,041	12,377	12,120
Wednesday	11,437	10,961	11,083	12,622	12,810
Thursday	11,090	11,462	11,193	11,981	12,460
Friday	11,296	10,714	11,896	12,362	
Saturday	8,888	8,501	10,194	11,295	

Commission and Court News

Interstate Commerce Commission

The commission has suspended until September 7, the operation of schedules which propose to reduce the rate on cement from Leeds, Ala., to Richmond, Va., from 20 cents per 100 lbs. to 21½ cents.

The commission has suspended until September 7, the operation of schedules published in a supplement to Agent F. A. Leland's tariff which propose to increase and reduce rates on cottonseed oil from various Oklahoma producing points to various Louisiana points.

The commission has suspended until September 7, the operation of certain schedules published by the Merchants & Miners Transportation Company, which propose increases in the rates on leather boots and shoes of 9½ cents per 100 lbs. from Boston, Mass., and Providence, R. I., to Petersburg, Richmond and South Richmond, Va.

The Interstate Commerce Commission has set aside its orders making increases in intrastate rates within the state of Texas to correspond to the interstate increases ordered by the commission in Ex Parte 74, because the Texas commission by an order entered April 26 has itself prescribed for observance after May 15 the increased rates ordered by the federal commission. The commission has also denied a petition for a re-hearing of the Texas case filed by the railroads.

The Interstate Commerce Commission

Now Working on Daylight Saving Schedule

Because the government departments at Washington are going on a daylight saving schedule on May 15 the Interstate Commerce Commission has announced that its hearings at Washington, which usually begin at 10:00 a. m., will begin at 9:00, and arguments, which usually begin at 10:30 will begin at 9:30. The hands of the clock are not to be changed but the government offices and business institutions of the city are to go to work an hour earlier and close an hour earlier.

Certificates of Public Convenience

Not Confined to New Lines

The Interstate Commerce Commission in conference on May 8, 1922, rescinded the following conference ruling which was adopted on April 8, 1921:

That the applications which must be made to the commission for certificates of public convenience and necessity under paragraph (18) of section 1 of the Interstate Commerce Act are confined to new lines of railroad and extensions of lines of railroad to be constructed, or put in operation in interstate or foreign commerce, by carriers subject to the act, subsequent to the effective date of the paragraph, and to lines of railroad in interstate or foreign commerce, except that the term "abandon," as used in the paragraph applies to any line of railroad or portion thereof owned or operated by a common carrier subject to said act, and means entire cessation of operation thereof in interstate or foreign commerce; and that any such certificate granted by the commission applies to the property covered thereby, regardless of any change in the owner or operator of the property which may take place after the certificate is granted.

That it is not necessary to secure from the commission a certificate of convenience and necessity for the acquisition of an ordinary trackage right, or for the discontinuance of the use of such trackage right, provided such discontinuance does not result in withdrawal of all service to the public upon the road or part of road over which such trackage right is exercised.

It is understood that this withdrawal will remove some questions which have arisen on applications for approval of the acquisition and operation of existing lines.

State Commissions

The Memphis, Dallas & Gulf has petitioned the Arkansas Railroad Commission for permission to take up its track between Nashville, Ark., and Hot Springs, 86 miles. Hearings were held on April 26 and 27 and the records have been forwarded to the Interstate Commerce Commission for further action.

The Arizona Corporation Commission has denied the application of the Arizona & Swansea for leave to dismantle and abandon its line. The road extends from Bouse, Ariz., to Swansea, a distance of 21 miles, connecting with the Atchison, Topeka & Santa Fe at the former point. It was constructed in 1910 to serve the Clara Consolidated Gold & Copper Mining Company, located at Swansea. The commission decided that inasmuch as the scrap value of the road was small, and, that there is a better outlook for business within that territory, it would be to the interest of all parties concerned to maintain the line.

Court News

Abandonment of Branch Not Special Injury to Shipper

The Montana Supreme Court holds that a mining company situated on a branch railroad cannot, in the absence of an express contract, claim damages for the abandonment of the branch because it has constructed and maintained a track at its own expense, though the branch was constructed specially to serve the mining company.—Helen & Livingston I. & R. Co. v. Northern Pacific (Mont.), 204 Pac. 370.

Employee, Denied Passage on Pass,

Has No Right to Become Blind Passenger

The Wisconsin Supreme Court holds that a railroad employee, denied passage on a train on which he is entitled to ride on a pass given him, must abide by the orders of the trainmen and seek redress, if he has any, otherwise than by endeavoring unlawfully to become a blind passenger on the train.—Herschman v. Chicago, M. & St. P. (Wis.), 186 N. W. 613.

Liability for Loss of Shipments to Foreign Countries

In an action for damages for loss of a carload of vegetables, delivered to the defendant, Southern Pacific, for shipment to a point in Canada, the California Supreme Court holds that the Carmack Amendment, making initial carriers liable for loss caused by them or by connecting carriers, did not apply to a shipment to a foreign country, and the Cummins Act, extending the liability, does not apply to such a shipment before its adoption in March, 1915.—McCaslin v. Southern Pacific (Cal.), 203 Pac. 742.

Not Liable for Loss When No Tariff Was Filed

The Texas Court of Civil Appeals holds that, under U. S. Comp. St., sec. 8569, par. 7, providing that no carrier shall engage in the transportation of passengers or property without filing and publishing a tariff, where a carrier has made no rate for solid silverware, it is not authorized to receive such property for shipment by freight, and as a contract therefor would be illegal under the statute, the carrier is not liable for the loss of such property taken as freight.—Payne v. Bassett (Tex. Civ. App.), 235 S. W. 917.

Excessive Damages

The Missouri Supreme Court holds that, in an action for compensation under the Federal Employers' Liability Act for the death of a switchman, 29 years old, earning \$115 a month, leaving a wife, 28 years old, and a daughter 2 years old, a verdict for \$15,000 was excessive by \$3,000.—Burch v. Wabash (Mo.), 236 S. W. 338.

Compensation for death under the federal Employers' Liability Act is limited to the present value of the pecuniary loss to the defendant for whose benefit the action is brought; and the Kentucky Court of Appeals holds that where the utmost the deceased contributed to the plaintiff, his father, whose life expectancy was 11.68 years, was \$20 a month for board and \$60 a year for the plaintiff's clothing, a verdict for \$4,000 was excessive, and a new trial was granted.—C. & O. v. Haggard's Admr. (Ky.), 235 S. W. 756.

Foreign Railway News

American Firms Win Bridge Contracts in Argentina

During the past few months American fabricators have been successful in securing some attractive bridge construction contracts from the Argentine State Railways, in keen competition with German and Belgian concerns, according to Commerce Reports. It appears that the local officials are not satisfied with the workmanship turned out by European shops, and preference was given to American bidders at prices which are really higher, considering that it is the practice of nearly all domestic companies to provide for payment in United States gold.

American bridge shop practice has been developed to a far higher degree than in the case of European manufacturers of like materials. This has been necessary because of the higher grade labor used in the United States. Multiple punch machines and spacing tables, such as are common in first-class shops in the United States, are almost unknown in Europe, where practically all work is drilled at a much higher cost of production, in spite of the lower wages paid to labor. American exporters, realizing that there is attractive business to be had in Argentina, are pursuing this market with a willingness to conform to local requirements, which, they state, are by no means unreasonable.

London & North Western Adopts Council System for Dealing With Labor Matters

The London & North Western has announced its plan for the establishment of councils of employees and officers to bring about closer contact with the management, according to Modern Transport (London). The plan is in accordance with the Railways Act of 1921.

The plan provides for the formation of a council composed of not more than four members representing the employees and an equal number representing the management at every shop or station where 75 or more persons are employed. At places where fewer men are employed, a council of four representing the employees will confer with local officers. The purpose of these councils is to provide a recognized method of communicating with the employees and to give them a wider interest in the conditions under which their work is performed. The matters to be considered by the local committees are:

- (1) Suggestions for the satisfactory arrangement of working hours, etc.
- (2) Questions of physical welfare (safety appliances, first aid, accommodations for comfort, etc.)
- (3) Holiday arrangements
- (4) Publicity regarding rules.
- (5) Suggestions as to improving efficiency.
- (6) Investigation of conditions tending to reduce efficiency.
- (7) Correct loading of freight.

Employee representatives are to be elected from among their number, each employee over 18 years of age being privileged to vote. Representatives must have been in service at least a year. Complaints by employees must be made directly to the company as heretofore and will then be referred by the company to the council.

Matters relating to the local application of the national agreements as to wages, working conditions, etc.; suggestions as to improved operation; points in which employees and management are mutually interested, such as increasing business and promoting economy; and subjects submitted by the local council—all these matters will be handled by sectional councils (likewise representing both employees and management), of which there are five, each covering the entire railway. These councils may not propose any changes inconsistent with rulings of the Central Wages Board or the National Wages Board.

The employee representation, Sectional Council No. 1, will be made up of stationmasters, agents, yard masters and traffic controllers (2 representatives); clerks (7 representatives); operating and freight traffic inspectors and foremen and dock supervisory staff (2 representatives); and inspectors and foremen in the locomotive, car engineering, signal, telegraph and tugboat departments (1 representative). Sectional Council No. 2 will be made up of

enginemen and motormen (12 representatives); No. 3 of signalmen, trainmen, porters, switchmen, car cleaners and car inspectors (12 representatives); No. 4 of freight house, delivery and dock forces (12 representatives); and No. 5 of maintenance of way and signal department employees and linemen (10 representatives).

The company will choose its representatives on each council from among its various officers. The plan provides for a railway council for the whole railway to deal with any matters which can properly come before a sectional council but which affect employees belonging to two or more sectional groups.

When agreements are arrived at by councils they are to be posted for the information of employees. Disagreements are referred to the trade unions, who confer with the railway managements, and, in the end if agreement is not reached, to the Central Wages Board.

South African Electrification

A report has been issued by British consulting engineers concerning the electrification of a portion of the railroad from Durban to Glencoe Junction, South Africa. The work now in hand will cost approximately \$20,000,000, and will consist of electrifying the line from Pietermaritzburg to Glencoe Junction. The total length of line from Durban to Glencoe Junction is 249 miles and the section which will be electrified includes a little more than two-thirds of the total length of line. Traffic has increased to such an extent as to make electrification urgent on the line from Pietermaritzburg to Glencoe Junction in order to increase the capacity of the line. The line from Durban to Pietermaritzburg, however, is double tracked and electrification of that section is largely an economic question.

It is considered that double tracking from Pietermaritzburg to Glencoe Junction would enormously increase the capacity of the line, but that it is not a remedy for the existing difficulties. Electrification, it is thought, would give practically the same relief as double tracking and in as short a time as if the latter remedy were chosen, and electrification offers additional advantages of improved working conditions and reduced operating costs. By providing for an industrial load at the power station, the administration, or the electricity authority, when appointed, will be able to supply current along the route of the railway for municipal and industrial purposes. The site of the power station has not yet been definitely determined.

Sir William Hoy, general manager of railways and harbors, thinks that the section from Glencoe Junction to Tendega and from Durban to Pietermaritzburg should also be electrified. These sections would entail heavy expenditure in the near future on track improvements if electrification is not adopted. Sir William states also that the electrification will open up great possibilities for by-product production at the power stations from waste coal. The best grade of coal now used for locomotive purposes will, with electrification, be available for shipment, and the coal now regarded as waste will be used for the power stations.

Sleeping Car Service in Europe

Before the war there was but one big international sleeping car line in continental Europe, a Belgian company known as the Compagnie Internationale des Wagons-Lits, according to the Railway Gazette (London). This company was organized in 1872 and owned and operated sleeping cars throughout Europe until the time of the war. There was of late years no competition anywhere except in Prussia and that only within the boundaries of the state. Wagons-Lits was always very progressive in the adoption of new devices for the safety and comfort of passengers.

When the war broke out many of the company's cars were confiscated and, of course, service was badly disrupted. After the war a competitor appeared in the field, a German company subsidized by the government and known as the Mitteleuropäische Schlaf-und Speisewagen Gesellschaft. This name was abbreviated to "Mitropa." Prior to the end of the war this company operated with equipment confiscated from the Wagons-Lits company.

Lately, however, the German company has been forced to return much of this equipment and it now operates only locally in Germany and into the Netherlands. Furthermore

Germany is being forced to allow the Wagons-Lits company to operate through services across its territories. The Wagons-Lits service, however, has not yet been restored in full.

Meantime the Mitropa company has been trying to get into the international business, but it is pointed out that its chances are not particularly good, inasmuch as the Wagons-Lits company already has long term contracts in most places and furthermore that, to do business on a large scale, Mitropa would have to build cars at present high prices whereas the Wagons-Lits cars were built under pre-war conditions.

Mexican Government Proposes to Rehabilitate the National Tehuantepec

In an effort to revive the freight traffic over the National Tehuantepec Railroad the Mexican government will make extensive improvements to the ports of Salina Cruz and Puerto Mexico, the respective Pacific and Atlantic terminus of the trans-isthmian line. The contract for the first of these improvements at Salina Cruz has already been let, an initial appropriation of \$250,000 having been made by the government for the construction of warehouses and wharves. The channel also is to be dredged and the old loading equipment is to be replaced by modern devices, including electric cranes and carriers, it is stated. Similar improvements will be made at Puerto Mexico, which was formerly called Coatzacoalcos. During the latter years of the administration of the late President Porfirio Diaz the government spent several million dollars in the construction of breakwaters and other harbor and port works both at Salina Cruz and at Puerto Mexico. At Salina Cruz a large dry dock also was installed. This dry dock has been in practically an abandoned condition for several years. It is to be rehabilitated and brought into use.

Before the construction of the Panama Canal the National Tehuantepec Railroad handled heavy traffic and its facilities were so taxed at times that there was serious thought on the part of the Mexican government of double-tracking the line between the two terminals, 180 miles. In those days among the freight handled each year was approximately 500,000 tons of raw sugar from the Hawaiian Islands. With the diverting of practically all of the trans-isthmian traffic to the Panama Canal the National Tehuantepec fell into hard times. Then came the protracted revolutionary period which caused a suspension of what little coastwise traffic the road had been handling as well as a complete falling off of local shipments. For months at a time the road was out of commission. The rolling stock went from bad to worse. Just in the midst of these unfortunate days a decree was issued by the late President Venustiano Carranza canceling the 51-year lease which S. Pearson & Son, Ltd., held from the government for operating the line. Lord Cowdrey and associates who compose this firm welcomed the action of Carranza, arbitrary as it was, as it relieved them of the burden of rehabilitating and attempting to operate a railway which offered little possibilities for the future.

It is the announced purpose of the Obregon administration to develop its deep water ports to the greatest possible extent. Steps have been taken to enlarge the coastwise shipping service on both the Pacific and Gulf sides. It is even asserted by government authorities that the National Tehuantepec can be made to compete with the Panama Canal in the handling of certain kinds of products, and by a reduction of port charges and freight rates.

No trans-isthmian transportation project ever had a more troublesome history than that which finally resulted in the building of the National Tehuantepec Railroad. Spanning the Isthmus of Tehuantepec was the dream of engineers for more than a century. Many men of money and other claims to greatness were interested in the project from time to time. Many millions of dollars of American money were wasted in different enterprises that had for their object the connecting of the two oceans by some facility of quick and cheap transportation. At one time it was proposed to build a great ship railway. This was to consist of several parallel tracks across the isthmus. The ocean-going vessels, when they arrived at the port would be hauled out of the water upon a large platform placed upon wheels and in this way it would be pulled across the 180 miles of land and dumped into the ocean on the other side. This project received the approval of many engineers of distinction. The Mexican government granted a concession for its fulfillment, but the promoters failed to finish it and it went by the board.

Equipment and Supplies

Locomotives

THE MINARETS & WESTERN will, within the next few months, send out inquiries for seven or eight locomotives.

THE MAGOR CAR CORPORATION, New York, has ordered one saddle tank locomotive from the Baldwin Locomotive Works.

THE ALABAMA & VICKSBURG has ordered one 10-wheel switching locomotive from the Baldwin Locomotive Works. This is in addition to the 3 locomotives ordered from the same builder reported in the *Railway Age* of April 8.

Freight Cars

THE WABASH is inquiring for repairs to 700 box cars.

THE GREAT NORTHERN is inquiring for 300 steel log car bodies.

THE ST. LOUIS-SAN FRANCISCO will repair 1,800 or more freight cars in its own shops.

THE CHESAPEAKE & OHIO will receive bids until June 1 for 500 box cars of 40 tons' capacity.

THE ILLINOIS CENTRAL will soon send out inquiries, it is reported, for repairs to 4,000 coal cars.

THE CHICAGO, NORTH SHORE & MILWAUKEE has ordered 15 merchandise cars from the Cincinnati Car Company.

THE CANADA CROSBOTING COMPANY has ordered 120 standard tie cars from the Canadian Car & Foundry Company.

THE CUBAN-AMERICAN SUGAR COMPANY has ordered 50 cane cars of 15 tons' capacity from the Magor Car Company.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has purchased 100 ballast cars from the Rodger Ballast Car Company.

THE PENNSYLVANIA SALT MANUFACTURING COMPANY, Philadelphia, Pa., is inquiring for 3 or 6 tank cars for transporting liquid chlorine.

THE PIER MARQUETTE, reported in the *Railway Age* of April 29 as being in the market for a number of cars, is inquiring for 500 box cars.

THE GOODWIN-GALLAGHER SAND & GRAVEL CO., New York, has ordered 6 hopper cars of 20 tons' capacity from the Magor Car Corporation.

THE CHICAGO & NORTH WESTERN, in addition to its recent car order, has purchased 20 box cars and 10 flat cars from the Western Steel Car & Foundry Company.

THE PACIFIC ELECTRIC is reported to have ordered 200 gondola dump cars, 40 ft. by 8 ft., 9 in., with steel underframes, from the National Safety Car & Equipment Company.

THE MISSOURI, KANSAS & TEXAS, which was noted in the *Railway Age* of April 15 as inquiring for 2,000 automobile cars, has issued an alternative inquiry for 1,500 box cars.

THE NORTHERN PACIFIC is inquiring for 250 gondola cars of 50 tons' capacity. As reported in the *Railway Age* of May 6, this company will buy a total of 1,750 cars of various types.

THE BELT RAILWAY OF CHICAGO, noted in the *Railway Age* of May 6 as inquiring for 450 gondola cars, has under consideration the purchase of 125 second-hand gondolas instead.

THE FLORIDA EAST COAST, reported in the *Railway Age* of March 11 as inquiring for 10 caboose cars, has ordered this equipment from the Mt. Vernon Car Manufacturing Company.

THE BANGOR & BROOKS is rebuilding 250 freight cars in its shops at Derby, Me., which work was authorized last year, and is contemplating the rebuilding of 250 more. The company has recently purchased two Russel snow plows.

THE ATCHISON, TOPEKA & SANTA FE is asking for bids on 2,000 steel underframe double-sheathed box cars of 40 tons' capacity and is also asking for alternate bids on 2,000 steel underframe double sheathed box cars of 40 tons' capacity, similar to the U. S. R. A. design.

THE CHESAPEAKE & OHIO reported in the *Railway Age* of April 22 as inquiring for 1,500 hopper bottom gondola cars and 1,500 flat bottom gondola cars, has ordered 1,500 hopper cars from the Newport News Shipbuilding & Dry Dock Co., and 1,500 gondola cars from the Pullman Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of April 22 as inquiring for 2,000 plain box cars of 40 tons' capacity, has divided an order for 5390 box cars as follows: American Car & Foundry Company, 3,000, with an option on 1,000 cars additional; Mt. Vernon Car Manufacturing Company, 1,390; and Standard Steel Car Company, 1,000.

Passenger Cars

THE WESTERN OHIO has purchased ten 45-ft. combination passenger and baggage cars from the J. G. Brill Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of April 22 as inquiring for 60 cars for passenger service, has ordered 75 cars from the Pullman Company and 25 cars from the American Car & Foundry Company.

Iron and Steel

THE PERE MARQUETTE, noted in the *Railway Age* of April 29 as inquiring for 3,500 tons of steel rails, has ordered this from the Inland Steel Company.

THE LONG ISLAND, reported in the *Railway Age* of April 15 as asking for bids on 2,500 tons of rail, has ordered from the Bethlehem Steel Company 2,500 tons of 100-lb. Pennsylvania Railroad standard sections.

THE NEW YORK CENTRAL, reported in the *Railway Age* of April 8 as asking for bids on 32,000 tons of rail, has placed orders for 24,800 tons with options on 7,200 tons additional as follows: Inland Steel Company, 2,000 tons, and Illinois Steel Company, 5,400 tons of 105-lb. sections for the New York Central, Lines West, with an option on 2,000 tons additional from the Illinois Steel Company if taken on or before July 1; Cambria Steel Company, 3,000 tons of 80-lb. sections for the Cincinnati Northern; Carnegie Steel Company, 3,000 tons of 105-lb. sections for the Cleveland, Cincinnati, Chicago & St. Louis; Bethlehem Steel Company, 1,300 tons of 105-lb. sections for the New York Central, Lines East, and to another company, 9,500 tons of 105-lb. sections for the New York Central, Lines East, with an option of 3,200 additional tons to be taken on or before July 1; also to the same company, 600 tons of 90-lb. sections for the Rutland Railroad.

Machinery and Tools

THE BANGOR & AROOSTOOK will install a considerable amount of new machinery in its shops at Derby, Me.

THE CUBA RAILROAD is inquiring for a number of machine tools for its new shops at Camaguey, Cuba.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 17 lathes of various types, 11 crank shapers, 8 drills of various types, 4 boring mills, a wheel press, 2 bolt threaders, a pipe threading machine 3 shears, 3 punches, 2 combination punches and shears, 5 bending rolls, 15 grinders of various types, 5 hack saws, and a plate bending machine.

THE WESTERN MARYLAND, reported in the *Railway Age* of May 6 as inquiring for a number of machine tools, is asking for the following machines: A punch and shear; rod boring machine; 14-in., 26-in., 36-in., and 48-in. lathes; 6-in. pipe threading machine; 2-in. bolt cutting machine; 20-in. and 28-in. vertical drilling machines; 5-ft. radial drill; 52-in. and 62-in. boring and turning mills; 36-in. and 42-in. planers; driving wheel lathes; 6-in. power hack saw; 300-ton wheel press; 20-in. slotter; 5-spindle centering machine; also a bushing press.

Supply Trade News

The Lundie Engineering Corporation has moved its Chicago office from 30 North LaSalle street, to 166 West Jackson boulevard.

Frank B. Stone has removed his office from the Railway Exchange building, to 1620 Mallers' building, 5 South Wabash avenue, Chicago.

W. B. Mallette has been appointed agent of the Track Specialties Company, New York, with office at 3883 Wyoming street, St. Louis, Mo.

The Austin Company, Cleveland, Ohio, has been given a contract to put up a one-story building, 120 ft. by 400 ft. at Hammond, Ind., for the Standard Steel Car Company.

W. T. Tyler, whose selection as director, vice-president and general manager of the National Safety Appliance Company, San Francisco, with temporary headquarters in the



W. T. Tyler

Peoples Gas building, Chicago, was announced in the *Railway Age* of May 6 (page 1089), was born in Janesville, Wis., on July 29, 1870. He entered railway service in June, 1883, as a messenger on the Wisconsin Central and was later an operator and dispatcher on the same road. In 1889 he was employed as a brakeman on the Milwaukee, Lake Shore & Western, now a part of the Chicago & North Western. From that time until 1891 he was a brakeman and conductor on the Northern Pacific, and from 1891

to 1900 he was consecutively, yardmaster, trainmaster and a superintendent of the Great Northern. He was appointed a superintendent of the St. Louis, Iron Mountain & Southern in 1900, and was promoted to general superintendent the following year. He was later successively general superintendent and general manager of the St. Louis-San Francisco. In 1915 he became a superintendent of the Northern Pacific, with headquarters at Pasco, Wash., and on February 1, 1917, was appointed general manager of the St. Louis-Southwestern. On May 15, 1917, he was elected first vice-president of this road, and on November 1, 1917, he resigned to become assistant to the vice-president in charge of operation of the Northern Pacific. On January 22, 1918, Mr. Tyler was appointed assistant to the director of the Division of Operation, with headquarters at Washington, D. C., and he was appointed senior assistant director on July 1, 1918. He was appointed director of the division of operation on January 15, 1919, in which capacity he served until March 1, 1920, when he became vice-president in charge of operation of the Northern Pacific. He later resigned and, as mentioned above, has now entered the railway supply field.

The Metal & Thermit Corporation, New York, has removed its Pittsburgh branch office from 1427 Western avenue to 801-807 Hillsboro street, Corliss Station, Pittsburgh, Pa.

W. H. Saunders, district sales representative of the National Cast Iron Pipe Company, with headquarters at Dallas, Tex., has been transferred to Kansas City, Mo. He will be succeeded at Dallas by B. L. Hendershot.

The War Finance Corporation has announced that the advance of \$5,000,000 to the Baldwin Locomotive Works, made

on January 15, 1920, for the purpose of financing the exportation of locomotives, has been repaid in full eight and one-half months in advance of the date of maturity.

Dwight P. Robinson & Co., New York, has been given a contract for the construction of a building to accommodate American commercial exhibits at the Brazilian Centennial Exposition to be held in Rio de Janeiro beginning September 7. The building, which will be the unofficial exhibit building, will be constructed of American materials as far as possible. It will be purely a commercial proposition, having no direct connection with the exhibition plans of the American government under the appropriation of \$1,000,000 made by Congress recently.

The Paige & Jones Chemical Company, New York, manufacturers of materials for treating boiler feed water, has opened a general sales office at 417 South Dearborn street, Chicago. Lucius A. Fritz, until recently vice-president and general sales manager of the Borromite Company, who is a practical chemist and has had an extended experience with various phases of feed water treatment, has become associated with the Paige & Jones Chemical Company as vice-president and general sales manager, with headquarters at Chicago, and Robert O. Friend, formerly water and mechanical engineer of the Borromite Company, who is experienced in designing and building water softening plants, has been appointed vice-president and supervising engineer with headquarters at Hammond, Ind., of the Paige & Jones Chemical Company. The other officers of the company are: Fred O. Paige, president; Charles P. Wolfe, vice-president and treasurer, both at New York; Fred O. Paige, Jr., secretary and works manager, Hammond, Ind. The executive offices of the company are at 248 Fulton street, New York and the technical department works are at Hammond. C. B. Flint will continue as sales manager of the railroad department, with headquarters at New York.

"No Pullman Merger," Carry Says

E. F. Carry, president of the Pullman Company, has declared that there is no foundation for various rumors connecting the Pullman Company with mergers with other concerns. "There has been no official talk or thought of buying any concern excepting our purchase of Haskell & Barker," he said. "With regard to the reported plan to segregate the operating and building functions of the company through separate organizations, I am told that such a suggestion has been made to the Pullman board of directors at least once annually for the past 10 or 12 years, and at intervals the directors have discussed it to some extent, but with no result. This year is no exception, and the matter will again be duly discussed, but whether anything will be done about it remains to be seen."

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for additions to its machine shop at Topeka, Kan., to cost approximately \$60,000, and has closed bids for the construction of bunkhouses at Galesburg, Ill., Shopton, Iowa, Lexington Junction, Mo., Ottawa Junction, Strong City and Cheryvale, Kan., and Newkirk, Okla., which work will cost approximately \$50,000.

BANGOR & AROOSTOOK.—This company's 1922 budget includes the ballasting of 65 miles of road, the contract for which has been let to the Eyre-Johnson Company, Philadelphia; the relaying of 24 miles of track with 80 and 90-lb. rails; installing 200,000 new ties, 80,000 tie plates and 14,000 rail anchors; relaying a number of side-tracks with heavier steel; replacing 140 wooden culverts with cast-iron or concrete; the painting of seventeen stations and fifteen steel bridges, including the large international bridge between Van Buren, Me., and St. Leonards, N. B.; extensive repairs to wire fences; the rebuilding of the engine house at Caribou, Me., probably with reinforced concrete, and the installation of a larger turntable; the construction of a new station, engine house and coaling plant at Squa Pan, Me.; repairing wharves at the company's tide-water terminal at Stockton Harbor; and extensive improvements to buildings at Derby, Me.

CHICAGO & NORTH WESTERN.—This company contemplates rebuilding in the near future its 12-stall engine house at Ashland, Wis., destroyed by fire on May 4.

CHICAGO ROCK ISLAND & PACIFIC.—This company will soon call for bids for the construction of a reinforced concrete undercrossing in connection with the separation of grades at Nora Springs, Iowa. This company and the New York Central have each ordered approximately 370 tons of steel from the King Bridge Company, Cleveland, Ohio, for the renewal of track elevation bridges between Eighteenth and Sixtieth streets, Chicago. The Rock Island will soon order an equivalent amount of steel for like purposes for installation between Sixtieth and Seventy-second streets in that city.

CISCO & NORTHEASTERN.—This company has awarded a contract to J. H. Lison, Cisco, Tex., for the construction of a 40-ft. by 200-ft. brick locomotive repair shop in that city, to cost \$12,500.

ILLINOIS CENTRAL.—This company has awarded a contract to the Water & Coal Handling Company, Chicago, for the construction of a 75-ton coaling station at Levy yard, New Orleans, La.

NORTHERN PACIFIC.—This company has closed bids for the construction of a \$182,000 double track bridge over the Yellowstone river at Huntley, Mont., to replace its single track structure at that point. It has also awarded a contract for the construction of a passenger station and office at Glendive, Mont., to cost \$200,000, and has authorized the construction of a tunnel and other work on its Phileman line change to cost approximately \$107,000, as well as the construction of a second main track at Duluth, Minn., to cost approximately \$38,000. Authority has also been given for the building of settling basins and other water supply facilities at Zero, Mont., to cost approximately \$16,000.

NORTHERN PACIFIC TERMINAL CO.—This company, pursuant to admitting the Great Northern and the Spokane, Portland & Seattle as tenants to the union station at Portland, is increasing the track layout in the station and for this and other reasons is now undertaking the construction of a new yard upon property recently acquired 2 or 3 miles from Portland. In connection with this work a petition has been filed with the city of Portland for extensive street vacations required to provide for increased trackage within the city limits.

OREGON SHORT LINE.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension of the Homedale branch from its present terminus at Homedale, Idaho, in a southeasterly direction, a distance of 7½ miles.

PACIFIC FRUIT EXPRESS.—This company is accepting bids for the construction of an artificial icing plant on the Southern Pacific at Bakersfield, Calif. to cost approximately \$400,000.



Express Train Plunges Into a Swollen River in Vermont

Railway Finance News

ATLANTA, BIRMINGHAM & ATLANTIC.—*State Ownership Favored.*—A meeting is to be held on May 16 at Moultrie, Ga., in behalf of saving this railroad from being junked. Mayor Key, of Atlanta, who is president of the association for state ownership of the road, will preside. The Atlanta Chamber of Commerce has indorsed the movement to prevent the junking of the Atlanta, Birmingham & Atlantic.

BANGOR & AROOSTOOK.—*Annual Report.*—The corporate income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues	\$7,353,938	\$5,786,756
Operating expenses	5,975,464	5,030,406
Net from railway operations	1,577,474	756,350
Railway tax accruals	422,709	286,561
Railway operating income	1,173,211	469,789
Total non-operating income	243,684	1,077,828
Gross income	1,416,895	1,547,617
Interest on funded debt	1,018,965	984,877
Total deductions from gross income	1,037,632	997,251
Net income	379,264	550,367

The operating revenues and expenses in detail and the principal traffic statistics for the year 1921 compares as follows:

	1921	1920
Operating revenues:		
Freight	\$6,127,457	\$5,240,928
Passenger	956,320	1,117,246
Total including other	\$7,348,709	\$6,675,481
Operating expenses:		
Maintenance of way and structures	\$1,192,469	\$1,445,082
Maintenance of equipment	1,768,400	1,585,035
Traffic	52,814	46,782
Transportation	2,538,523	2,649,211
General	235,621	241,921
Total, including other	\$5,838,452	\$6,063,076
Net railway operating revenue	\$1,510,257	\$612,404
Railway tax accruals	412,679	334,670
Railway operating income	1,095,782	227,645
Passenger traffic:		
Number of passengers carried earning revenue	532,451	684,644
Number of passengers carried one mile	20,866,348	27,345,129
Average distance carried, miles	39.19	39.94
Average receipts per passenger per mile	\$0.458	\$0.409
Freight traffic:		
Number revenue tons carried	2,136,483	2,154,229
Number of tons carried one mile	232,548,773	242,823,083
Average distance haul of one ton, miles	108.85	113.23
Average receipts per ton per mile	\$0.264	\$0.216

CENTRAL OF NEW JERSEY.—*Asks Authority for Equipment Trust Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$2,000,000, 6 per cent equipment trust bonds under an equipment lease with the Hudson Trust Company to be held in the treasury.

CHESAPEAKE & OHIO.—*Authorized to Assume Liability.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$7,635,000 of equipment trust certificates by entering into a lease and equipment trust agreement with the Commercial Trust Company of Philadelphia.

CHICAGO & NORTH WESTERN.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenue:		
Freight	\$95,687,013	\$94,576,106
Passenger	33,770,082	32,126,380
Total, including other	144,775,476	140,755,628
Operating expenses	129,091,428	130,252,212
Net from railway operations	15,684,048	10,503,416
Railway tax accruals	8,464,087	7,557,989
Railway operating income	7,201,883	2,917,251
Equipment and joint facility rents—net debit	550,746	2,217,599
Net railway operating income	6,651,137	699,652
Total non-operating income	3,935,387	123,111,911
Gross income	10,586,524	23,811,563
Interest on funded debt	11,218,008	10,440,294
Total deductions	11,831,957	11,352,309
Net income	Def. 1,245,433	12,459,254

Dividends:		
7 per cent on preferred stock	1,567,650	1,567,650
5 per cent on common stock	7,257,625	7,257,625
Balance income for the year	Def. 10,070,708	3,633,979

*March 1 to Dec. 31.

†Includes compensation and U. S. Govt. guaranty.

CHICAGO, MILWAUKEE & ST. PAUL.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "C. M. & St. P. Deficit After Charges \$11,070,609." See also excerpts from annual report on adjacent pages.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Annual Report.*—The income account for the year ended December 31, 1921, compares as follows:

	1921	*1920
Operating revenue:		
Freight	\$19,285,657	\$17,360,124
Passenger	6,865,280	7,047,837
Total, including other	28,137,408	26,489,817
Operating expenses	24,392,314	23,767,081
Net from railway operations	3,745,093	2,722,736
Railway tax accruals	1,265,198	1,461,938
Railway operating income	2,461,188	1,252,513
Net railway operating income	2,065,349	1,290,231
Total non-operating income	308,629	13,785,649
Gross income	2,373,978	5,075,879
Interest on funded debt	2,478,531	2,405,763
Total deductions	2,659,656	2,488,209
Net income	Def. 285,677	2,587,670
Dividends:		
Preferred stock, 7 per cent	788,151	788,151
Common stock, 5 per cent	927,835	927,835
Balance income for the year	Def. 2,001,663	871,684

*March 1-Dec. 31.

†Includes compensation and guaranty from U. S. Govt.

DELAWARE & HUDSON.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Delaware & Hudson Earns 11.62 Per Cent on Stock." See also excerpts from annual report on adjacent pages.

EL DORADO & SANTA FE.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue \$50,000 of capital stock.

GEORGIA NORTHERN.—*Six Months' Guaranty Certified.*—The Interstate Commerce Commission has certified the amount of this company's guaranty in 1920 as \$7,132, of which \$1,632 was still to be paid.

HAWKINSVILLE & FLORIDA SOUTHERN.—*Seek to Halt Sale.*—Charging that the entire proceeding, which resulted in an order from the court for the sale of the Hawkinsville & Florida Southern, was an act of collusion between the officials of that road and the Georgia Southern & Florida, the Union Savings Bank & Trust Company, of Macon, Ga., bondholders, has petitioned for an injunction restraining the sale of the road set for May 9. Judge J. A. Matthews has signed an order calling on the representatives of the two railroads to show cause why the petition should not be granted, an injunction issued and a new receiver appointed.

ILLINOIS CENTRAL.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue \$10,929,600 of its preferred stock in accordance with its intention, as previously announced, to provide funds for electrification and enlargement of its terminal facilities at Chicago.

KANSAS CITY SOUTHERN.—*New Directors.*—Moritz Rosenthal, Macon B. Staring and Pierpont V. Davis, all of New York, have been elected directors to succeed B. S. Guinness, John F. Harris and W. H. Williams. The resignations of Mr. Harris and Mr. Williams resulted from the decision ruling of the Interstate Commerce Commission regarding interlocking directorates.

LEHIGH & HUDSON RIVER.—*Annual Report.*—The income account for the year 1921 compares with the previous year as follows:

	1921	*1920
Railway operating revenue	\$3,242,291	\$2,780,302
Railway operating expenses	2,429,843	2,378,244
Net from railway operations	812,448	402,058
Gross income	676,876	646,574
Total deductions from gross income	339,920	291,101
Net income transferred to profit and loss	336,956	355,473
Dividend appropriations	395,306	103,170
Profit and loss, December 31st, credit	2,044,006	2,117,314

*March 1 to Dec. 31.

(Continued on page 1152)

Annual Report

Fifty-Seventh Annual Report of the Chicago, Milwaukee & St. Paul Railway Company

The Directors submit to the Stockholders the following report of the operations of the Company for the year ended December 31, 1921.

INCOME ACCOUNT.

RAILWAY OPERATING INCOME:		
Railway operating revenues	\$146,765,766.04	
Railway operating expenses	127,957,001.87	
Net railway operating revenue	\$18,808,764.17	
Railway tax accruals	8,762,089.33	
Uncollectible railway revenues	283,545.53	
Railway operating income	\$9,763,129.31	
NON OPERATING INCOME:		
Rents received—Equipment	\$218,995.34	
Rents received—Other	180,424.29	
Income from lease of road	310,574.54	
Dividends on stocks	74,496.83	
Interest on bonds	48,790.17	
Interest on other securities and acc. int.	225,624.38	
Amount accrued under guarantee provision	2,277,796.51	
Section 209, Transportation Act 1920	2,277,796.51	
Miscellaneous income	514,098.77	\$4,371,857.98
Gross income	\$14,134,987.29	
DEDUCTIONS:		
Interest on funded debt	\$18,767,680.70	
Interest on unfunded debt	1,482,113.39	
Rents paid—Equipment	3,488,115.38	
Rents paid—Lease of road	450,505.53	
Rents paid—Other	1,751,880.86	
Miscellaneous	560,901.19	25,205,595.95
NET DEFICIT	\$11,070,608.66	

ACQUISITION OF CONTROL OF THE CHICAGO, MILWAUKEE & GARY RAILWAY COMPANY.

January 1, 1922, your Company acquired the control of the Chicago, Milwaukee & Gary Railway Company, a corporation of the State of Illinois. This control was acquired pursuant to the terms and provisions of a certain agreement dated December 1, 1921, between your Company and the St. Louis Union Trust Company the owner and holder of all of the securities of the Chicago, Milwaukee & Gary Railway Company, consisting of the capital stock of that company, of the par value of \$1,000,000, and of First Mortgage Five Year Gold Bonds of that Company of the par value of \$5,700,000. By the terms of that Agreement, the St. Louis Union Trust Company has delivered to your Company all of said capital stock and \$2,700,000 of said bonds, in consideration of your Company guaranteeing the payment of the principal of \$3,000,000 of said bonds and the interest thereon accruing after January 1st, 1924. The principal of these bonds does not mature until April 1st, 1948. The Interstate Commerce Commission, pursuant to the provisions of the Transportation Act, 1920, has approved the acquisition of the principal of said bonds and the interest thereon accruing after January 1st, 1924.

The Agreement of December 1st, 1921, provides that the Chicago, Milwaukee & Gary Railway Company comprises 96.84 miles of main track and 9.74 miles of branch lines, which connects with the railway of the Terre Haute Division of your Company at Delmar, Illinois, and with the railway of the Illinois Division of your Company at Kirkland, Illinois, and with the railway of the Racine & Southwestern Division of your Company at Rockford, Illinois. It has direct connections at Delmar and Momence, Illinois, with the New York Central and Chicago & Eastern Illinois lines, and forms an outer belt line around Chicago.

The control of the Chicago, Milwaukee & Gary Railway Company by your Company, enables it to transport Company and commercial coal originating on the Terre Haute Division, as well as on the lines of the Chicago & Eastern Illinois, with the railway of the Chicago, Milwaukee & Gary, north, without hauling the same through the expensive terminals of Chicago, and with shorter haulage. This not only expedites movement, but greatly reduces the cost of transportation.

ACQUISITION BY LEASE OF THE CHICAGO, TERRE HAUTE & SOUTHEASTERN RAILWAY.

The Stockholders having given their approval of the transaction at the 57th annual meeting on May 14th, 1921, the lease of the railway property and franchises of the Chicago, Terre Haute and Southeastern Ry. Co. to the Chicago, Milwaukee & St. Paul Ry. Co. for a term of nine hundred and ninety-nine years became effective on July 1st, 1921. These leases, with the railway of Chicago Heights, Illinois, a point about twenty-seven miles south of Chicago, to Westport, Indiana, and consist of 361.41 miles of main track, 76.4 miles of second main track, 5.44 miles of connection tracks, and 196.41 miles of yard tracks, sidings and spur tracks, a total of 579.66 miles of track.

Under this lease valuable track rights are acquired over about 48 miles of other railway lines, of which about 35 miles has second main track, making direct connections with the lines of this company near Frankfort, Illinois, on the Illinois Division.

The revenues and expenses of the lines mentioned above have been included since July 1st, 1921, with the revenues and expenses of this company's lines.

ADDITIONS AND BETTERMENTS.

EQUIPMENT.
A contract has been given for the purchase of 2500, fifty-ton, steel underframe gondola cars, 1900 to be purchased from the Haskell & Barker Company, and 600 from the Bordenfeld Company. Authority was also granted for the purchase of 12 Class A-1 compound locomotives to simple type, of which 8 were completed during the year, the remainder will be completed early in 1922.

BRIDGES.
Restriction of Bridge FF114 over the Elroy Slough and FF1018 over the Snake River, near Everett, Washington, on the Coast Division, was practically completed during the year. Both structures span navigable waterways and are of movable spans to permit the passage of commercial traffic.

WATER TREATING.
The following water treating plants, referred to in last year's report as being under construction, were completed and placed in operation during the year: One at Le Roy, Illinois; one at Le Roy, Iowa; one at Marion, Iowa; one at Redwater, S. D.; one at City and Dakota Divisions—Ethan, Iowa; one at Tyndall and Platte, S. D.; a water treating plant at Seiland, S. D.; one at the City and Dakota Division, was constructed during the year and placed in service in January, 1922.

The new water station at Tyndall and the work necessary to increase the quantity and improve the quality of the present supplies at Yankton and Platte, S. D., on the St. Louis City and Dakota Division, and at Plankinton, S. D., on the Iowa and Dakota Division, commenced in 1920, was completed before the close of the year 1921. Similar work at Lennox, S. D., on the Iowa and Dakota Division, mentioned in last year's report, has been temporarily deferred, but its completion is expected in 1922. During the year work was commenced at Sibley, Iowa, for new water station facilities to increase the quantity over that obtained with the present facilities.

PALLAST.
On the Trans-Missouri Division Branch Line, Trail City to Faith, S. D., approximately 25,000 yards of cinders were placed in parts of 20 miles in length, approximately 60 miles in total.

INTERLOCKING PLANTS.
An interlocking plant was constructed and placed in operation at University Place, Evanston, Illinois. This plant controls the movement of Chicago, North Shore & Milwaukee R. R. trains to and from that company's Church Street Station.

GRADE SEPARATION.
The elevation of tracks on the Evanston Line of the Chicago Terminal Division between Milwaukee Avenue and Howard Street, a distance of 4.4 miles, was continued. At the end of the year approximately 90% of the work was completed, 5% having been done during the year.

The new stations at Loyola and Morse Avenues and Howard Street, on which work was started in 1920, were completed and placed in operation. Approximately 80,000 cubic yards of filling was placed, completing the filling for the third and fourth tracks.

The work remaining to be done consists of the completion of unfinished bridge floors, the laying of the fourth main track and the construction of six permanent stations located at Argyle Street and Berwyn, Bryn Mawr, Thornedale, Granville and Jarvis Avenues.

CHICAGO, TERRE HAUTE & SOUTHEASTERN RAILWAY.

ADDITIONAL TRACKS.
Trackage of 9,097 lineal feet to serve the I. W. Hamilton and the Baker Mines was constructed at Ilwaco, Indiana, completing a system of tracks at these mines—9,602 lineal feet having been laid prior to July 1, 1921.

Construction of an additional loading track, 811 feet long and of 2,466 feet of storage tracks serving the Talleydale Mine at Clayville, and the Fayette, Talleydale and Bardsley Mines at Bridge Junction, Indiana, respectively, was commenced and has been completed since the close of the year.

Crossovers were constructed at Posen and Blue Island, Illinois, providing permanent connections with the Indiana Harbor Belt R. R. at Posen and the Baltimore and Ohio Chicago Terminal Railroad, at Blue Island, to accommodate freight service between Faithorn and Bensenville, Illinois.

Construction of a passenger track, 253 ft. long at Bell Junction, Indiana, to expedite train movement, was commenced and since the close of the year the work has been completed.

TURNABLES.
Work was commenced in the replacement of a 62-ft. steel turntable at Terre Haute, Indiana, with a 70-ft. steel turntable and incidental changes, including rearrangement of tracks and turnouts. The work has been completed since the close of the year.

GUARANTY PERIOD.

As stated in a report last year, the Company filed with the Interstate Commerce Commission a statement of its operations during the guaranty period under the provisions of the Transportation Act, 1920. In addition to the amount of \$14,292,702.00 reported received in last year's report, further advances were made during the year 1921, amounting to \$8,137,190.05, which were used in payment of interest on funded debt and other miscellaneous or current obligations.

The claim for payment of the Interstate Commerce Commission for the balance of the amount due under the guaranty.

FEDERAL VALUATION.

Satisfactory progress was made on the Federal Valuation of the Company's property during the year. All field work was completed. All maps were completed and delivered to the Bureau of Valuation and final certificate of completion was filed. Joint work was continued with the Bureau of Valuation on the final collection and adjustment of quantities. Final collections are 20% completed and the Bureau is now applying prices to the inventory. Considerable progress has been made in the development of original costs and reproduction prices to be used in the application of prices to the inventory. During the latter part of the year the District offices of the Bureau of Valuation were consolidated at Washington, D. C., thereby somewhat delaying the progress of the work, and it is now probable that the Tentative Valuation will not be served upon the Company until some time during the year 1923.

MILES OF TRACK, DECEMBER 31, 1921.

Owned solely by this Company		
Main track	10,150.83	
Second main track	1,050.12	
Third main track	2,230.30	
Fourth main track	15.47	
Connection tracks	42.64	
Yard tracks, sidings and spur tracks	3,372.69	14,662.75
Owned jointly with other Companies		
Main track	109.35	
Second main track	6.10	
Third main track	1.95	
Fourth main track	1.90	
Connection tracks	8.03	
Yard tracks, sidings and spur tracks	214.25	341.53
Used by this Company under contract		
Main track	407.16	
Second main track	123.34	
Third main track	11.14	531.64
Used by this Company under lease		
Main track	361.41	
Second main track	7.64	
Connection tracks	5.44	
Yard tracks, sidings and spur tracks	196.41	570.90
Total miles of track		16,106.84

Average miles of main track in operation during the year:	
Owned solely	10,152.16 miles
Owned jointly	108.95 "
Used under contracts and under lease	547.52 "
Total average miles operated	10,808.63 miles

The lines of road of this Company owned solely and jointly are located in the following States:	
Wisconsin	1,793.12 miles
Illinois	418.75 "
Iowa	1,865.40 "
Minnesota	1,230.85 "
North Dakota	379.81 "
South Dakota	1,795.95 "
Missouri	140.25 "
Michigan	199.22 "
Montana	1,235.29 "
Idaho	230.67 "
Washington	979.54 "
Total main track owned solely and jointly	10,268.85 miles

EQUIPMENT CHANGES.

During the year the remaining twenty-nine of the one hundred Mikado Steam Locomotives mentioned in the 1920 report as being constructed under contract were received. Equipment rebuilt during the year consisted of 44 steam locomotives, 150 coal cars, 2 express refrigerator cars and 1 Company service car. One locomotive was converted for use as a shop switching locomotive, 4 open top observation cars and 7 Company service cars were converted from other passenger and freight equipment and 28 freight train cars and one Company service car previously reported as taken out of service were reinstated, as follows:

73 Locomotives—steam	4 Ore cars
76 Box cars	3 Express refrigerator cars
151 Coal cars	4 Open top observation cars
4 Flat cars	9 Work train cars
2 Refrigerator cars	1 Company service locomotive

During the year 46 steam locomotives and 1512 cars were destroyed by wreck or fire, sold or taken down on account of small capacity, converted or rebuilt, as follows:

46 Locomotives—steam	10 Ore cars
76 Box cars	3 Gas-electric motor cars
134 Flat cars	1 Sleeping car
132 Stock cars	2 Parlor cars
231 Coal cars	1 Observation car
91 Refrigerator cars	1 Passenger and baggage car
14 Caboose cars	104 Work train cars
22 Ballast cars	

RESERVE FOR ACCRUED DEPRECIATION.

At the close of the fiscal year, ending December 31, 1920, there was at the credit of reserve for accrued depreciation the sum of \$17,863,662.62. A certain percentage of the total cost of equipment has been credited to this reserve for the estimated depreciation of locomotives, passenger train cars, freight train cars and work equipment, accrued during the year, which, together with other adjustments, aggregates \$3,237,496.29. There has been charged to this reserve an amount of \$373,411.97 representing the accrued depreciation, previously credited, on locomotives and cars destroyed, sold or taken down during the year, which results in a net increase in this reserve of \$2,864,084.32 for the year. The balance of this reserve, December 31, 1921, as shown in the balance sheet is \$20,727,746.94, which represents the estimated depreciation of rolling stock from June 30, 1907, to December 31, 1921.

EQUIPMENT, DECEMBER 31, 1921.

	C. M. & St. P. Ry. Co.	C. T. H. & S. E. Ry. Co.
Locomotives—steam	1,645	70
Locomotives—electric	62	...
Freight-Train Cars:		
Box cars	37,883	191
Flat cars	4,668	905
Stock cars	4,670	7
Coal cars	6,859	5,309
Refrigerator cars	1,696	24
Caboose cars	192	48
Other freight-train cars (ore cars)	1,913	...
Ballast cars	2,277	...
	60,958	6,484
Passenger-Train Cars:		
Coaches	635	64
Combination passenger cars	4	...
Passenger, baggage and mail	98	7
Gas-electric motor cars	4	...
Baggage-buffet	5	...
Buffet-observation	16	...
Buffet-lounging cars	2	...
Other Combination Cars:		
Baggage, mail and express	4	...
Baggage and mail	83	4
Motor and express	51	...
Dining cars	56	...
Parlor cars	23	...
Sleeping cars—standard	201	...
Sleeping cars—tourist	36	...
Baggage and express cars	338	2
Postal cars	42	...
Opentop observation cars	4	...
	1,602	77
Company Service Cars:		
Officers' and pay cars	23	3
Derrick cars	52	1
Steam shovels	23	1
Wrecking cars	19	10
Other company service cars	2,650	133
	2,767	148

Floating Equipment:	
Tug boats	1
Barges	8
Total	67,343
	6,779

INSURANCE FUND.

INSURANCE RESERVE ACCOUNT	
INCOME:	
Premium received:	
For Insurance of railway properties	\$390,976.63
Less—reinsurance paid	146,001.59
Net premium income	\$244,975.04
Other Income:	
Interest received on securities owned	\$92,991.96
Gross Income	\$337,967.00
DISBURSEMENTS:	
Fire losses—Net	\$337,967.00

ASSETS AND LIABILITIES

ASSETS:	
Unfunded:	
Securities	\$3,296,748.77
LIABILITIES:	
Insurance Reserve	\$3,296,748.77

CAPITAL STOCK.

At the close of the last fiscal year (December 31, 1920), the share capital of the Company amounted to \$233,636,200.00 and consisted of \$117,411,300.00 of Common Stock and \$116,224,900.00 of Preferred Stock, of which \$429,100.00 Preferred Stock and \$5,300.00 Common Stock are held by the Company. Of the Preferred Stock held by the Company, \$343,000.00 is in the Treasury and \$86,100.00 is in the Insurance Reserve Fund. All of the \$5,300.00 of Common Stock held by the Company is in the Insurance Reserve Fund. No Capital Stock has been issued during the year ended December 31, 1921.

FUNDED DEBT.

At the close of the last fiscal year the Funded Debt of the Company was \$529,562,654.66. It has been decreased during this fiscal year by \$25,340,000.00 Chicago and Pacific Western Division 5% Bonds matured January 1st, 1921; by \$4,755,000.00 Wisconsin and Minnesota Division 5% Bonds matured July 1st, 1921; by \$1,360,000.00 Chicago and Lake Superior Division 5% Bonds matured July 1st, 1921; by \$2,192,600.00 6% Equipment Gold Notes matured January 15th, 1921, and January 15th, 1922; by \$15,000.00 Bellingham and Northern Railway 5% Bonds retired and \$57,981.96 European Loan 4% Bonds of 1910 retired.

It has been increased during this fiscal year by \$57,981.96 Four Per Cent Gold Bonds of 1925 issued in place of European Loan 4% Bonds of 1910 retired. There have been issued during the year \$43,000,000.00 General Mortgage 5% Bonds maturing May 1st, 1929 in place of underlying bonds, which have been retired and cancelled during this and previous years, and these bonds have been used by the company for collateral purposes.

There have been issued during the year notes in favor of the United States Government bearing interest at 6% for \$25,340,000.00, maturing March 1st, 1922, and \$10,000,090.00 maturing January 1st, 1923. The first mentioned note will be extended by the Government at \$25,000,000.00 to mature March 1st, 1927.

The amount of Bonds and Notes at the close of this fiscal year is \$574,240,054.66 of which \$160,257,358.24 are in the treasury of the Company, and \$413,982,696.42 have been issued and are outstanding. Mortgage Bonds of the Company known as the Wisconsin and Minnesota Division Bonds in the principal amount of \$4,755,000.00 and the Chicago and Lake Superior Division Bonds in the principal amount of \$1,360,000.00, matured July 1, 1921.

On account of the prevailing high rates of interest, it was not deemed advisable to issue, at this time, either General Mortgage Bonds or General and Refunding Mortgage Bonds of the Company for the purpose of meeting this maturity and other obligations.

Accordingly, an application was made to the Interstate Commerce Commission under the Transportation Act, 1920 for the loan of \$10,000,000.00. The application was granted, and this amount was loaned to the Company on its note which matures January 1st, 1923, bearing interest at the rate of six per cent per annum. Substantially all of the bonds have been paid, and the remainder will be paid when presented.

TREASURY BONDS.

At the close of the year ending December 31st, 1920, there were in the Treasury bonds to the amount of:		
There have been added during the year, bonds as follows:		
General Mortgage 5% Bonds	43,000,000.00	
Tacoma Eastern R. Co. 5% Bonds	10,000.00	
Four per cent Gold Scrip of 1925	158.24	
Treasury Bonds December 31st, 1921	\$160,257,358.24	

Composed of the following:

General and Refunding Mortgage bonds certified for the acquisition of additional property or additions and betterments and other lawful corporate purposes	\$73,495,200.00
General and Refunding Mortgage bonds certified by the Trustee against expenditures for additional properties or additions and betterments, and available for sale at any time: Pledged with the United States Government	43,722,000.00
General Mortgage 5% Bonds Pledged with United States Government	\$117,217,200.00
Tacoma Eastern R. R. Co. First Mortgage 5% Bonds	43,000,000.00
Four per cent Gold Scrip of 1925	40,000.00
	158.24
Total	\$160,257,358.24

General balance sheet, income, profit and loss and other tables relating to corporate affairs and statements showing results of operation are appended hereto.

By order of the Board of Directors.
 April, 1922. H. E. BYRAM, President.

Ninety-Second Annual Report of the Delaware & Hudson Company

GENERAL OFFICE

NEW YORK, N. Y., April 1, 1922.

To the Stockholders of The Delaware & Hudson Company:

The following presents the income account of your company for the year 1921, arranged in accordance with the rules promulgated by the Interstate Commerce Commission, with comparative results for the year 1920:

	1921	1920	Increase or Decrease
Railway operating revenues	\$45,776,859.41	\$45,354,298.72	\$422,560.69
Railway operating expenses	38,825,529.11	42,126,330.19	-3,300,801.08
Net railway operating revenues	\$6,951,330.30	\$3,227,968.53	3,723,361.77
Operating income credits:			
Hire of freight cars—credit balance	\$915,595.24	Dr \$75,555.60	995,150.84
Rent for locomotives	81,131.01	100,727.06	-19,596.03
Rent from passenger train cars	78,114.04	79,106.12	-992.08
Rent from work equipment	24,998.36	21,489.56	3,508.80
Joint facility rent income	167,055.68	136,502.10	30,553.58
Total credits	\$1,266,894.35	\$258,269.24	1,008,625.11
Gross railway operating income	\$8,218,224.65	\$3,486,237.77	4,731,986.88
Operating income debits:			
Railway tax accruals	\$993,973.96	\$1,186,053.92	-192,079.96
Uncollectible railway revenues	16,731.56	939.26	15,792.30
Rent for locomotives	26,065.95	18,447.13	7,618.82
Rent for passenger train cars	55,482.21	52,993.63	2,488.58
Rent for work equipment	2,364.71	1,578.44	786.27
Joint facility rents	364,489.49	428,058.56	-63,569.07
Total debits	\$1,459,107.88	\$1,667,670.94	-208,563.06
U. S. Govt. compensation guarantee	\$5,621,163.60	—	5,621,163.60
Net railway operating income	\$6,759,116.77	\$7,439,730.43	-680,613.66
Non-operating income:			
Income from lease of road	\$88,124.30	\$88,933.13	-808.74
Miscellaneous rent income	49,410.47	85,197.78	-35,787.31
Miscellaneous non-operating physical property	12,148.98	23,467.84	-11,318.86
Dividend income	1,327,616.98	1,038,041.03	289,575.95
Income from funded securities	702,547.10	214,966.29	487,580.81
Income from unfunded securities and accounts	108,888.85	143,876.71	-34,987.86
Income from sinking and other reserve funds	74,181.15	81,374.32	-7,193.17
Miscellaneous income	1,569,868.89	1,315,427.01	254,441.88
Total non-operating income	\$3,437,286.90	\$2,991,287.01	445,999.89
Gross income	\$10,196,403.67	\$10,431,017.45	-234,613.78
Debit on gross income:			
Rent for leased roads	\$177,909.11	\$1,944,157.01	1,727,247.90
Interest on funded debt	1,746.00	1,821.44	-75.44
Interest on unfunded debt	2,284,579.63	3,038,948.13	854,368.50
Interest on unfunded debt	178,771.37	101,585.05	77,186.32
Miscellaneous income debit	17,953.10	19,343.17	-1,389.07
Total debits	\$4,260,159.21	\$6,107,852.80	-1,847,693.59
Net income	\$5,936,244.46	\$4,323,164.65	\$1,613,079.81

FINANCIAL

The assets of the Delaware & Hudson Company in December 1921, was \$12,340,000, the liability being \$10,000,000, during the year 1921 the total paid out in December 31, 1921, was \$67,894,600 a reduction

of \$201,400, as compared with December 31, 1920. First lien equipment bonds in the amount of \$5,000,000 were purchased through the sinking fund established in connection with their issue. The issue of six per cent gold notes under the equipment trust provided to pay for 1,500 freight cars allocated to your company by the United States Railroad Administration increased \$196,000 by the payment of \$1,000,000 of maturing bonds on January 15, 1921, and the issue of 69,000 additional to complete the settlement in accordance with the contract. The total issue was \$3,981,000.

The sum of \$322,040, being one per cent of the par value of the first lien refunding mortgage gold bonds outstanding on June 1, 1921, was paid during the year to the trustee under the first and refunding mortgage, making the total paid in December 31, 1921, \$4,058,070. The sum paid was expended in additions and betterments to the mortgaged property in accordance with the trust agreement.

There was accumulated in the Coal Department sinking fund during the year, in the amount of \$5,000,000, which was paid on May 1, 1899, and amended on May 10, 1910, \$398,086.50, which has been used in the acquisition of coal lands and unmined coal in Pennsylvania.

The amount paid to the trustee under the first lien equipment trust indebted during the year was \$650,000. The total paid to date is \$9,100,000 which has been increased by accumulations of interest on balances and investments. Complying with the agreement, bonds issued thereunder having a value of \$3,976,000 have been purchased at a cost, including accrued interest, of \$3,930,445, and retired; \$4,439,126.55 has been expended for equipment which has been made subject to the indenture, and securities and cash to the amount of \$1,755,017.13 are now held by the trustee.

There was received during the year from the United States, on account of the guarantee of net earnings provided for by the Transportation Act of 1920, the guarantee period extending through August 31, 1920, the sum of \$515,000, which with the amounts received during the year 1920, aggregating \$2,195,000, makes a total of \$2,710,000 received from the United States during the year for compensation for the taking over of the company's property in December, 1917, and its subsequent occupation and use until the close of business on February 29, 1920. The final settlements of both these accounts with the United States are still pending.

COAL DEPARTMENT

The anthracite produced by your affiliated corporations during the year 1921, including the product of washeries, aggregated 9,122,408 long tons, an increase of 1,033,226 tons, or 12.77 per cent above 1920. This output was 13.01 per cent of the year's total production of all Pennsylvania anthracite mines and washeries, estimated at 70,117,000 long tons, or 1.5 per cent below 1920.

The new Marvite breaker, located in Scranton, began late in 1920, was completed during the year. It is of steel construction, with the least practicable inflammable material, and equipped with the most modern machinery for the preparation of anthracite.

Several statutes adverse to the anthracite industry of the State were enacted by the Legislature of Pennsylvania during the year. A taxing statute, effective on July 1, 1921, established a new and special tax of one and one-half per cent on the value of all anthracite prepared for market. Both in substance and in form, this statute seems to be the equivalent of the "Rooney" act which was declared unconstitutional by the Supreme Court of Pennsylvania in 1915. Although there have been subsequent changes in the personnel of the Supreme Court, there has been no relevant change in the fundamental law of the Commonwealth. Upon the advice of counsel, a suit was brought to test the power of the Legislature to reenact this form of taxation and the Dauphin County Court has sustained the enactment. Appeal to the Supreme Court of the State has been taken. Other enactments, known respectively as the "Kohler" and "Fowler" acts, impose penalties for mining operations that cause subsidence of surface resulting in injuries to persons or property, giving to municipal authorities extensive control over mining operations within the limits of their municipalities and exempting from punitive processes all operators that are approved by the legislature and thereby agree to pay to the State, the fund thus constituted to be first available to reimburse those damaged by mine caves, including both natural and artificial persons and the expenses of a commission charged with the enforcement of these laws and, second, for all public purposes. These acts became effective in August 27, 1921, and all but a few anthracite operators have exercised their statutory option by declining to accept. Counsel have advised that these statutes are unconstitutional and the outcome can be held in the case of the "Kohler" act. Appeal to the Supreme Court on the part of the State is anticipated.

As stated in the report for last year, the wages of the employees of the anthracite industry were fixed at approximately seventeen per cent above the market on March 31, 1922, by a contract, resulting from an award made by the Anthracite Coal Commission, appointed by the President of the United States, and this contract bound the operators until the agreed date of its expiration. Negotiations for a new contract, to take effect on April 1, 1922, are now in progress and the outcome cannot be predicted. The employees have demanded an increase of twenty per cent over the war rates of wages and numerous changes in conditions of employment that would further increase the labor cost of anthracite. The operators consider that some reduction in wages corresponding at least with corresponding reduction in the cost of living, should be made and the anthracite industry thus brought reasonably in line with the other great industries of the nation, all which are as rapidly as possible adjusting themselves to the conditions of war, and are being protected in its market position against the competition of bituminous coal.

RAILROAD DEPARTMENT

This is the first annual report since that for the year 1917 to cover a full year's operation of your railway for your corporate account. During the intervening years 3 years of operation were reported, commencing with February 29, 1920, operated by the United States Railroad Administration and from March 1, 1920, to August 31, 1920, inclusive its revenues were guaranteed under the Transportation Act of 1920.

During this first year of operation for your corporate account the gross operating revenues of your railway amounted to \$45,776,859, which is 1.64 per cent more than that resulting from the operations of 1920. Operating expenses amounted to \$38,825,529, a decrease from 1920 of \$2,400,801, or 7.84 per cent. The resulting operating income, before deduction of taxes, was \$6,951,330, an increase of \$3,723,361, or 53.55 per cent, as compared with 1920. The operating averages for the three years from July 1, 1914, to June 30, 1917, the "test period" adopted by Congress in the basis of compensation for possession and use of the property being Federal control are operating revenues, \$25,474,214, operating expenses, \$24,000,000, and the resulting operating income, \$1,474,214. These comparisons show that the increase in gross revenues has been more

then absorbed by increases in operating expenses, due to advances in the prices of materials, changes in working conditions, and increases in wages, so that while considerably more money has passed through the accounts of your railway, in the net result its actual earnings have been less than upon the former gross receipts of the pre-war period.

Freight receipts during the year exceeded those of 1920 by \$422,304, or 1.08 per cent, although the total freight movement declined 24.90 per cent from 4,265,734,874 ton-miles in the earlier to 3,203,759,205 in the latter year. Compared with the revenues of the test period, freight receipts increased 87.47 per cent, while freight movement declined somewhat less than one per cent. The average rate per ton-mile was 2.36 cents. The decrease in freight movement is wholly attributable to the prevailing industrial depression and was most marked in respect of bituminous coal, iron ore and cement, gravel, sandstone, pulp-wood, lumber and general manufactures and merchandise.

Passenger receipts exceeded 1920 by \$259,287.09 or 6.88 per cent. The total movement of passengers was 119,696,843 passenger-miles as against 130,971,551 passenger-miles in 1920, a decrease of 8.61 per cent. Passenger-train mileage was 10 per cent less than in 1920, but passenger-car miles increased by a fractional per cent. Per mile traveled the average passenger paid 3.37 cents in 1921, as compared with 2.88 in 1920. Gross receipts per passenger-train mile averaged \$1.72 in 1921, and \$1.58 in 1920, an increase of 8.86 per cent. The average per passenger-car mile was 6.84 per cent greater in 1921 than in 1920.

Receipts for mail transportation amounted to \$235,596, an apparent decrease of \$131,754 or 35.87 per cent, but substantially all this is accounted for by the fact that the figure for 1920 includes \$130,000 received in adjustment for under-payments in prior years.

Miscellaneous revenues decreased 12.05 per cent, principally on account of the general business depression.

The increased passenger and freight rates authorized by the Interstate Commerce Commission in 1920, pursuant to the new requirements of the Transportation Act, took effect on August 26, 1920, and were in force throughout the whole of 1921. This accounts for the increase in revenues that have been noted in operating conditions. The increase in revenues, somewhat more favorable prices for materials and supplies, adjustments in wages and conditions of employment and closer approximation to normal operating conditions as the abnormalities of war and Federal Control become more remote, have resulted in a net increase of three-fifths of one per cent. Maintenance of way expenditures increased \$395,082, or 7.72 per cent over 1920. The application of 2,866 tons more rails and 112,418 more ties than were applied in the maintenance of 1920 are represented by an increase in their cost of \$1,505,438, or 10.3 per cent. The cost of other track materials and in maintenance of interlockers and signals added \$322,063, but these increases were largely offset by reductions in other items. Maintenance of equipment charges increased \$64,216, or one-half of one per cent, but the net increase in this item was \$1,000,000, or 11.5 per cent. The average delay to cars passing through yards was reduced from 10 hours and 42 minutes in 1920, to 8 hours and 35 minutes in 1921, or 26.5 per cent.

On June 25, 1921, the Railroad Labor Board ordered certain reductions in wages to take effect on July 1, 1921. The resulting saving to your company during the last six months of 1921, was \$1,030,000, or 8.77 per cent of its total operating expenses. This amount, however, does not represent the amount paid out by reason of the advances required by the same authority on July 20, 1920, the increase then ordered having augmented your expenditures for wages approximately twenty-one per cent. The Railroad Labor Board has also made several orders during the year, the effect of which is affecting working conditions, but without very materially mitigating the severely restrictive and grossly extravagant rules that resulted from unilateral negotiations during Federal Control. Extravagant estimates of the savings resulting from changes in the rates of wages, in view of the persistence of the working rules have been widely circulated, but these potentialities are far more evident in the daily press than they are possible of realization in railway practice—the sole point at which they could benefit the railway industry or the public.

The Transportation Act of 1920 required the Interstate Commerce Commission to provide for a schedule of rates that would admit of a return of not less than five and one-half per cent or more than six per cent upon the fair value of the properties, from March 1, 1920, to February 28, 1921. The rate schedule then provided for a further consolidation of rates subsequent to the later date was left to determination by the Commission. An inquiry intended to supply information on which to establish the basic rate of return for the next period and covering the same level of service, and the relation between the rates of return for rates to industrial and traffic conditions was begun by the Commission on December 14, 1921. Many witnesses, including shippers, representatives of State railroad commissions and railway officers, were heard and the Commission has concluded, by a majority, that the future policy of the Commission, in the matters covered by this investigation, has been made. Under existing rates, the railways of the nation, as a whole, earned in 1921 about half the income provided for by the Transportation Act, and would probably set aside an order by which the deficiency as a permanent loss and to accept a lower average return than that earned by investments in United States bonds, they will not, while the average rates are substantially below the real value as compared with other properties. If the railways are to be required to write off the deficiency as a permanent loss and to accept a lower average return than that earned by investments in United States bonds, they will not, while the average rates are substantially below the real value as compared with other properties. If the railways are to be required to write off the deficiency as a permanent loss and to accept a lower average return than that earned by investments in United States bonds, they will not, while the average rates are substantially below the real value as compared with other properties.

The proceeding brought by the principal New England railroads, except the Boston and Albany as noted in the report for last year, against their connections, including your company, and substantially all carriers in the country, have resulted in a settlement set aside an order by which the Interstate Commerce Commission undertook to increase the annual revenues of the New England railroads by about \$7,500,000, to be diverted from the earnings of other railroads by means of modifications in the bases used in dividing the total revenues, and the respective shares of eight interchanged between New England and other sections of the country. This order was entered as of January 30, 1922, and made to take effect on March 1, 1922, but the effective date has been changed, by amendment, on April 1, 1922. On February 6, 1921 the first decision in this proceeding was rendered by the Commission, a majority holding that the New England railroads had not established their complaint and refusing to grant the relief asked, although recommending to the carriers in interest a general revision of the divisions, which were considered as inconsistent and in

some cases to be unfair to one side, while in others unfair to the other side. Commissioners were appointed to undertake these revisions, as suggested by the Commission, but before these committees had been in existence long enough to present any definite results, certain changes in the personnel of the Commission took place and were followed by the filing, on the part of the New England railroads, of a petition for a re-argument. This petition was granted, and with no additional changes of any kind in the record of testimony, the Commission, again by a majority and by a majority that included all the members appointed after the earlier decision, reversed its former conclusion and decided that the New England complainants had established the facts which they sought. The order issued in accordance with this second opinion required the defendants to shrink their division by fifteen per cent of the present divisions accruing to complainants, in cases in which the complainants now receive not more than granted of 1920, and with no additional changes of their own present divisions, in cases in which the existing contracts allow more than one-half of the total charge to the complainants. From this result, Commissioners Hall, Daniels and Esch (the latter, as a member of Congress and Chairman of the Committee on Interstate and Foreign Commerce of the House of Representatives having been most influential in determining the character of the present law under which the Commission acts) dissented. Upon advice of counsel your company has joined the defendant carriers in a suit, instituted in the District Court of the United States for the Southern District of New York, to set aside this order and enjoin its enforcement. The hearing upon the motion for an interlocutory injunction has been set for April 22, 1922.

FEDERAL VALUATION

Preliminary statements of proposed reports to the Commission concerning the valuation of your industrial side were furnished to your officers during 1920 and exceptions were filed with the Bureau of Valuation covering necessary corrections of errors and in unit prices. Subsequently, a preliminary accounting report was received and examined by your Accounting Department. This examination disclosing numerous errors and omissions which were also covered by the proposed action has been taken by the Commission with regard to these exceptions, although through conferences with representatives of your Valuation and Accounting Departments and representatives of the Bureau of Valuation many corrections have been made and many errors have been admitted. As a result of these conferences it is expected that the Tentative Valuation will be substantially more accurate and favorable to your company than the original compilations. No opportunity has been afforded for conferences with the Commission on the proposed accounting report, although they have been in the hands of the Bureau of Valuation since February 1, 1921. The cost of valuation work to the end of 1921, amounted to \$563,523.98, of which \$426,961.38 was charged to corporate operating charges and \$136,571.60 to the operating expenses of the Railroad Administration.

INDUSTRIAL DEPARTMENT

Ninety-four new industries were located on the tracks of your company during 1921, as compared with 115 in 1920. Thirty extensions to old industries were made. The industrial side tracks were constructed and fifty-five industrial side tracks were extended. The total number of tracks for 1920 were sixty-three, twenty and eight. The cost of new industrial side tracks and of extensions to such tracks in 1921, was \$95,620, of which \$18,524 was borne by your company and \$77,096 by the industries served. The Federal Bureau of Investigation has maintained a close relationship with your railway and representatives of your industrial department have continued to work with them and with all other Federal, State and co-operative agencies which are endeavoring to promote agricultural progress in the regions adjacent to your line. Efforts to advance the work of local commercial organizations has also been continued.

ALLIED TROLLEY LINES

The Union Traction Company strike which began on January 29, 1921, as stated in the last annual report resulted, as was anticipated, in serious losses to the public and an extraordinary expense of operation of operating per unit. Additional revenue losses resulted from the illegal operation of "jitneys" which affected every street-vanway route and the failure of the public authorities to maintain the public peace. The strike was finally abandoned on November 24, 1921, although it was practically at an end long before that date, and the subsequent resumption of the use of these lines by the general public has been rapid, so that traffic is now nearly at the normal level. Continuous efforts by the legal department of this company have greatly reduced the competition of illegally operated motor vehicles. No difficulty has been experienced in obtaining a sufficient number of qualified men to operate the cars at the rates of wages fixed when the former Public Service Commission for the Second District declined to authorize the rates of fare necessary to support the rates of wages then in force and took its position in favor of liquidation of wages, saying in part:

"The Commission in the order about to be made is dealing with wages of the employees. It is not the Commission's duty to consider the general cost list as being. It seems clear that they cannot remain at the present point when the general cost list is being. We must assume that the trend of wages will be downward."

The services supplied by the United Traction Company can be most satisfactorily rendered by one-man cars, the design and operation of which have been admirably developed to meet the requirements of surface transit in urban communities. The first car of this type was put in service during June, 1921; about ninety such cars are now in use in Albany and Troy and by July 1, 1922, it is expected that this type of equipment will be in operation for all regular basic schedules, possibly excepting the lines between Albany and Troy and between Albany and Cohoes.

Since January 28, 1921, under the order of the former Public Service Commission, this company has received eight cents as its standard fare (four tickets being sold for thirty cents) in Albany and but six cents in Troy. Waterbury, Cohoes, Green Island, Waterford and Colonie and five in Rensselaer County. A statutory change in the standard fare authority to be required by the then-existing law. A statutory change having been made, by which the new Commission is empowered to authorize reasonable rates in such cases, application for an equalization of rates was presented to the Commission on November, 1921. Testimony was taken and the case submitted upon briefs, and it is now awaiting decision. With properly equalized fares, one-man cars and the improved operation now possible, the income account of this property should become substantially self-sustaining.

The operating revenues of the Hudson Valley Railway Company amounted to \$970,779, operating expenses to \$921,320, taxes to \$64,066 and the net operating deficit to \$14,607. The data show a decrease in operating revenues of 11.67 per cent and in operating expenses of 6.65 per cent

with an increase in taxes of 16.43 per cent and a decrease in net operating income of 125.60 per cent. Operating revenues were considerably reduced by the strike on the United Traction Company, as the employees refused to operate cars south of Waterford and into Troy from January 29 to August 17, 1921. By reductions made in October and November, 1921, and in January, 1922, the wages paid by this company were equalized with those paid by the United Traction Company.

On August 9, 1921, the Public Service Commission allowed an increased fare on the interurban lines, representing an increase of one cent in each zone on the Glens Falls and Waterford divisions, with the exception of the line between Mechanicville and Waterford. The urban fares in Glens Falls, Hudson Falls, Fort Edward and Saratoga remain the same as formerly, that is, seven cents. Full benefit from the new rates has not been obtained on account of labor troubles in and near Glens Falls and Fort Edward, the employees of the International Paper Company and other companies having been on strike since early last spring.

GENERAL REMARKS

The serious business depression existing at the date of the report for last year was not relieved during 1921. The movement of prices toward lower levels continued, with some interruptions and exceptions, and there were some readjustments in wages, but in this field the movement was sporadic and commonly insufficient. Revision of Federal taxation, the proclaimed object of which was the relief of industry, raised the tax on corporate income twenty-five per cent, from the rate of ten to that of twelve and one-half per cent of the taxable income, while the slight mitigation of the surtax rates on individual incomes has not materi-

ally reduced the advantage of tax-free securities compared with those that can be issued by railways and other privately-owned enterprises. The elimination of taxes on so-called excess-profits has, of course, had no beneficial effect upon railways and other industries subject to public regulation. The Transportation Act of 1920, extravagantly heralded as the great charter of an era of reconciliation between the purpose of reformed regulative system and the inscapable requirements of efficient industry, has failed to provide the railways with the adequate revenues recognized on all sides as necessary to restore confidence on the part of investors. Under these conditions the rate of interest has declined, not because of an abundant supply of investment capital, measured by the opportunities for its utilization in desirable expansion of productive enterprise, but because of a general absence of confidence that such expansion is commercially warranted. With the capital invested in existing enterprises as idle as cars lying empty on railway side tracks and in their yards, and labor largely idle, because of lack of demand for the products of their employment at prices sufficient to pay wages and for raw materials, there is little incentive to seek capital for new undertakings or to apply it in the expansion of those already in existence. While in a country so rich in natural resources, industry will develop recurrent periods of more or less satisfactory activity, the sources of genuine improvement are more profound than any yet invoked. They suggest a clear recognition of the great truths that industry and prosperity are inseparable and that enterprise to be productive in any maximum degree must be unshackled.

By order of the Board of Managers,
L. F. LOREE,
President.

[ADVERTISEMENT]

(Continued from page 1147)

The revenues and expenses in detail and the principal freight statistics for 1921 compare as follows:

	1921	1920
Operating revenues		
Freight	\$3,076,756	\$2,984,251
Passenger	50,113	52,240
Milk	88,722	72,531
Total, including other	\$3,242,291	\$3,146,209
Operating expenses:		
Maintenance of way and structures	\$381,911	\$394,109
Maintenance of equipment	607,376	602,442
Traffic expenses	21,328	23,711
Transportation	1,326,640	1,651,475
General	92,587	98,325
Total	\$2,429,843	\$2,775,062
Net revenue from railway operation	\$812,448	\$371,147
Freight traffic:		
Miles operated	497	97
Number of revenue tons	4,639,163	5,927,454
Number of revenue ton-miles	321,459,650	409,680,013
Average distance each ton carried—miles	69.3	69.2
Average revenue per ton	\$6.6	\$5.0
Passenger traffic:		
Miles operated passenger service	87	88
Number of passengers	121,600	149,984
Number of passenger-miles	1,463,147	1,705,329
Average distance each passenger carried—miles	12.0	11.7
Average revenue per passenger per mile	\$4.1	\$3.7

LEHIGH & NEW ENGLAND.—Annual Report.—The comparative income account for the years ended December 31, 1921 and 1920, follows:

	1921	1920*
Railway operating revenues:		
Anthracite coal	\$2,410,883	\$2,659,033
Bituminous coal	21,487	479,701
Merchandise	1,443,775	1,478,193
Passenger	25,241	23,572
Total, including other	4,775,737	4,830,406
Railway operating expenses:		
Maintenance of way and structures	734,885	789,497
Maintenance of equipment	1,186,865	1,048,207
Traffic	80,160	70,381
Transportation	1,617,195	1,836,042
General	193,984	179,466
Total railway operating expenses	3,795,741	3,923,114
Net revenue from railway operations	979,997	892,265
Railway tax accruals	226,437	227,775
Total railway operating income	753,560	671,497
Total non-operating income	364,610	609,739
Gross income	1,118,170	1,281,236
Interest on funded debt	316,413	325,638
Total deductions from gross income	415,765	415,701
Net income	702,405	865,526
Income applied to sinking and other reserve fund	6,489	83,251
Less federal income for 1920		18,776
Balance transferred to profit and loss	695,916	843,698

*Federal and company operations for the year 1920 are combined in this statement.

The principal freight statistics for the year ended December 31, 1921, compare as follows:

	1921	1920
Operating mileage operated	218	217
Total revenue tonnage	5,943,780	6,881,496
Average ton-miles revenue freight per mile of road	1,066,194	1,082,624
Ton-miles revenue freight per train-mile	589	560
Ton-miles revenue freight per loaded freight car-mile	45.51	43.71
Miles based revenue freight	43,665	37,225
Average revenue per ton-mile of freight (cents)	1.81	1.80

MICHIGAN CENTRAL.—New Director.—Warren S. Hayden has been elected a director to succeed T. A. Harden, deceased.

MIDLAND VALLEY.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$541,000 of first mortgage 5 per cent gold bonds to be sold at not less than 75 or to be pledged as security for short term notes.

MINNEAPOLIS & ST. LOUIS.—Annual Report.—The annual report issued this week shows the following corporate income for the year 1921:

	1921	1920
Gross	\$16,185,129	\$14,352,998
Expenses, taxes, etc.	15,341,011	15,491,931
Operating income	\$644,118	*\$1,138,933
Standard return		451,438
Government guaranty		3,362,818
Other income	*171,426	241,549
Total income	\$472,622	\$3,916,872
Interest, etc.	2,308,914	2,316,696
Deficit	\$1,836,222	\$1600,176

*Deficit †Surplus.

MINERAL RANGE.—Annual Report.—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues	\$281,735	\$562,590
Operating expenses	407,495	717,801
Net operating deficit	(125,760)	(155,212)
Railway tax accruals	60,309	43,336
Operating deficit	186,091	196,570
Total non-operating income	21,536	249,363
Gross income	Def. 164,555	50,793
Total deductions from gross income	87,374	90,047
Net deficit	251,939	39,283

MISSOURI & NORTH ARKANSAS.—Authorized to Issue Securities.—The Interstate Commerce Commission has authorized the Missouri & North Arkansas Railway to issue \$3,000,000 of common stock for the purpose of taking over the Missouri & North Arkansas Railroad and also a \$5,000,000 first mortgage 15-year gold bond to be pledged with the Secretary of the Treasury as collateral security for a loan of \$3,500,000.

MISSOURI PACIFIC.—Annual Report.—The annual report issued this week shows a corporate income account for the year ended December 31, 1921, as follows:

	1921	1920
Operating revenues	\$109,785,950	\$98,194,271
Operating expenses	11,693,856	94,009,509
Net from railway operations	18,092,094	3,284,762
Railway taxes and noncollectible railway revenue	4,166,570	3,802,709
Railway operating income	11,695,565	Def. 536,036
Other operating income	799,174	660,230
Total operating income	14,494,739	124,194
Deductions from operating income	4,257,891	4,741,202
Net railway operating income	10,236,848	Def. 4,617,009
Non-operating income	3,061,557	1,274,902
Government guaranty	1,972,081	15,638,890
Gross income	15,270,487	14,168,823
Deductions from gross income	11,733,471	11,135,448
Balance—net income	3,537,016	3,033,075

NATIONAL LINE.—Certificate to Construct Line Declined.—The Interstate Commerce Commission has declined to issue a certificate authorizing this company to construct a 12-mile railroad from a point on the Columbus & Greenville in Webster County, Miss., paralleling the main line of the Gulf, Mobile & Northern. It

is stated that the record indicates that applicant has not given sufficient attention to an estimate of construction costs and of operating expenses and has estimated revenues erroneously.

NEW YORK, CHICAGO & ST. LOUIS.—Annual Report.—The annual report issued this week shows the following corporate income account for the year ended December 31, 1921:

	1921	1920
Operating revenues	\$27,030,663	\$23,953,824
Operating expenses	20,613,594	19,112,850
Net from railway operations	6,417,069	4,840,974
Railway tax accruals	1,820,862	1,020,000
Railway operating income	4,596,207	3,816,117
Total non-operating income	3,962,030	691,357
Gross income	8,554,745	4,507,474
Interest on funded debt	1,633,492	1,640,640
Miscellaneous income charges	2,191,491	92,408
Total deductions	4,232,041	2,258,623
Net income	4,322,705	2,248,851
Total sinking fund and dividend appropriations	1,597,555	1,597,966
Income balance	2,725,149	650,885

NORFOLK SOUTHERN.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920*
Operating revenues	\$8,056,795	\$6,610,402
Operating expenses	6,752,509	6,959,365
Net railway operating income	1,304,286	Def. 348,963
Railway tax accruals	366,095	219,416
Railway operating income	937,852	Def. 569,079
Total non-operating income	106,882	Def. 1,684,258†
Gross income	1,020,259	Def. 1,115,178
Total deductions	1,343,933	1,168,739
Net income	Def. 323,674	Def. 53,561
Profit and loss account:		
Net credit for the year from redemption of bonds, sale of securities owned, etc.	313,953	273,729
Net result for the year	Def. 9,720	220,168

*Under government control two months, and operated by owners balance of year.
 †Includes rental and operating deficit paid by government on account of operations during guaranty period.

NORFOLK & WESTERN.—Asks Authority to Guarantee Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to guarantee \$6,700,000 of ten-year, 5½ per cent equipment trust certificates to be issued by the Virginia Holding Company for equipment to be leased to the Norfolk & Western. The certificates are to be sold at 97.75.

NORTHERN PACIFIC.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$115,534,300 of refunding and improvement mortgage bonds, 5 per cent, to be sold at not less than 90 and the proceeds used to redeem at 103½ outstanding joint 6½ per cent bonds of the Northern Pacific and the Great Northern.

PERE MARQUETTE.—Asks Authority to Abandon Branches.—This company has applied to the Interstate Commerce Commission for authority to abandon its Remus and Mecosta branches, 13.38

and 11.23 miles, respectively, in Mecosta County, Mich., on the ground that the traffic is insufficient.

PITTSBURGH & WEST VIRGINIA.—Annual Report.—The income account for the year ended December 31, 1921, compares as follows:

	*1921	1920
Operating revenues	\$2,808,939	\$2,254,048
Operating expenses	3,660,192†	2,273,966
Net revenue from railway operations	Def. 851,252	Def. 19,919
Railway tax accruals	321,891	169,322
Total operating income	Def. 1,173,230	Def. 190,367
Total non-operating income	2,185,612	661,123
Gross income	1,012,382	470,755
Total deductions from gross income	62,384	37,076
Net income	949,998	433,679
Dividend appropriations of income	544,242	433,679
Income balance	405,756	.....

*Includes operating results of West Side Belt Railroad.
 †Includes \$810,917 for rehabilitation of road and equipment.

SHREVEPORT & NORTH EASTERN.—Certificate for Construction Denied.—The Interstate Commerce Commission has denied this company's application for a certificate authorizing the construction of a line from Minden, La., to a point near Junction City on the Arkansas state line, 36 miles, on the ground that the facts presented are not sufficient to enable it to form a reasonably accurate judgment of the possibilities of the proposed line or to indicate a reasonable prospect of success for the enterprise.

ST. LOUIS-SAN FRANCISCO.—New Directors.—B. F. Yoakum, of San Antonio, Texas, and A. G. Becker, of Chicago, have been elected directors to succeed Lorezo Semple and T. D. Heed.

TEXAS MIDLAND.—Guaranty Certified.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months period of 1920 as \$158,367, of which \$58,367 was still to be paid.

Railroad Administration Settlements

The United States Railroad Administration has this week announced final settlements for the federal control period with the Winston-Salem Southbound to which it paid \$72,000 and with the Missouri & North Arkansas which paid director general \$292,000.

Trend of Railway Stock and Bonds Prices

	May 9	Last Week	Last Year
Average price of 20 representative railway stocks	64.95	65.26	57.41
Average price of 20 representative railway bonds	86.07	86.58	74.89



Lethbridge Viaduct on the Canadian Pacific

Railway Officers

Executive

William A. Colston, whose election as vice-president and general counsel of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, effective May 1, was reported in the *Railway Age* of April 8, and whose sketch of his railway experience was published in the issue of May 6, has also been elected a director of this company, effective May 3, and vice-president and general counsel and a director of the Lake Erie & Western and a director of the Fort Wayne, Cincinnati & Louisville, effective May 10.

James B. Sheehan, who was elected vice-president and general counsel of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, effective April 18, with headquarters at Chicago, was born in Anamosa, Iowa, August 24, 1863, attended Beloit College from 1881 to 1883, was graduated from the University of Michigan in 1885, and was admitted to the bar in 1888. Thereafter he engaged in general law practice at Omaha, Neb., until September 1, 1892, when he entered railway service as an attorney for the Fremont, Elkhorn & Missouri Valley (now a part of the Chicago & North Western) at Omaha, Neb. On February 28, 1903, he was appointed assistant general attorney of the Chicago & North Western, with headquarters at Omaha, and continued in this capacity until March 1, 1905, when he became general attorney of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn. On March 1, 1910, he was promoted to general solicitor of that company and on October 1, 1918, was elected general counsel of both the Chicago, St. Paul, Minneapolis & Omaha, and the Chicago & North Western, with headquarters at Chicago, which position he held until his recent election to vice-president and general counsel of these companies.



J. B. Sheehan

Financial, Legal and Accounting

J. F. Fairlamb has been appointed auditor of revenue of the New York Central and the Ottawa & New York, succeeding **W. T. McCulloch**, deceased. **J. S. Conover** and **J. McKendrick** have been appointed assistant auditors of revenue. These changes were effective May 1. The office of auditor of miscellaneous accounts has been discontinued and jurisdiction over its affairs has been assumed by auditor of revenue

Operating

Charles F. Thomas has been promoted to superintendent in charge of traffic and operation of the Nezperce & Idaho, with headquarters at Nezperce, Idaho, to succeed **J. M. Mitchell**, resigned.

Traffic

P. M. Snyder has been appointed division passenger agent of the Buffalo, Rochester & Pittsburgh with headquarters at Pittsburgh, Pa.

H. D. Guy has been appointed commercial agent of the Norfolk & Western with headquarters at Roanoke, Va., effective April 24.

P. W. Clarkin has been appointed division freight agent of the Canadian National with headquarters at Charlottetown, P. E. I., succeeding **A. McDonald**, retired.

G. W. Curtis has been appointed industrial commissioner of the Canadian Pacific, Eastern Lines, with headquarters at Montreal, succeeding **H. P. Timmerman**, retired.

C. S. Blackman has been promoted to general freight agent of the Tennessee Central, with headquarters at Nashville, Tenn., effective May 4, to succeed **M. E. Newell**, promoted to the newly created position of freight traffic manager. Effective the same date, **J. A. McNeill**, has been promoted to the newly created position of assistant freight traffic manager, with headquarters at Nashville, Tenn.

Engineering, Maintenance of Way and Signaling

H. A. Hampton, assistant division engineer of the Portland division of the Southern Pacific, with headquarters at Portland, Ore., was promoted to division engineer, with the same headquarters, effective May 1, to succeed **E. E. Mayo**, who has been transferred to Sacramento, Cal., to succeed **F. M. Siefer**.

Clarence U. Smith, whose promotion to district engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., effective May 1, was reported in the *Railway Age* of April 29 (page 1046), was born at Philadelphia on June 20, 1883, and was graduated from Armour Institute of Technology, Chicago, in 1907. He entered railway service in June, 1907, as an instrumentman on location of the Chicago, Milwaukee & St. Paul at Taft, Mont., in the Bitter Root mountains. For the next seven years he served consecutively as instrumentman on location, as engineer in charge of concrete work on several bridge and terminal projects on the Pacific Coast extension, as resident engineer on the Cannon Ball River line in South Dakota, and on double track work in Minnesota. He was promoted to assistant engineer in charge of concrete work on the Middle district with headquarters at Milwaukee in 1914. In 1917 he entered military service as a captain in the 107th Engineers, 32nd Division, with which he served throughout the operations of this division overseas, until his discharge in May, 1919, when he returned to the Chicago, Milwaukee & St. Paul, as assistant engineer on the Middle district, where he remained until December, 1920, when he was promoted to assistant engineer of the Chicago and Milwaukee and the Northern divisions, the position he held at the time of his recent promotion.



C. U. Smith

Purchasing and Stores

G. H. Pinion has been appointed purchasing agent of the Trans-Mississippi Terminal with headquarters at Dallas, Texas, succeeding **L. M. Sullivan**, deceased.

Obituary

William B. Sears, one of the builders of the Flint & Pere Marquette, now a part of the Pere Marquette System, died at Saginaw, Mich., May 2, at the age of 90 years.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

More About Public Relations Work

THE RAILWAYS are fully and admirably equipped to present their case to law makers, commissions and courts. But law makers, commissions and courts are not going to settle the future of the railways. They are merely agents—the public is their principal. In this, as in other affairs, the principal will in the long run determine the policies carried out by the agents.

The Transportation Act is in most respects a good law. The Interstate Commerce Commission used its provisions to force advances in certain state rates. The Supreme Court of the United States upheld both these provisions and the action of the commission. But the commission would never have had a chance to set aside these state rates, or the courts to uphold its action, if the Transportation Act had not been passed by Congress. It would not have been passed by Congress if public sentiment had not been favorable to the railways at the time.

Bills to repeal every provision of the act that is intended to help the railways already have been introduced in Congress. They will be passed if public sentiment favors them. They will be defeated if public sentiment opposes them. No amount of money and ability which may be spent in presenting the case of the railroads to Congressional committees, commissions and courts will avail to secure fair and wholesome regulation unless the facts and arguments presented reach and influence the public. The railroad problem will not be solved in Washington. How can anybody think it will be after the experience of the last 15 years? It will be solved in every single city, town and rural district of the United States.

Is it not a curious thing that so many railways—practically every railway in fact—should recognize the need for employing men of great ability to represent them before legislative committees, commissions and courts, and that so few should recognize the need for employing men of equal rank and ability to represent them before the public? Let us be frank about it. Is it not a fact that most railway managements so greatly underestimate the importance of effective public relations work that they would think a man was a little crazy who should suggest that each large road should have in charge of its public relations work a man as highly paid and as able as those at the head of its legal, operating,

traffic and accounting departments? But has not the problem of establishing satisfactory relations between the railways and the public been proved by the experience of many years to be quite as difficult as any other problem confronting railroad managements? Is it not at least as far from solution as any other big problem of railroad management? The answers to these questions are obvious. If the problem presented by public relations is so big, so difficult and so far from solution, how can it be expected it will ever be solved unless by men who are able in proportion to the bigness of the problem and who can devote their time to it.

It may be said that the problem of public relations is the problem of each of the railroad departments which come in contact with the public. There is something in that view. But if so, the departments which already come in contact with the public have not done their work right. Otherwise the railroad situation could hardly be what it is today, and what it has been for years past.

The present railroad situation has one important feature which never existed prior to government control. The railway labor organizations are strongly in favor of government ownership. They would prefer to have coupled with it the Plumb Plan of employees' management, but if they cannot get that they want government management. Government control and agitation carried on by labor leaders have made a large part, and we fear a majority, of the railways' own employees active critics and enemies of private management. They are spreading propaganda against private management in every part of the country. Employees need education, and the public needs education to nullify the propaganda of the labor unions.

It may be that adequate and effective public relations work could be done through the existing departments of the railways. One thing is certain, however, and this is that it never has been done through them, and is not being adequately and effectively done through them now. Past experience may be misleading, but it indicates that adequate public relations work never will be done on most railways until a special department closely co-ordinated with the other departments, and especially with the president's office, is established on each large railway system. The president gets his information and recommendations regarding traffic,

operating, engineering and other matters from specialists on those subjects in the existing departments. He bases his policy largely on this information and these recommendations. Past experience makes it doubtful if he will get the information and recommendations regarding public relations that he needs until he has high grade specialists on public relations to give them to him.

In view of all that has happened to the railroads within the last 15 years owing to an uninformed and hostile public sentiment, it is surprising how much has been done to nullify the effect of this public sentiment and how little has been done to change the public sentiment itself, which is the cause producing the effects. Why devote so much energy and ability to defeating proposed adverse legislation after it has been introduced in the legislatures and Congress, and to fighting it in the courts after it has been passed, and so little energy and ability to changing the public sentiment which causes the legislation to be introduced and passed? Why, in other words, so often abandon the front line trench almost without a struggle, with the result that most of the fighting is done in the last trench, the loss of which means that all is lost? Or, to use a specific illustration from very recent experience, why let hostile sentiment regarding the Transportation Act be created among the farmers by false and unfair propaganda, which in many parts of the country was allowed to go almost unanswered for months, and then make a strenuous effort in Washington to defeat legislation to emasculate the Transportation Act which has been introduced by leaders of the agricultural bloc to cater to the sentiment among farmers thus created?

Under present conditions it would be a good thing if every high railway officer would place where he would have to read it every day a sentiment attributed to Abraham Lincoln: that with public sentiment everything is possible; without it, nothing can be done.

The railways are among the largest users of lumber and as such they have much in common with the producers of this commodity. Yet there has long

Railways Should existed a controversy between the manu-
Participate in facturers and the railway users of lum-
Lumber Conference ber, particularly regarding sizes and grades. The saw mill operators have complained of the insistence of railway purchasers for certain sizes not in common use elsewhere preventing orders for such materials from being filled from stock and requiring that they be cut special. Furthermore the producers have maintained that the manner in which the railways place their orders prevent them from utilizing the entire tree to the best advantage. The railways on the other hand object to being forced to accept standard sizes not adapted to their uses and feel that the volume of their purchases entitles them to secure these sizes and grades which are adapted especially to their needs. They also insist that they are in a better position to know their needs than the manufacturers and that

if they do not use the entire tree it is the problem of the manufacturer as a merchandiser to develop other demands for the surplus material as the packer has done so successfully with his various meat products. In view of these conflicts of opinion it is important to note that Herbert Hoover, secretary of commerce, has called a conference of lumber manufacturers and users at Washington during the week of May 22, and that the railway users of lumber are invited to participate in this conference on Thursday of that week when attention will be given to the railway phases of this problem. The large volume of lumber and lumber products purchased annually by the railways warrants the roads in seeing that they are properly represented at this conference in order that their interests may be protected in any standards which may be developed, while at the same time promoting the maximum economy in the cutting and use of lumber products.

The second article on the International Railway Congress at Rome appears on another page of this issue. In addition

English the Railway Language

to summing up the reports of the various sections, Mr. Dunn has written rather informally his opinions of the value of the Congress. The diversity which exists between European and American railway practices does not, he feels, make it improbable that the two continents can learn from each other, but rather the contrary—the very fact that methods and equipment differ so widely makes any effort to exchange knowledge the more likely to be fruitful. Unfortunately, however, delegates from English-speaking countries were not able to profit by the sessions of the Congress as much as could be desired because the French and Italian languages were used almost exclusively while English, the language of those who operate by far the greater part of the world's railway mileage, was used but slightly. Whatever the reason for this, there can be no question but that the English-speaking delegates did not and cannot secure the greatest benefit from a convention conducted in an unfamiliar tongue. "Modern Transport," a British contemporary of ours, in speaking of a convention to be held shortly in London, expresses the thought that it will be of more value than the International Railway Congress because English only will be used. The next International Railway Congress will be held at Madrid, Spain, in 1927—a long time off. But now, while the Rome convention is fresh in mind, is the time for action. Sessions in English to run concurrently with those in other tongues do not seem too much to ask, in view of the predominance of English-speaking peoples in the operation of the railways of the world.

Millions of chilled cast-iron car wheels are in service on American railroads and, owing to the large number involved,

Car Wheel Grinding Effects Savings

any improved method of maintenance or securing greater wheel mileage is of importance. Railroad men of wide experience advocate the grinding of cast-iron car wheels, both new and those with flat spots, maintaining that increased wheel mileage and economy are effected. In view of the possible savings, the subject of car wheel grinding is highly important and of vital interest to higher mechanical department officers. Regarding this practice E. A. Murray, shop superintendent of the Chesapeake & Ohio at Huntington, W. Va., says, "During the year 1921, 466 pairs of cast-iron car wheels were ground at Huntington at a saving of \$13.80 per pair, or a total saving of about \$6,400. It requires on an average

45 min. to grind out the flat spots on one pair of wheels. Experience has shown that the investment for the grinding machine pays a good dividend, in addition to improving the condition of the wheels. With the great number of car wheels ground at this point, we have never had one that has been through the process of grinding returned on account of sliding flat." This testimony strengthens the argument of those who favor car wheel grinding. Apparently a car wheel which is once ground true and concentric with the journal is far less likely to be gripped by the brake shoe and develop another flat spot. The evidence seems to show that there is also less danger of hot boxes with ground wheels owing to the fact that hammer blows, tending to cause the journal box packing to leave the journals, are eliminated. There are several well-founded arguments in favor of grinding new wheels before they are placed in service and this practice is being followed on another large eastern road in the case of chilled cast-iron wheels under local passenger equipment, the advantages claimed being easier riding wheels and coaches and less danger of the subsequent development of flat spots.

It has been distinctly encouraging to note in recent months the growing number of construction items of magnitude, indicating that the most progressive railroads are taking real steps not only to remedy existing inadequacies but to provide some measure of expansion for the future. The past year or year-and-a-half has been rife with pessimism and it has not been easy to shake loose from it. Business today needs some sort of a pace-maker and the railways are taking that position. Naturally any business they stimulate reacts to their own advantage; in their potential purchasing possibilities they have a powerful and tremendously effective influence for the quicker betterment of general business. Many roads have large budgets for construction and equipment needs which for good reasons they have not as yet felt that they could start. Others, perhaps more able financially or more willing to gamble on the future, have started programs which will shortly run into large expenditures. The most recent item is that of the New York Central's Castleton bridge project calling for an ultimate expenditure of about \$20,000,000, of which probably about twelve million will be spent in the next two years. It is only a short time ago that this road ordered new equipment and materials involving an expenditure in the neighborhood of forty million dollars. The stimulus to general business from these two expenditures cannot help but be felt. Certainly that system will be better prepared to handle the traffic which is bound to come and to profit from it. One distinct need today—and one clearly emphasized by the recent activities of such roads as the New York Central, the Santa Fe and a small number of others—is a thorough confidence in the future and a determination to go ahead.

The 1921 annual report of the Lehigh Valley, a review of which appears on another page, is a document of only 22 pages. It is, however, one of the most satisfactory annual reports which it has been our pleasure to examine. The reason for this is that the report presents to the Lehigh Valley stockholders a picture of the company's operations as adequate and complete as many other railroad companies succeed in giving in two or three times that number of pages. The report is also characterized by a new and interesting feature. In addition

Confidence in the Future

to the usual remarks of the executive there appears at the end of the report a statement to security holders which unquestionably will be read by them with interest and value. The remarks at the end of the report present an analysis of the present railroad problem, the attempt being made to bring home to the stockholder and bondholder his or her particular interest in the welfare of the railroads. The annual report may be regarded as a necessary presentation of the year's statistics or it may be regarded as a means of informing the security holders of what the railroad is doing or what it is trying to do to meet its particular conditions. It can easily be, and too often is, the first without the second, for it is not an easy task, even for those required to do it, to analyze a complicated mass of statistical data. It is the modern idea, however, that the security holder should be told the facts and told equally what the facts mean. The fact that a stockholder is a stockholder shows him to be in a receptive attitude to hear the executive's story and the railroad should be fair to him and tell him that story. The Lehigh Valley has taken a progressive step that we hope will be followed by such of the other railroads as have not as yet realized the value of taking their stockholders fully into their confidence.

Radio Legislation and the Railroads

FURTHER LEGISLATION for the control of radio communication is expected to be passed at this session of Congress, which will authorize the President to appoint a permanent board to control all radio communication in the United States. The bill, which will be an amendment to the radio act of 1912, under which radio communication is at present regulated, will be introduced by Representative Wallace H. White of Maine and is designed to give the Department of Commerce greater control and regulation over this new form of communication. The powers, however, will not be absolute. It is proposed that the permanent board of control will have a member each from the army, navy, commerce, post office and agriculture departments and five civilian members representing the public, skilled amateurs, manufacturers, scientific and other civilian interests.

The possibilities for the use of radio in the railroad field should not be overlooked by the government or by the railroads, for its application to railroad service is already receiving careful study by a committee of the Telegraph and Telephone section of the American Railway Association, while a number of railroads are conducting researches to ascertain its applicability to varying conditions of service. There is a large field for the use of short range sets to meet emergency requirements occasioned by the loss of pole lines because of floods, sleet storms, etc.; for trains marooned by storms or other reasons; for construction gangs and wrecking crews, etc. Other possibilities for the use of radio are for communication between the head and rear ends of trains, for long range operation between general headquarters and division points, and for automatic train control. It is also conceivable that it may find use in the signal field. While it is evident that these applications will create numerous complications the importance of radio to railroad work is so great that the railroads should receive consideration in the administration of any legislation relating to it.

Herbert Hoover, as secretary of commerce, under whose jurisdiction it is contemplated that the control and regulation of radio will come, has repeatedly pointed out the importance of the railroads to the welfare of the country and it is to be presumed that if the roads desire to be represented on the board of control he will give careful consideration to such a request. The railroads should be repre-

Annual Reports and Publicity

sented on this board in order that all avenues of communication may be available for their use, because the railroads, unlike the commercial telephone and telegraph companies, have no cross country lines on which they can maintain communication when something happens to their lines of communication along the right-of-way. Action should be taken for the protection of their own interests.

An Excess of Well Intentioned Zeal

THE Railroad Labor Board has decided that the contracts entered into between the Indiana Harbor Belt and the Burnham Car Repair Company for the operation of its shops "are in violation of the Transportation Act insofar as they purport or are construed by the carrier to remove said employees from the application of said act, and that those provisions of the contracts affecting the wages and working rules of said employees are in violation of decisions No. 2, No. 119 and No. 147 of this Board."

This decision, particularly as it is the first of some 36 similar cases, must be regarded as one of the most important and far-reaching which has yet been made by the Board. It may be regarded from two angles. On the one hand, it must be admitted that it was the natural one for the Board to make in the light of its previous policy and activity. On the other hand, it must be considered as the latest step in a long series of decisions, in all of which the Labor Board assumes the right to judge whether or not it has been exceeding the authority granted to it in the Transportation Act. *The Railway Age* believes that in the activities of the Board culminating in this decision the Board has gone too far. The railroads will be very much remiss in their duty if they do not fight the decision and carry the matter, if necessary, to the highest courts.

It is natural for an ambitious man, or a group of men, to try to secure all in the way of position and power that circumstances permit them to attain. This doctrine is the very definition of the word ambition. It is one of the most important elements in the theory of evolution or the survival of the fittest, or whatever else one may call it. The Constitution of the United States gives due regard to it because the basic principle of our form of government is that it shall function as a system of checks and balances. The creators of our government feared that there might some day arise a power which in those days, of course, they personified in King George III of England. They, therefore, worked out a theory that there should be three departments of government, the executive, the legislative and the judicial, each of which was to serve as a check or balance on the other two.

This theory is a far reaching one. It was applied to the Interstate Commerce Commission and that body went through a long period of trying and testing in the courts and in Congress before its powers were determined to the extent that they are today. The Labor Board thus far has had no such trying and testing. The railroads—with the single important exception of the Pennsylvania—have been content to sit back and permit the Labor Board to gain more and more power and more and more authority day by day. The result is that the Board has taken unto itself administrative functions and has been allowed to wield a power which, in our belief, was not granted to it by the Transportation Act.

The Labor Board thus far, therefore, has been primarily its own judge of where its power extended or did not extend—except as always in the Pennsylvania case. This is not as it should be. It is not best for the welfare of the Labor Board, for the railroads for the public or for the basic principles of our form of government that it should be worked out in this way.

There are those who believe that the most important factor in deciding the labor disputes in a public utility is the force of public opinion. The Labor provisions of the Trans-

portation Act were purposely framed with that idea uppermost. There seems, however, too much of an attitude on the part of the railway managements to forget this important aspect of the situation. The Labor Board should not be the arbiter of its own activity.

Realizing as we must that the Railroad Labor Board is an ambitious body seeking to secure all the power and rights that it can ethically secure and that it is properly doing its utmost to justify its existence as a part of our government, we may go further. Taking the decision itself in the Indiana Harbor Belt case, we find these words: "On the other hand, the Transportation Act was not enacted primarily for the protection of the rights of either carrier or employee except insofar as such protection was involved in the paramount purpose of the act; that is, to insure to the public, as far as possible, efficiency and uninterrupted railway transportation by protecting the people from the loss and suffering incident to the interruption of traffic growing out of controversies between the carriers and the employees who do their work. This act is the congressional assertion of a public right."

There is also a statement that "it is important if by such contract the carrier seeks to remove its employees from under the application of a law which the people have enacted for the purpose of maintaining industrial peace upon the railways." Of course, in this case, there was no question of the interruption of transportation that is apparent on the surface. The employees of the Burnham Car Repair Company were not threatening a strike. But the point is that the Labor Board has, if anything, given an exalted importance to the fear of interruptions to transportation. The Transportation Act, however, also requires the Interstate Commerce Commission to establish a level of rates which will yield a certain rate of return "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment."

Why have the railroads contracted for the repair of equipment? One of the best reasons we have seen is given in a report recently issued by the National Industrial Conference Board—Research Report No. 46 dated February, 1922, and entitled, "Railroad Wages and Working Conditions." This report contains on page 97, Chart 9: Hourly earnings, skilled shop labor, Class I railroads, compared with skilled labor in foundries and machine shops. The chart shows, among other things, this rather pertinent fact that whereas in July, 1914, skilled labor in railroad shops and in foundries and machine shops outside the railroad field hourly wages were nearly on a parity, in October, 1921, skilled railroad shop labor was receiving an hourly rate of 75.4 cents but in other shops a rate of slightly over 60 cents, a difference of say 15 cents. For December a figure is given for labor in foundries and machine shops of 57.3 cents or 18.1 cents less than the October railroad shop figure. The report contains also many other interesting details concerning the rules and working conditions in railroad shops—notably the effects of the national agreements as modified by the Labor Board decisions. Among other things it is pointed out that in railroad shops much work is carried out by men classified as machinists which in other shops would be done by helpers or handymen.

President A. H. Smith, of the New York Central and of the Indiana Harbor Belt has added some further interesting data. He is quoted as saying: "The facts in the case are that the men employed in these shops notified the Labor Board that they were satisfied with their wages and working conditions and protested against any interference on the part of the Labor Board. Furthermore, the average wages which they are now receiving are in excess of the wages prescribed by the Labor Board as just and reasonable. The striking point, however, is that the results show an increase of 40 per cent in efficiency as compared with the operations of these shops by the railroad company under the rules and regulations presented by the Labor Board."

The underlying reasons, then, for the contracting of the shops are: (1) that the Labor Board's scale is considerably in excess of that paid similar labor elsewhere; or (2) that when not working under the provisions still remaining from the national agreements the labor was 40 per cent more efficient.

It must be remembered that in paragraph (d) of section 307, the Transportation Act says: "In determining the justness and reasonableness of such wages and salaries or working conditions the Board shall, as far as applicable, take into consideration, among other relevant circumstances, (1) The scale of wages paid for similar kinds of work in other industries. . . ." This, quite apparently, the Labor Board has not done. The railroads, in contracting out their shops, did attempt to do so. It would appear that the Labor Board is in a position where in altogether too great a degree it is trying to subsidize railroad shop labor at the expense of the farmer and the consumer who, in the long run, pay the additional wages or who pay for the reduced efficiency under the railroad shop rules.

The Labor Board's decision in the Indiana Harbor Belt case is in line with its previous decisions in the matters of the wages and working conditions of railway shop labor. The Board, in establishing the wages, should seek to insure, if it can, the maintenance of these wages and working conditions in all railway shops. From its own point of view, the Board is correct in believing that the contracting of the shop is an evasion of its previous decisions. But, the carrier must be regarded as being between two fires—the necessity of operating efficiently and economically, and the Labor Board's decisions which in effect prevent it from doing so as far as its shops are concerned.

Matters should not be allowed to go on in this way. The question should not be allowed to go by default. That is why we maintain that the railroads should come out fairly and squarely for their rights. They should go to the courts or to the public for an ascertainment of how far the Board's power extends, or was intended by the Transportation Act to extend. There is no precedent under the Constitution of this country which permits the Labor Board as a governmental body to be allowed to gather in authority in all directions without control or as it, in its own mind, sees fit.

New Books

Index-Digest of Decisions of United States Labor Board; Compiled by Bureau of Information of the Southern Railways; Published and Distributed by Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. Bound in paper. 6 in. by 9 in. size, 332 pages. Price 50 cents. In lots of 100 or more, 25 cents.

The present edition of the Index-Digest succeeds the first edition gotten out last September. The book gives the gist of every decision rendered by the Labor Board up to May 1, 1922. References are given so that the full text may be obtained. Experience has demonstrated, however, that the use of this Index-Digest eliminates the time and labor of reading through the full text of the decisions.

Under alphabetical subject headings it gives a summary of every decision relating to each subject—containing all the necessary practical information that anyone would ordinarily have occasion to use. This arrangement enables one readily to obtain desired data regarding decisions.

The new edition has the added feature of two sections, respectively showing by roads and by labor organizations the decisions to which each has been a party. These two additions should prove useful in cases where the particular decision or principle involved is remembered by the name of the labor organization or the name of the railroad. In other words, the publication is indexed and cross-indexed in almost every conceivable way.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

"Our Road"

NEW YORK

TO THE EDITOR:

We all recall that before the days of Mr. McAdoo's reign as autocrat of the railroads, there was what we often call "high morale" among railroad men—in the train service particularly; meaning that there was a company spirit and every man took pride in his road, its equipment, etc.

Coming down on the Lackawanna last Sunday I ran across a flagman that took me back to those by-gone days. He took personal pride in pointing out the improvements this railroad had made in the past few years, the location of the old abandoned line, the drop after passing Pocono Summit, the Gap as seen from the distance, and many other things that might interest a weary traveler. After passing a dairy plant he went on to tell how many cars the Lackawanna carried to New York daily as its share in supplying milk to the great city, and then stated that within 15 minutes we would pass the empty milk trains returning; in less than 20 minutes three empty milk trains passed going up the mountain.

All this was not overlooked by the usual traveler, but what impressed me most was he always referred to the Lackawanna as "our road," "our line," "we," "us" and similar personal terms; all of which leads me to hope that some day the men will have the same interest in their road as they had before the days of federal control.

E. F. GARWOOD.

A Permanent Railway Supply Exhibit in Chicago

CHICAGO.

TO THE EDITOR:

Chicago is universally recognized as the railway supply center of the United States. This, together with the fact that more railroads have general offices in that city than at any other point in the country, makes Chicago the ideal location for a permanent railway supply exhibit. If a census could be taken of all of the railway supply concerns which maintain headquarters in Chicago and also of those with branch offices in that city, I feel sure that one would be surprised at the magnitude of the industry centered there. Furthermore, the amount of money spent annually for office rent by these companies would pay the interest on a very large investment to provide a building to house this exhibit.

My idea is that this building should be located on the lake front and have track connection. The ground floor should be arranged for the exhibition of cars, locomotives, snow plows, wreckers and other heavy railway equipment standing on its own wheels. The second and possibly the third floors might well be adapted for the exhibition of even the heaviest of shop tools with a crane or other hoisting equipment to raise these tools from the first or track floor to the second or third floor. Permanent exhibits of railway supplies, light machine tools, pneumatic tools and other devices now being sold to the railways could be presented on three or four additional floors. Above these exhibition floors

office space could be provided to accommodate at least most of the railway supply companies now scattered throughout the city. Above the offices there should, if possible, be a number of sleeping rooms with baths and on the very top of the building a suitable club.

Chicago is the central point to which all railway and railway supply men come or through which they pass at intervals. The establishment of a large exhibit of a wide variety of railway tools and equipment in one building will afford an educational opportunity for these men which they will not fail to take advantage of. It will also conserve the time and traveling of the men interested in these devices.

HARRY VISSERING.

The Committee Plan

CHICAGO

TO THE EDITOR:

The railroads have numerous associations—the American Railway Association with its various divisions, the General Foremen's, Traveling Engineers' Associations and others. In our industrial plants we have safety committees and our labor organizations have shop crafts committees. Why? For the fundamental reason that two heads are better than one; that a group of men can evolve ideas, make suggestions and consolidate operations quicker and make fewer mistakes than if one individual attempted to dictate and rule.

Now, knowing these things, why is it that in railroad circles we fail in this collaboration? Why is it we admit that we must co-operate with other railroads in certain respects and ignore the committee idea in our inter-departmental workings? Why is it that the average superintendent of motive power or shop superintendent arrogates to himself the full power of dictatorship—"You must do that in this way," instead of "Let's get together and decide which is the better way?"

What happens in a shop staff meeting? The shop superintendent or master mechanic starts in with one department, asks questions as to progress of work, tells his foreman what to do, passes on down to the next foreman, etc.

Does the superintendent of motive power call in his master mechanics and shop superintendent to get their views when he is getting up specifications for a new lot of locomotives? He does not; he calls in his mechanical engineer and instructs him to specify this and that. And so on all the way through the mechanical department organization.

This is a weakness in railroad work; a failure to get the best there is out of the organization and a careless handling of the company's money. Why not adopt the committee plan on these matters of new equipment; why not work it out in the plants and why not say, "We did this," instead of "I did this?" On the other hand it could be said, "We failed to do this," instead of, "I failed to do it."

The committee plan is not a medium for "passing the buck" or shifting of responsibility. To the contrary, it is a spreading of responsibility, a feature that will bring to you the undivided interest of several to focus on the object, not one.

Were I a shop superintendent, a staff meeting would be a committee meeting. I would consider that my highly trained locomotive men could make many good suggestions to the car department and while my car department organization may not be as technical as the locomotive, nevertheless some of these car men could make able recommendations to the other side.

I would select the weakest link in my departmental organization and in open meeting would lay the difficulty before my committee. As an example: "The boiler shop is way behind on the work and as a result we are losing output. Now this affects all of us; the tin shop, blacksmith shop, and principally the back shop. A loss of output reflects

on our management, not mine. What have you to suggest, Mr. Back Shop Foreman? Your remarks are not a criticism on the boiler shop but, to the contrary, they will be a help."

This back shop man, who has been worrying about the tie-up in his work, will immediately say what particular work is holding him up. If it's flues, your machine shop man will probably make a recommendation pertaining to the equipment in the boiler shop for handling flues. Your blacksmith foreman will have some ideas and the committee will regularly pass on the suggestions and without doubt some excellent thoughts will be brought out that make for speed and economy.

Instead of this method of handling having an adverse effect on the boiler shop man, it would put new heart into him; he would feel that his burden has been distributed and all are interested in him and through him in his department.

GRANT GIBSON.

Capitalizing the Cost of Tie Treatment

WASHINGTON, D. C.

TO THE EDITOR:

In your issue of February 18, page 416, you published an abstract of a paper by Earl Stimson, chief engineer maintenance, Baltimore & Ohio System, and in your issue of April 29, page 1003, there appeared a letter by F. S. Schwinn, chief engineer, International & Great Northern, on the cost of treating ties. Mr. Stimson and Mr. Schwinn seem to take opposite views as to the proper classification of this cost.

The Engineering Board of the Bureau of Valuation, Interstate Commerce Commission, during its life of 8½ years inventoried and priced ties exactly as found in the track on the date of valuation. A treated tie was "valued" as such and an untreated tie was appraised at a lower price.

The classification of investment in road and equipment of steam roads, page 18, account 8, states: "This account shall include the cost of cross, switch, bridge, and other track ties used in the construction of tracks for the movement or storage of locomotives and cars, and the cost of additional ties subsequently laid in such tracks; also the excess cost of metal ties used in repairs of track over the cost to replace in kind wooden ties removed." The classification of operating expenses, page 42, account 212, states: "This account shall include the cost of cross, switch, bridge, and other track ties used in the repairs of tracks." There is no specific reference to the cost of treating ties in any of the classifications. However, the economic principle to be followed is to charge "renewals in kind" to operating expenses. Assuming for the purpose of argument that untreated ties costing one dollar each are renewed with treated ties costing \$1.50 each, there should be a charge of 50 cents to the investment account according to the general principle of economics.

It is understood that the Bureau of Accounts of the Interstate Commerce Commission does not approve charging the cost of treatment to investment where a few ties are used on each track section, for example, but where a whole division has been renewed with treated ties it is possible that the Bureau would carefully consider any case presented by a carrier and approve a charge to investment after the actual cost of treatment had been checked by a representative of the Bureau, provided that this cost was clearly in excess of the original investment.

The practice of carriers has been to charge the cost of treatment from month to month to expenses as ties are used in miscellaneous renewals and after a district, a division or the whole road has been renewed with treated ties, to take up the question of charges to investment on its merits if the case warrants further consideration.

EDWIN F. WENDL,
Consulting Engineer.

The Revision of the Transportation Act

CHICAGO

TO THE EDITOR:

In view of the present agitation for the amending of the Transportation Act, it has occurred to me that there should be a wider dissemination of information with regard to the present law and its provisions. I am therefore suggesting several reasons why this act should not be amended at the present time. These reasons are as follows:

1. If the Transportation Act is amended as proposed it will prevent the establishment of a reasonably uniform system of rates which can be worked out only through a single regulatory body having ultimate responsibility for the establishment of fair rates and adequate service. These amendments will throw the rate situation back into the confused state that existed prior to the passage of the Transportation Act, when 48 different state commissions were regulating their intrastate rates with little restraint or control. It will be remembered that at that time each state was attempting to secure an advantage over every other state by maintaining lower intrastate rates, thus reducing those rates to such an abnormally low level that it was necessary to establish much higher interstate rates to enable the roads to exist and maintain adequate service.

2. In the latter part of the nineteenth century when the regulation of interstate commerce was first given serious consideration, it was claimed that every state had the right to regulate all transportation upon the waters within its boundaries. New Jersey granted exclusive franchises upon the waters of New Jersey, and other states did likewise. The result was confusion and chaos. The only thing that made commerce between the states possible was the adoption of a uniform scheme of regulation, without which no system of transportation can succeed.

3. In the western country the farmers especially are interested in reaching the large markets. This means that 90 per cent of their traffic must move on interstate rates. If every state is to be permitted to lower intrastate rates at its will or pleasure, it means such a breaking down of the rate structure and such an inroad upon the earnings of the carriers that higher interstate rates will be necessary to make up the deficiency. These higher interstate rates will be a greater burden upon the shippers and will more than offset any advantage that may be obtained by pounding down the intrastate rates.

4. The necessity of uniform supervisory control is illustrated by the recent action of the state commissions with reference to increases in intrastate rates corresponding with the increases in interstate rates authorized by the Interstate Commerce Commission. Thirty-one states complied with the request of the Interstate Commerce Commission and granted increases in intrastate rates, while 17 states refused to grant these increases. It is only fair to the states that granted the increases that there should be some supervisory authority which would require the other states to stand their just proportion of the burden.

5. The proposed legislation will injure the credit of the roads and thereby increase the cost of securing money for capital improvements, which will of itself necessitate a higher structure of rates than now exists.

6. There is no more reason why geographical lines should determine the right to fix rates as between states than there is why geographical lines should be used to fix rates as between counties. Indeed, in many western states there are counties that are as large or larger than some of the New England states, and if each New England state is to be permitted to fix its own rates, regardless of the effect upon the country as a whole, then many of the counties in the west should be granted the same privilege.

7. Rates should be fixed in relation to industrial rather than geographical lines. If Illinois, Wisconsin, Iowa and Minnesota, for instance, insist upon fixing intrastate rates

as they please, regardless of the effect upon interstate rates, they must then grant this same privilege to every other state. The result means chaos, for undoubtedly they must be uniform, and this can be secured only through the federal government.

8. An illustration of the confusion that will arise by the decentralization of authority is indicated by the recent action of the state commission of Arkansas. The Interstate Commerce Commission recently prescribed and promulgated a uniform bill of lading. The Arkansas commission has suspended this bill of lading and has ordered that it shall not apply in that state. Likewise there was a time when each state introduced its own safety appliance laws, and headlights that could be used in one state were illegal in others. The statutes are full of regulations with reference to the equipment of trains, the size of crews, etc. This resulted in such unnecessary and wasteful expenditures that Congress finally took over the whole matter and now regulates all safety appliance, train equipment, etc., with the result that standardization and uniformity have been brought about.

9. There should be no demand for a return to the old method of regulation unless the people are ready at the same time to eliminate all provisions relative to the control of capitalization and security issues, and unless the states are ready to take over and assume the financial obligations now carried by the federal government on behalf of the railroads. The federal government now fixes wages, it controls the so-called interlocking directorates, security issues, and extensions and improvements. It is fixing the physical value of the properties of the railroads, whether devoted to interstate or intrastate commerce. Certainly the states ought not to be permitted to fix the income of the railroads by the regulation of intrastate rates when the largest proportion of the expense of the railroads is left in the hands of the federal government.

10. The present law gives to the federal government only a general supervisory power over the complete structure of rates, looking to the maintenance of such revenue as is necessary to meet the expenses fixed by the federal government and necessary for the continued and successful operation and improvement of the railroads. As pointed out in the opinion of Chief Justice Taft in the Wisconsin rate case, the state commissions under the law as it now stands, have all the regulatory power over rates reasonably necessary for state purposes, and it is only when the entire general structure is such as to materially break down, burden, or obstruct the financial capacity of the carriers that the Interstate Commerce Commission may interfere.

11. There has not yet been time for the law to be given a fair trial, for the roads, the state commissions, and the Interstate Commerce Commission are only now beginning to become adjusted to the new plan.

A. C. JOHNSON,
Vice-President, Chicago & North Western.

The Locomotive Engineer as the Dispatcher Sees Him

MINNEAPOLIS, MINN.

TO THE EDITOR:

In your April 8 issue there is a locomotive engineer's letter telling us how to improve operation. His adverse criticisms reach for everyone, except the engine men. Evidently he would have the reader think that the locomotive engineer is a "Model of Perfection" and the "Czar Supreme" on a railroad. While it is true that we now have some "poor timber" as yardmasters and train dispatchers, if this engineer has had wide experience in his line of business he must realize that a very large percentage of his engineer comrades are "poor sticks."

Let one of these "would-be" engineers lose an eccentric bolt, nut, or meet with the most minor mechanical mishap;

instead of hitting the ball and squaring up to the emergency, what does he do? He tells the dispatcher he is in trouble and winds up his message with "Please advise." Many times he is unable to intelligently explain his trouble, and, when urged will send out an "S. O. S." for another engine. Too frequently it is found that had he but used his head this unnecessary expense could have been avoided.

The ambition of the young locomotive engineer of today is not to be an expert student of mechanics, but rather to be proficient in brotherhood schedules, with their many technical possibilities, that he may be in a position to draw the biggest check with the least exertion.

I would like to see the western road which he speaks of running daily 75 trains each way, on single track. I am sure this is only a pipe dream of his, or a vision that came to him in an enginehouse discussion with his associates. It is admitted by best authority that 40 trains are about single track limit—and not 40 each way, either.

I agree with the brother that there is better feeling existing all around and that there are weak sisters in the several departments he names, but he must remember that conditions are, and have been, changing. There is no question as to his preferring old methods, when he got 30 minutes preparatory time, then used 30 minutes to eat, 30 minutes to adjust his suspenders, etc., which the company paid for—in fact, using so much preliminary time that the dispatcher would begin figuring on an engine watchman for fear the 16-hour law would catch him before he started.

If this old time loyal engineer, together with the other loyal old timers, would start an educational campaign and endeavor to instill into the minds of the coming generation of engineers the great need of most loyal and ardent support to his company, there would be less computation of punitive methods and more real railroading.

TRAIN DISPATCHER.

Some Ways to Create Favorable Public Opinion

DALLAS, ORE.

TO THE EDITOR:

Much has been printed in your columns recently concerning the attitude of the public towards the railroads and measures which might be taken to create a more favorable public opinion. I have been a station agent for many years and have been surprised that railway managements have not taken more practical and effective means to put their roads in the proper light before the public. Efforts seem to be directed primarily towards the education of the employees who come in contact with the public in the essentials of courtesy, while but little thought has been given to the removal of the handicaps under which these employees labor.

Roll tape has been so increased in recent years that almost any dealing with the railroads is irritating to the public. We have storage charges for L. E. freight, parcel checks, stamps to cover excess value of baggage, and every sort of a method to add an extra ten cents. Charges for storage in parcel checking perhaps may be all right at large stations where every passenger is a stranger, but I do not understand why it is necessary to inflict such handicaps on the country agent. It is the practice on many roads to require those who check baggage to sign their names on a slip stating its value. This measure provides little revenue, but works injury to the roads through loss of prestige. Charges for storing L. E. freight at small stations have also made many enemies at home there for checking parcels.

It happens not infrequently that contracts, leases, bonds or other legal papers are sent to local agents for the patron to sign, affix revenue stamps and secure the signatures of

guarantors and several outside parties as witnesses, only to discover that they are made out on the wrong form; that a new contract must be provided, new bondsmen's signatures secured and new revenue stamps provided, always at the expense of the patron. I believe that the railways should rise above these tactics and provide the revenue stamps themselves, being sure that papers are on the proper form at the first or take the consequences. Make the checking of baggage the simple operation it really is, allow their agents to look after a traveling man's grip for an hour without charging him and in many other ways remove the handicaps under which their local agents work. These agents are the best publicity mediums which a railway can have and their contact with the public should be such as to enable their dealings to be as simple and direct as possible.

J. M. CAMPBELL.

Selling the Railroads to the Public

EDgewater, N. Y.

TO THE EDITOR:

In your discussion on "Selling the Railroads to the Public" you have overlooked the one fundamental on which rests success or failure; I refer to the employee, who is the "salesman" of any road, no matter in what capacity he is employed. True, an employee may not be engaged in actively soliciting freight or passenger business; but there are opportunities when any employee may speak a timely word in explanation of the service rendered by his road with the result that added business will be secured.

In the commercial world it is a well established fact that a salesman to be successful must be "sold" in his own product first. How many employees (salesman in the making) on our vast railway systems are sold on the merits of their own road?

As a regular reader of one railroad employees' magazine, I believe it is both possible and practical for the railways to do constructive work on public relationships through the pages of the monthly magazines or leaflets issued to their employees. It is here that the ground work should be started in the coming movement of selling the railroads to the public.

From the viewpoint of a reader, my idea of what a typical railroad magazine should contain, is to divide the reading matter by departments, offering some constructive suggestions on how to better each department. Develop and expand certain ideas which will add to the service of the road, or effect economy of operation. As a worker in the yard service, what do I care if Bill Smith of the machine shop is visiting friends in New York? But I am anxious to know how my yard work compares with that of other yards on the line. The switchmen in my yard may be careless. It is possible that I feel I am handling more cars per day per man than other yards. But what would be the result if I read that the other fellow's damages costs were one per cent of my cost. And when any employee causes damage, who pays the bill?

When John Jones is promoted to yardmaster, don't insult him by making a simple statement of his promotion. Give him due credit by publishing his picture and an outline of his services. This makes promotion worthy of effort and inspires confidence in other workers. A foreman in any department is an important official. He has a direct bearing on net income, hence it is worth the effort to show him how to avoid wasteful methods, to make each dollar earn a dollar's return and to co-operate with other departments by a broader knowledge of general conditions, rather than a selfish desire to lighten his own load through sacrificing other departments.

The regular employees' magazine can do this work and it is the first step in selling a railroad to the road's employees so that they, in turn, will produce "teamwork."

J. G. GLAZIER.



An American Party at the Rome Congress—Reading from Left to Right from Bottom Row Upward: Eugene L. Sullivan (Worthington Pump & Machinery Corp.); Samuel O. Dunn (Editor of the Railway Age); L. A. Downs (V.-P., Cent. of Ga.); A. S. Baldwin (V.-P., Ill. Cent.); J. E. Fairbanks (Gen. Sec'y, A. R. A.); F. K. Vial (Am. Assn. of Chilled Wheel Mfrs.); Ernest Lloyd (Am. Loco. Co.); Miss Pattison; Hugh Pattison (Elec. Engr., Ill. Cent.); Count Coruini; Capt. Privreau (Regan Safety Devices Co.); Dr. D. Z. Dunott (Chm., Med. & Surg. Sec., A. R. A.); D. F. Crawford (Delegate of U. S. State Dept.); F. A. Poor (Pres., P. & M. Co.); Mrs. Downs; Mrs. Fairbanks; Col. L. F. Finby (P. & M. Co.); Mr. Werlich (Am. Loco. Co.); W. F. Drysdale (Worthington Pump & Machy. Corp.); Miss Tollerton; Mrs. Drysdale; Donald Rose (European Traf. Mgr., Ill. Cent.); L. G. Cullett (Worthington Pump & Machy. Corp.); Mrs. Baldwin; Mrs. Dunott; Mrs. Tollerton; Mrs. Dunn; W. J. Tollerton (Chf. Mech. Supt., C. R. I. & P.)

Rome Congress Adopts Interesting Conclusions

Next Meeting at Madrid in 1927—Reports Adopted on Electric Traction, Locomotive Improvements, etc.

By Samuel O. Dunn
Editor of the *Railway Age*

THE NINTH CONGRESS of the International Railway Association adjourned today, after having been in session since April 18. Many of the delegates have left for their homes in countries throughout the world. A large party, however, has gone to Naples. There its members will be entertained by Thomas Cook & Sons, and by the municipality and civic organizations of Naples, with excursions to Pompeii and Mount Vesuvius and by a dinner on one evening and a special performance at the great San Carlo theater on another evening. After that most of the members of the party will proceed by ship to Genoa, whence they will go on an excursion to the electric traction installations at Modane.

The next Congress of the association will be held at Madrid, Spain, in 1927.

More Americans Participate

The closing session was presided over by Mr. Raffaele de Corne, President of the Council of Public Works of Italy, who made a farewell address to the delegates. The deliberations of the various sections in the latter half of the Congress were enlivened by the participation of an increased number of Americans. These included Gen. W. W. Atterbury, vice-president of the Pennsylvania System; L. A. Downs, vice-president and general manager of the Central of Georgia; and Col. W. B. Casey, technical adviser to the government of Australia, all of whom were delegates appointed by the American Railway Association. Other Americans who have been here include Colonel Barber, who is serving as technical

ROME, Italy, April 28.

adviser to the government of Poland, and W. L. Tedford, assistant to the president of the Commonwealth Steel Co.

In French and Italian

American railway men who have not attended the Congress will naturally be curious regarding the opinion of those who have been here as to the value of attendance upon it. If they ask those who have been here, they will get a variety of opinions. In the first place, the great diversity of conditions existing in the many countries of the world necessarily has caused corresponding differences in railway practice. In carrying on discussion and framing conclusions regarding what is desirable practice, so much allowance often has to be made for differences of conditions and of history that the conclusions reached are likely to be general, indefinite and hesitating and, therefore, practically valueless. But the most salient feature of the Congress from the standpoint of Americans—and many of the English have not been in much happier case—is that much the greater part of the discussion has been carried on in French and Italian, of which most Americans could not understand a word. French is the official language of the association; and courtesy required that the language of the country in which the Congress was held should also be used; but certainly all the English-speaking delegates felt that English should have been used more. The simple fact is that much more of the world's railway mileage is operated and more of its railway traffic is handled in countries using English than in countries using

any other language. If the association is to be made of real value to railways throughout the world, it must be made truly international; and if it is to be made truly international, enough of its proceedings must be carried on in English to render its sectional sessions intelligible and interesting to English-speaking railway officers. It cannot be said that this was true of the Ninth Congress.

Differences Between American and European Practice

The differences between the practice of American and European railways are very numerous and great. In the writer's opinion, however, this should be a help, not a hindrance, to railway men of different countries in teaching each other. There is altogether too much disposition on both sides of the Atlantic to assume that because of differences of conditions American and European railways have little or nothing to learn from each other. The International Railway Association could be made the most efficient medium of communication between them; but the association will never be an important factor in this respect unless the interest in it of all the railways of the world is secured and maintained; and their interest cannot be secured and held unless the proceedings are more largely carried on in a language which the representatives of the largest single group of railways in the world can understand.

Interchange of Rolling Stock in Europe

There were two interesting reports on "Interchange of Rolling Stock." The one prepared by C. W. Crawford, Chairman of General Committee, Division II—Transportation, of the American Railway Association, dealt entirely with the interchange of freight cars by the railways of the United States. The other, which was by Mr. Charron, of the Midi (Southern) Railway of France, dealt with the interchange of rolling stock in other countries, and especially in Europe.

It is not necessary to summarize here the contents of Mr. Crawford's very interesting report, as it was intended chiefly for the information of foreign readers.

Mr. Charron's report shows that there are in effect a number of different systems of interchanging cars in Europe. One is a "convention" which went into operation on January 1, 1922, and which is known as the "R. I. V."—Regulations for the Reciprocal Use of Wagons in International Traffic. It provides that the receiving railway must after unloading, return cars without delay and, as far as possible, reload to the owning railway. Stations authorized to reload are restricted, the object being to insure the return of the car to the company owning it as quickly as possible. Any failure to comply with the conditions is subject to a penalty of 40 francs (at present about \$4) from the defaulting company to the owner. Furthermore, the using company is required to pay the owning company demurrage which varies from 2½ francs a day for the first three days up to 6 francs a day beyond the fifteenth day. This agreement is in effect between the railways which use the standard gage on the continent of Europe.

There is another international convention, known by the initials "V. W. U.," which governs the interchange of cars between the railways of Germany, Austria, Hungary and the Netherlands. It differs from the R. I. V. mainly in regard to the amount of demurrage charged. It is expected that the interchange of cars between the continental railways using the standard gage will soon be subject nearly or quite universally to the R. I. V.

It will be noted that the interchange rules in Europe differ from those in the United States chiefly in attempting to compel the return of the car to the owning company as soon as possible, whereas in the United States the purpose is merely, after the car has been unloaded, to cause it to be sent toward the home line. The per diem rate is the same

for each day in the United States, while in Europe it is graduated upward.

The French railways have a "convention" among themselves which went into effect in April, 1920. In order to allow each railway to exercise its recognized right to the benefit of the equivalent of the cars it owns, this agreement requires that when for a period of eight consecutive days the number of cars upon a railway's lines is less than the number it owns, it may partially annul the restrictions imposed on the utilization of cars belonging to other companies in order to replenish its supply of cars. It may start home a smaller number of cars than the regulations ordinarily require, and also has the right to demand and receive a pecuniary indemnity which is made up from penalties from railways whose accounts show that they have had upon their lines more cars than they own.

Repairs to Foreign Cars

With regard to repairs to foreign cars, the principle of both the R. I. V. and V. W. U. regulations is that repairs to damaged cars must be made only by the owning company, with the exception of slight repairs necessary to make the car safe for immediate use or to enable it to be run home empty. These slight repairs are made without charge by the company which makes them.

The report also dealt with the rules covering the relations between the railways and consignors and consignees. In some countries, as in Belgium and Switzerland, the railways must comply with a demand for cars within a given time, counting from the date when the demand is made. The time allowed consignors and consignees for loading and unloading is much less than in the United States; in some countries, as short as eight hours. The French railways pay a bonus to those who load or unload cars in less than the period allowed. In Europe the proportion of freight cars furnished by consignors and consignees is much larger than in the United States. The owner of the private car is usually given compensation for its use, either in the form of a rebate per mile or by the application of lower freight rates. The railways in Belgium, the Netherlands, Switzerland and South Africa, do not, however, pay any compensation for the use of private cars.

Employees' Dwellings

There were two reports on "Workmen's Dwellings," one by A. F. Banks, president of the Elgin, Joliet & Eastern, for America, and the other by Fausto Lolli, of the Italian State Railways, for other countries. These reports disclosed a marked difference between conditions in the United States and in Europe. As Mr. Banks pointed out, American railways provide dwellings for their employees only in rather exceptional cases—usually only for section foremen or track laborers. Private enterprise usually has been sufficient to provide the houses required. In Europe this has not been the case and employees have been quite willing to have their dwellings provided by the companies. The proportion of employees of European railways lodged in buildings provided by the companies varies from 5 per cent to 17 per cent of the total number.

At the end of the year 1920 the Eastern Railway of France, which has 3,124 miles of line, owned 2,800 dwellings occupied by families of its employees, and 1,000 rooms for unmarried men, which represented an investment on the part of the company of 30 million francs. The Paris-Lyons-Mediterranean of France (6,086 miles) had spent 22 million francs on employees' dwellings. The London & South Western (1,105 miles) had 1,850 houses and cottages representing an investment of £796,000. The Italian State Railways (9,375 miles of standard gage) owned 4,677 dwellings, representing an investment of 85 million lire. As a general rule the companies assume direct responsibility for the

management and maintenance of these houses. They usually fix the rentals on the basis of actual cost, although sometimes on the basis of the average price of rents in the locality. The employees, therefore, usually get their houses for less than their neighbors. In some cases the European railways have lent financial assistance to buildings and loan associations of their employees to enable them to buy houses for themselves. Among the railways which have done this are the Norwegian State Railways, the Italian State Railways, the Paris-Orleans and the Midi of France and the Great Western of England.

Reports on Electric Traction

There were five reports on "Electric Traction." That for America was made by George Gibbs, chief engineer of electric traction of the Long Island. The other countries for which special reports were made were Holland and Great Britain, Belgium, Denmark, Sweden and Norway, Italy and Switzerland. It is somewhat gratifying to Americans to read in the report of Ernest Gerard, of Belgium, the statement that the United States "is still in the forefront for bold experiment in all directions of progress." The reports emphasize the fact that in countries or districts such as Italy and Switzerland, having numerous large waterfalls the problem of the production and transmission of the energy for electrification differs from that in other countries. It is found that in these and in the Scandinavian countries the managements of the railways are especially concerned that the energy from the hydro-electric generating stations shall be supplied under conditions which allow of its being used for general purposes as well as for traction on the railway itself. In other European countries, particularly Belgium, England, France and Holland, it has not been found desirable to adopt close interdependence between the production of current for electric traction and for other purposes.

The reporters agreed that the kind of current should be reduced to three types which can be recommended in practice for the electrification of large railway systems, viz., three phase at voltages exceeding 3,000 volts; single phase at voltages of 10,000 to 16,000 volts, and direct current at 1,500, 2,400 or 3,000 volts. It appears that single phase current at about 15,000 volts is preferred to all other types for economy in transmission, particularly when, as in Switzerland, it is carried direct in this form from the original source to the contact wire. The advantage of this diminishes where, as in Scandinavian countries, the energy must first be carried a great distance at very high voltage and reduced at sub-stations.

Mr. Gerard's summary says: "So few are the financial figures supplied and so impossible is it to compare them, that it will be sufficient to state that there has been a unanimous wish expressed in favor of the adoption of a standard form of accounts referring the different factors to the same unit. . . . The economic advantages of electric traction are not, and perhaps will never be, sufficiently evident to justify its universal substitution for steam traction."

Bonuses

In many places in the reports and the formal conclusions reached there are references to the desirability of paying bonuses to railway employees to increase their efficiency, which are of interest to the railway men of the United States where the payment of any kind of bonus to employees is so severely discountenanced by the labor unions. For example, one of the conclusions on the subject of "Slow Freight Traffic" is that "payment of bonuses to the men employed in switching is of advantage in getting the best output from yards, and consequently a better turnover of cars."

Congress in Five Sections

The method of working followed in the Congress is to divide into five sections, each of which considers certain

specific questions which are assigned to it. The section adopts definite conclusions which are referred to a general meeting that is held in the last days of the Congress, and at which the conclusions reached in the sections are finally passed upon.

No Action on Automatic Train Control

One notable instance in which Section III and the general meeting took somewhat unexpected action was in reference to the question of "Locomotive Cab Signals." There was a strong disposition among the French and some of the Italians, apparently, to adopt conclusions favoring audible cab signals to repeat visual roadside signals. Some delegates favored automatic train control. The report finally adopted states, "It was apparent that no conclusions could be recorded beyond the fact that the matter is in the experimental stage, and any result would have to be reported at a subsequent Congress."

Conclusions on Electric Traction

The following conclusions on electric traction were adopted:

"The Congress recognizes that at present no more than in the past, a single system could be recommended for all cases. Nor is it possible to choose between several systems, all of which have proved their value under most severe conditions of operation; the Congress recognizes, however, that these systems are all susceptible of considerable further improvements.

"The Congress agrees on the uselessness of standardization of the current in the contact wire on account of the ease with which locomotives may be changed at the frontiers of the different countries.

"It is desirable that the methods of keeping and supplying technical and economic information on electric traction should be defined and standardized, and with this in view the section suggests that this point be referred to a special committee of the association. This committee should draw up very fully the details governing each point, so that in the future as full a comparison as possible may be made by means of figures absolutely comparable."

Economical Production and Use of Steam

Superheated steam.—Superheating is universally adopted in the construction of locomotives for passenger and freight trains. It has not yet been extensively applied to suburban traffic, but the results obtained in these services have been satisfactory, especially when the smoke-box dampers, which cut off superheating when the regulator is closed, are removed. The application of superheat to saturated steam engines may be advantageously done when these are in the shops for repairs, especially to powerful engines of recent types. With the introduction of superheat, the use of two-cylinder single-expansion locomotives has increased. For powerful engines the preferences of the railways are divided between two-cylinder single-expansion with superheater, the four-cylinder compound with superheater and the three or four-cylinder expansion with superheater.

The fuel economy obtained by the application of superheat to the single expansion engines may be estimated on the average, in ordinary working conditions, to be about 10 to 20 per cent. This economy, however, is quite variable, according to the work done and the condition in which the parts are kept, and it is necessary to be more particular in this upkeep than with saturated steam engines. The special arrangements of valves and pistons of superheated engines have a tendency to become more uniform and simpler and more like those used on saturated steam locomotives. On new locomotives piston valves are exclusively used for the high pressure cylinders and packings, with sliding joints and outside cooling for rods acted on by live steam. The

area of the cylinder relief valves has also been increased. These are the only special arrangements the necessity for which has been universally recognized.

Some administrations use at the same time both inlet and air valves and by-pass. The usefulness of this double action does not appear to be yet completely established. Corliss and similar type valves and the uniflow arrangement have made no progress.

Feed water heater.—Some railways have introduced feed water exhaust steam injectors on a large scale. The results which have been obtained justify the extension of the use of these devices.

Various devices.—The trial of water-tube boilers in competition with those of ordinary type has made no progress. Those thus far made have not enabled any definite conclusions to be arrived at. Even in the most favorable cases the advantages found or anticipated in coal consumption or cost of maintenance appear to be small. There is an advantage in washing out boilers with hot water, particularly when it is necessary that they should be out of service for as short a time as possible. These washing plants with auxiliary boiler and fixed water and steam piping allowing the recuperation of the steam and water for locomotives are used to advantage in certain particular cases, especially where the cost of water is very high; but their cost and complication seem to be against their extensive use on systems where the engines have fixed bookings. Brick arches improve combustion and their use has become general.

Special Steels

The following conclusions on "Special Steels" were adopted:

Cast manganese steel with 12 per cent of manganese and 1.3 per cent of carbon gives excellent results and is economical for use in frogs. It is especially so in crossings cast in one piece. It is also advantageous for rails on curves of small radius in cases where the speed is low and the trains frequent.

Opinion is not unanimous with regard to the use of other special steels. The superiority of none of these is universally acknowledged.

Tempering rails is favored by a few engineers; the majority are against this practice except in cases where a sorbitic structure is desired.

It is desirable that experiments be continued to ascertain what are the best conditions for the use of manganese steel; to determine the actual value of other special steels and the best conditions for their use, as well as to determine the causes of the failure of rails in service.

Reinforced Concrete

The use of ordinary concrete and ferroconcrete has found a most extended field of application in all classes of railway structures. Reinforced concrete forms a more economical material than masonry or steel for many works. Works of this class include particularly bridges, foot bridges, water tanks, buildings, workshops, locomotive sheds, freight houses and overhung or extended roofs for passenger and freight platforms.

When properly designed with suitable materials reinforced concrete structures in most cases cause no greater expense of maintenance than masonry, and considerably less than steel structures. For railway underbridges which are subject to dynamic forces there appeared to be no technical reason against the use of reinforced concrete, which seems also advantageous in most cases but it requires a very close supervision in construction. It is always advantageous to lay a bed of ballast or an elastic woodplate between the track and the concrete, and it is necessary that the surface of the superstructure should be maintained in a thoroughly watertight condition.

It is desirable that the trials which are being carried out by various administrations of the use of reinforced concrete ties should be recorded.

Passenger Cars

The following summarizes the report adopted on "Passenger Carriages:"

The truck type of carriage is used exclusively in America. Its use is increasing in other countries and tends to become general for express and long-distance train service. The four-wheel truck is usually considered adequate, so long as the weight carried is not so great that the six-wheel truck becomes necessary. In England experiment has been made on articulated trains, one truck being common to two cars. This is generally applied to sections and not to whole trains. Vestibule coaches with through connections are extensively used in the U. S. A.; and are finding favor in other countries for long-distance trains. On many trains, however, coaches with side doors and corridors in some cases communicating throughout the train are used.

The use of all-metal, or nearly all-metal, carriages has developed rapidly in North America. This method of construction is now generally adopted there and is considered to reduce to a minimum the risks attendant on derailments, collisions and fire.

In Europe metal construction has not been applied to any appreciable extent, except in the case of electrified lines. On certain lines, however, steel construction is being considered with a view of reducing fire risk. It is not intended, however, to approach the weights of the American cars which have recently been incurred partly to provide additional comfort for passengers.

Lighting.—Notwithstanding the safety devices introduced into its use, gas is now, in some countries, considered to be dangerous and to be liable, if not to cause, at least to aggravate fire following a collision. Electricity, particularly for this reason, tends to replace gas completely.

Heating.—The method of heating by steam from the locomotive is becoming more and more widespread. Recent improvements have been made with the object of better insuring the flow of the steam to the last carriages of the longest trains and to allow regulating the heat in the carriages or in the compartments.

Brakes.—The use of continuous quick-acting brakes has been extended on nearly all the railway systems; trials have been carried out to increase the rapidity of action and effectiveness of the brakes on trains which run at very high speeds, and which have become of increased length and increased weight.

Oil Fuel

The following report on the use of liquid fuel was adopted:

There are no mechanical difficulties in the adoption and use of liquid fuel for locomotives. The question of cost both of the fuel and maintenance makes its use, however, prohibitive at present except in certain localities and these are so restricted that the subject is not recommended for discussion immediately. If prices should vary, it might, however, be desirable that it should receive consideration later. The question of the use of liquid fuel in conjunction with internal combustion engines on locomotives is, however, one of more general interest, and might be considered later.

Customs Examinations

In view of the vexations to which the delegates were subjected in connection with customs examinations at the frontiers of all countries (in spite of the fact that unusual courtesies were extended to them by the Italian government), it is not surprising that the Congress adopted a report upon this subject. Nobody who has not traveled in Europe since

the war can have any conception of the inconveniences, discomforts and indignities which the customs examinations of the numerous countries into which the continent is now broken up cause to be inflicted upon travelers.

The Congress recorded its opinion that "it is quite necessary to simplify customs and passport examination and also shorten the delay of the international train service at the various frontiers." It advocated the examination of baggage on trains, where possible, or at least in the immediate neighborhood of trains; that where it must be examined at stations, this should be done at the same stations for the two adjacent countries instead of at different stations.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER of cars loaded with revenue freight during the week ended May 6 showed a slight reduction as compared with the week before, to 755,749 from 758,286. This represented an increase as compared with the corresponding week of last year, when the loading was 721,722, in spite of the continuance of the coal strike, but was far below the loading for the corresponding week of 1920, which was 843,184. The principal decreases as compared with the preceding week were in forest products and ore but there was also a decrease in miscellaneous, which has been steadily gaining heretofore. Coal loading was about the same as the week before. Increases as compared with last year were shown in all districts except the Allegheny and South Western. The summary as compiled by the Car Service Division of the American Railway Association follows:

was about the same both years until the last quarter, when the loading did not reach the average attained in 1920. Corn was loaded heavier in each quarter of 1921; while oats—a comparatively light loading grain—averaged less and less each quarter of 1921, and during the last half of the year (when the seasonal demand for grain cars is greatest) dropped to a figure considerably below 1920. Other grain consistently loaded lighter in 1921 than in 1920. Flour, meal and other mill products show for the entire year a heavy loss in average tons per car loaded, and the average was lowest during the period of maximum demand for grain and flour cars. While the cause, no doubt, was primarily trade conditions, the depressed state of business inducing demand for minimum car load shipments, the resulting effect on car supply and operating costs was unfortunate. Neither potatoes nor cotton loaded at any time in 1921 as high an average per car as in 1920.

The effect of this loss in loading efficiency on railroad operating results is clearly set forth. The cars used in 1921 which need not have been used had the average loading in 1920 been maintained, run as high as 18.6 per cent of the entire movement in the case of flour and meal in the third quarter, and in the second and fourth quarters the percentage is almost as high. There was also a high percentage of cars used unnecessarily on the same basis in loading other mill products. The losses in other agricultural commodities do not run as heavy but are considerable in the aggregate.

The actual addition to operating expenses of the railroads by such reduced loading per car cannot be definitely determined, it is stated, but obviously is an important factor. All of the commodities named average a relatively long haul and the general movement is from the west and south to the east and north. That is to say, this traffic moves largely in the

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY MAY 6, 1922

Districts	Year	Total revenue freight loaded										
		Grain and grain stock	Live	Coal	Coke	Forest products	Ore	Miscellaneous	Miscellaneous	This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	9,032	3,018	8,224	1,332	5,161	2,056	70,272	82,391	181,486	.....	.....
	1921	6,558	2,668	39,626	907	5,483	2,019	57,650	64,817	.....	179,728	190,735
	1920	1,991	2,971	12,240	4,315	2,913	2,377	49,790	66,055	.....	142,652	.....
Allegheny	1922	2,188	2,961	44,078	2,750	2,195	1,410	42,854	45,901	.....	143,957	175,326
	1921	187	47	25,922	300	1,390	31	6,079	4,056	.....	38,012	.....
	1920	124	86	21,673	160	1,082	32	5,069	3,665	.....	31,891	32,874
Southern	1922	3,349	2,038	21,085	585	18,243	953	37,465	41,631	.....	125,349	.....
	1921	18,173	18,944	18,375	493	13,950	364	35,367	44,111	.....	108,027	129,766
	1920	11,209	8,078	2,850	1,265	16,850	3,815	30,308	35,331	.....	109,706	.....
Northwestern	1922	7,900	6,845	3,664	448	13,651	7,277	26,960	30,623	.....	97,368	137,828
	1921	10,495	11,691	3,347	151	5,693	2,096	33,105	38,403	.....	104,981	.....
	1920	10,236	10,403	13,592	166	5,334	773	30,869	31,592	.....	102,965	113,523
Central Western	1922	3,862	2,613	1,742	176	6,882	438	15,926	21,884	.....	53,563	.....
	1921	4,526	2,433	3,866	147	6,441	649	16,517	23,227	.....	57,786	63,133
	1920	25,566	22,422	7,939	1,592	29,475	6,349	79,339	95,618	.....	268,250	.....
Southwestern	1922	22,662	19,661	21,122	761	25,426	8,699	74,346	85,442	.....	258,119	314,483
	1921	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,751	.....	.....	.....
	1920	34,705	27,320	144,874	4,691	48,116	12,794	215,286	233,936	.....	721,722	.....
Total all roads	1922	29,144	33,844	172,156	9,588	64,329	46,925	154,334	182,864	.....	.....	843,184
	1921	5,420	3,176	.....	3,433	9,016	.....	27,659	55,815	.....	34,027	.....
Increase compared	1921	.....	.....	69,464	.....	.....	.....	1,028	.....	.....	.....	.....
Increase compared	1920	10,981	.....	.....	.....	.....	.....	88,611	.....	.....	.....	.....
Decrease compared	1920	.....	3,348	96,746	1,464	7,197	35,159	.....	43,113	.....	87,435	.....
May 6	1922	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,751	.....	755,749	843,184
April 29	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	.....	758,286	800,960
April 22	1922	33,271	28,114	63,445	7,609	55,859	9,770	239,484	276,536	.....	714,088	717,772
April 15	1922	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	.....	706,713	601,695
April 8	1922	31,598	25,024	69,456	8,599	54,680	8,259	243,718	272,934	.....	714,268	801,559

The Car Service Division has issued charts giving a graphic picture of the extent to which car capacity was utilized in 1921 and in 1920 in loading the principal products of agriculture. These show that grain loads heavily and substantially utilizes the full carrying capacity of the cars; that flour, meal and other mill products, while physically capable of similar heavy loading, in actual practice load much below the carrying capacity; that potatoes, although susceptible to heavy loading, actually average a very light load, and that cotton, largely on account of the volume of low-density shipments, loads very light.

Particular attention is drawn to the comparison between the two years in average tons per car loaded. Wheat loading

direction of the prevailing loaded traffic movement of the country. Such conditions inevitably involve an empty car movement in the reverse direction to return equipment to producing territory. Therefore, every car of agricultural products loaded to less than full carrying capacity increases the unproductive return empty mileage expense to the railroads. Estimating as accurately as possible the average loaded haul of the 129,413 cars that—on the basis of the previous year's performance—were wastefully used, it may safely be said, according to the bulletin, that over three million dollars were added to railroad operating expenses in 1921 by reason of these commodities alone being loaded lighter than in 1920.

A Water Analysis for the Non-Technical Man

By Cass Kennicott
Consulting Engineer, Chicago

FIGURES are of little value unless one is able to visualize their meaning easily. It is the purpose of this article to suggest a method for classifying boiler waters according to their mineral content so that the figures will have a definite and immediate meaning, fully as clear as the methods we now use for classifying locomotives.

If a railroad officer should ask about the quality of Lake Michigan water as a locomotive boiler supply he would receive the following:

MINERAL ANALYSIS OF LAKE MICHIGAN WATER

	Grains per gallon
Silica	.572
Oxides of iron and aluminum	.116
Carbonate of lime	3.913
Carbonate of magnesia	2.119
Sulphate of lime	1.051
Sodium and potassium sulphates	Trace
Sodium and potassium chlorides	.759
Total solids	8.878
Total incrusting solids	7.571
Non-incrusting solids	.759

But an analysis in this form, while perfectly clear to the analyst, usually means little to the officer requesting the information. It would be as illogical as for a master mechanic to reply to his superintendent's inquiry as to what power he had available for drag freight service by producing a certificate of analysis about as follows:

	Engine Number		
	800	810	1600
Bore of cylinders	25.141	25.270	26.081
Stroke	28.003	28.000	32.000
Steam pressure	200.000	200.000	200.000
Diameter drivers	62.731	63.051	62.880
Tractive effort	44,218.801	48,209.601	58,544.000
Etc.	Etc.	Etc.	Etc.

This instead of saying, "We have two Class-800 engines rated at 1,400 tons and one Class-1600 engine rated at 2,000 tons."

There are 58,349 grains in a United States gallon. But even in this knowledge the writer has never been able to visualize a grain per gallon. Some chemists call for analyses in parts per million, or in parts per 100,000. This is very convenient for the analyst because he usually conducts his operations in the laboratory under the metric system, which gives him results in a decimal system, but it is no easier to visualize parts per million or parts per 100,000 than it is grains in a gallon. However, we are more or less familiar with the appearance and size of a pound of any given material. The average mechanical officer will make a very close estimate of the weight of ordinary bulk material and will give that weight in pounds. In other words, he is able to visualize a pound. Railroad men are also familiar with 1,000 gal. as a unit of water measure in that they have a very clear conception of the bulk of water in a 50,000 gal. or in a 100,000 gal. railroad tank, or the amount of water in a 5,000 gal. or 10,000 gal. locomotive tender. Considering that an analysis expressed in grains per gallon may be converted into one expressed in pounds per 1,000 gal. simply by dividing the number of grains given by seven, why not, for the sake of clearness, adopt this very practice?

Under this plan the Lake Michigan water presents itself as a water containing one pound of scale-forming solids in each 1,000 gal. instead of seven grains in each gallon and from this it is easy for us to see that a 100,000 gal. roadside storage tank filled with Lake Michigan water holds 100 lb. of scale-forming material and that if 8,000 gal. of this water are drawn into a locomotive tender, we shall then take into the tender of the locomotive 8 lb. of scale-forming solid. In the same manner, if we are operating with water considerably harder than Lake Michigan water, say a water showing incrusting or scale-forming solids of 21 or 22 grains,

we are then handling a water with 3 lb. of incrusting solids in each thousand gallons and a 100,000 gal. roadside tank will have in solution 300 lb. of scale-forming or incrusting solids. When a locomotive draws 8,000 gal. of this water it takes into the tender 24 lb. of scale-forming material.

The same logic applies to the foaming solids in the water. Statements giving pounds of solids per thousand are now frequently added as a footnote to regular chemical analyses and this is a step in the right direction, but let us go a step further and adopt the practice of expressing the analysis in pounds per 1,000 gal. in the first place and classify the information so that the railroad man can use it.

As to a suitable classification of the information, consider the following analyses showing waters which may be found in use by railroads in the middle west:

	A	B	C	D
Silica	.247	.951	Trace	1.214
Oxides of iron and aluminum	.490	.222	.164	.047
Carbonate of lime	8.971	11.875	15.344	10.465
Carbonate of magnesia	8.299	4.155	2.179	8.654
Sulphate of lime	2.047	.608	15.712	12.241
Sodium sulphate	1.329	1.616	1.869	4.265
Sodium chloride	.510	2.040	6.484	17.243
Incrusting solids	20.054	17.841	33.096	32.621
Non-incrusting solids	1.839	3.656	8.353	21.508
Total solids	21.893	21.497	41.449	54.129

Figured in pounds per thousand gallons, the incrusting and non-incrusting solids would be as follows:

	A	B	C	D
Incrusting solids	2.865	2.550	4.730	4.660
Non-incrusting solids	.263	.522	1.193	3.072

Having proceeded this far it is suggested that the analyses be expressed in a still more practical form as follows:

	A	B	C	D
Incrusting solids	2.8	2.5	4.7	4.7
Non-incrusting solids	0.3	0.5	1.2	3.1

Here the upper figures represent pounds of scale in each 1,000 gal., figured to the nearest 1/10 lb. The lower figures represent pounds of foam-causing solids in each 1,000 gal., figured to the nearest 1/10 lb.

The question now arises as to how the information in this form can be used. An example will bring this out. Consider an imaginary short engine division with the water stations, A, B, C and D as above and assume that the locomotive draws water from each as follows:

Water station	A	B	C	D
Rating of water	2.8	2.5	4.7	4.7
	0.3	0.5	1.2	3.1
Amount taken	5,000 gal.	3,000 gal.	4,000 gal.	4,000 gal.

Now bearing in mind that the upper figure gives pounds of scale-forming solids in each thousand gallons and the lower figure, pounds of foam-causing solids in each thousand gallons, the following simple multiplication and addition may be made:

Scaling Solids	Foam Causing Solids
A = 2.8 × 5 = 14.0 lb.	A = 0.3 × 5 = 1.5 lb.
B = 2.5 × 3 = 7.5 lb.	B = 0.5 × 3 = 1.5 lb.
C = 4.7 × 4 = 18.8 lb.	C = 1.2 × 4 = 4.8 lb.
D = 4.7 × 4 = 18.8 lb.	D = 3.1 × 4 = 12.4 lb.
59.1 lb.	20.2 lb.

Thus we find that on a one-way trip over the division the locomotive has taken 59.1 lb. of scale and 20.2 lb. of foaming solids.

Knowing the water holding capacity of the boiler it is thus a simple matter to figure the concentration of soluble solids under any definite set of conditions and the man responsible for the care and operation of locomotives is enabled to figure blow-down, wash-out, the amount of boiler compounds to use, and in fact any other calculation except the actual conduct of a roadside water treating plant. It is not contended that the chemist should keep no other record of a water than this classification. He should keep a careful record of all analyses, but the report given an operating or mechanical man need go no further. If a complete analysis is requested the classification figures should be given first and the analysis follow as a detail.

The Aftermath of the Federal Control Period

Director General Davis Tells of Administration Liquidation Problems at Western Railway Club Dinner

THAT A GOOD FAITH effort was made by the Railroad Administration to return the properties of the railroads to their owners in as good repair as when they were taken over by the government was the conclusion drawn from the record by James C. Davis, director general of railroads, in his address before the first annual dinner of the Western Railway Club, held at the Drake Hotel, Chicago, on May 15. Mr. Davis expressed the opinion that the difficulties of the carriers attributable to federal control are economic rather than physical and suggested that the greatest need of the railroads in working out of the difficulties of their present situation is a period of legislative repose with an opportunity for a thorough trial of the present transportation act.

The meeting, which was attended by about 650 railroad and railway supply men, was also addressed by Samuel M. Felton, president of the Chicago Great Western, who briefly sketched the history of the development and accomplishments of the Western Railway Club as an organization of men interested primarily in the mechanical department, and said that the future opportunity of the club lay in the broader field of discussion of inter-departmental problems.

Address of Director General Davis

The winding up of the many and varied obligations of the government, as the result of 26 months of federal possession and operation of the railroads, presents perhaps the greatest liquidation proposition the world has ever seen. More than two years have elapsed during which this great adjustment has been in progress, and the time has now arrived when some definite opinions may be ventured not only as to when the settlement of these claims will be completed, and the amount of money that will be required to complete the adjustment, but the problems which federal control left the carriers to solve.

Up to May 1, 1922, claims had been filed by the carriers on final settlement aggregating \$1,011,251,598.42. This represents, exclusive of short lines, about 95.5 per cent of the mileage under federal control. Up to the same date claims aggregating \$519,798,985.18 had been settled. These settlements represent 61.22 per cent of the aggregate amount of mileage under federal control. The cash paid out by the government in making these settlements totals \$146,127,692.55.

If future adjustments proceed upon the same lines as those that have heretofore been made, the final settlements should be practically concluded by about July 1, 1923.

The Maintenance Controversy

Naturally the proposition over which the greatest difference of opinion has arisen as between the representatives of the carriers and the Railroad Administration is the question of maintenance, especially as to freight car equipment and motive power, the carriers contending that at the end of federal control their properties were returned in a greatly undermaintained condition, while the Railroad Administration contends that during federal control the individual properties were operated and maintained by the same persons who had possession of the property and who operated and maintained it during private control; that the government kept the federal managers quite liberally in funds for proper maintenance, and that, so far as was humanly possible under the abnormal conditions of a great war, the properties were as well maintained physically during federal control as they were under private operation.

In my judgment, the transportation companies suffered, as a result of war conditions, to a greater extent than any other one class of commercial property in this country, but I do not believe that this damage was the result of neglect to fairly well maintain the property.

Maintenance of Way

There was some 232,694 miles of Class I railroads taken over by the government. During the 26 months of the test period corresponding to the 26 months of federal control these carriers, under private control, expended in maintenance of way and structures \$859,393,403, or \$3,726 per mile of road. During the 26 months of federal control the government expended on this same property \$1,533,615,734, or \$6,616 per mile; that is, the government, in the maintenance of way and structures, expended \$674,222,331 in excess of similar expenditures made by the carriers during the test period, and, in concluding final settlements with the individual carriers, the Railroad Administration is making just allowance for undermaintenance when the facts presented justify same. When the final settlements are concluded the government will have expended more than twice as much on account of maintenance of way and structures during federal control as the carriers expended during the test period.

Motive Power

The total number of locomotives in service December 31, 1917, was 61,890. On February 29, 1920, at the end of federal control, the number of locomotives in service was 64,983, or an increase of 3,093 units. The total number of locomotives added to the equipment during federal control was 4,226. From the best available information, during 26 months of the test period the carriers expended in the maintenance of motive power \$422,244,108. During the period of federal control the government expended for the same purpose \$996,877,227, or an excess expenditure during federal control over the same time of the test period of \$574,633,119, the expenditure by the government in the maintenance of motive power being largely in excess of twice the amount expended during private operation.

The total number of locomotives out of service for repairs requiring more than 24 hours, on January 4, 1918, was 18.5 per cent. On February 28, 1920, at the end of federal control, the total percentage of locomotives requiring the same character of repairs was only 17.8 per cent. These records indicate a greater number of units and a higher state of efficiency at the end than at the commencement of federal control.

Freight Cars

There is much greater difficulty in comparing the condition of the freight car equipment as between the commencement and the end of federal control, largely because of the fact that in the consolidation, from an operating standpoint, of all the transportation lines the freight cars were pooled, and a large percentage of the freight equipment was during the period of federal control continuously on foreign lines.

No criticism should attach to this plan of pooling freight equipment. It was one of the necessary results arising out of the exigencies of war conditions, and was inaugurated by the Railroad War Board prior to the beginning of federal control. As a matter of fact, there was only about 44 per cent of the cars on home lines January 1, 1918, and the chairman of the Railroad War Board reported on December 22, 1917, that in the War Board's efforts at efficiency freight

cars were made to "circulate as freely over the United States as bank notes." This action was altogether commendable, and is evidence of a great desire on the part of the carriers while under private operation to meet the rising and increased responsibilities growing out of a state of war.

The total number of freight cars on line January 1, 1918, amounted to 2,374,566. The total number of freight cars on line February 28, 1920, amounted to 2,486,507. This shows an increase in the number of freight cars, as between the beginning and end of federal control, of 111,941 cars. As a matter of fact, there were built and put in service during the period of federal control 159,076 freight cars.

During the 26 months of the test period corresponding to the 26 months of federal control the total expenditure by the carriers for freight car maintenance was \$391,327,170, or an average of \$79.38 per car per annum. The total expenditure for freight car maintenance by the government during the period of federal control was \$907,227,045, or an average of \$178.40 per car per annum. At the commencement of federal control the percentage of bad order cars was 5.3, amounting to some 126,650 cars. At the end of federal control the same records indicate 5.7 per cent of bad order cars, amounting to 143,425.

I am not unmindful of the marked difference in the price or cost of labor and materials as between the test period and the period of federal control. I am fully aware of the difficulty during the time of federal control to procure at all times efficient labor and proper material. I also appreciate the insistent demands for the transportation of men and war materials, entailing in many instances unusual requirements from freight equipment, but I do submit that the expenditure by the government of these vast sums of money shows a conscientious, good faith effort to maintain and keep the carriers' property up to the same standards of efficiency as when the property was taken over.

Railroads Returned With a Deficit

It requires no profound knowledge of railroad finances to diagnose the present trouble. The serious injury to the railroad properties as the result of federal control is found in the fact that when returned to their owners the properties were being operated at a deficit, this as a result of a policy that at least a part of the increased cost of transportation should be borne by the general public as a war expense. I am not criticising the adoption of that policy; I am only suggesting its present effect.

Again, during federal control working rules and conditions were changed, labor was much more thoroughly organized; the general rule of an eight-hour day more effectively enforced, and standardized wage contracts were entered into that had not existed prior to federal control, and many other operating changes were effected in which the owners of the properties had no voice. In 1917 the average earnings per annum of each employee were \$1,003.01, and a large number of employees at that time were giving ten hours per day service. In 1920 the average earnings were \$1,819.71, and the average hours of service a small fraction over eight. Please understand I am not assailing the justness of these advances at the time they were made. The radical changes in living conditions and the abnormal conditions of war perhaps justified them. I am calling attention to the record and suggesting that time increments were made at a time when the carriers had no voice in the matter.

Now the railroads, upon the return of their properties, have been confronted by two very disagreeable and unpopular propositions—the raising of rates and the reducing of wages. One of the leading Senators in the United States has said, "It was just as much the duty of the government to return these roads with rates that would sustain them in their operation as it was to return them in an excellent condition generally and to back them."

Initiative Taken From Carriers

In solving these very controlling questions, the carriers find themselves confronted by other conditions that had not existed prior to federal control. I doubt if the general public recognizes the largely increased powers of the government as the result of the present Transportation Act, and with these increased governmental powers must go a correspondingly increased governmental responsibility.

In the matter of rates, the power to reduce charges as well as increase them is taken from the carriers. The commission is given very wide authority in the matter of permitting pooling of earnings, distribution of freight equipment, consolidation of companies, and joint use of terminals; in fact, control in the most minute details of operation is granted to the commission under this law.

The law also creates a national Railroad Labor Board. This board is given general authority to hear "and with diligence decide" disputes growing out of rules or working conditions, and is further authorized to hear "and with diligence decide" all disputes with reference to the wages and salaries of employees and subordinate officials. The Labor Board has construed its power under this act to extend to the control of all changes in wages, and that no changes in existing contracts or rules can be made by the individual carriers under its jurisdiction except upon approval of the board.

As a result of this legislation in these vital matters of rates and wages the government has definitely taken from the carriers the power and initiative to control either the income or the outgo in the operation of these properties. Much opposition to present conditions arises from a failure on the part of the people generally to understand the limited authority which the carriers have over these important matters, and also a failure on the part of the public to appreciate the vast difference between the operation of a common carrier and the operation of an ordinary private business.

Private enterprise has the benefit of the full scope of individual initiative and the exercise of discretionary judgment. Railroad operation is limited by the hard and fast rules not only of congressional legislation but of legislation of 48 states, acting independently, and supreme within their respective jurisdictions.

Private enterprises can reduce operation or altogether quit if the venture is losing money. Railroads must operate, and give the public reasonably efficient service, whether they make or lose money, and if the corporation is not able to do this a receiver, under the direction of a court, will ordinarily arrange the situation. Receiverships mean exhaustion of the resources of the property—a slow death by attrition.

Who Pays the Bill?

Another proposition that cannot be too greatly emphasized is this: Whenever the transportation systems of this country fail to function with efficiency it is the shipping public which must ultimately bear the results of inefficient and ineffective service. The commercial and agricultural interests in the end are the great sufferers from indifferent or inadequate railroad transportation service.

Again, permanent plans for capital investment, or expenditures to any large extent for deferred maintenance, require definite arrangements that consume some years of consecutive construction with reliable assurances that the necessary funds will be available as the work progresses. If the new investment in railroad capital account most urgently demanded by the commercial and agricultural interests of the country is to be furnished the credit of the railroads must be reasonably stabilized and the investment in railroad securities made sufficiently attractive to invite the enlistment of new capital.

If the conditions following federal control resulted in economic injury to the railroad transportation properties as a whole, they are damages which existing laws contain no

provisions for adjusting; they are the direct result of the war, for which there would seem to be no way that money damages can be demanded or paid, being largely remote, contingent, and speculative, but they do represent conditions which the public and the law-making bodies should consider in their present and future treatment of this great business, next to agriculture the most important in this land.

A Period of Legislative Repose Needed

What the railroad interests need at this time is a period of legislative repose, a fair opportunity to work out under normal conditions permanent plans for rehabilitation, a definite time to make necessary improvements, and a reasonable opportunity, under fairly normal surroundings, to determine the merits of the Transportation Act, especially by giving the Interstate Commerce Commission an opportunity to exercise its new authority in the matter of rates, and the Railroad Labor Board a chance to exercise its new authority in the adjustment of wages.

The carriers of the United States, if given a fair chance under normal conditions, should be able to give efficient and adequate service at reasonable rates, lower than those that are to be found in any other country in the world. The people must remember that there is no legislative panacea for a situation like the present. You cannot make bricks without straw. The destroying and far-reaching effects of the greatest calamity in the history of civilization cannot be restored overnight. The painful struggle back to anything like normal times calls for patience, patriotism and forbearance, the exercise of conservative judgment, and an abiding courage.

There is one service that the transportation companies rendered in the winning of the war which should not be forgotten. At the time when the civilization of the world seemed hanging in the balance, the men operating the transportation system of America, with a wonderful and generous patriotism, responded to every call in that great movement of men, food and materials necessary to keep the armies of the Allies carrying on. America was, at the end of the conflict, the great and controlling factor. It was the railroad transportation system of this country that enabled the nation to respond so effectively. In helping that system back to a condition of commercial solvency, some generous and considerate remembrance should be had of this great achievement.

Mr. Felton Tells of Work of Western Railway Club

After briefly sketching the history of the club from its inception in 1884 as a purely mechanical department organization, Mr. Felton called attention to the broadening of the scope of the club to include officers and men of every department. This took place a little over a year ago, in recognition of the need to show the relationship existing between the various departments of the railroads as a whole, as well as the relations existing between steam railroad transportation and the public which it serves. Mr. Felton continued in part as follows:

While the Western Railway Club has been working but a short time under its more ambitious program of including all departments of railroading, the beneficial effects of its work have already been seen and felt. Every department in railroading has its place, its work to perform in connection with other departments. While very naturally every man should be thoroughly conversant with the work in which he is immediately engaged, it is necessary that those who are engaged in railroading should know in a broad and general way all that pertains to railroading and its effect upon the nation as a whole.

Railroading stands unique in its position as an industry which has practically all of its rate of return determined by the government and nearly all of its outgo similarly controlled. Without entering into any lengthy discussion as to the correctness of the theory which is super-regulating our

railroads, attention should be called to the conditions under which we are operating, and railroad men should familiarize themselves with these conditions in order that the general public may learn through personal contact with the railroad man the true facts in regard to the situation.

The Problems of the Executive

Many of the members of the Western Railway Club have to do with the details of railway equipment. They appreciate very keenly the need for improvements and understand the economies that can be worked out through such improvements. It is entirely proper in their papers and discussions that they should emphasize the need of new and better equipment and show the savings which would result from such improvement.

Possibly not grasping in its entirety the problems of the executive, they may be inclined to feel that they do not always get from the management due consideration in the way of appropriations for things most evidently needed. It must be borne in mind that the railroad manager is in quite a different position from the manager of an industrial concern who is not limited by governmental action as to his rate of return or his cost of outgo. Through private initiative and resourcefulness the independent industrial manager is able to obtain not only a fair price for what he sells, but further to obtain credit so that he can install methods and equipment which lead to immediate and far-reaching economies. With the artificial limiting of the rate of return, and with the further artificially controlled expenditures of railroads, the railroad manager finds himself in a position where the control of the situation is absolutely out of his hands. The resulting effect of these conditions has left the railroad managements in a position where they are too poor to be economical. While we may see and feel the dire necessity for the purchasing of many things which would lead to more efficient operation of our railroads, those directly in charge of matters of equipment should remember that railway executives are confronted at all times with the pressing necessity of finding money enough to keep going, and the problem becomes one not only of efficient operation but one of super-management to keep operating at all.

While the railroad executives would not for a moment discourage the discussion at meetings of such organizations as the Western Railway Club of matters which would show possibilities of economy and efficiency through large expenditures for more modern equipment, it must be constantly borne in mind that our first problem is to secure a sufficiently fair rate of return so that we can get beyond the condition of a hand to mouth existence which at the present time confronts the railroads as a whole.

U. S. Chamber of Commerce Discusses Transportation

WASHINGTON, D. C.

A LARGE NUMBER of speeches relating to various aspects of transportation were presented at the various group sessions of the annual meeting of the Chamber of Commerce of the United States at Washington, May 15 to 18. At a meeting of the railroad group on May 16 presided over by George A. Post, president of the Hudson River Bridge & Terminal Corporation, addresses were made by Howard Elliott, chairman of the board of the Northern Pacific, on the regulation of railroad rates under the transportation act and by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, on the transportation act as a stage in the development of railroad regulation. At a general meeting on May 17 presided over by Mr. Elliott, F. A. Delano, former president of the Wabash and former member of the Federal Reserve Board, discussed general railroad conditions here and abroad. There were also ad-

dresses on waterway, highway and ocean transportation at other sessions and on railroad transportation in connection with meetings of other groups. At a meeting of the domestic distribution group on May 16, Charles E. Elnquist, former president of the National Association of Railway and Utilities Commissioners, discussed the effect of distribution of changes in freight rates, and at a meeting of the coal industry group, E. M. Poston, president of the New York Coal Company, discussed the relations of the transportation problem to the coal industry. Eugene McAuliffe, president of the Union Colliery Company of St. Louis, in discussing the coal strike, said that when the full importance of the relation that exists between the coal industry and the railroads is understood by the public, the proposition to regulate the development of the coal mines by withholding transportation facilities will be recognized as the only adequate and proper way that this necessary work can be done.

"As the matter now stands," he said, "a two billion dollar coal dog is wagging a twenty billion railroad dog. To put the coal industry on a sound basis, thereafter improving the railroad problem, would reflect enormously to our national advantage."

He recommended that the Transportation Act should be so amended as to require every railroad desirous of rendering transportation service to a coal mine to secure from the Interstate Commerce Commission a certificate of convenience and necessity before doing so. He also recommended a reduction in coal freight rates during the storage season.

Mr. Delano said in part:

In Europe, as here, railway builders have chafed under government regulation. There, as here, the complaint has been of "red tape." They say, as our men do, that one of the greatest objections to government regulation is not that decisions are *wrong*, but that they are so *tardy*. Because the railway is manufacturing service, which can only be used at the moment it is supplied, it follows that most railway questions must be settled immediately, and it does not always matter so much how a question is decided as that it should be decided one way or the other instantly. A fair definition of a competent railway man might be stated as "a man who could decide the questions which arise from day to day promptly, with fairness and wisdom, and with as small a percentage of error as any other man."

If our railways are suffering because decisions are tardy, the remedy lies not in abuse of these grossly overworked federal and state commissions, but in co-operation with them by railway men and by business organizations in order to determine a solution.

Some experience with government methods here and abroad, and my observations since I have lived in Washington, lead me to think that it is not fair to call on commissions to do administrative work. If they have executive and administrative functions to perform, they ought to be authorized to act as it were "in loco parentis," or as a board of directors employing an executive to attend to those functions under their direction and guidance on questions of policy. A commission may be well qualified to act as a court in judicial or semi-judicial matters or in dealing with questions of policy; but even then, if promptness of decision is an important desideratum, much could be gained by reducing, rather than increasing, its size. I may be expressing a novel thought, but it is one I have long entertained that our boards and commissions in Washington do better work if they were not so overlaid with routine matters and were more familiar with what was going on in the country. Although Washington is the center of our national universe, it is more detached from business and less intimate with what is going on in the country than any place I know of. And so it happens that Senators and Congressmen become professional legislators, unacquainted with what goes on in their constituencies and communities and board members who are appointed with a view of bringing outside knowledge to their work, are here at a center with home and become bureaucrats.

The interesting fact about the development of transportation in this country is that the demand for transportation increases at a rate which is more rapid than that of the population. The railway handles the passenger travel, the transportation of freight, and has a substantial growth at a rate far in excess of the population. This was true when our population has doubled in the last 40 years, our passenger travel has increased six fold, and freight transportation ten fold.

It may be said that this cannot be putative burden upon the country, but it is largely borne by the future development of internal waterways on the one hand and highways for motor

trucks on the other. That railways have little to expect from such competition except in a temporary way (as happened with interurban electric roads some years ago), may be shown without digressing far. Internal waterways have for a long time possessed no economic merit except in a very few favored localities. They are usually urged by special interests in order to reduce freight rates which of course means that the many are taxed for the benefit of the few. On the other hand, such natural waterways as the Great Lakes or the Hudson River are economically of great value; but so far from being a relief to the railways, they are a conspicuous failure, because navigation is closed in the months when the cost of rail transportation is greatest and the relief would be most welcome. Our southern rivers, while free from ice, are handicapped by conditions of current or by low water stages. In brief, it may be said that a means of transportation which fails to take the peak of the load off the railways is valueless as an economic measure; and inasmuch as water transportation is never self-supporting, but an expense of the general taxpayer for upkeep and many expenses of river and harbor or improvement, it cannot be looked upon as a valued adjunct.

Dr. Parmelee said in part:

The amount which it was estimated the railways would receive from the government in lieu of net income during the six months of the guaranty period, represented about a 5 per cent return on their valuation, computed, of course, to an annual basis. The Interstate Commerce Commission has recently stated an amount which will make the rate of return less than 4 per cent instead of 5 per cent as has been usually estimated.

Since the first of September, 1920, the railways have been on a basis of rates, which, it was expected, or at least hoped, would produce a return of 6 per cent on the tentative valuation of their properties as fixed by the Interstate Commerce Commission. This provision has now been in effect for 20 months. Complete records are available for 19 of the 20 months, or through March, 1922, which show that during the four months from September 1 to December 31, 1921, the carriers as a whole earned a rate of return on their tentative valuation equivalent to 3.03 per cent when reduced to annual basis; that during the calendar year 1921 they earned 3.26 per cent; and that during the three months from January 1, to March 31, 1922, they earned at an annual rate of 4.51 per cent. Their average annual rate over the whole 19 months has been 3.35 per cent. During the 19 months they fell \$784,000,000 short of earning 6 per cent on the tentative valuation fixed by the commission. In fact, the railways earned barely enough during this period to meet fixed charges.

The effect on railway credit and their ability to finance need not be emphasized here. What financing the railways have been able to do has been accomplished either through the help of the government, or through the medium of ordinary banking facilities at unusually high rates, although the situation has been improving in recent months.

What the financial situation may be during the next few months under the gradually tightening effect of the coal strike on industry, and under the modified levels of transportation rates and railways wages which may within the next few weeks, days, or even hours be put into effect by the Interstate Commerce Commission and the Railroad Labor Board, respectively, it is difficult to foresee; but an industry that even under government guaranty earns less than 4 per cent, and during a period of more than a year and a half at the highest level of rates ever experienced earns only 3½ per cent per year, cannot look for great improvement unless reductions in expenses can be brought about commensurate with reductions in revenue through rate cuts.

There have been many adjustments in rates during this period, most of which have been voluntary on the part of the carriers and the great bulk of which have been downward. These adjustments have covered a wide variety of commodities, including a 10 per cent reduction in agricultural products. In addition, the Interstate Commerce Commission directed the carriers in Western District to reduce the rates on grain, grain products, and hay by from 15 to 20 per cent. It has been estimated that the total annual freight revenue represented by these various rate adjustments approximates an average of about 5 per cent of the total rate level.

In the meantime, the deflation of labor in other industries has been proceeding at a more rapid pace than in the railway industry, due to the fact that a level of wages regulated by government supervision changes more slowly than wages subject to competition in the open market. This in turn has tended to postpone or delay rate reductions which might otherwise have been made, in sympathy with the general deflation in the price levels of agricultural commodities and manufactured products.

It will be perceived from this brief summary that our experience with the Transportation Act of 1920 has not yet been sufficiently extensive to offer a conclusive test of the effectiveness or the wisdom of its several provisions.

Some Notes on Railway Refrigerator Cars*

Requirements for Efficient Refrigeration; Importance of Air Circulation and Insulation

By W. H. Winterrowd
Chief Mechanical Engineer, Canadian Pacific

THE SUBJECT of railway refrigerator cars has been, and is still one of growing importance, a growth that has been contemporaneous and proportional to the development of the United States and Canada and their communities, and to the resultant demand and necessity of transporting increasing quantities of perishable commodities greater and greater distances. When hauls were short and the variety of perishable commodities few, the problem of transporting and protecting the commodities from heat or cold was comparatively simple. Increasing distances and a greater variety of perishables not only made necessary greater numbers of, and more efficient cars, but involved the establishment of railway-divisional and terminal facilities, upon

the lading is piled or stacked, a slatted wooden structure known as a floor rack is of very great value. These racks, on the top of which the lading may be placed, consist of longitudinal runners 3 or 4 in. high, with cross slats fastened to the top of them. They are hinged to the side walls of the car and are divided in the middle so that they can be turned up to make the floor accessible. These racks permit the cold air which flows beneath the bulkhead to circulate freely toward the center of the car and up through the lading.

Illustrations of Effect of Design

The *A* end of the car, Fig. 1, shows the relative arrangement of bunkers, bulkheads and floor racks, and the resultant trend of air circulation.

It is highly desirable that there be no obstruction to the flow of cold air where it passes beneath the bulkheads. The *B* end of the car, Fig. 1, shows how an obstruction at that point can act as a dam or deflector of the air currents, and partially or entirely defeat the object of the floor racks, and

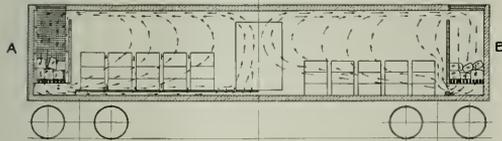


Fig. 1—Diagram of Air Circulation

which the successful operation of this type of equipment is contingent.

Comparatively speaking, literature upon the subject is not vast, although exceedingly valuable. Finding the sources of information to some extent scattered, the writer has attempted to include under one heading some of the most interesting and important facts regarding principles and methods involved, as well as to present some information regarding the type of cars and methods of construction used by various railways and private-car owners.

Refrigeration of Commodities in

Transit Involves Many Factors

The prevailing method of obtaining refrigeration is by means of naturally-circulated air, cooled by contact with ice, or ice and salt, placed in suitable receptacles called bunkers located at each end of an insulated car. Some modifications of this system will be touched upon very briefly later.

Circulation is assisted and made most efficient by means of insulated partitions, called bulkheads, placed in front of the containers and so constructed that the relatively warm air must pass over the top of them to reach the ice, or ice containers. The air becoming chilled, and therefore heavier, sinks toward the floor and reaches the body of the car by passing through a space beneath the bulkheads.

These insulated partitions also assist in protecting the lading nearest the ice containers. Without bulkheads, and when salt is used with the ice to hasten and increase refrigeration, that part of the lading nearest the ice frequently freezes, an undesirable and disastrous occurrence with some commodities. At the same time, that portion of the load near the center and top of the car may remain at too high a temperature, an equally undesirable condition.

As a further aid to circulation, particularly in cars where

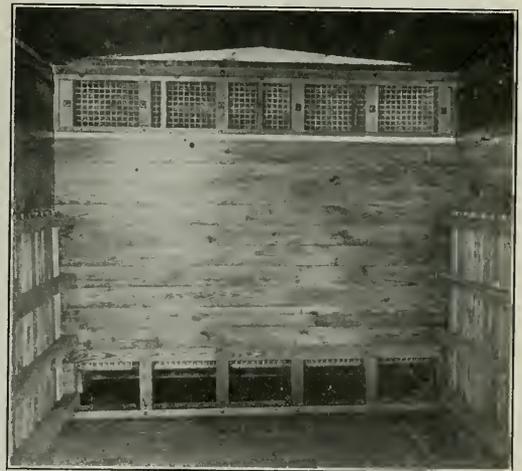


Fig. 2—Car with Fixed Bulkhead and Basket Bunker, Floor Racks Raised

even cause frosting of the lading against the insulated bulkhead. If floor, bunker or splash-board construction necessitates a ledge beneath the bulkhead, it should be kept as low as possible and the floor rack and bulkhead so designed to provide sufficient area for a free flow of air.

At the *B* end the lading is shown piled directly on the floor and the air currents indirectly indicate the advantage of floor racks. Fig. 2 illustrates these racks, showing their appearance when turned up against the side walls.

The method of loading various commodities is an important factor in their proper refrigeration in transit. To obtain the greatest advantage from circulation, the contents of the car should be loaded so that the air can come in contact with

*From a paper presented before the American Society of Mechanical Engineers at New York, May 16, 1922.

a maximum surface with a minimum of restricted circulation. It is easy to understand that boxes or containers, placed closely against each other and against the walls of the car cannot be cooled quickly or properly preserved at as uniform a temperature as when placed so that air can flow between them, or generally speaking, throughout the entire load.

The temperature of the circulating air is affected by the type and size of ice containers or bunkers. The chief considerations in the construction and capacity of the bunkers are the refrigeration required to replace the loss due to transmission and the refrigeration required to cool the car quickly and maintain its contents at the required temperature. The loss in transmission in turn depends upon insulation, car construction and maintenance; factors which will be more fully discussed later.

A basket bunker is shown in the *A* end of the car in Fig. 1, and a box bunker in the *B* end. Brine tanks are shown in Fig. 3.

The sides of the basket bunker are constructed of wire mesh. The bottom consists of a slatted wooden structure. The bunker is placed in position so that air space exists around the outer surfaces, this construction permitting the air behind the bulkhead to come in contact with a maximum ice area, while the open spaces around the bunkers facilitate circulation.

The bottom of the box bunker shown at the *B* end of the car in Fig. 1 is also slatted. The walls are formed by the bulkhead and by the sides and end of the car. In an endeavor to make the refrigerator car more productive and useful for general purposes, some builders have applied collapsible box bunkers. In this design, the bulkhead is

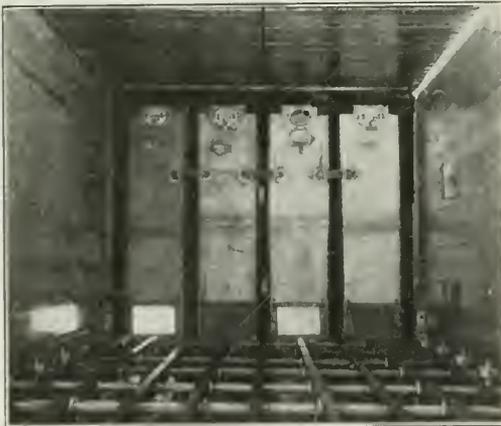


Fig. 3—Brine Tanks in Refrigerator Car, Bulkhead Swung to Side

swung up, or to one side, and fastened. The slatted rack is swung or folded back against the end of the car. In this way the space occupied by the bunker is made available for general lading.

Another very important factor is the size of the car and its proportions, particularly with reference to the distance between the bulkheads. The cold air passing out beneath these insulated partitions flows toward the center of the car. In doing its work it gathers heat and grows warmer. If the distance between bulkheads is too great, the air may not be at a low enough temperature when it reaches the center of the car to properly refrigerate the load at that point, particularly near the top of the car. Under such conditions a portion of the load near the bulkheads may be sufficiently

chilled while the upper and center part of the load may be too warm. The chief factors generally considered in this connection are type and capacity of car, type of bunkers, amount of commodities and size of containers, and temperature required for efficient refrigeration.

Importance of Temperature of Entering Load

The temperature of the entering load is a very important factor. If heat is not removed from certain commodities prior to loading it is highly desirable to remove it as quickly as possible after loading. Tests and general experience show that if the heat is not promptly reduced, the commodities either spoil en route or reach their destination in such condition that their market value is greatly reduced. Quick cooling after loading is generally attempted by pre-cooling

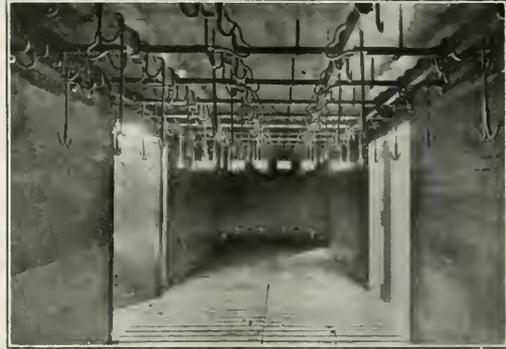


Fig. 4—Meat Rack and Hook Installation

the car, by the use of cars in which maximum and most efficient air circulation can be obtained and by mixing a proper amount of salt with the ice or by placing coarse rock salt on top of the ice.

When salt is mixed with the ice, the greatest amount is used at the first icing, the time when the greatest quantity of heat is in the lading. At the second icing the amount is generally reduced, while at the third and successive icings a stipulated minimum amount is used.

Pre-cooling the car may be accomplished by the use of ice and salt, but at many points where a large tonnage of fruit or meat originate, the cars as well as the lading are often pre-cooled by mechanical means.

Pre-cooling means less ice in transit, a matter of economy to shippers and railways alike. Some commodities can be frozen hard and therefore require little or no icing en route, the lading itself supplying the necessary refrigeration. This not only insures better condition in transit but is an added economy.

Humidity or moisture content of the air in the car is almost as important as temperature. Generally speaking, if refrigeration is effective and a high initial rate of cooling obtained, the air is kept sufficiently dry due to condensation taking place on the surface of the ice, or ice containers. In this way the moisture given off by some classes of lading is also deposited. Excess of humidity, if not fatal, is highly injurious to many commodities.

Insulation Is the Most Important Consideration

Finally we come to the matter of insulation, the most important factor in connection with efficient and economical refrigeration. The function of the insulation is to afford protection to the lading by minimizing heat transmission through the walls, roof, and floor of the car. To do its work properly it must be by nature a poor conductor of heat.

Other desirable qualifications are reasonable cost, strength, adaptability, durability, light weight, and imperviousness to moisture.

This subject might well be divided into two parts, insulating materials and insulation, because the general subject involves methods of car construction and maintenance in addition to the consideration of materials and principles of heat transmission.

The whole subject is capable of analysis but that the principles involved are not broadly known is indicated by the fact that in very recent years cars have been built without proper or sufficient insulation. These cars which do not properly protect their lading are huge consumers of ice and

expensive to operate and require a great deal of maintenance to keep them in service.

Summation of Requirements for Efficient Refrigeration

It is evident that an efficient and economical railway refrigerator car is one which provides adequate air circulation, adequate protection to the lading, adequate quantity and degree of refrigeration, quick initial cooling, uniform temperatures, dry air, space to permit proper methods of loading, and good car construction to minimize maintenance and increase time in service.

(An abstract of the remainder of Mr. Winterrowd's paper will be published in the next issue.—EDITOR.)

New Cantilever Bridge Replaces Famous Old Span

Canadian Pacific Completes a New Structure Over the St. John River in New Brunswick

ONE OF THE MOST IMPORTANT railway bridge projects completed during the last year was the new cantilever bridge over the St. John river at St. John, New Brunswick. This is a single-track structure with a main span of 450 ft., center to center of piers. No little interest is attached to this structure because of the unique character of the site at the narrowest portion of the St. John river gorge, a short distance from the point where the river flows

ara cantilever completed in December, 1883, the original St. John Bridge having a span about seven feet longer than the Niagara bridge.

The crossing of the St. John river carries the Canadian Pacific to its eastern terminus in the city of St. John, New Brunswick. The original bridge was built by the St. John Bridge & Railway Extension Company and served to connect the Intercolonial with the St. John & Maine Railway at



Three Interesting Bridges Span the Gorge at Its Narrowest Point

into the Bay of Fundy. With a tide variation of 22 ft. at the site of the bridge, terrific tidal flows are set up which have resulted in the phenomenon, known as the "Reversing Falls." This condition precluded the use of any form of construction requiring falsework. The completion of the new bridge marked the passing of one of the famous bridges on the American continent, which excited a great deal of comment at the time of its construction in 1884 and 1885, owing to the fact that it was very much similar to the Niag-

Fairville, N. B. The bridge and railway were purchased by the Canadian Pacific and incorporated into that system in 1905. The construction of the original bridge was a matter of great importance since it afforded the first direct rail connection between the New England states and Nova Scotia, the current condition in the river making the use of car floats out of the question.

The new bridge comprises the cantilever bridge proper and a viaduct composed of eight 70-ft. deck plate girder

spans on concrete piers, forming an approach from the west. The cantilever structure consists of two anchor arms, 125 ft. each, two cantilever arms of 150 ft. each, and a suspended span of 150 ft.

The anchorage at the east and required excavation in solid rock, while a concrete pier was built for the west anchorage. This west anchorage pier was designed with two pre-moulded shafts, into which the steel anchors were entered and later sealed up with concrete.

The two main or river piers are founded on the rock below low water level on which a satisfactory foundation was

for more than a mile; and the engineman saw the automobile half a mile away and sounded the whistle continuously to the crossing; and there was a visual and audible highway signal at the crossing. This was in good working order after the accident; and, moreover, a brakeman of a westbound freight which had just passed the crossing testified that he heard it ringing after his caboose had cleared the crossing. The highway crosses the tracks at a right angle.

All the cars of the train were of steel.

The immediate cause of the derailment appears to have been the entanglement of the engine of the automobile in



The New Bridge Is Flanked on the West by a Viaduct of Eight Deck Girder Spans

obtained. These piers are constructed of concrete, faced with granite from the base up to high water elevation and finish about 45 ft. over the surface of slack water. All four piers of the cantilever bridge have rock foundations while of the approach piers, two are founded on rock and the remainder on hard pan.

The photographs bring out the essential difference between the new and the old cantilevers. Both structures are of the through type, but whereas the bottom chord of the old cantilever was horizontal and the variation in the depth of trusses was taken up entirely in the top chord, the arrangement is entirely reversed in the new cantilever structure. In this the top chord is level and the bottom chord is on a parabolic curve each way from the main piers. However, the suspended spans in both structures have parallel bottom and top chords. The third structure seen is a 565-ft. highway arch.

The sub-structure was commenced in April, 1920, and completed in the following December. The steelwork was erected between June and October, 1921, and the bridge was opened for traffic on November 24, 1921.

The work was done under the general supervision of J. M. R. Fairbairn, chief engineer for the Canadian Pacific, P. B. Motley being engineer of bridges and C. F. Draper, resident engineer on the work. The contractors for the sub-structure were the Foundation Company, Limited, and for the steelwork the Dominion Bridge Company, Limited.

Black Diamond Express Derailed by an Automobile

THREE MEN were and an employee riding as a passenger were killed and 55 passengers injured, on train No. 10, the eastbound Black Diamond Express, of the Lehigh Valley, on Saturday morning, May 13, at North Leroy, N. Y., 47 miles east of Buffalo, when the train struck an automobile at a highway crossing and was derailed. The train was running at about 65 miles an hour and three coaches fell down a high bank and were overturned, but the locomotive and mail car kept to the roadbed. The occupant of the automobile was killed. He was traveling northward. The region is level, there was a clear view from the highway

the pilot of the locomotive, the mass being pushed along on the rails for about 300 ft. to a crossover track, where it caught in the frog and was forced under the wheels of the locomotive.

The man in the automobile, said to have been a farmer, 65 years of age, appears to have stopped a little distance short of the crossing to wait until the freight train should have cleared the highway; and but for the fact that the freight was north of the passenger train the explanation of his negligence would be expected to be found in the circumstance, often reported in crossing accidents, that the passenger train was hidden from him, but as a matter of fact he



Derailment on the Lehigh Valley

to have had both a visual warning and an audible warning—a plain view of the passenger train for a mile to the west of the crossing, and the long continued sounding of the whistle (assuming that he was not deaf); and the five crossing signals (the well known Hall enclosed-disk) to each side, one on the south side of the tracks and one on the north side.



Railroads Have Profited from Development Work in Nebraska.

Development Association Holds Annual Convention

Addresses by Distinguished Guests and Lively Discussions Are
Features of Denver Session

THE fourteenth annual convention of the American Railway Development Association, comprising representatives of the agricultural, colonization and industrial interests of the railroads of the United States and Canada, met at the Brown Palace Hotel, Denver, Colorado, on May 10, 11 and 12, with President Geo. E. Bates (Delaware & Hudson) in the chair. An address of welcome was tendered the association by Hon. Oliver H. Shoup, governor of Colorado. Addresses were also made by H. R. Safford, vice-president, Chicago, Burlington & Quincy; C. A. Lowry, president, Colorado Agricultural College; A. A. Reid, chairman, Colorado Committee, War Finance Corporation; Prof. James Underhill, Colorado School of Mines, and others.

Mr. Safford Discusses New Railway Era

"While railway development work has been valuable to a large degree in past years, I believe you are entering upon the period of greater possibilities," said Mr. Safford. "We are entering upon a period which is both reactionary and progressive—reactionary because of the rebound from a violent and destructive action beginning in 1914, and progressive because of the many new and unsolved problems suddenly developed. Conspicuous among the new conditions affecting the railroads are the greatly disturbed rates of exchange in foreign countries, causing cross-currents and reversals of the accustomed flow of traffic, the Panama Canal as a strong competitor of inland railway routes, the encouragement given to the establishment of inland lake and river routes, and the development of highway motor traffic facilities. Such conditions, coupled with the fact that railway expansion in terms of transcontinental mileage is practically at an end, makes the present problem one of developing and protecting the present mileage rather than one of enlarging it. The problem of meeting waterway and motor car competition is largely one of developing more traffic which can be handled only by rail. Your principal duty is to help find resources and to help show how to develop the maximum possibilities in them.

Mr. Safford pointed out the great opportunity of the association in the establishment of a better understanding of the railway situation by the public.

The agricultural section was opened by the presentation of an illustrated lecture by E. O. Fippin, general manager, National Lime Association, Washington, D. C., on agricul-

tural limestone and its relation to agricultural production and railway traffic. In the discussion of this paper emphasis was placed on the value of this promotion work from a railroad viewpoint. Traffic had been appreciably increased through the use of lime along the lines of the New York Central; the effect of its use for agricultural purposes is not only to provide an increased traffic from enlarged crop yields, but also by the shipment of the limestone itself.

The Interest of Railways in Reclamation

Taking as his subject the status of national reclamation legislation in the United States, R. E. Shepherd, chairman, Western Reclamation Association, Jerome, Idaho, presented figures to show that in 1921, 242,000 tons of freight were shipped out of the Boise, Idaho, development region and 261,054 tons of freight received. Mr. Shepherd also showed how studies had developed the fact that traffic between the east and the irrigated west, amounted to more than the entire trade with any foreign country except Great Britain.

Jesse Jones (S. A. L.), led the discussion on this subject by presenting a paper in which he outlined the progress in reclamation from its inception in 1890, down to the present time, giving particular attention to the character of the various bills presented to Congress and the problems encountered in securing proper legislation. Mr. Jones supported the Bankhead-Borah bill now awaiting final action by Congress. There are yet unreserved he showed, 200,000,000 acres in the public domain of which 20,000,000 acres are known to be susceptible to reclamation by irrigation; and in all there are over 350,000,000 acres of drainable and cutover lands which are reclaimable. As against this, approximately 58 per cent of the country's population does not own real estate of any character, a condition which has a tendency to make for irresponsibility on the part of citizens.

Advertising in Development Work

The importance and value of general and specific advertising in development work was set forth in an address by F. D. Zimmerman, vice-president, Eleventh District Associated Advertising Clubs of the World, Denver. After tracing the development of advertising from its origin to the present time, Mr. Zimmerman stated, "that advertising is today the mightiest factor in the business world, including the railroads." As to the interests of the railroads in this

matter, public relations, he said, is one of the most important subjects to be considered at the present time. In the same way that laws can be made or unmade by moulding public sentiment. So advertising should receive immediate and close attention by the railroads by reason of the possibility presented to overcome unfavorable public sentiment. In supporting any policy of advertising, however, Mr. Zimmerman pointed out the necessity and advisability of its continued application.

Correct Practice in Colonization Work

A paper on the subject of immigration and colonization was presented by J. H. Jasberg (D. S. S. & A.).

"My experience," Mr. Jasberg said, "has been that the bona fide settler is a strong and sturdy laborer and wage earner with a large family, such as are to be found in mines, factories and other industries. The interest of the wife is essential to the success of the colonization venture on the part of such men. The northern European is best suited to become a settler in the northern countries. The land should be suited to the kind of farming that the prospective settler intends to practice and should be advantageously located as to roads and schools. The land should also be reasonably priced, with attractive terms of payment, and when extraordinary difficulties arise, the agent should be ready to assist the settler in surmounting it.

Proceedings of the Industrial Section

The industrial section of the association, except when in joint session with the agricultural and marketing section, devoted its time to the consideration of the various details involved in connection with sidetrack contracts, the practices of the roads regarding the maintenance of private tracks, the effect of the proper handling of maintenance charges where team tracks or other railroad owned tracks are extended for private industrial use, the effect of fire indemnity clauses on insurance rates, and a detailed discussion of shippers guides. In order to obtain information as to the practices of the various railroads relative to shippers' guides a questionnaire was sent to 65 railroads and of the 32 replies received, 17 of the lines have shippers guides. Three of these roads issue annual guides. Two issue guides every three or four years and others at irregular periods. On eleven roads, the work of issuing and preparing the directory is carried out under the direct charge of industrial or development departments, while on nine, the work is under the traffic department. The returns also show that seven of the roads compile and issue the directory with their own forces, while eleven others leave the work to advertising companies and two handle it jointly with advertising companies. Twelve roads secured the data by sending questionnaires to their local agents, while two leave the matter entirely to advertising companies handling the work and one handles the entire matter with its own forces. As the result of this study, the committee recommended that all roads should issue industrial directories to promote closer relations between shippers and receivers of freight, also that the directory contain only actual receivers and such other information of value to them as the list of railway officers, schedules of manifest freight trains, location of stock pens, track scales, and stations and a general map of the territory. He recommended also that no advertising should be displayed in the directory and that the loose leaf form of directory is not practicable.

St. Louis, Mo., was selected as the location for the next convention. The following officers were elected for the year: President, J. B. Lamson, agricultural development agent, Chicago, Burlington & Quincy; first vice-president, John F. Fox, traveling immigration agent, Northern Pacific; second vice-president, J. F. Jackson, agricultural agent, Central of Georgia; secretary, A. Locke, industrial agent, Kansas City Southern.

Rate Decision Still Uncertain

WASHINGTON, D. C.

ALTHOUGH the Interstate Commerce Commission was supposed to have reached or practically reached a decision in the rate case several days ago, it had not been made public by Wednesday evening and it was reported and believed in some quarters that it had been held up at the request of the President until after his conference with railroad executives at dinner at the White House on Saturday, May 20.

The commission had a conference on the rate case on Saturday afternoon, May 13, and it was expected around its offices that the report would be made public at any time, but, according to reports, the President sent word from Atlantic City, where he was spending the week-end, asking that it be withheld until after his return. On Monday, Chairman McChord was at the White House twice but declined to comment on the purpose of his call and the President, at his conference with newspaper men on Tuesday, declined to shed any further light on the purpose of his invitation to the railroad executives to discuss the railroad situation. Commissioners Esch and Cox were also at the White House on Monday and it is understood the commissioners have had further conferences among themselves during the week.

While nothing authoritative has been given out, the story generally believed in Washington is that the President, anxious to have his administration do something big to improve economic conditions, and having been informed that the commission was unlikely to agree on a very pronounced program of rate reductions in view of the fact that the railroads have not yet attained what could be called a fair return, determined to call upon the railroad executives to do voluntarily, with public credit to themselves and to himself, more than they could be forced to legally by the commission. It is suggested in connection with this story that the President believes he can accomplish more with the railroads by giving them an opportunity to reduce rates without an order but there is also another theory that he would not be able to talk very strongly without a decision before him and that the delay is merely due to many differences of opinion among the commissioners in putting the finishing touches upon a report.

In view of the well known position of the railroads that rates should not be reduced until expenses have been reduced by a further reduction of wages by the Railroad Labor Board, there has been some curiosity as to what the President may have up his sleeve and what kind of arguments could be put up to them to reduce rates voluntarily by a greater amount than the commission could find warrant for ordering.



A Well-Maintained Tangent on the W. & L. E.

A New Plan for Unified Terminals at Chicago

Report Made for National Association of Security Owners Favors Joint Operation

A NEW PLAN for the joint operation of railway properties in the Chicago terminal district has just been made public in the form of a report by the Board of Economics and Engineering of the National Association of Owners of Railroad Securities. It comprises one feature of a general plan on the part of the association for a study of railway operation, having in mind the possibilities for increased economy and efficiency. Chicago was selected for this study as being fairly representative of the situation found in inland terminals throughout the country and the plans proposed for its improvement are submitted as being applicable elsewhere. An abstract of the report follows:

It is the purpose of this report to suggest plans and methods whereby the fundamental principles that should cover the operation of terminals in large cities can be applied so as to reduce the cost to the carriers of moving a revenue ton and improve the service to the shippers. The recommendations of the Chicago Terminal Commission, generally referred to as the "Wallace Plan," have been accepted by the board for the section of the downtown district to which they apply and as the basis for the extension of the same principles to the entire Chicago district.

Traffic Handled Is Large

The freight traffic in and out of Chicago each day consists of about 27,000 cars. Of these, 54 per cent, or about 14,600 cars, is through business; that is, freight merely passing through Chicago on its way to other points. The remainder, about 13,400 cars, less than half of the total, is local business; that is, freight of Chicago origin or destination.

The tracks required to handle this heavy volume of traffic constitute a network that has come to interfere seriously with commercial and industrial growth, to impede street traffic, and even to restrict the expansion of railway facilities. While some of the trackage is operated in common by several roads, each line has its own yards and terminals, and receives and interchanges freight on an individual basis.

Competitive methods increase the train miles necessary to handle the business, for when deliveries are made at interchange points, the road to which a car is destined must send a locomotive and crew to make the transfer to its own road, frequently requiring an all-day run to make the transfer of a single car. While this is an extreme case, nevertheless the number of light movements and the duplication of effort result in short trains and heavy train mileage.

The principles on which the roads now operate are:

1. Individual competition with the temptation of adding unnecessary train mileage to obtain special business that is of temporary advantage to that particular road.
2. Interchanging at stated points of which there are at least 80 on and inside the Indiana Harbor Belt.
3. Transfer of c. l. and l. c. l. cars from one road to another by means of transfer and connecting railroads.
4. Transfer of through l. c. l. shipments through downtown freight houses and the city streets.
5. Capital expenditures made to suit individual roads without reference to co-ordination.

The total average business in and out of Chicago daily is:

Freight houses	4,580 cars
Team tracks	1,636 cars
Industries	6,027 cars
Through business	14,488 cars
Total	26,731 cars

In the area bounded by the Indiana Harbor Belt and the

cities of Gary and Evanston, there are 12,982 tracks with a total strength of 4,389 miles, of which 871 miles are elevated. During the federal administration a "co-ordinating committee" of railroad officers was appointed, whose duty it was to co-ordinate the traffic in Chicago, particularly the through business, in such a manner as to make the best use of the facilities available and to divert as much traffic as possible away from the congested districts. As a result the Indiana Harbor Belt began to function as a "belt line" and facilities were developed along that line. After the roads were turned back to the owners, this operation was continued, in a modified way, with the result that at the present time part of the business is going around the city and at some points l.c.l. business for points outside the city is being consolidated for movement around the city instead of transporting it from one downtown freight house to another through the city streets. About 25 per cent of the through business is being handled around the city at the present time.

Proposed Improvements and Method of Operation

The plan of the board is to divert all through business around the city. All cars into and out of Chicago are to be collected in group yards along the Elgin, Joliet & Eastern, which is to be used as an outer belt. It is proposed to eliminate all interchange points; to eliminate transfer and connecting railways; to eliminate all freight yard and equipment facilities not needed for switching and passenger service. All through cars are to be transferred from group yard to group yard, and all improvements are to be made along this outer belt where they may be considered permanent until, after many years, the city's growth again requires a rearrangement.

It is proposed to use the Indiana Harbor Belt as a temporary belt line for transferring from the southeasterly group to the northerly group until it becomes necessary to devote it to other purposes on account of the growth of the city. Normally the movement between group yards will be in full trains, and generally cars will be made up in full trains for the receiving road. So also will the city business leave a group yard in full trains for distribution after delivery to an industrial switching yard, and the makeup of trains leaving an industrial yard can readily be made so as to require the minimum of switching after delivery to the group yard.

Less Than Carload Freight

Each group yard will have transfer platforms where all l.c.l. cars may be consolidated for the city and for foreign lines. By this means about one-third of the l.c.l. cars can be released in the group yard and the balance taken into the city in ordinary or specially designed cars in full trains.

Less than carload freight for Chicago and points beyond the city is now delivered in cars loaded to an average of about seven tons each. Of the l.c.l. cars going downtown approximately 600 cars containing over 4,000 tons are for out-of-town points. At present part of this is being transferred around the city but the greater part of it still goes through the city streets.

There are at present about 28,000 tons per day, or about 10,000,000 tons per year of l.c.l. freight coming in and going out of the city which costs the railroads:

For operation	Per ton
For property value—fixed charges	\$1.77
	1.08
Total present cost	\$2.85

The plan herein contemplates a reduction of this figure as follows:

	Per ton
Reduction of fixed charges under Wallace plan (\$40,000,000 at 6 per cent, divided by 10,000,000 tons).....	\$0.24
Reduction in operating cost under Group plan.....	.37
Total reduction	\$0.61

Notwithstanding this substantial reduction, it will still cost \$2.24 per ton to handle l.c.l. freight into and out of Chicago. No estimate has been made of the probable saving by consolidation of the city terminals, though a saving is no doubt possible.

Expansion of existing freight-house facilities with a continuation of methods now in use serves only to increase the unit terminal cost, which at present absorbs a large percentage of the revenue from line haul. For example, on l.c.l. shipments yielding an average revenue of two cents per ton-mile, these terminal costs are equivalent to a line haul of 112 miles on through business or a maximum of 224 miles on local business in and out of Chicago.

It is proposed to consolidate all city l.c.l. freight into cars carrying 11 tons each instead of seven as at present; to use cars of special design in which heavy loadings are practicable

and possibly flats to carry containers. The latter should be loaded, insofar as possible, for firms and individuals, in order to avoid rehandling through downtown freight-houses. The question of containers for store door delivery is one that should have further study. If they are used from group yard to the city a greater saving may be effected.

Passenger Traffic

It is proposed to consolidate the traffic of the six existing passenger terminals into three, viz., the North Western station, the Union station and the Illinois Central station. In selecting the roads that are to use stations in common, consideration has been given to the tentative plan of the Interstate Commerce Commission for consolidating the railroads into 19 systems, and the roads using these passenger terminals have been grouped accordingly. (Under this arrangement, all roads now using the Grand Central, La Salle and Dearborn stations would use the Illinois Central station at Twelfth street with the exception of the Santa Fe and the Chicago Great Western, which are placed in the Union station.)

This plan has a distinct advantage in that the roads are



How Freight Traffic Could Be Routed—Plan for Proposed Rearrangement of Both Local and Through Operation—Showing Traffic Densities

grouped together at outlying points and consolidated still more as they come in, which helps to reduce the number of crossings to a minimum and will tend to develop good trunk lines for passenger business only. Another distinct advantage is the mileage saved by some of the roads which otherwise would reach their respective stations by very circuitous routes, in some cases from three to nine miles longer than the proposed routes.

Advantages Outweigh Disadvantages

The proposed plan can be made effective only through unified control and operation, but such control does not necessarily involve disturbance of existing ownership. Single administrative control is required and we believe may be secured by lease or operating agreement.

Consideration must be given to the business advantages accruing to certain roads by reason of superior location and industrial connections, but these are of relatively little moment in comparison with the operating advantages to be gained under the proposed plan and can no doubt be readily adjusted in the common interest. The improved operating methods indicated can be put into effect immediately upon

the completion of the group yards, the proposed improvements along the Elgin, Joliet & Eastern and the addition of the required connections.

The Cost

The total cost of additional facilities necessary to accomplish the unified operation is estimated at \$90,000,000 but as in the case of the other reports for joint terminal operation a large part of this cost is covered by estimated savings and the value of air rights which may be leased for commercial or industrial purposes. A summary of the cost is as follows:

Estimated cost of rearrangement of freight facilities between State street and proposed river channel, south of Polk street to Sixteenth, including change of Chicago river—as outlined and estimated in the Wallace plan.....	\$43,000,000
Estimated cost of changing methods of operating freight terminals by elimination of interchange points, transfers and connecting railroads as per group plan proposed by Board of Economics and Engineering—\$46,550,000—or say.....	47,000,000
Total	\$90,000,000
Less—Value of ground space released as estimated by John F. Wallace.....	\$60,000,000
Value of air rights on property retained under Wallace plan	25,000,000
Estimated net cost of combined improvements.....	\$85,000,000
Estimated net annual saving in operation cost and fixed charges under group plan alone (\$16,155,259).....	16,000,000

Pere Marquette's Surplus After Charges \$3,765,880

Reorganization in 1917 and Increased Prosperity of Territory Put Road in Strong Position

THE PERE MARQUETTE in its recently issued annual report shows a surplus after fixed charges of \$3,765,880 for the year ended December 31, 1921, as compared with \$1,393,973 in 1920. The increase in net was due not to increased business, but to the result of improved conditions of railroading as evidenced in lower wage, fuel and material costs. There were also savings in the line of equipment. In ten months of 1920 the road had a debit balance in this item of \$1,761,120. In 1921, all twelve months, the debit balance was only \$690,654.

A comparison with 1920 must take into consideration that in that year the road was one of the few which did not accept the provisions of the guaranty covering the period from March 1 to August 30. Because of the peculiar conditions governing at that time, this proved to be unwise, because costs increased in greater proportion than could possibly have been foreseen. In other words, the road did not secure as great a net for the six months operating on its own account as it would have secured had it accepted the guaranty.

The Pere Marquette, as we know it today, is a very different property from what it was prior to the reorganization in 1917. There are two reasons for this. One is the drastic character of the reorganization; the other, the increased prosperity of the territory served due primarily to the development of the automobile industry.

The reorganization in 1917 brought to a close a very checkered career, because receiverships and reorganizations have been familiar episodes in the history of the Pere Marquette and its predecessors. The character of the reorganization is best shown by the fact that it reduced the company's funded debt from \$78,000,000 to \$36,000,000 and changed the proportion of funded debt from 73 per cent of the total capitalization to but 35 per cent. The company's funded debt at the end of 1917 was \$36,325,000. At the end of 1921 this figure had been increased to \$45,750,000, the reason being the inclusion, started in 1920, of the equipment trust notes covering the standard equipment allocated by the Railroad Administration. The amount of the notes on December 31, 1921, was \$9,426,200. The equipment in-

cluded 30 Mikado and 20 switching locomotives and 2,000 box and 1,000 hopper cars. With the inclusion of these notes the funded debt approximates 40 per cent of the total capitalization.

Dividends on Stock

The outstanding capital stock totaled on December 31, 1921, \$68,675,000. It was increased to this figure from \$28,500,000 in the reorganization. The stock includes \$45,-046,000 common; \$11,200,000 cumulative 5 per cent prior preference stock and \$12,429,000 5 per cent preferred, cumulative after January 1, 1919. Dividends on the prior preference stock have been paid regularly. The first dividends on the preferred were declared December 7, 1921, and totaled 10 per cent, covering the period to December 31, 1920. In April, 1922, the preferred dividend was put on a regular quarterly basis and at that time one per cent was declared on the cumulative dividends, leaving 4 per cent still in arrears.

With this more conservative financial structure the road is in a position to derive full advantage of the improved conditions in its territory. The nature of the expansion from which it will secure benefit is evidenced by the fact that the road earned for the government a slight margin in 1918 over its approximately \$3,700,000 standard return and in 1919 nearly \$3,000,000 more than its standard return. In 1920 it did not accept the guaranty and in that year it had a net after rentals of only \$260,530. In 1921, however, it had changed this figure with considerably less traffic to a net after rentals of \$5,106,442. Under the conditions it would appear that the Pere Marquette's traffic position is much improved over that of the period on which its standard return was based.

The Pere Marquette's corporate surplus after fixed charges in 1921 was \$3,765,880. In 1920 it earned \$1,393,973, as noted in the first paragraph. In 1918 and 1919 the net was \$1,896,931 and \$1,894,125, respectively. The prior preference dividends total \$560,000 and the regular preferred dividends will be \$621,450. This indicates that on the basis

of the earnings in 1921 there would be a considerable margin after payment of the prior preference and preferred dividends. The point, however, is that 1921 was not a good year, which further emphasizes that with normal business the road should be in an extremely favorable position—rather better than is readily realized by those not familiar with the new and improved financial and business conditions of the road.

Diversified Traffic

The Pere Marquette operates 2,223 miles of line. It has a line from Chicago to Buffalo and Suspension Bridge using trackage rights out of Chicago and over the Michigan Central east of St. Thomas, Ont. There is also another east and west line from Ludington to Port Huron and various north and south lines, such as the one from Grand Rapids north towards the tip of the Michigan peninsula and the line from Toledo to Saginaw. Two car ferries are operated across Lake Michigan from Ludington to Milwaukee and Manitowoc, respectively, and two across Lake Erie to Conneaut Harbor.

The road's traffic is diversified. Products of agriculture in 1921 made up 15.25 per cent; of animals, 1.56 per cent; of mines, 30.22 per cent; of forests, 6.76 per cent, and manufactures and miscellaneous, 20.46 per cent. Bituminous coal constituted 25.80 per cent of the total tonnage. In 1921 the total tonnage carried was 12,786,731. This compared with 14,855,393 tons in 1920, that year being the best in the company's history. The revenue ton-miles in 1921 were 2,172,802,065 as compared with 2,606,903,408 in 1920. In 1921 the average haul was 170 miles; in 1920 it was 175 miles.

The actual freight revenues in 1921 totaled \$29,291,665 as compared with \$29,754,566 in 1920, a decrease of \$462,901. The average revenue per ton was 1.348 cents as against 1.141 cents in 1920. The passenger revenues were \$5,940,618, or \$997,887 less than in 1920. The total revenues were \$38,161,241 as compared with \$40,372,814 in 1920, or \$2,211,574 less. The decrease in operating expenses as between the two years was \$6,452,382. The operating expenses in 1921 totaled \$30,279,374 as compared with \$36,731,955 in 1920. The result of the greater proportionate decrease in expense was shown in a figure of net operating revenue of \$7,881,667 in 1921 as compared with \$3,640,859 in 1920 and in a 1921 operating ratio of 79.35 as against 90.98 in 1920.

Maintenance

The decrease in maintenance of way expenses was \$730,449, or 13.76 per cent. The reduction was due partly to lower wage and material costs and partly to lesser work being done. The road put in track 621,748 cross-ties as against 862,343 in 1920. It laid 6,561 tons of rail as compared with 14,646 laid in 10 months of 1920. On the other hand, 115 miles were ballasted as compared with 84 in 10 months of 1920. The reduction in maintenance of equipment expenses was \$1,614,230, or 16.51 per cent. The road's equipment condition at present, however, is about the same as the country's railroads as a whole.

The transportation expenses were reduced \$4,073,679, or 20.71 per cent. The expenses per revenue train mile decreased from \$2.55 in 1920 to \$2.12 in 1921, or 16.21 per cent. "The chief factors contributing to the decreased cost," says the report, "were the reduction in forces, the decrease in rates of pay and decrease in price and consumption of fuel." There was a further decrease because of the increased cost of operation in the year 1920 due to the railway switchmen's strike." Referring to fuel, the report continues: "The competitive condition of the fuel market allowed a wider purchase range and, for the first time in several years, a choice of fuel, resulting in a lower purchase price and a marked improvement in quality. A large portion of coal

used in 1921 came from the West Virginia coal fields. The decrease in price resulted in a decrease of \$143,501 in the cost of fuel for locomotive use; and as a result of the improvement in the quality of coal, increased efficiency and a decrease in the number of locomotive miles run, the number of tons of fuel consumed by locomotives in this service decreased 234,786, which, at the average rate of \$4.85 per ton, resulted in a decreased cost of \$1,138,712."

Because of the decreased traffic it is to be expected that the operating statistics would not be as favorable as in 1920. The average train load in 1921 was 539; in 1920, 588. The revenue car load was 22.79 tons; in 1920, 24.22 tons.

New Engine Terminals

The Pere Marquette in 1921 purchased 12 passenger and baggage cars. It completed new engine terminals and accompanying facilities at New Buffalo, Mich., including a 16-stall brick engine house, a 250-ton coaling station, a 100,000-gal. water tank, etc., costing \$718,000; at Saginaw, a 30-stall house, a 100-ft. turntable, etc., costing \$1,000,000; at Plymouth, Mich., a 15-stall house, 100-ft. turntable, 100,000-gal. tank, etc., costing \$400,000. A three-story warehouse costing \$125,000 was completed at Wyoming, Mich., and a new station at Belding, Mich. Another important project is that embodied in the Flint Belt Railroad giving the Pere Marquette a new freight line around Flint, Mich. About \$70,000 was spent on this line in 1921, this being about 10 per cent of the total estimated cost of the project.

Low Platform Electric Truck

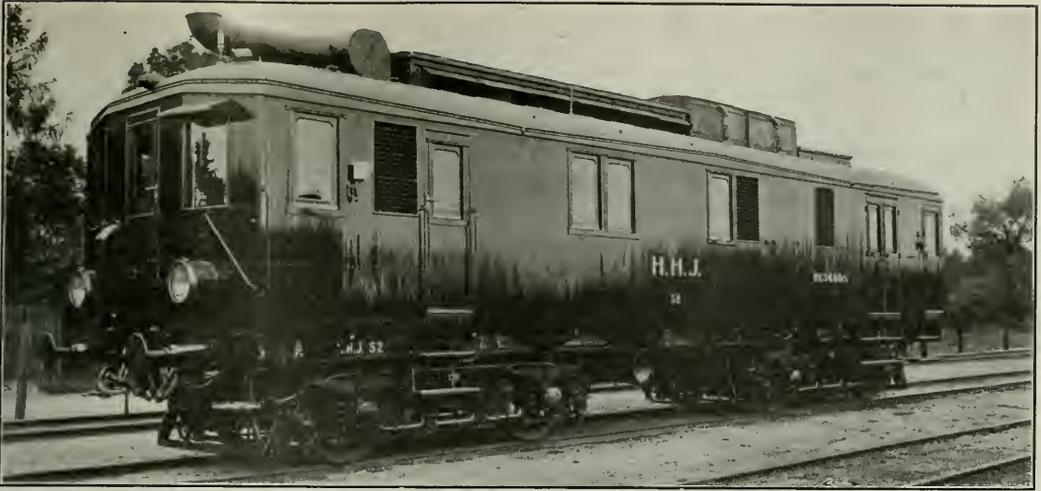
AN ELECTRIC TRUCK with an especially low loading platform has been designed by the Elwell-Parker Electric Company for handling barrels, bales, bags or heavy rolls. The truck is made up of about 95 per cent of standard parts on a special frame, and is designed for use where hauls are so long that a man with a hand chisel truck is too slow and expensive a means for the movement of material.

There is a storage battery over the driving wheels on the



The Truck Is a Drop-Frame Truck of Special Design

upper deck. The motor and worm drive axle are located under the upper deck. All four wheels steer and the raised portion near the end of the platform, known as the "kick-up," houses the rear wheels. The driving wheels are fitted with 21½ in. by 3½ in. rubber tires, and in the trailing wheels with 10½ in. by 5 in. tires. The truck will run from 15 to 20 miles on a single battery charge.



Swedish Diesel-Electric Motor Car of 250 Horsepower

Diesel-Electric Motor Cars for Railway Service

Successful Operation in Sweden Has Led to the Introduction of 250-Horsepower Cars

SWEDEN is one of the countries which is obliged to import its supply of locomotive fuel and consequently the greatly increasing cost of coal is a serious factor in operating expenses. An abundance of water power has made electrification practical on a number of lines where the traffic is heavy but this change is not feasible on a large amount of mileage where the traffic is relatively light. Both improvements in steam locomotives and the substitution of other sources of power are receiving thoughtful attention. Considerable pioneer work in the application of Diesel engines for railroad motive power has already been carried on in Sweden. The system favored uses a Diesel engine to drive an electric generator which furnishes power to motors mounted on the trucks. The first car, built in 1913, had a 75-hp. engine. This was followed by several other cars with the same sized engine and later by others of 120 hp. These cars were built and equipped by the Swedish General Electric Company and the Atlas Diesel Company working in conjunction.

These early motor cars proved to be so satisfactory in operation that a separate company, the Diesel-Electric Car Company, Vasteras, Sweden, was organized to carry on further development work. The new company has turned out several cars of the smaller sizes and in addition built cars of 160 hp. and 250 hp. which are now in regular service. At the present time 12 Diesel-electric motor cars are in service on seven Swedish railroads. That none of the cars delivered has been taken out of service, except when impossible to obtain oil during the war, and that all orders recently received have been from roads that already had at least one car in operation is indicative of the success of the general design.

The cars with 75-hp. or 120-hp. engines were provided with compartments having seating capacity for a number of passengers or with space for baggage and mail. One or more

small trailers were commonly hauled. The larger capacity cars lately built are not provided with accommodations for passengers but compartments for baggage and mail have been retained, passengers being accommodated in regular coaches hauled by the motor car.

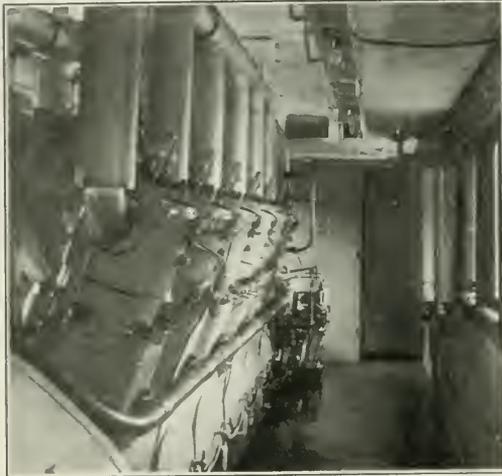
Cars of 160 hp. weigh 37,500 kg. (82,500 lb.) and, when grades do not exceed one per cent, are capable of hauling a trailing load of $67\frac{1}{2}$ metric tons ($74\frac{3}{4}$ short tons) at ordinary speeds. This is a total train weight of 105 metric tons ($115\frac{1}{2}$ short tons). Cars of 250 hp. weigh 50,000 kg. (110,000 lb.) and under the same conditions can haul a trailing load of 115 metric tons ($126\frac{1}{2}$ short tons) which corresponds to a train of 165 metric tons ($181\frac{1}{2}$ short tons) including the motor car. Plain trucks are used on the engine compartment end of these cars and motor trucks, one motor for each axle, under the other end. The cars can be operated equally well from either end. With the passenger cars used in Sweden, which are much lighter than are customary on American roads, the 160-hp. car can haul a train with about 225 passengers while the 250-hp. car can haul a train holding 375 passengers.

When hauling full trains the fuel oil consumption for the 160-hp. engine should average about 0.7 kg. per train kilometer or 2.5 lb. per train mile, while the consumption for the 250-hp. engine should average about 1.0 kg. per train kilometer or 3.5 lb. per train mile. Oil records of a 160-hp. motor car for an extended period in regular service handling a train of 90 metric tons (99 short tons) showed a fuel oil consumption of about 0.5 kg. per kilometer or 1.8 lb. per train mile. By weight, the fuel oil consumption of the Diesel engines averages about six per cent of that of the coal used by steam locomotives of the same power.

The 160-hp. engine has eight cylinders and the 250-hp. twelve cylinders but otherwise they are similar in general design to the smaller engines. A number of improvements

have, however, been introduced in the later designs of motor cars. The cooling water for the Diesel engines is now recooled in a number of radiators similar to those used for gasoline motor trucks, mounted on the roof of the car as shown in one of the illustrations. Cooling is effected by means of a fan-blower driven directly from the main engine and is thus independent of speed. The motors are now arranged to be connected either in series or in parallel.

In addition to low fuel costs, one man operation and little time or attention required at terminals, experience has shown that Diesel-electric motor cars can make a greater mileage



Engine Room of 250 Horsepower Diesel-Electric Motor Car

per day, spend less time in the shop and run for much longer periods without a general overhauling than steam locomotives. They are capable of making 50,000 to 60,000 miles per annum. Even after being taken in for overhauling after some 60,000 miles it has been found that the largest item of expense is for dismantling and reassembling.

While the Diesel motor car or locomotive will undoubtedly be still farther perfected and adapted to a wider railroad field of usefulness, indications point to a much more general employment of this general type of motor in the near future.

The Co-Operative Switching of Joint Tracks Succeeds at Seattle

EARLY IN 1918 PLANS were formulated by the operating officers of the United States Railroad Administration on the Pacific Coast for the unification of the terminals of the railways entering Seattle, Tacoma and Everett, Wash. These plans were put into effect about September 1, 1918, and remained in operation until the termination of federal control. (See *Railway Age*, September 1, 1918, page 203.)

On March 1, 1920, the various facilities were returned to their respective owners and independent operation of both freight and passenger terminals was resumed, with the exception that a so-called zone plan of switching was developed by the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Oregon-Washington Railroad & Navigation Company, and the Great Northern, to apply to certain districts where these roads were jointly interested or where two or more of them had private tracks serving the same industry. The thought underlying this zone plan was that

one locomotive could perform the switching service for all of the interested roads at such points. Seven such zones were created, two of which were assigned to each road with the exception of the St. Paul, which assumed charge of one.

The arrangement which has been perfected provides that the line handling the switching within this zone shall furnish the locomotives and crews and assume all of the expense incident to the joint operation, the cost being divided on the basis of the number of cars handled. A daily report is made to the officer in charge of the zone, showing the time that each locomotive enters and leaves the zone, the time spent in it and the number of cars moved into and out of the zone for each of the participating companies. The intra-zone switching revenue collected is credited to each zone separately, while locomotive expense is charged at a flat rate varying from \$9 to \$10.50 per engine hour according to the class of locomotives used.

Joint interchange tracks have been established convenient to most of the lines entering the city. Certain tracks have been set aside for receipt and delivery of cars to each line. The arrangement requires that direct interchange be made with the railroads operating each zone. The usual interchange reports are submitted to cover the movement of all cars. Joint car inspectors have supervision over the equipment moving in interchange and when necessary make light repairs for all lines, this expense being divided on a car basis as is the cost of joint yard checkers working on the interchange tracks. The maintenance of the interchange tracks is distributed on the basis of ownership.

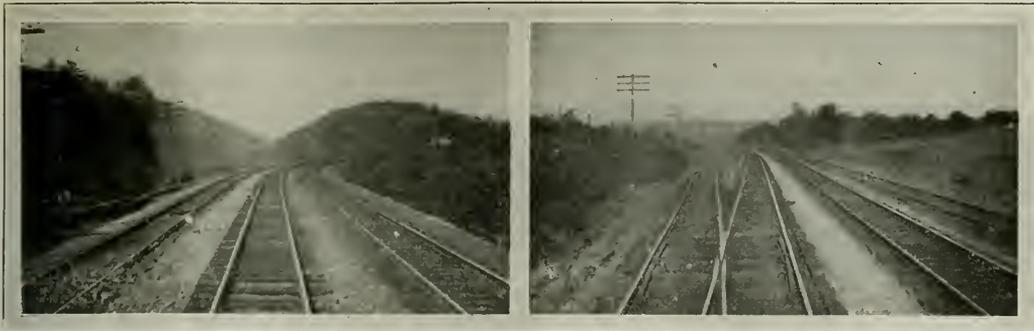
Enginemmen and switchmen engaged in zone switching are considered joint employees, when within the limits of the zone, for the purpose of determining liability. All expense incurred on account of loss or damage to engines or tracks, or because of the injury or death of a joint employee or third person is considered part of the zone switching expense, while the loss or damage to cars or contents is assumed by the road for whom the car is being handled.

The carding system for cars is in force throughout the terminals and all cars are returned to the delivering line, loaded or empty. When cars are switched to or from a track belonging exclusively to one road within the zone the tariff rate is charged and such cars are not counted as zone expense, nor is the time of the locomotive or crew engaged in switching upon such a track charged to the zone. Reclaim is allowed on cars switched to tracks jointly owned or used.

It has been found desirable to make interchange reports of all cars moving to or from zones in order to maintain proper car records. A copy of the daily yard check is furnished by each zone to all of the lines interested. The agents and general yardmasters of the lines operating the various zones are held jointly responsible for these records and for the proper performance of the switching service. The maintenance of tracks within a zone which belong exclusively to one road is handled by the owner, while the maintenance of tracks owned or used jointly is divided on a car basis. Each road looks after its own demurrage.

Under the unified plan of terminal operation put in effect during federal control, the switching cost of handling cars in the Seattle terminal varied from a minimum of \$2.09 in June, 1919, to a maximum of \$3.56 in January, 1919, whereas the zone cost per car to all lines during 1921 was approximately \$1.61. While the figures covering the cost of switching all cars, including those handled by non-zone engines for all lines are not available, the average cost per car for two of these lines was approximately \$1.68. In comparing these figures due allowance should be made for the fact that the yards were not as congested in 1921 as they were during the war. However, the cost of switching has been greatly reduced and the service improved by the plan.

We are indebted for this information to J. H. O'Neill, general manager of the Western lines of the Great Northern.



Lehigh Valley Car Repairs Big Factor in 1921

Corporate Income Account Shows Balance After Charges of
\$10,050,798—Surplus Now \$43,531,330

THE LEHIGH VALLEY'S corporate income account for the year ended December 31, 1921, shows a net after fixed charges of \$10,050,798. The property pays dividends of seven per cent on its \$50 par value stock. These dividends in 1921 amounted to \$4,245,749; in other words, they were earned considerably more than twice over. Although the 1921 net after charges compared with \$13,511,917 in 1920, it was much in excess of the figure of \$4,977,213 in 1919 and of \$6,592,834 in 1918. The principal reason for the decrease from 1920 and the expansion over 1919 and 1918 was due to the item of other income, or, to be more explicit, to dividends and interest receipts on securities of affiliated companies, notably the coal properties. In 1918 the Lehigh Valley received such dividends and interest amounting to \$2,601,543; in 1919 to \$1,302,834. In 1920, however, these dividends totaled \$15,661,525 and in 1921 \$10,616,311.

The company's profit and loss account showed on December 31, 1921, a surplus of \$43,531,330. This indicates the strong financial position of the company. It is further of interest to point out that in 1921 the company retired \$1,300,000 unmaturing equipment trust certificates. At the end of 1920 the road reported that it had no such trusts in the hands of the public. In the present case it reports that it now has no equipment trust certificates at all.

Equipment Maintenance

The distinguishing feature of the Lehigh Valley's operations in 1921 was the attention given to the matter of equipment maintenance. The maintenance of equipment account for the year totaled \$25,138,717, or 34 per cent of the total operating revenues. This amount compared with \$23,641,002 in 1920; in other words, it was \$1,497,715 in excess of the record figures for that year. The road's standards of both way and equipment maintenance are high. The increased expenditure for equipment maintenance in 1921 was the result of its effort to maintain these standards and to overcome the harmful results of the manner in which cars failed to be repaired during the period of federal control when the larger portion of the equipment was off-line and failed to receive proper attention. Since April, 1920, the road has rebuilt or rehabilitated 16,575 cars, inclusive of 2,000 recently scheduled for that treatment. The road's total owner-

ship of freight cars is about 40,000, so the measure of what has been done is evident.

"Approximately \$8,037,400 More"

President E. E. Loomis, in the annual report, speaks of the situation in part as follows: "Because of the high rates of pay and expensive restrictions governing working conditions for railroad employees, prescribed by the United States Railroad Labor Board, but which do not apply in other industries, favorable contracts were made with several outside concerns for part of the work. A total of 9,975 cars were delivered to various car builders for general repairs during the year, on which your company saved \$690,275 as compared with the cost of making these repairs at its own shops which, in the past, under normal conditions, have been able to take care of this work. As an illustration of the deplorable condition of equipment at the termination of federal control, your company expended . . . for the maintenance of engines, cars and floating equipment during 1921 . . . approximately \$8,037,400 more than would have been disbursed had expenditures been limited for this purpose to the same ratio as applied on other railroads during the year, according to Interstate Commerce Commission records."

Anthracite Coal Supplied 37 Per Cent of Operating Revenues

The Lehigh Valley's operating revenues in 1921 totaled \$74,929,913 as compared with \$75,223,862 in 1920. There was a decrease of but \$293,948. The company shows its coal revenues separately. Anthracite coal revenue in 1921 totaled \$27,951,609, or \$4,174,126 more than in 1920. Reductions in revenues on other traffic, however, over-balanced this increase. The revenue tonnage carried in 1921 totaled 26,377,743, as compared with 32,103,897 in 1920. The reductions in the various classifications of commodities were fairly general. Anthracite coal tonnage, however, held up rather well. It totaled in 1921 13,028,065 tons, constituting 49.39 per cent of the total tonnage and supplying 37 per cent of the total revenues. In 1920 it totaled 13,485,191 tons, 42 per cent of the total tonnage and supplying 32 per cent of the total revenues. There were increases in wheat, in flour and, in fact, in products of agriculture and of animals generally, which would apparently emphasize the grow-

ing importance and success of the Lehigh Valley's fast freight service concerning which, incidentally, favorable reports are being heard on all sides.

As against a decrease of not quite \$300,000 in operating revenues, there was a decrease of \$12,785,083, or 16 per cent, in operating expenses. In 1920 the road operated at a ratio of 107, which figure was reduced in 1921 to 90. This figure is high but is apparently explained by what has already been said about maintenance expenses. The operating expenses in 1921 were \$67,530,014, as compared with \$80,315,096 in 1920. There was a reduction of \$4,010,423 in maintenance of way expenses, an increase as already noted of \$1,497,715 in equipment expenses and a reduction of \$10,090,279 in transportation. In 1921 the Lehigh Valley had a transportation ratio of 42, which compared with 55 in 1920. In August, 1921, the road showed a transportation ratio of but 37.

Preparation for the Future

The Lehigh Valley's net operating revenue—revenues less expenses—in 1921 was \$7,399,899, which compared with a deficit in 1920 of \$5,091,235. In other words, there was an increase in this item of \$12,785,083. The net after rentals gave a figure for 1921 of \$5,582,216, as compared with a deficit after rentals in 1920 of \$6,779,615. For purposes of comparison, it may be noted that the company's standard return based on its average of net railway operating income or net after rentals for the three years ended June 30, 1917, was \$11,318,714. The year 1921 did, therefore, not bring the road back to this average. The reason apparently was the decreased traffic, but more particularly the high expenses for equipment maintenance.

In view of what has been said concerning the latter factor, the general conclusion would be that the Lehigh Valley devoted 1921 to putting its house in order for the future, or in making up, in other words, for the difficulties occasioned by federal control and the peculiar railway conditions since. The road has, therefore, strengthened its position generally in the competitive territory between New York and the Niagara frontier. The company's large surplus and its strong financial position generally, relieved it, insofar as concerned 1921, of the necessity of making as favorable a paper showing as it might under more difficult conditions have found it necessary or advisable to make. The road, when all is said and done, should be able to show excellent results in 1922 although, of course, the fact that 37 per cent of its earnings come from the carriage of anthracite coal, will have to be borne in mind because of the present cessation of anthracite coal mining.

Progress on New Terminals

The Lehigh Valley has made much progress in recent years in the matter of terminals. This included in 1921 the work on the Claremont Terminal in New York harbor. President Loomis gives these details: "The first unit of this development, which will be ready for service during the year 1922, is a pier more than two-thirds of a mile long, with 35 ft. of water alongside, at which the largest ship afloat can be berthed. Its facilities include a two-story warehouse with a capacity of 500 cars of freight, an open dock served by a 50-ton traveling gantry crane capable of handling 100 cars of freight a day, and two electrically operated unloaders to handle ore and coal from vessels to cars, with a capacity of 20,000 tons per 24 hours. As increased traffic warrants, two additional piers will be built. When completed in its entirety, the terminal will afford docking facilities of approximately 3½ miles, capable of berthing the largest ocean-going craft."

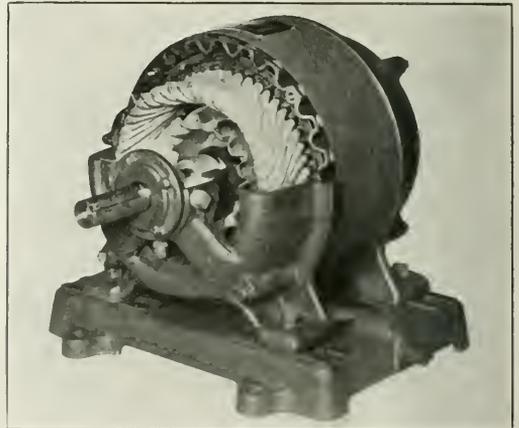
THE NEW YORK CENTRAL'S MOTION PICTURE designed for the elimination of shippers by the proper methods of packing merchandise, is being shown along the line of the Boston & Albany

Polyphase Motor With Unique Ventilating System

A LINE of polyphase induction motors has been brought out recently by the S. A. Woods Machine Company, Boston, Mass., which are so designed as to prevent the accumulation of oil on the motor winding and the resulting collection of dirt. The new Woods semi-enclosed 40-deg. induction motor, as it is known, is so built as to screen the ventilating air before it enters the windings and to direct this air so that it opposes the entrance of oil into the windings from the waste-packed bearings.

While the motors are ventilated or air-cooled, they are virtually enclosed from a mechanical standpoint. Air enters at the periphery of the machine and is discharged at both ends, the direction of the air flow being opposite to that found in most motors. It is claimed that oil leakage caused by careless filling of bearings cannot occasion bad results, because such oil is expelled from the ends of the motor instead of being driven into it.

The motor frame or casing is made from a single piece of corrugated sheet steel. The corrugations are equally spaced and in mechanical contact with the stator core, so that much



Ventilating Air Is Reversed to Keep Oil Out of Windings

of the heat generated in the core and its windings is conducted to the casing, which therefore forms a large surface for the radiation of heat to the ventilating air.

Air entering at any point along the surface of the screen travels over the outside of the corrugations through holes provided at the center of these corrugations, then through the lateral ducts between the casing and core, then over the windings at the end, and finally is discharged at each end of the motor.

Fans are provided at the ends of the rotor for the purpose of drawing the cooling air through the machine. They are of unique design and it is claimed that a stream of air is drawn directly over the bearing housing and immediately expelled without entering the motor, while another stream is drawn through the machine and expelled at the same points. These fans are made of a single piece of sheet steel welded to the thrust collars. Rotor windings are used which have bars and end rings made of one piece of metal, entirely eliminating mechanical or electrical joints, the windings being molded or cast on the magnetic core. The motors are built in sizes up to 30 h.p. at 1,800 r.m.p. for 60-cycle polyphase circuits with corresponding capacities at other standard speeds and frequencies.

Operating and Maintaining Oil Burning Locomotives*

Oil Tanks; Piping; Location of Burners; Drafting; Preventing Air Leaks; Cleaning Soot from Flues; Maintaining Oil Temperatures

THE FIRST ATTEMPT in the United States to burn crude oil in the firebox of a locomotive was made at Santa Paula, California, in October, 1894. The subsequent study of combustion soon led to a better understanding of the firebox and boiler design and realizing the many advantages to be gained by the use of oil as fuel, every effort was made to develop the most efficient burner and drafting arrangement. Most obstacles were overcome and in a comparatively short time a high degree of efficiency was attained.

Crude oil possesses many advantages over other fuels and in the west its use soon became widespread. At no time during the past few years has the production of crude oil in the United States been sufficient to meet requirements, and records for June, 1921, show the consumption of 81,000 barrels per day in excess of production, which deficit was and is being supplied from the Mexican fields.

Daily production, United States, June, 1921.....	1,446,833 bbls.
Imports from Mexico.....	340,175 bbls.
Total.....	1,687,008 bbls.
Daily consumption.....	1,427,367 bbls.
Amount placed in storage daily.....	259,641 bbls.

At the present rate of consumption we are told by geologists that the crude oil supply in the United States will be exhausted within a few years as there now remains but about 60 per cent of the original supply underground. With this prospect in sight it is small wonder that strenuous efforts are being exerted to conserve the remaining supply by maintaining and operating oil burning locomotives as economically as possible. At the present time there are about 41 railroads operating in 21 states which burn oil for fuel, some, however, on a very small part of their power.

The maintenance of the locomotive rests largely with the enginemen. The medium through which the maintenance is accomplished is the work report and its correct rendition. This means that if the locomotive is to perform economically at its maximum capacity specific information must be given to the roundhouse force as to just what defects were noted under actual operation. Maintaining an oil burning locomotive would be a very simple task if a thorough and accurate report of defects noted by engine crews were reported at the end of each trip. "Don't Steam" covers a multitude of sins but the worst sinner of all is the man who writes it on his work report, with no further detail, and then has writer's paralysis.

Generally speaking there are but few points of difference in maintaining an oil burning locomotive as compared with a coal burner and these points of difference affect the design of tender, oil piping and firebox arrangement. The fuel oil tank is constructed of $\frac{3}{8}$ -in. material and the capacity is approximately 3,000 gallons—a coal equivalent of about 17 tons on the basis of 42 gallons per barrel and 4 barrels of oil equal to a ton of coal. On filling the square tank a 2-in. space is left in the top and on semi-cylindrical 6 in., to allow for expansion when the oil is heated. The ratio of expansion is one per cent for each 25 deg. F. increase in temperature. Fuel tanks are provided with a measuring rod designed to show inches on one side and gallons on the other so that accurate measurements may be obtained at all times.

Oil flows to the burner by gravity on all types of locomotives except the Mallet, in the tender of which is used six

pounds air pressure. The oil piping arrangement conveys the oil from the tank to the burner, from which it is sprayed into firebox by steam. This conduit is two inches in diameter and passes through a superheater four inches in diameter which is used, in addition to the tank heater, to heat the oil before it reaches the firebox. The tank heater should be so constructed and maintained as to keep the oil at the proper temperature, the oil feed line should be free from leaks, with as few elbow joints as possible; metal with flexible joints is preferable to rubber. The cut-out or safety valve on the tender, the blow-back valve, superheater and firing valve should all be in perfect working condition. Burner should be of suitable size, varying from one inch to three inches according to size of firebox, clean and lined up about 60 in. from the flash wall to insure perfect combustion. The correct distance from burner to fire pan floor is 6 in. to $9\frac{1}{2}$ in., depending on the draft arrangement, and particular attention should be given to see that the burner is so placed that the oil strikes the flash wall in the center. Care must also be exercised to see that fire pan is free from air leaks with no obstruction on the floor and that all damper controls are in perfect working order.

There are two ways of drafting an oil burning engine; one, the horizontal draft and the other the vertical. Both are in general use on oil burning roads. The arrangement of the brick work on both drafts is practically the same. The horizontal draft, by which air is admitted through the fire door, is the most economical, but in poor water districts, from the standpoint of boiler maintenance, the vertical draft arrangement with the flat door, by which air passes to the rear of the firebox, prevents cold air from reaching the staybolts and thus reduces boiler maintenance. The horizontal draft in good water districts has proved very successful both from the standpoint of maintenance and fuel.

Air openings through the fire pan should vary, depending on the size of the firebox—from 16 sq. in. air admission around the burner and 85 sq. in. at the rear of the firebox, to 225 sq. in. around the burner and 224 sq. in. at the rear. It has been found that the best results are obtained on an oil burning engine with the use of an extension stack extending down to the center line of the boiler, 12 to 16 in. in diameter.

To secure the best results the fire pan should be welded to the mud ring and rigidly secured so as to obviate all possibility of air leaks at sides and front or behind the brick work. Too much attention cannot be given to the maintenance of fire pans on oil burning locomotives.

Front end air leaks and outside steam leaks should not be tolerated. In the roundhouse one man should be assigned to make torch tests and repair all air leaks into the front end and around outside steam pipes. There are many recommended practices for the elimination of air leaks around outside steam pipes. The best one in use is the application of a casing of $\frac{1}{4}$ -in. steel plate with a welded seam. This casing is riveted permanently to the smoke box and then caulked or welded around the edge to make it airtight. It is large enough in diameter to allow removal of the steam pipes without disturbing it. The lower end of the casing is flanged outward and to it is riveted a wrought iron ring. A cast iron flange made in halves is fitted together and bolted snugly around the steam pipe, which is machined true at this point. This flange is secured to the wrought iron ring with eight studs and a copper wire gasket is used between them to

*Abstract of a report presented at the meeting of the Traveling Engineers' Association, at Chicago, September 8, 1921.

obtain an airtight joint. A copper gasket is then caulked into a dovetail groove in the cast iron flange around the steam pipe.

Operation of oil burning locomotives call for the same attention from the engineer as on a coal burner but the fireman has no manual labor to perform in delivering fuel to firebox. But he has to be alert at all times for there is no bank of burning coal to aid him in keeping an even firebox temperature when the engineman is working a light throttle or drifting after having forced the locomotive to its capacity. A supply of clean, gritty sand should be used in the sand box of the locomotive with a sand scoop so the fireman can clean the soot from the flues. Flues should be sanded while running by placing a small quantity of sand in the scoop and by inserting through an opening in the fire door while the engine is working hard, allowing the exhaust to draw the sand through the flues. It is good practice to sand frequently in order to keep the soot removed. It is a non-conductor of heat and causes the steam pressure to drop rapidly. Enginemen should take care to give the valve sufficient travel and open the throttle far enough so that the exhaust will carry sand through the flues and do the work for which it is intended. The sand scoop should be held as far in the fire door as possible in order to prevent sand from falling on brickwork or flash wall.

Firemen should watch the temperature of oil and endeavor to keep it just warm enough to insure an even flow to the burner. This temperature will vary from 100 deg. F. for light California or Texas oil to 180 deg. for heavy Mexican oil. The fireman has direct control of the amount of steam used to heat the oil in the tender and unless he is careful he may not only damage the oil by overheating it so that it loses its lighter gases, but also increase the danger of explosions from the escaping gas. Where excessive steam is turned into the tender there is excessive condensation and unless this water is drained off it will go to the burner and often puts the fire out. Heating the oil in the tender is not for the purpose of aiding in burning it but to cause it to flow in a steady, even stream from the tender to the oil feed line, where it passes through a superheater box before it reaches the burner. The purpose of the superheater is to raise the oil to a temperature at which it will be easily broken up by the atomizer as it goes from the burner tip into the firebox. Since it takes less than one-fifth of a second for a particle of burning oil to travel from the burner tip to the flue sheet, it is of the utmost importance to have oil so atomized that no time is lost in burning it. The use of the blower is to create sufficient draft to keep the firebox clear of smoke and gases and to produce artificial draft. The misuse of the blower causes waste of fuel and damage to the boiler. Very light applications should be indulged in under all conditions. The strong use of blower draws cold air into the firebox, damaging the flues and flue sheets, and causing them to leak.

A slight color of smoke at the stack is better than no smoke at all for a clear stack indicates too great an amount of air. Lesses from too much air are frequently three times as great as from insufficient supply. Firemen should avoid black smoke at all times if possible; it indicates a loss of fuel and should not be tolerated. Black smoke is either the result of faulty firing or the condition of the engine. The firing valve by which the flow of oil to the burner is regulated requires constant attention. Lost motion frequently occurs in this apparatus. Much fuel is wasted when the fireman loses the correct adjustment of this valve because of too much play either in the rods or in the valve itself.

When an engine is worked to full capacity on long grades and has been fired heavily it requires very careful attention to prevent flues from leaking as the small tongue of flame does not fill firebox sufficiently to keep out the cold air. Enginemen cannot be too careful at such times; they should

start gradually to ease off on the throttle, allowing the fireman plenty of time to adjust his firing valve. Injectors should be shut off at once, if only for a short time, and then worked at short intervals. In most cases engines start leaking while descending grades after having been worked hard. Careful team-work between engineer and fireman will prevent black smoke when shutting off or pulling out of stations.

The report was signed by J. N. Clark (Chairman), Sou. Pac. Co.; J. C. Harris, G. H. & S. A.; H. H. Kane Gulf Coast Lines; E. F. Boyle; E. E. Cornish, M. K. & T., and W. G. Tawse, Locomotive Superheater Company.

Discussion

In answer to a number of questions relative to the terminal handling of oil burning locomotives, J. N. Clark (Southern Pacific) stated in closing that from 50 gallons to 175 gallons of oil are required to fire up engines at terminals, requiring from 30 min. to 1 hr. 50 min. before leaving time. A test made with a 2-8-2 type locomotive weighing 207,000 lb. on drivers, was fired up with $\frac{1}{3}$ glass of water at 120 deg. in a total time of 108 min. to 200 lb. gage pressure, with a consumption of 119 gallons of oil. In comparison with 15 per cent to 25 per cent of the fuel consumed at terminals on an eastern coal burning road, the terminal oil consumption was estimated at about 8 per cent of the total fuel.

Mr. Clark referred to a test made under the supervision of the fuel conservation committee of the Southern Pacific in which the fuel consumption per 1,000 ton-miles was measured for a 1,000-ton train hauled by a 2-10-2 type superheated locomotive. At 5 miles an hour the oil consumption was .3 gal.; at 10 miles an hour, 1.1 gal.; at 15 miles an hour, 2.5 gal.; at 20 miles an hour, 4.5 gal.; at 25 miles an hour, 7 gal.; at 30 miles an hour, 10 gal.; at 35 miles an hour, 13.7 gal.; at 40 miles an hour, 18 gal.; at 45 miles an hour, 22.7 gal., and at 50 miles an hour, 28 gal. A test to show stand-by fuel consumption showed that 45 gal. of oil per hour was refined to hold train and run the air pump, while 37 gal. an hour was burned by a light engine standing.

Missouri Pacific Continues to Show Large Savings from Water Treatment

THE CARE with which the Missouri Pacific has compiled records of the economies in operation resulting from water treatment has caused the reports of this road to be watched with interest from year to year. In the report for 1921, which has recently been compiled, it is shown that the 77 treating plants on the system, including ten placed in service last year, treated 1,781,560,000 gal. of water from which 4,916,247 lb. of scaling solids were removed. Using 13 cents as the conservative estimate of the savings per pound of scaling solids removed, there was a total saving of \$613,964, from which should be deducted \$170,575 for the cost of treatment, supervision and depreciation of plants, leaving a net saving of \$443,369, or a return of 143 per cent on the \$309,611 invested in treating facilities.

The total consumption of water on the system during 1921 was 5,948,117,000 gal., of which 5,153,024,000 gal. was used for making steam. Of this latter amount 34.6 per cent was treated. The average cost of treatment in 1921, including operation, supervision and ten per cent depreciation, was 9.8 cents per 1,000 gal. It is estimated that the removal of these solids from the water resulted in a saving of approximately five per cent or 62,000 tons in coal consumption, while the records show that the life of flues and fireboxes has been more than doubled in many districts since treating plants were installed and that delays to traffic from engine failures due to boiler troubles have been reduced from 30 to 60 per cent.

General News Department

Oral Argument on A. B. & A. Valuation

Oral arguments were presented before the Interstate Commerce Commission on May 13 on the motion of the Atlanta, Birmingham & Atlantic to correct and amend the supplemental tentative valuation of its property issued by the commission. W. G. Brantley argued on behalf of the road and C. W. Needham for the commission. Whereas the tentative report assigned as the final value of the used property \$25,630,000, the carrier claimed that it should be not less than \$36,000,000. Hearings were also held before Examiner Marchand on May 15 in the cases of the Norfolk Southern and the Mobile & Ohio.

Government Attempts to Prevent Increased Coal Prices

While the administration has no plan for settling the coal strike, it was announced at the White House on Tuesday that it was interested in preventing undue increases in the price of coal, such as have appeared in some districts. Later Secretary Hoover announced that he would call a conference of coal operators for this purpose in the near future. He has also requested the American Railway Association and the public utilities associations to create buying committees to handle their coal purchases and will also ask other large consuming industries to take similar measures to avoid the danger of buyers bidding against each other.

American Express to Operate on Alaska Railroad

The American Railway Express Company has contracted with the Alaskan Engineering Commission to do express business on the United States Government Railroad in Alaska, beginning on May 15. The length of road operated is 537 miles. Express service has been carried on in Alaska and in the Yukon territory for more than 25 years, the American Railway Express having succeeded to the business of the Wells-Fargo Company in that region. According to the Official Guide the Alaska Railroad operates passenger train twice a week each way, except for one section, of 64 miles, where there are three trains a week. Trains are run only in the day-time, and a passenger traveling by railroad from Seward to Fairbanks must stop over night at Anchorage, at Curry and at McKinley Park.

Messenger Foils Daring Hold-Up

An attempt was made early in the morning of May 15 by eight masked men to rob the westbound Golden State Limited (a C. R. I. & P., E. P. & S. W. and S. P. train) at a lonely spot between Jaynes, Ariz., and Cortaro, on the line of the Southern Pacific about 10 miles west of Tucson. Forcing a tramp who had been riding blind baggage to uncouple the mail and express cars, they forced the engineer to pull the cars about 300 yards ahead and then opened up with their guns.

But Express Messenger Harry Stewart opened the door of his car and shot and killed one of the bandits; and soon after wounded another. The robbers then became scared and took to their waiting automobile and fled. The dead bandit was identified as a rancher resident in the vicinity.

The Pullman Hotels at New Orleans

During the triennial convale of the Knights Templar in New Orleans, La., on April 24-27, the three principal railroads provided sleeping and eating accommodations for visitors by parking Pullman cars in their yards. The Pullman Company reports that 175 cars were run on a per diem basis, and 109 according to berth rate; a total of 284 cars. In the Poydras yard of the Illinois Central, 124 cars were parked and 2,500 guests taken care of. A total of 3,211 meals were served by

this road in its dining cars in this yard. A laundry company with headquarters in warehouse No. 3 (converted into a clubhouse), handled more than 500 bundles of laundry. The road also installed 24 shower baths in this clubhouse.

The Southern Railway, which also parked a number of cars in its yards, lighted its thoroughfare with electric lights of 1,000 watts and erected signs indicating the exact location of all commanderies. Two freight cars were converted into shower bath compartments, one car for men and one for women. The Louisville & Nashville parked 72 cars adjacent to Elysian Fields avenue, between Tonti and Decatur streets, and likewise provided the necessary features for the comfort of its patrons.

Federal Trade Commission Investigates

Proposed Steel Merger

Upon receipt of the resolution adopted by the Senate on May 12, introduced by Senator La Follette, directing the Federal Trade Commission and the attorney general to inform the Senate as soon as possible what steps have been taken or what steps will be taken to ascertain the purposes and probable effects of the proposed merger of seven of the largest iron and steel corporations, the Federal Trade Commission, on May 13, sent a demand in a telegram to the presidents of the Midvale Steel & Ordnance Company, Republic Iron & Steel Company, Lackawanna Steel Company, Inland Steel Company, Youngstown Sheet & Tube Company, Steel & Tube Company of America, Brier Hill Steel Company, and the Bethlehem Steel Corporation, asking them to submit to the Federal Trade Commission full and specific information as to the plan of the proposed merger before the plan is consummated or actual transfers made.

In this connection the commission states that the proposed merger was called formally to its attention on December 27, 1921, and that the matter has been under investigation since that time.

RETURNS OF CLASS I RAILROADS FOR MARCH

	March		Three Months	
	1922	1921	1922	1921
Average miles op.	235,228.61	234,830.99	235,216.17	234,828.18
Revenues:				
Freight	\$352,907,732	\$320,774,338	\$925,329,037	\$930,293,438
Passenger	180,530,876	297,312,871	\$237,846,211	\$291,037,569
Mail	7,737,198	9,701,457	22,102,126	25,838,302
Express	9,359,312	6,983,840	23,180,006	18,883,711
Other transp.	14,232,616	12,905,317	38,314,523	38,073,984
Incidental	8,187,109	10,908,672	24,006,941	30,824,225
Joint facility—Cr...	888,484	659,737	2,277,199	1,972,002
Joint facility—Dr...	173,698	197,906	524,660	593,412
Ry. op. revenues	474,669,629	459,048,326	1,271,531,383	1,336,329,819
Expenses:				
Maint. way	53,239,401	61,599,020	148,483,774	175,756,736
Maint. equip	106,133,335	107,753,561	291,672,815	339,967,214
Traffic	7,176,990	7,346,469	21,141,967	21,736,991
Transp	177,560,910	204,799,420	512,259,655	633,923,834
Misc. operations ..	3,762,709	4,191,282	10,965,046	12,742,551
General	13,522,128	14,913,222	39,708,063	44,264,982
Transp for inv.—Cr.	467,031	491,787	1,312,785	1,447,002
Ry. op. exp...	360,928,442	403,111,187	1,022,918,535	1,226,945,306
Net rev. ry. op. ...	113,741,187	58,937,139	248,612,848	109,384,513
Ry. tax accruals ...	24,522,666	22,134,085	69,704,472	65,519,023
Uncollectible	133,469	81,616	305,680	227,270
Ry. op. income	89,085,052	36,722,038	178,602,696	43,638,220
Eq. rents—Dr. bal.	4,244,630	4,117,505	13,402,222	10,883,334
J. fac. rent—Dr. bal.	1,329,014	1,797,468	4,201,045	5,187,479
Net ry. op. inc.	83,511,408	30,807,065	160,999,429	27,574,407
Pct. of expenses...	76.04	87.16	80.45	91.81

*Includes \$2,577,810, sleeping and parlor car surcharge.

*Includes \$2,873,349, sleeping and parlor car surcharge.

*Includes \$6,949,603, sleeping and parlor car surcharge.

*Includes \$7,634,864, sleeping and parlor car surcharge.

Operating Statistics of Large Steam Roads—Selected Items for the Month of March, 1922,

Region, road and year	Average miles of road operated	Locomotive-miles			Car-miles		Ton-miles (thousands)		Average number of locomotives on line daily				
		Trains	Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross, Excluding locomotive and tender	Net, Revenue and non-revenue	Service-able	Unserviceable	Per cent unserviceable	Stored	
New England Region:													
Boston & Albany.....	1922	391	26,266	257,418	32,573	65.7	403,297	35,473	563	19	21.0	76	21.0
1921	394	245,063	265,024	30,843	4,383	63.2	242,972	98,792	122	28	18.8	..	..
Boston & Maine.....	1922	2,455	582,200	605,115	56,388	12,489	681	657,197	267,146	320	136	29.7	31
1921	2,469	528,993	588,602	56,960	10,607	66.6	584,925	246,886	344	116	25.2	62	34
N. Y., N. H. & H.....	1922	1,969	468,632	416,626	30,700	62.9	615,577	12,435	274	10	2.0	10	2.0
1921	1,959	457,981	427,227	32,812	10,254	66.8	542,974	234,100	298	73	19.7	27	19.7
Great Lakes Region:													
Delaware & Hudson Co.....	1922	887	424,693	569,839	44,404	10,734	60.5	733,644	367,065	281	41	12.8	84
1921	880	471,270	575,418	33,743	8,853	58.6	825,353	3,471	357	35	11.1	9	11.1
Delaware, Lacka. & West'n.....	1922	994	544,534	682,154	138,032	16,638	70.3	901,633	430,175	397	63	17.5	9
1921	995	500,996	615,991	118,608	14,860	67.1	841,751	394,679	333	47	12.4	60	12.4
Erie (inc. Chic. & Erie).....	1922	2,309	988,724	1,132,238	46,513	31,780	64.9	1,917,785	895,249	549	216	28.2	27
1921	2,350	941,628	1,051,137	51,793	17,773	62.1	1,751,765	800,203	563	149	21.0	76	
Lehigh Valley.....	1922	1,316	618,517	686,906	74,417	17,657	64.5	1,072,694	504,534	410	133	24.4	99
1921	1,431	524,728	579,199	52,756	14,000	61.7	870,208	402,144	403	129	24.2	116	
Michigan Central.....	1922	1,837	539,553	552,895	22,224	16,828	66.1	897,606	362,038	316	54	24.0	71
1921	1,829	438,646	455,279	15,753	12,462	62.1	686,993	274,414	329	90	21.4	90	
New York Central.....	1922	8,675	1,848,629	2,193,821	114,155	67,047	69.1	3,996,962	1,738,070	1,056	546	34.1	245
1921	5,655	1,663,015	1,802,905	135,055	53,677	61.6	3,139,363	1,537,675	1,140	498	30.4	355	
N. Y., Chic. & St. L.....	1922	510	347,200	348,418	668	11,596	69.4	584,265	235,741	117	32	21.7	42
1921	510	332,083	332,831	668	9,408	65.3	469,362	198,273	110	58	34.5	33	
Pere Marquette.....	1922	2,151	355,032	369,851	6,845	9,624	66.5	528,249	228,426	159	52	23.8	14
1921	2,207	283,977	291,362	5,506	6,824	62.8	363,630	172,395	171	37	17.9	30	
Pitts & Lake Erie.....	1922	228	120,428	124,398	1,108	4,049	59.5	256,799	166,649	62	13	22.2	7
1921	225	80,635	90,119	608	2,711	61.8	197,748	110,534	67	12	15.0	23	
Wabash.....	1922	2,418	648,545	683,921	8,100	10,260	67.0	952,626	473,520	260	80	25.0	11
1921	2,418	541,633	567,344	5,706	14,983	67.7	808,593	342,016	272	71	20.7	38	
Ohio-Indiana-Allegheny Region:													
Baltimore & Ohio.....	1922	5,235	1,879,642	2,194,382	141,881	48,742	64.8	3,076,364	1,554,597	932	452	32.7	91
1921	5,185	1,606,146	2,002,953	105,653	36,974	59.1	2,126,352	1,131,323	1,013	349	22.8	270	
Central of N. J.....	1922	689	260,815	269,865	4,674	7,458	59.9	476,623	237,341	213	38	15.0	9
1921	679	260,815	268,954	33,206	5,542	57.7	381,721	189,089	214	50	19.0	19	
Chicago & Eastern Ill.....	1922	945	233,466	234,773	3,763	5,684	63.7	345,754	174,596	117	52	30.6	33
1921	1,131	207,215	208,424	3,814	4,065	62.7	276,909	118,559	118	55	31.6	34	
C., C., C. & St. L.....	1922	3,027	713,316	713,611	14,345	20,155	62.7	1,279,828	596,210	200	133	33.0	33
1921	2,396	643,678	680,539	3,591	16,297	57.0	1,065,808	481,924	320	115	26.4	59	
Elgin, Joliet & Eastern.....	1922	459	125,941	140,690	9,792	3,805	65.6	251,917	153,858	39	16	14.9	24
1921	456	103,296	115,410	8,527	2,971	69.1	217,582	120,148	101	10	8.6	28	
Long Island.....	1922	394	47,840	50,553	9,155	6,530	61.3	63,675	36,737	7	7	14.5	7
1921	395	42,891	50,262	8,402	549	63.0	29,766	11,494	35	8	18.8	3	
Pennsylvania System.....	1922	10,882	4,515,323	4,955,119	379,025	118,997	63.7	8,000,792	3,982,471	2,577	747	24.7	515
1921	10,869	3,869,239	4,224,399	304,852	93,646	61.6	6,394,121	3,170,878	2,518	717	22.2	795	
Phila. & Reading.....	1922	1,119	648,259	721,084	82,654	15,980	61.7	1,105,526	542,553	351	77	20.0	11
1921	1,118	491,435	535,427	68,339	11,635	60.5	802,401	417,359	341	87	18.3	101	
Pennsylvanian Region:													
Chesapeake & Ohio.....	1922	2,548	638,665	933,252	22,184	24,653	56.6	1,932,160	1,045,878	439	114	20.7	34
1921	2,543	636,487	694,505	18,411	17,333	56.4	1,301,161	674,950	453	104	19.1	83	
Norfolk & Western.....	1922	2,228	804,834	844,070	24,393	37.8	1,890,140	1,018,607	559	110	15.7	103	
1921	2,210	609,173	736,536	25,204	15,672	55.2	1,192,069	631,195	632	140	18.1	272	
Southern Region:													
Atlantic Coast Line.....	1922	4,924	729,852	743,600	12,364	17,243	62.5	885,852	323,775	281	104	26.8	20
1921	4,858	712,361	734,909	11,877	16,007	62.0	845,896	347,509	302	119	23.8	2	
Central of Georgia.....	1922	1,908	225,083	227,412	2,936	5,236	76.6	257,064	117,768	134	24	17.6	8
1921	1,908	238,928	240,659	2,125	4,816	70.1	255,962	117,930	100	24	19.4	..	
I. C. (inc. Y. & M. V.).....	1922	617	174,816	172,718	35,689	45,273	62.5	2,844,570	1,206,204	751	94	11.1	41
1921	615	159,638	162,604	28,856	37,951	61.1	2,308,662	1,071,841	745	101	12.1	26	
Louisville & Nashville.....	1922	5,021	1,617,696	1,731,265	67,120	28,715	61.4	1,806,623	898,787	582	96	14.4	11
1921	5,026	1,417,797	1,508,970	53,024	33,404	59.7	1,496,141	688,958	543	115	17.5	28	
Seacoast Air Line.....	1922	3,537	477,013	487,499	9,434	10,061	67.4	555,718	217,267	188	75	28.5	..
1921	3,594	473,840	487,678	6,681	9,039	63.7	489,553	188,939	179	83	31.4	..	
Southern Ry.....	1922	6,942	1,346,391	1,374,607	33,681	29,489	69.1	1,532,409	650,525	662	188	27.9	10
1921	6,942	1,182,043	1,203,511	26,754	24,876	68.9	1,284,609	536,772	604	216	19.3	94	
Northwestern Region:													
C. & N. W.....	1922	3,369	1,569,204	1,620,059	16,468	32,335	63.0	1,846,442	759,134	803	228	22.1	28
1921	3,320	1,530,047	1,568,924	18,059	29,051	61.4	1,698,857	657,068	620	331	19.8	4	
C. M. & St. P.....	1922	11,027	1,717,877	1,783,714	75,063	40,335	61.1	2,341,164	1,066,519	891	206	34.7	59
1921	10,618	1,922,355	1,336,167	61,551	29.0	64.1	1,665,022	688,591	17	262	24.3	134	
C., St. P., M. & O.....	1922	17.6	327,146	347,531	13,872	6,298	72.4	377,012	141,110	148	63	29.8	22
1921	17.26	305,561	328,402	12,613	5,552	69.3	298,187	129,335	154	51	24.9	..	
Great Northern.....	1922	8.65	758,797	813,992	30,081	2,532	70.4	1,129,146	235,082	175	184	24.2	176
1921	8,164	684,472	704,962	24,823	17,368	73.8	913,481	443,661	608	170	21.8	20	
M., St. P. & S. Ste. M.....	1922	4,380	485,130	520,389	8,376	11,645	75.5	591,400	244,343	343	61	15.1	28
1921	4,402	460,643	486,517	6,517	8,766	67.6	484,584	236,416	307	60	15.2	53	
Northwestern Pacific.....	1922	6,414	743,951	772,324	49,744	21,416	62.1	1,188,506	549,854	354	136	22.0	26
1921	6,408	672,977	653,548	43,073	17,294	75.0	931,662	436,585	506	160	22.0	17	
Orn. Wash. P. R. & Nav.....	1922	3,166	1,272,791	1,271,026	29,714	4,869	74.7	2,091,912	1,177,113	566	100	22.0	2
1921	2,711	1,838,916	1,497,735	26,235	4,702	76.0	2,585,101	1,458,212	742	42	25.8	9	
Central Western Region:													
Atm., Pop. & Sant. F.....	1922	7											

Compared with March, 1921, for Roads with Annual Operating Revenues above \$5,000,000.

Region, road and year	Average number of freight cars on line daily			Per cent un-service-able	Gross tons per train, excluding locomotive		Net tons per train	Net tons per car loaded	Net ton-miles per car-day	Car-miles per day	Net ton-miles per 1,000 gross tons, including locomotive		Passenger service		
	Home	Foreign	Total		Stored	tender					Net ton-miles per 1,000 gross tons, including locomotive	Train	Passenger-car-miles		
New England Region:															
Boston & Albany	1922	3,353	4,999	8,533	6.0	840	995	392	20.7	377	28.5	8,394	209	305,044	1,957,708
1921	3,525	4,663	8,022	6.6	1,383	991	417	21.5	392	28.5	8,080	208	311,833	2,012,683	
Boston & Maine	1922	14,114	14,653	31,677	7.8	847	1,129	459	21.3	372	18.7	19,911	19	493,254	16,823,669
1921	17,257	14,913	32,170	16.3	3,934	1,106	466	23.2	247	16.0	3,220	162	866,106	4,570,199	
N. Y., N. H. & H.	1922	24,211	16,692	40,903	23.6	743	1,315	559	21.8	207	13.8	41,165	165	999,990	6,123,598
1921	24,495	16,978	41,473	14.4	5,563	1,186	511	22.8	182	11.9	3,854	182	1,096,824	6,695,533	
Great Lakes Region:															
Delaware & Hudson	1922	10,123	6,700	16,823	8.3	245	1,727	864	34.2	704	34.0	13,350	196	192,790	975,147
1921	11,976	5,088	17,064	8.7	1,236	1,624	804	34.2	548	27.3	10,626	201	187,876	974,005	
Delaware, Lackawanna &	1922	15,939	6,693	22,632	11.6	6	1,655	771	25.2	599	33.8	13,635	191	493,539	3,418,033
1921	19,297	7,862	24,078	7.8	893	1,800	788	26.6	529	29.7	15,801	192	493,254	3,522,313	
Western	1922	17,355	12,792	30,647	18.7	27	1,664	671	25.5	381	26.8	6,394	132	554,138	4,879,084
1921	17,892	10,378	28,270	13.7	2,442	1,566	626	22.0	313	22.9	4,839	139	575,571	5,041,239	
Erie (inc. Chic. & Erie)	1922	38,215	17,553	55,768	19.0	5,275	1,940	905	28.2	518	28.3	12,405	154	676,679	4,721,371
1921	35,223	15,996	51,219	16.2	10,809	1,860	850	28.8	584	28.2	11,458	162	674,803	5,078,290	
Lehigh Valley	1922	30,374	9,206	39,580	10.7	3,254	1,742	816	28.6	411	22.3	12,364	169	345,285	2,549,482
1921	32,375	10,318	39,615	11.6	2,725	1,658	766	28.7	327	18.5	9,068	196	362,789	2,718,428	
Michigan Central	1922	19,297	12,792	30,647	18.7	27	1,664	671	25.5	381	26.8	6,394	132	554,138	4,879,084
1921	17,892	10,378	28,270	13.7	2,442	1,566	626	22.0	313	22.9	4,839	139	575,571	5,041,239	
New York Central	1922	80,381	48,235	128,616	19.3	3,350	2,046	892	25.5	436	27.1	9,879	129	2,335,128	17,913,915
1921	84,295	51,960	136,255	5.6	26,513	1,906	816	25.3	321	20.6	7,745	133	2,344,930	17,792,860	
N. Y., Chic. & St. L.	1922	4,305	4,898	9,403	9.7	986	1,022	679	26.3	809	37.3	3,313	114	86,732	497,216
1921	5,857	4,223	10,080	15.3	1,439	1,504	597	21.1	635	46.1	12,356	126	84,094	522,528	
Pere Marquette	1922	10,668	11,051	21,719	14.0	1,000	1,500	642	24.2	339	21.1	3,558	132	252,891	1,242,956
1921	10,418	7,139	17,557	11.3	1,850	1,281	607	25.3	317	19.9	2,320	165	285,656	1,307,882	
Pitts. & Lake Erie	1922	19,817	8,244	28,061	10.4	101	1,465	682	28.2	492	28.2	8,802	83	100,000	559,707
1921	16,377	8,492	24,869	11.6	4,585	2,452	1,375	40.9	144	5.7	15,916	90	111,989	580,887	
Wabash	1922	12,266	10,277	22,543	12.1	596	1,470	649	23.9	602	36.0	5,610	170	500,010	2,873,416
1921	12,857	10,215	23,072	11.0	898	1,493	633	22.9	479	30.9	4,575	171	522,953	2,689,864	
Ohio-Indiana-Allegheny Region:															
Baltimore & Ohio	1922	69,810	34,297	104,107	15.2	7,503	1,637	827	31.9	482	23.3	9,579	189	1,459,990	2,022,852
1921	67,773	30,971	98,744	9.3	5,570	1,497	701	30.5	368	20.4	7,008	197	1,395,295	8,908,047	
Central of N. J.	1922	19,428	8,377	27,805	5.4	6,557	1,591	794	33.2	276	13.9	11,136	177	329,926	1,555,675
1921	18,971	10,001	28,972	23.7	3,965	1,464	725	44.1	211	10.7	8,990	216	324,321	1,489,909	
Chic. & Eastern Ill.	1922	18,743	17,543	36,286	11.2	3,302	1,843	838	37.7	303	11.5	10,801	192	1,200,000	8,222,000
1921	19,970	5,537	19,507	10.2	5,150	1,336	645	28.7	221	12.3	8,319	204	241,426	1,511,010	
C., C., C. & St. L.	1922	15,694	16,960	32,654	13.7	1,027	1,793	837	29.6	589	33.3	8,665	139	682,113	4,215,342
1921	19,055	16,878	35,933	10.3	5,351	1,656	749	29.6	433	25.7	6,088	145	715,300	4,746,157	
Elgin, Joliet & Eastern	1922	13,338	4,898	18,435	9.3	3,818	1,222	638	34.6	346	13.0	11,818	138	1,475,585	2,371,678
1921	10,409	4,615	15,024	5.6	3,508	2,106	1,163	40.4	258	9.2	8,493	148	(1)	(3)	
Long Island	1922	2,341	4,293	6,634	4.4	390	764	301	22.5	70	5.1	11,777	344	192,029	1,034,860
1921	1,795	3,183	4,978	4.2	655	694	268	20.9	74	5.6	9,940	149	176,765	1,024,482	
Pennsylvania System	1922	212,253	70,562	282,815	13.2	31,593	1,773	813	25.3	454	24.3	11,800	147	4,940,645	32,668,777
1921	206,566	70,562	277,128	9.5	37,438	1,652	820	33.9	368	17.7	9.9	129	151	4,940,645	32,668,777
Phila. & Reading	1922	23,282	14,717	37,999	9.4	1,309	1,705	899	36.5	495	22.0	16,788	181	489,848	2,186,922
1921	27,103	12,898	40,001	9.9	6,448	1,633	849	35.9	336	15.5	12,034	204	531,241	2,395,794	
Poconos Region:															
Chesapeake & Ohio	1922	36,338	12,902	49,240	14.4	772	2,309	1,250	42.4	685	28.5	13,238	137	446,880	2,414,302
1921	37,437	11,697	49,134	7.3	11,448	2,039	1,057	38.8	443	20.2	8,564	144	447,039	2,463,185	
Norfolk & Western	1922	30,771	6,785	38,456	5.1	1,563	2,186	1,173	41.7	851	35.2	14,686	174	390,810	2,349,528
1921	38,351	6,440	45,091	7.0	13,859	1,957	1,036	40.3	452	18.9	9,213	180	391,116	2,418,188	
Southern Region:															
Atlantic Coast Line	1922	22,552	11,477	34,029	13.2	1,214	444	18.8	307	26.1	2,121	124	879,110	6,445,815
1921	21,814	12,232	34,046	13.7	.....	1,155	443	19.8	301	24.4	2,097	149	909,386	6,572,908
Central of Georgia	1922	4,037	4,299	8,261	14.0	1,142	523	22.2	460	36.9	1,991	150	325,619	1,730,750
1921	4,544	4,120	8,664	9.9	.....	1,071	494	24.5	439	25.6	1,994	168	325,258	1,637,596
I. C. (Inc. Y. & M. V.)	1922	43,164	21,238	64,402	8.0	7,598	1,653	738	28.0	634	36.3	6,656	152	1,472,422	8,993,298
1921	45,085	17,949	63,034	6.6	10,943	1,505	673	28.2	549	30.8	5,621	153	1,472,422	8,993,298	
Louisville & Nashville	1922	37,430	14,810	52,240	11.0	74	1,150	586	31.3	555	28.9	5,774	185	1,030,175	5,966,361
1921	38,415	15,750	54,165	19.5	111	1,055	454	31.3	419	29.4	4,862	182	964,202	5,334,038	
Seaboard Air Line	1922	13,894	11,437	25,331	29.7	1,165	456	20.4	288	21.0	9,838	163	657,691	3,771,691
1921	11,005	9,133	20,138	16.9	.....	1,099	422	20.8	301	22.7	1,715	187	627,931	3,864,076
Southern Ry.	1922	38,745	20,236	58,981	16.5	1,136	483	22.1	356	23.3	3,023	205	1,314,776	7,417,170
1921	35,875	22,609	61,484	8.2	7,440	1,087	454	21.6	282	19.0	2,494	215	1,390,653	8,481,133	
Northwestern Region:															
C. & N. W.	1922	45,362	26,216	71,575	7.6	4,200	1,176	484	23.4	342	23.2	2,926	191	1,596,290	9,955,516
1921	47,748	25,480	73,227	7.5	5,000	1,110	429	22.6	289	20.9	2,548	202	1,689,715	10,020,020	
C., M. & St. P.	1922	49,340	27,538	76,878	15.2	1,360	619	26.4	448	26.8	3,120	180	1,486,610	8,720,845
1921	49,406	18,437	67,843	9.8	4,877	1,243	563	23.2	423	23.2	2,486	187	1,477,880	8,827,921	
C., St. P. & M. & O.	1922	3,582	10,852	14,434	14.2	627	1,								

Railroad Officers Before House Committee

Howard Elliott, chairman of the Northern Pacific, was the first witness on behalf of the railroads at Washington on May 16 at the hearing before the House committee on interstate and foreign commerce on the Hoch and Sweet bills which, like the Capper bill in the Senate, propose to amend the transportation act to restore the powers of the state railroad commissions, whose representatives had previously appeared in support of the bill. Mr. Elliott urged the importance of dealing with the railroads as a national system and pointed out that the Interstate Commerce Commission and the state commissions have recently adopted a plan of co-operation in cases of conflicting jurisdiction.

The committee had postponed consideration of the mileage book bill for two weeks in the hope that the Interstate Commerce Commission would issue its rate decision. Before taking up the Hoch and Sweet bills there was an argument among the members of the committee on a motion to postpone consideration of the mileage book, subject to the call of the chairman. It was finally decided to postpone the discussion until Wednesday.

The hearing in the general railroad investigation before the Senate committee, at which L. F. Loree and R. S. Lovett were to appear on Thursday and Friday, has been postponed because Chairman Cummins has gone to Hot Springs for his health.

Safety at Highway Crossings

Using cards furnished by the railroads of the State, the Department of Highways of Tennessee has this year sent out with each automobile license a warning notice designed to inculcate the habit of caution at railroad crossings. The warning, copied below, is on a tag, 2½ in. by 5 in., which is provided with a string, like a tag for a bag, enabling the recipient to conveniently fasten it in front of his seat in the automobile.

It appears that a law requiring automobiles to be stopped before crossing a track has been on the statute book in Tennessee since March 12, 1917, and this law is printed on the back side of this tag. It prescribes a penalty of from \$1 to \$10 for violation. Unlike the Virginia law, recently noticed, this Act applies only to motor vehicles, but it applies to all railroad tracks except at crossings where a watchman is in attendance.

So far as can be learned, this statute has been little more than a dead letter; this action in 1922 full five years since the law was passed, appears to have been the first important step that has been taken looking to its observance.

AUTO DRIVERS

In the interest of human safety and in the prevention of needless waste of human lives and the unnecessary destruction of property, you are earnestly urged to be in your guard at all times and under all circumstances, when approaching railroad crossings at grade. The toll of human lives and bodily injuries on account of careless and inattentive drivers of automobiles, is alarming. Through the momentary pause when your attention is distracted or when you take a glance

Printed and Sold by the State of Tennessee
Department of Highways, State of Tennessee
PLACE THIS TAG IN FRONT OF YOUR CAR WHERE IT WILL BE SEEN

Actions looking to greater safety at crossings has been taken in the State of Pennsylvania and New York, the Public Service Commission have issued orders requiring common carriers by automobiles to establish rules requiring a stop before passing over a railroad. In Pennsylvania the rule applies to "carriers of passengers or property," and the stop is to be made within 75 ft. The driver must look carefully in each direction. The order does not apply to electric street railways within cities and boroughs. In New York the order may be considered by the Commission as a condition precedent for receiving the certificate of public convenience and order which the automobile is operated.

The New York order issued on April 13 is of similar intent, but may be construed to be made in less than 20 ft. and not more than 70 ft. from the crossing. In both of these States the operation of automobiles at railroad crossings is lawful only after authorization by the Public Service Commission of a certificate of public convenience and order.

Traffic News

The St. Louis-San Francisco and the Chicago, Rock Island & Pacific will on May 27 put on through sleeping cars between Memphis, Tenn., and Denver, Colo.

Associated Traffic Clubs of America

This is the name of an organization formed at Chicago on May 17, by 50 delegates representing 35 of the principal traffic clubs of the country. The following officers were elected for the ensuing year: President, W. J. L. Banham, general traffic manager, Otis Elevator Company, New York City; first vice-president, S. S. Butler, freight traffic manager, St. Louis-San Francisco; second vice-president, T. T. Webster, general traffic manager, of G. H. Mead Company, Dayton, Ohio; third vice-president, George S. Harlan, assistant general freight agent, Baltimore & Ohio; fourth vice-president, R. H. Schultz, traffic manager, San Antonio, Uvalde & Gulf; secretary, B. L. Birkholz, general agent El Paso & Southwestern, New York City. Four directors were elected to serve for one year, the same number for two years and likewise for three years.

From communications received it was stated at this meeting that a large majority of the city traffic clubs have signified their willingness to become members of the national organization.

Coal Production

Production of soft coal increased at the beginning of the sixth week of the strike (May 8-13), according to the weekly bulletin of the Geological Survey, probably to about 4½ million tons. Production of anthracite, however, remains practically zero.

The revised figures for the fifth week (May 1-6) show 4,161,000 tons of bituminous coal, and 6,000 tons of anthracite, or some 3,000,000 tons a week (both kinds) short of the 1919 experience. The table of cars loaded shows:

	First week	Third week	Fifth week	Sixth week
Monday	11,445	7,598	11,598	13,045
Tuesday	11,019	10,041	12,164	13,260
Wednesday	11,437	11,488	12,861	13,384
Thursday	11,090	11,193	12,487	13,234
Friday	11,296	11,596	12,776	
Saturday	8,888	10,194	11,275	

The increase has been general in those districts not affected by the strike. It is especially marked in the Southern and Middle Appalachians and in Western Kentucky. It is due less to resumption of work at mines hitherto closed by the strike than to an increase of activity caused by quickening demand in these fields not affected by the strike order.

Preliminary estimates place the total output of soft coal in April at 15,780,000 tons, much below that of any April in recent years. In fact, the output for the month fell some 3,000,000 tons short of that in November, 1919, when, as now, a general strike of bituminous miners was in progress.

Heavy Shipments of Automobiles

The National Automobile Chamber of Commerce reports very heavy shipments of automobiles for the first four months of this year, compared with last year. Its totals are as follows:

	TOTAL AUTOMOBILES SHIPPED BY MANUFACTURERS			
	City	Driveways	Heat	
1922	132,577	17,911	19,111	171,600
1921	15,457	6,485	7,479	29,421
1920	17,616	9,098	10,173	36,887
March	77,380	16,381	16,766	110,527
April	66,880	16,187	22,258	105,325

* Figures estimated.

On this basis it is estimated that 213,000 passenger cars and trucks were produced by all makers in April. This would be an increase of 35 per cent over April, 1921, and 24 per cent over March, 1922. The heaviest shipping previously recorded was in March, 1920, when 29,326 carloads and 57,273 driveways

and boat shipments were made, and approximately 220,000 cars and trucks produced. Thus April appears to have set a record for rail shipping, due to more adequate car supply, and it is second in number of machines produced in one month.

Calling attention to these figures the Car Service Division of the American Railway Association, in a circular addressed to the railroad, says that in order that continued heavy production at automotive plants may be fully supplied with rail transportation it is highly important that:

- (1) Automobile cars be moved promptly, loaded or empty, to owners or nearest automotive producing territory.
- (2) Cars be not loaded with freight which takes them out of route.
- (3) Automobile cars be not loaded with cement, lime, plaster or other freight that leaves a residue of dust in the car. Many hundreds of automobile cars have been rejected at automobile plants because of dust.
- (4) Owners give special attention to the repair of automobile cars.

Increase in Parcel Post Rates Foreshadowed

The necessity for an increase in the rates for parcel post is indicated in a letter written by Postmaster General Work to the Interstate Commerce Commission, stating that the department is proceeding in conjunction with the joint commission on postal service to secure the necessary data and to make an estimate as to the revenue derived from the several classes of mail matter, the cost of carrying and handling them, and the profit or loss per pound. When these results are known the postmaster general proposes to present them to the commission so far as parcel post matter is concerned with appropriate recommendation for changes in rates of postage, as contemplated by the act of 1912. The law establishing the parcel post system was passed in 1912 and provided rates based in a measure upon the estimated cost of carrying and handling such matter in the mails. These rates, the letter says, were based upon estimated cost of transporting and handling fourth class mail matter under conditions existing during 1908-1911. As most of the expenses for conducting the postal service are common to all classes of mail matter estimates for individual classes must be based upon apportionments of such common expenses; and these largely upon the relative weights of the several classes.

In 1907 fourth class matter was 4.79 per cent (estimated) of the total weight of all mail matter. It is estimated that at present fourth class, or parcel post matter, is approximately 60 per cent of the weight of the entire mails.

Not only have conditions changed, the rates per unit of service for railroad transportation and for all other transportation and the salaries of the postal employees in the field, including those in the post offices, the railway mail service, and the rural delivery service, have all been greatly increased in recent years and since the inauguration of the parcel post system under the rates above mentioned.

In the case of the pay for railroad mail transportation, the Interstate Commerce Commission's order of 1919 increased those rates approximately 60 per cent. The salary legislation of Congress, including the acts passed during the war-period and the reclassification act, increased salaries very materially. As the revenues received from parcel post matter are produced by rates fixed by the act of 1912, then estimated to be little more than sufficient to cover the cost of performing the service, it is obvious that the revenue now received on such matter must be far below the actual and apportioned cost for that service under the conditions now existing.

THE 1,540 PASSENGER TRAINS that were run by the Monongahela division of the Pennsylvania Railroad in the seventeen days ending with Thursday, May 4, made their running time, without exception. In the month of April, altogether, this record was made on 21 days; and on 13 days all trains arrived at destination on time. This record is considered so fine that the superintendent has issued a special bulletin congratulating the employees who made it. The principal lines of the Monongahela division are those from Pittsburgh to West Brownsville, Pa., 54 miles, with 14 regular passenger trains southbound, and 10 northbound; and the Southwest Branch, 60 miles long, with five trains southbound and four northbound.

Foreign Railway News

South African Railway Employees

Help to Suppress Revolt

The recent Rand mine strike in South Africa which became a small revolution was suppressed largely through the efforts of the South African Railways and Harbors Brigade, a military organization of employees of the South African Railways. This body was recently publicly thanked for the part it played in restoring law and order by the prime minister, General Jan C. Smuts.

"Windfall for Egyptian Railways"

Under the above heading the Times (London) Trade Supplement publishes a dispatch from Cairo to the effect that the Egyptian State Railways, which are badly in need of money for maintenance and improvements, have received a check from the British government for 900,000 Egyptian pounds (approximately \$4,500,000 at the normal rate of exchange) on account of the part played by this railway in transporting soldiers and supplies during the war. The Times expects this check to result in increased orders for railway equipment and supplies.

Revival of Mexican Railway Project

Plans for building a railroad from Agua Prieta, Sonora, along the northern boundary of Mexico to Guzman, Chihuahua—a distance of 180 miles—have been revived by influential Mexicans, according to Consul F. J. Dyer, Nogales, Mexico. The estimated cost is about \$3,250,000, and it is thought that the line can be completed in one year of actual construction work. It is understood that the Mexican government desires to have the road built and may offer a substantial subsidy for its completion. American railway builders will probably take the contract.

British Railways in Argentina Have Bad Year

Labor troubles and a decline in traffic resulting from the worldwide business depression combined to keep the British railways in Argentina from making a particularly good showing during the fiscal year ended June 30, 1921, according to the Railway Gazette (London).

Gross receipts of the more important lines were as follows:

Buenos Aires Great Southern.....	£8,733,000
Buenos Aires Western.....	4,145,000
Buenos Aires & Pacific.....	6,854,000
Central Argentine.....	9,747,000
Cordoba Central.....	1,180,000

Gross receipts of all these companies were considerably under those of the previous year. Operating ratios compared with the previous year were:

	1920-21	1919-20
Buenos Aires Great Southern.....	84.33	69.19
Buenos Aires Western.....	90.88	69.49
Buenos Aires Pacific.....	85.68	69.66
Central Argentine.....	79.82	67.61
Cordoba Central.....	89.62	78.06
Entre Rios.....	89.38	80.03

Passenger traffic increased considerably in spite of the falling off in freight business.

To Build New Line in Mexico

Through the financial aid of the government of the state of Durango the Compania del Ferrocarril del Rosario y El Oro will build a railroad which will connect the Durango-Tepehuanes branch of the National Railways of Mexico and the Parral & Durango Railroad. The proposed line will be 60 miles long. Its importance lies in the fact that it will traverse one of the richest mineral and heaviest timbered regions of Mexico; also that it will afford a new and direct rail route between Parral and Durango. The branch line which runs from Durango to Tepehuanes is 136 miles long. The Parral & Durango Railroad has a length of 68 miles. It is asserted that there has been an urgent need for this proposed railroad for many years. Several years ago a

syndicate of mine owners along the route of the line offered a bonus of \$150,000 in aid of the project. The concession for building the road has been held by two or more persons at different times but through failure to finance its building the concessions were forfeited. It is stated that several thousand laborers will be employed in the grading and other work connected with the project. The headquarters of the company that has been formed to build the line are at Durango.

Large Expenditures by Indian Railways

An expenditure of \$85,000,000 annually for five years was recently recommended by the Indian railway finance committee as a minimum requirement. The estimate calls for 437 locomotives during each of the five years and 62,000 passenger and freight cars over the entire period, according to Consul North Winship, Bombay.

The shortage of cars has checked the coal mining and other industries, and it is proposed to double track many lines, strengthen bridges, remodel yards, and generally make the system equal to the needs of the country's growing traffic.

Danzig Railway Repair Shops and Shipyards to Be Internationalized

The "Danziger Werit" which engages in shipbuilding and car repairing was formerly the property of the German government. Since the war the city government of Danzig has been conducting the enterprise but it is now proposed to turn it over to private capital to be subscribed in several countries, according to Commerce Reports. About 5,000 men are at present employed in the works.

It is proposed to have the railway shops and the shipyards taken over by separate companies, each with a capital of 20 million German paper marks; the stock is to be taken by four groups, the first being the Société des Betignolles, Paris; the second, Cravens & Company, Ltd., Sheffield, England; the third, a group of eight Warsaw banks; and the fourth, not yet formed, a group of Danzig banks and capitalists. Danzig and Polish interests are each to have 20 per cent of the capital stock in each of the companies; in the shipyards company the English group is to have 60 per cent; and the French company is to have 60 per cent of the railway shop stock.

The title to the property, grounds, buildings and equipment is to rest in common with Danzig and Poland. Both states shall, however, be obligated to leave operation of the plants to the companies for a minimum of 45 years and a maximum of 60 years. In order not to displace the majority relationship through the participation of the various groups the shares are to be "blocked."

Both companies shall maintain, under one director general, a community of interest in operations, credits, and profits. The operating community shall consist of a uniform system of book-keeping, inventory, and balance; valuation of materials when transferred from one plant to the other; exchange of information and patents; placing of building and equipment at disposal; and exchange of personnel. The credit community is based on a bond issue of £300,000, which the English and French participants in the scheme have agreed to underwrite, the bonds to be secured by a mortgage on the buildings and lands of the company.

The profits go first to the establishment of the legal reserve fund, next to the amounts necessary for interest and amortization of the loan; then to the funds for depreciation and replacements. In case a loss instead of a profit is shown by either of the companies a special common reserve fund must then be created to cover possible losses in the future. Any profits remaining after the above charges have been covered are then divided equally between the two companies which are authorized to dispose of their respective shares of these profits according to the following schedule: the stockholders are to be paid a 10 per cent dividend; 40 per cent of the remainder is paid to the owners, Danzig and Poland; in lieu of rent, each country receiving half.

The entire plan is subject to the final action of the distribution committee of the Council of Ambassadors, which action must be approved by the Council itself.

The contracts in hand and the business in sight apparently give the new companies good prospects for earnings, and it seems likely that they will be profitable from the start.

Equipment and Supplies

Locomotives

THE CHICAGO & EASTERN ILLINOIS expects to send out inquiries this week for six Pacific type locomotives.

RICHMOND, FREDERICKSBURG & POTOMAC is having repairs made to 8 locomotives at the shops of the American Locomotive Company, Richmond, Va.

THE ERIE has ordered 15 Decapod locomotives from the United States Government. These are part of the locomotives originally built for the Russian government.

PICKANDS MATHER & Co., Cleveland, Ohio, has ordered five 0-6-0 type locomotives from the Lima Locomotive Works, Inc. These locomotives will have 21 in. by 26 in. cylinders; 51 in. driving wheels and a total weight in working order of 160,000 lb.

THE WESTERN MARYLAND is having repairs made at the shops of the Baldwin Locomotive Works to about 20 locomotives, including Pacific, Mallet and Consolidation types and is having 8 locomotives repaired at the shops of the American Locomotive Company, Richmond, Va.

THE SIAM STATE RAILWAYS will receive bids until 2 p. m., September 15 at Bangkok, Siam, for the supply of locomotives and tenders. General Purachatra is commissioner-general, Department of State Railways, Bangkok. Specifications and drawings may be obtained from C. P. Sandberg, 143 Liberty street, New York City.

Freight Cars

THE GRAND TRUNK is inquiring for 250 refrigerator cars.

THE GREAT NORTHERN contemplates buying some additional refrigerator cars.

THE CHILE EXPLORATION COMPANY, New York City, is inquiring for 50, 70-ton ore cars.

THE WABASH will accept bids until May 22 for repairs to 500, 40-ft. box cars and 200, 36-ft box cars.

THE COWLITZ, CHEHALIS & CASCADE has ordered 10 logging cars from the Pacific Car & Foundry Company.

THE MIDLAND TERMINAL RAILWAY COMPANY is inquiring for from 15 to 20 side dump cars of 70 tons' capacity.

THE SAN DIEGO & ARIZONA is inquiring for 10 all-steel, drop-bottom gondolas, 10 all-steel, tight bottom gondolas and 4 steel-underframe stock cars.

THE KANSAS, OKLAHOMA & GULF contemplates buying 100 composite gondola car bodies, 150 composite flat bottom gondola cars and 250 general service gondola cars.

THE AMERICAN REFRIGERATOR TRNSIT COMPANY, noted in the *Railway Age* of April 8 as inquiring for 2,000 refrigerator cars, has ordered this equipment from the American Car & Foundry Co.

THE SOUTHERN has ordered 500, 40-ton automobile box cars from the Standard Steel Car Company and 250 caboose cars from the Lenoir Car Works. This is in addition to the 5,300 cars ordered by this company and reported in the *Railway Age* of May 13.

THE MISSOURI, KANSAS & TEXAS, noted in the *Railway Age* of April 22 as inquiring for 300 flat cars of 40 tons capacity and in the issue of May 13 as inquiring for 1,500 box cars, has ordered the former from the General American Car Company and the latter from the American Car & Foundry Company. The same company also ordered 500 automobile cars from the Mt. Vernon Car Manufacturing Company.

Passenger Cars

THE AURORA, ELGIN & CHICAGO has reopened an inquiry for 20 passenger cars.

THE SAN DIEGO & ARIZONA is inquiring for one combination passenger and baggage car.

THE BOSTON ELEVATED, reported in the *Railway Age* of April 1 as inquiring for 100 cars, has ordered this equipment from the J. G. Brill Company.

THE INTERBORO RAPID TRANSIT COMPANY, reported in the *Railway Age* of May 6 as about to place inquiries for new cars, is now inquiring for 100 cars.

THE COWLITZ, CHEHALIS & CASCADE, noted in the *Railway Age* of April 8 as inquiring for a gasoline propelled motor passenger car, 28 ft. 7½ in. in length, with seating capacity for 41 people and a compartment for baggage, has ordered this equipment from the Skagit Steel & Iron Works of Sedro-Woolley, Wash., the chassis to be furnished by the White Motor Car Company.

THE SOUTHERN RAILWAY was reported in the *Railway Age* of May 13 as having placed orders for 75 cars with the Pullman Company and 25 cars with the American Car & Foundry Company. These include 40 steel passenger coaches, 10 steel combination passenger and baggage cars and 25 steel baggage express cars to be built by the Pullman Company and 25 steel postal cars to be built by the American Car & Foundry Company.

Iron and Steel

THE MOBILE & OHIO has ordered 40,000 pairs of angle bars from the Illinois Steel Company.

THE MISSOURI, KANSAS & TEXAS will accept bids until May 20 for 200, 40-ft. steel underframes for refrigerator cars.

THE SOUTH MANCHURIAN RAILWAY is inquiring through export houses in New York City for 88 boiler and fire-box plates.

THE ILLINOIS CENTRAL has ordered 150 tons of reinforcing bars for grade reduction work at Matteson, Ill., from the Corrugated Bar Company.

THE ALASKAN ENGINEERING COMMISSION has awarded a contract to the United States Steel Products Company for 2,700 tons of steel for the Tenana River bridge.

THE MISSOURI PACIFIC has ordered 26 water tanks and standpipes, involving 700 tons of plates and 300 tons of structural shapes, from the Pittsburg-Des Moines Steel Company.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon, May 24, at Roanoke, Va., for its requirements of locomotive steel tires July to December, 1922; requirements of wire fencing from May 24, to December 31, 1922; for 400 cast steel truck side frames; also for 200 cast steel side frames.

Track Specialties

THE ATLANTIC COAST LINE is inquiring for 3,000 tons of tie plates.

THE WABASH is inquiring for 500 to 1,000 kegs of spikes and bolts.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will accept bids for 3,250 kegs of track bolts until May 23.

THE MISSOURI, KANSAS & TEXAS has placed an order for 4,000 kegs of spikes and bolts with the Illinois Steel Company.

THE ERIE has divided an order for 6,000 kegs of railroad spikes between the Jones & Laughlin Steel Company, Pittsburgh, Pa., and another company.

THE PENNSYLVANIA has divided an order for 2,000 kegs of railroad spikes between the Jones & Laughlin Steel Company and Dilworth, Porter & Co., Pittsburgh, Pa. The company also ordered 70,000 track bolts from the Oliver Iron & Steel Co., Pittsburgh.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS, noted in the *Railway Age* of April 22 as inquiring for 198,000 tie plates, has ordered 148,000 from the Inland Steel Company and 50,000 from the Railroad Supply Company.

Machinery and Tools

THE NORFOLK & WESTERN is inquiring for tools for its rail reclaiming plant at Roanoke, Va., including a 6-spindle upright drill; 2 rail drills; a draw cut shaper and a rail bender.

THE CUBA RAILROAD, reported in the *Railway Age* of May 13 as inquiring for machine tools for its new shops at Camaguey, Cuba, has ordered a number of heavy machine tools for use in these shops.

THE WESTERN MARYLAND, reported in the *Railway Age* of May 13 as inquiring for a number of machine tools, has placed orders for the following machines: 36 in. and 48 in. lathes; 6 in. pipe threading machine; 2 in. bolt cutting machine; two 28-in. vertical drilling machines; 5 ft. radial drill; 84 in. boring and turning mill; 36 in. and 42 in. planers; 6 in. car hack saw; 300-ton wheel press and a bushing press.

Miscellaneous

THE ATCHISON, TOPEKA & SANTA FE, it is reported, is in the market for a large quantity of fuel oil.

THE MICHIGAN CENTRAL will accept bids until July 1 for sheets, bars, shapes and plates, billets, springs, axles, tubes, crank pins and piston rods, steel rope and various types of wire.

THE ST. LOUIS-SAN FRANCISCO has contracted with Cosden & Company, the Indianola Refining Company, the Producers & Refiners Corporation and the Empire Refiners for supplying 100,000 barrels of fuel oil monthly.

THE WABASH, noted in the *Railway Age* of April 22 as inquiring for 300, 36-in. wheels for passenger coaches, has divided an order for this equipment between the Illinois Steel Company and the Edgewater Steel Company.

THE NEW YORK CENTRAL LINES will receive bids until 12 o'clock noon, May 24, for the requirements of these lines for one year, commencing June 1, 1922, of incandescent lamp bulbs, aggregating \$300,000 or more in net value.

Signaling

THE CHICAGO UNION STATION has awarded a contract to the Union Switch & Signal Company for two interlocking plants and complete signal equipment. See item under Railway Construction News.

THE CHICAGO, BURLINGTON & QUINCY is installing automatic signals on 55 miles of line between Napier, Mo., and Pawnee, Nebr., and has ordered the equipment for this work from the Federal Signal Company, Albany, N. Y.

AUTOMOBILE TRUCKING SERVICE, in cities, can be done with electric cars more efficiently than with either gasoline cars or horse-drawn vehicles. This was the declaration of Robert E. M. Cowie, vice-president of the American Railway Express Company, addressing the convention of the National Electric Light Association at Atlantic City, N. J., on May 15. He says that the electric vehicle has not been used much for long distances but is showing the gas car out into that service and reserving for itself the "infield." His company recently took fifty gas cars out of one city and replaced them with fifty electric. It uses large numbers of all three types of transportation. The American Railway Express Company is the largest user of electric trucks in the world; of which 123 have been purchased this year. There has not been a year since 1911 in which some electric were not purchased. The company now operates 1,194 electric street trucks and 250 electric industrial trucks. Mr. Cowie regards the express business as the best business barometer in the country, and he believes he can see the upward trend; that the period of stagnation has passed.

Supply Trade News

The **Foamite Firefoam Company** has removed its office from 200 Fifth avenue to 151 Fifth avenue, New York City.

The **McClellan Products Company**, Chicago, has recently been organized to handle the McClellan refrigerating machine for installation on railroad cars.

W. E. Mathews has joined the sales organization of the **Lima Locomotive Works, Inc.**, Lima, Ohio. He will devote his entire time to the sale of Shay geared locomotives.

I. L. AuWerter, sales representative of the Carnegie Steel Company in the Michigan territory, has been appointed Michigan district sales manager of the **Apollo Steel Company**, with headquarters at Detroit, Mich.

J. Martin Duncan, follow-up engineer of the **Detroit Steel Casting Company**, Detroit, Mich., has been promoted to general sales manager and **E. R. Young** has been appointed follow-up engineer to succeed Mr. Duncan.

E. P. Waller, assistant manager of the railway department of the **General Electric Company**, Schenectady, N. Y., has been appointed manager of the railway department. **J. G. Barry**, who has heretofore held the positions of general sales manager of the company and manager of the railway department, will in the future devote his entire time and attention to the work of the sales managership. Mr. Waller was born in Martinsville, Va., and was graduated from the Virginia Polytechnic Institute in the class of 1900. Following his graduation he entered the testing department of the General Electric Company at its Schenectady Works. After two years in that department he joined the staff of its publication bureau and later served as associate editor of the *General Electric Review*. In the fall of 1903 Mr. Waller took up commercial railway work under Mr. Barry and in 1912 he was appointed assistant manager of the railway department, which position he held at the time of his recent appointment as manager of that department.



E. P. Waller

C. E. Allen, manager of the central station division of the **Westinghouse Electric & Manufacturing Company**, with headquarters at Chicago, has been promoted to manager of the St. Louis, Mo., office, with headquarters in the latter city.

Louis F. Vonier, formerly sales engineer of the **Federal Bridge & Structural Company**, with headquarters at Waukesha, Wis., has been appointed district representative of the **Lyon Metallic Manufacturing Company**, Aurora, Ill., with headquarters at Milwaukee, Wis.

The **Illinois Zinc Company**, Peru, Ill., has opened a sales office in the McCormick building, 332 So. Michigan avenue, Chicago. The company also has sales offices at 280 Broadway, New York City, and 131 Hilbert street, Philadelphia, Pa. The smelters and rolling mills are located at Peru.

Louis W. Siple, formerly sales engineer with the Electric Storage Battery Company, Philadelphia, Pa., has been appointed sales engineer for the **Safety Car Heating & Lighting Company**, New York. Mr. Siple's headquarters are in the Commercial Trust building Philadelphia. He is a graduate of Drexel University, holding degrees in both mechanical

and electrical engineering. While with the Electric Storage Battery Company, his duties included handling the power plant and railway sales.

The **Bucyrus Company**, South Milwaukee, Wis., has under way extensive enlargements to its plants at South Milwaukee and at Evansville, Ind. In the South Milwaukee plant, where all the larger machinery is built, a new gray iron foundry is now under construction, 276 ft. in length. The old gray iron foundry is being converted into a cleaning room with annealing ovens, sand blast rooms and a welding room. A large addition is also being made to the steel foundry molding floor, and an electric furnace is being installed. At the Evansville plant which specializes in the manufacture of small revolving shovels the machine and erecting shops are being considerably enlarged.

Charles A. Coffin, of the **General Electric Company**, Schenectady, N. Y., and the **Thomson-Houston Company**, one of its predecessors, and who for 40 years took an active part in the development of these corporations, resigned as chairman of the board on May 16. Mr. Coffin will continue as a director. **Owen D. Young**, vice-president, succeeds Mr. Coffin as chairman, and **Gerard Swope**, president of the International General Electric Company, an affiliated organization, has been elected president. **Anson W. Burchard**, a vice-president of the company, has been elected vice-chairman of the board. The title of honorary chairman has been created for **E. W. Rice, Jr.**, who was president for eight years. The board was increased by the election of **J. R. Lovejoy** and **George F. Morrison**, both long associated with the company as vice-presidents.

Bethlehem Steel Corporation's Purchase of Lackawanna Steel Company

President Grace announced after the meeting of the board of directors of the Bethlehem Steel Corporation on May 16 that the directors had unanimously approved all terms and conditions agreed to in respect to the purchase of the properties and assets of the Lackawanna Steel Company, and took the necessary steps for placing the matter before the stockholders for their consideration.

The purchase price agreed to be paid by Bethlehem is an aggregate par amount of its seven per cent preferred stock and class B common stock equal to the par amount of the stock of Lackawanna outstanding (\$35,108,500), consisting of 40 per cent in the seven per cent preferred stock and 60 per cent in the class B common stock of Bethlehem, with an option in Bethlehem to reduce the par amount of the preferred stock and increase the par amount of the class B common stock thus to be delivered by \$1,543,400 upon payment of approximately \$300,000 in cash. Bethlehem is also to assume the debts and obligations of the Lackawanna.

The Bethlehem stockholders will be requested to authorize the additional stock required for the consummation of the purchase.

No financing is required as a part of the transaction but consideration is being given to providing the monies for the improvement and extension of the consolidated properties to the extent of from \$15,000,000 to \$25,000,000. Provisions may also be made simultaneously with this financing to provide for the 1923 \$11,000,000 Lackawanna bond maturity.

Without reference to the consummation of any public financing it will be the policy at once to authorize the expenditure of \$10,000,000 mainly for approving and developing the Lackawanna property which the present management in Lackawanna recognizes should be done.

Although the transaction takes the form of the outright purchase of the Lackawanna properties, the Bethlehem Company announces that Mr. Taylor and other important interests associated with him in the control of the Lackawanna Company will become closely associated with the direction of the consolidated properties and it is expected that they will be liberally represented on the Bethlehem board.

A fine of \$250 was imposed on the proprietor of a shoe shop, at Freeport, Long Island, N. Y., on May 13, for unlawfully renting a commutation ticket of the Long Island Railroad. This is the first conviction secured by the railroad company in its efforts to prevent violations of this new New York law.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was reported in the *Railway Age* of March 11 as contemplating the construction of a new power plant at San Bernardino, California, has authorized the erection of an 80 ft. by 100 ft. structure and has authorized the construction of 75 miles of second track between Yampai, Ariz., and Griffith, reported as contemplated in the *Railway Age* of February 11. The company has also applied to the Interstate Commerce Commission for authority to build a 12-mile line from El Segundo, on the Redondo Branch of the Los Angeles division, to Los Angeles Harbor.

BALTIMORE & OHIO.—During the opening week of May, this company placed contracts for two important pieces of bridgework. One of these involves the structure carrying the tracks of the railroad across East Maiden street, Washington, Penna. This bridge consists of three plate girder spans, with solid floor, total weight of steel about 90 tons. Contract covering the erection, concreting and waterproofing of the new structure was placed with the Seaboard Construction Company, Philadelphia. This railroad has also placed an order with the McClintic-Marshall Company for the fabrication of superstructure steel work for four plate-girder bridges to be installed on its Parkersburg branch, Monongah division, between Grafton and Parkersburg, W. Va. The new structures consist of plate girder spans, ranging in length from 64 to 112 ft., total weight of steel involved about 350 tons. Delivery will be made during July, and the replacement of these structures will be pushed to completion during the present working season.

CHICAGO & NORTH WESTERN.—This company is accepting bids for a 100-ton steel coaling station at Manitowoc, Wisconsin.

CHICAGO, BURLINGTON & QUINCY.—This company, which was reported in the *Railway Age* of April 15 as having closed bids for the construction of a 20 ft. by 60 ft. frame passenger station at Pattensburg, Mo., has awarded the contract for this work to G. A. Johnson, Chicago.

CHICAGO UNION STATION.—This company is calling for bids for the widening of Canal street between Madison and Washington streets, a distance of about 600 ft. It will also call for bids in the near future for the excavating of Canal street between Adams and Jackson. It has awarded a contract to the Union Switch & Signal Company for two interlocking plants and complete signal equipment with the exception of wire, which work will cost approximately \$900,000.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company, reported in the *Railway Age* of February 18, as contemplating the construction of approximately 12 miles of second main track from Farmland, Ind., to a point about 2 miles east of Muncie, has awarded the contract for the grading work to the Walsh Construction Company, Davenport, Iowa, and for the concrete bridge and culvert work to the Read Construction Company, Indianapolis, Ind. This company has also under way the replacing of its bridge over the White river on its Evansville, Indianapolis & Terre Haute line, a few miles south of Bloomfield, Ind., with a modern structure consisting of four 100-ft. plate girder spans, a 60-ft. flanking span and 400-ft. of trestle approach, the girders for which have been secured and the masonry work and grading for which are also being done under a contract with the Walsh Construction Company. This company is now securing right of way for and expects to complete the grading and track work this summer by local contract for a 3½-mile cut-off on its Cleveland division between Columbus and Galion, Ohio. It will also replace four steel bridges at various points on its Evansville, Indianapolis & Terre Haute line, other than the White river crossing referred to above.

GREAT NORTHERN.—This company will soon call for bids for the construction of an 84-ft. by 300-ft. frame car repair shed at Minot, N. D. This road has awarded a contract to the National Boiler Washing Company, Chicago, for the construction of a hot water washout and refill system at Wenatchee, Wash., and to

the F. W. Miller Heating Company, Chicago, for a similar system at Minneapolis Junction, Minn.

NORTHERN PACIFIC.—This company has authorized the raising of tracks in Seattle, Wash., incident to improving Ninth avenue south, to cost about \$60,000; the replacing of a timber bridge over Olegua Creek near Winslock, Wash., with deck girder spans to cost approximately \$50,000; the replacing of a timber trestle over Wilson Creek, near Indio, Wash., with two 100-ft. plate girder spans to cost approximately \$41,000; the replacing of a turntable at Livingston, Mont., to cost approximately \$41,000; the construction of an 80-ft. extension to the inbound freight house office at Seattle, Wash., including a new heating plant to cost approximately \$22,000; the replacing of the dry kiln at Brainerd, Wash., with a modern kiln of larger capacity, to cost approximately \$37,000; the construction of a car repair shed at Auburn, Wash., to cost approximately \$20,000; and the placing of riprapping on the Seattle and Tacoma divisions to the amount of approximately \$200,000.

NORTHERN PACIFIC.—This company, which was reported in the *Railway Age* of May 6 as having closed bids for repairs and improvements to dock No. 6, Duluth, Minnesota, has awarded contracts for the work to Barnett & Record and W. N. Hill, Duluth, and to Grant Smith & Company, St. Paul, Minnesota. The company has also awarded a contract to Winston Brothers & Grant, Minneapolis, for the construction of a \$250,000 passenger station and office building at Glendive, Montana.

OKLAHOMA-SOUTHWESTERN.—This company has awarded a contract to the Allhands & Davis Construction Company, Joplin, Mo., for the construction of a 10-mile extension from Nuyaka to Okmulgee, Okla., and contemplates further extensions in the near future. It is expected that the grading for the Nuyaka-Okmulgee extension will begin within the next 30 days.

TEXAS & PANHANDLE.—This company, representing local business interests, has had under consideration for several years and is now about to petition the Interstate Commerce Commission for authority to construct a 300-mile line from Seymour, Tex., in the Wichita Valley, northeasterly to Tucumcari, N. M., on the Chicago, Rock Island & Pacific. The proposed line will cross the Kansas City, Mexico & Orient at about Crowell, also the St. Louis-San Francisco and the Atchison, Topeka & Santa Fe, with the possibility of passing through Farwell, on the latter road. The main shop will probably be located at Turkey, Tex. Preliminary surveys have been made by Wallace & Noonan, Chicago, and local committees are now being organized to enlist the support of land owners along the line. The section to be traversed by the line is now partially developed but considerably removed from transportation facilities.

New York Central to Build Castleton Bridge

The New York Central has authorized the immediate commencement of the Castleton bridge and cut-off calling for the ultimate expenditure of approximately \$20,000,000, the expenditure in the next two years being about \$12,000,000. The improvement work included in the above includes a high-level steel bridge across the Hudson river about 12 miles south of Albany, N. Y., a large freight classification yard in the vicinity of Feura Bush, N. Y., and about 20 miles of double-track connections linking up the railroad with the West Shore and the Boston & Albany by easy grades. This improvement will increase the freight and passenger carrying capacity of the road while it may make possible a reduction in time of transit of fast freight between the North Atlantic ports and the Middle West.

The order for the fabrication of the 23,000 tons of structural steel for the bridge was noted in a recent issue of the *Railway Age*. Invitations for bids on the erection, masonry, grading, dredging and other work have been sent out and everything is being done to facilitate the quick completion of the bridge, the yard and the more important parts of the rail connections. All grade crossings in connection with the project will be eliminated. The bridge will be double track with provision for two additional tracks at some future date. It will have one 600-ft. and one 400-ft. main truss spans over the channel flanked by steel viaduct approaches, the total length being about one mile. It is expected that this work will be completed and in operation by early in 1924.

Railway Financial News

ATLANTIC COAST LINE.—Annual Report.—The annual report issued this week shows the following corporate income account for 1921:

	1921	1920
Gross	\$66,730,768	*\$25,304,074
Operating expenses, taxes, etc.	61,150,483	*22,417,740
Operating income	\$5,580,285	*\$2,886,334
Standard return (12 months)		1,684,197
Government guaranty (6 months)		5,478,458
Other income	4,423,110	5,203,804
Total income	\$10,003,395	\$15,252,783
Interest, rentals, etc.	8,212,826	7,568,627
Net income	\$1,790,569	\$7,684,156
Preferred dividends	9,835	9,835
Common dividends	4,801,034	4,801,034
Deficit	\$3,200,300	\$2,873,287

* For four months, 1920

BOSTON & MAINE.—Injunction Halts Annual Meeting.—The annual meeting at Boston on May 16 was suddenly adjourned to May 31 when it became known that injunction proceedings had been brought in the Supreme Court to prevent the New Haven's holdings from being voted. Edmund D. Codman filed the petition, the effect of which would be to restrain the counting of ballots for the election of directors, five of whom, according to a federal court decree given on May 12 by Judge Mayer in New York, were to be representatives of the New York, New Haven & Hartford.

CANADIAN PACIFIC.—Address of President Beatty.—At the annual meeting in Montreal on May 3, President E. W. Beatty said, in part:

The forty-first annual report indicates in a vivid way the effect on your company's operations of the acute depression through which the business of the country passed during 1921, and it is a matter of gratification that, notwithstanding the decrease in gross earnings of \$33,619,000, the economies which were effected resulted in somewhat increased net earnings, and, of course, a slightly larger surplus, after paying fixed charges and usual dividends on the preferred and common stocks. The results reflect great credit upon the ability of the officers and men of the company, and are also a tribute to the physical condition of the property.

Sales of agricultural lands were, as indicated in the report, small, due to the general depression and the absence of the immigration of agriculturists during the year. In my opinion, Canada cannot afford to be without a definite and forward immigration policy much longer. While it is urged that the depression both in agriculture and in general industry, with consequent unemployment during the past winter, is a reason why active immigration measures should not be taken, it must not be forgotten that there are types of immigrants that can be readily obtained and brought to Canada without the possibility of adding to the burdens of the country.

As forecast in the address at the last annual meeting, reductions took place during the year in both rates of wages and in freight and passenger rates. The former, which became effective July 16, last, was equivalent to a reduction of 9.03 per cent on their existing payrolls of the company. The demand for further freight rate reductions is still persistent throughout Canada, and to the existing scale of rates is attributed much of the present weakness in business. It is, in my opinion, an entirely erroneous impression that the existing freight rates are the cause, rather than the result, of the present economic conditions, the most important of which, from a transportation standpoint, is the present scale of wages and working conditions which the railways were compelled by government action to accept during the war.

It is the view of your directors, and it has been their view for some time, that the coming upward of freight rates should be begun with reductions in labor rates, especially in those industries which have the most general depression most severely. Notwithstanding the weakness of the country, it is a gratifying fact that the help that will come out of this year on these conditions would give an impetus to business which, they have been precluded from agreeing on a definite point because of the approaching expiration, on July 7, next, of the provisions of the railway act allowing the railway companies to make any arrangement of agreements, statutory or other.

I feel that it is important that the present year would see a resumption of at least normal activity in maintenance and construction works, the necessity for which always prevails on a system the size of the Canadian Pacific. Appropriations of money on these accounts during the period at which we can show that large expenditures are warranted, especially in view of the freight rate situation.

Gross earnings on all Canadian roads still show substantial decreases over those of the corresponding period of 1921. Crop conditions, however, so far as they can be judged at this late, are very favorable, and there is a returning spirit of optimism and activity which should grow in volume if the agricultural prospects are realized.

The company's taxation is not unattractively increasing from year to year and, at only \$10,000,000 having accrued in federal taxes during the last five and one-half years. As indicated in the annual report, the

finances of the company are in splendid condition, and the credit of the company has been well maintained and is extremely high. While there are some serious and difficult problems yet to be solved, the general sentiment of the country shows a distinct improvement over that prevailing at the end of last year and the beginning of 1921.

CENTRAL OF GEORGIA.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$1,313,000 of refunding and general mortgage 6 per cent bonds to be pledged from time to time as security for short term notes.

CHICAGO, MILWAUKEE & ST. PAUL.—Six Months' Guaranty Certified.—The Interstate Commerce Commission on May 11 announced its first final settlement of the amount of the six months' guaranty for 1920 in the case of one of the larger railroad systems when it certified the amount for the Chicago, Milwaukee & St. Paul as \$23,111,528, of which all but \$673,636 had been paid in the form of advances and partial payments.

CLEVELAND UNION TERMINALS COMPANY.—Hearing on Application to Issue Securities.—The Interstate Commerce Commission has assigned this company's application for authority to issue stock and bonds for a hearing before Examiner Agate at Cleveland on May 23.

GEORGIA, ASHBURN, SYLVESTER & CAMILLA.—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and operation by this company of the railroad extending from Ashburn to Camilla, Ga., a distance of 51 miles, formerly operated as a part of the Hawkinsville & Florida Southern. The applicant company has been organized to purchase this section, the receiver having fixed \$125,000 as an upset price for that portion of the property.

GRAND TRUNK RAILWAY OF CANADA.—Annual Report.—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenues:		
Freight	\$54,239,904	\$58,102,754
Passenger	15,510,164	16,948,183
Total	76,858,032	81,444,647
Operating expenses:		
Maintenance of way and structures	12,862,797	12,005,384
Maintenance of equipment	17,809,497	21,103,432
Traffic	1,533,830	3,894,107
Transportation—rail line	35,574,298	38,518,233
General	2,904,024	2,787,700
Total operating expenses	71,170,293	76,213,815
Net revenue from railway operations	5,687,739	5,228,832
Railway tax accruals	1,155,577	1,280,003
Railway operating income	4,344,254	3,925,765
Total non-operating income	8,634,102	7,706,273
Gross income	12,978,356	11,632,038
Interest on fund of debt	16,412,615	10,054,583
Total deduction from gross income	27,042,797	16,231,142
Income balance	Def. 14,064,442	Def. 4,599,105

INTERNATIONAL & GREAT NORTHERN.—Valuation.—Following a valuation of the property of the International & Great Northern by the Texas State Railroad Commission that body has officially announced the amount to be \$38,748,469 and holds in abeyance claim for an additional \$376,046 represented in a 6 per cent value of franchise. The commission will issue a supplemental order if it recognizes the franchise valuation. Against the valuation allowed, the International & Great Northern has outstanding indebtedness as of December 31, 1920, of \$33,267,000, making a difference in favor of the railroad company of a little more than \$5,000,000. This difference it is understood, represents additional receiver's certificates and equipment obligations issued since December 31, 1920, as well as to give the company a working fund to meet current expenses immediately following the proposed reorganization to terminate the receivership.

LAKE ERIE & WESTERN.—New Directors.—The following new directors have been elected: O. P. Van Swearingen, M. J. Van Swearingen, J. J. Bernet, Otto Miller, W. A. Culston, J. R. Nutt, John Sherwin, H. Van Vechten and C. L. Bradley.

LEHIGH VALLEY.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Lehigh Valley Car Repairs Big Factor in 1921." See also excerpts from annual report on adjacent pages; also editorial entitled "Annual Reports and Publicity."

LONG ISLAND.—Asks Authority for Equipment Trust Obligations.—This company has applied to the Interstate Commerce Commission for authority to issue \$980,000 of ten-year, 6 per

cent equipment trust obligations to be taken by the American Car & Foundry Company in payment for 40 passenger motor cars costing \$1,078,440 and 10 steel passenger cars the cost of which totals \$147,735.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Annual Report*.—The income account for the year ended December 31, 1921, compares as follows:

	1921	1920*
Total operating revenue	\$26,185,804	\$34,270,691
Total operating expenses	24,325,913	30,847,709
Net operating revenue	1,859,888	3,399,260
Railway tax accruals	1,899,069	2,513,934
Operating income	Def. 45,214	826,246
Total non-operating income	1,616,018	18,923,523
Gross income	1,572,804	9,749,769
Interest on mortgage bonds	3,188,945	2,913,850
Total deductions from gross income	5,044,962	6,665,156
Net income	Def. 3,473,158	3,084,613

*Operating revenues and expenses, March 1 to Dec. 31. Includes income from lease of road.

Chairman Elected.—Edmund Pennington, former president, has been elected chairman of the company, a newly-created position.

MISSOURI, KANSAS & TEXAS.—*Branch Line Sold*.—William Edenborn, of New Orleans, president and principal owner of the Louisiana Railway & Navigation Company, has concluded arrangements to purchase that part of the Missouri, Kansas & Texas system extending from McKinney, Texas, to Shreveport, La., about 220 miles. The purchase price has not been announced, but it is said to be close to \$30,000,000.

NEW YORK, CHICAGO & ST. LOUIS.—*Annual Report*.—See excerpts from annual report on an adjacent page.

NORFOLK & WESTERN.—*Asks Authority to Guarantee Equipment Trust Certificates*.—This company has applied to the Interstate Commerce Commission for authority to guarantee \$6,700,000 of ten-year 5 per cent equipment trust certificates, instead of 5½ per cent certificates as was incorrectly stated in these columns last week. The certificates are to be issued by the Virginia Holding Company for equipment to be leased to the Norfolk & Western and are to be sold at not less than 97.75.

PERE MARQUETTE.—*Annual Report*.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Pere Marquette Surplus After Charges, \$3,765,880." See also excerpts from annual report on adjacent pages.

Abandonment of Lines Recommended.—The Interstate Commerce Commission has made public tentative reports by an examiner recommending that certificates be issued authorizing the abandonment of the Freeport branch, 6.23 miles, and the line from a point near White Cloud to Big Rapids, Mich., 19.67 miles.

TOLEDO, PEORIA & WESTERN.—*Annual Report*.—The corporate income account for the year ended December 31, 1921, is as follows:

	1921	1920*
Operating revenues:		
Freight	\$996,984	\$1,285,608
Passenger	568,635	630,174
Total, including other	1,692,420	2,090,667
Operating expenses:		
Maintenance of way and structures	366,595	382,554
Maintenance of equipment	530,007	676,494
Traffic	37,233	36,154
Transportation	874,686	1,249,355
General	95,192	97,024
Total	1,903,532	2,441,420
Net revenue from railway operations	Def. 211,112	Def. 350,753
Railway tax accruals	117,542	122,000
Railway operating income	Def. 328,654	Def. 472,753
Total non-operating income	106,094	634,962
Gross income	Def. 222,650	162,209
Total deduction from gross income	285,005	350,249
Net income	Def. 507,654	Def. 188,040

*Corporate and federal operations combined.

UNION PACIFIC.—*Annual Report*.—The income for the calendar year 1921, compared with the calendar year 1920, after excluding all offsetting accounts between the Union Pacific Railroad Company, the Oregon Short Line Railroad Company and the Oregon-Washington Railroad & Navigation Company, was as follows:

	1921	1920	Increase or decrease
Operating revenues	\$181,445,913	*\$175,260,837	.....
Rental from United States Railroad Administration (two months)	7,099,453	.....	.....
Total receipts	181,445,913	182,360,290	.....
Operating expenses	131,601,749	*135,303,242	.....
Receipts over expenses	49,844,164	47,057,048	\$2,787,117

Taxes	11,720,856	*10,754,015	966,840
Operating income	38,123,309	36,303,032	1,820,276
Other income, representing rents received and incidental operations:			
Total income from railroad properties	1,795,054	*1,492,885	302,169
39,918,362	37,795,917	2,122,446	
Deductions, representing rents paid, hire of equipment and incidental operations:			
Net income from railroad properties	5,692,195	*1,833,655	3,858,540
Income from investments and miscellaneous income	34,226,167	35,962,262	—1,736,094
Total income from all sources	13,138,088	12,298,597	839,131
47,364,255	48,261,218	896,963	
Deduct: Interest on funded debt and miscellaneous charges	16,063,180	15,586,987	476,193
Dividends on stock of Union Pacific Railroad Company:			
Preferred stock at 4 per cent	3,981,740	3,981,740	.....
Common stock at 10 per cent	22,229,160	22,229,160	.....
Sinking fund requirements	10,173	10,877	—703
Total appropriations of net income	26,221,073	26,221,777	—703
Surplus, transferred to profit and loss	5,080,002	6,452,454	—1,372,453

*For ten months, March to December, 1920, with a few minor exceptions, the Railroad Administration having operated the properties during the two months, January and February, 1920.

WESTERN PACIFIC.—*Annual Report*.—The corporate income account for the year ended December 31, 1921, compares as follows:

	1921	1920
Operating revenue:		
Freight	\$8,974,264	\$10,499,725
Passenger	2,324,507	2,365,166
Total, including other	12,104,155	13,595,790
Operating expenses:		
Maintenance of way and structures	2,157,574	2,232,282
Maintenance of equipment	3,378,689	2,073,740
Traffic	2,387,728	308,852
Transportation	4,593,023	4,973,462
General	716,855	446,281
Total operating expenses	10,391,343	10,311,410
Net revenue from railway operations	1,712,812	3,284,380
Railway tax accruals	*1,231,081	670,079
Total operating income	481,024	2,613,487
Non-operating income	4,445,463	2,050,685
Gross income	4,926,487	4,664,171
Interest on funded debt	1,225,560	1,202,755
Total deductions from gross income	2,067,953	2,247,960
Net income	2,858,533	2,416,212
Income applied to sinking fund	50,000	50,000
Income balance	2,808,533	2,366,212

*Includes \$205,173 income taxes for years 1918 and 1919 paid in 1921 on account of compensation received as rental of property for 1918-1919 in excess of compensation on which taxes had been paid for the year in question.

More Equipment Trusts Sold

The director general has announced additional sales of railroad equipment trust certificates maturing January 15, 1923, to January 15, 1935, inclusive, now held by the government, to:

Hornblower & Weeks, New York City	
Chicago & Alton	\$1,049,100
Cassatt & Co., Philadelphia, Pa.	
Chicago Great Western	375,700
	\$1,424,800

The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, is \$253,375,500.

Dividends Declared

Alabama Great Southern.—Common, ¾ per cent, semi-annually, payable June 29 to holders of record May 31; preferred, 3½ per cent, semi-annually, payable August 17 to holders of record July 13.

Chicago & North Western.—Common, 2½ per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable July 15 to holders of record June 15.

Eric & Pittsburgh.—¼ per cent, quarterly payable June 10 to holders of record May 31.

North Pennsylvania.—\$1, quarterly, payable May 25 to holders of record May 11.

Pittsburgh, Bessemer & Lake Erie.—Preferred, 3 per cent, semi-annually, payable June 1 to holders of record May 15.

Pittsburgh, Youngstown & Ashabula.—Preferred, 1¼ per cent, quarterly, payable June 1 to holders of record May 20.

Southern Pacific.—¼ per cent, quarterly, payable July 1 to holders of record May 31.

Union Pacific.—Common, 2½ per cent, quarterly, payable July 1 to holders of record June 1.

Trend of Railway Stock and Bonds Prices

	Last May 16	Last Week	Last Year
Average price of 20 representative rail way stocks	64.31	64.95	56.38
Average price of 20 representative rail-way bonds	85.87	86.07	74.05

Annual Reports

Lehigh Valley Railroad Company—Sixty-Eighth Report

PHILADELPHIA, Pa., April 3, 1922.

To the Stockholders of the Lehigh Valley Railroad Company:
The Board of Directors submits herewith a report of the business and condition of your company for the calendar year ended December 31, 1921.

INCOME

The Corporate Income Account for the year was as follows:

Total Operating Revenue.....	\$74,997,799.15
Total Operating Expenses.....	67,238,067.77
Net Operating Revenue.....	\$7,759,731.38

Railway Tax Accruals.....	\$2,026,088.03
Uncollectible Railway Revenues.....	40,683.80
	2,066,771.83
Operating Income.....	\$5,692,959.55
Other Income.....	12,839,774.08

Total Income.....	\$18,532,733.63
Deductions from Income.....	8,481,936.12

Net Income.....\$10,050,797.51

PROFIT AND LOSS

Balance December 31, 1920.....	\$36,126,576.04
Transferred from Income.....	10,050,797.51
Miscellaneous Items—Net.....	1,399,705.37

Dividends.....	\$47,777,078.92
	4,245,749.00

Balance December 31, 1921.....\$43,531,329.92

The Income Statement is not comparable with that for the previous year, because of the fact that the corporation operated its property during only 10 months of 1920. A consolidated income account showing revenues and expenses in detail for both years, on a comparable basis, including both Federal and Corporate operations, will be found on page 15 of the report. Operating Revenues for the year were practically the same as for the previous year, there being a decrease of slightly less than \$300,000. Operating expenses, however, decreased 16%, or \$12,785,082.62.

FINANCIAL

The following obligations matured and were paid and cancelled during the year:

Collateral Trust 4% Bonds.....	\$1,000,000.00
Equipment Trust Series "M" Certificates.....	200,000.00
Equipment Trust Series "O" Certificates.....	500,000.00
Equipment Trust Series "R" Certificates.....	400,000.00
	\$2,100,000.00

In addition to the above, the following unmatured Equipment Trust Certificates, all of which were owned by your company, were paid and cancelled during the year and the Equipment Trusts terminated:

Equipment Trust Series "M" Certificates.....	\$400,000.00
Equipment Trust Series "O" Certificates.....	500,000.00
Equipment Trust Series "R" Certificates.....	400,000.00
	\$1,300,000.00

This leaves your company without any Equipment Trust Obligations. At the close of the year the company held in its treasury the following securities of its own issue, amounting to \$13,742,000.00, which are not included in the pledged securities, amounting to \$30,131,172.48, shown on page 10:

Consolidated Mortgage 4½% Bonds.....	\$66,000.00
Consolidated Mortgage 6% Bonds.....	108,000.00
Collateral Trust 4% Bonds.....	1,088,000.00
General Consolidated Mortgage Bonds.....	12,480,000.00
	\$13,742,000.00

In addition, \$3,806,000.00 General Consolidated Mortgage Bonds are temporarily held by the United States Government, as collateral, pending settlement of Federal Control and Guaranty Terminal accounts. It is expected that during the year 1922 a substantial sum will be received from the Government in final settlement of these matters and the collateral released.

Since 1903, the date of the General Consolidated Mortgage, expenditures have been made for additional bonds and other securities. It is expected that for other capital purposes of approximately \$26,050,000.00 against which no securities have been issued.

An issue of \$6,000,000.00 Easton & Amboy Railroad First Mortgage 5% Bonds, the principal and interest of which are guaranteed by your company, will mature during 1922. This will require no new financing, as provision has been made for the payment of these bonds out of available funds. This payment will entitle the Lehigh Valley Railroad Company to receive \$6,413,016.10 in addition to the General Consolidated Mortgage of September 30, 1903, which bonds the company in due course will secure from the trustee and place in its treasury for future use.

ROAD AND EQUIPMENT

Expenditures for additions and betterments to road and equipment, including expenditures for subsidiary properties, during the year amounted to \$6,413,016.10, against which there were credits representing the sales or retirement of property of \$1,156,480.67, leaving a net expenditure of \$5,256,535.43.

The most important items the cost of which was charged wholly or in part to Investment in Road and Equipment are as follows:
We were annexed to Clarendon Terminal, the water and rail terminal your company is building on New York Bay, Jersey City. The first unit of this development, which will be ready for service during the year 1922, is a pier more than two thirds of a mile long, with 15 feet of water along side at which the largest ships afloat can be berthed. Its facilities will include a two-story warehouse with a capacity of 500 cars of freight, an open dock served by a 36-ton traveling gantry crane capable of handling

100 cars of freight a day, and two electrically operated unloaders to handle ore and coal from vessels to cars, with a capacity of 20,000 tons per 24 hours. As increased traffic warrants, two additional piers will be built. When completed in its entirety, the terminal will afford docking facilities of approximately five and one-half miles, capable of berthing the largest ocean-going craft.

The new freight pier station, erected by your company at the foot of East 47th and East 48th Streets, New York City, was completed and placed in service.

New passenger and freight stations were erected at Ulster and Midlesex. At Hillside, formerly known as West Elizabeth, the freight house was relocated and a new platform for handling milk constructed. Freight stations at New York City, existing facilities were enlarged and improved.

Twenty-one new motor cars for use in maintenance of way work, etc., were placed in service.

Thirty automatic signals between South Somerville and Stanton were equipped with electric lights, replacing acetylene gas light equipment.

Interlocking plants at Easton, Packerton and Laurel Junction were re-wired and upper quadrant signals installed. Few new audible-visible crossing alarms were installed.

Two new tugs, nine lighters and three covered barges for use in New York harbor were added to your company's floating equipment.

GENERAL REMARKS

Your company is offering for industrial development a 230-acre tract at Buffalo, following the clearing of certain long-disputed titles. The property has a frontage on Lake Erie of over a mile, amply protected by breakwater, and lies less than two miles from the center of Buffalo, adjoining the 500-acre freight terminal of your company, with which it has direct track connections. It offers special advantages as sites for grain elevators, or industries desiring lake and rail transportation facilities.

Stockholders now number 19,122, with an average holding of 63 shares. Of this number, 1,000 are women and 615 banks, insurance companies, fiduciaries and charitable organizations, of the latter one hundred and seventy-three of the company's employees have invested their savings in the stock.

In connection with the order of the United States Supreme Court, directing your company to sever its connection with The Lehigh Valley Coal Company and Cox & Co., Inc., careful study was devoted to formulating a plan to carry out the Court's order. In seeking a solution of this problem, the management has kept constantly in mind the necessity of complying fully with the letter and spirit of the Court's decision, and at the same time protecting the interests of its many stockholders and owners of its General Consolidated Mortgage Bonds. To accomplish the desired result, the management has presented a plan to the District Court for the Southern District of New York, which has been entered, certain objections to the plan and it is now awaiting argument.

The had order freight car situation, which has been mentioned in previous reports, continued serious. Many of your company's cars, which had been away from the yard for a considerable period, were returned during the year in a crippled condition, lack of proper maintenance during Government operation being largely responsible. To be prepared to meet a business revival prompt repair of these cars was necessary. Because of the high rates for pay and expense restrictions governing working conditions for railroad employees, prescribed by the United States Railroad Labor Board, but which do not apply in other industries, favorable contracts were made with several outside concerns for part of this work. A total of 9,975 cars were delivered to your yards for general repairs during the year, of which your company saved \$690,274.50, as compared with the cost of making these repairs at its own shops, which, in the past, under normal conditions, have been able to take care of this work.

As an illustration of the deplorable condition of equipment at the termination of Federal control, your company expended and charged to operating expenses for the maintenance of engines, cars and floating equipment during 1921 a total of \$25,138,217.00, an increase of practically \$1,500,000.00 over the previous year and approximately \$8,037,400.00 more than would have been disbursed had expenditures been limited for this purpose to the same ratio as applied on other railroads during the year, according to Interstate Commerce Commission records.

Unfavorable business conditions resulted in a decrease in revenue producing tonnage of the railroads in the United States in 1921 of 25.18% as compared with 1920. On the Lehigh Valley the decrease was 19.26%. In meeting the business depression the management sought to make every possible economy in operation. As a result, on December 31, 1921, there was a 18% reduction in employees, as compared with December 31, 1920. On the other hand, there was a notable gain in efficiency over the previous twelve months.

As a result of the policy of recent years of putting only creosoted ties into the roadbed, it was necessary to place but 456,789 ties in tracks during 1921, as compared with an average of 838,627 for the five-year period prior to Federal control. It is anticipated that the annual requirements will continue to show a reduction as the number of creosoted ties in the track is reduced. The total number of ties at this time 5,707,979 creosoted ties, which is approximately 62% of the total number of ties in service. The policy of purchasing only rail weighing 136 pounds to the yard also was continued. There are now 380 miles of track laid with this heavier rail. The cost of this year's acquisition of ties amounted to \$1,262,290.60, a decrease of \$1,092,256.78 as compared with the year 1920.

Taxes accrued during the year amounted to \$2,196,959.42, which is an increase of 36% over the average annual tax accruals for the five-year period prior to Federal control. This situation has become a serious one for all railroads, due largely to the issue by different communities of bonds for highway improvements, resulting in enormous increases in taxes to meet the interest and sinking fund payments on such bonds. In effect, the taxpayers are being compelled to contribute a part of the benefit of their motor-track competitors whose ironroads upon railroad traffic are continuously increasing.

While 1921 was hardly to be regarded as a year for business expansion, the Industrial Department has developed new industries in the territory served by your railroad. Of this number 44 have direct sidetrack connections.

Mr. Arthur W. Sewall, a director of your Company, resigned during the year, and General Harry C. Trexler was elected to fill the vacancy. In effect, the officers are continuing to carry on a grandly spirited co-operation in the performance of their duties, for which the management is deeply grateful.

Respectfully,
E. E. LOOMIS, President.

GENERAL BALANCE SHEET DECEMBER 31, 1921

ASSETS		LIABILITIES	
Investments:		Stock:	
In road.....(See note below)	\$32,562,134.07	Common stock.....	\$60,501,790.00
In equipment.....	\$8,155,463.60	Preferred stock.....	106,300.00
		Total stock outstanding.....	\$60,608,090.00
Improvements on leased railway property.....	\$100,717,597.67	Long-Term Debt:	
Miscellaneous physical property.....	1,613,682.44	Funded debt.....	\$131,436,000.00
Investments in affiliated companies:	2,124,912.06	Less—Funded debt held in treasury.....	37,548,000.00
Stocks.....	\$54,032,052.67	Total long-term outstanding.....	93,888,000.00
Bonds.....	22,715,654.52	Current Liabilities:	
Notes.....	3,831,159.97	Traffic and car-service balances payable.....	\$33,436.55
Advances.....	14,147,444.16	Accounts and wages payable.....	7,712,862.48
		Miscellaneous accounts payable.....	437,254.19
Other Investments:	94,726,331.32	Interest matured unpaid.....	413,860.50
Stocks.....	\$853,367.00	Dividends matured unpaid.....	14,635.21
Bonds.....	5,770,399.44	Unmatured debt matured unpaid.....	2,000.00
Notes.....	3,016,380.29	Unmatured interest declared.....	1,061,410.31
Miscellaneous.....	9,647.00	Unmatured interest accrued.....	816,935.01
	9,651,545.73	Unmatured rents accrued.....	346,455.89
Total investments.....	208,834,069.22	Other current liabilities.....	842,889.86
Current Assets:		Total current liabilities.....	11,680,860.00
Cash.....	\$6,675,601.64	Deferred Liabilities:	
Special deposits and other funds.....	84,198.28	Liability for provident funds.....	\$58,417.53
Loans and bills receivable.....	2,039.69	Other deferred liabilities.....	1,598,731.98
Traffic and car-service balances receivable.....	1,141,803.35	Total deferred liabilities.....	1,657,149.51
Net balance receivable from agents and conductors.....	1,418,700.03	Unadjusted Credits:	
Miscellaneous accounts receivable.....	1,865,947.57	Tax liability.....	\$1,122,745.14
Material and supplies.....	6,313,095.67	Insurance and casualty reserves.....	201,313.21
Interest and dividends receivable.....	3,432,564.97	Operating reserves.....	1,447,241.94
Rents receivable.....	70,622.12	Accrued depreciation—Equipment.....	19,402,032.61
Other current assets.....	476,197.60	Other unadjusted credits.....	656,790.87
Total current assets.....	21,480,770.92	Total unadjusted credits.....	22,830,123.77
Deferred Assets:		Corporate Surplus:	
Working fund advances.....	\$12,939.00	Additions to property through income and surplus.....	\$28,291.65
Insurance and other funds.....	22,892.57	Profit.....	43,531,329.92
Other deferred assets.....	3,381,361.39	Total corporate surplus.....	43,559,621.57
Total deferred assets.....	3,417,193.11	Total Liabilities	\$234,223,754.85
Unadjusted Debits:			
Rents and insurance premiums paid in advance.....	\$37,701.22		
Other unadjusted debits.....	454,020.38		
Total unadjusted debits.....	491,721.60		
Total Assets	\$234,223,754.85		

NOTE—The item, Investment in Road, represents only road property of Lehigh Valley Railroad Company property (Phillipsburg, N. J., to Wilkes Barre, Pa.). The total road and equipment Investments of the system, including transportation subsidiaries, owned by your Company, is \$222,000,764.57.

GENERAL REMARKS TO OWNERS OF RAILROAD SECURITIES

The general situation affecting the transportation interests of the United States is worthy of the attention and careful study of all owners of railroad securities. The year just closed was one of upset and disturbed conditions, and 1922, while promising better things, offers serious and difficult problems, particularly from a railroad point of view.

During 1921 the situation was complicated, so far as the railroad companies were concerned, by difficulties with organized labor, the leaders of which were ill-disposed to accept the deflation of wages brought about in almost every other industry, and by demands for reduced freight rates from commercial interests pressed by a horizontal reduction.

After an exhaustive investigation, the United States Railroad Labor Board in July announced a reduction in wages of approximately 11½% for all classes of employes, and later during the year it promulgated new rates governing their working conditions—the latter taking the place of the National Agreements made with various unions during Federal control. While the National Agreements have been abrogated, National rules laid down by the Labor Board have been substituted. These are not as onerous as the National Agreements, but prove a handicap to economical and efficient operation because they are standardized for the country as a whole and make no allowance for local conditions. Neither the wage reduction nor the new rules made it possible for the railroads to reduce their operating expenses sufficiently to consider any horizontal reduction in rates. The railroads agreed, however, to seek further reductions in wages, with a view to harmonizing them with the prevailing rates of pay in other industries, with the understanding that all savings effected should be passed along to the public in the form of reduced rates, and the matter is now before the Labor Board.

In the meanwhile, numerous voluntary adjustments in freight rates were made by the railroads, correcting obvious cases of injustice, and, late in the year, all the railroads of the country agreed to reduce, on January 1, 1922, to make a reduction of 10% in rates on farm products, while on December 27, 1921, a 16½% reduction in the rates on grain and grain products, ordered by the Interstate Commerce Commission, became effective in western territory.

RATE REDUCTIONS SOUGHT AS AID TO OTHER INDUSTRIES

Despite these reductions, the demand for further concessions in rates continued unabated, and such action offers a serious menace for prevailing business difficulties apparently was widespread. The railroads as a whole went far less on their properties during the last year than normally required. Their return to the market as purchasers to any important degree is possible only by permitting them to carry a fair return on their investment, but there was little disposition to give this opportunity to the country's largest buyer. Instead, it was argued that rate reductions must be made that this or that industry might be rescued from the unsatisfactory conditions into which it has fallen as a result of the worldwide depression. Because of this insistent demand for further reductions, the Interstate Commerce Commission, on its own motion, decided upon a general inquiry into the whole question of transportation charges.

The Committee on Interstate Commerce of the United States Senate is now conducting an exhaustive inquiry into all phases of the transportation problem. While no important changes have been made in the Transportation Act of 1920, special attack has been made upon the provision of the law requiring the Interstate Commerce Commission to make rates which will provide the railroad companies with a fair return upon their properties

used in railroad operation, and upon the section under which the Interstate Commerce Commission is given authority over intrastate rates where they affect interstate rates.

It will be recalled that the Transportation Act specifically required the Interstate Commerce Commission to make rates which would bring to the carriers revenue representing a reasonable return upon their investment in property used for railroad purposes and provided particularly that for the period between the passage of the Act and February 28, 1922, this reasonable rate should be 6 per cent. In 1921 the carriers, as a whole, earned only 3.3% on their investment, despite this provision, so frequently incorrectly called a guarantee.

RAILROAD'S CREDIT SITUATION IS AID TO MALCONTENTS

Advocates of some form of Government ownership of railroads, a question which it was thought had been eliminated as an issue in the railroad situation following experiences during the war and immediately afterward, continued to urge their ideas. The most active were officials of various labor organizations, pressing the so-called Plumb Plan, which provides for Government ownership with operation by the unions, and the theorists who see in the socialization of all public utilities the solution of all the ills to which the world is subject. Another element, and one which invites careful consideration, bids fair to become more important in the future. In recent years there has been a serious decline in railroad development. Not only have lines not been extended, but terminal facilities, additional trackage, etc. have not been constructed to keep pace with the Nation's commercial growth, and many railroad companies have not been in a financial position which would enable them to purchase new engines and cars in numbers calculated to meet the situation. When business revives, the demand for transportation probably will be greater than the capacity of existing facilities, and the railroads as a whole will have difficulty in supplying the service required. Past experience indicates that the unthinking immediately will start a clamor for Government ownership.

There should be a matter of concern to all, and particularly to those whose business is dependent upon adequate and efficient transportation. Experiences with Government owned railroads in other countries, without exception, has demonstrated the impossibility of their performing service of a character approaching our standards, and such railroad systems, instead, are the mere cat's-paw of politics with the burden of making up deficits in the cost of operation falling upon the people in the form of taxation.

To meet this threatened condition requires an attitude on the part of the Government and a people which will permit American railroads to re-establish their credit, that they may be able to finance needed improvements to their properties.

It is necessary that those who would be fair in regard to such matters, and particularly those who have even more interest because of their investments, should not only themselves recognize the situation which has been forced upon the railroads, but also that they should make it a point to bring all others to a realization of the fact that this condition is not one of the railroads making but the outcome of a policy of regulation which mistakenly has been carried too far. Likewise it is incumbent upon them to let their representatives in State and National legislative and regulatory bodies know where the owners of railroad securities stand regarding this problem, that there may be an end to the hampering and well-nigh stranglehold of the carriers which has prevailed for the last two decades.

E. E. LOOMIS, President.

New York, Chicago & St. Louis Railroad Company — Thirty-fifth Annual Report

To the Stockholders of

THE NEW YORK, CHICAGO AND ST. LOUIS RAILROAD COMPANY:
The Board of Directors herewith submit its report for the year ended December 31, 1921:

The capital stock authorized and issued to December 31, 1921, was	\$30,000,000.00
being the same as at the close of the previous year	
The funded debt outstanding as of December 31, 1920, was \$37,320,000.00	
It was decreased during the calendar year:	
By the retirement of Equipment Trust Certificates of 1916	\$110,000.00
By the retirement of Engine Trust Certificates of 1916	30,000.00
By the retirement of Equipment Trust Certificates of 1917	135,000.00
By the retirement of First Mortgage Bonds	115,000.00
	390,000.00

Funded debt outstanding as of December 31, 1921, was \$36,930,000.00

You were advised in my letter of September 8, 1921, that final settlement had been effected with the United States Railroad Administration for all claims and accounts arising out of the period of Federal control. In accordance with the requirements of the Interstate Commerce Commission, the accounting for that settlement was accomplished during the year 1921. As a result of the settlement, the income of the company applicable to the years 1918, 1919, 1920 and 1921, has been finally determined and a statement of the income actually applicable to the years mentioned is set forth on page 11 of this report.

The usual financial and statistical statements are appended. The Board takes pleasure in acknowledging the fidelity, efficiency, and united efforts displayed by your officers and employes in the discharge of their duties during the year.

For the Board of Directors, J. J. BERNET, President.

INCOME ACCOUNT

Operating Income:	
Railway operating revenues	\$27,030,663.44
Railway operating expenses	20,613,593.97
Net revenue from railway operations	\$6,417,069.47
Railway tax accruals	1,820,862.00
Uncollectible railway revenues	3,491.75
	\$1,824,353.75
Railway operating income	\$4,592,715.72
Nonoperating Income:	
Rent from locomotives	\$5,264.69
Rent from passenger-train cars	18,316.13
Rent from work equipment	12,306.67
Joint facility rental income	76,042.87
Income from lease of road	3,412,397.74
Miscellaneous rent income	28,920.27
Miscellaneous non-operating physical property	19,231.71

Income from unfunded securities and accounts	137,869.13
Income from sinking and other reserve funds	425.00
Miscellaneous income	251,055.39

Total nonoperating income	\$3,962,029.60
Gross income	\$8,554,745.33

Deductions from Gross Income:	
Hire of freight cars—Debit balance	\$27,918.99
Rent for locomotives	4,118.34
Rent for passenger-train cars	37,610.31
Rent for work equipment	3,566.26
Joint facility rents	203,534.79
Rent for leased roads	5,400.00
Miscellaneous rents	81,928.94
Miscellaneous tax accruals	2,858.60
Interest on funded debt	1,623,491.72
Interest on unfunded debt	6,171.44
Amortization of discount on funded debt	43,950.52
Miscellaneous income charges	2,191,490.99

Total deductions from gross income	\$4,232,040.80
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Net income	\$4,322,704.52
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Disposition of Net Income:	
Applied to retirement of first mortgage bonds	\$98,190.40
Dividend appropriations of income	1,499,365.00

Total sinking fund and dividend appropriations	\$1,597,555.40
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Income balance transferred to profit and loss account	\$2,725,149.12
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PROFIT AND LOSS ACCOUNT

Credit balance December 31, 1920	\$4,307,690.69
Add:	
Balance transferred from Income Account	\$2,725,149.12
Discount on first mortgage bonds purchased and retired	16,809.60
Discount on equipment trust certificates of 1917 purchased and retired	11,365.00
Unrefundable overcharges	16,236.74
Profit on road and equipment sold	32,778.42
Donations	2,900.45
Miscellaneous credits	16,373.56
	2,821,612.89
	\$7,129,303.58
Deduct:	
Loss on retired road and equipment	\$11,660.84
Surplus appropriated for investment in physical property	2,900.45
Dividend appropriations of surplus	1,774,360.00
Miscellaneous debits	18,625.66
	1,807,546.95
Credit balance December 31, 1921	\$5,321,756.63

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1921

ASSETS		LIABILITIES	
Investments		Stock	
Investment in road and equipment	\$55,448,334.49	Capital Stock:	
Road	17,921,148.12	First preferred	\$5,000,000.00
Equipment	81,133.39	Second preferred	11,000,000.00
General expenditures	73,450,616.00	Common	14,000,000.00
	\$73,450,616.00		\$30,000,000.00
Improvements on leased railway property	710,521.66	Long Term Debt	
Sinking fund for Equipment Trust Certificates of 1917	108.00	Funded Debt Unmatured:	
Deposits in lieu of mortgaged property sold	4,554.47	Equipment obligations	\$4,102,000.00
Miscellaneous physical property	932,998.68	First mortgage bonds	17,822,000.00
Investments in affiliated companies stocks	1,505,400.00	Gold bonds of 1906	10,000,000.00
Other Investments	1,602.50	Second and improvement mortgage bonds	4,956,000.00
	\$76,605,801.31	Second and improvement mortgage bonds nominally issued	1,036,000.00
Current Assets			\$7,966,000.00
Cash	\$1,154,098.97	Total capitalization	\$67,966,000.00
Time drafts and deposits	1,000,000.00	Current Liabilities	
Special deposits	1,883,105.00	Loans and bills payable	\$60,000.00
Loans and bills receivable	1,925.89	Traffic and car service balances payable	919,340.38
Traffic and car service balances receivable	1,067,918.82	Audited accounts and wages payable	1,313,271.00
Net balance receivable from agents and con- tractors	480,167.73	Miscellaneous accounts payable	94,484.87
Miscellaneous accounts receivable	688,656.23	Interest matured unpaid	33,172.50
Material and supplies	2,356,370.11	Dividends matured unpaid	396,496.50
Interest and dividends receivable	14,602.00	Unmatured interest accrued	336,146.67
Other current assets	1,389.86	Other current liabilities	138,598.99
	8,847,434.31		3,701,410.91
Deferred Assets		Deferred Liabilities	
Working fund advances	\$7,319.11	Other deferred liabilities	\$2,075.69
Insurance and other funds	10,287.50	Unaudited Credits	
Other deferred assets	6,198.00	Tax liability	\$1,233,091.02
	\$13,804.61	Operating reserves	123,300.00
Unaudited Debts		Accrued depreciation—Equipment	3,360,173.34
Discount on funded debt	\$412,447.38	Other unaudited credits	150,247.25
Other unaudited debts	1,411,868.97		4,876,711.61
Securities issued or assumed		Corporate Surplus	
Unpledged Capital Stock		Additions to property through income and surplus	\$5,235,507.03
of the New York, Chicago and St. Louis Railroad Co.		Funded debt retired through income and surplus	1,576,588.91
held in treasury	\$1,270,000.00		
Second and improvement mortgage bonds held in treasury	1,046,000.00	Total appropriated surplus	\$6,812,095.94
	2,316,000.00	Profit and Loss Balance	5,321,756.63
	\$88,350,050.78		12,133,852.57
	\$88,350,050.78		\$88,350,050.78

Report of the Pere Marquette Railway Company

DETROIT, Mich., April 1, 1922.

To the Stockholders:

The Board of Directors respectfully submit herewith their report of the affairs of the Pere Marquette Railway Company for the fiscal year ended December 31, 1921:

CORPORATE INCOME ACCOUNT

	Year Ended December 31, 1921	*Year Ended December 31, 1920	Increase and Decrease
Operating revenues.....	\$38,304,029.43	\$35,022,787.09	.....
Operating expenses.....	30,036,300.21	30,350,542.14	.....
Net-operating revenue.....	\$8,266,729.22	\$4,672,244.95	.....
Non-operating income.....	690,653.53	1,761,120.49	.....
Gross income.....	\$8,957,382.75	\$6,433,365.44	.....
Taxes.....	\$1,408,480.66	\$768,407.38	.....
Miscellaneous income charges.....	3,826.90	3,711.35	.....
Uncollectible railway revenues.....	4,695.86	1,397.92	.....
Hire of equipment—Debit.....	550,381.72	1,297,173.65	.....
Rentals.....	839,771.28	730,410.11	.....
Total charges, excluding interest.....	\$2,807,156.42	\$2,801,100.41	.....
Balance before deduction of interest.....	\$6,150,226.33	\$3,632,265.03	\$2,517,961.30
Interest on bonds.....	\$1,687,754.22	\$1,687,760.00	—\$5.78
Interest on equipment notes.....	639,030.13	505,058.37	133,971.76
Interest on bills payable, etc.....	57,562.02	45,733.96	12,068.06
Total interest accruals.....	\$2,384,346.37	\$2,238,292.33	\$146,054.04
Surplus.....	\$3,765,879.96	\$1,393,972.70	\$2,371,907.26
Ratio of operating expenses to operating revenues.....	78.42	86.66	.....
Ratio of taxes to operating revenues.....	3.67	2.19	.....
Total.....	82.09	88.85	.....

*Note—The figures shown for the year 1920, represent results of ten months' operation by the Pere Marquette Railway Company, and two months' "Standard Return" received from the United States Railroad Administration covering Federal Control operations for January and February, 1920, which latter is included with "Non-Operating Income." As the operating revenues, expenses, etc., for the two months ended February 29, 1920, are not included in the above tabulation, the results from operation during the year 1921 are not comparable with the ten months period during which the road was operated by the Company in 1920.

FUNDED DEBT

During the year ended December 31, 1921, additional temporary Equipment Gold Notes aggregating \$907,200.00 were issued in connection with the purchase of 40 locomotives and 3,000 freight cars allocated to the Pere Marquette Railway Company by the United States Railroad Administration, covered by Equipment Trust Agreement No. 63, dated January 15, 1920, between Walkers D. Hines, Director General of Railroads, Pere Marquette Railway Company and the Guaranty Trust Company of New York, Trustee. These notes are numbered 17 to 30, inclusive, and amount to \$64,800.00 each, being dated January 15, 1920, and mature serially January 15th of each year, beginning with 1922 and ending with 1935. They bear interest at the rate of 6% per annum, payable semi-annually on the 15th day of January and July in each year, and are subject to redemption at the election of the Railway Company at their face value and accrued interest, together with premium of 3% of the principal, in the manner and upon the terms and conditions provided for in said Equipment Trust Agreement.

The final agreed purchase price of all equipment covered by Equipment Trust Agreement No. 63, as certified by the Director General, was \$10,121,167.28, which was satisfied by the Railway Company as follows:

Notes Nos. 1 to 15, inclusive, at \$608,500.00 each, dated January 15, 1920, due annually, January 15, 1921, to January 15, 1935, inclusive, executed during the year ended December 31, 1920.....	\$9,127,500.00
Notes Nos. 17 to 30, inclusive, at \$64,800.00 each, dated January 15, 1920, due annually, January 15, 1922, to January 15, 1935, inclusive, executed during the year ended December 31, 1921.....	907,200.00
Cash payments made by the Railway Company to the Guaranty Trust Company of New York, Trustee, and to the Director General.....	*\$6,467.28

Total, representing final agreed purchase price..... \$10,121,167.28

*Note No. 16 for \$64,800.00, representing a portion of principal due January 15, 1921, was not issued, but in lieu thereof this amount was included in the cash payment on June 16, 1921.

During the year, Note No. 1, maturing January 15, 1921, amount \$608,500.00, was retired by cash payment made to the Guaranty Trust Company of New York.

Mention was made on page 10 of the Stockholders' Report for the year ended December 31, 1920, that First Mortgage 5% Series "A" Bonds of the Pere Marquette Railway Company, amounting to \$3,231,000.00, were authenticated by the Bankers Trust Company as Trustee under the First Mortgage and Deed of Trust, dated July 1, 1916, to cover 80% of expenditures made by the Railway Company for additions and betterments during the period July 1, 1918, to December 31, 1919. These bonds are held for safekeeping

by the Central Union Trust Company of New York, New York, N. Y., subject to the order of the Pere Marquette Railway Company.

During the year ended December 31, 1921, application was made to the Interstate Commerce Commission for authority to use these bonds as collateral, and this was authorized by order of the Commission dated May 31, 1921, Finance Docket No. 1397.

During the year ended December 31, 1921, Pere Marquette Railroad Collateral Trust Indenture 4% Bond No. 13, maturing January 1, 1923, par value \$1,000.00 was purchased by the Railway Company on account of being defaulted and not being good for delivery under the rules of the New York Stock Exchange. This bond was purchased at \$930.00 and accrued interest from July 1, 1921, to November 8, 1921, the purchase being authorized by action of the Board of Directors at meeting held on November 2, 1921. This bond, with coupon maturing January 1, 1922, July 1, 1922, and January 1, 1923, is in the possession of the Treasurer at Detroit, Mich., for safekeeping.

On July 15, 1921, the Pere Marquette Railway Company issued its promissory note to the Standard Steel Car Company for \$645,000, payable June 13, 1922, without interest. This note was issued in connection with an agreement made on May 2, 1921, between the Standard Steel Car Company and the Pere Marquette Railway Company, covering the purchase of 12 passenger coaches and 12 baggage cars.

There were no other changes in the amount of the Company's funded debt or capital stock outstanding during the year ended December 31, 1921.

SECURITIES ACQUIRED

During the year ended December 31, 1921, the Pere Marquette Railway Company purchased at par 50 shares of stock of the Flint Belt Railroad Company, for which it paid \$5,000.00 cash.

During the year, the Pere Marquette Railway Company advanced \$60,000.00 to the Flint Belt Railroad Company to be used for construction work.

DIVIDENDS

During the year ended December 31, 1921, quarterly dividends at the rate of 1¼% were regularly paid on the Prior Preference Stock. These payments were made out of surplus as of December 31, 1920, and amounted to \$560,000.00.

On December 7, 1921, a dividend of 10% was declared on the Company's 5% Preferred Stock, payable on January 3, 1922, to stockholders of record December 15, 1921. This dividend, amounting to \$1,242,900.00, was declared out of surplus as of December 31, 1920. Dividends on the 5% Preferred Stock are cumulative after January 1, 1919, and the declaration of 10% covered the period January 1, 1920, to December 31, 1920. The cumulative dividend for the year ended December 31, 1921, amounting to \$621,450.00, while not declared, has been accrued and recorded on the books of the company in suspense.

PROFIT AND LOSS

The Profit and Loss surplus carried forward from December 31, 1920, amounted to \$4,825,296.79. During the year there was a credit from record of \$3,765,879.96, and there was charged to Profit and Loss dividends declared out of surplus at December 31, 1920, as follows:

Prior Preference Stock 5%.....	\$560,000.00
Preferred Stock 10%.....	1,242,900.00

Total..... \$1,802,900.00
The net debit of other Profit and Loss items during the year was \$9,850.06, leaving a surplus as of December 31, 1921, of \$6,778,426.69, an increase during the year of \$1,953,129.90. (See page 23.)

TAXES

The tax accruals on the Corporate books for the year ended December 31, 1921, amounted to \$1,408,480.66, as compared with \$768,407.38 for the year ended December 31, 1920, an increase of \$640,073.28, or 83.30%. This increase was due principally to income and capital stock taxes, as indicated by the following tabulation:

United States Government Income Tax.....	\$334,451.07
United States Government Capital Stock Tax.....	12,034.00
Canadian Income Tax.....	10,593.55
Michigan State Ad Valorem Tax.....	244,797.50
Miscellaneous.....	38,197.16

Total Increase..... \$640,073.28

The apparent increases in Michigan State Ad Valorem and Miscellaneous Taxes shown above are due partly to the fact that these tax accruals on the books of the Pere Marquette Railway Company for 1921 represent a twelve-months period, while similar accruals for the year ended December 31, 1920, represent the ten-months period subsequent to February 29, 1920. The United States Railroad Administration paid the Michigan State Ad Valorem and Miscellaneous Taxes for the months of January and February, 1920. The combined Federal and Corporate accruals for Michigan State Ad Valorem and Miscellaneous Taxes for the year 1920 were \$980,901.05. Similar accruals on the books of the Pere Marquette Railway Company for the year ended December 31, 1921, were \$1,408,480.66. This comparison indicates a net accrual in the Michigan State Ad Valorem Tax and Miscellaneous Taxes of \$46,304.22. This increase is due to the increase in Michigan State Tax Rate for the year 1921 as compared with the year 1920.

FLINT BELT RAILROAD

This line will connect with the Pere Marquette main line at McGrew, 3.8 miles north of the station at Flint, and extend southerly 8.2 miles, connecting again with the Pere Marquette main line at a point 3.1 miles south of the station at Flint, passing east of the built-up portion of the city, but being for the most part within its corporate limits. This project will make an extensive territory available for industrial locations, and by operating the Pere Marquette freight trains over the new line, the congestion along the present route will be relieved.

The amount expended to the end of 1921 was approximately \$70,000, being about 10% of the total estimated cost of the project.

FINAL SETTLEMENT WITH UNITED STATES RAILROAD ADMINISTRATION

As the result of prolonged negotiations between the United States Railroad Administration and officers of the Pere Marquette Railway Company, a memorandum of agreement was entered into between the two parties under date of November 2, 1921, whereby the Director General of Railroads agreed to cancel on the Federal books all debit balances versus the Pere Marquette Railway Company transactions handled during the period of Federal control, including so-called "Open Account Balances," Materials and Supplies Balances, and amounts due to the Administration for Additions and Betterments. A final agreement between the two parties was duly signed and executed under date of November 12, 1921.

FRANK H. ALFRED, President.

By Order of the Board of Directors,
EDWARD N. BROWN, Chairman.

Railway Officers

Executive

G. R. Huntington, vice-president of the Minneapolis, St. Paul & Sault Ste. Marie, has been elected president, succeeding **Edward Pennington** who has been elected to the newly created position of chairman. **G. W. Webster**, secretary and assistant to the president, has been appointed vice-president, succeeding Mr. Huntington. These changes were effective May 16.

Financial, Legal and Accounting

W. D. Beymer, controller of the Illinois Central with headquarters at Chicago, has been appointed assistant to the vice-president in charge of accounting with the same headquarters, effective May 1.

Edward W. Wheeler has been appointed general counsel of the Maine Central with headquarters at Portland, Me. In addition to his legal duties Mr. Wheeler will also exercise jurisdiction over matters of public relations, legislative action and leased lines.

Sydney Smith, valuation counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to general attorney, with the same headquarters, effective May 10, to succeed **Ernest Woodworth**, resigned to engage in general practice. Effective the same date, **J. H. McChord**, counsel, has been promoted to assistant to the general counsel, **Ashby M. Warren**, assistant district attorney for the district of Kentucky, has been promoted to assistant general claims attorney, and the jurisdiction of **James J. Donohue**, general claims attorney, has been extended to cover litigation over personal injuries and damages to property.

J. F. Fairlamb, whose appointment as auditor of revenue of the New York Central was announced in the *Railway Age* of May 13, was born in Pennsylvania, in 1855. After his graduation from high school he entered the service of the Pennsylvania as a clerk. In 1884 he went with the New York, West Shore & Buffalo (New York Central) in a similar capacity. In 1886 he went with the New York Central as a clerk. Two years later he became assistant auditor of passenger accounts and, in 1890, auditor of passenger accounts. On March 1, 1906, he was appointed general passenger agent and on February 1, 1910, auditor of miscellaneous accounts, which position he held at the time of his recent appointment.

Operating

C. E. Carson, manager of the Chicago Traffic Club, has been appointed superintendent of the Southern division of the Chicago Great Western, with headquarters at Des Moines, Iowa, effective May 15, to succeed **C. A. Shoemaker**, who has been granted a leave of absence.

W. H. Bevans has been promoted to superintendent of the Western division of the St. Louis San Francisco, with headquarters at Find. Okla., effective May 10, to succeed **C. H. Claiborne**, who has been transferred to the Southern division, with headquarters at Memphis, Tenn., to succeed **J. F. Liston**, deceased.

H. W. Purvis has been appointed general manager of the Georgia & Florida with headquarters at Augusta, Ga., succeeding **D. F. Kirkland**, who has resigned to become vice-president of the Southern States Development Company. Mr. Kirkland will also serve as director of development of the Georgia & Florida. Mr. Purvis started what was to become a railroad career when he entered the employ of the Western Union Telegraph Company as an operator at Charlottesville, Va. in 1865. In 1897 he entered the service of the Norfolk & Western and served that company as an operator and agent operator at a number of places until 1900 when he

became an operator-yard clerk for the Seaboard Air Line at Hamlet, N. C. The following year he became a clerk in the office of the chief dispatcher at Raleigh, N. C., and, in 1902, was promoted to dispatcher in the same office. Four years later he was promoted to chief dispatcher at Jacksonville, Fla., and, in 1907, was transferred to Hamlet, N. C. In 1909 he was appointed trainmaster at Hamlet and, in 1912, was transferred to Americus, Ga. In November of the same year he was promoted to superintendent with headquarters at Jacksonville. From August, 1918, to July, 1919, he served as terminal manager under the Railroad Administration of all lines entering Jacksonville and then served for a time as superintendent at Jacksonville. In August, 1920, he was promoted to general superintendent with headquarters at Savannah, Ga., and Norfolk, Va., and in September of the following year was appointed general agent on the general manager's staff, in which position he was serving at the time of his recent appointment.

Traffic

W. R. Graham has been appointed commercial agent of the Southern with headquarters at Hattiesburg, Miss.

H. W. Stigler has been appointed general agent of the Kansas, Oklahoma & Gulf, with headquarters at Memphis, Tenn., effective May 1.

C. M. Shaftoe has been appointed New England passenger agent of the New York, New Haven & Hartford and the New England Steamship Company with headquarters at South Station, Boston.

Mechanical

James E. Goodwin has returned to the Northern Pacific as master mechanic at Duluth, Minn., after a five months' leave of absence and **John A. Marshall**, acting master mechanic, has been appointed road foreman of engines at Duluth.

Engineering, Maintenance of Way and Signaling

L. J. Hughes, assistant engineer on the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to division engineer, with headquarters at Chicago, effective May 15, to succeed **A. C. Bradley**, who has been transferred to Fairbury, Neb., to succeed **J. G. Bloom**, who has been promoted to engineer maintenance of way of the system, with headquarters at Chicago.

Purchasing and Stores

A. W. Hix, whose appointment as assistant to the director of purchases of the Chesapeake & Ohio was announced in the *Railway Age* of April 29, page 1040, was born at Bramwell, W. Va., on December 10, 1892, and was educated in the public schools and at Massey's Business College at Richmond, Va. On November 24, 1908, he entered the service of the Chesapeake & Ohio in the office of the storekeeper at Richmond. Two years later he was transferred to the purchasing department as stenographer to the assistant chief clerk. From that time on he worked in various positions including those of file clerk, invoice clerk, trace clerk, tabulation clerk and order clerk, in which position he was serving at the time of his recent promotion as noted above.



A. W. Hix

EDITORIAL

Railway Age

1917

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The third of the series of articles by Samuel O. Dunn, editor of the *Railway Age*, dealing with European Railways appears on another page of this issue. The first two articles had to do primarily

Poor Passenger Service in Europe

with the activities of the International Railway Congress at Rome. The present article, however, is made up entirely of Mr. Dunn's observations of railway service in Italy, France and Switzerland. His portrayal of conditions there does not give a particularly happy picture. The war, of course, retarded railway development more in Europe than in this country. The building of equipment for high-class passenger service suffered particularly and it is the difficulty of securing accommodations and the overcrowding of trains which is most trying to the traveler in Continental Europe at the present time. Other conditions exist which are less excusable. The customs and passport formalities at international borders, of which there are many more since the war, are made needlessly uncomfortable for the traveler. Customs examinations are, of course, necessary but there is little excuse for the passport nuisance, especially between the countries allied in the war. Europe might learn much from the ease of traveling between the United States and Canada. There are, to be sure, many things to admire about these foreign railways. The speed of express trains in France has been restored to the high rate of pre-war days. Another point deserving favorable comment is the greater comfort of the seats in these trains as compared with our own. This, Mr. Dunn says, is especially noticeable in the seats provided for daytime use by making up the berths in the sleeping cars. All in all, however, it seems likely that the American tourists who are now "invading" Continental Europe will come back with a much higher appreciation of the adequacy, comfort and speed of American passenger service.

Few provisions in the working agreements with the train service organizations are more unsatisfactory to the managements or more demoralizing to the employees than that regarding overtime. The heavy penalty constitutes a severe tax on operation, while it offers an incentive to the crews to loiter on the road rather than to get their trains into the terminal. The local operating officers on one road have set out to reduce this overtime by offering a counter attraction to the men. On one division they found that it was possible for a crew to take a tonnage train over the road in approximately seven hours. As an incentive to a crew to make a good run they offered to provide a return train on arrival so that the men could get home without a long tie-up at the away-from-home terminal and then have 24 hours or more at home while making the same mileage as before. On another division where a slightly longer time was required to make the run with a tonnage train, it was found possible to provide time freight trains for the return trip so that the crews could make the round trip well within 16 hours. On another division where it was not possible to perfect such an arrangement, the engine districts were rearranged to require approximately 14 hours for the run, with the result that a crew which began to earn overtime

One Way to Reduce Overtime

ran the danger of being tied up on the road. In each of these instances overtime became a dead issue because the men were offered an incentive to avoid rather than to earn it. If the managements will offer the men equally favorable inducements to move their trains over the road as the rules now offer for delays en route, the overtime provision can be made very largely a dead letter.

Few Americans knew the meaning of the word "propaganda" until the activities of Germany in this country prior to our entrance into the war became known. Quite naturally, then, the Germans, who were the first to engage in propaganda on a large scale, have not forgotten that there is such a thing. They are still using it against the welfare of the American people. The most recent example of such activity has been brought to our attention by a letter from E. St. J. Greble, Jr., manager of the Baldwin Locomotive Works' office at Bucharest, Roumania, to a New York newspaper. This letter was in protest to Berlin dispatches which had appeared in that paper alleging that American locomotives in service in Roumania were proving unsatisfactory. Now it happens that just the contrary is true; the American locomotives are proving entirely satisfactory and are being used to bring in trains which German locomotives can not handle. Last year we had the privilege of translating and publishing an official statement denying similar scurrilous reports about American locomotives in service in Belgium. Indications were that this propaganda, too, emanated from Germany. If this is the manner in which Germany is attempting to reinstate her industry in the world's markets, then let our manufacturers know with what unscrupulous competitors they have to deal! Moreover, prospective buyers of German goods should learn the character of those who are attempting to gain their goodwill and take their promises and representations with the necessary grain of salt.

More German Propaganda

It is a regrettable fact, becoming more generally appreciated, that the majority of railroad shops are not equipped with machinery sufficiently powerful to work high speed steel tools to any where near their capacity. A longer time than necessary, therefore, is required to repair cars and locomotives and labor costs are correspondingly higher. This condition could hardly be otherwise since a large proportion of present shop machinery is ten or more years old. Even a few years ago it was the problem of tool experts to develop cutting tools which would utilize the full power of machines. Today the problem is reversed. The extent to which modern manufacturers have been successful in developing both accurate, high production machines and cutting tools which stress them to the limit is little short of astounding. The development of modern automobiles would have been an absolute impossibility without modern machine tools. The supremacy of America both industrially and mechanically is also dependent on such tools. It is an inescapable conclusion that the railroad industry, holding as it does sec-

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Possibilities of High Speed Tools Not Realized

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and place among the industries of the country, should not be satisfied until obsolete, inefficient shop machinery and tools are replaced by modern equipment. Is there any inherent reason why the average railroad shop should always be considered the last place to look for productive machinery and efficient methods?

The most obvious thing to say about the wrecking of the Lehigh Valley fast passenger train at a highway crossing,

Automobiles reported in the *Railway Age*, May 20, 1922, page 1176, is that this is a rare occurrence; that, usually, the person or **Wreckers of** persons in the automobile will be the only sufferers from defying a hundred-ton locomotive, running at a mile a minute; but when it is remembered that automobile freight trucks, the use of which is constantly increasing, sometimes weigh as much as ten tons, truck and load together, one realizes that derailments at crossings are likely to become less rare. Heavy automobile trucks, requiring perfect braking apparatus, seem to be entrusted to inexperienced or untrained drivers as freely as were the smaller vehicles of former days. A ten-ton obstacle is not so easily thrown aside. Solely as an element in self-preservation, railroads will be obliged to take a hand, as citizens, in the regulation of automobiles. In the light of such a case as this last one, the idea of improving the situation by calling on the owner of the automobile to pay for the damage he has done to railroad property seems almost ridiculous. By the way, what rule of law or reason would justify a court in requiring the railroad company to pay damages to the passengers injured in the North Leroy derailment?

The news items from Tennessee, Pennsylvania and New York printed in the *Railway Age*, May 20, 1922, page 1192,

How Can We Educate the Auto Driver?

afford encouraging evidence that the enforcement of the stop-look-listen rule at highway crossings is making progress—though the progress is extremely slow. It seems that in Tennessee a period of five years has been required to bring about a realization that there is on the statute books a law requiring automobiles to stop; five years to bring about a realization of the well-known fact that printing a regulative law in the statute book frequently has no effect at all in actual regulation. A correspondent in Tennessee, commenting on the fact that in his state (as in every other) the majority of motorists seem to drive regardless of all warnings, including plainly lettered boards set up at the side of the road, calls for the improvement of such roadside signs by freeing them from the confusing influence of other roadside signs which do not conduce to safety; as, for example, advertisements. This is one more feature of highway regulation in which railroads will be obliged, for their own protection, to take an active part. The approved warning sign, the 24-inch round disk, on a post, set up 300 ft. short of each railroad crossing, has been subjected to some criticism as not sufficiently large and conspicuous. It would help to make it conspicuous if all unnecessary roadside signs were required to be taken down. Massachusetts has passed a law to regulate bill-boards, under which action has been taken in at least one city, looking to the removal of all bill-boards that are within 300 ft. of important highways. This is a very necessary improvement, for which thoughtful citizens have long waited. The law, however, has a local option feature; it is wholly permissive except as cities and towns pass ordinances, and active stimulation of local public sentiment will be necessary before there can be any marked benefit from it. Massachusetts, however,

has made a good start, which should be imitated elsewhere. High speeds are now permitted freely on highways all over the country. To keep up this practice with any reasonable degree of safety there ought to be a complete scientific and uniform system of roadside signals, to cover all dangerous points. It may seem fanciful to propose the actual carrying out of such an idea, for the obstacles to anything of the kind would be great; but the need is very plain. And it is plain that public spirited railroad officers have a duty in the matter; are not they, by reason of their long experience in signaling for high speeds, better qualified than any other citizens to formulate a correct plan?

Surprising as it may seem there is relatively little information available regarding the amount of traffic which rail should normally carry before it is

Promising Field for Investigation

worn to the point that requires renewal. Such limited data as have been collected indicate that the tonnage carried increases in a much greater ratio than the weight of the section. In other words, the experience of those roads which have adopted the heavier sections in recent years indicates that the investment in the added metal has been amply justified by the increased service, without considering the reduction in the cost of maintenance and the better riding qualities of the stiffer rail. Not enough information has, however, been collected up to the present time to enable this statement to be made conclusively. For this reason a plan of co-operative action which the Rail committee of the American Railway Association has perfected recently with two universities holds much of promise. Through arrangements made with Professor Herman Diederichs, director of Sibley School of Engineering of Cornell University, 10 senior students of that institution are now making a detailed investigation of the rate of wear of rails of sections ranging from 90-lb. to 136-lb. per yard on tangent tracks of the Delaware, Lackawanna & Western and the Lehigh Valley. Measurements are being taken on rails which have carried traffic ranging from 10,000,000 tons to 300,000,000 tons. Similar arrangements are also being perfected with the University of Arizona for studies on tracks of the El Paso & Southwestern and the Southern Pacific. The results of a large number of observations of wear on rails of varying section and service on different railways in various parts of the country should go far in establishing the life which may reasonably be expected from rail of various sections and promoting uniformity in renewals. This plan will also bring the students in contact with the practical problems of railway operation which should result to the future benefit of those who enter railway service. It is to be hoped that the Rail committee may be able to interest other universities in this work to the mutual benefit of the students and the railways.

Striking proof that the business of the country is not being seriously retarded by freight rates is afforded by recent reports of freight car loading which show

Car Loading Shows Business Revival

that general business, exclusive of coal, is moving over the railroads at a heavier rate than it was even in 1920, the peak year of railroad traffic and before the latest advance in rates. For the week ending May 13, the number of cars loaded with revenue freight was 777,359, an increase of 26,173 as compared with the corresponding week of last year, in spite of the fact that less than half of the normal amount of coal is now moving. The coal traffic for that week, 79,170 cars, was 82,109 cars less than the movement for the corresponding week last year. If this amount

of coal were added the total loading would have been 859,000, as compared with 843,000 cars loaded in the corresponding week of 1920. A similar statement may be made of the other weeks since the coal strike began. President Harding, in his address before the United States Chamber of Commerce last week, expressed in a way that attracts more public attention than the weekly reports of railroad car loadings a fact to which they have been steadily pointing for several weeks, namely, that "business is reviving" and "our country is finding itself again." When reports of the Car Service Division of the American Railway Association for April and the first part of May show more cars loaded than in the corresponding weeks of last year, in spite of the loss of coal traffic, it cannot be denied that business is not only improving but it has improved. As practically all business involves transportation it would be difficult to find a better rough index of the general activity of the country than is afforded by these weekly car loading figures. The President not only called attention to what has happened, but he declared that: "Undoubtedly there is more than a mere business revival in sight. We are on the threshold of a new era. We do not intend ever to be discouraged for a long time." Supplementing this address, it was announced on the following day that reports to the White House indicate a shortage of labor already in many localities, a highly gratifying improvement in agriculture as well as in most branches of industry, and even the possibility of a distressing shortage of common labor within 90 days. The reports have convinced President Harding that we are on the eve of a wholesome revival which he expects to continue. To all of which the *Railway Age* may properly add that these statements were made prior to the decision of the Interstate Commerce Commission reducing freight rates and also before the dinner at which the President urged the railroads voluntarily to reduce rates.

The Rate Decision

THE OPINIONS which will be expressed with reference to the rate decision announced on Wednesday will vary in direct ratio with the degree of optimism felt by the one expressing the opinion as to the present general business situation. The Commission's findings in favor of an approximate 10 per cent decrease in freight rates are made in the face of the fact that in 1921, at the higher rates, the carriers earned only 3.3 per cent on their property investment. They are similarly made in spite of the fact that the rate of 5.83 per cent earned in March, 1922, was largely due to the heavy coal movement in anticipation of the coal strike. Business, however, is picking up. Those of us who are optimists are hoping that it is going to pick up soon enough and sufficiently enough so that increases in tonnage will overcome the reduction in receipts per ton or per ton-mile. The Commission declares its business judgment to be to that effect. We hope that it has decided correctly.

One question that arises in connection with the rate decision is as to whether the reductions suggested should have been general or should have been confined to the basic commodities and we shall probably hear more about this. That some reductions should have been expected is hardly in question. General sentiment throughout the country was in favor of it and that is always a powerful factor. The public has felt for some time that rates were too high and that the result of the high rates was to act as a check on business. That theory is not holeproof. The depression of 1921 was due to many causes and would have occurred with high freight rates or low freight rates, and, at present, business is picking up in excellent fashion at the present high rates. Nevertheless, the high rates have been a detriment, particularly because they have upset commercial relationships and

have borne severely on certain commodities and on certain producing centers. The tenor of the times was in favor of some reductions.

Nor were the reductions unexpected. The manner in which surrounding circumstances accompanied—whether intentionally or otherwise—the announcement of the Commission's decision is worthy of comment. The calling of the conference with President Harding last Saturday evening indicated that things were about to happen. The decision followed the press reports of what was done at the White House sufficiently close so that the favorable effect of the one were carried over to the other. Business psychology is more or less of an inexplicable sort of thing. It has a manner when the general trend of affairs is optimistic of emphasizing anything that has a trace of optimism. It is to be expected, therefore, that the action which has been embodied in the rate decision will accelerate the present business revival.

The administration has had a great deal to do towards encouraging public opinion to believe that a reduction in freight rates would assist the revival of business upon which the Administration is placing so much hope. It seems only fair that the Administration should now supplement its efforts and exert itself in the coal situation. It can do more towards settling the affair than any other parties in the present mix-up. The roads are at present losing at least 80,000 cars of coal traffic weekly or in other words this amount of coal traffic is being deferred until after the end of the strike. The unbalancing of the coal traffic will be a handicap in many ways taking the year as a whole. The Administration, it would seem, would do the wise thing, if it now directed its efforts towards restoring the traffic supplied by the mines.

The Interstate Commerce Commission has shown itself in pleasing contrast to the Railroad Labor Board. The Commission has accepted the view that it can do something towards bringing about or assisting the revival of business. The Board seems to have no such attitude and the unfortunate part of the Commission's decision is that conditions are such that the actions on one body are not more closely correlated with those of the other. The Labor Board is willing to go on subsidizing railroad shop labor by permitting it a rate of wages much above that for similar work in other industries, and to permit this class of labor to thrive at the expense of the farmer and the consumer who pay the freight rates.

Further, the revival of business is now on. Does not the Labor Board know that when business picks up to a gradually greater extent the carriers will need all the cars and locomotives they can secure? Has it not been advised that the percentages of bad-order cars and unserviceable locomotives are almost hopelessly high and that repairs are being postponed for lack of funds with which to pay the present high wage scales? There is some talk that the Labor Board's decision is to be handed down July 1—the day on which the present rate decision will presumably become effective. One hopes that this belief is correct. The Board's decision cannot be made public too soon in view of the present conditions.

It is difficult to see how the railroads can do otherwise than accept the Commission's decision to reduce rates. They should, however, make their assent of greatest value to themselves and the public. There is no reason, for example, why, in making it, they cannot point out that their coal traffic is conspicuous by its absence and that the Administration should take a hand in adjusting the situation. They should certainly express themselves about the activities—or rather the lack of activity—of the Labor Board with reference to the shop wages decision.

There has, of course, been a very considerable amount of comment and guesswork about the purpose of the President

in calling the chief executives together at dinner to talk over the rate question. Because of the announced intention of the Administration to put more business in government and less government in business, it has appeared to many that the President was using this opportunity of cultivating better relations between the government and the railroads. He was undoubtedly informed of the decision of the Interstate Commerce Commission to bring about a reduction in rates, and it is quite possible that his action and the general attitude of the Administration were such as to induce the Commission to seek to have the railroads make a voluntary reduction, rather than have the Commission issue a formal order. If this is true, then it would seem wise for the railroad executives to accept it in this spirit and to take such action as will strengthen the roads with the public and the Administration and insure more cordial relations in the future.

Analyzing the rate decision as a whole, one is inclined to feel optimistic about it. The decision calls for reductions of about 10 per cent, but it includes those reductions which have already gone into effect through previous formal orders. The public was asking for lower rates and its getting them should have a salutary effect on business. It seems a sane guess that business will revive sufficiently to make up in tonnage what will be lost in revenue per ton. A "sane guess," of course, is not a certainty, but it will be more of a certainty if the coal and labor situations are ironed out with some degree of promptitude.

It is difficult to understand why the Commission should have determined upon a rate of return of 5 $\frac{3}{4}$ per cent. The Act established a rate of 5 $\frac{1}{2}$ per cent with the proviso that $\frac{1}{2}$ per cent might be added for improvements chargeable to capital account. The carriers need these improvements as much as ever. Presumably the figure of 5 $\frac{3}{4}$ was chosen because of its psychological effect, on the ground that it might look better to the public than 6 per cent. Public bodies frequently have a way of doing things in this manner. Perhaps we should be satisfied that the rate was not reduced more than $\frac{1}{4}$ per cent. We are not overly impressed by what the decision says about federal taxation.

Enlarging the Ananias Class

"LABOR" is the name of a weekly paper published in Washington by the railway labor unions to disseminate propaganda among railway employees to discredit private management and promote the Plumb plan.

In its issue for April 1 this paper published an editorial entitled "Dunn in Ananias Class." It quoted the following statement made by Samuel O. Dunn, editor of the *Railway Age*, in an address before the Citizens' Alliance of Minneapolis on March 22: "The main reason for existing rates is that the average wage per hour of railway employees is 120 per cent higher than five years ago." It then said: "The Associated Press accepted Dunn's statement as gospel truth, sent it out over its wires and it was given a position of prominence in practically every daily paper." "Labor" charged that "Dunn's statement is false," and added: "The average wage of railway employees has increased 59.2 per cent during the last five years, not 120 per cent as claimed by Dunn. That's the finding of the United States Railway Labor Board from data gathered exclusively from railroad sources. The supporting figures may be found in 'Report No. 3—Wage Series' compiled by the board in October 1921."

What are the facts?

First, Mr. Dunn compared the average wage *per hour* in 1916 with the present average wage per hour. In 1916, as shown by the statistics of the Interstate Commerce Commission, the average hourly earnings of the 90 per cent of railway employees paid by the hour were 27.8 cents. In Novem-

ber, 1921, the latest month for which statistics of the Interstate Commerce Commission are available, the average earnings per hour of railway employees paid by the hour were 61.8 cents. This was an increase per hour of 34 cents, or 122 per cent.

Second, the Labor Board in October, 1921, issued "Report No. 3—Wage Series." This did not give any statistics regarding wages *per hour*. It did not give statistics for any date earlier than December, 1917, which was only four years, and not five years prior to the date of the wage figures given by the board for 1921. The board's report showed that the average *monthly* rate in December, 1917, was \$78.06, and that after the reduction in wages on July 1, 1921, it was \$124.27, or 59.2 per cent more.

In other words, Mr. Dunn gave average *hourly* earnings for two periods approximately five years apart and "Labor" attempted to refute them by giving *monthly* rates of pay for two periods only four years apart.

Why is there such a wide difference between the relative increases shown by the hourly earnings and the monthly rates? One reason is, of course, that one of the comparisons made was between statistics for 1916 and 1921, and the other between statistics for December, 1917, and the latter part of 1921; and there were substantial increases of wages in 1916 and 1917. Another and the most important reason is that the eight-hour day has been established, that employees as a result now work fewer hours per month for their monthly rate of pay than they did in 1916 and that, of course, in consequence their hourly earnings show a correspondingly greater increase than their monthly earnings. Finally, the monthly rate given by the Labor Board included no earnings for overtime work.

But why use the hourly earnings instead of the monthly rates? First, because the employees demanded and have obtained reductions in their hours of work as a benefit to themselves. Secondly, because the increase in the hourly earnings is the true measure of the increase in the operating expenses of the railways which has been caused by both the reduction in hours of work and the advances in wages which have been made. The reduction in hours of work has made it necessary for the railways to employ more men to do a given amount of work. This, as well as the increase in the average wage per hour, has increased the payroll, and it is the increase in the total payroll which has contributed most to the increase in operating expenses which has made necessary the present rates.

How accurately under normal conditions the increase in the hourly rate of pay conforms to the increase in the total payroll is illustrated by the following facts: Between 1917 and 1920 the average earnings per hour of employees paid on an hourly basis increased from 31.8 cents to 66.5 cents, or 109 per cent. Between the same years the total increase in the payroll was from \$1,740,000,000 to \$3,698,000,000, or 112 per cent. The freight business handled in 1920 was only 4 $\frac{1}{2}$ per cent greater than in 1917.

If railway employees were working as many hours per day, or month, now as in 1916 they would be earning approximately 120 per cent more than in 1916 per day and per month. That the daily and monthly earnings per employee have not increased as much in proportion as the hourly earnings or the total payroll is due to the fact that they have chosen to have their hours of work per day and per month reduced.

We are not unaware that the Plumb plan agitators who edit "Labor" will not be influenced by the foregoing statement of facts to accept for themselves the membership in the Ananias Club which they have offered to the editor of the *Railway Age*.

We have stated the facts so fully for the information of railway employees and other persons who really want to know them.

Is the Engineer to Blame?

FEW INDOOR SPORTS are more popular today than that of diagnosing the railroad ills, and the cures which are offered in consequence are nearly as varied as the number of diagnosticians. A new remedy comes from Roger W. Babson, who finds that among other ills the railroads are suffering from too many civil engineers in high places. We feel that an indictment of those railway executives who fall within this class cannot go unchallenged.

"The construction period of railroading is gone by," says Mr. Babson, "there is no more reason why a civil engineer should run a railroad today than that he should run the Woolworth business or the Sears-Roebuck business." Apparently Mr. Babson's conception of railway engineering and construction conforms to the popular impression which pictures a man behind a transit fitting curves to a mountain canyon. Such railroad construction, of course, is a matter of the past, but is there no work for the engineer in the design and construction of the Cedar Hill yard of the New York, New Haven & Hartford, in the building of the new Union passenger terminal at Chicago, or in the direction of maintenance of way work on an enormous property like the Pennsylvania? But the field of the engineer in railway service is by no means limited to construction and maintenance of way, *per se*. Ample testimony as to the usefulness of the engineer in the gradually increasing complication of railway operation is to be had daily, and no better evidence is to be found than the increasing reliance which the American Railway Association is placing on the American Railway Engineering Association for the study of technical problems of railway operation.

But to turn to the question of executives—civil engineers have been chosen as railway executives not because they were civil engineers but because some of them have developed into efficient operating officers, and surely such names as Rea, Kruttschnitt, Loree, Storey, Kelly, Dice and Pearson are received with exactly as much confidence when signed to an annual report as those of other railway presidents whose early training was along somewhat different lines.

The Needs of Water Transportation

ONE OF THE PRINCIPAL objections to "government in business" must be ascribed to the fact that it frequently places the spending of other people's money in the hands of men who consider all too lightly the responsibility thus placed upon them. This attitude is frequently manifested by the War department in its control over railway crossings of navigable streams. The building of new bridges, or the reconstruction of old ones, usually calls for extravagant requirements as to the clear width and height of channel openings with apparently no effort to balance the pecuniary advantage to be derived by the existing or potential river transportation with the enormous burden placed upon actual and thoroughly established rail transportation.

This subject has been given attention previously in these columns but merits further reference because of the particularly illuminating demonstration of the mental processes of the War department in spending the railroads' money. The Cincinnati Southern's bridge over the Ohio river which was recently reconstructed, as described elsewhere in this issue, provides a waterway opening that is 500 ft. wide and has a clear height of about 40 ft. above maximum high water and 81 ft. above average low water. The high water clearance was not considered sufficient, so provision was made in the original bridge for an auxiliary high water channel along the Kentucky shore in the form of a draw span having a total length of 370 ft. and providing two channel openings of approximately 150 ft. each.

When plans for reconstructing the bridge were submitted to the War department, the requirements imposed for the high water channel in replacing the old swing span were such as to make it necessary to provide a clear span for the entire distance between the two rest piers of the swing bridge. That is, a 365-ft. lift span was provided so that the old pivot pier might be removed. This requirement was made in spite of the fact that there is no record of the swing span ever having been turned following the test made at the time of its completion 45 years ago.

The reconstruction of the bridge was carried out in accordance with these requirements and when the work was completed, and the costly lift span was ready for use except for the razing of the old pivot pier, the river steamer interests petitioned to have this pier left in place so that it could continue to serve as an ice breaker for the protection of steamers moored down stream from it during times when the ice was running. The cost of the real or fancied requirements of a visionary inland water transportation cannot be scrutinized too carefully in these times when a reduction in the cost of rail transportation is the topic of the hour.

Trying to Hold Down Coal Prices

RAILROADS should find considerable of interest in the announcements from Washington of the efforts being made by Secretary Hoover to bring about a plan of co-operation among the coal mine operators to prevent a runaway coal market and incidental high prices as a result of the curtailment of coal production by the strike. This plan is being tried as a substitute for the system of price regulation which proved so unsatisfactory during the war.

As indicated by the dinners at the White House attended by steel and railroad executives last week, the President is a firm believer that much can be accomplished by calling men together around a table for a frank discussion of important problems. The coal operators are rather too numerous to be invited to dinner together, but Mr. Hoover got about 50 of them, representing over half of the output of the mines now in production, into a conference, at which it was proposed to call a general conference of coal operators to consider plans for the better co-ordination of coal distribution and the prevention of profiteering by the formation of central and district committees to take measures to assure the direct progress of coal to the consumer in proportion to his need and on the basis of the Garfield prices adjusted to meet changed conditions. Although the conference was open to the press and although it was proposed that representatives of the government be members of the central committee, it was regarded as necessary to submit this plan to the attorney general to see if it is in violation of the laws intended to prevent combinations and agreements to raise prices.

Mr. Hoover does not express complete confidence in the success of the plan but says it is worth trying and as large consumers of coal the railroads will doubtless wish him well. He called attention to the fact that in 1920, following the 1919 strike, nothing was done until the price of coal had mounted to from \$9 to \$15 a ton. Coal is now selling at from \$2.25 to \$4 a ton, but although there has not yet been sufficient demand for coal to take the full output of the non-union mines, scarcity and competitive buying in some districts have caused advances in some quarters. On the present basis of production the Washington authorities do not anticipate any serious situation at least until June, but Mr. Hoover is taking warning from previous experience in trying to interest the operators in the prevention of high prices—which in many instances were enjoyed by the coal dealers rather than by the operators—and at the same time in trying to avoid excessive competition among buyers by suggesting the formation of buying committees.

New Books

Railroads and Government: Their Relations in the United States, 1910-1921. By Frank Haight Dixon. 5½ in. by 8¼ in. 384 pages. Bound in cloth. Published by Charles Scribner's Sons, New York.

In one of the early chapters of this book Professor Dixon quotes the Interstate Commerce Commission in 1910 as saying:

"We must not regard too seriously, however, the effort of railroad counsel to establish this Commission *in loco parentis* towards the railroads. . . . This country cannot afford to have poor railroads, insufficiently equipped, unsubstantially built, carelessly operated. . . . Nevertheless, it is likewise to be remembered that the government has not undertaken to become the directing mind in railroad management. We are not the managers of the railroads. And no matter what the revenue they may receive, there can be no control placed by us upon its expenditure, no improvements directed, no economies enforced."

To anyone who knows to what extent the Commission is now doing the very things that in 1910 it said it had no power to do, the importance of the subject matter of Professor Dixon's book will be at once evident. Railway regulation by the federal government has progressed farther during the period since 1910 than for all the years prior to that date. The Adamson Law, federal control, the Transportation Act, the Labor Board—all these terms reflect the importance of the period.

Yet, until the appearance of this book, the happenings during these years have been concealed from those not actually engaged in matters having to do with railroad policy in its broader, country-wide aspects. Concealed—not in the sense that the actual happenings from day to day and week to week have not been published and read, but in that no story of happenings day by day or week by week can emphasize and minimize various events according to their true importance—consequently the significance of the achievement of recent history is lost to everyone but the student who makes it his business to connect events into a well-balanced whole. Not many people, with the exception of the numerically few railway executives, legislators, economists and writers who have by the nature of their callings been kept in close touch with the minute developments in Washington, have had even the approximation of a correct perspective of the developments of the past decade. And to acquire this perspective without this book would require weeks of toil—studying the files of magazines and newspapers, reports of Congressional hearings, decisions of the Interstate Commerce Commission, etc.

With the appearance of this book, however, all this has changed. Anyone with a fundamental knowledge of railroading can, with a few hours of reading, acquire an accurate knowledge of recent events in sufficient detail for ordinary purposes.

The Transportation Act has so many aspects that it is difficult to single out any one feature and call it the most important. The increased power which it gave to the Interstate Commerce Commission over rates can safely, however be called one of its more important provisions. These rates are to be fixed according to the law which will provide, "under honest, efficient and economical management," a reasonable return to the railroads. A knowledge of the development in rate-making which preceded this enactment and the power which the Commission now has over interstate rates makes an interesting background now when existing rates, which have never provided the legal returns, are under fire from many sources. Surely no railroad officer ought to be without a rather complete knowledge of these things which affect so closely the welfare of his company.

Professor Dixon's treatment of the federal control period

is thorough and adequate. He agrees with most railway economists that it served a useful purpose during the war but that government ownership offers no solution for peacetime transportation problems. His criticisms of the shortcomings of the Railroad Administration may seem inadequate to some, but the whole book is characterized by an absence of partisan feeling and gains in power thereby.

Another recent development which Professor Dixon emphasizes is the increasing interest which bondholders are taking in the management and control of the railroads. It is, of course, well known that a large part of the capital invested in the railroads is represented by bonds which carry no voting power with them. These bonds are, for the most part, not met at maturity out of earnings but by refunding. The National Association of Owners of Railroad Securities, representing large holders of bonds, has made itself heard in many ways of late and this seems to be one of the really significant results which the past few years have brought forth.

The consolidation provisions of the Transportation Act have not meant much as yet. Ultimately, however, consolidations may be brought about which will have a profound effect upon the art of railroading in this country. Hearings soon to be held before the Interstate Commerce Commission will bring the problem to the front and those familiar with Professor Dixon's chapter on the subject will be at a decided advantage in following these hearings, whether or not they agree with his rather sympathetic leaning toward the proposal.

The regulation of wages and working conditions is ever a problem. The strange method of raising wages which the Railroad Administration followed, *i. e.*, the rapid advancement of the wage scales of lower-paid employees and a much lower increase for the higher grades, did away with differentials which had proved their value by long years of use. All classes of labor profited by federal control in securing improved working conditions. All but a few, notably the train and engine service men, profited by wage increases (by the Railroad Administration and the Labor Board) which increased greatly their standard of living. A return to normal conditions in this respect seems difficult of attainment.

The authority of the Labor Board is being questioned and probably not until the Supreme Court has decided several cases will it be able to go forward in the course it has laid out for itself or confine its activities as the court may direct. Last autumn the Board secured a point in its favor by its masterful leadership in bringing to naught an impending strike. Only an unthinking optimist, however, could assume that the Labor problem on the railroads is solved for all time. It will come up time and time again and challenge the best minds that can be brought to deal with it. Professor Dixon is of the opinion that the Labor Board is a "valuable laboratory" for the study of this problem and is "entitled to a thorough test." With this position most of our readers will be in hearty accord.

Professional railroad-baiters attack the roads generally with carefully chosen statistics and plausible sounding economic theories. Most railroad men are occupied with the technical and operating problems of their own particular property and concern themselves little with the broad field of railway economics as applied to all the railroads. If the thousands of railway officers in the country were to inform themselves a little more thoroughly about the railroad problem in its broader aspects, fallacious theories advanced by anti-railroad "economists" would be checked before they could do much damage. For railroad men who desire to improve their ability to serve their employers this book is unhesitatingly recommended. Students and others who make it a business to keep abreast of modern thought along these lines will read the book as a matter of course.

Some Observations on European Railway Service

Traveling Is Difficult—Sleeping Car Service Inadequate— Trains Crowded and Rates High

By Samuel O. Dunn
Editor of the *Railway Age*

PARIS, FRANCE, May 9.

THE NEWSPAPERS report that American tourists are coming to Europe in unprecedented numbers. Anybody who has been traveling in Europe within recent weeks knows that thousands of Americans are here already. It is not indulging a facetious spirit to say that it is doubtful if this "American invasion" will tend to increase the good feeling between Europe and the United States.

There are some reasons, however, why it should, and undoubtedly will, increase the popularity of the passenger service of the railways of the United States among our own people. After an American who travels much at home has had an experience of a few weeks traveling on the continent of Europe under present conditions, he will be a strange person if he does not recall with longing the adequacy, cleanliness, convenience, comfort and speed of American passenger service.

It is not the purpose of this letter to criticize the railways of Europe or their management. The criticisms passed by the people of different countries upon each others' institutions, methods and customs very commonly are based on vanity, jealousy, ignorance or misunderstanding, and almost always tend to cause friction and antagonisms that often have serious results. But no reasonable person can take offense at a plain narrative of actual experiences given for a good purpose.

Now many of the people of the United States are disposed to complain about their railway service. A further fact is that they have less reason to complain about the service they get than almost any other people in the world. It is useful, therefore, to publish in the United States actual experiences on the railways of other countries, not in any spirit of captious criticism of other railways, but to help Americans who do not travel abroad to appreciate reasonably the favorable situation they are in with respect to railway service. Of course, many of the shortcomings of service in Europe are due to the aftermath of the war; but that does not make it any less true that they exist.

Shortage of Sleeping Car Service

One of the most outstanding features of railway service on the continent at present is the extreme shortage of sleeping cars. Practically all the sleeping car service is rendered by the International Sleeping Car Company, the headquarters of which are in Brussels, Belgium. Most of the Americans who came over here to attend the International Railway Congress arrived on the continent between the beginning and the middle of April. They were all somewhat startled to find that it would take some days to get sleeping car accommodation to Rome. The large party that came on the *Mauretania* arrived in Paris on April 11. Its members were advised that they could not get sleeping car reservations of any kind to Italy for at least a week!

At that time there was a rush of people going to Rome for Easter; but in spite of that it was somewhat of a shock to persons accustomed to American railway service to encounter such a condition of affairs. There never was a time as far back as I can remember, even during the war, when one could not within 24 hours get at least an upper berth on some train running between any two large cities in the United States. The upper berth in an open Pullman

car has its disadvantages; but it has great advantages over no berth at all.

A specific incident will perhaps best illustrate the sleeping car situation over here.

The president and the general manager of a certain American railway, and their wives, sought sleeping car reservations from a border point in France to Rome. They were told all space was sold a few days ahead. The president suggested that an extra sleeping car should be put on one of the trains. As the president himself tells the story, the railway employee to whom he made the suggestion, threw up his hands and exclaimed,

"It could not be done without a special decree from the King!"

So the American railway president and general manager and their wives arrived in Rome after having spent a sleepless night sitting up in a first class compartment.

This shortage of sleeping cars is a chronic condition. Persons desiring to leave Rome for Paris after the Railway Congress found all space on one train sold out for fifteen days ahead and the other trains completely sold out on all days of the next ten except two. Yet, curiously enough, there often are ways of getting sleeping accommodation even under these conditions. The tipping of employees in the offices of the International Sleeping Car Company prevails on a large scale; and a big enough tip paid to the right persons frequently causes entire compartments to spring up where not a single berth grew before.

Overcrowded Trains

The question will naturally be asked how, being unable to get sleeping accommodation, the visitors got to Rome. Some, as already indicated, sat up all night in day cars; others traveled by day, and got off and stayed at hotels in cities along the way at night. Whether they traveled by day or night, however, they found all trains overcrowded. The writer, since arriving on the continent, has traveled about 3,000 miles, east, south, west and north, on railways in France, Switzerland and Italy. Only for short distances in two instances—from Paris to Rheims and return on the Eastern Railway of France and from Lausanne in Switzerland to the northern border of Italy—has he ridden on day trains that were not overcrowded. By "overcrowded" is meant a train in which all the seats were taken and many persons were standing or sitting on their baggage in the corridors.

Before the war it was always possible to get seats in first class, and usually in second class, compartments on most European railways and many persons were expected to stand in the third class compartments. Now even in the first class compartments there almost always are more passengers than there are seats for.

Bedevilmnt of Passengers at Frontiers

Passenger cars in Italy are especially crowded. In that country on almost every day train all the seats are taken and the corridors are so filled with people that it is difficult to move through them.

Needless to say, this shortage of passenger equipment is largely due to the war. It was impossible for the railways

to keep up their equipment during that long and dreadful conflict.

Other conditions are encountered, however, which are not so easy to explain or excuse. International through car service has not been satisfactorily re-established even between countries which were allies during the war, or between former belligerent and neutral countries. Imagine, for example, leaving the women of your party peacefully reading their magazines at a point on the border between Switzerland and Italy while you run forward along the platform to see what the customs officials do with your trunks, and finding on your return that the women, hand baggage, coats, books, canes and umbrellas have been unceremoniously dumped out on the platform. This was done to cut out a Swiss car and replace it with an Italian car.

Before the war, hand baggage was inspected in the cars. Now, on entering Switzerland, Italy or France, it usually must be taken out of the car, and passengers must go trooping into the customs office in the station to see it put through a perfunctory examination. Meantime your train is unnecessarily delayed an hour or more, and (under your breath) you curse all the bureaucrats of Europe, and rejoice that you live in a country so large that you are not bedevilled every few miles by customs officers who seem to exercise their ingenuity to make staying at home a pleasure.

The passengers on many trains are obliged to get up and visit the customs offices or frontier points in their night gowns and pajamas, in the middle of the night. To the traveler, one of the worst results of the disintegration of some European countries is the increase in the number of national boundaries and custom houses.

Inadequate Toilet Facilities

The very worst feature of railway service in some parts of Europe is the toilet facilities. These facilities on many day coaches in America are bad enough; but our worst cars are immaculate in this respect compared with many in Europe. The toilets in the first class cars of the better French railways are clean, and are provided with towels, soap and paper. As one travels eastward and southward the towels give out, and then the soap. The toilets of even first class cars in Italy often have neither towels, soap nor paper, and are too dirty and unsanitary for description. Italy is a very mountainous country, and the Italian railways are a fine product of engineering skill. They are at present among the leaders in electrification. It is painfully evident, however, that the management has devoted and now devotes very little attention to sanitary engineering. The station—many of them handsome structures—need sanitation even more than the cars.

Regarding "de Luxe" Trains

The traveler can obtain very good accommodation on the "de luxe" trains between principal cities if he makes reservation several days in advance. These trains are made up entirely of sleeping cars; and the sleeping cars usually are clean and comfortable. But the difficulty of getting space on the "de luxe" trains never ceases. The Rome express, from Paris to Rome, for example, runs every day in the early spring, when tourists are flocking to Italy, and is always crowded during that season. Early in May, when travel to Italy becomes lighter, instead of being run every day, it is run only three days a week, with the result that reservations on it still must be made days ahead. The International Sleeping Car Company takes no chances of running with any empty berths.

A "de luxe" train on the continent does not mean the same thing as in the United States. Take, again, the Rome Express, which is one of the best examples of such trains. The distance between Paris and Rome is somewhat over 900 miles—not very much different from what it is between

New York and Chicago, or better Chicago and New Orleans. The better trains between these points in the United States make their run— from 20 to 24 hours. The schedule time of the Rome Express is 30 hours. All these trains of this class in the United States have buffet-smoking cars, and some also observation cars. Such cars are virtually unknown in Europe.

American and European Sleeping Cars

In addition to open sleeping cars with ordinary upper and lower berths, the better trains in the United States have compartments and drawing rooms with complete toilet facilities, which are roomy and luxurious beyond anything known in continental Europe. The sleeping cars on the continent are all divided into small compartments with upper and lower berths for two, and sometimes three, persons and equipped with wash bowls, the rest of the toilet facilities being at the ends of the cars, and being used by both men and women.

There is one respect, however, in which the sleeping cars of Europe are distinctly superior to those of America. When the berths are made up in the daytime, they afford seats which are much more comfortable than the seats in the American sleeping car. The seats in our Pullman sleeping cars are, in fact, extremely uncomfortable. There is no problem the management of the Pullman Company could solve with more satisfaction to its patrons than that of making its cars as comfortable to ride in by day as are the sleeping cars of Europe. It is curious that this problem should have been solved so much better in Europe than in America, in view of the fact that people ride in sleeping cars by day so much more in America than in Europe. It might be added, in this connection, that the seats in the first and second class compartment of most of the day coaches of Europe are far more comfortable to ride in than the seats in the day coaches of most cars in the United States. In fact there is no means of transportation in the world that is more comfortable than a first class compartment on a European train if it is not overcrowded. The car builders of Europe do know how to make seats to fit the human back—an art that has not been acquired in all parts of the world.

A party of Americans returning from the International Railway Congress had a novel experience on the Rome Express. They left Rome on April 30, and awakened on the morning of May 1 to find that because this was the "Labor Day" of Europe the enginemans and trainmen of the Italian State Railways had "struck work" and left the train in the station at Turin at 4:30 a. m. Here this "crack" train remained until about 6 o'clock a. m. on May 2—over 25 hours. The passengers were not warned before leaving Rome that any such thing was likely to happen; and they remained all day in Turin without any official advice as to when the train would start moving again. The only information they could get was the very unofficial opinion of the sleeping car guards that the "strike" would last 24 hours. The situation was not made less uncertain and exasperating by the fact that other trains were moving in and out of the station all day. Just why other trains ran while the Rome Express stood still it was impossible to learn, but apparently it was because the bolshevistic Italian railway employees desired especially to harass the "millionaires" who ride on "de luxe" trains.

High Speeds Again Made

It would do injustice to leave the impression that the comparatively slow schedules of the "de luxe" trains to Southern Europe represent the best speeds now being made on the continent. The French railways made high speeds between important points before the war; and in this respect their service has been practically restored to normal. The lines of the Eastern Railway between Paris and Rheims and of the

Northern between Paris and Calais were fought over and largely destroyed repeatedly during the war. Their tracks and their service have been so completely restored that express trains over them in which the writer rode made speeds upward of 60 miles an hour and averaging over 50 miles an hour for long distances with entire comfort to the passengers. The "de luxe" trains also make good speeds on the Paris-Lyons-Mediterranean.

The Cost of Travel

In Europe, as in America, the war caused very large advances in railway rates of all kinds. It has been extremely difficult since the war to state European rates in United States money because of the great fluctuations in the rates of exchange. It would appear, however, from my own computations, based on current rates of exchange that, stated in American money, first-class fares in Europe now average about the same as in the United States. For example, the distance from Cherbourg to Paris is 230 miles, and the rate actually paid in American money was \$7. This makes an average of 3.5 cents a mile. The distance from Paris to Lausanne—partly over the Paris-Lyons-Mediterranean of France and partly over the Swiss Federal Railways—is 348 miles, and the fare paid was \$11.60. This gives an average of 3.53 cents a mile. Computations based on the amounts paid between other points give somewhat similar results.

The cost of a sleeping compartment for two persons for a night trip such as that between Florence and Rome—196 miles—is about \$7 and between Rome and Naples—155 miles—is about \$6. Passengers starting on such a trip, on a train leaving at midnight, cannot get into the car at, say, 10 o'clock and go to sleep, as at many places in the United States. They must get in just before the train starts, and get out as soon as it reaches its destination. A sleeping compartment and lunch and dinner for two persons on the Rome Express costs about \$38, of which about \$6 is for the four meals. Before the war the table d'hote lunch or dinner served in the restaurant cars of continental Europe cost about 50 cents. Now these meals cost from \$1.50 to \$2. Anybody who studies these figures will conclude that it now costs practically the same to travel first class in Europe as in the United States, and this is true. The increase in the cost of traveling—including emphatically that of staying at hotels—has been, measured in United States money, relatively greater than in America, except apparently in Germany and elsewhere in central and eastern Europe.

Will Not Tend to Increase Good Feeling

Perhaps the facts, based upon personal observation and experience, which have been given in the foregoing will explain why the writer began this letter by implying that this season's invasion of Europe by American tourists will not tend to increase the good feeling between Europe and America. Almost everywhere the American tourist finds expenses greater than he has expected and encounters conditions which cause him discomfort and annoyance. Americans are very far from being as popular in the countries of their recent allies as they were when the war ended; and when they protest and swear about expenses that surprise them and conditions that make them angry they do not increase their popularity. But, as estimated at the beginning of this letter, this American invasion is quite certain at least to have the good effect of making those who participate in it appreciate their own railway service more when they return home.

A NEW ICING STATION of the Southern Railway at Macon, Ga., to facilitate the prompt movement of the rapidly increasing shipments of fruits and vegetables from points in South Georgia and Florida accommodates 26 refrigerator cars at one time, and has an overhead conveyor by which ice is brought directly to the platform from the plant of the Atlantic Ice and Coal Corporation.

Hearing on Power Brakes by Interstate Commerce Commission

IN CONFORMITY to order No. 13528 of the Interstate Commerce Commission, dated February 20, 1922, and supplementary orders in connection therewith, an important hearing in regard to power brakes and appliances for operating power brake systems was started in Washington on Wednesday, May 17. The object of the inquiry and investigation is to determine whether, and to what extent, such brakes and appliances now generally in use on locomotives and cars are adequate and in accordance with requirements of safety, what improved appliances or devices are available for use, and what improvements may or should be made to obtain increased safety in train operation.

Large Attendance at Hearings

The hearing is being held before Examiner Mullen. The air brake manufacturers and the American Railway Association are represented by counsel and on account of the importance of the case the sessions are being attended by from 80 to 100 men, among whom are most of the air brake supervisors of the largest railroad systems.

The first subject taken up was the air brake apparatus which has been developed by the Automatic Straight Air Brake Company, New York. In substantiation of its claims for the need of such a system and that it was superior to the Westinghouse air brake system now in general use, Clark and La Roe, counsel for the Automatic Straight Air Brake Company, have called a number of witnesses and submitted many exhibits. The first witness examined was Robert Burgess, southeastern manager of the Westinghouse Air Brake Company. The questions centered around a paper presented by Mr. Burgess before the Southern and Southwestern Railway Club in November, 1919, relative to the empty and load brake.

The next witness examined was S. D. Hutchins of the Westinghouse Air Brake Company, who was questioned in regard to a memorandum relative to the automatic straight air brake which he sent to M. A. Kinney, superintendent of motive power, Hocking Valley. Mr. Hutchins was followed by W. S. Bartholemew, vice-president, Westinghouse Air Brake Company, who was questioned in regard to a similar general memorandum.

Automatic Straight Air Brake

The next witness called was M. E. Hamilton, field engineer, Automatic Straight Air Brake Company. His testimony covered the operation of the automatic straight air brake both in solid trains and when mixed with Westinghouse brakes, as observed on the test rack and on various railroads where this system has been applied. Evidence showed that an earlier design of the brake was tested on the Virginian in 1918 and subsequently removed. The apparatus of this company is now in service on the following equipment: 100 coal cars on the Norfolk & Western; 40 coal cars on the Denver & Salt Lake; 11 passenger cars on the Chicago & Eastern Illinois; 48 passenger cars on the Erie, and 6 passenger cars on the New York Central. Additional orders now on the books included brakes for the New York, Chicago and St. Louis, Pere Marquette, Rock Island, Erie, Norfolk & Western, Missouri, Kansas & Texas, and El Paso & Southwestern.

A number of enginemen and brakemen of various roads who have operated trains on which automatic straight air brakes were in use have been called to testify as to the operative results obtained.

From present indications it appears that the hearing will be thorough and will last for some time as many additional witnesses are to be called.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended May 13 showed another large increase to 777,359, which was 26,173 more than the loading for the corresponding week of 1921, and an increase of 23,000 as compared with the week before. This was in spite of a reduction as compared with last year of 82,109 cars of coal. With this added to the actual loading the total would have exceeded that for

which showed a decrease of 10,092 cars, and all showed increases over the preceding week except livestock and merchandise, i. e.

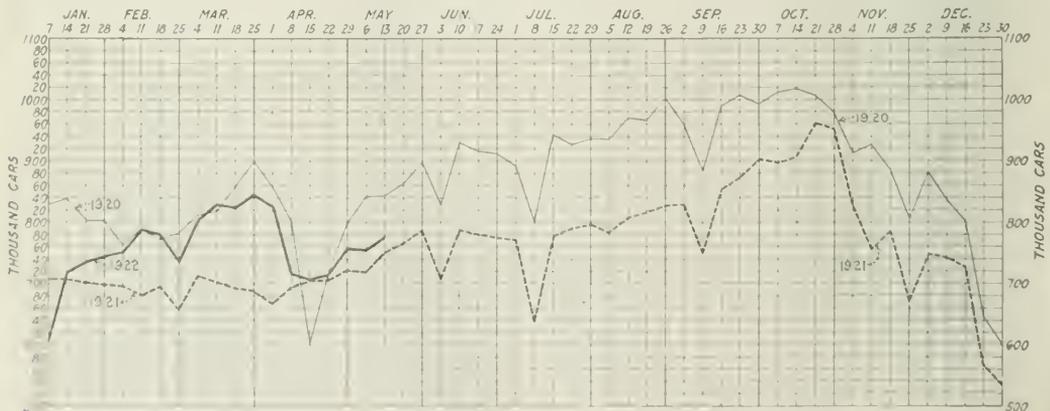
The summary as compiled by the Car Service Division of the American Railway Association is given below:

The number of surplus freight cars for the period from April 30 to May 8 showed a decrease of 18,299 cars, as compared with the period ending April 30, to 353,239. Of these, 86,604 were box cars, a decrease of 8,049, while the surplus coal cars amounted to 226,276, a decrease of 8,801.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS. COMPARISON OF TOTALS THIS YEAR, LAST YEAR TWO YEARS AGO. WEEK ENDED SATURDAY, MAY 13, 1922

District	Year	Total revenue freight loaded							This year, 1922	Corresponding year, 1921	Corresponding year, 1920	
		Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.				Miscellaneous
Eastern	1922	10,886	2,878	8,455	1,434	5,857	2,442	70,555	85,132	187,639	.....
	1921	6,402	2,536	45,543	1,130	5,452	2,679	57,174	63,340	.....	186,256
Alleghany	1922	2,240	2,684	12,866	4,531	3,007	2,758	51,448	66,949	146,483	.....
	1921	1,968	2,545	50,698	2,509	2,139	4,059	43,403	46,330	.....	153,541
Peachinas	1922	197	88	28,283	318	1,457	30	6,145	4,161	40,676	.....
	1921	134	75	23,566	201	1,218	19	5,139	3,537	.....	33,889
Southern	1922	3,192	2,192	21,833	999	19,281	1,064	34,289	46,020	128,869	.....
	1921	3,424	1,812	18,545	760	14,293	818	36,292	33,907	.....	109,871
Northwestern	1922	10,867	7,926	2,487	1,207	17,656	5,752	30,187	35,604	111,686	.....
	1921	7,848	6,705	4,374	598	14,217	15,414	27,087	29,800	.....	106,013
Central Western	1922	10,592	11,304	4,332	155	5,872	2,020	32,880	38,970	105,025	.....
	1921	9,659	9,633	14,594	167	5,638	747	31,154	31,798	.....	103,390
Southwestern	1922	4,401	2,868	2,015	169	7,511	337	15,914	23,846	56,981	.....
	1921	4,775	2,188	3,959	118	6,287	759	16,546	23,580	.....	58,206
Total Western Dist.	1922	25,760	22,098	7,734	1,531	41,059	8,109	78,981	98,420	273,692	.....
	1921	22,272	18,526	22,927	883	26,142	16,920	74,781	85,178	.....	267,629
Total all roads	1922	42,270	29,940	79,170	8,813	60,661	14,403	241,418	300,684	777,359	.....
	1921	34,100	25,514	161,379	5,483	49,234	24,495	216,789	234,292	.....	751,186
Increase compared	1920	30,719	31,403	163,608	9,899	64,438	51,355	156,128	335,614	.....	.....
	1921	8,170	4,426	.....	3,330	11,427	.....	24,629	66,392	.....	26,173
Decrease compared	1921	.....	.....	82,109	.....	.....	.....	10,092	.....	.....	.....
	1920	11,560	.....	.....	.....	.....	.....	85,290	.....	.....	.....
Decrease compared	1920	.....	1,463	84,438	1,086	3,767	36,952	.....	34,930	.....	.....
	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May 13, 1922	1922	42,270	29,940	79,170	8,813	60,661	14,403	241,418	300,684	777,359	751,186	843,435
May 6, 1922	1922	40,133	30,496	75,410	8,124	57,132	11,766	242,945	289,751	755,749	721,722	843,184
April 29, 1922	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	721,084	800,960
April 22, 1922	1922	33,271	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772
April 15, 1922	1922	29,869	25,014	62,851	8,072	54,905	7,164	244,228	274,610	706,713	702,116	601,695



Revenue Freight Car Loadings Up to May 13, 1922

the corresponding week of 1920, which was 84,145. Coal loading was the heaviest it has been since the beginning of the strike and an increase of nearly 4,000 cars as compared with the previous week. All other classes of commodities showed increases as compared with last year, except iron,

there was also a decrease in the number of coke and stock cars. For the following week, ending May 15, there was a further decrease in surplus to 343,689.

The number of bad order cars for the two weeks ending May 1 was 537,704, or 14 1/2 per cent.



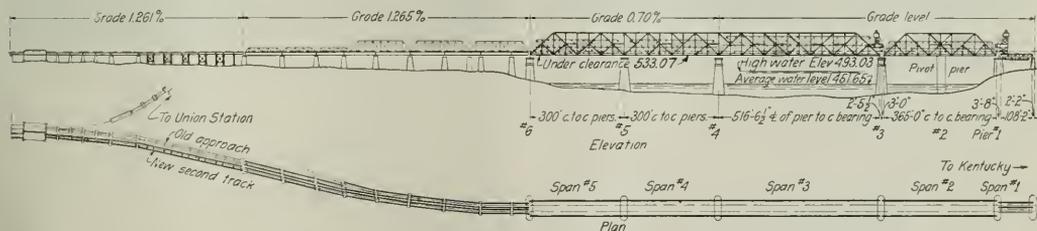
After Supporting These Single Track Spans for 45 Years, the Piers Now Carry a Heavy New Double-Track Superstructure

Double-Track Spans Placed on Single-Track Piers

Utilize Forty-Five Year Old Substructure in Renewal of the Cincinnati Southern Bridge Over the Ohio

THE RENEWAL of the Cincinnati Southern bridge over the Ohio, now nearing completion, is noteworthy as the only large railway bridge project in progress for some time. Aside from this it merits the attention of engineers because of the many original and ingenious methods employed in meeting the problems imposed in this important reconstruction project. Chief among these is the utilization

favorable to cantilever erection. The erection followed the rather common procedure of building the new spans around the old trusses, but according to methods that are essentially original. Provision for a high water channel opening for river transportation requiring a vertical headroom of only 13 ft. more than that afforded by the fixed spans was fulfilled by a 365-ft. vertical lift span, and this short lifting



General Plan and Elevation of the New and Old Structures

of the original piers, built in 1876 for single-track spans, to carry a new superstructure several times as heavy and designed for double-track. This, of course, reflects well earned credit on J. H. Linville, the designer of the original bridge. However, it was only through the exercise of a high degree of engineering skill on the part of those responsible for the reconstruction work that these old piers could be adapted to their present use.

The new superstructure represents the fourth instance of trusses continuous over three or more supports to be built in America during the last five years, a further evidence of the advantages of this form of construction for conditions

distance afforded opportunity for the development of elevating equipment essentially different from that normally employed in bridges of the vertical lift type.

Bridge Owned by City of Cincinnati

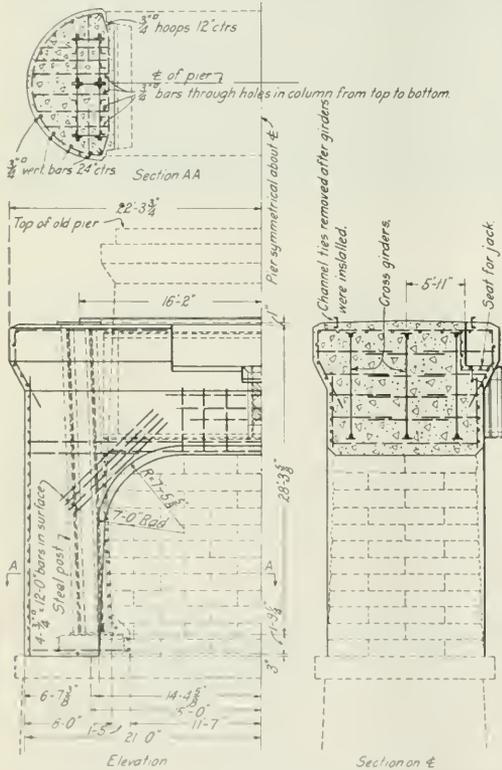
Aside from the structural considerations considerable interest is attached to the Cincinnati Southern bridge because of its ownership by the city of Cincinnati as a part of the Cincinnati Southern, one of the few municipally owned steam railroads in the United States. The property is under lease to the Cincinnati, New Orleans & Texas Pacific, a line controlled by the Alabama Great Southern, which in turn is

controlled by the Southern Railway. The line is operated as a part of the last named system and the bridge renewal project has been financed by the sale of five-per cent gold bonds of the city of Cincinnati, the obligation of which the leasing railroad has assumed by the payment of the annual interest and an annual installment of one per cent against the principal.

The old bridge consisted of four river spans. Two of these were simple fixed spans of 300 ft., the third was a fixed channel span of 519 ft. and the fourth was a symmetrical swing span of 370 ft. center to center of rest piers, this swing span being intended for use at times of high water when there would be insufficient clearance under the 519 ft. span. All of the spans were of wrought-iron, Whipple trusses on

to impose restrictions on the loading of the bridge, as a consequence of which road engines were cut off trains at the south end so that the trains could be hauled across the river by locomotives weighing not over 65 tons. The cars also were restricted to such as had a gross weight not in excess of 115,000 lbs.

As stated above, the bridge has been renewed with a new superstructure on the old piers. In the case of the three fixed spans, continuous trusses have been provided, extending from Pier 3 to Pier 6. In the place of the swing span a vertical lift span has been provided spanning from Pier 1 to Pier 3, thus eliminating the pivot pier. All the spans have been made the same depth, this being determined primarily by the requirements of the long span. The depth was kept the same primarily for convenience of erection equipment operated on the top chords of the trusses. An idea of the difference between the new and the old superstructure is to be had from the cross section showing the plan of erection. The new trusses are nearly twice as deep and are spaced more than twice as far apart as the old trusses. The new spans



How the Tops of the Piers Were Strengthened and Enlarged to Receive the New Spans

limestone piers carried to rock (blue limestone) foundation by the open coffer dam process. The design and details were of a character such that the construction of this bridge marked an important milestone in the progress of bridge engineering in America, particularly as the 519 ft. span was at one time the longest simple truss span in this country. The south approach comprised one 112-ft. truss span, while the north approach embodied 1,660 ft. of viaduct, partly on masonry piers and partly on viaduct towers.

Use of Old Bridge Restricted

Obviously, a structure designed 45 years ago developed limitations on its loading capacity with increases in the weight of railway equipment. This had made it necessary



Erecting One of the Steel Columns Used to Strengthen the Piers

average 8,200 lb. per lin. ft. of bridge, while the old 519-ft. span averaged 4,500 lb. per ft. of bridge. The design loading for the new span is Cooper's E-60; the old spans were designed for a live load of 1,800 lb. per lin. ft. of bridge.

The spans are riveted throughout except for I-bars in the closing panel of the 519-ft. span and a few diagonals in the web system. The main panel lengths are about 74 ft., so that with subdivided panels the stringer span is 37 ft. All riveted members except the bracing are of silicon steel. The I-bars are heat-treated, high-carbon steel.

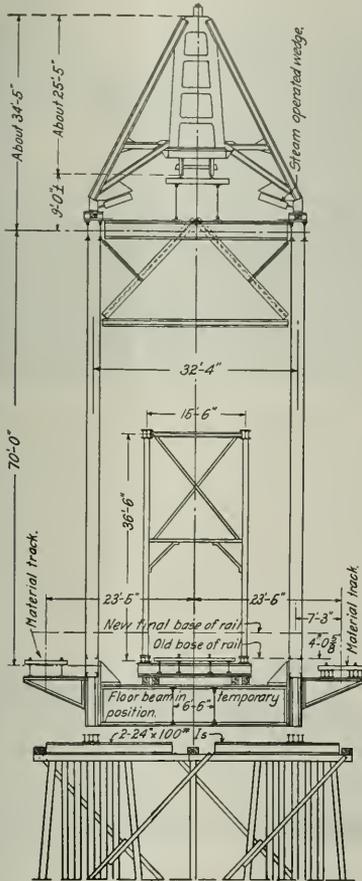
In the north approach, the old through truss spans have been replaced by deck plate girders on masonry piers for double track, covering a total length of 921 ft. Of these the longest span is 120 ft. For a length of 658 ft. the existing single track viaduct is supplemented by a new single track viaduct alongside.

Spans 1, 2 and 3 of the bridge are level; the other two spans are on a grade of 0.7 per cent rising to the south. Owing to the fact that the floor of the new bridge is four feet deeper than the old floor and it was necessary to maintain the

established under-clearance, the track grade on the new bridge is four feet higher than on the old one. This necessitated considerable change in the viaduct structure which was subjected to further change because of a raise of seven feet in the grade of the approach at Gest street, where a new reinforced concrete viaduct has been provided. The entire project required the fabrication and erection of 8,200 tons of structural steel, of which 3,914 tons are in the three con-

ting coping was removed and enough of the pier ends cut away to make room for heavy steel columns and grillage footings to take the end bearings of the new trusses. To apply the load as far from the end of the pier as possible, these columns were inclined inward so that the bases are 14 in. closer to the center line of the bridge than the tops of the columns, the resultant outward thrust at the top being resisted by tie members extending across the faces of the piers and connecting the tops of each pair of columns. However, application of the superstructure load is to be further distributed (following the removal of the old spans) by taking down enough of the pier top between the columns to permit the introduction of three cross girders. These will serve as diaphragms connecting the two columns of each pair and will be wedged up on the masonry so that a considerable portion of the column load will be distributed to the center portion of the pier.

The top of the piers will be jacketed with concrete to enclose the structural steel and provide a bridge seat and

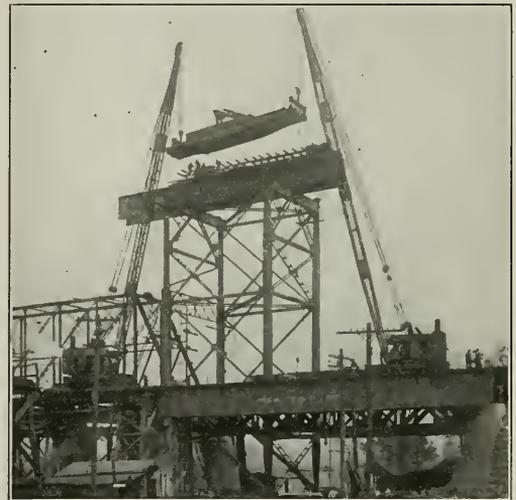


How the New Superstructure Was Erected Around the Old

tinuous spans and 1,251 tons are in the lift span, exclusive of the towers and machinery.

Work on the Piers

To support trusses spaced 32 ft. 4 in. center to center on piers having a top length of only about 28 ft. over the coping was by no means the least of the problems imposed in the renewal of the bridge. Fortunately, the over-all length of the piers at the top of the starting, 30 ft. below the coping, was about 42 ft., thereby offering a solution in the reconstruction of the pier above that point. The great concentrations to be imposed by the new span, together with the need of supporting the existing span during erection of the new work, called for the use of structural steel bents as a means of applying the new load to the piers. The star-



A Delicate Piece of Erection—Setting One of the Derrick Cars on a Scaffold So That It Will Lie in Position to Run Out on the Top of the New Superstructure

coping. The drawing shows how this will be accomplished with a maximum consideration of the finished appearance of the pier.

At Pier 3 an additional complication is introduced in providing a seat for the lifting equipment required for the movable span. This necessitated a pair of cantilever girders projecting from the side of the pier as shown in the drawing. Pier 1 at the south end of the lift span is on pile foundation and has been completely encased in a heavy concrete jacket, also on pile foundation.

Erection Methods Original

Spans 2 and 5 were erected on falsework while Spans 3 and 4 were erected by the cantilever method with the closure in the center of Span 3. The use of continuous trusses for Spans 3, 4 and 5, provided the necessary continuity over Piers 4 and 5 for erection purposes. This was provided over Pier 3 by temporary connections between the top chords of Spans 2 and 3. As shown in one of the photographs, this consists of girders provided for use in the north approach viaduct equipped with temporary end details as re-

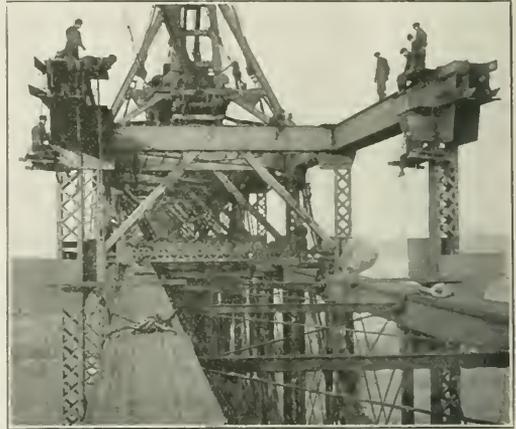
quired for pin connection to the hip-joints of the two adjacent spans.

Obviously, the cantilever method of erection imposed conditions requiring the erection equipment to travel on the top of the structure, but instead of using a creeper traveler running on the top chords, two standard-gage, 60-ton bridge derrick cars with 70-ft. booms were used for this purpose, traveling on a track supported by a floor system composed of bridge stringers spanning between the cross struts of the top lateral bracing. These were the stringers provided for the two outside lines of the stringers in the floor system, as only the two inside stringers were erected at once in final position. The only special equipment provided for the derrick cars was an A-frame designed to provide side bearings and tie downs on the top chords when loads were being lifted. The application and release of the side bearing was accomplished by hydraulic-operated wedge blocks as shown in the drawing and photograph.

The placing of these two derrick cars in position to start work at an elevation 74 ft. above the track level on the old bridge was no mean problem. It was solved as shown in one of the photographs. Four-post platforms were erected just beyond the ends of the two end spans with their tops at a level with the top of the new spans and the first pair of girders for the erection track was placed on these towers, following which the ties and rails were installed and the derrick car assembled piecemeal with the aid of locomotive cranes equipped with 110-ft. booms.

The material for the new trusses could not be delivered on the operated track of the old bridge because it was impossible to pass the large chord members through the framing of the old trusses. For this reason material tracks were provided at the level of the bottom chords on cantilever brackets outside the new trusses on either side. On one side of the bridge these brackets were necessary to provide a sidewalk, but on the other side they served only for erection purposes. In all 801 tons of structural steel was used for the erection of this bridge which was not required in some way as a part of the permanent structure. The mate-

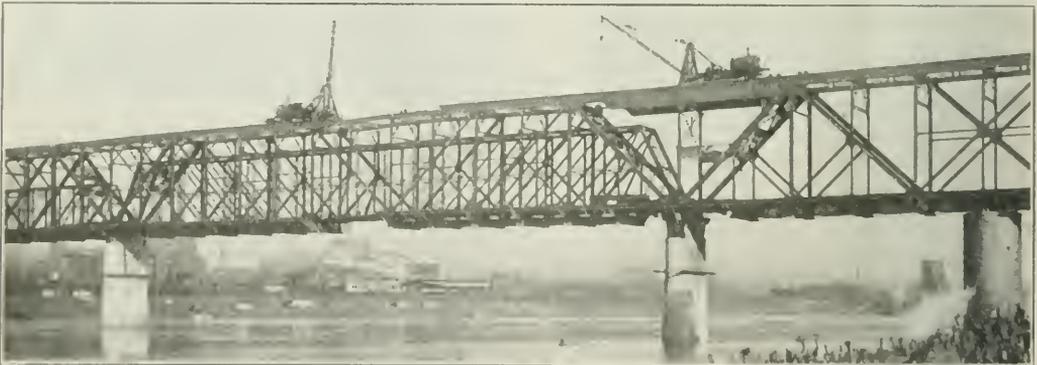
time came for wrecking them. These beams and two lines of stringers were assembled complete in the temporary position with the bottom lateral system and the beams were equipped with special brackets to receive the lateral plates in the absence of the bottom chords, while short diagonal struts were introduced to connect the bottoms of the floor



The New Cross Bracing Had to Lie Erected in a Temporary Position to Clear the Old Spans

beams with the chord members as a means of transmitting the longitudinal thrust of the lateral system into the chords.

This plan had to be modified to some extent in the end panels of the trusses owing to the fact that end floor beams could not be inserted because of interference with the bridge piers. These beams were omitted until the old trusses were removed and the piers cut down as previously explained.



Closing the Gap in Span 3—Note the Kinks in the Bottom and Top Chords at the Ends of the Closing Panel

rial was delivered on these material tracks on standard-gage car, but to avoid undue loading a light narrow-gage locomotive was used to handle the cars. This necessitated the use of a third rail in the material tracks and an offset coupling for connecting the locomotive with the cars.

The erection of the new span around the old one introduced certain considerations to avoid interference of the new members with portions of the old structure. The floor beams had to be erected so as to hang below the old floor and thereby provide a means of supporting the old spans when the

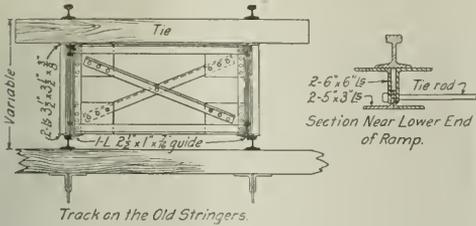
The portals and cross-frames also interfered with the old trusses, as a consequence of which the upper portions of the cross frames were omitted temporarily and the lower portions erected in a raised position. This is clearly shown in some of the photographs which show only the lower part of the X-bracing in position.

How Span 3 Was Closed

Extensometer measurements were made in the top chords of the trusses over Piers 4 and 5 during the course of erec-

tion and the results checked very closely with the calculated stresses for various stages of the work. Thus, readings of 26,000 lb. per sq. in. were obtained for conditions under which the calculated stress was 25,000 lb. per sq. in. The adjustment of bearings on Span 4 after the erection had reached Pier 4 was accomplished by the use of jacks at that

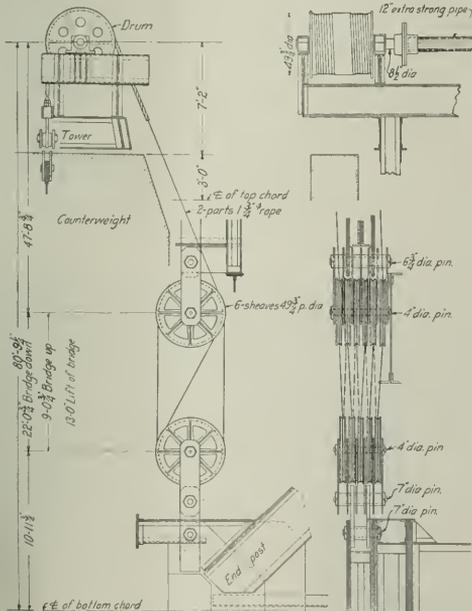
end of the south cantilever was above final position through the adjustment of jacks at the south end of Span 2 on Pier 1. This arrangement allowed a sufficient clearance for the entrance of the closing members in the gap between the ends of the two cantilevers. With the members in position the south end of Span 2 was slowly raised, thus lowering the end of the south cantilever. This action served to shorten the top chord length and gradually introduced compression in the closing member of the top chord. This in turn served to raise the outer end of the north cantilever until Span 3



Two Sections Through the Ramp Used While the Old Floor System Was Being Removed

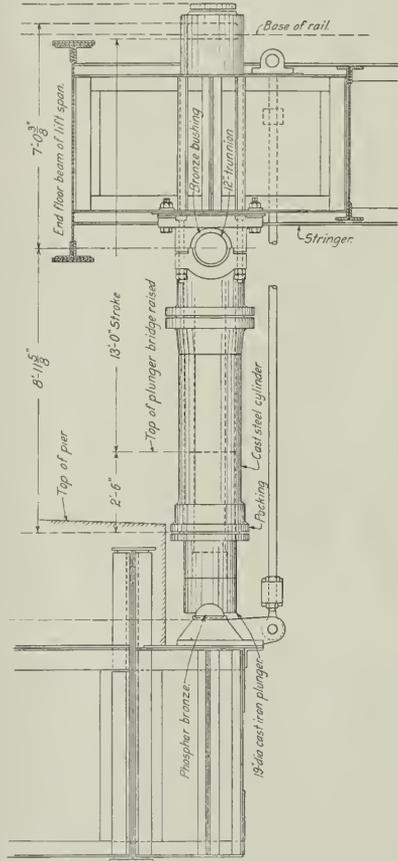
pier, after which no changes were made in the levels at Piers 4, 5 or 6 in connection with the closing of Span 3. This was accomplished entirely by adjustment in elevation at Pier 1 in connection with a unique method of inserting the members in the closing panel.

The closure was made in the central panel on this span



The Counterweight Rig for the Lift Span Is Arranged to Give a Five-Time Multiplication (Copyright American Bridge Company)

as shown in the photograph, the closing members comprising bottom chord eyebars and diagonals with slotted pin holes and a top chord member having butting ends planed on a slight chamfer so that only about the middle third of the member was in bearing. As erected the outer end of the north cantilever was below final position, while the outer



Details of the Jack Provided to Operate the Lift Span (Copyright American Bridge Company)

gradually assumed the elastic curve for the condition of continuity over Pier 4 and simple support at Pier 3.

Following the erection of the new trusses complete the old spans were blocked up on the new floor and the old trusses cut apart and removed. The members were lowered and loaded by the derrick cars from the erecting track on top of the new spans, the material being loaded on to cars standing on the operated track within the bridge. After this work was completed there remained the removal of the old floor and the raising of the new floor to the final level. This work was carried on simultaneously for about four stringer panel lengths at a time, making two or three changes per week. This was complicated by the fact that there was

a difference of four feet between the new and old rail levels, this difference being taken up temporarily by a ramp 150 ft. long, supported on the top of the rails of the old floor and shifted forward each time that a section of the floor was changed. Each time that a change of floor was made the new floor was supported at each panel point by fall lines, while the floor beams were disconnected from the posts. This completed, they were hoisted to the new level, carrying up the old floor system with them. The old floor beams had previously been cut off close to the stringers at each side and had been cut in two between the stringers. The track was then hoisted clear of them and the old stringers were "snaked" out from under the floor on either side, after which the track was let down onto the new stringers.

This process was complicated to some extent at the piers where the new floor could not be installed complete at the lower level as previously explained. This change in floor system was made at intervals between trains and was handled without interference with traffic.

Lift Span of Unusual Design

One of the unique features of the bridge is the lift span for the high water channel between Piers 1 and 3. The lift is only 13 ft., but the piers supporting the span are relatively high in proportion to the lift. Advantage has been taken of these conditions to introduce several innovations, chief among which is the provision of hydraulic power in the form of two large jacks or rams for the lifting equipment, these jacks being of sufficient power to lift one-half the weight of the span owing to the fact that the span is counterbalanced for only one-half its weight. Another interesting detail is the use of multiple part counterweight tackle, as a result of which half the weight of the span is counterbalanced by counterweights weighing only one-tenth the weight of the span. This, of course, implies that the travel of the counterweights is 65 ft. for the 13 ft. travel of the span. The jacks are cast steel cylinders 19 $\frac{1}{4}$ in. in diameter receiving cast iron plungers. One of these jacks is mounted on the center line of the span at each end of the bridge so as to exert a thrust between the loading pocket

on the pier and two loading girders set between the two inside stringers of the end panels of the span.

To allow for change in the length of the span due to changes in temperature the rams are hung in trunnions 12 in. in diameter attached to the loading girders with a hinge joint at the bearing in the loading pocket. The jacks will be operated by oil at a pressure of approximately 3,000 lb. per sq. in., the pressure being supplied from a pump located centrally in the span from which pipes will be connected to each jack through the center of the trunnions. To guard against dropping the span in case of failure of the pumps or the circulating pipes, check valves are placed in the pipes close to each ram. The estimated time for raising the span is five minutes.

Work on the reconstruction of the bridge was started on March 1, 1921, beginning with the construction of the approach piers. This work proceeded to a point where the steel reinforcement of the river piers could be inserted by July 1. The erection of the new trusses, which was started on September 26, progressed continuously and was virtually completed with the closing of the channel span on December 21. Following this, work was started on the removal of the old span, which was completed on February 1, except for the changes in the floor system.

The entire reconstruction project has been carried on under the direction of Ralph Modjeski, consulting engineer, Chicago. The interests of the railroad company are represented by T. H. Gatlin, chief engineer of construction, Southern Railway, Washington, D. C. M. B. Case was the resident engineer for Mr. Modjeski until December, 1921, when he was appointed senior resident engineer on the Delaware River bridge at Philadelphia, Pa., and was succeeded at Cincinnati by Charles Hahn. The new superstructure was fabricated and erected by the American Bridge Company, Emil Larsson, assistant chief engineer.

TWO THOUSAND EMPLOYEES of the Georgia Southern & Florida held their annual picnic at Valdosta on Saturday, May 20. Automobiles to carry the visitors from the railroad station to the fair grounds were furnished by the Rotary and Kiwanis clubs.



A Transcontinental Train on the Canadian Pacific

I. C. C. Prescribes 10 Per Cent Rate Reduction

Credit for Decreases Already Made Reduces Estimated Cut
to \$225,000,000—Rate of Return Fixed at 5.75 Per Cent

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION made public on Wednesday morning, May 24, its long awaited rate decision, in which it finds that 5¼ per cent on the aggregate value of the railway property will be a fair return after March 1, 1922, and that existing freight rates and charges, including charges for switching and other accessorial service and all other charges applicable to freight service which were increased in Ex Parte 74, will be, on and after July 1, unjust and unreasonable to the extent that they may respectively include more than stated percentages of increase over the rates in effect prior to August 26, 1920. The new percentages prescribed effect a general 10 per cent reduction except that rates reduced as a result of the commission's decisions in the western grain and livestock cases and the southern hardwood lumber case and by the voluntary 10 per cent reduction on agricultural products made by the carriers, are not to be further reduced, but are continued in effect. Where rates have been changed since August 26, 1920, primarily by way of readjustment to remove discriminations, prejudices or discrepancies without material effect upon the aggregate level, the 10 per cent reduction is to be applied to the new rate in order to preserve relationships. A 10 per cent reduction on all freight revenues would amount to approximately \$400,000,000. It is estimated that the exceptions and reductions already made will decrease the amount of the reduction now proposed to about \$225,000,000 a year. The reduction in the rate of return reduces the amount which the commission finds should constitute a reasonable net operating income for the carriers from \$1,134,000,000 to \$1,086,000,000.

Decision Dated May 16

The decision bears the date of May 16, indicating that it was reached prior to the President's conference with the railway executives at dinner at the White house on Saturday evening, at which he and Secretary Hoover urged the railroads to make voluntary reductions on certain basic commodities. It has been stated officially at the White House that the commission could not on the record made in its general rate investigation apply the amount of the reductions which it found warranted to specific commodities only, but must apply them generally and that the carriers had been offered an opportunity to substitute an immediate voluntary reduction for one to be ordered by the commission. The commission's report is not in the form of an order, but states that the respondents should advise it promptly and not later than May 31, if possible, whether its findings will be carried into effect without formal order or orders. A committee of railway executives appointed following the White House dinner which had conferred with the commission on Monday morning was to meet with the commission again on Thursday and apparently the decision leaves it open for them to propose a program of voluntary commodity reductions as a substitute for a general order. The commission's report contains no indication as to how such a proposal would be regarded, however, and statements from the White House indicate that the President was not optimistic following his conference with the railroad executives that they would be able to reach an agreement that would comply with the wishes of the administration for substantial reductions on basic commodities rather than a smaller reduction spread over all traffic.

The commissioners were unanimous that rates should be re-

duced and the majority opinion finds that the reductions should be general. Four of the commissioners, however, in concurring and dissenting opinions, favored reductions on basic commodities. Commissioner Eastman expressed the opinion that the decision should have been deferred until after the Labor Board has acted. The majority opinion finds no reductions in passenger fares warranted, but Commissioners McChord, Potter and Cox thought that passenger rates should be reduced.

Fair Return 5.75 Per Cent

The 10 per cent reduction is proposed to be effected by the findings that rates will be unreasonable to the extent that they exceed more than 26 per cent above the rates in effect on August 25, 1920, in the eastern group and between points in Illinois territory and between Illinois territory and the eastern group, instead of the 40 per cent increase authorized in Ex Parte 74. In the western group and between the western group and Illinois territory the 35 per cent increase of Ex Parte 74 is reduced to 21½ per cent. In the southern and Mountain-Pacific groups the 25 per cent is reduced to 12½ per cent and on interterritorial traffic the 33⅓ per cent is reduced to 20 per cent.

The commission finds that such rates will enable the carriers in the respective rate groups under honest, efficient and economical management, with reasonable expenditures for maintenance of way, structures and equipment, to earn an aggregate annual net railway operating income equal as nearly as may be to a return of 5.75 per cent upon the aggregate value as taken for the purpose of this proceeding and the railway property of such carriers held for and used in the service of transportation.

The majority opinion says that a fair return of 5.75 per cent, representing income arrived at after deducting the federal income tax on a return of 6 per cent, would be approximately the equivalent of a fair return of 6 per cent, out of which the federal income tax was payable. Commissioner Potter, in his concurring opinion, says the rate should have been fixed at 6 per cent.

The commission finds that since the advance of August, 1920, the carriers have failed by a considerable margin to earn the authorized return. Not that it appears reasonably certain, with increased traffic and lowered operating expenses that the net railway operating income of the carriers in 1922 would be more favorable under present rates than in 1921. The commission does not find that the high rates caused the business depression. "Manifestly," it says, "the depression of 1921 resulted primarily from causes other than transportation charges, but it does not follow that under present conditions existing high rates do not tend to retard the return to a more normal flow of commerce. We are of the opinion that general reduction in the rate level as substantial as the condition of the carriers will permit, will tend not only to lessen the transportation burden, but also to equalize and stabilize the condition under which commerce and industry are carried on, with consequent full assurance to the carriers of realizing the fair return contemplated by the law." An abstract of the report follows:

Report of the Commission

The important questions for determination are whether present rates, fares, and charges, in the aggregate, as a whole or in the several rate groups defined in Increased Rates, 1920, or upon

specified commodities or descriptions of traffic, are or will be unreasonable under section 1 or other provisions of the act; whether such rates, fares, and charges are those which will most nearly produce a fair return as provided in section 15a; and what the fair return shall be on and after March 1, 1922. When this proceeding was instituted there were pending before us several petitions filed by carriers and by various organizations of shippers in which we were asked to enter upon general investigations into the reasonableness of existing rates and charges.

In Increased Rates, 1920, supra, we designated rate groups and authorized substantial increases. Late in that year there developed a pronounced and long-continued business depression, nation wide, a phase of the general post bellum adjustment throughout the world. Practically all traffic and all industry have been affected. There has been substantial reduction in the price of most commodities without a corresponding reduction in rates. There is a definite conviction in the minds of the shipping public that the present rate level is unreasonably high, is an effective barrier to the return of business activity, prosperity, and the usual volume of traffic, and that it should be substantially reduced.

Fair Return

Since August, 1920, the carriers have failed by a considerable margin to earn the authorized return. It is urged by some that under existing conditions the question of a fair return for the future is academic and that it is not necessary for us to determine a percentage of return at this time. We do not take this view. The operation of economic forces which have prevented, or which may hereafter prevent, carriers from earning a fair return under the adjustment of rates then prevailing does not constitute a bar to determination of what a fair return should be. By the qualifying words "as nearly as may be," Congress recognized that conditions during certain periods might prevent such realization under any adjustment of rates.

The determination of what will constitute a fair return is, in our judgment, a function distinct from that of initiating and adjusting rates. Section 15a, reasonably construed, contemplates the determination of a return which the carriers, collectively or in rate groups, may attain over a period of time under rates adjusted from time to time with that object in view. The phrase "from time to time" does not mean that we should adjust and readjust rates to meet business fluctuations. Whether carriers may be able to earn an aggregate net railway operating income equal to a fair return must depend to a large extent upon business conditions.

We have before us a practical problem. The record emphasizes the need of a constant influx of capital to meet the country's growing transportation needs. In the 10-year period ending June 30, 1916, a period of relatively low costs of materials, supplies, and labor as compared with present costs, there was a net addition to capital account for new lines and extensions, additions, betterments, and general expenditures properly chargeable to that account which aggregated about 534 billion dollars, or an average of 574 millions per annum. According to an exhibit of the carriers, expenditures for such purposes in the 12 months ended September 30, 1921, aggregated about 365 millions, an average of 1 million a day. This omits certain roads not reporting. The carriers estimated that based on the volume of traffic which they were then handling, capital expenditures in the year 1922 should approximate 458 millions, and that if transportation facilities are to be expanded in 1922 as they should be to provide for a materially increased volume of business, the expenditure this year should be approximately 858 millions, or an average of 2 1-3 million dollars a day. Others estimate lesser amounts. Some authorities on transportation and economic conditions place the requirements for the next few years at even higher amounts, to cover in part out of earnings and predict that, unless there is immediate resumption of new construction, a return of anything like normal business will result in "strangulation for lack of transportation." Others are of opinion that the existing transportation facilities, if properly maintained, with necessary additions in the way of terminal and trackage facilities, is adequate to handle the business which may reasonably be expected in the immediate future.

It is not to be inferred, in addition to capital must continually be made. The carriers must attract money by rates of return and earnings on investments. While return must not exceed a reasonable amount, and the rate level is fixed, it must be such as to obtain the needed investment. It is necessary to determine and make public the rate to be provided by section 15a, a percentage of fair return. Determination of the percentage for each carrier with it, it is contended, should be connected with the provision for recapture of capital of the carrier, and 6 per cent of the total investment.

It is urged that the carriers should be held to the limit to some extent of their present rates, and that a fair return should be determined on that basis. We do not deal with rates with interest in this proceeding. It is not our duty to deal with rates, but with the question of what a fair return should be, and the circumstances which should justify a return on the terms of the present act, and the adjustments which should be made.

Provisions Congress recognized that uniform rates on competitive traffic which would adequately sustain all the carriers would produce substantially and unreasonably more than a fair return for some carriers. We should not take the few, and the highest type of their securities, as the basis for determining what shall be a fair return for all. It can hardly be disputed that the carriers of this country should not continue to provide for all needed capital by successive bond issues. In such a process eventually a point must be reached where no new capital can be raised, except for short terms at high rates. No substantial proportion of the new capital has been raised by issuance of stock since 1907.

Notwithstanding the failure of the carriers to earn the 6 per cent allowed in the first two years of operation under section 15a, there is an upward trend in railroad securities, which share in the improved conditions that have prevailed generally in the money market. This is urged upon us as an argument for reduction in the percentage to be determined. Other elements, however, are to be considered. The intent of Congress was to create a steady and reliable flow of money "for enlarging such facilities in order to provide the people of the United States with adequate transportation." A substantial reduction in the percentage of return might be unsettling in its effect, particularly in light of the fact that the return allowed in 1920 was not realized. The fact that a utility may reach financial success only in time or not at all is a reason for allowing a liberal return on the money invested in the enterprise.

In numerous cases cited, courts and regulating authorities of states have recognized that public utilities and railroads may be permitted individually to earn under reasonable rates at least 6 per cent upon fair value. In some instances higher rates of return have been approved. But we are here considering return upon "the aggregate value of the railway property."

The interstate commerce act in many provisions other than those quoted indicates that 6 per cent may be regarded as a fair return. Paragraph (6) of section 15a provides for the disposition of net railway operating income in excess of 6 per cent of the value of the property held for and used in the service of transportation. One-half of the excess goes into a reserve fund, which may be drawn upon for certain purposes, in accordance with paragraph (7), when net railway operating income for any year is less than a sum equal to 6 per cent upon the value. Under paragraph (12) we may make loans from the general railroad contingent fund, such loans to bear interest at the rate of 6 per cent per annum. Under paragraph (14) we may lease equipment or facilities purchased from the general railroad contingent fund, the rental charges to be at least sufficient to pay a return of 6 per cent per annum plus allowance for depreciation. That Congress by direct legislation fixed the fair return for the period of two years beginning March 1, 1920, at the rate of 5 1/2 per cent, to which, in our discretion, we might add not exceeding one-half of 1 per cent, is a matter which may fairly be considered in the determination of the rate for the period immediately ensuing. But, taken in connection with the other provisions of section 15 (a), it does not constrain us to consider 5 1/2 per cent as maximum in determining a fair return for the ensuing period.

Railway Property Value

In the instant proceeding there is little of record which goes directly to the subject of value. There has been a general acceptance by carriers and shippers of the value taken in our former determination as an appropriate basis for the purposes of the present proceeding. The carriers have not attempted to show that that value should be increased, other than by appropriate consideration of the subsequent increments to the transportation plant. We have before us deductions made by certain of the state commissions and shippers, based upon the results of the valuation work under section 19a so far as announced, and also computations based upon the market value of outstanding stocks and bonds.

More than 20 months have passed since our former determination and in that period the valuation of the railroads under section 19a has gone forward. The work is still incomplete, but has progressed to such an extent that we may accept the results with full assurance, both as to particular roads and as showing general trends and principles. In our administration of various sections of the act, and in our certification of standard return for the purposes of the federal control act, we have had occasion to make further investigation and corrections of investment accounts of the carriers.

The various other values and elements of value, as set forth in Increased Rates, 1920 supra, have been re-examined in the light of the present record and the requirements of section 15a. We find no present reason to disturb the value taken by us in that proceeding as approximating the sums there stated, except to the extent that subsequent additions to or withdrawals from the property in service involving materials and supplies and working capital, and further depreciation, made adjustment necessary. Whether the value taken by us in 1920 should stand without con-

sideration of these later items or not, the difference would be reflected only in fractions of per cents of the returns hereinafter indicated as the results of operation.

Revenues and Expenses

The net railway operating income for 1921 of Class I carriers, including large switching and terminal companies, yielded returns of 3.30 per cent in the eastern group, 2.60 per cent in the southern group, 3.50 per cent in the western and mountain-Pacific groups, and 3.31 per cent for the United States as a whole, on the valuation for all roads taken by us, for the purposes of that proceeding, adjusted by the carriers to cover Class I roads only, together with additions and betterments on Class I roads aggregating \$605,000.00 for the year ended December 31, 1920.

The decrease in net railway operating income shown between October, 1920, and July, 1921, was due to decline in traffic. The marked increase in that income during the last six months of 1921 was due to increased traffic and lowered operating costs. Deficits were experienced in January and February, 1921, in the eastern group and in January, 1921, in the western district. In the southern group the rate of return in those months was less than 1 per cent, although the tonnage handled in January was high as compared with the remainder of the year, bearing in mind ordinary seasonal variations. Ordinarily, except in the southern group, traffic begins to increase in the spring months and reaches its peak in the harvest months, August to October. In the south traffic during the summer months is light and the heavy months are October, November, and December. The principal reductions in costs accomplished during 1921 were brought about by reductions in force, wage reductions ordered by the Railroad Labor Board effective July 1, and gradually receding prices of materials and supplies. As the combined result of the higher level of rates, fares, and charges and of these reductions in operating costs, the net railway operating income of the carriers as a whole for 1921 was substantially greater than that for 1920, although the ton-mileage in 1921 was less than in any year since 1915 and approximately 25 per cent below that of 1920.

Efficiency and Economy in Operation

One of the matters for consideration is the extent to which net income can be increased by enhanced economy and efficiency in operation. The record indicates that the railroads individually, and collectively through their associations, have been and are devoting their attention to this matter. Substantial progress has been made in standardizing the various parts of equipment, thus increasing their interchangeability and promoting economy in equipment repairs. Committees of these associations are engaged upon plans to lower the unit cost of car repairs, fuel, and other items, and to reduce loss and damage. The evidence indicates realization of certain savings and improvements in operation. We are investigating methods of increasing economy and efficiency of operation.

During the war various governmental agencies, in co-operation with shippers, brought about material increases in car loading. The carriers direct our attention to the fact that the loading per car during the 12 months ended September 30, 1921, was 28.5 tons, which is substantially the same as that during the war years. Since February, 1921, for various causes, some of which are temporary in character and beyond carriers' control, the average car loading has declined.

The percentage of empty-car mileage to loaded-car mileage was greater during the 12 months ended September 30, 1921, than during any corresponding period within the past nine years. The carriers' existing car-service rules are based upon ownership and control by each carrier of its cars. The increase in the movement of empty cars resulted from the carriers' practice, then, and now, of returning cars empty to the owning carrier when loads are not available. The business depression which then prevailed prevented the usual number of loaded movements, and thus brought about the increase in empty-car mileage.

Representatives of owners of railroad securities appeared and urged adoption of a plan which contemplates co-ordination and unification of operations of carriers, more particularly with respect to the purchase, repair, distribution, and control of freight cars. Respondent carriers introduced little testimony with respect to this plan and gave no indication of intent to adopt any similar plan. It is evident that the full economies predicted would not be immediate, that there would be difficulties in attainment, and that heavy expenditures of capital would be required. If the purpose of section 15a to afford carriers a reasonable return is to be attained, earnest efforts toward reduction of operating expenses in all possible ways consistent with good service must be continued. The far-reaching importance of such proposals calls for a more intensive study by carriers and the proponents than appears to have been made.

Consideration is being given by the carriers to co-operation in the use of facilities. The joint use of facilities established dur-

ing federal control has been continued in many instances, and some progress is being made in the direction of further co-operation. The record does not disclose any general lack of efficiency.

Maintenance

The significance of the return of 3.31 per cent given above for Class I railroads during 1921 depends to a considerable extent on whether the maintenance charges for that year represented adequate upkeep. Certain executives testified that the net railway operating income which resulted from the operations of 1921 was obtained only by forced economies which are neither in the public interest nor susceptible of indefinite continuance; that these economies took the form of inadequate maintenance; that the hours of labor consumed and the quantities of material applied in maintenance of way and structures on certain lines was less in 1921 than during the average of years in the test period; and that in general no more was done than was necessary to keep the lines in a condition safe for operation.

The carriers generally seem to have taken the fact of under-maintenance during 1921 for granted rather than to have undertaken to prove it. Individual carriers have proved its existence in their own properties. Maintenance charges of Class I roads aggregated \$2,017,700,867 in 1921, more than in any preceding year except 1920, when the total was \$2,623,985,448. The decrease of 1921 under 1920 was \$606,284,581, or 23.1 per cent. The volume of traffic in 1921, as measured by ton-miles, was about 25 per cent less than in 1920. Unusual features in the operations of 1920 make that year unreliable as a measure of what the annual outlay for maintenance should be. It was a period of peak prices, when the greatest ton-mileage and passenger-mileage in the history of the railroads moved under most adverse conditions. Moreover, labor and material costs were lower in 1921 than in 1920. In relation to total operating expenses, maintenance charges in 1921 were almost the same as in 1920, the percentages being 43.6 and 44.1, respectively.

The record does not disclose whether the actual quantities of material applied were as great in 1921 as in previous years. It does not appear that, taking the country as a whole, such applications in 1921 compare unfavorably with those of 1920, or of the test period. Returns from carriers representing more than half of the tie and rail applications for 1920 indicate that their 1921 applications are within 1 per cent of those of 1920, the East and South being greater than in 1920, and the West being less. In a year in which the movement of traffic is light, somewhat less maintenance is required than in years of heavy traffic, although it would be in the public interest if surplus from prosperous years were expended on maintenance in years of light traffic.

When we consider the conditions which prevailed during 1921, the carriers' contention that current maintenance was deferred may have basis, but they have not supported their contention with such facts of record as would warrant us in making a definite finding of to the extent to which it was deferred. Carriers could not and did not escape the compelling influences which affected other forms of industry during that lean year. The number of their employees was reduced by a fifth, sometimes more; outgo was pared and upkeep skipped where possible; the "bad-order" figures cover an increasing number of cars requiring heavy repairs, as well as the obsolete and obsolescent, which were not being replaced to the requisite extent; and, in brief, we are left with the abiding, if composite, impression that, on the whole, the railway plant of the country was not at the end of 1921, and is not now, in as good condition as it should be, and is far from ready to meet the demands which will come with resumption of general business activity. There are, of course, some notable exceptions.

We are of opinion that if the return of 3.31 per cent for Class I roads for the year 1921 were corrected, such corrected return would not vary so materially from 3.31 per cent as to make unsafe or unreliable the adoption of that figure as approximating the result of actual operation in 1921.

Constructive Year

Rapidly changing conditions since August, 1920, make the actual results of operation and the percentage earned of little value as a guide for the future, unless viewed in the light of present and prospective conditions. The carriers in response to our request introduced statements indicating what the results of the operations of Class I roads would be for a constructive year, based upon the traffic of 1921, under rates and costs prevailing in February, 1922. The statements reflect net railway operating income here of \$443,609,800, or a yield of 5.06 per cent on a valuation of \$8,775,000,000 for the eastern group; \$95,350,869, or a yield of 4.25 per cent on a valuation of \$2,243,499,045 for the southern group; \$368,732,961, or a yield of 4.49 per cent on a valuation of \$8,206,000,000 for the western district; and \$907,693,630, or a yield of 4.72 per cent upon a total of \$19,224,499,045 for Class I carriers in the United States as a whole. The valuation used is that taken by us in Increased Rates, 1920, supra, for all railroads, as ad-

justed by them in their estimates to cover Class I roads, with additions and betterments of \$330,000,000 to September 30, 1921, a total of \$778,449,045.

Passing from the constructive year to the prospects for the immediate future, the carriers estimate that the revenue tonnage for 1922 will not exceed that of 1921. In support of this position they assert that in the Middle West the winter wheat crop of 1922 will be less than that of 1921; that there is prospect of a considerable decline in the California citrus crop due to damage by frost; and that in the South the acreage of cotton has been reduced by various factors. We are not ready to accept February crop estimates as accurate, but, even if their forecasts of these three crops are realized, this is far from conclusive that the aggregate tonnage of agricultural products will be decreased. Yields of various crops vary from year to year. Some are good and others are poor, and large yields of other crops may more than offset and deficiency in these three. Moreover, facts of record indicate that in the South cotton growing is being supplanted to some extent by diversified farming.

The carriers asserted that there was no evidence of a revival of business sufficient to warrant a prediction of increased traffic in the near future. Since the second week in January the number of cars of revenue freight loaded had been steadily increasing, but this the carriers in part discounted on the ground that the increased car loadings were caused largely by emergency shipments of coal designed to guard against the contingency of a strike in the coal fields on April 1. The strike has occurred and still continues; and the revenue freight loaded has somewhat decreased.

Taking the charted trend as normal, freight traffic for 1921 was subnormal. We feel justified in accepting increased revenue car loadings as foreshadowing an increased volume of freight traffic. The effect of the coal strike, which began April 1, cannot be forecast. It may affect traffic other than coal and coke. The increase in loading for all freight traffic during the first three months of 1922 was 11.9 per cent over that of 1921.

The increase was general, and not confined to coal and coke. It appears reasonably certain that, with increased traffic and lowered operating expenses, the net railway operating income of the carriers in 1922 would be more favorable, under present rates, than in 1921.

Freight Rates and Charges

The average revenue per ton-mile in 1921 was greater than that for the fiscal year ended June 30, 1914, by the following percentages: Eastern district, 96.1; southern district, 61.4; western district, 59.3; and United States as a whole, 76.2. In 1914 the average-distance haul per revenue ton per road was 155 miles and in 1921, 187 miles.

General reductions ranging from 10 to 22 per cent ordered by us with respect to carload rates on grain, grain products, and hay in the western and mountain-Pacific groups became effective during January, 1922, and upon our recommendation rates on live stock in the same groups in excess of 50 cents per 100 pounds had been reduced 20 per cent, but not below 50 cents, in October, 1921. Practically all other carload rates upon products of the farm, garden, orchard, and ranch throughout the country were reduced 10 per cent in January, 1922. All of these reduced rates, other than those on grain, grain products, and hay in the western and mountain-Pacific groups, expire by tariff limitation on June 30, 1922. Only in these three instances have reductions been made covering the entire country, or the whole of any one or more rate groups, since the increases of 1920 became effective.

Many rate adjustments, resulting in reductions, have been made since the increases of 1920. Some affected a substantial volume of traffic such as export grain, bituminous coal to Lake Erie ports for the Northwest, sand and gravel in eastern territory, ore, lumber, and petroleum and its products. In some instances the volume of traffic after the reduction was less and in others more than before the reductions. Protests, usually alleging undue prejudice, have been filed by shippers against many of these readjustments, and in some cases have resulted in suspension proceedings. Some readjustments have been made hastily under pressure from particular shippers, or for the purpose of retaining traffic or detaching it from one group of carriers to another.

In their constructive year, which is based on 1921 tonnage, the carriers calculated the net effect of the reductions in the revenue of Class I roads at \$189,700,000, distributed as follows: Eastern group, \$75,000,000; southern group, \$15,200,000; western district, \$99,500,000. This estimate represents but 47 per cent of \$3,963,500,000 the freight revenue for 1921, as adjusted by carriers to cover rate reductions made prior to January 1, 1922. The total amount paid by shippers and passenger for transportation has also been reduced by the amount of the transportation taxes, reported January 1, 1922 which in 1921 aggregated approximately \$1,500,000,000.

The opinions of shippers and representatives of the public in this proceeding are diverse. Many urge immediate radical reductions, contending that rates in the aggregate or on particular com-

modities are unreasonable; that the increases of 1920 contributed to the depression which followed by a few months the date of their establishment; that notwithstanding some readjustments and reductions subsequently made, the existing rate level is preventing a revival of commerce, and, by diminishing the flow of traffic, defeats the desired end of producing adequate net return for the carriers. Others urge that rates be reduced as soon as possible, but express no opinion as to whether reductions should now be made. Most of the general commercial and shippers' organizations urge that reductions when made should apply generally to all rates, as did the increases of 1918 and 1920, but no shipper or shippers' organization urged reductions in fares as well as in rates. Numerous state commissions in the West and South contend that reductions should be made both in rates and in fares. The representatives of certain industries and of a few general organizations urge that reductions be applied only to basic commodities, the staples which are recognized as most important to the economic situation of the country, and which usually constitute low-grade freight.

The carriers are unanimous in the opinion that increased rates have not caused the business depression, which they attribute to generally recognized world-wide readjustments resulting in unfavorable trade and credit conditions, restricted purchasing power, contraction of consumption, and, in many instances, collapse of demand. The carriers contend that the increased rates were not even an important contributing factor in the lessening of traffic in 1921, and that reduction in rates will not restore normal traffic. They admit that rates are too high and must come down, but they insist that rates can not be further reduced until the costs of transportation are further reduced.

Rates generally have been increased twice in the past four years, the increase of 1920 alone having been intended to produce more than one billion dollars additional revenue from the transportation of freight. As wages and cost of materials have been materially reduced since the increases of 1920, it is the position of shippers generally that the inability of the carriers to earn a fair return since these reductions were made is due largely to the failure of traffic to move in normal volume, and that the most important problem before us is to devise rates that will move more traffic and at the same time be compensatory to the carriers. It is generally recognized that existing high rates are a burden upon commerce, and many shippers insist that they are forcing movement to other forms of transportation, tend to restrict traffic, and in some instances to prevent particular movements. Many complaints are also made relative to the disturbance of relationships between producing or consuming districts due to the manner in which rates have been increased, and to partial readjustments which have subsequently taken place. The belief is general that traffic has been localized and the radius of distribution reduced.

Numerous shippers sought reductions in rates on commodities manufactured or handled by them. Most of these shippers contended that their commodities are basic and accordingly entitled to first consideration; or that, if any reductions are to be made, such reductions should apply upon their commodities quite as much as upon commodities generally characterized as basic. Some shippers stressed the relatively high level of class rates, and pointed to increases therein as well as in classification ratings of many articles, in addition to general increases. They stated that the net result of the various changes has been to widen unduly the differences between carload and less-than-carload rates, and urged that to widen further these differences by reducing carload commodity rates and not class rates would have a serious effect. Some of the miscellaneous commodities move generally on class rates, others on commodity rates. Commodities which move on class rates in some territories move on commodity rates in others. The wide range of evidence presented, the numerous and diverse interests concerned, and the competitive relationship of many commodities, accentuate the difficulty of selecting individual commodities for specific reductions.

Passenger Fares

According to statistics compiled by us from annual reports of Class I roads the operating ratio in 1920 for passenger and allied services was more favorable than that for freight service. For the 12 months ended September 30, 1921, the situation was reversed, and, except in the southern district, the operating ratio for the freight service became the more favorable of the two. This is readily explained by the greater increase in freight rates than in passenger fares and by the fact that decline in traffic permits of greater reduction in freight-train than in passenger-train mileage.

Many causes contributed to the decrease in revenue passenger-miles in 1921. They include the business depression, the increased use of motor vehicles, the improvement of highways, and the high level of passenger fares. Reduction in fares would no doubt increase travel somewhat, but the record does not warrant the conclusion that under existing conditions this stimulus would suffice to offset the resulting loss in revenue. Eastern carriers

estimated that restoration of the passenger fares of August 25, 1920, a reduction of 16.2/3 per cent, would result in a revenue loss of \$176,560,000 annually in the whole country, and that to offset that loss an increase of 20 per cent in passenger traffic would be necessary, allowing nothing for the added expense incident to the additional traffic.

The Pullman Company sought removal of the surcharge, contending that it tended to reduce travel in sleeping and parlor cars. A sharp decline in such travel followed the application of the surcharge. Fluctuations since September, 1920, in the number of Pullman passengers carried have almost paralleled those in the number of all revenue passengers carried.

The record indicates that travel in sleeping and parlor cars has not decreased in substantially greater ratio than travel generally, and does not warrant a conclusion that the decrease in travel in sleeping and parlor cars is traceable to the surcharge.

Conclusions

The carriers take the position that we must be guided solely by those things which are definite and certain in the past. With this we can not agree. Our function under the law is not that of mere computers and can not thus be atrophied. The duty to prescribe rates for the future carries with it the obligation to exercise an informed judgment upon all pertinent facts, present and past, in order to forecast the future as best we may.

When we decided Increased Rates, 1920, supra, the country was still in a period of steadily rising prices. We then resolved doubts as to future operating costs in favor of the carriers. In recent months costs have been declining and traffic increasing. Rates of pay for employees have been reduced to an extent which, based upon the light traffic of 1921, is estimated by carriers to aggregate more than \$350,000,000 per annum. The Railroad Labor Board has estimated that the reduction exceeds \$400,000,000 per annum, without taking into account changes in rules and working conditions. The tendency is toward increased revenues, lowered costs, and higher net income for the carriers.

Under the adverse conditions of 1921 the net railway operating income of Class I carriers of the United States totaled \$614,810,531. Based upon the subnormal traffic of that year, and the wage rates, and prices of materials and supplies, prevailing at the end of the year, the carriers in their constructive year estimated an aggregate net railway operating income of \$907,693,630, equal to 4.72 per cent upon the valuation used by us as adjusted by carriers to cover Class I roads only, including additions and betterments since January 1, 1920, amounting to \$778,499,045. Adopting the ratio of net railway operating income of all carriers to that of Class I carriers in 1915 and 1916 as being approximately correct for 1921, the net railway operating income in the carriers' constructive year would be for all carriers \$923,783,340, or 4.89 per cent upon the valuation.

We do not accept the adjustments made by carriers in their constructive year as correct or complete. We have indicated that further adjustments are necessary in order better to reflect probable expenditures for federal income tax, fuel, and materials and supplies. Reductions in rates will carry with them reductions in operating expenses of carriers through lessened transportation charges paid by them on their fuel and materials and supplies. Thus it is estimated that a reduction of 10 per cent in transportation charges on coal would effect a saving of over \$7,000,000 on the amount of coal consumed by Class I carriers in 1921.

The net railway operating income of all carriers has exceeded \$900,000,000 in only two years, 1916 and 1917. In 1916, the most prosperous year in the history of the railroads, it aggregated \$1,051,543,860, and during the three years of the test period the average for Class I carriers was \$906,524,492, approximately the amount which accrued as annual rental to the carriers under federal control.

The figures heretofore given include no estimate for increased traffic over that of 1921, which clearly was subnormal. We do not anticipate return to the tonnage of 1920 for some time to come, but there are many indications of greater tonnage than in 1921. The car loadings for February and March, 1922, exceeded those of the corresponding months in 1921 by 11.7 per cent and 19.9 per cent, respectively. During the first three months of 1922 car loadings exceeded those of the same period of 1921 by 11.9 per cent.

Any additional tonnage realized should be handled under a favorable operating ratio. It appears that under present rates, and with an increase of 10 per cent or more in traffic over that of 1921, not only would the net railway operating income of the carriers as a whole for the next 12 months be substantially in excess of the fair return herein determined, but it would greatly exceed the corresponding figure for any year in the history of railroad operation.

In 1920 we authorized large increases in rates and fares designed to produce the necessary revenues under the conditions then prevailing. There was then little doubt of the ability of industry to

bear the increased charges. The situation has since changed. High rates do not necessarily mean high revenues, for, if the public can not or will not ship in normal volume, less revenue may result than from lower rates.

Shippers almost unanimously contend, and many representatives of the carriers agree, that "freight rates are too high and must come down." This indicates that transportation charges have mounted to a point where they are impeding the free flow of commerce and thus tending to defeat the purpose for which they were established, that of producing revenues which would enable the carriers "to provide the people of the United States with adequate transportation." In 1921, freight traffic was only slightly more than 10 per cent in excess of that in the year ended June 30, 1915, which was not an unusual year. But the charges for moving freight traffic in 1921 totaled nearly four billion dollars, or about two billion dollars in excess of 1915. Railway operating revenues in 1921 aggregated about 5 1/2 billion dollars, or more than 2 1/2 billion dollars in excess of 1915. If the traffic in 1921 had equaled that indicated as normal by the trend during the 26-year period preceding the war, freight revenues and total railway operating revenues would have exceeded those of 1915 by approximately 2 1/2 billion and 3 1/2 billion dollars, respectively. Without any allowance for pyramiding of transportation charges in goods passing from hand to hand, these figures are significant as explaining, at least in part, existing wide spreads between the amounts received by producers and these paid by consumers.

Manifestly the depression of 1921 resulted primarily from causes other than transportation charges. But it does not follow that under present conditions existing high rates do not tend to retard the return to a more normal flow of commerce. Deflation has taken place to a greater or less extent in wages and origin prices of commodities in nearly all branches of industry but most transportation charges are still near the peak.

Practically all agree that stability of freight rates is highly desirable and that normal traffic may not well be expected until the present widespread expectation of rate reductions is realized or dispelled. To assume that rates can or should be stabilized on the present high basis is futile. As already observed, the anticipation of a falling market tends to restrict purchases, and until the public is convinced that there is little likelihood of immediate further material reductions in prices or transportation charges, the confidence necessary to normal business will to that extent be impaired. The period of deflation has been in progress more than 15 months; demand is reviving; prices are showing a tendency to stabilize upon a level much below that of 1920 but above that of pre-war years; and conditions of the agricultural and manufacturing industries have greatly improved in the past few months.

We are of opinion that general reduction in the rate level, as substantial as the condition of the carriers will permit, will tend not only to lessen the transportation burden but also to equalize and stabilize the conditions under which commerce and industry are carried on, with consequent fuller assurance to the carriers of realizing the fair return contemplated by the law.

The raising of the rate level by the director general of railroads in June, 1918, and again under our authority in August, 1920, were necessitated by increases in operating expenses. The latter have now partially receded. The rate increases were general and justified by the increase in general cost of service, and with decrease in that cost a rate decrease, also general, is justified. The justification for decrease is to be found in the rate structure as a whole rather in individual rates, or in rates on individual commodities. It is true that the prices of some commodities have receded more rapidly and to a greater extent than others, even as some went up more rapidly and to a greater extent than others. The needs of commerce can not be met if rates are to fluctuate with market prices of commodities. In bringing down the rate level to meet lowered expenses a similar process should be followed and the reduction made generally upon all commodities in substantially equal ratio.

Under the circumstances described in paragraphs (a), (b), and (c), below, carriers should consider existing freight rates and charges as representing those made effective by authority of Increased Rates, 1920, supra, and shall apply the reductions herein prescribed accordingly, even though in such instances some individual rates or charges may be higher and others lower than those which would result from exact application of the bases above prescribed:

(a) Where, since August 26, 1920, rates or charges have been readjusted primarily to remove discriminations, prejudices or discrepancies without material effect upon the aggregate level of the rates or charges so adjusted. This does not apply to rates or charges which have been reduced since August 26, 1920, primarily for the purpose of removing all or a part of the general increase of 1920.

(b) Where previously existing recognized rate relationships were maintained in applying the increases of August, 1920, or where rates have been readjusted since August 26, 1920, to restore previously existing recognized rate relationships. In these cases,

such recognized rate relationships should be maintained in applying the reductions herein prescribed; or, if that is impracticable in the first instance, the rates should be readjusted to restore such relationships as soon as practicable.

(c) Where, pursuant to decisions by us, rates or charges shall have been changed since August 26, 1920. This does not apply to rates resulting from Rates on Grain, Grain Products, and Hay, 64 I. C. C., 85; National Live Stock Shippers' League v. A. T. & S. F. Ry. Co., 63 I. C. C., 107; Southern Hardwood Traffic Assn. v. I. C. & R. Co., 61 I. C. C., 68.

Where outstanding decisions require changes in rates or charges subsequent to June 30, 1922, the rates or charges existing on June 30, 1922, shall be reduced as herein provided, effective July 1, 1922. In proceeding thereafter to comply with such outstanding decisions, the rates or charges which would result therefrom shall be considered as those effective by authority of Increased Rates, 1920, supra, and the reductions herein prescribed shall be applied thereto, except that this provision shall not apply to rates on brick and related articles as prescribed for application between points in the eastern group in National Paving Brick Mfrs. Assn. v. A. & V. Ry. Co., 68 I. C. C., 213. Those rates are not required to be further reduced hereunder.

Where rates on live stock have been reduced pursuant to our recommendations in National Live Stock Shippers' League v. A. T. & S. F. Ry. Co., supra, and are now less than the rates herein prescribed, the expiration date thereon should be canceled and the rates maintained in effect.

Separate Opinions

Chairman McChord assented to the report in so far as it results in a reduction of rates, but stated that he was not in full accord with it. He was opposed to fixing the rate of return at this time and thinks if a rate is to be fixed at all it should not exceed $5\frac{1}{2}$ per cent. He also expressed the opinion that the times and conditions plainly demand reductions in rates on all materials and products that are basic to a level that business interests will recognize as the lowest available for some time to come, saying that nothing less will quiet the prevalent unrest and agitation for lower transportation costs and encourage the needed healthy flow of traffic. In his judgment, the general reductions decreed fall short of full attainment of the desired end, and the mutual interests of both industry and transportation demand a 50-50 readjustment of the further material rate increases made under Ex Parte 74. If reductions are to be made on all classes and commodities and a still greater reduction if confined to selected commodities. Reductions on that general basis should also be applied to passenger fares, he said.

Commissioner Eastman, in a concurring opinion, repeated his objection made at the time of Ex Parte 74 that any valid determination of aggregate value is impracticable and it was his judgment that it would have been wiser and better if the commission had announced several weeks ago that its decision would be deferred until after the Labor Board had acted so that it might be assured that the rates prescribed would be the lowest possible under the law and the most likely to remain stable for some considerable period of time.

Commissioner Potter concurred in the conclusion that reductions should be made, saying that if later the commission is convinced that its estimate is not warranted, existing rates can be restored to the extent which then seems necessary. He continued in part:

Nations and the need, which is decreasing, for lower rates, I am not certain that I can render a real service to the shipping community by recommending unless and until there is further evidence of operating excess. Freight transportation is more important than passenger traffic. Better service was the desire of the general public in summer of 1921. The increases then announced were accepted generally, and our complaint relative to passenger traffic will bring its demand for better service and its pressure to readjust its rates. I apprehend that in the future the public will be able and after some time will probably be able to pay for the continuance of present rates. For reasons which I do not state, it is not upon us. The transportation situation I do limit the return we may allow for a while. We must accord to Congress the proposed limit of that return.

All the members of the report have the support of the public, and the commission as most nearly representing the

consensus of opinion, it is apparent from the individual expressions to a considerable extent the views of the majority differ. I call attention to certain respects to which I have preference for different conclusions. Assuming that there is a prospective excess earning available for rate reduction, I think different treatment was required for the following reasons:

1. The percentage increases authorized by Ex parte 74 resulted in disproportionate increases upon long-haul traffic. Therefore, when called upon to eliminate a portion of the increases authorized by Ex parte 74 we should first correct the injustice of that decision by giving preference in reduction to carload and long-haul traffic.

2. The theory upon which reductions have been made since Ex parte 74 on certain traffic, instead of on all, was that such reductions were required in justice to the traffic to which they applied, and in order to bring such traffic into proper relation with traffic as a whole. No unlawful preferential treatment was intended when such reductions were made. The reductions now required do not increase the reduction heretofore made upon agricultural products, live stock, and certain other commodities. As the reductions heretofore made were to remove injustice and establish a proper level and relation as between commodities, it seems to me that in distributing the prospective surplus now available for reduction, such commodities should share.

3. I favor a reduction in passenger fares other than commutation fares and without removing the Pullman surcharge.

4. There are not many, familiar with the conditions in the financial world, who would question the propriety of naming 6 per cent as a fair return upon the property values of the carriers which are devoted to the public service. We should have fixed the return at 6 per cent. We should not be influenced in naming a fair return by our views upon the subject of taxation. Our function is to name a fair return without regard to how much of it the government may decide to take from time to time in taxes.

During the early stages of our deliberations, I was impressed with the notion that in making reductions we should give preferential consideration to a selected list of so-called basic commodities. Further consideration developed objections to this course which to my mind are convincing. It appears impossible at this time to select a list of so-called basic commodities to which reduction could consistently and lawfully be limited. Concluding that there is a prospective surplus available for rate reductions, I know of no theory on which that surplus, resulting largely from hauling certain traffic, can be made the basis for a finding with respect to the reasonableness of rates on other traffic. If we were to select a list, our difficulties would not be reduced. Some situations are more acute than others. Different commodities and different conditions require different treatment. Some rates are not high enough; others are too high in varying degrees. We would not do justice in requiring horizontal reductions limited to particular commodities. If I were persuaded of the practicability of limiting reductions to the so-called basic commodities, I would favor an announcement of the amount available for rate reduction and have a further hearing upon the question as to how specific application should be made. The record is not sufficient to show what selections should be made.

Commissioner Lewis in a dissenting opinion, said that the decision that rates be reduced is unanimous, but his dissent was limited to what appears to him to be "unjustified economic waste." "The margin available for reductions or adjustments that may be required by us is not sufficient," he said, "if spread over the entire freight traffic, to give to the country the relief and to business and industry the stimulation that is urgently needed. A 10 per cent reduction will, in the case of many commodities, have no perceptible influence in lowering costs of living, stimulating industry, ameliorating economic conditions, or bringing us into more favorable and equitable relationships at home and abroad. On the other hand, there are commodities and raw materials that are basic to existence, to industry and to readjustment, on which transportation charges are relatively and absolutely too high. Making these more cheaply available to consumers and manufacturers would contribute to reduction of costs of living, relief in the housing situation, maintenance of productivity of the soil, increased employment and stimulation of buying."

Commissioner Cox, dissenting, concurred to the extent that a measure of relief has been granted to the public generally, but expressed the opinion that the amount available for reduction should have been applied to agricultural products, raw materials and basic commodities.

President Urges Voluntary Rate Reduction

Asked to Cut Charges on Basic Commodities and Given Opportunity to Forestall I. C. C.

By Harold F. Lane

WASHINGTON, D. C.

WITHOUT ANY decision having been announced by the commission as the result of its general investigation ordered on November 23, on which hearings were begun on December 14 and concluded on March 13, as to whether and to what extent, if any, further general reductions in rates can lawfully be required, 19 leading railway executives at a dinner at the White House on Saturday evening were urged by President Harding and Secretary Hoover voluntarily to reduce rates "more particularly on such basic commodities as may be found necessary to speed industrial development."

After explaining the difficulties of railway management under present conditions, the railway executives expressed a desire to do everything consistently possible toward restoring and maintaining prosperity and voted to have a committee named to take up the problem and recommend what action could be taken.

Railway Executives Confer With Commission

Later Daniel Willard, Fairfax Harrison, Hale Holden, H. E. Byram, Charles Donnelly, W. H. Finley and Edward Chambers were appointed as the committee and on Monday morning they met the Interstate Commerce Commission by appointment for a conference. The discussion of the railroad situation continued for about two hours, after which it was announced that it had been adjourned to meet again on Thursday for the purpose of giving the subject further consideration.

The railroad executives emerged from the White House about 12:30 a. m. Sunday, after which the newspaper men were called in to see the President and given a statement that he had invited the railroad presidents and board chairmen to dine with him "and to confer concerning further relief in railway service along particular lines somewhat similar to the voluntary reductions made in some commodities some months ago, more particularly relief on such basic commodities as may be found necessary to speed industrial betterment."

Statement From the White House

"Naturally the whole railway problem was discussed," the statement continued, "and the difficulties of railway management under existing conditions were presented. The railway presidents voiced their unanimous desire to make the fullest possible contributions to restore and maintain prosperity. Of course, the various aspects of the transportation problem were discussed, particularly the necessary preparations in providing new or repaired equipment to amply serve the country when normal commerce is restored.

"The President made it clear he was attempting none of the duties of rate-making nor recommendations, but that he felt that much could be accomplished in a conference and that helpful results must attend a full co-operation of the railway heads with the government body charged with the duty of regulating rates.

"After two hours of discussion the presidents voted to have a committee named from their membership to take up the problem and recommend what action could be taken."

The railroad men who attended the dinner were: A. H. Smith, president, New York Central; Carl R. Gray, president, Union Pacific; W. H. Finley, president, Chicago &

North Western; W. B. Storey, president, Atchison, Topeka & Santa Fe; Edward Chambers, vice-president, Atchison, Topeka & Santa Fe; C. H. Markham, president, Illinois Central; R. S. Lovett, chairman of board, Union Pacific; H. E. Byram, president, Chicago, Milwaukee & St. Paul; Samuel Kea, president, Pennsylvania; Hale Holden, president, Chicago, Burlington & Quincy; Howard Elliott, chairman of board, Northern Pacific; Charles Donnelly, president, Northern Pacific; Ralph Budd, president, Great Northern; Julius Kruttschnitt, chairman of board, Southern Pacific; F. D. Underwood, president, Erie; S. M. Felton, president, Chicago Great Western; Daniel Willard, president, Baltimore & Ohio; E. E. Loomis, president, Lehigh Valley; Fairfax Harrison, president, Southern.

Most of the executives remained in Washington and held a long conference on Sunday at which the committee was appointed, but made no announcement and declined to amplify the President's statement.

Commissioners Visit White House

It has been apparent that the President has been keeping in close touch with the progress being made by the commission, as several of its members have been at the White House both before and since his announcement that he had invited the railroad executives to dinner. Chairman McChord has called on the President several times recently, and was at the White House for a short time on Saturday before the dinner.

It has been understood for a number of weeks that the commission had decided that railroad earnings or the prospects for the year were such as to warrant reductions in rates and it has been stated several times that it had "practically" reached a decision, but it is now stated that the important point of difference among the commissioners has been as to whether the reduction should be general or should be confined to a few specific commodities.

It was stated at the White House that the President had been anxious to secure further relief in rates on basic commodities, but that it was his understanding that this could not be done quickly except by the voluntary action of the railroads because the Interstate Commerce Commission could not, as a result of its general hearing, order reductions on a few specific commodities but must go through a long process of separate hearings on the specific commodities. This point had been raised by various witnesses during the rate hearings who had contended that any reduction should be a horizontal percentage, on the ground that only a few hours of the hearing had been devoted to some commodities, whereas many days would be required to deal with them in a specific complaint case. The commission, it was stated, could not, even after determining that rate reductions are warranted, order cuts in specific commodities at a single sweep.

President Appreciates Difficulties

The President realizes, however, that the desire for reductions on basic commodities presents a very difficult situation to meet and that it is difficult to harmonize the railroads on such a question because some commodities affect some roads more than others. For example, certain roads are almost exclusively coal roads and the effect of a large reduction in coal rates would be concentrated upon them, while roads

depending on a greater variety of traffic would still be on a higher level of rates.

The President has let it be known that he considers that the railroad men at the dinner showed a fine spirit and a disposition to co-operate to the best of their ability but he also appreciates some of their troubles, which they presented to him with great earnestness, and he is less enthusiastic about the result of the railroad dinner than he was about the dinner at which he urged the establishment of the eight-hour day in the steel industry. He was represented as doubtful as to whether the railroads are able to work out the problem in the way the administration desires. If nothing can be accomplished by the railroads, it was said, the entire question would be up to the Interstate Commerce Commission.

The commission was said to have reached a conclusion that earnings are now such as to warrant some reduction in rates but to have divided on the question as to whether it could legally order anything but a general reduction on the present record, or as to what specific commodities should be selected for relief. Those advocating reductions apparently have been considerably influenced by the showing made in March when many eastern roads earned a larger net than they have for some years and the eastern roads as a whole showed a return of 7 per cent, but the President has been told also that a different situation was presented by many western roads and also that the good showing made in the East in February and March was largely due to a rush of coal purchases for storage in anticipation of the strike and that the results since March are much less favorable.

Wage Reductions Declared Essential

The President draws a distinction between what he has been trying to do and any idea of interference with the decision of the rate case. He takes the position that he has been merely discussing general policies for the public good with the railway executives and that, while the rate case is entirely within the province of the Interstate Commerce Commission, if the railway managers step in voluntarily to do what is desired the commission should welcome their co-operation. He has not urged reductions in class rates nor rates on the higher grade commodities. When the railroad executives went to the dinner not many of them knew just what was to be put up to them. They had had a conference among themselves beforehand and had prepared themselves to discuss the general situation from many angles. Naturally the wage question was taken up and the railroad men argued that a wage reduction was essential to a freight rate reduction on the ground that the horizontal increases in rates made in 1917, 1918 and 1920 were made directly to meet wage increases.

President Desires New Legislation

While the question of new legislation was not discussed at the dinner the President has frankly let it be known that he believes that certain changes in the Transportation Act are vitally necessary, but that they cannot be taken up until after Congress begins a new session in December. He is convinced for one thing, as he has said before, that the Labor Board should be brought from Chicago to Washington so that a closer point of contact may be established between the body that deals with wages and the one that deals with rates. Nothing has been given out as to any intention on the part of the administration to try to expedite the decision of the Labor Board in the wage case but it was announced that the President has no present intention of conferring with the railroad labor leaders.

The latest move of the administration follows nearly a year of efforts to persuade the railroads to reduce rates in view of the fact that they have never in any month since the law was passed earned as much as 6 per cent. Last August the Interstate Commerce Commission issued a report

recommending reductions in western livestock rates, which the railroads made, and then entered upon a hearing involving western rates on grain and grain products. While this proceeding was pending the railroads were urged by members of the commission and other representatives of the government to reduce rates both as a means of reviving business and to improve their relations with the public.

Progress of the Rate Case

On October 7 and 8 the executive committee of the Association of Railway Executives came to Washington and conferred with the President, Chairman McCord of the commission, Secretary Hoover, Chairman Cummins of the Senate committee, Chairman Winslow of the House committee and Chairman Anderson of the Joint Commission on Agricultural Inquiry, all of whom urged the railroads to reduce rates even at a sacrifice. On October 14 a general meeting of the member roads of the Association of Railway Executives was held at Chicago at which the executive committee recommended a 10 per cent reduction in rates on agricultural products but this plan was not adopted by the meeting and it was decided to ask a further reduction in wages with the understanding that the benefit of the reduction should, with the concurrence of the Interstate Commerce Commission, be passed on to the public in the reduction of rates, except insofar as such reductions should have been made in the meantime.

On October 22 the commission made public a report in the grain case, which did not specifically order reductions in grain rates, but declared the existing rates unreasonable and said it would expect prescribed reductions to be made by November 20 and that an order would be issued if necessary. The railroad executives then went to Washington and had a conference with the Interstate Commerce Commission, after which at a meeting in New York on November 16 they decided on a 10 per cent reduction on agricultural products and a petition to the Interstate Commerce Commission to withdraw its grain order and conduct a general inquiry as to whether further reduction in rates could or should be required until a substantial reduction could be secured in the labor and other costs of operation.

The commission on November 21 issued a formal order in the grain case effective on December 27 and on November 23, the date that the railway petition was filed, issued its order for the general inquiry. It then permitted the 10 per cent reduction to be made but later declined to withdraw its order in the grain case. Meanwhile the railroads had made thousands of reductions in rates voluntarily at the request of shippers and in co-operation with the Interstate Commerce Commission, to meet individual situations, some of them of considerable extent, and they took the position at the hearing that further reductions should only be made in the same way until wages could be further reduced than they have been up to the present.

President Sees Business Revival

Even before the railway dinner the President had called attention in a speech before the Chamber of Commerce of the United States and in other ways to the reports received at the White House indicating the general improvement of the business situation. The administration has not taken the position with the railroads that a rate reduction would show immediate or big results in the way of stimulation of business. It has rather taken the position that rates are out of line with the prices of many commodities and that railroad earnings on the more important roads have reached or should soon reach a level where they can afford to do something to help the revival of business. The effect on the situation of the expected decision of the Railroad Labor Board has also been discussed but to what purpose has not been made public.

Some Notes on Railway Refrigerator Cars*

Survey of Existing Equipment; Efficiency of Insulation; Special Systems of Refrigeration

By W. H. Winterrowd
Chief Mechanical Engineer, Canadian Pacific

IN AN ENDEAVOR to sense the trend of refrigerator-car design, proportions, and construction, the writer addressed an inquiry to a number of railways and private-car owners. A comparison of the most interesting returns makes a very interesting study, although the fact must not be overlooked that possibly some of the railroads or owners, if building equipment today, might modify their designs.

Every road or owner represented owns at least one thousand cars. As far as possible the cars were chosen from quantities built in comparatively recent years. Many of the old timers, really not refrigerator cars at all, were omitted. Even so, some of the cars built in recent years provoke question.

During the past three years car building or re-building has been at a minimum. Even so, it is of great interest to note that many of the cars built within this period, or being designed or constructed today, embody in great measure those principles which make for an efficient and economical unit.

Types of Cars and Ice Containers

Generally speaking the cars can be divided into two types: one, equipped with brine tanks and generally used for carrying meats; the other, equipped with bunkers, and used principally for carrying commodities such as eggs, butter, vegetables and fruit.

In connection with this distinction, based on ice containers, it is interesting to note that Dr. Pennington has stated that a car of the basket bunker type, such as the U. S. Railway Administration Standard, will carry meat hung from rails quite as successfully as a car built especially for meat. The statement is also made that there is not visible in practical results the advantages supposed to accrue from the retention of the brine, provided coarse rock salt is placed on top of the ice in the bunker and so forced to bore its way through the whole mass before finding an exit.

But there is a very important problem in this connection that must not be overlooked if salt is to be used with ice in a basket bunker, and that is the method of disposing of the brine. It is common knowledge that if brine falls on journal boxes, side frames, arch bars or other truck parts, as well as upon rails, tie plates, bridge members, etc., the resulting damage is great and a factor involving heavy maintenance cost.

The subject is so important that the American Railway Association interchange rules specify that after July 1, 1922, no car carrying products which require for their refrigeration the use of ice and salt and which are equipped with brine tanks, will be accepted in interchange unless provided with a suitable device for retaining the brine between the icing stations.

If salt is to be used with ice in basket bunkers, a practical and economical arrangement is necessary to retain the brine so that it can be disposed of between icing stations.

The data submitted do not show any car of the basket bunker type equipped with overhead meat racks. They show

that cars built for carrying meats and products requiring a low temperature are equipped with brine tanks.

Twenty-seven railroads and owners are represented in the replies. Out of this number the principal cars of 16 are equipped with bunkers, and the remainder are equipped with brine tanks. Out of the 16, 11, or practically 69 per cent, are of the basket type; the remaining 5, or approximately 31 per cent, are of the box type. The majority of the cars recently built, or now under construction are equipped with the basket type of bunker. The demand for refrigeration and the special-service car, as well as greater efficiency of the permanent basket type, appear to be decreasing the demand for the collapsible bunker.

Bulkheads

The majority of the cars tabulated are equipped with solid bulkheads. These are either built into place or are hinged from the walls or ceiling so that they can be swung open. A few cars are equipped with the syphon system, in which the bulkhead consists of a framework holding a series of galvanized iron louvres supposed to direct the air back and down into the bunkers. The theory is that air entering the bunker over the top of the bulkhead becomes chilled, and in its downward motion creates a suction or siphoning effect which draws air from the body of the car into the bunker through the openings in the bulkhead. Although this system is on some cars of fairly recent origin it is significant that many railroads or owners who used it on their older cars have abandoned it in favor of the solid bulkhead.

The prevailing trend of construction indicates a recognition of the value of solid and insulated bulkheads.

In the matter of efficient refrigeration the distance between bulkheads is an important one. The tabulation shows that this varies between 28 ft. 8 in. and 38 ft. 10 in. The general trend is between 32 and 34 ft.

Difficulty in obtaining proper temperatures at the center and top of the lading has been responsible for the thought that longer cars and less deep loading would bring better results. Longer cars have been demanded also as the result of a desire to increase their capacity.

The principle has been emphasized that heat transmission varies directly as the number of square feet of surface enclosing the car space. A study of some of the long cars indicates that this principle has not been followed closely in determining the kind and amount of insulation.

Floor Racks

Space between the top of the floor rack and the floor of the car averages between 4½ and 5 in. The majority of the modern cars are equipped with these racks, but an examination of the tabulation would indicate that their importance is not fully recognized. This fact is borne out by an examination of hundreds of refrigerator cars at a fruit- and produce-distributing station. Many of the cars with long slats or runners fastened to the floor are of such construction and equipped with such types of bulkheads that floor racks could be applied easily and cheaply.

An impression seems to prevail that the life of a railway refrigerator car is about 6 to 8 years. In 1919 a committee

*Conclusion of abstract of a paper presented before the American Society of Mechanical Engineers at New York on May 16. The first part of the paper was abstracted in the issue of May 20, page 1173.

of the Mechanical Section of the American Railway Association reported that the average life of railroad-owned wooden refrigerator cars, dismantled, was 17.1 years, and of private-line wooden refrigerator cars, dismantled, 21.9 years, making the average life for all wooden refrigerator cars, dismantled, 19.4 years. It was also stated that the average life of railroad-owned wooden refrigerator cars was largely affected by two lines reporting the dismantling of a large number of cars of an average life of only 15 years; by excluding these two lots of cars, the average life for railroad-owned wooden refrigerator cars was 21.3 years, and for private-line-owned cars 21.9 years.

The life of refrigerator cars equipped with steel underframes or steel framing and superstructure is a matter upon which there are little data, because such cars are comparatively modern. There seem to be no reasons, however, barring those of possible evolution, why such cars should not have a long life and require little for maintenance by reason of their better design and construction.

It is not difficult to appreciate the causes responsible for the high cost of maintenance of old wooden cars; the refrigerator type does not stand alone in this class. But in addition to more severe traffic conditions, this type of car has required attention on account of the difficulty in keeping moisture away from the insulation as well as from the wooden framing and flooring. If the insulation becomes broken, wet or sags so that air can circulate around it, the car rapidly loses its efficiency.

Floors

The chief problem in floor construction is to make the structure waterproof, as well as a good insulator. Moisture and water finding its way through the floor or along the floor boards into the walls of the car, have been responsible for much trouble and expense.

The insulating value of all materials that absorb moisture is greatly decreased when water is absorbed. In addition, water causes most of the insulating materials popular in refrigerator construction to become mushy and sag or drop out of place. It also causes wood floors, lining and framing to decay and weaken, thereby making it more difficult to keep the general structure tight.

Nearly all the modern or at least recently built floors employ a construction involving cork as an insulating material. To keep moisture away from the cork various waterproofing compounds or waterproof materials are used. Fig. 5 shows a photograph of the floor and manner of applying insulation.

In past years it was the opinion that floor insulation with intervening dead-air spaces gave the highest insulation value in walls and roofs as well as in floors. More recent opinion differs because experience has shown that unless unusual methods of construction or maintenance are used, it is very difficult to keep the air spaces tight. To be insulators, they must be dead-air spaces; once circulation starts their efficiency is destroyed.

Walls

In connection with a waterproof structure, it is interesting to note the various methods employed at the junction of the floor and side walls to keep water from getting past the lining and into the insulation. This point has been a source of great trouble.

An exceedingly interesting example of waterproof construction is contained in some all-steel refrigerator cars designed by W. F. Keisel, mechanical engineer of the Pennsylvania Railroad. The body of the car consists of an all-steel container placed within an outer container, the space between the wall being filled with insulation. At the floor, the sections of the inner container are welded together, thus making the floor practically one piece and water tight and

thereby affording maximum protection to the insulation.

Inspection of the various cross sections indicates a general trend toward massing wall insulation and eliminating air spaces between the layers of insulation. As a rule the insulation is applied in a continuous strip from door post to door post. The advantage of applying insulation in this way lies in the fact that a continuous or unbroken surface presents no joints or openings through which air can pass or circulate. It has been the experience that where insulation is applied in sections, unusual construction is required to prevent eventual air circulation. Wall insulation is rarely less than 2-in. thick on the most recent cars. In some cases



Fig. 5—Method of Applying Insulation and Waterproofing in Floor

this insulation is applied in two massed layers. In one case the single layer is 2-in. thick. In the majority of cases four massed layers of 1/2-in. insulation are used.

Roofs

The tendency is to apply massed insulation in the roofs. As a rule the most modern cars have 2 to 2 1/2 in. of insulation applied in this way.

Some cars are equipped with a carefully designated double-board roof with waterproofing compound between the layers. There are many advocates of this type of roof, but it is interesting to note the number of outside-metal roofs that are applied to cars of this type. The advocates of the outside-metal roof claim a saving in weight and greater protection to the sub-roofs and insulation from moisture, claiming that with proper insulation the metal roof has no effect on the interior temperature of the car.

Miscellaneous

Doors and Hatches.—Doors and hatches are being made with more insulation and are being strongly and properly constructed so that they will fit the door openings tightly, and not permit any loss of refrigeration due to leakage. In this connection, any other openings into the car should be so constructed that they can be kept tightly in place and easily maintained. An efficient door-locking device is no small item in keeping doors tight, and thereby maintaining the efficiency of the car.

Painting. Refrigerator cars should be kept well painted in order to preserve all exterior surfaces. This is in the

interest of obtaining long life for the car. Metal parts should be given particular attention in this respect.

The writer believes that refrigerator cars should be painted with a light or non-heat absorbing color. Dark colors absorb heat. An inquiry addressed to the owners of white and

eliminating it entirely. Comparative results are shown in Table 1. The car cross-sectioned in Fig. 6 is used as an illustration of good construction and relatively high efficiency. The car shown in Fig. 7 is used in comparison in order to show the greater rate of heat transmission or lower efficiency caused by different methods of insulation and construction.

Materials and Workmanship

Proper materials are a very important factor in refrigerator car construction. The right grade of lumber should be used wherever required, and it should be properly dried before being placed in the car. Workmanship should be of the best. Insulation should be handled carefully, care

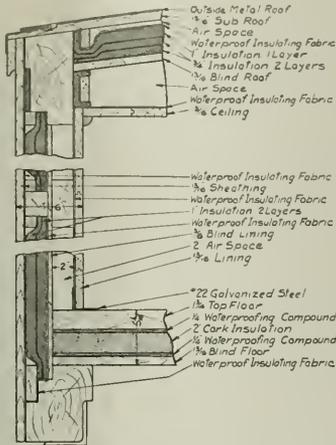


Fig. 6—Type of Construction Giving High Insulating Efficiency

yellow cars indicated that no specific data existed on the subject, but it was the general belief that the light colors were an advantage in this respect.

Insulation

The paper discusses at some length the properties desired in an insulating material and the thermal conductivity of various materials and compound structures. After giving

TABLE 1
Comparison of B.T.U. per sq. ft. per deg. diff. F. per 24 hr. in cars shown in Fig. 6 and Fig. 7

	Including air space		Excluding air space	
	Fig. 16	Fig. 27	Fig. 16	Fig. 27
Roof	1.702	2.328	1.953	3.112
Wall	2.172	2.80	2.388	3.768
Floor	2.46	2.544	2.46	3.24

being taken to see that it does not become torn or damaged. Such insulation placed in a car makes a weak link in a possibly otherwise strong chain. Some care in initial construction with attention to these details makes for an efficient car, as well as one that will have a longer life and lower maintenance cost than a car not receiving such attention.

While on the subject of materials, it is important to note the growing interest in the use of car lumber which has received preservative treatment. Lumber so treated has received considerable attention from car builders and car owners for several years, and much of it is now in service. Sufficient time has not elapsed to indicate what increased life can be obtained, but experience to date indicates treated lumber to be more durable, and one that will resist moisture and decay.

The Marsh Refrigerator Service Company has used creosote-treated lumber in certain parts of its refrigerator cars, such as sills, sub-floors and roof boards, and appears to be the pioneer in the use of treated lumber in refrigerator cars. The writer has been advised that this lumber is giving excellent service, and that no objection can be made to it on account of any odor caused by treatment. The treated lumber in these cars is submerged for a number of hours in hot creosote oil, after which it is placed in a driprack and permitted to drain. It is estimated that this treatment will result in large saving, doubling the life of the roofing boards and sills, and effecting considerable saving in labor that would otherwise be necessary to properly maintain these parts in the course of time.

An interesting report in connection with the use of treated lumber for use in the construction of cars was presented recently before the American Wood Preservers' Association. This report calls attention to the fact that decay is the principal cause of failures in lumber, and that great economy is possible by the use of a preservative.

It is evident that if some of the wooden parts of a refrigerator car can be made moisture proof or highly resistant to moisture, the efficiency of the car can be maintained at a much higher average.

The writer has been advised that some refrigerator cars are in service in which Balsa wood is the principal insulating material. This wood is very light in weight, having in its natural state a density of 7.1 lb. per cu. ft. It is a South American wood that grows very rapidly, and is of cellular structure. It has a thermal conductivity of 7.5 in its natural state and 8.3 when treated with waterproofing compounds.

It would be of great interest to know if treated or untreated Balsa wood is used between the ordinary walls of a car as insulation, or if the material figures largely in the construc-

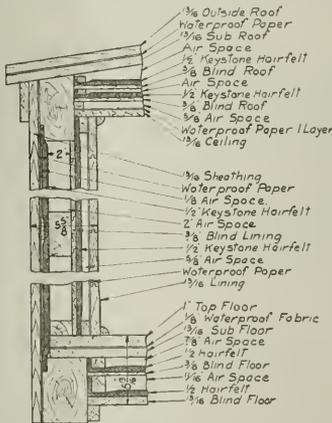


Fig. 7—Heat Transmission Through Cars of This Type Is Much More Rapid Than for the Car Shown in Fig. 6

the formulas for heat transmission the amount of heat transmitted through the walls of two typical refrigerator cars is compared.

The calculations were made in two ways: first, by assigning an insulating value to the air space, and second, by

tion of the superstructure of the car, such as lining and sheathing. Its strength is insufficient for its use in framing. It would also be of interest to know if the material is durable and efficient in this class of service, if any modification of car structure is necessary for its use, and if any reduction of car weight can be accomplished by its employment.

Some Other Systems of Refrigeration

A previous statement indicated that some reference would be made to other systems of refrigeration. In the cars described, refrigeration is accomplished by means of air circulation, the air being cooled by contact with ice or ice containers placed at the ends of the car.

One modification of this system is a car in which ice containers are placed just below the roof and in the center of the car. In this system it is claimed that maximum refrigeration can be applied where the air within the car is at its highest temperature.

There do not appear to be a great number of cars of this type in modern service. The principal objections to such a system are decreased head room in the center of the car, weight of ice near the roof of the car, and difficulty of adopting this system for use with meat racks placed below the ceiling of the car.

Another system consists of a brine tank built into the roof at each end of the car. These tanks extend about 9 in. below the ceiling and are heavily insulated on top, sides and bottom. The tanks at each end of the car are connected to each other by pipes hung about 2 or 3 in. below the ceiling. The pipes are not insulated. In each tank is a partition

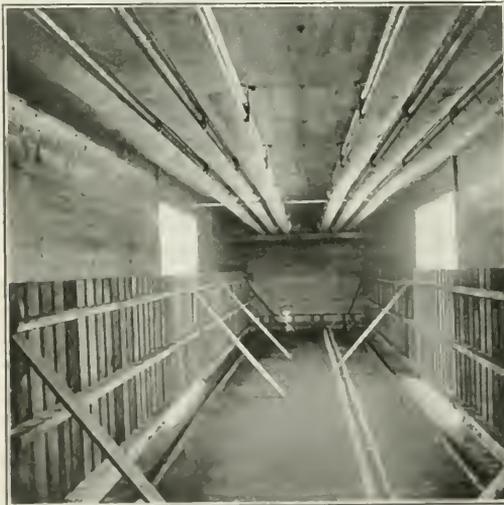


Fig. 8—Car with Overhead Brine Tanks, Showing Also Heater Pipes on Floor

running lengthwise of the car. In one partition are some check valves opening to the right, in the other partition some check valves open to the left. The theory is that when ice and salt are placed in the two tanks the swaying of the car in motion automatically circulates the brine through the pipes, refrigeration being accomplished by contact of the air within the car against the surface of the pipes connecting the two tanks.

Comparatively speaking, this system has not been in service a very great length of time. The advantages claimed

for it are increased loading space, decreased consumption of ice, uniform temperatures, and a car that can easily be changed from a refrigerator to a heater car. The writer understands that these cars are being tested in various fields of service. It would be interesting to have some information regarding the ability of this system to supply refrigeration when the car is not in motion, and what the system can accomplish in the way of quick pre-cooling when the car is placed at the loading shed or platform.

The interior of such a car is shown in Fig. 8. This illustration shows the floor racks propped up against the side walls so that the piping along the floor beneath the racks can be seen. This piping is used when the system is used to heat the contents of the car. Canvas troughs are placed beneath the piping located beneath the ceiling in order to catch any condensation or frost slush that may drop from these pipes.

Pre-Cooling

The importance of pre-cooling the lading and the resulting economy in the use of ice and labor were mentioned in a preceding paragraph. There are two distinct methods of pre-cooling cars and lading. The first is known as shippers' pre-cooling; and the lading is placed in cold storage rooms in which the proper temperature is maintained, and where the lading is allowed to remain until it cools to the proper temperature, after which it is loaded quickly into cars that have been pre-iced. The second method is known as the carriers' pre-cooling, and generally consists of a system in which the car is loaded, after which the interior of the car and the lading are pre-cooled by mechanical means.

Great economies are possible due to pre-cooling. Where small tonnage originates little pre-cooling has been done by mechanical methods on account of the high cost of the plant and equipment. Most mechanical pre-cooling is done where large tonnage originates. At such points the shippers frequently combine to build such a plant. Pre-cooling is receiving more and more attention in connection with various commodities and additional economy in the way of ice and labor may be expected.

General Conclusion

The inquiries upon which these few notes on railway refrigerator cars are based, indicate that a very great improvement has been made in refrigerator car construction and design, particularly within the last few years, but there is also evident indication that the field of investigation in connection with cars of this type is still a most fertile one. Some fairly recent cars indicate that the subject of refrigeration in transit is not appreciated in some quarters as it should be. The subject of efficient refrigeration is a most important one, because cars that can be kept in continuous service with a minimum cost of maintenance and which are sufficiently efficient to protect the lading in transit, mean dollars and cents to the railways.

TWENTY-EIGHT CITIES report that, in the year 1921, the number of fatalities in automobile accidents within their limits was smaller than in 1920; and some of the differences are striking. In Detroit the number was 134 as compared with 240 in the earlier year; St. Louis 97 as compared with 192; Buffalo 27 and 77; Indianapolis 56 and 98; Milwaukee 53 and 79; Newark, N. J., 44 and 70; Akron, Ohio, 13 and 26. These figures are given out by the National Automobile Chamber of Commerce, New York City which finds that, for the nation as a whole, there was an increase in fatal accidents in 1921, though the total in proportion to the number of motor vehicles in use, was less than in preceding years. For 1921 the number of cars registered was 10,448,632; number per thousand of population ⁹⁹, and automobile deaths per 100,000 of population 11.

Fuel Association Holds Annual Meeting

Heavy Program Includes the Consideration of Many Operating Problems Affecting Fuel Economy

EVIDENCES OF THE interest in and support of the railway fuel conservation movement on the part of executives and operating officers and an interest in the relation of fuel costs to other operating factors characterized the fourteenth annual convention of the International Railway Fuel Association, which was held at the Auditorium

Hotel, Chicago, on May 22 to 25 inclusive. After the usual opening exercises the meeting, with over 450 members in attendance, was addressed by L. W. Baldwin, vice-president, Illinois Central, followed by the address of W. L. Robinson (B. & O.), president of the association. Mr. Baldwin spoke in part as follows:

L. W. Baldwin's Address

THE CONSERVATION of fuel rests largely with these two principles: 1. Interesting and educating the men who place fuel on the fires, and 2. Developing and using proper machinery. My experience has taught me that each of these constitutes a vast field of opportunity.

Coal means more now than it did prior to the war. The increased cost has made it necessary for us to get our coal burned in such a way as to use a minimum amount and get maximum efficiency. On the railroad of which I am an officer we maintain an organization to educate our men to burn coal scientifically. This organization has a car fitted up for holding fuel conservation classes and is constantly visiting the terminals, large and small alike. The men doing this educational work are peculiarly fitted for their duties. They have studied fuel production and uses from various angles, and they impart their experience to the men, display films, make replies to questions, and exchange views on all phases of fuel conservation in their meetings, in fact so impress officers and men that they actually appreciate it is a crime to waste fuel.

The education of the men and the carrying out of good practices cover a wide scope of endeavor on the part of those in charge of and who are to teach fuel conservation. Great care must be taken to insure the selection of men for such positions who are qualified by experience, are natural enthusiasts and in whom all who should be concerned in fuel economy have confidence.

We have distributed a book entitled "Fuel Economy on Locomotives" which deals with the subject at length, but we can't depend on the book to do the work. To get the best results, it is necessary to employ the personal contact method.

In addition, we have a General Fuel Conservation Committee, consisting of the general superintendent of transportation, the general superintendent of motive power, the engineer maintenance of way, the purchasing agent, the auditor of disbursements, and the superintendent of fuel conservation, and fuel committees on each division consisting of division officers, enginemen, trainmen and others. This General Fuel Conservation Committee has to do with purchase, inspection, storage and handling of coal, including all feasible economies that can be effected. The duty of the division fuel conservation committees is to study in more detail the ideas of the General Fuel Conservation Committee and general officers, circulate the results obtained by individuals as well as to instruct as to best methods to be used.

On the Illinois Central System we conducted a fuel conservation campaign throughout September and October, 1921. Enginemen and trainmen on the same terminals competed with one another, and divisions competed for rank. Daily reports of fuel consumed in freight, passenger and yard service were obtained from all divisions, and reports showing the number of pounds of coal consumed per 1,000 gross ton miles, per 100 passenger car miles and per yard engine mile for all divisions were promulgated daily. The campaign

was an interesting and successful one and produced a saving on our lines of 30,000 tons in one month alone. I attribute the success of the campaign to the initial interest taken by enginemen, trainmen and other employees concerned in fuel consumption, and the spirited competition which resulted from posting individual accomplishments. Of course, the local officers must be duly credited for the intensive interest developed in preparing for and during the campaign.

I do not want to be quoted as saying that fuel conservation results are entirely in the hands of the men and local officers. There are a great many things for the managements of the railroads and other properties to consider and act upon. We must have fuel inspection at the mines, and, where coal is placed in storage, it must be scientifically handled to insure economical and proper results. Our purchasing departments must surround the purchase of coal with recommendations made by men competent to pass upon the grades and preparation of coal. Power plant and station use of coal on some railroads warrant specialized supervision, with a man in charge who is thoroughly trained in power plant operation.

Distribution of coal needs close supervision. It is sometimes necessary to burn various grades of coal on a railroad. Under such conditions the distribution should be regular. Proper tonnage rating of locomotives is a factor. Where engines can be assigned to individual enginemen it will go a long way toward conserving fuel because of the personal interest the enginemen manifest in the condition of the engines assigned to them. Efficient yard operation and dispatching of engines and trains, as well as not overloading the tenders, are important features. In fact, nearly every phase of operation is directly or indirectly related to fuel consumption, and it is this relation that must be considered to get the desired result.

Our mechanical departments must understand that they are largely responsible for fuel conservation or waste, at least to the extent that they are permitted to spend money. An engine that does not economically burn coal should be kept out of the service until conditioned. We have on the market a number of devices and improvements which have been demonstrated as coal savers. All may not agree on the merits of these devices, but I think it is well worth every mechanical man's time to watch and study the development and performance of every improvement and device designed to save coal.

Stationary boilers must be kept in good condition and a systematic method of inspection and to insure economical operation, and the results obtained posted to promote interest of the operators.

Further, roundhouse equipment, such as hot water boiler washing plants, water treating plants, plenty of ash pit room and modern coaling stations are important. These, of course, are expensive items, but the savings produced as a result of such expenditures have demonstrated that it is money well spent.

Our existence today depends upon coal. It moves our commerce. It prepares our food. It heats our offices and homes. Just because we see it in large volume should not detract from its value. It should be indelibly impressed on the minds of everyone that fuel conservation is needed and

can be accomplished to a large extent, and that the money so saved can be applied to the general good of the properties upon which we and our families are dependent for a livelihood.

President Robinson spoke in part as follows:

President's Address

FUEL ECONOMY was long considered purely a mechanical department matter, but this association has for years advocated the policy of arousing all the departments to a realization of their share in the responsibility. There are at present many of our members, who may be classed as transportation or operating officers and much has been gained through papers and addresses delivered at previous meetings by general managers, general superintendents and other operating officers.

It is most encouraging that the executives of our railroads through the American Railway Association have so fully recognized the magnitude of the fuel problem and have urged and encouraged all departments toward greater interest in fuel conservation.

The Fuel Association's Committee on Fuel Tests in conjunction with the University of Illinois, and the United States Bureau of Mines, completed during 1917 at the locomotive testing laboratory of the University of Illinois, a series of tests of six sizes of coal from the same mine located in Franklin County, Ill. These tests developed that on a modern Mikado locomotive at the high rate of evaporation the 1 1/4 inch screenings are worth only 94 per cent as much as 2 in. screenings for stoker firing; and 2 in. screenings only worth 87 per cent as much stoker fired as mine run hand fired.

It was the original intention that similar and additional tests be made of coal from the various fields throughout the country. Due to the war, the matter has been held in abeyance, but within the past year the Special Committee has suggested to the American Railway Association that a continuation of the tests would be desirable and it is hoped that favorable consideration will be given this matter at an early date.

While little accurate data has been made public other than the University of Illinois tests, already referred to, concerning the relative efficiency of various sizes of coal, it can be stated that the matter of size depends to a large extent on the description of the coal considered, whether low or high volatile coking or non-coking. However, from the results of the laboratory tests at University of Illinois as well as various road tests, it may be definitely stated that the physical characteristics of coal constitute a factor equally as important as the B. T. U. value in so far as concerns the effective burning of coal on grates in locomotives. The coal mining interests can do much to assist the railroads in reducing fuel consumption through decreasing the stack loss, by furnishing them coal with as low per cent of fineness as practicable.

It would appear that the railroads can with profit frequently conduct road tests to determine sizes best suited to their needs, and some roads have given consideration to this feature.

It may be of interest to mention briefly the results of some road tests which may serve as suggestions for further checking by laboratory tests, similar to those which have already been mentioned.

Comparison of Two Varieties of Coal in Two Sizes: A Mikado locomotive, 60 in. by 32 in. cylinders, 64 in. drivers, 34,877 lb. grate, effort, equipped with superheater arch and Street stoker was tested on the road with dynamometer car and hot conditions controlled as closely as practicable. Two varieties of coal in two sizes for each variety were used stoker fired in order to determine their relative econ-

omy. Description, proximate analyses and comparative performance of the coals were as follows:

	Fairmont high volatile		Myersdale low volatile	
	1 1/4 in. N. P. & S.	3/4 in. Slack	Mine run	1 1/2 in. Screenings
Moisture	1.33	1.57	0.75	0.81
Volatile	36.47	35.74	18.17	17.52
Fixed carbon	53.04	52.78	69.07	70.06
Ash	8.36	9.91	12.01	11.61
Sulphur	2.59	3.3	3.33	2.11
B. T. U. (calculated)	13,100	12,600	13,800	13,850
Lb. coal per ave. h.p. hour	3.74	4.19	4.14	4.89
Equip. evap. lb. water per pound of coal	6.71	5.98	6.62	5.50
Efficiency of boiler	46.6	41.9	46.1	38.0
Lb. coal per sq. ft. grate per hour	57.78	65.89	59.55	74.28
Value based on 11,500 B. T. U. & S. 1,000	1.00	0.89	0.99	0.82

These tests indicate clearly the desirability of high volatile coal of as large size as permissible on stoker locomotives requiring screenings, unless length of haul or other factors make ultimate cost of low volatile coal equal or less.

Comparison of Two Mine Run Coals from Different Mines in Same Region: Similar tests were made of mine run coal (crushed by stoker in firing) from two mines producing from the same vein of coal but from different parts of the field. The coals were similar in analysis and heat content.

The results obtained showed that coal A was decidedly more economical. Consumption of coal B was about 15 per cent in excess of coal A per D. B. H. P. Hour. Equivalent evaporation with coal A was 17 per cent greater than with coal B. Boiler efficiency with coal A was about 16 per cent higher than with coal B. Coal B was the more friable coal running about 75 per cent slack, which is characteristic of the coal while coal A ran about 45 per cent slack.

Mine Run Coal Versus Two Inch Screenings: Dynamometer car tests were run with a Mikado locomotive of recent design under comparative conditions in slow freight service to determine the relative economy of high volatile mine run coal and N. P. & S. screenings from the same mine when the locomotive is equipped with the duplex stoker. The mine run coal averaged 45 per cent slack, the N. P. & S. screenings averaged 65 per cent slack, with average proximate analyses very nearly the same.

The results showed the following relative performance:

	N. P. & S.	Mine run	Per cent in favor
Pounds coal per h.p. hour	5.68	2.71	Mine run
Pounds water per lb. coal train and at 212 degrees F.	8.44	6.50	13.6
Efficiency of boiler	58.18	66.04	11.5

These tests would indicate that stokers of type that can be supplied with mine run coal, might profitably be substituted for one requiring a special size coal or screenings.

The cost of fuel and the wages of train and engine crews totals 50 per cent or more of the expense of our railroads for conducting transportation. (Cost of haul of fuel over own lines is not included in total audited cost, but is a considerable item in connection with conducting transportation expense.) The fact that the volume of traffic at present being offered for movement does not by a material amount approximate the capacity of the available transportation facilities, results in present average operating conditions under which congestion is largely eliminated.

The opportunity to reduce overtime wages and standby fuel consumption through reduction of delays on line of road and extension of locomotive runs through intermediate terminals is presented by these conditions and many railroads

are taking advantage of this opportunity to reduce the transportation expense.

Caution is required, however, to insure that the increase in speed of movement is not made at the expense of too great

a reduction in the train load. The index of gross ton mileage produced per unit of combined wage and fuel expense should be employed as a check to determine the relative economy of performance.

Locomotive Feed Water Heaters

IN ORDER that definite information might be obtained as to the operation and maintenance of the Locomotive Feed Water Heaters, a questionnaire was compiled and sent to the presidents of 137 railroads in the United States and Canada. Answers were received from 78 of these roads, 20 roads having feed water heaters.

In 1920 there were seven roads using feed water heaters. There are now 28 American roads with five types of heaters on order or in service. The number of the different types of heaters in use or on order are as follows:

The Superheater Company's feed water heater.....	93
Worthington feed water heater.....	156
Weir feed water heater.....	1
Simple Blake Knowles feed water heater.....	3
Local type.....	1
Total heaters applied or on order.....	234

The advisability of extending the use of locomotive feed water heaters is strongly recommended by five railroads; the other roads consider that the process of development is yet in the experimental stage and are waiting until further tests show that the economy derived will justify further application.

The application of feed water heaters has not been limited to any single class of power or service. The largest locomotive equipped with a feed water heater is a Mallet type of 107,961 lb. tractive effort, while the smallest is an American type of 24,000 lb. tractive effort. Other types of locomotives to which feed water heaters have been applied are Mikado, Pacific, Consolidation, Mountain and locomotives in suburban service. These locomotives operate in both passenger and freight service on mountainous and rolling territory. Both coal and oil are used for fuel.

One of the most important considerations in the selection of the type of feed water heater to be used, is the character of the water in the territory through which the locomotive is to operate. In bad water districts, the open type heater seems to be preferred, as the scale deposits on the tubes of the closed type heater retard the heat transmitted and reduce the efficiency of the heater, and there would be less danger of boiler trouble from oil due to the frequent washouts. No road has reported trouble from oil from the feed water in the boiler. Roads where the boiler washout period averages 30 days generally prefer the closed type of feed water heater.

Three roads have reduced the size of the exhaust nozzles on application of feed water heaters and one road has enlarged the nozzle. The reduction in the size of the nozzle is done in order to offset the loss in superheat temperature which occurs when a feed water heater is applied to a locomotive. This is not considered advisable, as the reduction of the size of the nozzle increases the back pressure, which will probably offset any saving that would be effected by the increased superheat.

There has been no difference reported in the amount of boiler scale in boilers equipped with feed water heaters over the other engines.

The open type heater has in all cases gone from shopping to shopping without cleaning, regardless of the water conditions. While going through the shop the scale deposit is scraped from the inside of the heater, no acid or cleaning solution being used.

In good water territory, the closed type of heater is cleaned each time the locomotive is shopped. The usual method of doing this is to dip the tube nest into a lye vat to remove any oily deposit which may have formed on the outside of the tubes. In districts where the water conditions necessitate more frequent cleaning, the deposit is either washed

out by flushing the heater with water or, if the scale is not soluble, a dilute solution of muriatic acid is pumped through the heater for a short time and then water is pumped through to clean out the acid. The strength of the acid varies from 20 to 33½ per cent, depending on the nature of the scale.

The highest cost of cleaning the feed water heater is \$170.00 per year, both labor and material, and the lowest cost is \$2.31. In one case the heater is cleaned by the use of dilute muriatic acid. The other, by a basic solution. An average of the cost data submitted by all the roads for cleaning by the acid process is \$62.19 per heater per year, which includes both labor and material.

The cost of other maintenance of the heater proper per year is practically nothing on both the open and closed types. Where weak acid solutions are used, none of the heaters cleaned show any signs of deterioration due to the use of the acid. The territory in which locomotives equipped with feed water heaters operate, includes the greatest range of climatic conditions possible. No serious difficulty has been encountered with any of the feed water heater systems freezing up. Drain valves and telltale pipes have frozen up, but these have given no further trouble after properly lagging.

Failures of the heater proper while in service have occurred, due to tubes bursting or becoming loose in the tube sheet, heater heads cracking with the closed type of heater, and a crack developed in the cylinder near the discharge valve on the open type of heater. The brass tubes in the closed heater have been replaced by copper tubes, which are more ductile than the brass and a better joint can be made when the tubes fasten into the header. Some trouble has been experienced with the boiler checks pounding out or breaking off with the use of feed water heater equipment. This has been largely overcome by using larger boiler checks with reduced lift.

The boiler feed pump has given good service with all types of heaters. The most common defects which have been encountered are the pump piston rod packing leaking, rods wearing, water valve springs breaking, water cylinder scoring, top head pump gasket leaking, abnormal lift of intake and outlet valves, and valves stuck or leaking. The average cost of maintenance per pump, taken from the data submitted, is \$55.16 per year, which includes both labor and material.

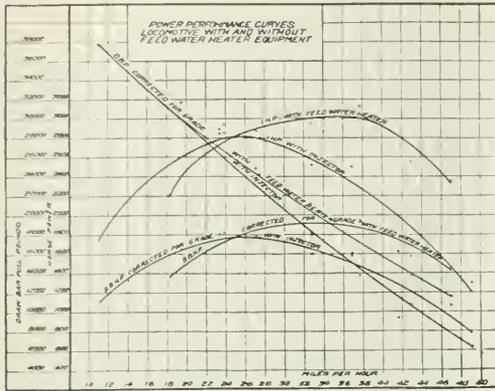
The cost of maintenance of the feed water heater apparatus complete averages \$97.15 per locomotive for labor and material per year. This figure was determined by averaging the maintenance costs submitted by all the roads, regardless of the type of heater used.

As all the locomotives, which are equipped with feed water heaters, have an injector, no engine failures could be attributed to the operation of the feed water heater apparatus, as the injector was used to supply the boiler in case of the failure of the feed water heater.

Where feed water heaters are applied, the enginemen should be personally instructed relative to the operation of the equipment in order that the highest efficiency may be obtained. The feed water heater pump should only be used to supply the boiler when the engine is working steam, as the exhaust steam from the auxiliaries is not sufficient to heat the water hot enough to show a saving, and the introduction of the cold water into the boiler would tend to cause serious strains in the flues and flue sheets. The rule to pump locomotives with feed water heaters only when

working steam, is in force on very nearly all the roads using this device.

It has been possible to eliminate some water tank stops



Results of Dynamometer Tests With and Without Feed Water Heaters

when the condensate from the feed water heater is returned to the boiler.

On tests made on feed water heater locomotives, the feed water heater shows a saving of between 10 and 16 per cent in fuel, based on the evaporation performance of the locomotive. On two roads where dynamometer car tests had been conducted on feed water heater locomotives, there was a saving of approximately 10 per cent based on fuel consumption per drawbar horsepower. On a thousand ton mile basis, the saving as shown by the different roads varies from 4 to 11 per cent.

The accompanying power performance chart is based on data taken on dynamometer car tests. It shows that with the feed water heater locomotives, there is an increase of both indicated and drawbar horsepower. This increase in horsepower is due to the back pressure being decreased by diverting about 12 per cent of the exhaust steam from the cylinders

A Division Superintendent's Interest in Fuel Conservation

By S. U. Hooper

Division Superintendent, Baltimore & Ohio

LET IT BE definitely understood that this is strictly a non-technical paper. The very nature of the subject makes it desirable that it be treated in a non-technical way. Bearing in mind that many of our largest railroad systems still cling to what is generally termed the divisional form of organization, oftentimes putting at the head of a divisional unit a man whose sole claim to shouldering that responsibility is his *general* ability to co-ordinate, regulate and stimulate all of the numerous phases which go to make up successful operation, it will be seen that there is a decided place for the general or non-technical treatment of fuel conservation.

It requires the mechanical specialist and the fuel expert to determine the proper grade of fuel and the proper design of locomotive. But the battle is then only partially won. It also requires the competent road foreman, the able supervisor, backed up by the operating officer, to insure the successful operation of correctly designed and maintained locomotives supplied with the carefully selected and prepared fuel. Too much stress, therefore, cannot be laid upon the well established policy of this association in getting its purpose before, and in arousing the interest of, every so-called strictly operating officer.

to the feed water heater, thus increasing the steaming capacity of the locomotive at high speeds. This increased horsepower will permit an increase in the tonnage rating and average speed of the locomotive, either in time freight or passenger service.

In its present form the locomotive feed water heater has passed through the experimental stage in this country and the results indicated in this report are typical of what may be anticipated from the application of feed water heaters on other railroads, barring unusual local conditions.

At the present time, the exhaust steam injector as extensively used abroad is being considered as an alternative to the open type of locomotive feed water heater. One American firm is already engaged in the manufacture of this device, and arrangements are being perfected for supplying the railroads in this country with a type of exhaust steam injector that has been successfully used on an extensive scale in England and her colonies.

The report was signed by E. E. Chapman, chairman (A. T. & S. F.); J. R. Alexander (Penn.), E. A. Averill (Superheater Company), J. A. Carney (C. B. & Q.), J. N. Lammedee (Worthington Pump & Mch. Corp.), L. P. Michael (C. & N. W.), Geo. E. Murray (Grand Trunk), C. B. Peck (Railway Age), L. G. Plant (Railway Review), G. B. Von Boden (Sou. Pac.), W. H. Winterrowd (Can. Pac.).

Discussion

H. B. Oatley (Superheater Company), called attention to the fact that feedwater heating has been practiced as long as the injector has been used to feed the locomotive boiler, although in the line steam injector the heat is taken direct from the boiler and is not reclaimed. He then referred to the exhaust steam injector, which has been used extensively in England and the British Colonies, and said that from seven to eight pounds of water could be passed from the tank to the boiler for each pound of steam condensed in the injector; the exhaust steam alone at one, three and five pounds pressure being capable of delivering against boiler pressures of 150 lb., 165 lb. and 180 lb. respectively. A small amount of line steam is required to supplement the exhaust steam for delivery against higher pressures. Mr. Oatley suggested that the possibilities of heat reclamation with the exhaust steam injector compare favorably with those of other types of feed water heaters.

Now comes the question of the relative importance of the fuel problem from a superintendent's viewpoint.

Operating economy consists primarily in keeping down his wage and fuel costs, and, of these factors, fuel cost amounts to approximately one-third of the total expense. Is it any wonder, therefore, that the subject should be rightfully given a very considerable proportion of the operating officer's study and attention? And is it not self-evident that the subject is so large, and so important, that it should be handled by the boss himself? He is the father of his entire divisional organization, and particularly that important part known as his staff. His main function is to educate, to devise ways and means whereby the most up-to-date methods and the most advanced tactics can be effectively placed before his subordinates, on whom he must rely to pass the gospel to the men. It lies largely with him whether harmony is going to exist in his family, and genuine success is not going to be his unless the representatives of all his departments pull together. It is not only his prerogative, but his duty, to press constantly on the identity of interest until the various members of his staff are co-operating for the accomplishment of what is best for the division and the railroad as a whole, burying everything which might savor

of department influence. It rests with him to determine such delicate matters as inter-departmental relationships. One department must not be allowed to profit in showing at the expense of another. Specifically illustrating, fuel conservation must not be sacrificed in order that maintenance expenses may show a reduction.

The success of any movement lies in getting the objects to be accomplished, and the methods whereby they are to be accomplished, to the men who are actually performing the work. As the superintendent comes in frequent close contact with the men who are handling his trains, he is indeed in a position to reinforce the educational measures of his staff officers and can do much towards stimulating, on the part of the men, a genuine interest and desire to carry out the program.

It is scarcely necessary to deal in detail with the many other ways in which the superintendent can prove himself the actual leader of his division in fuel conservation. It is fitting, however, to emphasize again the importance of the road foreman's monthly fuel meetings, for these occasions bring to the superintendent a glorious opportunity not only to familiarize himself thoroughly with what is transpiring on the division, but the chance of getting directly before his employees an expression of what can be done in the saving of coal. On such divisions as enjoy superintendent's staff meetings, open also to the employees, fuel conservation subjects should invariably occupy a prominent place on the program. It will sometimes be found surprising, as well as gratifying, to note how much interest can be aroused by an enumeration in simple form of divisional operating statistics, especially as affected by fuel costs, savings, etc. The employees feel that they are entitled to this information and in possessing in their identity of interest with the employer is materially strengthened. An occasional remark showing that the superintendent is familiar with the enginemen and firemen who are making the noteworthy fuel performances is oftentimes productive of real interest and competition on the part of the employees.

As the direct connecting link between the division and the general officers, the superintendent is in the best possible position to call attention to, and urge such improvements in, the physical condition of his division as will bring about additional fuel economies.

Among the many possibilities which the present day holds

for progress in fuel conservation should be named the proper relation of tonnage to speed in producing fuel efficiency. The endeavor to find the economic speed at which a locomotive will produce the least expensive transportation has not yet achieved complete success. In the solution of this problem alone the results to a superintendent should more than repay all his efforts. Granting that wages and fuel constitute by far the major portion of train operating expense, tabulating the results of a series of experiments, the varying factor in which will alone be the train tonnage, should, and does, place us in a position to determine what train rating will produce the lowest wage and fuel expense per thousand gross ton miles. It has, within the past few months, been the privilege of the writer to engage in studies of this nature, but, unfortunately, the fluctuating traffic conditions have thrown our computations, thus far, badly out of line.

Closely allied to these tonnage experiments, is another evolution of transportation improvement, namely, increasing the length of through freight and passenger runs. The idea is by no means a new one, but its recent adoption by many of our most progressive railroads shows that operating officers are today leaving no stone unturned. Logically, a locomotive should be operated over the longest possible territory that good maintenance of power will permit. An investment such as is represented in the modern locomotive should be producing transportation as great a proportion of the twenty-four hour period as proper maintenance will allow. Recent experiments have shown conclusively that with proper attention at the dispatching terminal, engines can easily be prepared to withstand longer runs, intermediate terminals can be dispensed with, engine mileage increased, and a decided fuel economy effected.

It is in the solving of such problems that a superintendent can perhaps do his most constructive work for fuel conservation. The opportunity is his, for he alone has all the necessary machinery at his disposal.

In conclusion, let the superintendent ever remember that unless he is thoroughly acquainted with the fuel problems on his division, and unless he takes such an active part in the solution of those problems, his subordinates and employees will not be impressed with the importance and possibilities of fuel conservation, and can not be censured if they do not display a whole-hearted interest in the subject.

Front-Ends, Grates and Ashpans

THE REPORT of the committee was chiefly a summary of and comment on existing conditions and recommended practice as presented in previous reports.

Front-Ends

Master Mechanics' Standards.—The Master Mechanics' Association in 1906 recommended standards for front-end design. The great increase in the size of locomotives has brought about departure from these standards even in locomotives using saturated steam, and the widespread use of superheaters has necessitated still greater deviation. There are comparatively few roads which now adhere to the standards recommended by the Master Mechanics' Association 16 years ago.

Bridged Nozzles.—The committee has previously recorded its opinion that a bridge in the nozzle is useless. It has recommended that in cases where it is desired to sharpen the draft, the nozzle tip be replaced by a plain tip of smaller diameter instead of applying a bridge to the old tip; and it has maintained that better results can be obtained from a plain circular tip than from a bridged tip of equal net area. There continues to be, however, a decided difference of opinion on this point and there are still a great many advocates of nozzle bridges.

Height of Nozzle and Stack Entrance.—The exhaust jet

acts by entraining the gases along its surface, and the committee in 1916 pointed out that we get the maximum entraining surface, and consequently the maximum efficiency of the jet, by having the jet as long as possible. It suggests therefore a low table plate and low exhaust nozzle combined with a stack placed with its lower edge as high as practicable. It pointed out also that this practice has an incidental advantage, in that a low table plate allows the maximum netting area. A study of current designs indicates, however, that there are numerous deviations from these recommendations, the reasons for which would doubtless be of interest.

Adjustable Draft Pipes.—In the report of 1916 the committee expressed its preference for the extended drop stack as compared with the separate draft pipe, and it supports this view thus: "The adjustable petticoat or draft pipe seems to be disappearing, and this we believe to be consistent. Under some conditions it is possible that a double draft pipe may improve an otherwise faulty design, but under no conditions is it believed that results can be obtained by their use which are as successful as the more modern arrangement. In place of the petticoat pipe the extended or drop stack is employed, with a generous flare at the bottom, and run as high above the nozzle as can be done and still clean the table plate. With this plan we do not believe that over-draft is necessary or desirable."

Special Front-end Arrangements.—The committee has at various times called attention to special front-end arrangements, especially to those using radically different arrangements of the netting and nozzles of unusual shape or cross-section. Special forms referred to in previous reports are the Slater or Mudge-Slater front-end, a front-end in use on the Burlington "differing widely from that of other railroads so far as form is concerned, having a basket form over the exhaust pot," the so-called "Unit Spark Arrester" on the Rock Island, and the Lewis front-end.

Air Leaks.—While it is generally understood that leaks into the front-end cut down the available draft and entail losses in efficiency which must ultimately be paid for in coal, it is nevertheless not uncommon to find front-end air leaks.

One of the commonest and most serious front-end leaks in modern locomotives occurs at the point where outside steam pipes pass through the front-end shell. F. P. Roesch, in his paper in 1919, suggested a method of stopping this leak which is in use on several roads. It consists of welding a ring of thin sheet iron around the pipe at this point. The Union Pacific System, for example, uses a sheet of iron of about No. 16 gauge, which has circular corrugations to give it flexibility, and which fits snugly about the steam pipe. It is placed inside the shell and is welded to both the shell and the pipe.

Grates

Air Openings in Grates.—The committee has previously recommended that for the majority of coals in use, the air openings through the grates be as great as is compatible with the mechanical strength of the grate bars. The data secured by the committee for its reports of 1915 and 1916 show that on locomotives burning bituminous coal the air opening in the grates in service runs as high as 70 per cent, although this is rare. Fifty per cent air opening is not uncommon, and the average of the designs reported to the committee was about 40 per cent. On locomotives burning anthracite coal the prevailing air opening averaged nearly the same amount, although the maximum was only 45 per cent.

It is obvious, however, that with certain fine and friable coals maximum grate opening will entail undue waste of coal through the grates; and it is unfortunate that many such coals, like lignite for example, are the very ones which, from the point of view of good combustion alone, ought to have maximum air supply and the greatest air opening in the grates. Such coals clearly call for a compromise in designing the grates. An interesting solution of this difficulty has been made by the Union Pacific in some of its locomotives burning a light fragile coal resembling lignite. In order to prevent excessive waste of coal through the grates, the grate openings have been kept moderate in size. The air drawn through the grates is consequently insufficient for good combustion, and in order to supply the necessary additional air they provide a small air door which opens into the firebox above the fire. When the locomotive is in operation this door is open.

It is clear that the air opening through the grates must continue to be determined with some reference to the kind of coal in use, and that for many kinds of fuel grate design must be a compromise between the desire to obtain maximum air opening and the necessity of avoiding undue waste of coal. Under the circumstances, probably no positive recommendations can be made with respect to air openings which would be generally applicable and satisfactory for all fuels.

Table Grates vs Finger Grates.—While the committee's investigations seem to show a tendency to substitute table grates for finger grates, there is little evidence to prove that under all circumstances there is any clear superiority of one type over the other. Each type can be so designed as to provide adequate air opening and strength; but there remains much difference of opinion as to the relative merits of the two, and it seems probable that the choice between them must be made with regard to the kind of coal in use.

Composition of Grate-bar Iron.—The proper chemical composition of grate-bar iron seems to have received but little attention and apparently the majority of roads have no standard specifications and accept any foundry mixture, notwithstanding the general belief that many grate-bar failures are traceable to unsuitable material. The committee in 1916 suggested a tentative mixture which had proven satisfactory.

Ashpans

The committee has previously presented data concerning such features of ashpan design as pan volume, dumping arrangements, slope of the sides, guards for preventing fire being thrown from the pan, and so forth. Most of these features are largely controlled by the general design of the locomotive.

Ashpan Air Openings.—The most important feature of ashpan design from the point of view of performance, and the one which is generally well within the designer's control, is the amount of air opening into the ashpan. On this point we have laid great stress and made definite recommendations, namely, that the area of this opening be not less than 14 per cent of the grate area. There are hundreds of locomotives in service in which this standard is not attained and where the ashpan opening does not amount to much more than half of the 14 per cent proposed. We wish again to emphasize the importance of complying with this standard.

General

Standards of Older Locomotives.—While gratifying progress has been made in the design of drafting arrangements in the last ten years, and while the majority of recently built locomotives have well designed front-ends, grates and ashpans, we would call attention to the fact that no such progress has been made in re-designing these parts on older locomotives. There is a profitable field for improvement here in bringing up to modern standards such fundamental features of design as grate opening, ashpan opening, etc.

In concluding its report the committee wishes to emphasize the fact that, in designing and maintaining locomotives, front-ends, grates and ashpans must be given equal consideration. They make up, together, the drafting system of the locomotive and consideration of the one cannot safely be divorced from that of the others. Excellent front-end arrangements may be rendered ineffective by poor grates or by poor ashpan design.

The report is signed by Edward C. Schmitt (University of Illinois), chairman; W. J. Bohan (Nor. Pac.); M. C. M. Hatch (M. K. & T.); V. L. Jones (N. Y., N. H. & H.); G. R. Likert (U. P.); John P. Neff (American Arch Co.); F. C. Thayer (Southern); G. A. Young (Purdue University), and F. Zeleny (C. B. & Q.).

Discussion

M. H. Haig (A. T. & S. F.) emphasized the necessity of taking the ash pan seriously in designing new locomotives, rather than fitting in whatever can be gotten in after the rest of the design is complete. Not only is it necessary to provide ample air opening, but the sides should slope under the mud ring sufficiently to prevent an accumulation of ashes which will restrict the openings when the engine is in service. He suggested that it would be worth while to modify the trailer truck and frame design as well as the mud ring slope, if necessary, in order to secure a good ash pan design.

Papers were also presented by G. M. Basford, on Locomotive Fuel, by J. B. Davenport on Effects of Speed and Tonnage Rating on Fuel Consumption, by O. S. Beyer on Incentives for Promoting Fuel Economy and by D. C. Buell on Educational Work for Fuel Economy. Other committee reports were presented on Fuel Accounting and on Firing Practice. These papers and reports will be published in future issues. Proceedings of the later sessions of the convention will appear in next week's issue.

N. Y. Central Surplus After Dividends, \$9,747,588

Operating Expenses Reduced 26 Per Cent from 1920. Transportation Ratio for 1921 Only 38.53

THE NEW YORK CENTRAL'S annual report, issued on Thursday of the present week, shows a net after interest and other fixed charges of \$22,295,686, and after the 5 per cent dividends and sinking fund appropriations, a surplus carried to profit and loss of \$9,747,588. There was, however, included in the income amount for 1921 items aggregating \$5,613,183, representing adjustments in that year which related solely to the federal control and guaranty periods. If these items be deducted from the 1921 figures the surplus for the year would be \$4,134,404. The 1920 surplus after dividends was \$1,250,256. In 1916 and 1917, the last two years before the advent of federal control, the Central's surplus after dividends was respectively \$30,692,606 and \$13,004,054.

The operating results obtained by the New York Central in 1921 approach the spectacular as compared with 1920. In 1921, as compared with 1920, the road had to contend with a falling off in its revenue tonnage of 33 per cent and a reduction in total operating revenues of 13.73 per cent. On the other hand it reduced its operating expenses 26.47 per cent. In 1921 the road had an operating ratio of 78.24 per cent, while the transportation ratio was 38.53.

The year 1921 was signalized on all railroads by the drastic manner in which operating expenses were taken in hand and the degree by which they were reduced through lower costs of materials, lower wages and greater efficiency. The New York Central's reductions were in even greater proportion than those of other roads, except in the case of maintenance of way. Its reduction of 26.47 per cent in total operating expenses compared with a decrease, as compared with 1920, on all the Class I roads, of 17.8 per cent. Its reductions in expenses for maintenance of way figured out at 13.02 per cent; the Class I roads' average was 23.4. Maintenance of equipment was reduced 30.91 per cent; the Class I roads' reduction in this item was 18.4 per cent. The Central's reduction in transportation expenses was 29.30 per cent. The Class I roads, as a whole, decreased their transportation expenses in 1921, as compared with 1920, 17.4 per cent. The foregoing figures are those for the New York Central Railroad and exclude those for the Boston & Albany which are shown separately in the report.

Approximated Pre-War Operating Results

The final result of all this was, that in spite of the unfavorable 1921 conditions, the New York Central approximated its pre-war average earnings from its own operations. The New York Central's standard return was \$55,802,630, excluding additional compensation accrued on account of completed additions and betterments. In 1918 and 1919 it fell short of wholly earning its governmental rental. In 1920 it had a net after rentals approximating \$4,000,000. This amount, however, was lowered by certain maintenance equalization reserve charges of over \$7,000,000, which, upon the elimination of this reserve in 1921 were credited in the 1921 accounts. The 1921 net after rentals was \$54,938,035. Excluding the credit items to maintenance, just noted, this would have been about \$47,000,000, in either case a very substantial increase. This result was, of course, obtained with higher rates—the receipts per ton per mile were 1.208 cents in 1921 and 0.93 cents in 1920—but with greatly reduced tonnage and with extremely rigid control over operating expenses. It indicates the Central's earning power and its ability to come through under adverse conditions.

The 1921 net railway operating income, representing the results of the New York Central Railroad's own operations, made up about two-thirds of the company's total gross income. This figured up to \$75,097,499 and compared with \$61,788,441 in 1920. The earnings of the affiliated New York Central properties—those controlled by majority stock ownership—are shown in the New York Central's report under "other income," which, in 1921 totaled \$20,121,944. Included in this there was dividend income of \$6,316,257; income from funded securities, \$3,171,613, and from unfunded securities, \$2,783,073. The leased, but separately operated, Boston & Albany, had a deficit after its rental payment of \$1,351,943. The peculiarity of the New York Central's large financial structure is its comparatively large interest charges. Of the total deductions from gross income in 1921 of \$52,801,813, there was included \$33,598,469 interest on funded debt, \$7,196,207 interest on unfunded debt and \$6,703,481 rent for leased roads. The 5 per cent dividends at a rate of 5 per cent total \$12,479,641. It seems to be a consensus of opinion among students of the New York Central affairs that the interest charges of the property are not at all excessive. It is frequently observed, on the other hand, that the dividend obligations are comparatively low considering the earning power of the property. The 1921 operating results seem to bear out this contention and, if the contention is correct, it means that with the restoration of more normal times in American railroading, the New York Central should find itself in a very favorable condition from the standpoint of raising new capital.

The total tons of revenue freight carried on the New York Central Railroad, exclusive of the Boston & Albany, in 1921, were 74,475,185, as compared with 110,753,433 in 1920. In other words, there was a reduction of 32.76 per cent. The New York Central has a very diversified tonnage and the reductions in 1921 were general in nearly all classes of commodities with the exception of the classifications given under products of animals. The road gives figures both for car loads and tons. The reduction in bituminous coal traffic was from 727,724 cars in 1920 to 481,869 in 1921. The tonnage in 1921 was 24,819,033, a decrease of 11,796,997 from 1920. The road also had a very drastic cut in its iron ore traffic, as is shown by the fact that in 1921 it moved 45,178 cars, or 127,970 less than in 1920. Shown in tons this reduction was 7,167,030.

Reserves for Maintenance Equalization

The road's total railway operating revenues were \$292,130,995, as compared with \$338,624,456 in 1920, a reduction of \$46,493,461, or 13.73 per cent. As has been previously noted the reduction in operating expenses was 26.47 per cent, the actual figures being in 1921 \$228,571,355 and in 1920, \$310,870,826, the difference as between the two years being \$82,299,471. These figures of operating expenses, as given, eliminate the adjustments for equalization of maintenance which the New York Central made in 1920. The report explains the situation by saying that "in arriving at the operating income for the guaranty period, the Transportation Act required that the maintenance allowance should be fixed with reference to the standards and price levels of the test period. The company worked out a tentative factor which resulted in charges to maintenance in excess of the actual expenditures and the carrying forward of a reserve at the end of 1920. This factor, however, has

proved to be larger than the government is likely to accept. Therefore, entries were made in December, 1921, closing out balances in the maintenance reserves which had been accumulated in 1920 . . . The larger part of the maintenance reserve in question was in maintenance of way. The 1920 statement of primary accounts showed an item, "equalization of maintenance," \$6,928,347, and the 1921 accounts, a credit of \$6,802,965. If the equalization items were included in the total operating expenses as a debit in 1920 and a credit in 1921, the figures would show total operating expenses in 1921 of \$221,768,390; in 1920, \$317,799,163, a reduction of \$96,030,783, or 30.22 per cent. In this use also the operating ratio for the year would be 75.91, as compared with 93.84 in 1920. If the equalization items be excluded the operating ratio for 1921 would be 78.24.

The expenses for maintenance of way were reduced from \$40,956,006 in 1920 to \$35,621,006 in 1921 or a reduction of \$5,334,300. These figures eliminate the equalization of maintenance items. The New York Central does not give, in its report, any figures showing the amount of material used for maintenance but it is shown in classified expenses that more money was spent in 1921 than in 1920 for ties, rails and other track material and that the reduction in ballast was small, which indicates that the savings in maintenance were due to increased efficiency and lower costs.

The expenses for maintenance of equipment for 1921 totaled \$64,435,871, a reduction of \$28,840,877 from the 1920 figure of \$93,296,748. The larger part of the reduction was in repairs to locomotives and cars. The steam locomotive repairs in 1921 were \$7,749,517 and freight car repairs were \$21,128,117. The result is shown in a figure for May 1 of 19.3 per cent bad order cars and of 30.9 per cent locomotives out of service for repairs requiring over 24 hours. These figures are unusually high. The average bad order car percentage for all roads on the date given was 14.4 and the unserviceable locomotive per cent, 20.2. The New York Central's high percentage figures indicate, if one judges correctly, that the road has before it some large expenses to be met for repairs or retirements of equipment. It is understood, however, that the road at present is handling its traffic extremely well and is not having any operating difficulties due to car or locomotive shortage.

Present Operating Efficiency

It was noted above that the New York Central in 1921 had a transportation ratio of 38.53, which indicates operating efficiency of a high order. The 1920 figure was 47.01. The transportation expenses in 1921 were \$112,561,539, as compared with \$159,203,029 in 1920, a reduction of \$46,641,490. This saving, which amounted to 29.3 per cent, was primarily due to the reduction in revenue tonnage and to savings in wage and fuel costs. The savings in fuel for locomotives totaled approximately \$10,000,000.

This is a good place to bring out some rather interesting points in connection with the New York Central's present operating efficiency. It is, of course, worthy of more than ordinary attention that a concern the size of the New York Central should have been able to take such a drastic hold upon its expenses as it did in 1921. The New York Central further has been doing some rather remarkable work in connection with its fast freight service. The road is rapidly regaining its former strong position in fast freight service between New York and the West and at the present time it is giving the other competing lines some interesting competition. The road, of course, has an advantage in this fast freight service because of its lack of grades, and it now is in a position to secure the advantage of the large equipment purchases which it has made in the past several years. This point is worth bearing in mind in connection with the statement made above that the percentage of unserviceable locomotives at present is unusually high. The locomotive

condition is certainly not being reflected in the manner in which the fast freight service is being handled. It is our understanding that shippers are extremely well pleased with the New York Central service.

Earnings in 1922 Should Be Good

The evidence would be that the New York Central should be able to do much better in 1922 than it did in 1921, and it will be remembered that in 1921 it came close to operating on a pre-war basis. In March of this year the road had a net after rentals of \$4,555,930, as compared with \$3,072,946 in March, 1921. Its three months' figure was \$11,612,442 as against \$3,008,576 in the first three months of 1921. The operating ratio for the first quarter of 1922 was 79.30.

The road's coal traffic is at present running very low on account of the coal strike. Since April 1 the weekly loadings of coal had been about 200 or 300 cars weekly, whereas in March and April last year they were nearer 1,500 or 2,000 weekly. Nevertheless, in spite of the lack of coal traffic the total loadings are considerably in excess of those of the comparative period last year. This bears out the theory of the optimists that business is now meeting its revival and makes one feel rather optimistic also about New York Central. The whole thing, of course, is involved in the result of the rate decision. The road, however, should be able easily to make up in increased tonnage what it may lose in the 10 per cent reduction in rates.

It is a peculiar feature in New York Central operations that the company always seems to be engaged in doing something unusual on a large scale. For the past few years the leading element in this connection has been its large purchases of equipment. It has continued these purchases in 1922, its orders for 17,000 freight cars for the entire system having recently been reported in the *Railway Age*. Another very important development which has recently been put under way is the new bridge over the Hudson river at Castleton, N. Y., and the accompanying facilities. This project will cost some \$20,000,000. An article concerning it appears on another page of the present issue.

Another interesting feature in recent New York Central development is its acquisition of the Chicago River & Indiana and the Chicago Junction which will greatly improve the system's position at Chicago. The Commission's decision approving, with certain conditions the proposed acquisition, will be found on another page. Details have appeared in the *Railway Age* concerning the passenger terminal development at Cleveland.

Big Four and Toledo & Ohio Central

The New York Central has offered to acquire additional stock in the Cleveland, Cincinnati, Chicago & St. Louis. This company has outstanding \$9,998,500 preferred and \$47,028,700 common. The Central at present owns \$30,207,700 of the Big Four's common stock, or 52.97 per cent of all its outstanding stock. It has offered to purchase the remaining Big Four stock on a basis of one share of New York Central to one share of the Big Four's \$9,998,500, 5 per cent preferred and at the rate of 80 shares of Central for 100 shares of Big Four common. Stockholders have authorized the issue of \$23,478,500 common stock for the purpose. The application to the Interstate Commerce Commission is still pending.

The New York Central board of directors, on December 14, 1921, authorized a lease of the Toledo & Ohio Central and also leases of the Kanawha & Michigan, the Kanawha & West Virginia and the Zanesville & Western. These companies are now made parts of the New York Central system by entire stock ownership, except a few shares of the Kanawha & Michigan. The proposed leases will have the advantage of offering the possibility of substantial economies in operation and accounting.

Edmund Pennington Becomes Chairman of the Soo

The New President Is George R. Huntington, Formerly Vice-President and General Manager

FOLLOWING OUT an intention entertained for a considerable time, Edmund Pennington, president of the Minneapolis, St. Paul & Sault Ste. Marie, appeared before the board of directors on May 16 to announce his desire to retire from active service, and to request that he be relieved of the responsibilities of chief executive which he has carried for 11 years. In acceding to this request the board elected as his successor G. R. Huntington, vice-president and general manager, and elected Mr. Pennington to the newly created position of chairman.

Edmund Pennington

In turning over the active control of this property to a younger man Mr. Pennington, who is 74 years of age, rounds out more than half a century of continuous active railway service, 38 years of which have been with the Soo Line and

Toronto and the east. A 260-mile extension was also soon built from Glenwood, Minn., to Noyes, forming a second connection with the Canadian Pacific and a short line between St. Paul and Winnipeg. Lines were built from Brooten, Minn., to Duluth and from Plummer, Minn., to Moose Lake to afford outlets for grain from central and northern North Dakota respectively to the head of the lakes at Duluth.

The Soo Line has also competed actively with the Great Northern for the control of traffic in northern North Dakota, building a line from Thief River Falls, Minn., west 300 miles to Kenmare, N. D., parallel to and midway between the main line of the Great Northern and the international border, which intersected 11 branch lines of the latter road. A short time later it then built another extension west from this point 136 miles into eastern Montana parallel to and a



Edmund Pennington



G. R. Huntington

its predecessor properties. During this period, largely under his direction, the Minneapolis, St. Paul & Sault Ste. Marie has expanded from a road of approximately 800 miles as formed in July 11, 1888, by the consolidation of the Aberdeen, Bismarck & Northwestern; the Minneapolis & Pacific; the Minneapolis & St. Croix and the Minneapolis, Sault Ste. Marie & Atlantic, to a system of some 4,400 miles.

The Soo Line is controlled by the Canadian Pacific; its development has therefore been designed to supplement the facilities of the parent system. Thus one of the earliest lines built in the program of expansion was that from Hankinson, N. D., northwest 350 miles to Portal, on the Canadian border, where connection was made with the Canadian Pacific, affording an alternate route south of Lake Superior for grain and other traffic moving from points in western Canada to

short distance south of the border. It was while Mr. Pennington was vice-president that the Soo Line acquired an entrance into Chicago through the lease of the Wisconsin Central, a property of approximately 1,000 miles extending from Chicago to St. Paul and Minneapolis, with branches to Ashland, Wis., and Duluth, Minn. The most recent addition to the property was made on August 1, 1921, when the Wisconsin & Northern was acquired to provide a shorter route for traffic moving between the upper peninsula of Michigan and points south, including Chicago.

Mr. Pennington's career on the Minneapolis, St. Paul & Sault Ste. Marie, is inseparably connected with an era of widespread railroad expansion in the northwest, during which the property of which he has been chief executive, has established itself as an important transportation system in

the Lake Superior region and north Mississippi valley. With trunk lines extending from Portal, N. D., through the Twin Cities to Sault Ste. Marie, Ont., and from Chicago to Noyes, Minn., near Winnipeg and with a considerable mileage of branch lines in the timber and grain producing areas of the north, this road has become an important element of the trans-continental system of which it is a subsidiary.

While not a man of unusually wide acquaintance, Mr. Pennington has commanded the esteem of those who have come in contact with him. Although he has in general been conservative to the point of persistency, holding out against the adoption of some practices on the lines under his jurisdiction which have been readily adopted elsewhere, he has been aggressive in other respects, as in the development of the local freight terminal facilities at Chicago, which were the most modern in that city when completed in 1913. He has used his practical experience to good advantage throughout his administration and the comparative freedom with which each department manages its affairs and projects its work, evidences an especially conspicuous trait of Mr. Pennington—that of constantly endeavoring to encourage initiative in the organization, and to develop responsibility on the part of the officers. He has fitted well into the period of expansion from which the lines under his jurisdiction are emerging and as a result of his administration the organization is in good condition to enter the period of more intensive development.

The career of Mr. Pennington affords another instance of a man working his way up through the ranks and bears further evidence of the continuing opportunities in this country for success and achievement by young men of purpose and application. He was born in LaSalle, Ill., on September 16, 1848, and began his railway career in his twenty-first year as a warehouse man in the employ of the Chicago, Milwaukee & St. Paul. A year later he became a brakeman in the train service of that road. Two years later he was promoted to conductor and then in 1875, after rounding out five years in train service, he was appointed a roadmaster. He held this position until 1877, when he was promoted to superintendent of construction, a position from which he rose in 1879 to that of general roadmaster. After three years as general roadmaster, he was promoted to assistant superintendent on the Iowa & Dakota divisions and finally after 15 years of continuous service with the Chicago, Milwaukee & St. Paul, he resigned in 1884 to become a superintendent on the Minneapolis & Pacific. His connection with the Minneapolis, St. Paul & Sault Ste. Marie dates from the consolidation of the Minneapolis & Pacific with that road at the time of its reorganization in 1888, since which he served as superintendent until April 15, 1898; as general superintendent from April 15, 1898, to February 1, 1899; as general manager from February 1, 1899, to July 31, 1905; and as vice-president and general manager from July 31, 1905, to March 11, 1909, when he was elected president. Since that time, in addition to serving as president of the Minneapolis, St. Paul & Sault Ste. Marie, he has also acted as president of the Wisconsin Central; the Central Terminal Company; the Duluth, South Shore & Atlantic; the Mineral Range and the Spokane International.

The career of Mr. Pennington thus represents a continuous record of 52 years in railway service, of which over 35 years were spent with the Minneapolis, St. Paul & Sault Ste. Marie and 11 years as its president. As indicating the continuity with which he has applied himself to railway work, the statement is made that for 35 years, with the exception of a week of sickness, and trips away on business, he has been in his office every day including Sundays.

George R. Huntington

As Mr. Pennington's successor, George R. Huntington enters upon his new duties with a long period of responsible

experience to his own credit, and in the estimation of his former chief, a thorough knowledge of the property of which he assumes control, coupled with ability that make him qualified to carry the administration through a trying period in its history.

In common with other roads in the vicinity, the Soo Line is suffering acutely from the business depression. The states traversed by its lines have experienced a series of crop failures which has greatly reduced the shipment of agricultural products outbound and by reducing the purchasing power of the farmers has similarly curtailed the shipment of agricultural implements and other products inbound. At the same time the shut-down of building throughout the country has reduced the shipment of lumber on the Pacific Coast. This resulted in the road earning a deficit of approximately three and a half million dollars in 1921. That the road will come back with the resumption of business is certain. That the problem at the present is trying and will tax the ability of the new executive is equally evident.

Mr. Huntington was born at New Lisbon, Wis., September 10, 1868, and entered railway service in 1882 as an office boy in the employ, as in the case of Mr. Pennington, of the Chicago, Milwaukee & St. Paul. Consecutively from 1882 to 1884 he was an office boy, an operator, and an agent on this road until 1884, when he was promoted to train dispatcher.

He entered the service of the Minneapolis, St. Paul & Sault Ste. Marie in 1888 as train dispatcher and served in that capacity until June 25, 1899, when he was promoted to superintendent. He was promoted to general superintendent on November 1, 1900, and in July of the following year was made general manager, with jurisdiction over the Minneapolis, St. Paul & Sault Ste. Marie and the Wisconsin Central (of which control had just been acquired). Mr. Huntington then continued as general manager of these properties until the roads passed into the hands of the government during the war, when he was made federal manager of the Minneapolis, St. Paul & Sault Ste. Marie; the Duluth, South Shore & Atlantic; the Mineral Range; the Copper Range and the Lake Superior Terminal & Transfer Company, in which capacity he continued until their return to their owners in 1920, when he became general manager of the Minneapolis, St. Paul & Sault Ste. Marie; the Duluth, South Shore & Atlantic, and the Mineral Range.

On March 10, 1920, he was also elected a vice-president of the Minneapolis, St. Paul & Sault Ste. Marie (including the Wisconsin Central) and the Duluth, South Shore & Atlantic, and continued as vice-president and general manager of these roads and general manager of the Mineral Range Railroad until the date of his recent election as president, May 16. Mr. Huntington thus enters the office of president at the age of 54, after a continuous career of 40 years in railway service, of which 23 years have been spent in the employ of the Minneapolis, St. Paul & Sault Ste. Marie and all of which has been spent in the northwest, where he has acquired a wide acquaintance among railway men and the shipping public.

THE BALTIMORE & OHIO RAILROAD ACCOUNTING ASSOCIATION has been organized at the general offices of that road in Baltimore, Md. and it is proposed to hold meetings regularly on the third Friday of every month. The object is to exchange views on railroad accounting problems and in general to promote inter-departmental cooperation. The membership is confined to the officer, chief clerks, head clerks and secretaries in the accounting, treasury, claims and relief departments, all of which are under Vice-president George M. Shriver. The membership of the association numbers already about 100. The principal speaker at the first meeting was John J. Ekin, comptroller. The president of the association is F. F. Lollman, and the secretary J. M. Finn.

C. & N.W. Revenue Tons Decreased 34.92 Per Cent

Loss for Year 1921 Totals \$10,070,708 After Dividends on Preferred and Common Stock

THE CHICAGO & NORTH WESTERN pays seven per cent on its preferred stock and five per cent on its common stock. These dividends totaled in 1921, \$8,825,275. The property had for the year a net loss after fixed charges of \$1,245,433, or, after the payment of dividends, a balance for the year in red of \$10,070,708. The reason for this is explained in a reduction in revenue tonnage of 34.92 per cent. The North Western reported for 1921 a revenue tonnage of 39,227,758 as compared with 60,275,207 in 1920.

The road's tonnage in 1921 was divided as follows: Products of agriculture, 19.80 per cent; products of animals, 5.59 per cent; products of mines, 37.57 per cent; products of forests, 13.48 per cent, and manufactures and miscellaneous, 18.42 per cent. The most decisive decrease in 1921 as compared with 1920 was in products of mines. The 1920 tonnage in this group was 29,731,546, or 49.33 per cent of the total tonnage; in 1920 this tonnage was reduced to 14,737,114—a reduction of 50.43 per cent. The tonnage of bituminous coal in 1920 was 10,254,478; in 1921 it was 6,235,916, or 39.19 per cent less. Bituminous coal in 1921 made up 15.9 per cent of the total tonnage. Iron ore showed a reduction of 74.19 per cent; whereas in 1920 it made up 13,978,103 tons or 23.19 per cent of the year's total tonnage, in 1921 it made up only 3,607,582 tons or 9.2 per cent of the total. The decrease in iron ore was also reflected under manufactures and miscellaneous in pig iron and steel products. Pig iron showed a reduction of 71.55 per cent; bar and sheet iron, etc., a reduction of 68.85 per cent. Practically the only commodities in which increases were shown as between the two years, were wheat, corn, packing house products, wool, etc., but with the exception of corn none of these represent a very considerable proportion of the North Western's total tonnage.

Taking the situation as a whole and noting particularly the degree of the reductions above noted, it was to have been expected that the North Western's results for the year would have been far from satisfactory. Because of the fact that the greatest reductions were in the classes of tonnage which load most heavily and are handled at the lowest costs per ton, it is also to be expected that the conditions mentioned should be reflected in the operating statistics, notably in the manner of decreased train load, or car load, etc.

"Due to the reductions in traffic handled," says the annual report, "substantial results in operating costs were effected, but it was impossible to reduce the operating costs in proportion to the loss in traffic. The total loss in tonnage was 34.92 per cent. Freight train miles were reduced 15.73 per cent; freight switching locomotive miles were reduced 25.45 per cent; loaded car miles were reduced 20.92 per cent; while empty freight car miles were reduced less than one per cent." The revenue train load in 1921 was 383 tons as compared with 458 in 1920. The revenue car load was 24.16 as compared with 26.31 in 1920.

The freight revenues of the North Western in 1921 totaled \$95,687,013 as compared with \$110,500,758 in 1920, a decrease of \$14,813,745. The passenger revenues for 1921 were \$33,770,082, a decrease of \$3,616,521. Total operating revenues were \$144,775,476 as against \$165,692,399 in 1920. There was, in other words, a reduction of \$20,916,924. The decrease in operating expenses was \$28,018,772. For 1921 the operating expenses totaled \$129,091,428 as compared with \$157,110,200 in 1920. The North Western operated at a ratio of 89.17 in 1921; in 1920, at 94.82. The decrease in operating expenses in 1921 as compared with 1920, in-

cluded decreases of \$6,974,044 in maintenance of way; of \$6,055,533 in maintenance of equipment, and of \$14,620,231 in transportation. With reference to maintenance of way, it should be noted that there were 126 miles of track renewed with new rail in 1921 as compared with 253 in 1920; 2,667-562 ties were put in as compared with 2,543,892 ties in 1920. The equipment condition is best indicated by a percentage of bad order cars on April 15 of but 7.6 per cent as compared with the country's average on that date of 13.9 per cent, this showing for the North Western a very favorable condition.

With further reference to expenses, it should be noted that the corporate income account includes a debit item under rental income of \$324,993. This is due to a charge to rentals of \$957,824, representing the cost of replacing the grain elevator at Chicago which suffered from an explosion on March 19, 1921. "At the time of the explosion," the report says, "approximately 7,000,000 bushels were in the elevator. As soon as the operators were able to remove this grain, the work of reconstruction was begun and it has progressed at favorable speed, and the elevator will be in shape to receive grain this season."

Acquisitions of Equipment

It has been suggested that the railway annual reports might well include in their pages some reference as to what the railroad is doing in the way of acquiring more equipment, etc. This is done in the Chicago & North Western report and the number of cars and locomotives mentioned is rather imposing. The North Western was allocated by the Railroad Administration 2,250 box cars and 1,000 gondola cars and 35 six-wheel switching locomotives. In 1920 it placed orders for 500 ore, 500 stock, 250 refrigerator and 50 caboose cars, for 62 passenger cars and for 40 Mikado and 20 Pacific type locomotives. It has since placed orders for additional passenger equipment totaling 50 cars to be delivered before June 30, 1922. In the *Railway Age* of May 6 it was further reported as having placed orders with the American Locomotive Company for 20 Mikado, 20 six-wheel switching and 10 Pacific type locomotives and in the *Railway Age* of April 29, as having placed orders with various car builders for 1,250 box, 500 flat, 500 stock, 250 gondola, 250 refrigerator and 300 ballast cars.

In 1921 the North Western resumed work on its grade separation work at Clinton, Iowa. It completed an 840-ft. extension to its ore dock at Ashland, Wis., several important bridges were constructed, etc., all of which indicate that although 1921 was a very poor year, the road did make some progress.

The North Western is another of those roads which was severely hit by federal control and it has not yet made considerable progress towards recovery. The road had a standard return or compensation for operation by the government of about \$23,000,000, of which in 1918 and 1919, it earned only about one-half. In 1920, when it had standard return for two months and guaranty for six, it had a deficit after rentals of \$1,609,232. In 1921 it earned a net after rentals of \$6,651,137. For the first three months of 1922 it had a net after rentals of \$1,712,169 as against a deficit for the first three months of 1921 of \$1,261,337, which indicates improvement, although not in great degree. Its loadings at present are running slightly ahead of those at this time last year, but the evidence on the whole is that the revival in business which is beginning to show itself has not yet

reached the North Western to the extent the road needs to give it a reasonably good year for 1922. There is but little question, however, but that it will be prepared to handle the business when it does come.

C., St. P., M. & O. Also Shows Deficit

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is in much the same position as its parent company, the Chicago & North Western, which controls it through majority stock ownership. The Omaha is paying seven per cent on its preferred stock and five per cent on its common stock. The dividends on these issues totaled in 1921, \$1,715,986. The company had a net loss after fixed charges for the year of \$285,677 and a loss after dividends of \$2,001,663. This compared with a profit after dividends in 1920, in which year the road had poorer operating results than in 1921, which, however, were compensated for by standard return and guaranty.

The North Western owns \$5,380,000 of the \$11,259,859 outstanding Omaha preferred stock and \$9,540,000 of its \$18,559,087 common. The total dividend income of the parent company in 1921 was \$2,577,208, of which about one-third was derived from its Omaha shares. The Omaha in 1921 did not have as sharp a reduction in its traffic as the parent company. Its tonnage was reduced 21.85 per cent as against the North Western's 34.92 per cent. The reason for the lesser reduction was that the Omaha does not have a large tonnage of coal, iron ore and products of iron, in which classes of tonnage the North Western had its greatest reductions.

The Omaha is more of a granger road. This is shown by the fact that in 1921 products of agriculture made up 37.05 per cent of its total tonnage, whereas coal constituted only 8.95 per cent of the total tonnage; products of mines, as a whole, only 16.62 per cent, and manufactures and miscellaneous, only 17.44 per cent. The reductions in the Omaha's tonnage in 1921 as compared with 1920 were general. There was an increase in corn, however, of 67.58 per cent. Corn with a total movement in 1921 of 639,505 tons, made up 7.36 per cent of the total tonnage. The wheat moved totaled 730,631 tons, or 8.41 per cent of the total and was 10.69 per cent less than in 1920.

The revenue tons carried by the Omaha in 1921 totaled 8,691,370 as compared with 11,121,752 in 1920, a reduction, as above noted, of 21.85 per cent. The revenue ton-miles totaled 1,345,870,353, a decrease of 24.45 per cent, the greater proportionate decrease being due to a reduction in the average haul from 160.18 to 154.85 miles. The 1921 freight revenues totaled \$19,285,657, a decrease from 1920 of \$1,573,222. The passenger revenues of \$6,865,280 represented a reduction of \$1,433,347. The total operating revenues in 1921 were \$28,137,408 as compared with \$31,955,612 in 1920, this being a reduction of \$3,818,205. Operating expenses were reduced \$4,042,194. The 1921 total was \$24,392,314; the 1920, \$28,434,508. The operating ratio in 1921 was 86.69; in 1920, 88.98 per cent.

The Omaha's net after rentals in 1921 was \$2,065,349. This was slightly better than the figure for 1920, but not as good as in 1918 and 1919, when the road was being operated by the government. The 1918 and 1919 net after rentals further was only slightly over one-half the standard return which was fixed at about \$5,000,000. In view of the fact that the 1921 figure was only \$2,065,349, this means that the Omaha, like its parent company, the North Western, is thus far making but small progress in its return towards normalcy. The Omaha is doing slightly better proportionately. In 1920 it did not operate with a deficit after rentals as the parent company did and in 1921 it did not suffer as severe a falling off in its tonnage.

The Omaha's present position is quite like that of the North Western. It also has been making rather disappointing progress in restoring itself to its pre-war earnings standard. There has been some improvement shown in its condition thus far in 1922. In March it had a net after rentals of \$274,192 and for the three months, a net of \$259,297. This compared with a deficit in the first three months of 1921 of \$264,268. In the first three months of 1922 the operating ratio was 88.4, so the nature of the improvement over last year's first three months' figure cannot be termed peculiarly striking.

New York Central Authorized to Acquire Chicago Junction

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION, on May 18 made public its report authorizing the acquisition by the New York Central of control of the Chicago River & Indiana by the purchase of its capital stock for \$750,000 and the acquisition by the Chicago River & Indiana of control of the Chicago Junction by lease at a rental of \$2,000,000 a year, subject to 17 conditions. This proceeding has been pending since December 28, 1920. The application of the New York Central was opposed by eight trunk line roads entering Chicago from the east and southeast and by a group of Chicago shippers and the Chicago Railway Terminal Commission. Another group of shippers took a neutral position and in addition there were filed separate written endorsements of individual corporations and firms comprising about 90 per cent of the 400 shippers served by the Junction and the River road urging the commission's approval of the proposed plan. About 30 of these were subsequently withdrawn. Four of the commissioners, Commissioners Meyer, Aitchison, Eastman and Cox, signed dissenting opinions, while Commissioners Daniels, Campbell and Hall filed separate concurring opinions.

In support of its application, the New York Central showed that the New York Central lines are in need of downtown terminals in Chicago which they cannot now build up for themselves and that to bring under a common control the properties of the Junction and River roads and the Indiana Harbor Belt would greatly promote the public interest by providing the necessary balance between the inner industrial movement afforded by the former and the transfer, interchange and classification facilities available and potential on the rails of the latter. The territory served by the two roads is entirely within the Chicago switching district and besides serving the central manufacturing district and the stock yards district, the two roads handle traffic to and from all of the 23 trunk lines entering Chicago.

The intervening carriers contended that the plan was contrary to public interest because the two roads are now neutral and open to all carriers and shippers on equal terms and that the plan would substitute monopoly of these facilities for the present neutrality of operation. They took the position that they had an equity in the properties by reason of having contributed to the Junction's earnings by the absorption of switching charges and they offered to combine with the Central in a joint control of the properties on the basis of their fair value.

The shippers intervening in opposition expressed the belief that they would not under the proposed plan continue to enjoy existing routing privileges or receive equal service from all trunk lines entering Chicago, but would be forced to route over the Central as a matter of self-preservation. The second group of shippers desired to preserve the present organization of the Junction and the same impartial service

which they now enjoy and that the Central bind itself to accept certain conditions designed to insure that result. The Chicago Railway Terminal Commission feared that the project might prove deterrent to the adoption of the city's plan, not yet formulated, for the unification and co-ordination of all Chicago terminals.

Questions were also raised at the hearing as to the value of the properties. The Central offered proofs tending to show that the present cost of reproduction of the River road exceeds \$3,000,000 and a present cost of reproduction for the Junction properties, including the value of its leases, of considerable more than \$33,000,000. The commission's Bureau of Valuation has not yet completed its tentative report on these properties. The majority report of the commission says in part:

The Commission's Majority Report

Under all the circumstances it is not feasible to make a definite finding of value in this proceeding which shall be taken and accepted as a final judgment in the matter, and the conclusion herein reached renders such a finding unnecessary.

On all the facts of record, it is concluded that for the purpose of this proceeding only, we may accept the position of the Central that the market value of the properties to the Central and its affiliated companies at this time is such as to justify the payment of a rental based on something more than the value for capitalization or rate making purpose. That is by no means saying, however, that its figures are to be accepted as the basis for permanent capitalization or for rate making, or that the Central is to be permitted to capitalize the intangible values by paying, through the River road, permanent fixed charges on the basis of the market value claimed. Since the values are not at this time capable of definite settlement, it follows that such part of the application as relates to the purchase of the capital stock or the physical properties of the Junction will not be granted herein, but will be reserved for future treatment at such time as the Central may desire to renew its application in that respect, following the final determination of values under section 19a of the act.

There are grave objections to an unconditional approval of the plan under consideration. Much testimony was adduced at the hearings, and divergent opinions were expressed, as to the relative merits of cooperative, singly controlled and independently controlled terminals. That discussion need not be reproduced here. The policies and plans of the city with respect to the general terminal situation have not yet fully developed, and it is obviously impossible for any one to determine at this time the ultimate goal which ought to be attained. It is believed, however, that pending final determination of future policies, the greatest good can be attained by the continuance, for the time being, of the competitive terminal situation. This can be best accomplished by bringing the present neutral Junction properties into closer relation with a trunk line like the Central. The Central's terminal facilities are relatively inadequate as compared with the competitor eastern trunk lines, but the Central controls extensive facilities for classification and interchange which are complementary to the Junction properties. The stronger competition and the connection between the Junction properties and the Harbor Belt facilities which would thus be brought about, would not only insure to the shippers of the Junction the necessary expansion and elasticity of facilities, together with the assistance of an interested trunk line in times of car shortage, and other emergencies, but would also remove congestion from the closely hemmed-in district served by the Junction and thus open facilities for expedition in the handling of traffic in and out, and also for handling traffic from one part of the city to another. It has been held that where such a transaction as the present one would clearly facilitate the movement of traffic through a highly congested district, the circumstances that other carriers would suffer a loss of revenue is not controlling.

There are in the record ample grounds for the belief that the Junction can no longer solve its problems without outside assistance. On the other hand, it is believed that the benefits pointed out by the Central can be made to accrue to the public by the consummation of the proposed plan. A prime factor in the situation is the circumstance that the general policy on all terminals in Chicago is that of equal opportunity afforded to all connecting carriers irrespective of the ownership or control of a given terminal property by a single trunk line or by a group of trunk lines. Traffic is handled for all carriers in the same way and on the same terms, so that a shipper on terminals owned by a single carrier has the utmost freedom in routing via competing lines and apparently receives the same measure of service whether his shipment moves over the lines of the owning carrier or those of a competitor. Those shippers who appeared in opposition express the fear that they will not be accorded like treatment by the Central. The

present management of the Central disclaimed any intention of making any changes in the method of handling competitive traffic or the general plan of operating the Junction properties, and those assurances may be taken at their face value, especially since the contrary policy would clearly be against the self interest of the Central, in that it would thereby lose the good will of the shipper. There is, of course, every indication that the Central will be able to build up its own line-haul traffic as the result of its connection with the management of the Junction, and it by no means follows that harm to the public may result from legitimate effort and initiative to that end.

Commission Sets 17 Conditions

But we are not prepared, in any event, to authorize the consummation of the plan without making assurance doubly sure by the imposition of certain conditions. Those conditions relate partly to the method of operation of the property and partly to the treatment of the transaction by the corporations participating therein. Among the number are those matters enumerated by the shippers who have asked an approval of the plan with the understanding that certain agreements already made by the Central will be adhered to. Other matters are suggested by the group of shippers who took a neutral attitude at the hearing, such matters being agreed to on the record by the applicant; and still others suggest themselves from the standpoint of an administrative body, as stated in order to safeguard the public interest in the future. Set out concretely, they are:

1. The Central will be required to maintain a separate corporate identity and organization for the combined properties of the Junction and River Road so that the two shall constitute a separate operating entity with a responsible management located in Chicago in order to preserve for the shipper the present direct access to the railroad officials.
2. The present neutrality of handling traffic in and outbound by the Junction and River Road organization shall be continued so as to permit equal opportunity for service to and from all trunk lines reaching Junction rails, without discrimination as to routing or movement of traffic which is competitive with the traffic of the Central, and without discrimination against such competitive traffic in the arrangement of schedules.
3. The present traffic and operating relationships existing between the Junction and River Road and all carriers operating in Chicago shall be continued, in so far as such matters are within the control of the Central.
4. For the purpose of assessment of switching charges, the Junction and River Road shall continue to be treated as a single line to the same extent as at present, so that the carrying out of this plan will not in and of itself result in increasing the charge to any shipper for the service.
5. Subject to subsisting car service regulations, cars made empty on the rails of the Junction and River Road shall be available for outbound loading in the same manner and to the same extent as at present, irrespective of routing.
6. Whenever additional cars are required for outbound loading, because of inadequacy of available car supply on the Junction and River Road rails at any given time, for any cause, orders for such additional cars shall be accepted from the shipper by the local Junction organization and by it promptly transmitted to the designated trunk line without discrimination, and all cars ordered by and delivered to the Junction shall be promptly moved to the shippers by the Junction without discrimination on account of proposed routing.
7. The Junction shall accept, handle and deliver all cars in and outbound, loaded and empty, without discrimination in promptness or frequency of service as between cars destined to or received from competing carriers and irrespective of destination or route of movement.
8. The National Code of Demurrage Rules, as in effect from time to time, including the average agreement, shall be applied by the Junction and River Road to each industry served by either of them on all in and outbound cars irrespective of what carrier or carriers may be interested in the line-haul.
9. Shippers served by the Junction and River Road shall be entitled to the same basis of switching charges as prevails in the Chicago switching district generally, and no attempt shall be made to establish any different basis of local or connecting line switching charges than that which prevails in the Chicago switching district generally for the same or similar service under substantially similar conditions.
10. No change shall be sought in the present method of basing rates to and from the Chicago switching district as a single point upon which rates are now based without regard to the character of the movement in and out of such district.
11. Present trap car arrangements for the transfer of l. c. l. freight at the Junction union station, at connecting line freight stations, or at connecting points reached by the Junction and River Road, shall be continued, but this condition shall not apply

to routine changes in management and operation of trap car service.

12. Continuance of present operating arrangement on the Junction properties shall include the maintenance of existing shipping and billing arrangements at the Junction union freight station, in so far as such arrangements are within the control of the Junction.

13. The Junction shall, if ordered by us, establish station facilities for the receipt of inbound l. c. l. freight at a point convenient and accessible to shippers wishing to make use of the same, to which freight may be delivered by all trunk line carriers, without discrimination, and there distributed through the medium of the Junction's operating force.

14. Neither the approval of the purchase by the Central of the stock of the River Road for the sum specified, nor of the leasing to the latter of the properties of the Junction, shall be taken as establishing or tending to establish the fair value of the respective properties in any other proceeding, nor shall anything herein contained be construed as a finding that the annual rental to be paid by the River Road for the lease of the Junction properties is just and reasonable.

15. The carrying out of the plan as authorized herein shall be taken to be without prejudice to the adoption of any plan or plans in the future by the city of Chicago, by us or by any other public agency, for unified or coordinated terminals, and neither the Central, the River Road nor the Junction shall urge the authority herein given or the situation resulting therefrom as a ground for opposition to such plan or plans of said city, our plans or those of any other public agency.

16. Nothing contained in this authorization shall be taken as permitting the River Road and Junction properties to be considered as a part of a single system with that of the Central for

any of the purposes of section 15a or section 20a of the act.

17. Any party or any person having an interest in the subject matter may at any future time make application for such modification of the above conditions, or any of them, as may be required in the public interest, and jurisdiction is retained to reopen the proceeding on our own motion for the same purpose.

Subject to the observance of the above conditions, we find that the acquisition by the Central of the capital stock of the River Road and the leasing to the River Road of the properties (owned and leased) of the Junction will be in the public interest.

Original Conditions Numbered 18

The commission at one time served a tentative report stating 17 conditions which should be imposed, most of which presented conditions which were assented to by the New York Central, although it objected somewhat to an additional order. Later a revised tentative report was served imposing 18 conditions. The New York Central objected in principle to the 17 conditions, but it objected particularly to Condition 18, which provided that the commission's order authorizing the transaction might at any time be cancelled for good cause shown, and this has been omitted.

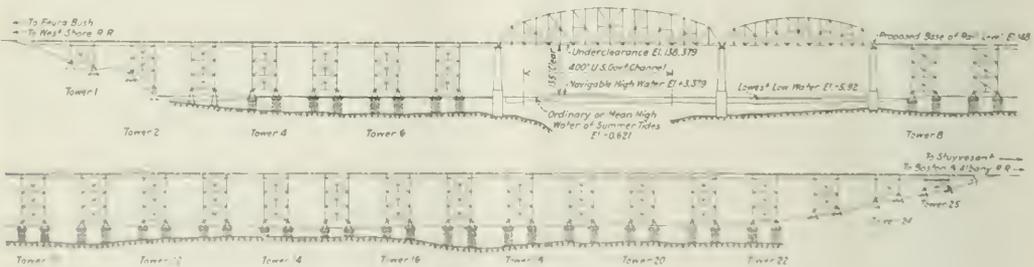
Commissioners Daniels and Campbell held that a certificate of public convenience and necessity should have been incorporated in the order entered and Commissioner Hall said that the facts warrant grant authority without elaboration of conditions.

Castleton Bridge and Freight Cut-Off Started

New York Central Commences \$20,000,000 Project to Relieve Operating Difficulties at Albany, N. Y.

CONSTRUCTION WORK will commence at once on the Castleton bridge and cut-off improvement of the New York Central, under plans providing for rapid work on a scale that will bring it into operation within two years. The bridge, connecting tracks, yards, etc., call for an ultimate expenditure of approximately \$20,000,000. The new bridge, located about 12 miles south of Albany, N. Y., near

amount of through freight traffic of New England and New York now passing through the Albany gateway, where conditions restrict rail facilities, causing uneconomical operation and in times of heavy business serious congestion and delays. In normal past years there has been an average interchange of 1,000 freight cars each way between the west and the Boston & Albany every day, and a daily interchange of 600



Plan of the Castleton Bridge

Schoelck Landing, will be the second high level structure to span the Hudson River, and larger than its single predecessor at Poughkeepsie, N. Y. Extending from it will be three tangents of double-track line, aggregating 20 miles, creating shorter and level connections between the main line of the New York Central and the Boston & Albany and the West Shore Railroad. The beneficial results forecast include a great increase in passenger carrying and freight tonnage capacity and a possible substantial reduction of average time in transit of freight between the North Atlantic seaports and the Middle West.

The new connection will provide easy flow for a vast

amount through freight traffic of New England and New York now passing through the Albany gateway, where conditions restrict rail facilities, causing uneconomical operation and in times of heavy business serious congestion and delays. In normal past years there has been an average interchange of 1,000 freight cars each way between the west and the Boston & Albany every day, and a daily interchange of 600

Operating Difficulties at Albany Will Be Obviated

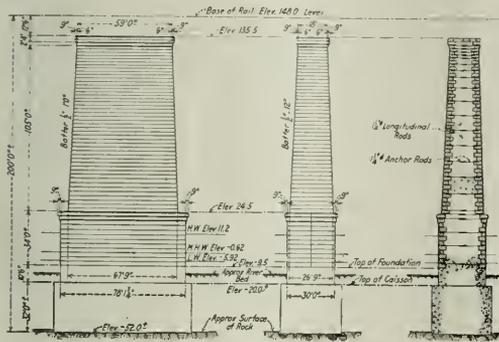
The Albany gateway of the New York Central is comparable to a "small neck of a large bottle." The major accomplishment of the Castleton improvement is relief from the obstacles to easy movement of heavy freight trains existing at Albany. The railroad has been able to handle efficiently no more tonnage than could be accommodated by the low drawbridges, and particularly the heavy grade west-

ward from West Albany to Karner, N. Y. Here for eight miles to the west is the steepest grade on the entire system.

Under present operating conditions freight trains of 80 cars can be brought solid from New York City for 140 miles on the water-level route along the Hudson, but before crossing the low drawbridge at Albany they have to be cut into sections, and each section supplied with a "pusher" for the long up-grade westward to Karner. All of the sections have been subject to various delays, often being held up by an open drawbridge in navigation season, while the reassembling of the sections has involved an additional expenditure of time and labor. During the busy navigation season the Albany drawbridges are turned 40 times a day.

A High Level Bridge With 138 Feet Clearance

The preliminary studies for the bridge involved extensive investigations and tests to find solid rock foundations beneath the river at locations where the currents and shore line typography were adaptable and land available. This required investigation of the river bed and banks over a



Elevation, End View and Section of Center Pier

great distance. At the Castleton location the three main supporting piers of the bridge, each 200 ft. in height, will be carried down below the river bed to a depth of 40 ft., 50 ft. and 70 ft., respectively, to solid rock. They will be faced with granite and limestone.

The structure across the Hudson will consist of two steel truss spans, 600 ft. and 400 ft. in length, flanked by steel viaducts on either side, the total length of the structure being approximately one mile. It will be built to carry two tracks but provision has been made in the design for expansion to four tracks when desired. The supporting piers for the main spans are three in number and, as stated, are 200 ft. high from base to bridge seat. This gives an under clearance of 138 ft. above high water level, slightly greater than the clearances of the high level bridge at Poughkeepsie, N. Y., or at the suspension bridges across East river at New York City. The tracks will be 150 ft. above the water line. The viaduct approaches to the main spans will be supported by rectangular steel towers, 25 in number, each carried on four concrete piers on piles driven to rock. Towers, center to center, are 164 ft. apart, the supports being in the form of a square, 64 ft. on a side.

At present the single existing navigable channel at the bridge site is 400 ft. wide between the government dikes, and as this will be blockaded during part of the construction work, the railroad will be compelled to dredge a second channel for a distance of over two miles, this to be a permanent and straight channel, and run beneath the secondary span to permit flow of navigation without any interruption.

The routing of the 20 miles of rail connections involves the crossing of highways at 24 points, 16 on the east shore

and 8 on the west shore, but the construction is so arranged that at all of these places the tracks pass either above or below the roads without a single crossing at grade. To the west of the bridge the new trackage will extend inland across level farm lands for eight miles to a connection with the West Shore at Feura Bush, N. Y., where there will be constructed a large gravity freight classification yard. On the east shore the tracks will extend four miles with very slight grades to connection with the Boston & Albany at Van Hoesen, N. Y. The third lateral will make connection with the New York Central main line just north of Stuyvesant, N. Y., the new tracks skirting the bluffs for 12 miles southward from the bridge to accomplish easy grade. Maximum grades will be 0.35 per cent.

Double Track Rail Connections and

Classification Yard to Speed Up Movement

The improvement includes a large gravity freight classification yard with an over-all length of about six miles located at Feura Bush, where cars will be classified for movement eastbound and westbound. Eastbound classification will permit direct movement of solid trains over the West Shore tracks to Weehawken, N. J.; across the Castleton bridge to the New York Central main line and thence to terminals on Manhattan Island; and to connections with the Boston & Albany for deliveries in New England. In this yard may be concentrated the classification work now carried on in the smaller and inadequate yards at West Albany, Karner, Ravena and other points.

The yard comprises new engine terminal facilities with at least two enginehouses of 30 stalls, one of which will be built at the present time. The yard tracks will be arranged into tonnage and fast freight tracks each with its individual complement of receiving, classification and advance yards and winter and summer humps. About 60 per cent of the layout will be constructed immediately, as may be seen from the following typical items. The westbound receiving yard will have ultimately 24 tracks, each holding 45 to 100 cars of which 13 tracks with capacities of 50 to 90 cars, 1,000 car total, will be built at present. Westbound classification will have 32 tracks ultimately of which 28 tracks, 3,200 car capacity, will be built now, the corresponding yard eastbound to have ultimately 36 tracks and 28 at present.

All Legal Obstacles Now Removed

The Castleton cut-off was first definitely planned by the New York Central in 1910, and during succeeding years it has continuously been before public commissions, the courts or other authorities seeking the necessary official sanction. The opposition was launched and sustained throughout by residents of the City of Albany, the cut-off establishing a shorter new route between East and West that detours to the south of the city. The opposition to the bridge contended that if it were built in two spans the supporting pier in the middle of the river would constitute an obstruction to deep-draught shipping and also cause ice gorges and floods. The railroad contended that a bridge with a single 1,000-ft. span would cost a prohibitively higher sum, which was unnecessary, wasteful and impracticable from the railroad standpoint. All legal and legislative barriers have now been cleared away. A new act passed by Congress provides that the bridge and connections shall be completed and in operation by February 15, 1925, but the railroad's schedule calls for completion a year earlier.

The work is under the immediate direction of the engineering department of the New York Central, G. W. Kittredge, chief engineer; J. W. Pfau, engineer of construction; H. T. Welty, engineer of structures, and R. E. Dougherty, designing engineer. Contracts for the fabrication and delivery of the steel were let to the McClintock-Marshall Company, Pittsburgh, Pa., and for the grading and masonry to the Walsh Construction Co., Davenport, Iowa.

General News Department

The Interstate Commerce Commission has fixed June 15 as the date for the resumption of hearings at Washington on its tentative plan of consolidation as it applies to the Southeastern district.

Fewer Accidents—More Money

The board of trustees of the Brotherhood of Railroad Trainmen, because of the large decrease in the number of casualties to railroad employees, has recently recommended that members of the brotherhood be insured for \$2,700 at the rate heretofore paid for a \$2,000 policy; a 35 per cent increase in insurance without any additional cost.

Association of Railway Claim Agents

This association held its thirty-third annual convention at Montreal, Canada, on May 17, 18 and 19. The officers elected for the ensuing year are: President, R. H. Doolittle (C. & S.); first vice-president, W. H. Failing (C. of N. J.); second vice-president, S. R. Brittingham (S. A. L.); third vice-president, F. R. Haney (C. P. R.); secretary, H. D. Morris (N. P.).

New Line Chartered in Arkansas

The Arkansas state railroad incorporation board has granted a charter to the newly organized "Arkansas Short Line Railroad Company," which plans to operate a railroad between the town of Truman in Poinsett county and McDonald in Cross county, a distance of approximately 32.6 miles. The company is capitalized at \$200,000, all of which has been subscribed. The incorporators are the Poinsett Lumber & Manufacturing Company, which owns the controlling interest.

Southern Pacific Veterans' Reunion

The annual reunion and banquet of the Southern Pacific veterans was held in the Palace Hotel, San Francisco, Cal., on May 10, the 53rd anniversary of the driving of the last spike at Promontory Point, Utah, in 1869. A number of prominent pensioners were present from various points on the system. This company has pensioned 1,775 employees, of which 834 are living, and has paid out \$4,269,356 in pensions since the present pension policy was adopted in 1903.

Minnesota Car Repair Shed Law Declared Invalid

A statute passed by the Minnesota legislature requiring railroads and other concerns who build or repair cars and car trucks to provide shelters for the protection of workmen from inclement weather, was declared null and void in a decision rendered by Federal Judge W. F. Booth at Winona, Minn., on May 15. The decision grants the Chicago & North Western a permanent injunction restraining the Minnesota Railroad & Warehouse Commission and the attorney general of the state from enforcing the statute in question.

Our Regulating Machinery

There is more truth than just in the assertion that about the only function left to railway management is the borrowing of money to make up deficits. There are ninety-nine agencies which make it a part of their duties to "regulate" the railways; 48 state legislatures, a like number of state commissions, Congress, the Railway Labor Board and the Interstate Commerce Commission. Most of these are not overlooking any opportunities to "regulate." Last year the legislatures of 42 states were in session. They passed 161 laws regulating railroads and having to do with railway affairs; and measures introduced but not enacted into law numbered 411. Some of the 572 measures introduced were: To require railways to fence the entire right of way; making it a felony to keep employees of a railway from holding public office;

prohibiting smoking on trains; prohibiting the use of paint-spraying machines; prohibiting advertising during threatened or actual strikes; prohibiting locomotives from running backwards; requiring all passenger trains to stop at all county seats; requiring railways having tracks along moving streams to keep the channels of such streams clear; requiring railways to transport all pupils in schools, high schools and night schools, at half fare.—*Central of Georgia Circular.*

U. S. Chamber of Commerce Opposes

Amendment of Commerce Act

The following resolution was adopted at the annual meeting of the Chamber of Commerce of the United States in Washington on May 18:

"The Transportation Act of 1920 placed in the interstate commerce law enactments which are of high importance, and which were advocated by the chamber. The interstate commerce act as it now stands should not be amended, and none of its basic provisions should be repealed, until there has been more opportunity for the law to be tested by experience under more normal conditions than yet exist. Opposition should be continued against proposals for the repeal of such basic provisions of the law as confer upon the Interstate Commerce Commission power to correct intrastate rates that unreasonably discriminate against interstate commerce, and give the commission the guidance of a rule for rate-making intended to secure for the public adequate transportation facilities and services."

Carl R. Gray, president of the Union Pacific, was elected a director of the chamber representing the transportation and communication department.

Pensions Capitalized

W. A. Winburn, president of the Central of Georgia, finding that employees do not fully understand and appreciate the benefit of being promised a pension on retirements from the service, has issued a letter briefly explaining the retirement plan and calling attention to what a pension costs the employer. He says, in part:

"The basis for pension allowance is one per cent for each year of service. . . . For example, an employee who had served continuously for 25 years, and whose average pay for the last ten years of service was \$200 a month, would receive 25 per cent of \$200 or \$50 a month; if in service 30 years he would receive \$60 a month. In other words, the company has set aside the sum of \$12,000 for the benefit of that 30-year employee and the interest at the rate of 6 per cent per annum on that sum, goes to the employee in the form of a pension. The man who earns more receives more and the man who earns less, has less; but every employee who complies with the requirements participates in the benefits.

"It should certainly be an incentive to faithful and continuous service to know that liberal provision is made for us.

We should regard the length and continuity of our service records with a pride second only to the pride in doing well whatever we have to do."

Manhattan Produce Yard

This is the name of a new freight delivery yard, with eleven team tracks holding 511 cars, which has just been completed by the Pennsylvania Railroad at South Kearney, near Meadows, N. J., five miles from the ferry terminus at Jersey City. The work has been done in five weeks at an expense of \$250,000, under the supervision of E. D. Davis, division engineer.

This yard is to be used for the delivery of perishable food-stuffs for distribution in New York City, and marks what may be considered the first step to provide facilities for the delivery of freight in conjunction with the proposed vehicular tunnel under

the North River connecting New York and New Jersey, the construction of which is expected to commence shortly. For the present consignees' trucks will have to cross the river by ferry. The new yard will assist materially in relieving the congestion at the piers on the New York side, which often results in hundreds of carloads of perishables missing the daily wholesale produce markets and auctions, and makes it necessary to embargo much freight.

For the immediate present the new yard will be used only for the delivery of watermelons, of which, between now and September 1, the Pennsylvania expects about 3,500 carloads.

The yard covers 28 acres. There are five macadamized driveways for motor vehicles, averaging 2,000 ft. in length and 66 ft. wide. Each driveway is electrically illuminated with three lamps—1,000 watt—suspended 50 ft. in the air. The office building is 25 ft. by 60 ft.

Tentative Valuations

The Interstate Commerce Commission on May 22 announced a number of additional tentative valuations, including a report on the Virginian Railway as of June 30, 1916, in which it placed the final value of the property owned, including 470 miles of first main track and 657 miles of all track, at \$52,750,314 and of the property used, including 474 miles of first track and 697 miles of all track at \$55,862,622. The outstanding capitalization as of the valuation date was \$89,663,500, of which \$59,226,500 was stock and \$30,437,000 was funded debt. The investment in road and equipment, including land, as stated in the company's books was \$87,604,302. The report says that if readjusted this would be increased to \$87,683,906, of which \$77,487,693 consists of the par value of securities issued, the money value of which is not determined. The original cost was not ascertained but it is stated that the recorded money outlay did not exceed \$44,931,594. In addition the carrier issued \$7,387,693 par value of securities for common carrier property.

The cost of reproduction new of the owned property is given as \$49,497,678 and the cost less depreciation as \$43,513,419. The cost of reproduction new of the used property was given as \$51,779,449 and the cost less depreciation as \$45,456,204. The final value of the property of the Virginian Terminal Railway, whose stock is owned by the Virginian, was placed at \$2,670,000. The company has outstanding \$3,500,000 of stock and bonds.

The final value of the carrier property owned by the Central Vermont as of 1917 was placed at \$16,592,724 and of the used property at \$22,665,787. The capitalization was \$14,257,000 and the investment in road and equipment as shown by the carrier's books was \$16,997,915, readjusted by the commission to \$15,968,989. The final value of the Bethel Granite was placed at \$87,500 and of the New London Northern at \$5,281,892.

The commission has also issued other tentative valuations stating the final values as follows:

	Property Owned	Property Used
Fort Street Union Depot Co.	1915 \$2,195,779	\$2,212,336
Carolina & Tennessee Southern	1915 377,077	.....
Oregon Trunk Line	1916 15,049,086	.....
Maryland, Delaware & Virginia	1915 2,266,312	2,696,312
Puget Sound & Cascade	1917 427,902	.....
Baltimore, Chesapeake & Atlantic	1915 3,217,309	3,567,309
Shenandoah Railroad	1916 364,194	389,493
Magma Arizona	1917 319,560	.....

Amendment of Transportation Act Opposed

Bruce Scott, general solicitor of the Chicago, Burlington & Quincy, testified on May 23 before the House Interstate and Foreign Commerce Committee that enactment of either the Sweet or Hoch bills would prove a misfortune to interstate commerce. Those measures propose a limitation on the so-called Shreveport doctrine and would bring about such an uncertainty in commerce as to hurt business at a time when every effort is being made to restore normalcy.

Under the Sweet bill, it is proposed to repeal section 15a of the Transportation Act while under both the Sweet and Hoch bills it is proposed to limit the jurisdiction of the Interstate Commerce Commission over intrastate rates.

These acts would start a new series of litigation on every hand for the purpose of construing the law and would unsettle business for years. Since the enactment of the law conditions have been abnormal so that the act has not been given an opportunity to prove its practicability. It has been argued that the states have been deprived of power over intrastate rates. The carriers have

never argued in support of such a contention. Before the Supreme Court they contended that the Interstate Commerce Commission had power over such rates only when they discriminated against interstate commerce; and the court upheld this contention.

Mr. Scott also said that 34 federal judges who have passed on the act have been unanimous in sustaining the interpretation of the act as given by the railroads and the Interstate Commerce Commission. The federal commission in administering the law recognized the national character of the transportation systems in its order making a general increase in freight rates on August 26, 1920.

Under the common law the carriers are entitled to a "fair return." It cannot be contended that a return of 6 per cent is excessive; yet the railroads in 1921 only earned 3½ per cent. The Interstate Commerce Commission in its decision in the hay and grain rate case held that freight rates were not responsible for the business depression. Experience has shown that reductions in rates have not stimulated traffic or buying.

Mr. Scott called attention to the fact that so far as his observation went no shipper had appeared before the committee in support of either bill but that support of the proposed legislation had come entirely from representatives of the state railroad commissions.

The Senate Committee on Interstate Commerce met on May 23 to consider its report on the Capper and other bills to amend the Transportation Act, but adjourned to meet later without taking definite action.

C. P. R. Memorial to Fallen Employees

Lord Byng, Governor-General of Canada, recently unveiled in the Windsor Street Station of the Canadian Pacific at Montreal a memorial to the 1,100 employees of that company who lost their lives in the war. The accompanying photograph portrays the unveiling ceremonies with Lord Byng speaking and E. W. Beatty,



Unveiling the Memorial

president of the company, standing at his right. The guard of honor was composed of employees who had been in the service. At the same time that this memorial was unveiled, similar ones were unveiled at Winnipeg and Vancouver. Likewise 25 bronze tablets were at the same time unveiled at various points along the C. P. R. as well as at the company's American, European and Asiatic offices.

Traffic News

A bill to repeal Section 15-a of the interstate commerce act and to restore the rates in effect prior to the increases of August 26, 1922, was introduced in the House by Representative Huddleston on May 22.

The Union Pacific will put on a new passenger train from Pocatello, Idaho, to West Yellowstone, Mont., on June 20, leaving Pocatello at 9 a. m. The operation of the "Yellowstone Special" from Salt Lake City, Utah, to West Yellowstone will be resumed. This train will carry a through sleeper from Chicago.

The Merchants' Association, New York City, announces that freight rates from New York to Chicago and Milwaukee, by Hudson river, the barge canal and lake vessels, have been reduced; the new tariff being on a basis of \$1.21½ first class; sixth class 40½ cents per 100 lb. and other rates in proportion. The first class rate is 36 cents less than the rate by all rail, and sixth class 12 cents less.

The Transportation Club of Evansville, Ind., was recently organized and it has a membership of 80. The officers are as follows: President, J. C. Keller, traffic commissioner of the Furniture Manufacturers' Association; vice-president, E. E. Wieland, general agent of the Chicago & Eastern Illinois; and secretary and treasurer, W. H. Orr, chief clerk in the general freight office of the Louisville & Nashville.

The Canadian Pacific has announced the inauguration of the "Empress Steamship Special," a solid vestibule passenger train operating between Chicago and its Empress steamship docks at Vancouver, B. C. The initial trip of the train will be made on June 12, and departures will thereafter continue to connect with each steamer for Yokohama, Hong Kong, and other oriental points, there being two such sailings each month. The same company has also resumed the operation of its "Trans-Canada Limited" which will run daily between Montreal, Toronto, and Vancouver. A through passenger train, to be known as the "Soo-Pacific Express" operating between Vancouver, Minneapolis, St. Paul and Chicago, will also be placed in service beginning June 4.

Coal Production

Having risen close to the 4,500,000-ton mark, the production of soft coal shows no further increase, according to the weekly bulletin of the Geological Survey. Production of anthracite remains practically zero.

The revised figures for the sixth week of the strike (May 8-13) indicate 4,421,000 tons of bituminous coal and 7,000 tons of anthracite. Up to the close of the sixth week the total output since the strike began was 23,826,000 tons of bituminous coal and 39,000 tons of anthracite, the anthracite mines were working to capacity and the 11,816,000 tons which they produced, added to 29,329,000 tons contributed by the bituminous mines which remained in operation, gave a total for the six weeks of 41,145,000 tons. Following is the condensed record:

	1st Week	4th Week	6th Week	7th Week
Missouri	11,445	12,711	13,118	13,399
Texas	11,919	12,377	13,266	12,726
West Virginia	11,437	11,622	13,445	13,421
Illinois	14,000	17,981	13,266	13,283
Florida	11,766	11,367	11,757	.....
Other States	.....	11,298	11,431	.....

The record suggests no marked change in the number of men on strike. No further increase is reported in shipments out of Southeast Kentucky and Tennessee, the only district where any considerable number of striking union miners have gone back to work. The market has quietened as is indicated by rising spot prices.

Visitors at the Philadelphia & Reading, numbering, with their families, about 1000 were taken by the company last Saturday, May 20, on an excursion to New York City and by train up the Hudson River.

Commission and Court News

Interstate Commerce Commission

The commission has vacated its order relating to intrastate rates in Georgia, the railroad commission of that state having amended its order so as to approve increases similar to those ordered by the federal commission.

The commission has suspended until September 19 the operation of schedules which propose to reduce from \$1.35 per 100 lb. to 74½ cents the rates on sash and doors, from Pacific Coast points to New York, via Southern Pacific and Morgan Line.

The commission has suspended until September 21 the operation of schedules which propose for backhaul or out of line service on cars of grain, hay, straw and seeds for inspection and disposition orders, at points in Texas, an additional charge based on the extra mileage involved the same as those now applicable on shipments reconsigned or diverted.

The commission, on petition of the city of Detroit, has reopened the standard time zone case for further hearing upon the question of whether the orders of the commission, insofar as they define the boundary line between the standard Eastern time zone and the standard Central time zone, should be so modified as to include the city of Detroit, and any western portions of the state of Michigan. The hearing will be held at Detroit, May 29, before Commissioner Aitchison.

State Commissions

Protest Abandonment of Memphis D. & G.

On April 26 and 27 a hearing was held by the Arkansas Railroad Commission, at the request of the Interstate Commerce Commission, to consider the petition of the Memphis, Dallas & Gulf, for leave to take up its tracks between Nashville, Ark., and Hot Springs, 87 miles. Since that time the state body has been preparing a report; and this report says: "On May 5 we inspected the railroad from Hot Springs, Ark., to Murfreesboro, 72 miles, and found the roadbed in good condition, the line and curvature good, and the rails for the most part likewise in good operating condition. The territory adjacent is now being developed. There are numerous business enterprises, such as gins, stores, truck farms and sawmills, which at present are practically valueless on account of the railroad not being operated. The country traversed by this railroad is adapted to the growing of cotton and is rich in undeveloped mineral resources; and . . . in our opinion no part of the road should be abandoned as we feel that under normal conditions and times the road as a whole could be operated at a profit to its owners. . . ."

Court News

Highway on Railroad Right of Way

Where a railroad company has by act of Congress a 400-ft. right of way, the Kansas Supreme Court holds that the laying out of a parallel highway inside of its boundaries 50 ft. from the track does not extinguish the company's right to the strip on the farther side of the highway.—Union Pacific v. Heger (Kan.), 204 Pac. 1008.

Railroad Not Liable as Garnishee for Wages

Earned During Federal Control

A railroad company is not liable for wages earned by an employee, while he was employed by the Federal Railroad Administration in operating the company's properties, and such a railroad company cannot be required to respond as garnishee of funds from which such earnings are alleged to be due.—Heuermann v. Heuermann (Missouri Pacific, Garnishee) (Mo. App.), 237 S. W. 83.

Foreign Railway News

Locomotive Exports in February

During February 39 steam locomotives were exported as follows: Eight to Honduras (\$62,575); one to Cuba (\$22,200); 19 to Argentina (\$856,100); five to Brazil (\$240,710); two to China (\$9,450), and four to Hongkong (\$78,130), giving a total value of \$1,269,165. These figures were compiled by the Bureau of Foreign and Domestic Commerce.

Car Exports in February

Only one passenger car, valued at \$1,000, was exported in February. This car went to Mexico. Forty-one freight cars were exported, valued at \$50,236, as follows: 12 to Mexico (\$10,686); 22 to Cuba (\$20,300); one to Dominican Republic (\$520); and six to Australia (\$18,730). These figures were compiled by the Bureau of Foreign and Domestic Commerce.

Belgian Firm Secures Finnish Contract

A contract has just been concluded between the Finnish State Railways and the Belgian firm, Société Anonyme des Acieries d'Angleur, for the delivery of 15,142 tons of rails. Tenders were received from Belgian, English, French and German firms, one firm in Luxemburg also competing. The Belgian tenders were lowest in price. The French, German and Luxemburgian firms were from 9.5 per cent to 16.7 per cent higher than the Belgian firm's quotations, and the English quotations were from 21 per cent to 44 per cent higher.

February Exports of Car Wheels and Axles

Car wheels and axles weighing 1,533,486 lb. and valued at \$64,700 were exported in February, according to the compilations of the Bureau of Foreign and Domestic Commerce. Detailed figures by countries follow:

Countries	Pounds	Countries	Pounds
Canada	154,182	Dominican Republic	2,359
Guatemala	1,658	Brazil	8,123
Honduras	16,781	Chile	35,597
Panama	24,008	Peru	9,509
Mexico	679,091	Venezuela	2,681
Barbados	42,800	British India	137,600
Trinidad and Tobago	19,936	Other Brit. East Indies	6,059
Cuba	15,943	New Zealand	1,938
Japan	231,838	British South Africa	1,014
Kwantung	49,905	Other countries	1,492
Philippines	50,000		
Australia	42,972		
		Total	1,533,486
		Value	\$64,700

Powerful Combine of British Supply Manufacturers

An interesting engineering combine has just been registered under the title of the Power & Transport Finance Company. The firms represented in the combine are Cammell, Laird & Co., Ltd., shipbuilders; Sir William Arrol & Co., Ltd., machinery manufacturers; the English Electric Company, Ltd., electrical manufacturers; John Brown & Co., Ltd., shipbuilders; the North British Locomotive Company, Ltd., locomotive builders; and the Prudential Assurance Company, Ltd. The board of directors consists of W. L. Hichens of Cammell, Laird & Co., Sir John Hunter of Sir William Arrol & Co., Lord Meston and P. J. Pybus of the English Electric Co., Sir Hugh Reid of the North British Locomotive Co., John Sampson of John Brown & Co., and Sir George May of the Prudential Assurance Company. The object of the company is to undertake and, if necessary, to finance large contracts for railway construction, rolling stock, power stations, docks and harbors and, in general, all other aspects of power production and transport work. The new company has established headquarters in Kingsway, London, W. C. The initial capital is £250,000.

Track Material Exports in February

Rails exported in February were valued at \$508,460 and tonnage was 14,093. Exports of rail joints, splice bars, fish-plates and tie-plates were valued at \$48,508; of switches, frogs and crossings at \$54,567; of track spikes at \$27,756; and of bolts, nuts and washers at \$9,624. These figures were compiled by the Bureau of Foreign and Domestic Commerce. Details by countries follow:

Countries	Rails, Tons	Rail Joints, Splice Bars, Fish Plates, Pounds	Switches, Frogs and Crossings, Pounds	Railroad Spikes, Pounds	Railroad Bolt, Nuts, Washers, etc., Pounds
Spain	1,783	131,500	10,500		615
Canada—Quebec and Ont.	1,970	79,005	122,059	1,000	39,081
Prairie Provinces	32	13,534			1,210
Br. Columbia and Yakon.		22,029	29,553	49,200	9,246
Costa Rica		16,600	1,393	29,000	1,530
Guatemala		138,315	56,710	139,250	26,017
Honduras	2,543	63,348	191,979	188,401	29,950
Mexico	306				36,000
Newfoundland and Labrador		76	16,026	17,992	18,300
Cuba			2,932		25,000
Dominican Republic	8	4,786			14,800
Haiti	552		261,986		6,248
Chile	306	968			4,800
Colombia	306	37,536	2,818	55,010	3,039
Peru	346	36,840			37,092
Venezuela			3,359		6,600
British India			63	11,060	19,171
China		213	7,740	30,559	9,428
Java and Madura			164,760		
Other Dutch East Indies			57,300		
Japan	5,050	438,863			4,729
Philippine Islands	787	61,865			106,580
New Zealand	66				1,278
British South Africa	6		20,545		
Other countries	49	12,680	4,889	7,945	2,806
Total quantity	14,093	1,358,582	765,870	863,231	205,662
Total value	\$508,460	\$48,508	\$54,567	\$27,756	\$9,624

The Trans-Zambesia Railway

The recent completion of the Trans-Zambesia Railway from Beira, a seaport in Portuguese East Africa, northward to the Zambesia river opens up a vast area of rich natural resources. The Trans-Zambesia touches the river at Chindio. Northward from this point to Blantyre, in the Nyasaland Protectorate (about 100 miles south of Lake Nyasa), the Shiré Highlands Railway was already in operation. Bids have been asked, according to the Times (London) Trade Supplement, for the extension of the line to Lake Nyasa. When this is completed vast territories in South Central Africa will have direct connections with the sea.

Attention should be drawn to the fact that while the Shiré Highlands Railway is in British territory, the recently completed Trans-Zambesia is not. Instead it is in Portuguese territory. Notwithstanding this the Nyasaland government was so desirous of securing rail connections with the sea that it guaranteed the interest on the railways bonds for a period of 25 years and furthermore will retire half of them at its own expense within 20 years.

The Trans-Zambesia Railway was financed and built by a British company. A British contractor built the line for £810,000, including one important bridge and stations, culverts, telegraph lines, etc. Construction of the new railway was begun in September, 1920.

From Beira the new railway uses the line of the Beira-Mashonaland Railway to Dondo Junction, 18 miles from Beira. Thence it extends northward 157 miles (which is the extent of the new construction involved) to the Zambesia river. The ferry run across the river to Chindio is 2½ miles where the Shiré Highlands Railway begins. From Chindio to Blantyre is 173½ miles, making the total distance from Beira to Blantyre by rail and ferry 351 miles.

The gage of the line is 3 ft. 6 in., which is almost universal in Southern Africa, and 60 lb. rails were used. With the exception of one bridge of five 90-ft. spans there were no great natural obstacles to construction. It is planned eventually to carry the railway further up the Zambesia river where a bridge will be built, thus avoiding the ferry.

Little American equipment was purchased for the new line, the bulk of the orders going to British concerns, although the Pressed Steel Car Company was awarded contracts for a number of box cars, cattle cars and gondolas.

Equipment and Supplies

Locomotives

THE UNITED SUGAR COMPANIES of South America, Los Moches, Sinaloa, Mexico, has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE NORFOLK SOUTHERN, reported in the *Railway Age* of May 8 as inquiring for 5 Consolidation type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

THE PEORIA & PEKIN UNION, reported in the *Railway Age* of May 6 as inquiring for six 6-wheel switching locomotives, has ordered this equipment from the Lima Locomotive Works.

THE CHICAGO & EASTERN ILLINOIS, reported in the *Railway Age* of May 20 as contemplating the purchase of 6 Pacific type locomotives, has sent out inquiries for the same. In addition to its inquiry for passenger locomotives this company is accepting bids for 10 Mikado type locomotives.

Freight Cars

THE KANSAS CITY SOUTHERN is inquiring for 1,000, 40-ton box cars.

THE BUREAU OF MINES will receive bids until May 31 for two mine rescue cars.

THE UNITED STATES ARMY is inquiring for a U. S. R. A. box car equipped with air compressor.

THE WABASH is reported to have ordered 750 car bodies from the Standard Steel Car Company.

THE BETHLEHEM CHILE IRON MINES COMPANY is inquiring for 25 hopper ore cars of 50-ton's capacity.

THE BELT RAILWAY OF CHICAGO has ordered 100 hopper cars from the Western Steel Car & Foundry Company.

THE BALTIMORE & OHIO is inquiring for 1,000 hopper car bodies of 50 tons' capacity and 500 box car bodies.

THE MISSOURI, KANSAS & TEXAS has ordered 200 refrigerator cars from the American Car & Foundry Company.

THE FORT SMITH & WESTERN has ordered 125 steel center constructions from the Western Steel Car & Foundry Company.

THE NEW YORK CHICAGO & ST. LOUIS has ordered 100 steel center constructions from the Illinois Car & Manufacturing Company.

THE UNION REFRIGERATOR TRANSIT COMPANY, Milwaukee, Wis., has ordered 350 refrigerator cars from the American Car & Foundry Co.

THE SEABOARD AIR LINE is inquiring for 900 steel underframe, ventilated box cars of 40 tons' capacity also for 100 phosphate cars of 50 tons' capacity.

THE NEW YORK CHICAGO & ST. LOUIS, reported in the *Railway Age* of April 29, as inquiring for 400 refrigerator cars, has ordered this equipment from the Merchants' Dispatch.

THE CHILE EXPLORATION COMPANY, New York City, reported in the *Railway Age* of May 20 as inquiring for 50, 70-ton ore cars, has ordered 50 steel ore cars from the Pressed Steel Car Company.

THE CHICAGO NORTH SHORE & MILWAUKEE in addition to its order for 15 merchandise dispatch cars from the Cincinnati Car Company, reported in the *Railway Age* of May 13, has purchased one motor line car from the same company.

THE BALTIMORE & OHIO is having repairs made to 25 refrigerator cars at the shops of the Standard Steel Car Company and to 25 at the shops of the American Car & Foundry Co., and 25 coke cars at the shops of the Koppel Car Repair Co.

THE FLORIDA EAST COAST, reported in the *Railway Age* of April 8 as asking for prices on 400 refrigerator cars, has ordered 175 of these cars from the Mount Vernon Car Manufacturing Company. The company is asking for prices on 20 tank cars of 10,000-gal. capacity.

THE ERIE, reported in the *Railway Age* of May 6 as contemplating having repairs made to a large number of freight cars, is now having repairs made to 100 refrigerator cars at the shops of the Standard Steel Car Company and is asking for prices on the repair of about 3,000 cars.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of May 13 as inquiring for 2,000 steel-underframe, double-sheathed box cars of 40 tons' capacity, has ordered this equipment as follows: From the Pullman Company, 1,000 cars; from the American Car & Foundry Co., 500 cars; and from the Standard Steel Car Company, 500 cars.

Passenger Cars

THE SEABOARD AIR LINE, reported in the *Railway Age* of April 8 as inquiring for 5 dining cars, has ordered 10 dining cars from the Pullman Company.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age* of April 15 as inquiring for 30 passenger cars, has ordered 30 steel passenger coaches from the American Car & Foundry Co.

ST. LOUIS-SAN FRANCISCO, reported in the *Railway Age* of April 22 as inquiring for 6 chair cars and 8 coaches, has ordered 6 steel chair cars and 8 steel coaches from the American Car & Foundry Co.

Iron and Steel

THE INDIANAPOLIS UNION is inquiring for 500 tons of 85 lb. rails.

THE IMPERIAL GOVERNMENT RAILWAYS of Japan have ordered 10,000 tons of 60-lb. rail and 600 tons of accessories, through Mitsubishi Shoji Kaisha, Ltd., New York City, from the Consolidated Steel Corporation.

Machinery and Tools

THE WHEELING & LAKE ERIE has ordered one 48-in. car wheel borer from the Niles-Bement-Pond Company.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a portable motor-driven bolt lathe with quick change gears and taper attachment. This same company is soon expected to distribute orders for its large outstanding machinery inquiry.

Signaling

THE LONG ISLAND has bought from the Union Switch & Signal Company a Saxby & Farmer interlocking machine, 12 levers, with connections and other material for installation at Jekyl Island, N. Y.; also an electro-pneumatic interlocking machine for Flat-bush, N. Y., 31 working levers.

Miscellaneous

THE TEXAS & PACIFIC has ordered three 100-ton turntables from the American Bridge Company.

THE IMPERIAL GOVERNMENT RAILWAYS of JAPAN are inquiring through New York City export houses for a large amount of air brake parts.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS will accept bids until June 2, for seven 90-lb. manganese frogs and 151 switch stands with accessories.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon May 31, at Roanoke, Va., for 70 cast steel rigid side frames, 50 cast steel flexible side frames and 2,500 steel bulb angles.

Supply Trade News

O. H. Dallman, formerly with the Vanadium Alloy Steel Company, Latrobe, Pa., and the mechanical department of the Pennsylvania Railroad at its Fifty-fifth street shops, Chicago, has joined the sales force of the **Independent Pneumatic Tool Company**, Chicago.

Wesley W. Burden, formerly with the Bird-Archer Company as chief mechanical engineer and assistant to the president, has resigned to become vice-president and treasurer of the **Wilbur G. Hudson Corporation**, engineers and constructors, with offices at 50 Church street, New York. This company specializes in coal, coke, ash, and ore handling systems, steel, timber and reinforced concrete structures, railroad shops, roundhouses, terminals, and railroad coaling stations.

A. W. Bowie and **J. J. Lydon**, who have for the past 25 years been connected with Westinghouse, Church, Kerr & Company, and their successors, Dwight P. Robinson & Company, have recently resigned from that organization and have organized the firm of **Bowie, Lydon & Company, Inc.**, to handle railroad and industrial construction, with offices at 340 West Harrison street, Chicago. **W. G. Bied**, president of the Chicago & Alton, has been elected president of this company and **M. P. Tilley**, formerly with Westinghouse, Church, Kerr & Company and more recently with the Lustbader Constitution Company, has been added to the staff.

Westinghouse Electric & Manufacturing Company

The gross earnings of the Westinghouse Electric & Manufacturing Company from sales billed for the year ended March 31, 1922, as shown by the company's annual report, were \$99,722,026, compared with \$150,980,106 in the previous fiscal year. The net income available for dividends was \$5,837,389, as against \$12,617,536 in 1921. Dividends on the common and preferred stocks for total year totaled \$5,984,895. The surplus, as of March 31, 1922, was \$42,324,085.

Guy E. Tripp, chairman, in his report to the stockholders says: "The general business depression during the past year is reflected by the reduced volume of business, but an extreme depression in certain important departments reduced the net profits to a greater proportional extent than would be usual on the diminished amount of business.

"Due to the low volume of business taken during the year, the value of unfilled orders in hand has been reduced from \$65,621,000 as shown in last year's report, to \$50,740,696 as of March 31, 1922. The contraction in orders booked continued throughout the year until January, 1922, when there began a substantial improvement which has since been maintained. In addition to the favorable indications for an increasing demand for the regular lines of your company's product, a large demand for radio telephone receiving apparatus has recently developed with a prospect of its continuance for an indefinite period. It should be pointed out, however, that the ensuing year promised to be a period of keen competition."

The consolidated general balance sheet follows:

ASSETS	
Property and plant	\$47,942,797
Investments	17,029,221
Cash	9,966,631
United States bonds and Treasury notes	7,886,309
Cash on deposit for matured bonds, etc.	64,492
Notes receivable	5,660,841
Accounts receivable	18,146,790
Inventories	55,027,059
Other assets	5,345,746
Total	\$167,069,886
LIABILITIES	
Capital stock:	
Preferred	\$3,998,700
Common	70,813,950
Funded debt	36,249,000
Current liabilities	11,400,121
Reserves	2,384,030
Profit and loss—surplus	42,324,085
Total	\$167,069,886

Railway Construction

BALTIMORE & OHIO.—This company has awarded a contract to the Ferro Construction Company, Chicago, for the erection of the steel superstructure of a bridge to be erected over Salt creek, east of Vigo, O. The new bridge is of two single-track, through-truss spans, each 144 ft. from center to center of end pins. These spans have a total weight of about 416 tons and were fabricated by the Mount Vernon Bridge Company, Mt. Vernon, Ohio. This new bridge is on the main line between the Atlantic seaboard and Cincinnati and St. Louis and the erection will be performed without interference to scheduled traffic.

CHICAGO UNION STATION.—This company is calling for bids for additional foundation work under the head house required to meet a new type of building and for construction of the first section of the head house known as "Canal Street Space," this work to include the preparation of site foundations, retaining walls, rough floor construction, erection of steel work and building of roadway and sidewalks below and some distance on either side of Canal street between Jackson and Adams streets. This work also includes the installation of plumbing, lighting and heating to adapt the space for use as a temporary passenger station.

DENVER & SALT LAKE.—This company is giving immediate consideration to plans looking to the early commencement of the construction of a tunnel through the continental divide and to the extension of its present line from Craig, Colo., in a north-westerly direction through the Uintah Basin to Provo or Springville, Utah, as the result of the action of the governor of Colorado in signing the Moffat tunnel bill on May 12, providing for the financing of this project. This tunnel will be approximately 6½ miles long, to construct which the law authorizes a bond issue of \$6,720,000. Provisions are contained in the law for the tunnel to accommodate telegraph and telephone lines, power and water lines and vehicles as well as the railroad. A board of five commissioners is to be appointed by the governor, with full power under the law to prescribe all regulations concerning tunnel.

ERIE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of an additional track from Sparrowbush, N. Y., to Lackawaxen, Pa., about 20 miles.

LOUISVILLE & NASHVILLE.—This company has placed an order with the Roberts & Schaefer Company, Chicago, for N. & W. type cinder plant for installation at Corbin, Ky.

NEW YORK CENTRAL.—This road has awarded contracts to the Walsh Construction Company, Davenport, Iowa, for the grading and masonry in connection with the Castleton bridge and cut-off work.

NORTHERN PACIFIC.—This company, which was reported in the *Railway Age* of May 13 as authorizing the construction of a tunnel and other work on its Phileman line change in western Montana, to cost approximately \$107,000, has awarded the contract for this work to Clifton, Applegate & Toole Company, Spokane, Wash.

PENNSYLVANIA.—This road is asking for bids for the construction of a single-track, half-through girder bridge to carry the tracks of the Bellefonte branch, Williamsport division, over the state highway, Route No 18, east of Lewisburg, Pa. Approximate quantities of materials are as follows: 600 cu. yd. roadway excavation under track; 1,200 cu. yd. foundation excavation; 400 cu. yd. foundation masonry; 290 cu. yd. abutment masonry; 21 cu. yd. reinforced concrete floor and 45,000 lb. erecting superstructure. The work will be in charge of George Patton, assistant engineer, Milton, Pa.

FOR NEW TERMINAL FACILITIES, the Canadian government is to lend to the Harbor Commissioners of Montreal \$5,000,000. A loan of \$1,500,000 will also be made to the Quebec City Harbor Commissioners for a similar purpose.

Railway Financial News

BALTIMORE & OHIO.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,840,000 of refunding and general mortgage 6 per cent bonds to be pledged as collateral security for short term notes.

BANGOR & AROOSTOOK.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of operation of a branch line extending from a point near Brownville Junction to Katahdin Iron Works, Me., 8.85 miles.

BOSTON & MAINE.—Protest Against Tentative Valuation.—This company and its subsidiaries have filed their protest with the Interstate Commerce Commission against the tentative valuation issued on March 18 in which the company claims that the total value of the properties comprised in its system is not less than \$37,729,860, whereas the commission stated the final value of the used properties as \$234,189,816. The company says that the reported final values, so-called, of the property have been determined arbitrarily and without proper consideration of relevant facts and of all the properties which should be included and represent much less than the true value. The company states that the value of the property wholly owned and used as of the valuation date, June 30, 1914, was not less than \$323,089,000, whereas the commission's tentative figure for property wholly owned and used was \$101,712,972. The protest also claims not less than \$41,576,037 for property used and not owned, \$6,656,600 for property operated as agent, \$154,111 for property used by the Western Union, \$220,360 for property used by the St. Johnsbury & Lake Champlain, \$27,454 for property used by the Central Vermont and \$6,100 for property used by the Conway Electric Street Railway. These items make the total of \$371,000,000 given above. Details of the corrections which the commission is asked to make are given in the protest and the various items of the amounts claimed are set up in parallel columns.

CAMBRIA & INDIANA.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$1,000,000 of general mortgage 6 per cent bonds, the proceeds to be used to pay promissory notes. The bonds have been conditionally sold to Brown Bros. & Co., of Philadelphia.

CHICAGO & EASTERN ILLINOIS.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate as to interstate and foreign commerce authorizing the abandonment of the Chicago & Indiana Coal Railway division, which extends from Brazil, Ind., to a point on the Indiana-Illinois state line, with a branch, comprising in all 162.1 miles of main track. The certificate was issued in spite of the numerous protests that large investments have been made in various business enterprises along the line and many industries have been established that require railroad facilities and have no other railroad connection. It was shown that there were grain elevators at 29 stations and there are some 48 towns and villages along the line, of which 32 are not served by any other railroad. For many years block coal constituted approximately 70 per cent of the coal traffic originating on the road and there is now practically no such coal handled by it as the coal fields are substantially worked out. The report says the physical condition of the road is such as to make operation over it very expensive and it appears reasonably clear that the territory traversed is not productive of sufficient traffic to justify its operation as an independent line and that there is no reasonable expectation that the territory ever will produce sufficient tonnage to enable the property to pay its operating expenses. The commission says the issuance of the certificate will not preclude or prejudice making of arrangements for the taking over of the road or parts of it by any carrier or persons able to finance its continued operation.

CHICAGO & NORTH WESTERN.—Annual Report.—This company's annual report for 1921 is reviewed in an article elsewhere in this

issue entitled "C. & N. W. Revenue Tons Decreased 34.92 Per Cent." See also excerpts from annual report on adjacent pages.

CHICAGO, PEORIA & ST. LOUIS.—Partial Payment Certified.—The Interstate Commerce Commission has certified to the Secretary of the Treasury a partial payment on account of this company's six months guaranty of \$55,000.

CHICAGO, ROCK ISLAND & PACIFIC.—Equipment Notes Offered.—Freeman & Co. and Hayden, Stone & Co. are offering \$2,345,000 Chicago, Rock Island & Pacific Railway 6 per cent equipment trust notes which have been stamped as subordinate in lien to \$4,690,400 prior lien notes now outstanding. The notes mature annually from January 15, 1923, to January 15, 1935, and are offered at prices to yield from 5.25 to 5.75 per cent.

This is the first offering of this kind of the notes which the director general of railroads has sold. During recent months there has been sold to bankers more than \$250,000,000 in equipment trust notes. About \$100,000,000 of these notes represented two-thirds of the cost of equipment purchased by the government for the railroads, the remaining one-third of these issues being stamped as subordinate in lien, in accordance with a special supplemental agreement. These stamped notes were taken by the government and have been held since the sale of the prior lien obligations. The bankers have selected the notes of the Rock Island as the most attractive of the subordinated notes.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Asks Authority to Sell Bonds.—This company has applied to the Interstate Commerce Commission for authority to sell at not less than 93½, \$2,700,000 of its 5 per cent debenture gold bonds of 1920 now held in the treasury, to reimburse the treasury for expenditures.

Annual Report.—This company's annual report for 1921 is reviewed in an article elsewhere in this issue entitled "C. St. P. M. & O. Also Shows Deficit."

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Authorized to Abandon Line.—The Interstate Commerce Commission has authorized the abandonment of the present line from Glenn to St. Clair, Ind., 3 miles, incident to a relocation which will substitute a line of 4.6 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Dividend Resumed.—The directors have declared a dividend of 2 per cent on the common stock, payable June 15 to stock of record June 2, the first dividend disbursement since September, 1910. The action of the directors was announced merely as a dividend, without mention of any definite period. The earnings on the common stock in 1921 have been estimated at around \$8 a share.

GEORGIA, ASHBURN, SYLVESTER & CAMILLA.—Organization Formed.—This company, which was authorized to purchase that part of the Hawkinsville & Florida Southern from Ashburn to Camilla, Ga., a distance of 51 miles, as noted in last week's issue, has elected the following board of directors: J. N. Pidcock, C. W. Pidcock, J. R. Hackett, J. J. Hill, C. W. Pidcock, Jr., L. G. Cox, all of Moultrie; T. C. Jeffords and C. W. Hillhouse, Sylvester; George Petts and J. L. Evans, of Ashburn; J. W. Butler, J. E. Brooks, and G. L. Wade, of Camilla.

Service on the Hawkinsville & Florida Southern was suspended last November. Plans for resuming service are being hurried by the new company and it is expected that trains will be in operation early in June.

HAWKINSVILLE & FLORIDA SOUTHERN.—Part of Line Purchased.—See Georgia, Ashburn, Sylvester & Camilla.

MARSHALL & EAST TEXAS.—Hearing on Application to Dismantle.—A final hearing has been set for June 12 at Texarkana, Texas, by the United States Court for the Eastern District of Texas, on the application of Bryan Snyder, receiver, for authority to dismantle and dispose of the remaining property of the Marshall & East Texas for the benefit of its creditors.

MORENCI SOUTHERN.—Authorized to Abandon Line.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon as to interstate and foreign commerce its narrow gage line from Guthrie to Morenci, Ariz., 18 miles. Following the decision of the Supreme Court in the Eastern Texas railroad case, the commission's finding and order will deal only with interstate and foreign commerce.

NEW YORK CENTRAL.—Authorized to Lease Chicago Terminal Properties.—The Interstate Commerce Commission has issued an order approving and authorizing the acquisition by the New York Central of control of the Chicago River & Indiana by the purchase of its capital stock and the acquisition by the Chicago

River & Indiana of control of the Chicago Junction by lease, subject to 17 conditions. The commission denied authority to the New York Central to purchase the capital stock of the Chicago Junction or its physical properties without prejudice to future proceedings. (Further details regarding report of commission are published elsewhere.)

Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue, entitled "N. Y. Central Surplus After Dividends \$9,747,588." See also excerpts from annual report on adjacent pages.

NEW YORK, NEW HAVEN & HARTFORD.—Extension Plan Operative.—President Edward J. Pearson has informed noteholders of the 4 per cent 15-year European Loan of 1907, that the extension provided in the agreement of March 8, 1922, is operative. Under the terms the noteholders are entitled to a 10 per cent cash payment, with interest payable at the rate of 7 per cent. Holders of certificates of deposit are asked to deposit them with the depository on or after May 22, 1922, to receive the new certificates and the cash payment. The time within which holders of undeposited obligations may become parties to the agreement is extended, subject to termination without notice.

NORTHERN PACIFIC.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Average mileage operated.....	6,658	6,653
Operating revenues.....	\$94,538,059	\$113,084,408
Operating expenses.....	77,630,867	100,983,874
Net railway operating revenue.....	16,907,192	12,100,534
Railway tax accruals.....	9,014,121	10,108,866
Railway operating income.....	7,875,176	1,973,378
Equipment rents—net.....	1,445,606	4,696,162
Joint facility rent—net.....	1,523,044	1,279,918
Net railway operating income.....	10,843,826	7,949,458
Dividend income.....	21,858,646	4,353,552
Total non-operating income.....	26,552,683	7,265,213
Gross income.....	37,396,509	15,214,671
Interest on funded debt.....	14,480,680	12,134,458
Total deductions from gross income.....	15,331,110	12,441,358
Net income.....	22,065,399	2,773,313
Compensation under contract with U. S. Govt. Guaranty under Transportation Act of 1920.....	2,063,399	19,094,183
Deduct, federal income, January and February, 1920, included above.....	.....	3,741,045
Dividend appropriations of income.....	17,360,000	17,360,000
Income balance for the year, transferred to profit and loss.....	4,705,399	1,734,183

ROCK ISLAND SOUTHERN.—Six Months' Guaranty Certified.—The Interstate Commerce Commission has issued a certificate stating the amount necessary to make good this company's guaranty for the six months period of 1920 at \$58,711.

SACRAMENTO NORTHERN.—Proposed Acquisition.—See Western Pacific.

SOUTHERN.—Equipment Trust Certificates Authorized.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$9,300 equipment trust certificates to be issued by the Pennsylvania Company for Insurance of Lives and Granting Annuities, to be sold at not less than 97½.

TONOPAH & GOLDFIELD.—Six Months Guaranty Certified.—The Interstate Commerce Commission has certified the amount necessary to make good this company's guaranty for the six months period of 1920 as \$96,683, of which \$16,683 remains to be paid.

VIRGINIAN.—Annual Report.—The annual report for the year ended December 31, 1921, shows the following income account:

	1921	*1920
Operating revenue:		
Freight.....	\$15,681,361	\$13,901,140
Passenger, including excess baggage and club car fares.....	978,765	798,531
Gross revenue.....	18,024,357	15,989,750
Operating expenses:		
Maintenance of way and structures.....	2,547,898	1,965,229
Maintenance of equipment.....	3,375,345	3,177,424
Traffic expenses.....	123,080	91,735
Transportation.....	5,540,613	5,518,806
General.....	369,515	350,688
Total operating expenses.....	12,405,728	11,085,299
Net revenue from operation.....	5,618,629	4,904,451
Taxes.....	1,043,175	1,026,492
Income from operation.....	4,575,084	3,877,944
Gross income.....	5,374,675	4,819,568
Interest on funded debt.....	1,642,000	1,572,017
Total deductions.....	2,436,943	2,045,472
Net income.....	2,937,732	2,774,097
Minimum compensation, two months, 1920.....	.....	513,365
Additional compensation received from U. S. Government for rent during years 1918, 1919 and two months, January and February, 1920.....	2,308,095	.....

Net income carried to profit and loss.....	5,245,827	3,287,462
Average mileage in operation.....	520	524

*Corporate operation, March to December.

Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$909,000 of first mortgage 5 per cent, 50-year gold bonds to be pledged with other collateral as security for a note for \$2,000,000 to the director general of railroads. The company has also asked authority to guarantee a similar amount of bonds to the Virginian Terminal Railway, which that company also asks authority to issue.

WESTERN PACIFIC.—Authority to Acquire Sacramento Northern Denied.—The Interstate Commerce Commission has denied without prejudice to a new application, the application of this company for authority to acquire control of the line of the Sacramento Northern Railroad upon its transfer to the Sacramento Northern Railway by the purchase of the capital stock of the latter and the purchase of the bonds of the railroad. The denial is based on the ground that the Sacramento Northern, which operates an electric line of 165 miles in California, is a carrier which must make application to the commission for authority to issue securities and not merely an electric interurban railroad, and that until application of the new Sacramento Northern Railway for authority to issue its securities is made, the commission is unable to pass upon the public interest involved in the acquisition of control in such company by the Western Pacific. Commissioner Daniels filed a dissenting opinion.

WISCONSIN CENTRAL.—New Directors.—A. L. Osborne, of Oshkosh, Wis., has been elected a director. G. W. Webster has been elected a director to succeed C. E. Wales, resigned. Edmund Pennington has retired as president to become chairman of the board.

Railroad Administration Settlements

The Railroad Administration has announced this week final settlements for the federal control period and has paid the amounts named to the following companies: Pacific Fruit Express, \$2,925,000; Piedmont & Northern, \$100,000; Durham & Southern, \$75,000; Pueblo Union Depot & Railroad Co., \$7,700.

Dividends Declared

Cincinnati, New Orleans & Texas Pacific.—Preferred, 1¼ per cent, quarterly, payable June 5 to holders of record May 25.
 Fonda, Johnstown & Gloversville.—Preferred, 1½ per cent, quarterly, payable June 15 to holders of record June 10.
 Hocking Valley.—2 per cent, semi-annually, payable June 30 to holders of record June 9.
 New Orleans, Texas & Mexico.—1½ per cent, quarterly, payable June 1, to holders of record May 23.
 Chicago, Rock Island & Pacific.—Six per cent preferred, 3 per cent, semi-annually, seven per cent preferred, 3½ per cent, semi-annually; both payable June 30 to holders of record June 9.
 Chesapeake & Ohio.—2 per cent, semi-annually, payable June 30 to holders of record June 2.
 Mobile & Birmingham.—Preferred, 2 per cent, semi-annually, payable July 1 to holders of record May 31.

Trend of Railway Stock and Bonds Prices

	Last May 23	Last Week	Last Year
Average price of 20 representative railway stocks.....	66.64	64.31	54.71
Average price of 20 representative railway bonds.....	86.65	85.87	74.10

AT THE THIRD TRIENNIAL convention of the Brotherhood of Railway Clerks, Freight and Express Handlers and Station Employees, held recently in Dallas, Tex., E. H. Fitzgerald of Cincinnati, Ohio, was re-elected grand president, and R. F. Dee, New Orleans, La., J. H. Sylvester, Spokane, Wash., G. H. Harrison, St. Louis, Mo., G. C. Milam, Kansas City, Mo., and C. R. Briceland, Pittsburgh, Pa., vice-presidents. G. S. Levi, grand secretary-treasurer, was also re-elected, as was P. E. Ziegler, editor and manager of "The Railway Clerk," official publication of the organization. The convention discussed a proposition to erect a building in Cincinnati for the purpose of establishing a bank and the national headquarters of the order. The next convention will be held in Kansas City, Mo., in 1923.

Annual Reports

Sixty-second Annual Report of the Chicago and North Western Railway Company

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submits herewith its report of the operations and affairs of the Company for the year ending December 31, 1921.

Average mileage of road operated, 8,402.28.

OPERATING REVENUES:	
Freight	\$95,687,013.19
Passenger	33,770,081.94
Other Transportation	12,924,037.70
Incidental	2,393,442.69
	\$144,775,475.52

OPERATING EXPENSES (89.17 per cent of Operating Revenues) 129,091,427.62

Net Revenue from Railway Operations

Railway Tax Accruals (5.85 per cent of Operating Revenues)

UNCOLLECTIBLE RAILWAY REVENUES

Railway Operating Income

EQUIPMENT AND JOINT FACILITY RENTS—Net Debit

Net Railway Operating Income

NON-OPERATING INCOME:

Compensation for Lease of Road to U. S. Government

Rental Income

Dividend Income

Income from Funded Securities

Income from Unfunded Securities and Accounts, and Other Items

Gross Income

DEDUCTIONS FROM GROSS INCOME:

Rental Payments

Interest on Funded Debt

Other Deductions

Net Loss

DIVIDENDS:

7% on Preferred Stock

5% on Common Stock

Balance Loss for the Year

GENERAL REMARKS

In his last annual report it was stated that the account with the Director General of Railroads for the period of Federal control had not then been settled. During the early part of the year 1921 the Company received cash payments on this account totaling \$9,000,000.00, and in September, 1921, the Board of Directors, a final settlement was made under which the Company received \$6,500,000.00 in cash. The settlement was in full for all claims of the Director General against the Company for expenditures made by him for additions and betterments, liabilities and expenses paid and all other transactions due by the Company under the provisions of the contract, and for all claims of the Company against the Director General for balance due in compensation, cash and other assets taken or collected by him, deficiency in material and supplies, road and equipment retired, accrued depreciation, under-maintenance, etc.

With this settlement the Company is in no wise indebted to the United States Government for matters growing out of or incident to Federal control.

The settlement of the accounts under the guaranty provisions of the Transportation Act, 1920, has not been made. All reports and information requested by the Interstate Commerce Commission to enable it to determine the amount due have been furnished and it is expected that this matter will be closed out in the near future.

The effect of the war and the attendant high level of prices and wages still exercise an influence of the greatest importance in keeping operating expenses at an abnormally high level. Some reduction has been possible. Effective July 1, 1921, the United States Railroad Labor Board promulgated a new scale of wages which averages about 11 1/2% lower than the scale established by it in 1920. This new scale was accepted and put into effect by the Company by every particular and the reductions were accepted by the employees. The Company likewise made proportionate reductions in the wage scales of such of its employees and subordinate officials as were not embraced in the order of the Labor Board.

These reductions in wage scales were not, however, sufficient to fully offset declining revenues and further reductions in payrolls were necessary and were brought about by reducing forces.

The total amount included in Operating Expenses during the year for labor was \$77,844,144.00. This compared with \$100,550,396.00 included in the year 1920. This railway company, along with practically every other in the United States, is at the present time before the labor Board seeking to have further reductions in the wage scales of employees. At the present time the average wage scale is 6% above that of 1917.

The year 1921 was a year of widespread business depression, which naturally had its effect upon the affairs of your Company. Manufacturing and merchandising throughout the country declined greatly, and as a result

the traffic in manufactured products and in raw materials used in their manufacture was reduced correspondingly.

The volume of iron ore traffic handled declined from 13,978,103 tons in 1920 to 10,627,582 in 1921, a loss of 74.19%. The volume of bituminous coal handled declined from 10,254,478 tons in 1920 to 6,235,916 tons in 1921, a loss of 39.19%. During the year 1920 these two items constituted 40% of the tonnage shipped over the road. Forest products declined from 6,883,662 tons in 1920 to 5,288,176 tons in 1921, a loss of 23.18%. The volume of manufactured products declined from 11,233,090 tons in 1920 to 7,225,477 tons in 1921, a loss of 35.68%. Products of agriculture moved in greater volume during the year 1921 than in 1920; the total tonnage in 1920 was 7,418,564 and this was increased to 7,767,958 in 1921, or 4.71%. This increase was due almost entirely to the great increase in the amount of corn marketed during the year 1921. Animals and animal products decreased slightly from 2,333,186 tons in 1920 to 2,194,666 tons in 1921, while the volume increased, the total tonnage was only 7,418,564 tons in 1920 compared with 52,856,643 tons of other traffic, so that the gain in tonnage of agricultural products was insignificant in comparison with the losses in ore, coal, forest products and manufactured products.

Due to the reduction in traffic handled, substantial reductions in operating costs were effected, but it was impossible to reduce the operating costs in proportion to the loss of traffic. The total loss in tonnage was 34.92%. Freight train miles were reduced 25.75%; freight switching locomotive miles were reduced 25.45%; loaded car miles were reduced 20.92%; while empty freight car miles were reduced less than 1%.

The kinds of traffic which suffered the heaviest loss were of the character that can be loaded most heavily and handled with the least amount of station service. Proper service demands that trains be run at sufficiently frequent intervals, regardless of whether or not they can be loaded to capacity. Owing to the fact that the volume of agricultural products remained normal, whereas the movement of other products declined from 25% to 50%, the traffic was unbalanced, and this contributed to the empty car mileage in a very marked degree, and the relation of empty car miles to the total rose from 33% in 1920 to 38% in 1921.

Passenger traffic likewise declined, not, however, as much in proportion as the decline in freight traffic. The total number of passengers carried dropped from 40,692,627 in 1920 to 35,685,702 in 1921, a loss of 12.30%.

On March 19, 1921, an explosion occurred in the Company's Chicago Terminal elevator, the result of which was seriously damaged. As soon as the strain contained therein could be salvaged and the debris cleared away the work of restoration was started. More complete details concerning the matter are contained in the report in the remarks pertaining to construction and maintenance. Under the rules of the Interstate Commerce Commission, the cost of replacement of this property is chargeable to Income Account, therefore, such expenditures made during the year, amounting to \$957,824.37, are included in the item "Rental Income," as shown herein, thereby reducing the Net Income for the year by that amount.

PENSIONS

During the year, 177 employees were retired from the service of the Company and granted pensions. Of these retirements, 82 were on account of employees having reached the age of 70, and 95 were on account of employees having suffered permanent physical disability.

On December 31, 1921, there were 1,190 retired employees receiving pensions. The average monthly pension in force on that date was \$32.80. The amount paid in pensions during the year was \$430,922.96.

Since the inauguration of the pension system, the total payments made from January 1, 1901, to December 31, 1921, was \$4,243,951.34.

FEDERAL VALUATION

The work of valuation of the property by the Interstate Commerce Commission has progressed, but has not been completed. The engineering report of the Commission has been finished, but has not been served upon the Company. The Land and Accounting Sections have not completed their work, and it is anticipated that it will be considerable time before a tentative final valuation will be completed and served. During the year 1921, \$303,920.13 was expended by the Company. Since the commencement of this work \$2,134,856.07 has been expended on it by the Company.

CONSTRUCTION AND MAINTENANCE DURING THE YEAR 1921

Expenditures for construction were held to the minimum necessary to provide for the most urgent demands. This was because of the continuing high cost of labor and material. The following were the principal items of work carried out during the year:

Chicago Terminal Elevator.—The explosion of March 19, 1921, caused damage to various parts of the structure above the foundation throughout the entire building, as well as adjacent buildings. At the time of the explosion approximately seven million bushels of grain were in the elevator. As soon as the operators were able to resume work, the work of reconstruction was begun in order to get the elevator in operation as early as possible. The elevator will be in shape to receive grain this season.

Clinton, Iowa.—During the fall, work was resumed on the grade separation project by commencing construction of a subway in Fourth Street carrying the tracks of the Chicago & North Western Railway, Burlington and the Chicago, Milwaukee & St. Paul Railways. This is of a concrete construction. The excavation work and a large portion of the concrete retaining walls and abutments have been completed.

Kenosha, Wisconsin. The work of building a viaduct over the tracks leading to the Simmons Company and the Rainier Elevator plants, which is being carried out in connection with the construction by the City of Kenosha of a new bridge over the river at Main Street, was carried forward and the viaduct proper was completed.

Racine, Wisconsin. As a result of the project being carried forward by the City of Racine involving the straightening and widening of Sixth Street and the rebuilding of a new viaduct bridge to carry Sixth Street over the Road and the rebuilding of a new viaduct to rebuild its subway at Sixth Street. The plan required the construction of a new abutment at the north end of the subway and the moving and lengthening of the present span. About 50% of the work was finished during the year. The City of Racine will pay about 80% of the cost of the work.

Chicago, Illinois.—Additional facilities in the Erie Street coach yard, consisting of a two-story brick building 22' x 102' to provide quarters for car repairers and wash cleaners, a brick oil house 20' x 30', and a concrete

wheel pit were provided, 3,000 lineal feet of additional coach storage tracks were also added to the yard.

Chicago, Illinois.—A new steam heat plant to serve the Wells Street Annex building and the American Railway Express Company building was installed in the basement of the Annex building. Heat was formerly secured for these buildings from the old power house at Kinzie and Kingsbury Streets. A saving of about 50% in operating cost will result.

Proviso, Illinois.—The wooden floor and trestle approaches of bridge 1614, carrying a highway over Proviso yard, were destroyed by fire in August, 1921. The structure was restored. The work consisted of building 950 lineal feet of pile trestle approach and providing new floor for the steel structure 810 feet in length.

Ashland, Wisconsin.—The 840-ft. extension to ore dock No. 3, referred to in the last annual report, was completed. This extension is of timber construction of the same character as the existing dock, and adds 140 pockets to the dock, making its total capacity 340 pockets.

West Chicago, Illinois.—A modern mechanical coaling chute of 300 tons capacity was built to replace the former coaling chute, which was destroyed by fire.

Casper, Wyoming.—Approximately 13,000 feet of storage tracks were built to provide additional storage room for oil tank cars so as to care for additional business of the refineries located at this point. The capacity of this additional track is 300 cars.

During the year the following important bridges were constructed:
Fremont, Neb. Bridge B-8—Eight additional concrete piers were built to replace present pile piers.

Owanka, S. D. Bridge 1888—60' single track shallow through plate girder on concrete piers, replacing 4 spans of 23 span pile bridge. Sub-structure completed.

Oral, S. D. Bridge H-87—85' single track deck plate girder with concrete slab deck on concrete abutments to replace 11 span pile bridge. Sub-structure completed.

Ida Grove, Iowa. Bridge 1290—90' single track, shallow through plate girder span on pile piers. 3 span pile bridge to replace a 126' through Howe Truss span and 2 pile piers. Sub-structure completed.

Battle Creek, Iowa Bridge 1310—90' single track, shallow through plate girder span on pile piers and 3 span pile bridge to replace 126' Howe Truss span and 2 pile piers. Sub-structure completed.

Wausau, Wis. Bridge D-37-B—Second-hand steel spans on cylinder piers and concrete abutments to replace Pony Howe Truss spans on timber and pile approach. Sub-structure completed.

Woodbine, Iowa. Bridge 920½—60' double track shallow through plate girder span on concrete abutments, replacing 2 span pile bridge, 2 span deck plate girder and I-beam, 1 span pile bridge. Sub-structure completed.

Bando, Ill. Bridge 1863—Two 85' deck plate girder spans, shifting 60' deck plate girder span and constructing one concrete abutment and two concrete piers to replace portion of 14 span pile and frame bridge. Sub-structure completed.

Bando, Ill. Bridge 1948—One 40' and two 85' single track deck plate girder spans on concrete abutment and two concrete piers to replace Section 1 of 18 span pile and frame bridge. Sub-structure completed.

Creston, Ill. Bridge 117—64' double track through plate girder with concrete slab deck on present masonry to replace 64' double track through plate girder span. Completed.

DePere, Wis. Bridge 1272—Second-hand steel spans on cylinder piers and present masonry remodeled to replace Section 1 of 8 span Pony Howe Truss Bridge. Sub-structure completed.

Benid, Ill. Bridge 2008—Approximately 80,000 yards of filling was placed. This brings the filling up to within about 10 feet of the track; it being proposed to eventually fill this portion of the structure up to the track.

RAIL RENEWALS

126.41 miles of track were renewed with new rail and 225.68 miles were renewed with relay rail.

TIE RENEWALS

2,667,562 cross ties were laid in renewals in main and side tracks.

NEW EQUIPMENT

During the year the equipment, which it was stated in the last annual report had been arranged for, was delivered and put into service. This equipment consists of the following:

- 40 Class "M" Mikado type freight locomotives.
- 20 Class "E" Pacific type passenger locomotives.
- 500 Steel ore cars.
- 50 Steel underframe caboose cars.
- 250 Steel underframe refrigerator cars.
- 500 Steel underframe stock cars.
- 25 Steel vestibule passenger coaches.
- 9 Steel vestibule smoking cars.
- 2 Steel postal cars.
- 23 Steel baggage cars.
- 3 Steel combination baggage and mail cars.

In addition to the foregoing, the Company has awarded contracts for the following passenger equipment to be delivered prior to June 30, 1922:

- 20 Steel vestibule passenger coaches.
- 10 Steel vestibule smoking cars.
- 3 Steel vestibule chair cars.
- 3 Steel combination smoking and baggage cars.
- 9 Steel baggage cars.
- 5 Steel combination baggage and mail cars.

MILES OF RAILROAD

The total number of miles of railroad owned December 31, 1921, was: 8,328.86 miles

In addition to which the Company operated under Trackage Rights:

- In the City of Peoria, Illinois..... 2.02 miles
- (Peoria & Pekin Union Railway)

Churchill to Ladd, Illinois.....	2.80	"
(New York Central Railroad)		
Broadway Station, Council Bluffs, Iowa, to South Omaha, Nebraska.....	8.73	"
(Union Pacific Railroad)		
Blair to Omaha, Nebraska.....	24.70	"
Elroy to Wyeville, Wisconsin.....	22.79	"
In Sioux City, Iowa.....	2.28	"
(Chicago, St. Paul, Minneapolis & Omaha Railway)		
Sioux City to Wren, Iowa.....	10.10	"
(Illinois Central Railroad)		
	73.42	"

Total Miles of Railroad Operated December 31, 1921..... 8,402.28 miles

The above mileage is located as follows:

In Illinois.....	824.53	miles
" Wisconsin.....	2,160.12	"
" Michigan.....	510.90	"
" Minnesota.....	650.30	"
" Iowa.....	1,632.55	"
" North Dakota.....	14.28	"
" South Dakota.....	1,230.45	"
" Nebraska.....	1,100.80	"
" Wyoming.....	278.35	"
Total.....	8,402.28	miles

CAPITAL STOCK

The capital stock and scrip of the company held by the public has been reduced \$40,225.00 during the year as follows:

By the purchase of common stock scrip.....	\$225.00
By the purchase of special stock.....	40,000.00
	\$40,225.00

The capital stock authorized by the company is two hundred million dollars (\$200,000,000.00), of which the following has been issued to December 31, 1921:

Held by the Public:

Common stock and scrip.....	\$145,156,903.82
Preferred stock and scrip.....	22,395,120.00
Special stock.....	25,000.00

Total stock and scrip held by the public..... \$167,577,023.82

Held in Treasury:

Common stock and scrip.....	\$2,342,737.15
Preferred stock and scrip.....	3,834.56

Total stock and scrip held in Treasury..... 2,346,571.71

Total capital stock and scrip, December 31, 1921 \$169,923,595.53

FUNDED DEBT

At the close of the preceding year the amount of funded debt held by the public was..... \$235,616,500.00

The above amount has been decreased during the year ending December 31, 1921, by bonds and equipment trust certificates redeemed as follows:

C. & N. W. Ry. 30-year Debentures, 5%.....	\$9,944,000.00
M. L. S. & W. Ry. Consolidated First Mortgage, 6% (including \$12,000 unrepresented and transferred to "Current Liabilities").....	4,996,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%.....	22,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%.....	411,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	109,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%.....	158,000.00
C. & N. W. Ry. Serial Notes, 5½%.....	300,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1913, 4½%.....	
Series A.....	300,000.00
Series B.....	300,000.00
Series C.....	397,000.00
	997,000.00
C. & N. W. Ry. Equipment Gold Notes of 1920, 6%.....	664,900.00

Total Funded Debt redeemed..... 17,601,900.00

\$218,014,600.00

And the above amount has been increased by Bonds and Equipment Trust Certificates sold during the year, as follows:

C. & N. W. Ry. 15-Year Secured Gold Bonds, 6½% (secured by General Mortgage Gold Bonds of 1987).....	\$15,000,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1920, Series J and K, 6½% (secured by equipment Series J and K of the Equipment Trust of 1920).....	5,436,000.00

20,436,000.00

Leaving Funded Debt held by the public, December 31, 1921..... \$238,450,600.00

BONDS IN THE TREASURY AND DUE FROM TRUSTEE

At the close of the preceding year the amount of the Company's unpledged Bonds and Equipment Trust Certificates in the Treasury and due from Trustee was..... \$17,766,000.00

The above amount has been increased during the year ending December 31, 1921, as follows:

C. & N. W. Ry. General Mortgage Gold Bonds of 1987 received, or due from Trustee, in exchange for bonds redeemed during the year.....	15,035,000.00
Other bonds redeemed during the year exchangeable for C. & N. W. Ry. General Mortgage Gold Bonds of 1987, viz:	
M. L. S. W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%.....	\$21,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%.....	411,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	8,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%.....	153,000.00
.....	593,000.00
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee on account of Construction Expenditures made during the year.....	1,000,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1920, Series L, 6 1/2%, issued.....	2,805,000.00
	<u>\$37,199,000.00</u>

And the above amount has been decreased during the year, as follows:

C. & N. W. Ry. Equipment Trust Certificates of 1912, Series C, 4 1/2%, matured and canceled.....	\$3,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1913, 4 1/2%, matured and canceled:	
Series D.....	400,000.00
Series E.....	485,000.00
Series F.....	115,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1917, 5%, matured and canceled:	
Series G.....	422,000.00
Series H.....	400,000.00
Series I.....	178,000.00
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 5%, deposited as part security for the C. & N. W. Ry. 15-Year Secured Gold Bonds sold during the year.....	17,985,000.00
	<u>19,991,000.00</u>
Total December 31, 1921, unpledged.....	<u>\$17,208,000.00</u>

The following bonds owned by the Company and pledged as security for the C. & N. W. Ry. 10-Year Secured Gold Bonds and C. & N. W. Ry. 15-Year Secured Gold Bonds:

C. & N. W. Ry. General Mortgage Gold of 1987, 5%.....	\$20,488,000.00
C. & N. W. Ry. First and Refunding Mortgage, 6%.....	15,000,000.00
Total December 31, 1921, pledged.....	<u>\$35,488,000.00</u>

LANDS

During the year ending December 31, 1921, 1,040.48 acres and 41 town lots of the Company's Land Grant lands were sold for the total consideration of \$23,191.89. The number of acres remaining in the general Grants December 31, 1921, amounted to 264,909.86 acres, of which 39,891.39 acres were under contract for sale, leaving un sold 225,018.17 acres.

Acknowledgment is made to all officers and employees of their loyal and efficient co-operation and service.
Appended hereto may be found statements, accounts and statistics and the condition of the Company's affairs on December 31, 1921.
By order of the Board of Directors. W. H. FINLEY, President.

Chicago, April 18, 1922.

PROFIT AND LOSS, DECEMBER 31, 1921

Credit Balance, December 31, 1920.....	\$60,740,397.74	Cr.
Credits for the Year Ending December 31, 1921:		
Donations.....	193,401.41	
Net Profit from sale of Land Grant Lands.....	25,371.42	
Final settlement with U. S. Railroad Administration.....	9,287,135.22	
Miscellaneous Credits.....	89,691.14	
	<u>\$70,336,000.93</u>	
Charges for the Year Ending December 31, 1921:		Dr.
Debit Balance of current year's Income, brought forward from Income Account.....	\$10,070,707.66	
Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another.....	368,276.30	
Net loss on property sold or abandoned and not replaced.....	16,862.68	
Debit discount extinguished through surplus.....	824,616.57	
Miscellaneous Debits.....	408,591.26	
Balance Credit, December 31, 1921, carried to Balance Sheet.....	<u>58,646,946.46</u>	
	<u>\$70,336,000.93</u>	

GENERAL BALANCE SHEET, DECEMBER 31, 1921

(\$328.86 MILLION)

ASSETS		LIABILITIES	
INVESTMENT		CAPITAL STOCK	
Road and Equipment—		Held by the Public.....	\$167,577,023.82
Balance at end of this Account, December 31, 1920.....	\$441,915,400.77	Held in Treasury.....	2,346,571.71
Add Sundry Construction and Equipment Expenditures for the year ending December 31, 1921, including Trust Equipment.....	12,030,790.94	Premium Realized on Capital Stock.....	29,657.75
	<u>\$453,946,191.71</u>		
Miscellaneous Physical Property.....	658,860.91	LONG TERM DEBT	
Investments in Affiliated Companies.....	2,704,238.61	Funded Debt held by the Public.....	\$238,450,000.00
Other Investments—		Funded Debt held in Treasury and Due from Trustee:	
149,200 Shares of Capital Stock of Chicago, St. Paul, Minneapolis & Omaha Ry. Co.....	\$10,337,152.29	Unpledged.....	17,208,000.00
41,715 Shares of Preferred Stock of Union Pacific Railroad Company.....	3,910,575.93	Pledged.....	35,488,000.00
\$186,000 C. St. P. M. & O. Ry. Debentures of 1930.....	178,161.25		<u>291,146,000.00</u>
\$100,000 New York Central & Hudson River R. R. Refunding and Improvement Bonds.....	91,750.00	CURRENT LIABILITIES:	
\$64,000 New York Central Railroad Consolidation Bonds.....	60,020.00	Traffic and Car Service Balances Due to Other Companies.....	\$2,841,926.82
Miscellaneous.....	33,665.33	Audited Accounts and Wages Payable.....	5,791,358.87
	<u>14,611,324.80</u>	Miscellaneous Accounts Payable.....	425,396.99
		Interest Matured Unpaid.....	948,550.84
		Dividends Matured Unpaid (including dividend payable January 16, 1922).....	4,419,316.20
		Unmatured Interest Accrued.....	2,209,855.78
		Other Current Liabilities.....	1,549,021.22
			<u>18,187,426.72</u>
	<u>\$471,920,616.03</u>	UNADJUSTED CREDITS:	
CURRENT ASSETS		Tax Liability.....	\$5,061,086.00
Cash.....	\$ 2,246,509.18	Accrued Depreciation—Equipment.....	29,493,332.06
Traffic and Car Service Balances Due from Other Companies.....	603,237.97	Balance Premium on C. & N. W. Ry. 5% General Mortgage Gold Bonds of 1987.....	626,593.01
Net Balance Receivable from Agents and Conductors.....	2,572,171.39	Other Unadjusted Credits.....	2,025,394.46
Miscellaneous Accounts Receivable.....	4,857,916.67		<u>37,206,405.53</u>
Material and Supplies.....	12,407,144.10	CORPORATE SURPLUS	
Other Current Assets.....	27,875.33	Additions to Property through Surplus Profit and Loss.....	\$2,034,939.05
	<u>41,683,549.60</u>		<u>58,646,946.46</u>
			<u>61,681,885.51</u>
UNADJUSTED DEBITS			
Balance due from U. S. Government on preliminary estimate included in 1920 report under Clarifying Section of Transportation Act of 1920.....	\$1,700,949.88		
Miscellaneous Unadjusted Debits.....	3,819,648.93		
Capital Stock and Div. C. & N. W. Ry. Co. held in Treasury.....	346,571.71		
Company Bonds held in Treasury and Due from Trustee:			
Unpledged.....	17,208,000.00		
Pledged.....	35,488,000.00		
	<u>52,696,000.00</u>		

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New York Central Railroad Company—Annual Report

To the Stockholders of

THE NEW YORK CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1921, with statements showing the income account and the financial condition of the company.

Road operated

	Mileage operated: 1921	Miles	Increase Miles
Main line and branches owned.....	3,699.19	3,699.19	.....
Leased lines	1,946.64	1,946.64	.02
Lines operated under trackage rights	452.37	452.37	20.00
Total road operated.....	6,098.20	6,078.18	20.02

The increase in the mileage of leased lines is the result of corrections in measurements of the Beech Creek Railroad. Mileage operated under trackage rights has been increased by the acquisition of rights over the Buffalo Rochester and Pittsburgh Railway from Rossiter to Clearfield and Mahoning Junction, Pennsylvania, 18.33 miles, providing a new route for coal traffic from the mines on the Beech Creek Extension Railroad, and by changes in the mileage of the Cherry Tree and Dixonville Railroad, 1.67 miles.

Traffic conditions

The year 1921 was one of business depression, reflected in the decreased freight and passenger traffic of the company. The tonnage fell off one-third in volume and the passenger traffic approximately one-tenth as compared with 1920. This situation was met by economies in operation.

In co-operation with the federal government in its effort to lower costs of foodstuffs, voluntary decreases in rates on certain agricultural products were put in effect during the year. There was no general reduction in other freight rates but arrangements were made from time to time to remove inequalities. The company has co-operated with state authorities in a readjustment of rates on road-making material for the purpose of stimulating the building of good roads and to meet the unemployment situation.

There was a general reduction of rates of passenger fares but the practice which obtained prior to federal control of putting into effect reduced excursion rates during the summer months was re-established to some extent. By an order of the Interstate Commerce Commission made pursuant to the provisions of the Transportation Act, 1920, the company's rates were given the full benefit of the increase in fares under the Commission's order of July 29, 1920, Ex Part 74, notwithstanding the limitation in the New York statute of way passenger fares between Albany and Buffalo to two cents a mile.

Account with Railroad Administration

The company's account with the Railroad Administration covering the period of federal control will be completed in the early part of 1922.

Claim against United States upon the guaranty

The company's claim against the United States based upon its guaranty for the period March-August, 1920, is approaching completion. It has been necessary to re-state this claim several times in accordance with tentative formulas. It will be ready for presentation in the early part of 1922.

Wages

Effective July 1, 1921, the United States Labor Board issued its Decision No. 147 reducing the rates of pay for employees by an amount which aggregated approximately eleven per cent of the payroll. A revision of rules and working conditions for shop employees so modified the lines of demarcation between the various crafts that it is now possible to use a common rate on work of no incidental work of another craft. The Board also discontinued the requirement that time and one-half be paid for necessary Sunday service, thus permitting the use of engine terminal and car repair forces for such necessary Sunday work without the payment of a punitive rate. During the federal control period and up to July 1, 1921, all overtime for maintenance of way employees was paid for at the rate of time and one-half, but, under the decision of the Labor Board, the ninth and tenth hours of service may now be paid for at the regular hourly rate. Pending final decision of the Board, certain other classes of employees for whom overtime is established by the Director General of Railroads are now receiving the pro rata hourly rate for such overtime. Notwithstanding the reductions in rates of pay and changes in rules above mentioned, the average earnings per employee for the last six months of 1921 as compared with the corresponding period of 1920 are still much higher than prior to the federal control period. The company is negotiating with its employees looking to further reductions in pay and further changes in working rules and in some cases these matters have been referred to the Labor Board.

Modified agreement for operation of Providence Webster and Springfield Railroad

Prior to February 1, 1921, this company, as lessee of the Boston and Albany Railroad, paid as rental for the use of the Providence Webster and Springfield Railroad 25 per cent of the gross earnings of the line. By agreement of a date subsequent to the Providence Webster and Springfield Railroad Company and the Boston and Albany Railroad Company, the rental was revised so as to limit the annual rental to a maximum of \$15,000. The new arrangement is effective for three years, and thereafter until terminated by either party on ninety days' notice.

Stock of The Pittsburgh McKeesport and Youghiogheny Railroad Company
During the year the company acquired ten shares, par value \$500, of the common stock of The Pittsburgh McKeesport and Youghiogheny Railroad Company. Its total holdings of this stock at the close of 1921 were 19 shares, par value \$31,347 shares, par value \$1,567,350, or 39.6 per cent of the amount outstanding. The Pittsburgh and Lake Erie Railroad Company owns a like amount of this stock.

Stock of The Mahoning Coal Railroad Company

During the year the company acquired 575 shares, par value \$28,750, of the common stock of The Mahoning Coal Railroad Company. Its total holdings of this stock at the close of 1921 were 1,925 shares, par value 7,990 shares preferred, par value \$399,500, or 60.4 per cent of the amount outstanding, and 17,893 shares common, par value \$894,650, or 59.6 per cent of the total amount outstanding.

Purchase of stock by employees

Under authority of the Board of Directors the company adopted a plan under which its employees are given the opportunity to purchase shares of the company's stock at the market price, the purchase price of the stock being deducted from the payroll in equal monthly installments over a period of not exceeding two years.

Chicago River and Indiana Railroad—Chicago Junction Railway

In the latter part of 1920 this company entered into an agreement with the Chicago Junction Railways and Union Stock Yards Company, subject to approval of the Interstate Commerce Commission, to acquire the Chicago Junction railway properties by the purchase of all of the capital stock of the Chicago River and Indiana Railroad Company and the lease thereto

of all the properties of the Chicago Junction Railways Company. Pursuant to this agreement, this company has made application to the Interstate Commerce Commission for authority to consummate the acquisitions referred to. The application is still pending before the Commission.

Pensions

In the operation of the Pension Department 333 employees were retired and placed upon the pension rolls. Of these retirements 202 were authorized because of the attainment of seventy years of age, and 131 because of permanent physical disability. One hundred and ninety-five pensioners died during 1921. At the close of the year, 1,914 retired employees were carried upon the pension rolls. The average monthly pension allowance of these is \$30.70. The total amount paid in pensions during the year was \$686,354.92.

Changes in property investment accounts

Charges for owned railway property, net.....	\$6,224,193.89
Charges for equipment net.....	18,924,398.20
Miscellaneous physical property.....	2,068,097.14
Total	\$27,216,689.23
Improvements on leased property (net credit).....	1,981,713.77
Net increase in property investment accounts during the year.....	\$25,234,975.46

Capital stock

There was no change in the capital stock of the company during the year. The total number of stockholders at the end of the year was 34,328, of whom 33,824 were in the United States and 504 abroad. The par value, on which dividends were paid, held by those in the United States was \$246,053,395 and by those abroad \$3,539,500, the average holdings being 77 shares and 70 shares, respectively.

The following table shows the growth in the number of stockholders from 1915 to 1921, both inclusive:

Date	Total		In United States		Abroad	
	Number	Average holding	Number	Average holding	Number	Average holding
Dec. 31, 1915.....	25,042	100	22,270	104	2,772	64
Dec. 31, 1916.....	25,912	111	23,536	112	696	56
Dec. 31, 1917.....	27,102	92	24,924	92 1/2	331	69
Dec. 31, 1918.....	28,693	87	28,395	87	298	69
Dec. 31, 1919.....	30,445	82	30,180	82	265	67
Dec. 31, 1920.....	32,396	77	32,173	77	223	64
Dec. 31, 1921.....	34,328	73	33,824	73	504	70

In 1916 the company authorized the issue of \$25,000,000 of its capital stock to be sold at not less than par, the company's stockholders being given the right to subscribe for this stock at par. Shortly after the issue of this stock was authorized the price of the company's stock fell below par and only \$258,900 was disposed of. By resolution adopted on December 14, 1921, the Board amended the previous resolution for the \$25,000,000 stock issue so as to limit the amount of capital stock authorized thereby to the total of \$28,000,000. By the same resolution, the Board authorized the issue of not exceeding \$23,478,880 of stock for the acquisition of capital stock common and preferred, of The Cleveland, Cincinnati, Chicago and St. Louis Railway Company, the plan for which is described elsewhere in this report.

Changes in funded debt

There were issued during the year, but classified as nominally outstanding, \$7,000,000 of the company's 6 per cent refunding and improvement mortgage bonds, series B, which were pledged as collateral for a promissory note like amount given to the Director General of Railroads in part payment for additions and betterments made by him during federal control.

Additional notes amounting to \$155,400 were issued under the equipment trust known as Equipment Trust No. 44 and given to the Director General of Railroads in full settlement of the equipment allowed to the company during the period of federal control and described in the annual report for 1920. The total cost of the equipment was \$18,468,507.59, of which \$13,829,400 was financed by equipment notes.

Under the terms of the agreement of 1911 of the Merchants Despatch Transportation Company amounting to \$450,000, hitherto carried in suspense, were transferred during the year to the company's funded debt, as directed by the Bureau of Accounts of the Interstate Commerce Commission.

The changes in the funded debt of the company, in detail, were as follows:

The amount on December 31, 1920.....	\$748,354,477.42
has been increased as follows:	
N Y C R R Co Equipment Trust 6 per cent notes of January 15, 1920, given to the Director General of Railroads.....	\$155,400.00
Merchants Despatch Transportation Company Equipment Trust of 1911, 4 1/2 per cent certificates.....	450,000.00
	605,400.00

and has been reduced as follows:

Payment of notes:	
Two-year promissory note—Gary Land Company.....	\$211,759.04
Serial note—Secretary of the Treasury of the United States.....	78,567.21
Payments falling due during the year and on January 1, 1922, on the company's liability for principal installments under equipment trust agreements, followed by:	996,000.00
N Y C Lines Trust of 1907, installment due November, 1921.....	1,492,884.74
N Y C Lines Trust of 1910, installment due January, 1922.....	1,406,413.74
M D T Co Trust of 1911, installment due July, 1921.....	75,000.00
N Y C Lines Trust of 1912, installment due January, 1922.....	688,398.90
Boston & Albany Trust of 1912, installment due October, 1921.....	500,000.00
N Y C Lines Trust of 1913, installment due January, 1922.....	742,117.61
N Y C R R Co Trust of 1910, installment due January, 1922.....	1,117,000.00
Trust No. 43 of January 15, 1920, installment due January 15, 1921.....	911,600.00
N Y C R R Co Trust of April 15, 1920, installment due April 15, 1921.....	1,153,167.33
	9,366,908.57

leaving the funded debt on December 31, 1921 \$739,592,968.85

Loans and bills payable

In addition to the finished bills there were outstanding on December 31, 1921, the following loans and bills payable:	
Secretary of the Treasury	\$6,500,000.00
Director General of Railroads	26,500,000.00
Miscellaneous	13,000.00
Total	\$33,013,000.00

The indebtedness to the War Finance Corporation of \$17,500,000 and all but \$13,000 of the indebtedness of \$2,432,866.68 to banks, trust companies and individuals, included in the list of loans and bills payable in the annual report for 1920, was paid during 1921.

The company gave to the Director General of Railroads, in reduction of its indebtedness to him for additions and betterments during federal control, its demand note for \$10,500,000, thereby correspondingly decreasing the amount due him for additions and betterments and increasing the amount due him on notes from \$7,000,000 to \$26,500,000.

Loans and bills receivable

Included in loans and bills receivable, amounting to \$13,303,954.37, are United States Certificates of Indebtedness aggregating \$12,999,480.99 representing a temporary investment of moneys held to provide for certain authorized additions and betterments from time to time as made.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

(SEPARATE STATISTICS FOR BOSTON AND ALBANY RAILROAD WILL BE FOUND AT THE END OF THIS REPORT)

	Year ended Dec. 31, 1921 5,704,27 miles operated	Year ended Dec. 31, 1920 5,684,25 miles operated	Increase or Decrease 20.02 miles
OPERATING INCOME			
RAILWAY OPERATIONS			
Railway operating revenues	\$292,130,095.06		
Railway operating expenses	221,768,389.78		
NET REVENUE FROM RAILWAY OPERATIONS	\$70,362,605.28		
Percentage of expenses to revenues			
Revenues	(75.91)		
Railway tax accruals	\$18,132,163.17		
Uncollectible railway revenues	54,084.95		
RAILWAY OPERATING INCOME	\$52,176,357.16		
Equipment rents, net debit	\$961,046.68		
Joint facility rents, net credit	3,722,734.31		
NET RAILWAY OPERATING INCOME	\$54,938,034.79	\$46,212,792.46A	\$8,725,242.33
MISCELLANEOUS OPERATIONS			
Revenues	\$80,682.51	\$473,804.22	—\$393,120.71
Expenses and taxes	43,162.21	268,274.15	—225,111.94
MISCELLANEOUS OPERATING INCOME	\$37,520.30	\$205,529.07	—\$168,008.77
TOTAL OPERATING INCOME	\$54,975,555.09	\$46,418,321.53	\$8,557,233.55
OTHER INCOME			
Additional compensation and adjustment of standard rate turn under contract with Director General of Railroads for use of the company's railroad property during federal control	\$4,281,607.57	\$84,612.05	\$4,281,607.57
Income from lease of rail	367,389.37	1,110,310.57	282,777.32
Miscellaneous net income	3,423,369.62	2,313,059.05	1,110,310.57
Miscellaneous net operating physical properties	511,893.39	501,876.69	10,016.70
Separately operated properties profit	32,194.95	1,032,775.29	—\$1,000,580.34
Dividend income	6,116,257.46	6,655,251.13	—338,993.67
Income from Federal securities	3,171,612.70	1,009,249.39	2,162,370.31
Income from unaffiliated activities and accounts	2,783,072.72	4,691,028.56	—1,907,955.84
Income from sinking and other reserve funds	71,474.65	60,037.34	11,437.31
Miscellaneous income	836,928.37 ^a	225,185.33 ^b	—1,062,113.70
TOTAL OTHER INCOME	\$20,121,944.06	\$15,370,119.35	\$4,751,824.71
GRAND INCOME	\$75,097,499.15	\$61,788,440.88	\$13,309,058.27
DEDUCTIONS FROM GRAND INCOME			
Rent for leased roads	\$6,701,480.51	\$7,170,182.42	—\$468,701.91
Miscellaneous rents	1,157,912.85	730,218.15	418,574.50
War taxes accrued	2,178,000.00	1,040,304.88	1,019,304.88
Miscellaneous tax accruals separately operated properties—loss	278,196.10	170,320.54	107,875.56
Interest on funded debt	1,323,143.08	367,816.14	1,055,636.74
Interest on unaffiliated debt	11,508,460.01	30,216,911.26	3,801,557.25
Amortization of liability on funded debt	7,196,307.16	5,776,420.45	1,419,786.71
Maintenance of investment organization	551,788.43	440,032.96	111,755.47
Corporate general expenses	2,581.26	3,499.73	917.46
Miscellaneous income charges	1,988,113.97	247,408.56	2,474,008.56
		1,452,917.44	535,116.51
TOTAL DEDUCTIONS FROM GRAND INCOME	\$34,818,133.37	\$48,951,762.92	\$4,748,069.45
NET INCOME	\$40,279,365.78	\$13,736,678.96	\$26,542,686.82
DISPOSITION OF NET INCOME			
Dividends declared	\$1,479,611.01	\$12,476,614.76	\$11,997,003.75
Retained	38,800,000.00	1,260,064.20	37,539,935.80
Sinking funds	68,457.00	4,816.87	63,640.13

TOTAL APPROPRIATIONS OF INCOME	\$12,548,098.21	\$12,484,431.63	\$63,666.58
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS—	\$9,747,587.57	\$1,250,256.33	\$8,497,331.24

^a—Includes compensation accrued under contract with Director General January and February, Guaranty under Transportation Act of 1920 March to August and net railway operating income—corporate—September to December.

^b—Includes accrual account Guaranty under Transportation Act, 1920.

^c—1920 figures revised to include revenues and expenses prior to January 1, 1918.

^d—War taxes for 1921 included in Railway tax accruals.

^eDebit balance.

Profit and Loss account

BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1920..	\$99,933,555.34
ADDITIONS:	
Surplus for the year 1921	\$9,747,587.57
Depreciation on equipment sold	94,999.37
Sundry adjustments (net), unrefundable overcharges and uncollectible bills	175,287.17
	10,017,874.11
DEDUCTIONS:	
Surplus appropriated for investment in physical property	\$43,781.85
Depreciation prior to July 1, 1907, on equipment retired during year	617,950.39
Loss on retired road and equipment	140,390.68
	802,122.92
BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1921..	\$99,149,306.53

Comparison of revenues, expenses and freight and passenger statistics

The following comparison of revenues, expenses and freight and passenger statistics for 1921 are with those of 1920, including in the latter year similar items of the United States Railroad Administration for January and February.

Revenues, tonnage and passengers

The total operating revenues for 1921 were \$292,130,995.06, a decrease of \$46,493,461.44. These and the following figures exclude the results of operation of the Boston and Albany Railroad, which are separately tabulated in another part of this report.

Freight revenue was \$179,170,832.03, a decrease of \$30,621,376.08. The total revenue tonnage decreased 36,278,248 tons. The principal items making up the decrease in tonnage were anthracite and bituminous coal and coke, 13,865,357 tons, and iron ore, 7,167,030 tons. The remainder of the decrease is well distributed among the other commodities.

Passenger revenue, \$30,432,126.11, decreased \$4,169,514.32. The total number of passengers carried was 54,188,310, a decrease of 6,494,341.

The heavy falling off in freight and passenger traffic during the year more than offset the benefit in earnings from increases in rates which went into effect August 26, 1920.

The revenue from the transportation of mail was \$6,508,491.20, a decrease of \$4,939,966.70. The mail traffic of the company increased in 1921. The decrease in mail revenue is the result of the inclusion in 1920 of large amounts for adjustments covering additional compensation for the entire period of federal control.

Express revenues amounted to \$6,311,135.91, a decrease of \$5,386,344.02, which was due not only to the business depression but also to the operation of the new contract with the American Railway Express Company, effective September 1, 1920.

Rents of buildings and other properties decreased \$1,096,040.49. The greater part of this decrease is due to a change in classification of certain rentals in the Grand Central Terminal.

The decrease of \$1,108,634.05 in miscellaneous revenue is largely in the revenue from the handling of ore at the docks at Buffalo and Ashabula, a direct result of the business depression.

Operating expenses

In arriving at the railway operating income for the guaranty period the Transportation Act required that the maintenance allowance should be fixed with reference to the standards and price levels of the test period. The company worked out a tentative factor which resulted in charges to maintenance in excess of actual expenditures and the carrying forward of a reserve at the end of 1920. This factor, however, has proved to be larger than the government is likely to accept. Therefore, entries were made in December, 1920, closing out balances in the maintenance reserves which had been accumulated in 1920; and as operating expenses for that year had been over-accrued by the amount of the reserves, it was necessary to adjust operating expenses in 1921 for the overcharge and preserve the continuity of the accounts. In making this adjustment the amount tentatively charged against the government for guaranty period operations was reduced and a corresponding charge was made against non-operating income, as a result of which the net corporate income for 1921 was not affected.

The operating expenses for 1921 by groups as compared with those for 1920, eliminating these adjustments, were as follows:

	1921	1920	Decrease
Maintenance of way and structures	\$35,671,705.75	\$5,334,299.80	28,840,872.28
Maintenance of equipment	61,455,870.94	50,307,233.37	11,148,637.57
Traffic	3,504,504.23	3,504,603.23	99.00
Transportation	112,561,539.17	112,561,539.17	46,641,490.21
Miscellaneous	3,894,433.90	8,825,251.15	915,588.88
Transportation for investment—	292,614.66	290,418.55	2,196.11
	\$28,571,354.68	\$82,299,470.77	

^aIncrease.

The substantial decrease in operating expenses reflects the falling off in traffic, the economies effected by the company during the year, and reduction in wages and in cost of material and fuel.

Claims for loss and damage to freight

The charges to operating expenses for loss and damage to freight during the year amount to \$7,204,044.77, an increase of \$236,040.67 over 1920. Of the claims settled during 1921 only about 25 per cent accrued during that year, the balance being for account of the period prior to federal control, the guaranty period, and the last four months of 1920.

Railroad tax accruals—Equipment and joint facility rents

Separate tables setting forth the details of these accounts will be found in another part of this report.

Miscellaneous operations

In 1921 the results of operation of the stockyards at East Buffalo were included in miscellaneous operations while in 1920 they were included in

other accounts. This is the principal reason for the decrease in the net miscellaneous operating income of \$108,008.77.

Non-operating income

Pursuant to the final certificate of the Interstate Commerce Commission, the annual compensation for the possession, use and control of the property of this company and its leased lines under the contract with the Director General of Railroads for \$4,227.60. This is an increase of \$1,619.92 over the amount stated in the contract and accrued during federal control. This increase and additional compensation, representing interest on completed additions and betterments put in service prior to February 29, 1920, amount for the item to \$4,281,607.57 shown in the income account as additional compensation and adjustment of standard return.

The increase of \$382,777.32 in income from lease of road is mainly attributable to a redistribution in the accounts extending back to March 1, 1920, and to an increase in the Indiana Harbor Belt Railroad for trackage between Ivanhoe and Dune Park.

Miscellaneous rent income shows an increase of \$2,313,059.05. Of this the greater part is accounted for by an adjustment extending back several years in method of distribution of bills for rental in connection with property in the Grand Central Terminal area and West Side Improvement property in New York City, these rentals having been included in other accounts in 1920.

The account "separately operated properties—profit" shows a decrease of \$1,000,866.84. This decrease is due to a deficit from operation of the Pittsburgh, McKeesport and Youghiogheny Railroad during 1921, as compared with a surplus in 1920.

Dividend income decreased \$338,993.67. This is explained by the receipt of reduced dividends on the stock of The Mahoning Coal Railroad Company.

Increase in income from funded securities of \$2,162,570.31 is mainly due to income received from additional loans to affiliated companies and to the fact that income from such loans in 1920 was included in income from unfunded securities. This change in classification is in compliance with a ruling of the Bureau of Accounts of the Interstate Commerce Commission.

Income from unfunded securities and accounts shows a decrease of \$1,077,955.84. A substantial part of this decrease is due to the change in distribution of income from loans made to affiliated companies as above explained and the remainder is accounted for by a decrease in interest accrued on deferred payments of compensation due from the Railroad Administration.

The decrease in miscellaneous income of \$1,062,113.70 is due in part to a rearrangement, for purposes of comparison, of the figures shown in the 1920 report and in part to adjustments in connection with the guaranty period March-August, 1920.

Deductions from gross income

The rental for leased roads decreased \$466,701.91. Due to the falling off in freight traffic during the year, a dividend based on gross revenues, paid under the lease of the Mahoning Coal Railroad and this was partially offset by an increase in the amount charged to this account for rental of the Lake Erie and Pittsburgh Railway as a result of changing the status of that road in the accounts from a joint facility to a leased line, pursuant to a ruling of the Bureau of Accounts of the Interstate Commerce Commission. The increase resulting from the Lake Erie and Pittsburgh adjustment is offset by corresponding changes in other accounts.

Miscellaneous rents increased \$418,674.50. This increase is principally accounted for by an account change in the amount of charges for several past years in connection with West Side Improvement property, New York City, and which charges had been included in other accounts.

Miscellaneous tax accruals increased \$107,875.56, largely due to increase in assessments during the year.

The increase in charges account "separately operated properties—loss," was \$1,055,626.74 and is attributable to the fact that in the year 1921 a loss of \$1,351,943.08 in operation of the Boston & Albany Railroad was included as against a loss of \$118,241.92 for the year 1920, or the last four months of 1920 the Boston & Albany showed a loss of \$448,963.62 which was partially offset by the surplus accruing during the federal control months (January and February) and the guaranty period.

The increase of \$2,861,557.75 in interest on funded debt is caused by the accrual of five per cent interest upon the notes given to the United States Government for the loan of December 23, 1920, and on \$25,000,000 collateral trust gold bonds issued September 1, 1920.

The increase of \$1,419,786.71 in interest on unfunded debt is chiefly attributable to an increase in interest on indebtedness to the Director General of Railroads for additions and betterments to road and equipment and on other accounts.

The increase of \$113,755.47 in amortization of discount on funded debt is principally accounted for by the charge-out of a full year's proportion of the discount and expenses in connection with the \$35,000,000 issue of ten-year collateral trust gold bonds.

The decrease of \$247,408.56 in corporate general expenses is due to the inclusion in the expense of maintaining the corporate organization in January and February, 1920, during which period the transportation property of the company was under federal control. Expenses of a similar character subsequent to February, 1920, have been included in railway operating expenses.

The increase of \$535,116.53 in miscellaneous income charges is due in part to a rearrangement, for purposes of comparison, of the figures shown in the 1920 report and in part to adjustments in connection with the guaranty period.

Net corporate income

The net corporate income of the company was \$225,685.78 from which were declared dividends of 5 per cent, amounting to \$12,479,641.01. There were appropriations for sinking fund purposes of \$68,457.20. After these deductions, there remained a surplus of \$9,747,587.57, or an increase over the surplus for 1921 of \$8,497,331.24.

If, however, additional compensation credited during the year under the contract with the Director General of Railroads and additional amounts credited in connection with the guaranty under the Transportation Act, 1920, aggregating \$5,613,183.45, are excluded from the income account, the amount representing the surplus on the basis of actual operation of the property would be \$4,134,404.12.

Improvements

Important improvements completed or under way during the year, or contemplated for the near future, are as follows:

Completion of Mail Service and Office Building:
The thirteen story addition to this building has been practically finished and the railroad forces formerly in the main station and post office buildings have moved into the new quarters, and a portion of the former quarters converted into commercial tenements.
New apartment buildings—290 Park Avenue and 300 Park Avenue:
Continuing the development of the use of air-right space above the Grand Central Terminal tracks, two high class buildings occupying the blocks between 48th and 50th streets and 49th and 50th streets, respectively, on the west side of Park Avenue, were completed.

Power plant and transmission improvements, Port Morris and Grand Central Terminal:

The increased demand for electric power for train service and for the new buildings in the Grand Central area has caused the need for additions to the present power facilities. A new 20,000 K.W. turbo generator was installed in the Port Morris power plant and an additional 11,000 volt high tension circuit was installed between Port Morris power station and Substation No. 1 at 50th Street, Grand Central Terminal. At the latter place one 500 K.W. and one 500 K.W. generator have replaced three 500 K.W. generators.

Viaduct across tracks at Mott Haven:

On account of the antiquated condition of the highway bridge over the tracks at Mott Haven, it has become necessary to reconstruct it. The structure has been lengthened to permit the expansion of the company's track facilities. The work was started in 1917 in conjunction with the Interborough Subway extension. The roadway and one sidewalk terminal have already been placed and it is expected that the work will be finished during the spring of 1922.

Castleton, N. Y. Hudson River Connecting Railroad:

The Hudson River Connecting Railroad Corporation was incorporated in 1913 to build a bridge, with approaches, across the Hudson River connecting the West Shore Railroad at Feura Bush with the New York Central Railroad just north of Stuyvesant, together with a branch to connect the Boston and Albany Railroad. The proposed high level bridge route is for the purpose of relieving congestion at the Albany gateway and obviating the frequent opening of the drawbridges over the Hudson River and of obviating the long and steep grades which must be overcome in crossing the Hudson Valley at this point. The improvement will greatly facilitate the movement of freight to and from points in New, England and New York City. During the year work was commenced on the building of six piers on the east side of the river.

Cleveland, Ohio. New passenger terminal:
The Interstate Commerce Commission has approved the application filed in the report for 1920 for the construction of a new and improved passenger terminal on the Public Square at Cleveland and negotiations with the Cleveland Union Terminals Company for the prosecution of the work have been completed. An engineering organization is being formed to proceed with construction.

Detroit, Mich. Elimination of highway grade crossings:

The separation of grades at various streets in Detroit under contracts with the City, the first of which was made in 1900, was suspended during the war, permitting the city to make grade crossings rapidly, especially in the southwesterly portion, and the highway traffic became so heavy over certain streets that the separation of grades was essential. During the year grade separation work has progressed at Livernois, Dix and Waterman avenues. In addition, the City has undertaken at its own expense the widening of Military Avenue and the removal of the street.

Elimination of grade crossings. Various points in state of New York:

Eliminations of grade crossings at various points under orders of the Public Service Commission were under way or completed during the year. Work at Rast Bridge, Adirondack Division, Fairview and Auburn Branch, and reconstruction of an existing undercrossing at Martisico, Auburn Branch, were completed during the year. Work on four crossings at Stageries, River Division, and Poland, Adirondack Division, was in progress and will be completed in 1922.

Proposed purchase of capital stock of

The Cleveland, Cincinnati, Chicago and St. Louis Railway Company

There is outstanding \$9,988,500 of the 5 per cent preferred stock and \$47,028,700 of the common stock of The Cleveland, Cincinnati, Chicago and St. Louis Railway Company, not including \$1,500,000 of preferred stock and \$27,600 of common stock nominally issued but held in the treasury of that company. The New York Central Railroad Company owns 30,207,700 of the common stock but none of the preferred, or 52.97 per cent of all of the outstanding stock. Pursuant to the terms of the purchase agreement, on December 14, 1921, made an offer, subject to the approval of the Interstate Commerce Commission, to the holders of preferred and common stock of The Cleveland, Cincinnati, Chicago and St. Louis Railway Company to purchase the stock of that company at the following basis:

One share of this company's stock for one share of the preferred stock of The Cleveland, Cincinnati, Chicago and St. Louis Railway Company; Eighty shares of this company's stock for one hundred shares of the common stock of The Cleveland, Cincinnati, Chicago and St. Louis Railway Company.

Thereupon application was made to the Commission for its approval of the acquisition of such stock or so much thereof as might be offered upon the terms stated, and for authority to issue the company's stock up to \$23,478,880 for the purpose of such acquisition.

Proposed lease of the railroads of

The Toledo and Ohio Central Railway Company and its subsidiaries

The Board of Directors of the company, by resolutions adopted on December 14, 1921, authorized, subject to the consent of the holders of one-third of the capital stock of the company and the approval of the Interstate Commerce Commission, the taking by the company of a lease, to be effective January 1, 1922, of the property and franchises of The Toledo and Ohio Central Railway Company, and the term of the lease to be ninety days' notice, subject to termination of such lease by the lessee upon ninety days' notice. The proposed lease will include an assignment by the lessor of the leaseholds proposed to be acquired by it, through lease or assignment of lease, of the properties 92 miles in length to be operated by the lessee, to wit: the Kanawha and West Virginia Railroad Company and The Kanawha and Western Railway Company, such leaseholds to be effective January 1, 1922, and to be for the corporate existence of the respective lessors, subject in each case to termination by the lessee upon ninety days' notice.

The lease will provide for the payment, as rentals, of the fixed charges and taxes of the lessor companies, and in addition thereto amounts annually equal to the net income of The Toledo and Ohio Central Railway Company for the properties 92 miles in length to be operated by the lessee, the stock of The Kanawha & Michigan Railway Company, with provision that the rentals beyond fixed charges and taxes may from time to time be applied by the lessee so far as necessary for payment of indebtedness of the lessors. This company contracts to acquire the stock of the lessor companies except a few shares of the stock of The Kanawha & Michigan Railway Company. The lease of these properties will effect substantial economies in the expense of operation and accounting.

Changes in organization

On January 26, 1921, Mr. Abraham T. Hardin was elected a Director to fill the vacancy caused by the death of Mr. William K. Vanderbilt, Jr. Mr. Samuel Mather resigned as a Director of the company on February 9th, 1921, and Mr. J. W. C. Mackay was appointed to succeed him as one of the officers and employees of their loyal and efficient co-operation and service.

For the Board of Directors,
ALFRED H. SMITH,
President.

Railway Officers

Executive

Pursuant to the acquisition of control of the Lake Erie & Western by the Van Sweringen interests, new officers have been chosen as follows: **O. P. Van Sweringen**, chairman of the board of directors; **J. J. Bernet**, president; **M. J. Van Sweringen**, **C. E. Denney**, **J. R. Nutt** and **John Sherwin**, vice-presidents; **W. A. Colston**, vice-president and general counsel; **Lewis A. Bell**, comptroller; **C. C. Collister**, secretary and general treasurer, and **B. E. Morgan**, traffic manager. Headquarters will be Cleveland, Ohio.

Financial, Legal and Accounting

B. D. Warfield, district attorney of the Louisville & Nashville for Kentucky, and **E. Woodward**, general attorney, have resigned to engage in general practice in Louisville, Ky., under the firm name Woodward & Warfield, in which association they have been appointed district attorneys for Kentucky, effective May 15. Effective May 17, **George W. Jones**, district attorney for Alabama and **Judge E. Perry Thomas**, assistant district attorney, have become associated under the firm name of Jones & Thomas, and have been appointed district attorneys for Alabama. Effective the same date, **R. Tate Irvine** and **William H. Stuart**, associated under the firm name of Irvine & Stuart, have been appointed district attorneys for Virginia, with offices at Big Stone Gap, Va. **Harold R. Small** has been appointed district attorney for Missouri with offices at St. Louis, Mo., and **H. K. Rogers** has been appointed district attorney for Ohio, with offices at Cincinnati, O.

Operating

E. Van Dyne has been appointed district superintendent of the Pullman Company with headquarters at Buffalo, N. Y., succeeding **E. G. Kirk**, retired under the company's pension regulations.

R. N. Young, superintendent of telegraph of the Canadian Pacific, with headquarters at Vancouver, B. C., has been transferred to Calgary, Alta., to succeed **D. L. Howard** transferred to Vancouver.

P. J. Flynn, superintendent of the Buffalo division of the Lehigh Valley with headquarters at Buffalo, N. Y., has at his own request been transferred to a similar position on the Mahanoy and Hazelton division with headquarters at Hazelton, Pa. Mr. Flynn's position at Buffalo has been assigned to **F. M. Barker**, superintendent of the Wyoming division with headquarters at Wilkes-Barre, Pa. **P. T. Reilly**, heretofore superintendent at Hazelton, has been transferred to Wilkes-Barre to succeed Mr. Barker.

W. D. Pearce, supervisor of bridges and buildings on the Northern Pacific, with headquarters at Glendive, Mont., has been promoted to general manager of the Walla Walla, a subsidiary of the Northern Pacific, with headquarters at Walla Walla, Wash., effective May 16, to succeed **C. S. Walters** resigned. Mr. Pearce entered the service of the Northern Pacific on May 16, 1906, as a rodman. He was promoted to instrumentman on November 25, 1908, and on April 23 of the following year was advanced to assistant engineer, which position he held until 1915, when he was promoted to supervisor of bridges and buildings. He left this work on November 25, 1918, to enter the operating department as trainmaster at Forsyth, Mont., but resumed the duties of supervisor of bridges and buildings, with headquarters at Glendive, on April 15, 1921, continuing in this position until his recent appointment.

M. A. Wallace has been appointed first chief train dispatcher of the Southern Pacific and **T. F. Custer** has been

appointed second chief train dispatcher at Dunsuir, Cal. Other appointments as first, second and third chief train dispatchers are: At Portland, Ore., **C. H. Spencer**, first, **F. W. Cantrell**, second, and **C. H. Eva**, third; at Roseburg, Ore., **J. I. Love**, first, and **C. W. Grubbs**, second; at Marshfield, Ore., **R. C. Harden**, first; at Sacramento, Cal., **O. T. Stackpoole**, first, and **D. A. Neelley**, second; at Oakland Pier, Cal., **C. E. Norton**, first, **D. Blake**, second, and **C. C. Davison**, third; at Ogden, Utah, **Wm. Johnson**, first, and **F. M. Kelley**, second; at Sparks, Nev., **R. E. Beach**, first, and **H. G. Valleau**, second; at Bakersfield, Cal., **E. F. Wasem**, first, and **R. M. McLeod**, second; at Tucson, Ariz., **J. J. Cowin**, first, **J. Shakespeare**, second, and **H. G. Bonorden**, third; at Los Angeles, Cal., **J. A. Day**, first, **T. W. McKinley**, second, and **G. H. Marsh**, third; at Stockton, Cal., **M. A. Michelson**, first, and **C. R. Rice**, second; at San Francisco, Cal., **I. J. Onyon**, first, and **J. T. Bell**, second; at San Luis Obispo, Cal., **G. Merritt**, first, and **D. W. Brophy**, second.

C. E. Carson, whose appointment as superintendent of the Southern division of the Chicago Great Western, with headquarters at Des Moines, Iowa, effective May 15, was reported in the



C. E. Carson

Railway Age of May 20, page 1204, was born at Portsmouth, Ohio, on January 9, 1870, and entered railway service immediately following his graduation from Carleton College, Syracuse, Ohio, on June 13, 1888, as a switchman on the Kansas City Southern at Kansas City, Mo. Thereafter he was employed on the Kansas City Southern and the Missouri Pacific at Kansas City, Mo., successively as switchman, brakeman, conductor, yardmaster and trainmaster until 1903, when he entered the service of the Terminal Railroad Association of St. Louis as chief clerk in the superintendent's office. He was promoted to superintendent of the Missouri Pacific, with headquarters at Kansas City, in 1897, and consecutively thereafter served as superintendent of the Missouri Pacific, first at Kansas City and later at St. Louis, from 1897 to 1903; as superintendent of the Colorado & Southern at Denver, Colo., from 1903 to 1906; as superintendent of the Missouri Pacific at Kansas City from 1906 to 1908; as superintendent of the Mexican Central at Tampico, Mex., from 1908 to 1911; as superintendent of the Chicago Great Western at St. Paul, Minn., from 1911 to 1913, and as superintendent on the Fort Dodge, Des Moines & Southern at Boone, Iowa, from 1914 to 1917, when he entered military service, where he acted as chief transportation officer of the District of Paris from 1917 to 1919. In October, 1919, he re-entered the service of the Fort Dodge, Des Moines & Southern as general agent with headquarters at Chicago, where he remained until September, 1921, when he became manager of the Traffic Club of Chicago, the position he held at the time of his recent appointment.

Traffic

John F. Fox, traveling immigration agent of the Northern Pacific, with headquarters at Chicago, has been promoted to assistant general immigration agent with headquarters at St. Paul, Minn.

W. Ray Wilson, traveling freight agent of the Gulf Coast Lines, with headquarters at Chicago, Ill., has been promoted to commercial agent, with headquarters at Pittsburgh, Pa., effective May 15, to succeed **L. B. Williams**, resigned.

A. G. Albertson, general agent of the Canadian Pacific, with headquarters at Minneapolis, Minn., has resigned, effective May 1, to become freight and passenger agent of the Royal

Mail Steam Packet and the Pacific Steam Navigation companies, San Francisco.

Paul P. Hastings, formerly assistant general freight agent of the Atchison, Topeka & Santa Fe at San Francisco, and for the last two years a member of the Rate Committee of the Transcontinental Freight Bureau, has been appointed to the newly created position of general freight agent, with headquarters at San Francisco, Cal.

W. L. Donaldson, assistant general freight agent of the Lehigh Valley with headquarters at Buffalo, N. Y., has been appointed general freight traffic agent with headquarters at New York. **Ira F. Auch**, district freight agent with headquarters at Philadelphia, has succeeded Mr. Donaldson at Buffalo. **C. W. Murphy**, general agent at Pittsburgh, has been transferred in a similar capacity to Philadelphia and **C. C. Dailey**, commercial agent at Buffalo, has been appointed general agent at Pittsburgh.

William L. Donaldson, who has been appointed general freight traffic agent of the Lehigh Valley with headquarters at New York, was born on December 4, 1881, at Detroit, Mich. He attended grammar school, high school and the classes of Detroit Business University at Detroit and entered railway service as a clerk-stenographer for the Grand Trunk in the division freight office at Detroit. He served in this position for three years and was subsequently employed, first, in the superintendent's office of the Wabash for six months and, next, eighteen months in the office of the general agent of the Chicago & North Western—as a clerk-stenographer and in Detroit in both cases.



W. L. Donaldson

In April, 1903, he became a soliciting freight agent at Detroit for the Michigan Central-Lehigh Valley route. Three years later he was transferred in a similar capacity to Sayre, Pa., for the Lehigh Valley. From March, 1907, to September of the following year he was stationed at Auburn, N. Y. He was then promoted to general traveling agent of the Lake Shore-Lehigh Valley-Michigan Central route, with headquarters at Buffalo, N. Y. From August, 1909, to May, 1911, he was agent for the Lake Shore-Lehigh Valley route at Chicago. In May, 1911, he was appointed soliciting freight agent and westbound agent of the Lehigh Valley at Chicago and served in this capacity until March, 1915, when he became chief clerk to the general freight agent at New York. On January 1, 1916, he was promoted to assistant general freight agent at Buffalo and served in that position until his recent promotion.

C. H. Pumphrey, division freight agent of the Baltimore & Ohio, with headquarters at Youngstown, O., has been appointed division freight agent at New York, succeeding **M. J. Bevans**, who has resigned to take up the practice of law. **P. S. Phenix**, division freight agent at Cumberland, Md., has been transferred to New York in a similar capacity. **C. F. Farmer**, division freight agent at Akron, takes Mr. Pumphrey's place as division freight agent at Youngstown, O. **R. J. Beggs**, chief rate clerk in the general freight traffic department at Baltimore, has been promoted to division freight agent at Cumberland, Md.

J. R. Hayden has been appointed assistant traffic manager of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., effective May 6. He was born at Bennville, Ind., March 13, 1872, and entered railway service in 1894 as an operator for the Kansas City, Fort Scott & Memphis. He was employed at various points on this road as operator,

agent and dispatcher until 1899, when he entered the service of the Atchison, Topeka & Santa Fe as an agent. After serving as agent at various points until 1906, he was promoted to traveling freight agent, with headquarters at Los Angeles. A year later he assumed the title of industrial agent, in which capacity he served until 1913, when he was promoted to assistant industrial commissioner. He was promoted to general industrial agent, with headquarters at San Francisco in 1918, since which time he has devoted his attention to industrial, agricultural, colonization and general development matters under the direction of the general manager and freight traffic department until his recent promotion.

J. A. McNeill, whose promotion to assistant freight traffic manager of the Tennessee Central, with headquarters at Nashville, Tenn., was reported in the *Railway Age* of May 13, page 1154, was born in New York City, N. Y., November 20, 1881, and entered transportation service on September 1, 1902, as chief clerk to the superintendent of the Clyde Steamship Company, New York. On February 1, 1904, he was promoted to commercial agent, with headquarters at Atlanta, Ga., and on October 1, 1907, was promoted to manager of the Clyde-Charleston Fast Freight Line, where he remained until June 1, 1918, when he entered government service as agent of the United States Shipping Board at Philadelphia. He left this service on March 1, 1919, to engage in the electrical business in Newark, N. J., where he remained until November 15, 1920, when he re-entered transportation service as assistant to the freight traffic manager of the Munson Steamship Line at New York, the position he held until his recent appointment as assistant traffic manager of the Tennessee Central.

M. E. Newell, whose promotion to freight traffic manager of the Tennessee Central, with headquarters at Nashville, Tenn., was reported in the *Railway Age* of May 13, was born at West Newbury, Mass., on August 26, 1868, and entered railway service in July, 1886, as a clerk for the Railway Car Service Association at Boston, Mass. Thereafter he served as clerk in the car service department of the Atchison, Topeka & Santa Fe at Topeka, Kan., and the Chicago, Rock Island & Pacific at Chicago until September, 1890, when he entered the service of the Lake Shore & Michigan Southern as a clerk in the freight office at Chicago. He served in this and other clerical capacities until December, 1897, when he was promoted to northwestern freight agent, with headquarters at St. Paul, Minn., a position he held together with that of agent for the Lake Shore-Lehigh Valley route until January 1, 1900, when he entered the service of the Chicago Great Western as a general agent, with headquarters at Pittsburgh, Pa. He was appointed a division freight agent, with headquarters at Fort Dodge, Iowa, in May, 1904, and resigned in March, 1909, to become associated with the Alberta Clay Products Company, Medicine Hat, Alta. He re-entered railway service on July 1, 1910, as commercial agent for the Tennessee Central, with headquarters at Chicago, and continued in this position until April 1, 1914, when he was promoted to general freight agent, with headquarters at Nashville, Tenn., holding this position until the time of his recent promotion; excepting during the period of federal control, when he served as division freight agent at Nashville.

Mechanical

F. B. Stafford has been appointed master mechanic of the Houston Belt & Terminal, succeeding Fred Hooker, resigned.

H. E. Smith has been appointed engineer of tests of the New York Central Lines with headquarters at New York, effective May 15.

J. McKenzie has been appointed general car inspector of the Pere Marquette with headquarters at Grand Rapids, Mich., succeeding **W. F. Crowder**, who has been promoted to shop efficiency engineer.

Purchasing and Stores

R. M. Nelson, whose appointment as purchasing agent of the Chesapeake & Ohio was announced in the *Railway Age* of April 29, page 1046, was born in Hanover county, Vir-

ginia, on November 6, 1873, and was educated at McGuire's University School, Richmond, Va. After having completed his schooling in 1890, he entered the service of the Chesapeake & Ohio (then the Newport News & Mississippi Valley) as a clerk in the store department at Lexington, Ky. During the following year he served in the same capacity in the freight office and then in the auditor's office at Lexington. In 1892 he went to Ashland, Ky., as a clerk in the freight office and during the same year was transferred to Lexington in the same capacity. In 1901 he was promoted to traveling auditor and, in 1904, was appointed chief clerk in the freight office at Newport News, Va. In January, 1912, he became chief clerk to the purchasing agent at Richmond, Va., and in January, 1916, was promoted to assistant purchasing agent. He was appointed assistant to the director of purchases and stores in April, 1921, and was serving in that position at the time of his recent promotion.

Obituary

E. F. Meedham, retired superintendent of motive power of the Wabash, died in Boston, Mass., on May 12.

Albert F. Rust, consulting engineer of the Kansas City Southern, died at his home in Kansas City, Mo., May 11, at the age of 73.

J. B. Turner, mail superintendent of the Chicago & Alton, and an employe of the company continuously for 49 years, died in Chicago, Illinois, on May 20, after an illness of three months.

John D. Hardin, vice-president and general manager of the East Tennessee & Western North Carolina, with headquarters at Johnson City, Tenn., died at his home in Johnson City, May 21, after having been connected with this railroad for 40 years.

Edward A. Williams, at one time general mechanical superintendent of the Erie, died at his home in Glen Ridge, N. J., on April 29. Mr. Williams was born at Wiscasset, Me., on October 4, 1848. He attended public school at Milwaukee, Wis., and learned the machinist's trade in the Milwaukee shops of the Chicago, Milwaukee & St. Paul. From 1877 to 1880 he was roundhouse foreman for this road at Prairie du Chien, Wis., and thereafter, until 1886, general foreman at Wells, Minn. From 1886 to 1890 he was assistant general master mechanic at Milwaukee. Then, until 1893, he was master mechanic of the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at Minneapolis. He was then promoted to mechanical superintendent, which position he left in 1901 to become superintendent of rolling stock of the Canadian Pacific with headquarters at Montreal. In 1904 and 1905 he was assistant general manager of the Erie and in November, 1905, became general mechanical superintendent, in which position he served until the time of his retirement in 1907.

George W. Smith, until 1920 foreign freight agent of the Pennsylvania, died at his home in Chicago on May 16, after a short illness. Mr. Smith was born in Minnesota on December 10, 1869, and entered railway service on August 16, 1885, as an employe of the Chicago, Milwaukee & St. Paul, where he remained until May, 1903, when he entered the service of the Erie & Western Transportation Company, operators of

the Anchor Steamship Line. From December, 1905, to August 1, 1910, he was associated with the Star Union Steamship Line, and from the latter date to January, 1914, he represented this line and the Anchor line at Chicago. He became foreign freight agent of the Pennsylvania on the latter date and held this position until September, 1920, when he became a representative of the allocated lines of the United States Shipping Board, and it was this position which he held at the time of his death.

Alfred W. Gibbs, chief mechanical engineer of the Pennsylvania with headquarters at Philadelphia, died suddenly from heart failure on May 19 at his home in Wayne, Pa. Mr. Gibbs was born at Fort Filmore, N. M., on October 27, 1856. He attended Rutgers College Grammar School, New Brunswick, N. J., and Rutgers College (the latter institution in 1873 and 1874) and then entered Stevens Institute of Technology, Hoboken, N. J., from which institution he was graduated in 1878. In March of the following year Mr. Gibbs entered the service of the Pennsylvania as a special apprentice in the Altoona shops and continued as such until June 1, 1881, when he became a draughtsman. Four months later he left the Pennsylvania to become a draughtsman for the Richmond & Danville (now the Southern). In 1886 he was promoted to master mechanic and served in that position on several divisions until 1890, when he was appointed superintendent of motive power of the Central of Georgia. Two years later that position was abolished and he returned to the Richmond & Danville as master mechanic. In July, 1893, Mr. Gibbs returned to the Pennsylvania as assistant mechanical engineer and served in that position until September, 1902, when he was appointed superintendent of motive power of the Philadelphia, Wilmington & Baltimore (a subsidiary of the Pennsylvania). On January 1, 1903, he was promoted to general superintendent of motive power of the Pennsylvania Railroad and on July 1, 1911, was appointed to the newly created position of chief mechanical engineer, in which capacity he was serving at the time of his death. Mr. Gibbs was one of the managers of the Franklin Institute, Philadelphia. He served for many years as chairman of the Committee on Tank Cars of the Mechanical Division of the American Railway Association. He was a member of the advisory committee of the Locomotive Cyclopedia for each edition of that volume excepting that of 1912 and at the time of his death was chairman of this committee. Mr. Gibbs played a prominent part in the mechanical design of the electric locomotives built for the Pennsylvania Railroad's electrification at New York.

John J. Cotter, engineman of northbound passenger train No. 517, of the Greenwood Lake division of the Erie Railroad, on the afternoon of May 13, at Riverdale, N. J., 28 miles from New York, saved the life of a little girl, seventeen months old, by crawling to the pilot of his engine and picking her up a second before she would have been struck. The child was Adele Cushman, granddaughter of Ira M. Meade, an Erie engineman. She had crawled to the track from her home nearby, and was on or close to the rail. Seeing that she did not realize her danger, and estimating that it would be impossible to stop before reaching her, Cotter set the brakes and then crawled forward and reached the pilot just in time. By that time the train had been brought almost to a stop, and Cotter jumped off and ran ahead. The front wheel stopped about 30 feet beyond the child.



A. W. Gibbs



E. A. Williams

EDITORIAL

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Railway Age

EDITORIAL

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All railroads have today a special duty to make friends of their patrons. There are many ways in which this may be done, but above all things it must be

A Railroad Appreciated by the Public

remembered that actions speak louder than words. Basing its remarks on a news item, to the effect that the Long Island Railroad has killed no passenger

in a train accident in three years, the New York Herald prints a 300-word editorial congratulating the officers and employees on their skill and fidelity throughout these 36 months. Moreover, C. D. Baker, general superintendent of the road, does his part to make the editorial effective by re-printing it in full, with a message to employees, commending the conscientious effort and hearty co-operation which have made this good record. In the last analysis it must be admitted that it is a great thing to conduct an enormous passenger traffic with the highest degree of safety, even if occasionally a brakeman does forget his manners, or a baggage-man delays your trunk. And the Herald's editorial is to be commended for its intelligence and sanity. The number of passengers carried by the Long Island Railroad in the three years was 212,317,406.

The Railway Accounting Officers' Association will hold its annual meeting this year at Cleveland, June 6 to 9. The meeting will be the same busy affair that the Accounting Officers' conventions usually are. The agenda this year is a document of over 350 pages.

Accounting Officers' Meeting

For the first time in the history of the organization, one committee has covered subjects numbering over the 100 mark, the committee on freight accounts having reported on 103. At its 1921 meeting the R. A. O. A. took the important step of making mandatory a sizable portion of its interline accounting rules and it adopted an unusually large number of new accounting forms. The 1921 meeting was one of the best in the association's history. This year, among the leading factors of interest, are the recommendations relative to the standardization of station accounting forms and practices, a matter of special importance. The meeting will give considerable attention to the requirements of the Interstate Commerce Commission as to the reports it requires from the railroads. It has had a large amount of correspondence with the bureau of statistics during the past year relative to a proposed change in the compilation of freight commodity statistics. The bureau has suggested that it might require the carriers to report, in addition to the tonnage of their various commodities carried, the number of car loads, the ton-miles and the freight revenue, which proposal the association has argued against on the basis of its cost and the feeling that the increased information might not be sufficiently valuable, or that it might lead to mistaken conclusions as to the figures of the different roads. Another interesting proposal that will be advanced this year is the scheme to modify the present classification of railway operating expenses. The committee on disbursement accounts has proposed a very considerable reduction in the primary accounts and the creation of a new general account under the name of "Casualties" which will include damage to property, freight loss and damage, injuries

to persons, etc. This is an important step and one which will be watched with great interest by railway men in other departments as well as by those in the accounting department.

Whether the summer season this year is to bring in large increases in passenger revenues or not is a matter of conjecture. The potential traffic during the vacation season is, of course, immense. How much of it will actually materialize, however, is another matter and one which is largely up to the

To Increase Passenger Business

excursion and tourist rates are being offered in pleasing number by most roads, but in many cases these could be largely extended. Tourist and excursion rates have two results—one, increased business, and, the other, better feeling toward the railroads on the part of the public. One feature of American practice in running excursions is rather difficult to understand, i.e., excursions are run almost entirely on holidays and Sundays when business would normally be high even at regular rates. Then on week days traffic moves only in fractional volume. The extra cars and locomotives which are called into service on Sunday spend six days in idleness. American roads have never gone as far in stimulating travel by reduced rates as have the British railroads. Conditions in the two countries vary greatly, of course, but the full utilization of existing passenger equipment could scarcely help being remunerative. An outline of the reduced rates offered by the British railways will be found in the Foreign Railway News column of this issue. This information should be of value to American railway officers who are studying situations where they may profitably apply excursion and tourist rates.

If a division superintendent in charge of a fairly heavy traffic division on which trains are operated under the manual

Cost of Delays to Trains

block system and on which each freight train is delayed an average of one hour because of the length of blocks, was told that this meant a loss of \$87,600 a year for every ten freight trains receiving such a delay daily, he would be negligent indeed if he did not attempt to improve conditions. The records compiled on one road showed the cost of delays to freight trains to average 40 cents a minute. In order to overcome the defects of the manual block system with its long, irregular blocks, automatic signals were installed and the average freight train time over the division was reduced from 10 hr. 29 min. to 8 hr. 49 min. The saving in this case, on the basis of 40 cents a minute, amounted to \$40 a train or \$400 a day for ten trains, the equivalent of \$146,000 a year. Under these conditions it is easy to see that such installations would pay for themselves quickly. Unfortunately, the division superintendent has so many and such varied duties to perform that he cannot devote the time he should to such studies. However, those who have had opportunity to do so have found that a proper signal installation will yield a

high return on the original investment and are sold to the idea because the improved operating results redound to their credit. It would appear that every division superintendent would be well repaid for investigating the results which may be accomplished by such installations on his division, if automatic signals are not yet in service.

Every railroad officer who is fully alive to his responsibilities and his privileges is today constantly on the lookout for opportunities to show his friendliness toward the public. Years of un-

**Faithful
Are the Wounds
of a Friend**

friendliness in the past must be obliterated (and without stopping to consider whether it is your road or some other road that is responsible for failures to give the public satisfactory service). And, what is equally important, every citizen who *thinks* that the railroads have not been fair to him must be placated. But in the midst of these efforts to please the prospective patron there may be a stern duty to do things that will displease him—but which are for his good. A correspondent in Tennessee calls our attention to the fact that the law of that State requiring automobiles to be stopped at railroad crossings contains a section (Sec. 3) preserving the right of people struck at crossings to sue the railroad for damages. An auto driver may deliberately disobey the law requiring him to stop, and yet in the following week go before a dozen sympathetic jurymen, if he has been hit by a train, and do his best to wheedle them into deciding that the railroad was to blame for his injury. Every railroad lawyer in Tennessee is in duty bound to advocate the repeal of that Section 3; but, as we have suggested, that simple plea for justice would be interpreted by many persons as an unfriendly act; a move of the wicked railroad to fatten its treasury. "Faithful are the wounds of a friend;" but the railroad officer who inflicts that kind of wound and who expects the public still to class him as friend, has a big task on his hands. One optimistic railroad officer, commenting on the New York and Pennsylvania rules requiring common-carrier automobiles to stop at crossings, classes these rules as laws "with teeth in them." But he will have to admit that whoever causes these teeth to bite, whether state officer or railroad policeman, will have difficulty in maintaining his reputation as a true friend of the public. Actually to make drivers stop at crossings would require an elaborate campaign.

Motor truckmen and ship owners charge certain sums for conveying goods and passengers. Highways and waterways

**The Subsidized
Agencies of
Transport**

are provided and maintained by taxing the public. The cost to society of highway and water transport, then, is not only the sum paid to these agencies in freight and passenger charges but is that sum plus the cost to society of the highways and waterways. In many cases, then, where ships and motor trucks are taking business away from the railroads, they are doing so not because their form of transport is more economical, but because the public is subsidizing them out of the public treasury. A few shippers secure the benefit of lower rates but the people as a whole by allowing themselves to be taxed for highways and waterways are making possible the operation of uneconomic systems of transportation. These are the general conclusions brought out at a meeting of the British Institute of Transport, which is reported in an article on another page of this issue by Samuel O. Dunn, editor of the *Railway Age*. Champions of the motor and ship-owning interests attacked these conclusions but, according to Mr. Dunn, they were unable to meet squarely the criticism that they must justify themselves on a basis of total cost to the

public, and not upon the rates they charge without taking into account the use of a right-of-way which they have practically free of cost to themselves. The competition of motor trucks and buses and steamers on the inland waterways is not so serious a matter for the railways of this country as it is for those of Great Britain, but it is serious enough even in this country and one upon which the public is not well informed. The meeting of the Institute of Transport brought out many arguments on both sides of the case and the article we publish can be read with profit by all railway officers who desire to meet the arguments of the propagandists for the subsidized forms of transport—the motor truck and the steamboat.

One of the principal reasons why many railroads still buy shop tools and equipment on a price basis is because mechanical department officers fail to convince those higher up that poor tools

**The Ultimate
Cost of
Poor Tools**

waste annually, and sometimes monthly, many times their first cost. Standardized small tools, such as twist drills and reamers, may be taken as an example. Because of keen competition, drill manufacturers must be thoroughly familiar with their competitors' drills. They know which of the companies are producing good drills and which are cutting the corners here and there, producing less efficient drills at a lower price. The average hole-producing capacity of the various makes of drills and reamers are known to the individual manufacturers, and when the latter observe that the railroads place orders time after time, not with the standard drill manufacturers, but with some little company which cuts the corners and then cuts the price, their opinion on railroad buying can better be imagined than expressed. One drill manufacturer, in explaining the situation and pointing out the false economy of buying shop tools solely on a price basis expresses himself very fairly as follows: "You can scarcely blame the railroads, handicapped as they have been by the lack of actual cash, if they should have adopted this policy (price buying) for a few months or a year, but now it has been going on for a little over a year and there seems to be no let up in it. Not only in our line but in many lines the railroads are actually losing money by this short-sighted policy." The cost of unit producing, rather than the cost of unit purchase, is what counts in buying railway shop machinery and tools. Every effort should be made to impress this fact as strongly as possible on railroad executives and department heads responsible for the actual placing of orders. It is obviously poor business to save five per cent on the cost of a drill or other tool and send it to the shop where it breaks on the first trial, produces no useful work, and has to be sold for scrap. Twist drills are typical of many other standard and special shop tools in which quality is the first consideration, the ultimate cost of the tools being a function of work done rather than first cost.

Some of the movements for the improvement of the railroad service seem to be all right except in the one particular that they do not go far enough. A new station building sometimes comforts the superintendent in such an extremely

**Big Questions
for Small
Station Agents**

satisfactory way that he temporarily forgets the fifty shabby stations that are on his mind night and day—or ought to be. He has done well, but he has not gone very far. The letter of the Local Freight Agent printed in this issue reminds us of this aspect of railroad progress. He does not know how to apologize for a slow claim department and a severely strict treasury department. He gets no satisfaction when we tell him that freight claims are being settled much more promptly

than they were four years ago. His problem is to answer the dissatisfied patron *now*, concerning *present* practice. Should not the improvement of this feature of the service be pushed ten times harder than it has yet been pushed? And the refusal to give credit on freight bills—would not a local banker give much more detailed and thorough attention to this point than you are giving to it, Mr. Railroad Treasurer? If you must be strict with farmers because your country station agent is a small-size business man, or is inexperienced, is it not a duty to explain that point much more carefully than is usually done? Getting into touch with the public in a really sympathetic way involves a heap of work, every day!

Reduction of the "Fair Return"

VERY MUCH the most unsatisfactory feature of the Interstate Commerce Commission's decision in the recent general rate case is the part of it relative to the percentage of net return the railways will be allowed to earn.

The opinion specifically holds that the record does not show any general inefficiency in management. It states that continuance of the commission's investigation of the value of the railways has tended to confirm the tentative violation made by it in the rate decision in 1920. These findings should help to create a healthy public opinion regarding railway matters and to stabilize railway securities.

The finding reducing the average rate of return allowed to be earned from 6 per cent to $5\frac{3}{4}$ has an exactly opposite tendency. On the basis of the valuation made in 1920 it reduces by \$47,250,000 the amount of net return that may be earned annually. This is 6 per cent on eight hundred million dollars. It is, therefore, equivalent to a reduction of eight hundred million dollars in the amount of new capital which the railways can raise.

The commission evidently believed that the railways, if allowed $5\frac{3}{4}$ per cent, could raise enough new capital. Past experience and present conditions seem to demonstrate that this belief is unfounded. The experience of the last fifteen years has indicated that under normal conditions the railways need to earn approximately $5\frac{3}{4}$ per cent on their *property investment* in order to raise enough new capital. Their valuation is less than their property investment and therefore experience indicates that they need to earn more than this percentage on their valuation. Furthermore, this experience antedates the "recapture" provisions of the Transportation Act. Under these provisions all railways which in any year earn more than 6 per cent must pay over one-half of the surplus to the government. Thus $5\frac{3}{4}$ per cent on the valuation probably would not yield the railways as a whole more than $5\frac{1}{4}$ per cent on their valuation. This as an average, year by year, would certainly have been too low under the financial conditions before the war.

The present general financial conditions are no more favorable. At the present time only very good railway bonds are selling in the open market on a five per cent basis. A higher rate would have to be paid on additional and poorer secured bonds. The best railway stocks are selling on a basis that yield six to seven per cent. Railways with only average credit would have to pay higher rates than these to issue new securities, while railways with poor credit would have to pay very much more, if, indeed, they could finance them at all. The prices of the securities of railways which already are earning approximately the return which the commission holds should be earned as an average seem to make clear that if the railways as a whole did earn this average they could not under present conditions raise the new capital needed adequately to develop their facilities.

The situation would be improved if railway managers and investors could feel any assurance that even the $5\frac{3}{4}$

per cent return would be allowed to be earned as an average, over a period of years. The unfortunate, but incontrovertible fact, however, is that never since the Hepburn act went into effect sixteen years ago has the Interstate Commerce Commission "made good" on its own findings regarding what the railways should be allowed to earn. It so regulated the rates that the percentage of net return earned declined almost constantly during the ten years, 1906 to 1916. The commission in its opinion in the recent rate case frankly recognized the fact that the development of the railways has fallen far behind what it should have been. The commission's policy in regulating rates has contributed more toward arresting their development than all other causes combined. The older members of the commission probably will not admit this. It must be plain to the newer members.

The commission has made a mistake in reducing the "fair return." The law makes it its duty to allow the railways under efficient and economical management to earn enough net return to enable them to furnish sufficient railway transportation for the people of the United States. The railways cannot even hope to do this unless they are allowed to earn a net return averaging at least $5\frac{3}{4}$ per cent in both good years and bad years. That means, of course, that if they earn less than $5\frac{3}{4}$ per cent in bad years they must be allowed to earn equal additional amounts in good years. It is most doubtful if even then the railway facilities of the country could be adequately developed.

The railways should not accept this part of the commission's decision without the most vigorous protest. It would be easy under normal business conditions to correct a reduction of rates made to produce an *adequate* return if the reduction of rates proved too great. It would probably prove far more difficult to secure an advance in a rate of return held to be reasonable once it had been both established by the commission and tacitly accepted by the railways. A return of six per cent is the very minimum which the railways should be asked to accept. It is the least under which it is conceivable that they can raise enough new capital adequately to develop their facilities. Therefore, it is the least to which in the public interest the commission should have even considered restricting them.

Equipment Orders in May

THE DOMESTIC orders for freight cars reported in the four issues of the *Railway Age* in May totaled 18,427; for passenger cars, 235, and for locomotives, 99. Among the important freight car orders were included 3,000 for the Chesapeake & Ohio, 6,140 for the Southern, 2,300 for the Katy, 2,000 for the Santa Fe, etc. The passenger car orders included among others, 100 for the Southern, 63 for the Chesapeake & Ohio and 30 for the Katy. The leading locomotive purchases were 30 for the Chicago & North Western and 20 for the Atlantic Coast Line. The orders of freight cars, passenger cars and locomotives reported in May were, in each case, less than in April but greater than the figure for any previous month of 1922 except April.

The real news in the equipment figures, however, is contained in the five months' totals, and particularly the freight car totals. Since the beginning of the year the *Railway Age* has reported in its equipment and supplies column the placing of orders for a total of 77,053 freight cars, 1,195 passenger cars and 460 locomotives. The buying movement that is exemplified in the freight car figure is the interesting detail, for a comparison with previous years shows that in the case of freight cars we are now observing the largest buying movement of rolling stock for domestic service that we have had for a period of no less than 10 years. The five months' total for 1922—77,053 cars—compares with a figure for all 12 months of 1921 of but 23,346; of 1920, 84,207 (which the 1922

orders will soon exceed): of 1919, 22,062, and of 1917, 79,367. In 1912, to go back to the beginning of the ten-year period, the domestic freight car purchases totaled 234,758. The best year since 1912 has been 1916, in which year 170,054 cars were ordered. Orders for 1922 to date are considerably ahead of 1916, for in the first five months of 1916 the orders totaled 49,551, or 17,500 less than in the first five months of 1922.

	DOMESTIC ORDERS					
	Locomotives		Freight cars		Passenger cars	
	1922	1916	1922	1916	1922	1916
January	5	231	7,960	14,613	235	...
February	8	272	14,771	9,323	160	...
March	76	634	6,550	14,233	25	...
April	272	178	29,345	7,228	540	...
May	99	248	18,427	4,154	235	...
Total 5 months	460	1,563	77,053	49,551	1,195	736

The total passenger car orders for the first five months of 1922 has been 1,195, which compares with a figure for the first five months of 1916 of 736. In 1916, as a whole, the passenger car orders totaled 2,544, but this total ran about 500 behind the totals for 1913 and 1915. The locomotive orders have not been doing so well comparatively as the car orders. The 1922 first five months' figure of 460 compares with 1,315 for the first five months of 1916. The total domestic locomotive orders in 1916 were 2,910, that year being the best from 1913 to date.

The First of the Wage Reduction Decisions

IN THE FIRST of the series of decisions on the petitions of the roads for a reduction in the wages of certain classes of their employees, the Railroad Labor Board has authorized decreases of approximately 13 per cent in the rates for maintenance of way forces. Additional decisions affecting the shop crafts and clerical and other employees are expected within a few days. These reductions will all become effective on July 1.

It is estimated that the decision already announced will save the roads approximately \$48,000,000 annually and with the reduction of nearly \$150,000,000 in the maintenance of way payroll of a year ago, will reduce the expenditure for maintenance of way labor nearly \$200,000,000 annually from the high point of 1920. The reduction which has just been made public follows closely after the decrease in freight rates announced by the Interstate Commerce Commission on May 24, also effective on July 1, which it is estimated will reduce the revenues of the roads by approximately \$225,000,000.

It is evident that the reductions in wages already announced and those yet to appear will go far in offsetting this loss in revenue.

This decision is in accordance with the general trend of wages. It follows the decline in the cost of living and also reduces the differential between the wages which the roads have had to pay and those for which they can secure their labor in the market. It is this differential which has given the impetus to the contracting of much work in recent months.

Coming as it does at the season when maintenance of way work is at its height, this reduction will do much to stimulate activity.

The board has acted wisely in reducing the wages of track foremen less than those of the laborers in their gangs and thereby increasing the spread between the pay of the two groups. It is in the interest of economy for the roads to pay

their foremen a sufficient rate to make this position attractive to men of the proper caliber. There is a sentiment in some quarters that the roads should not take advantage of any reduction in the wages of their foremen, but should hold them where they are and thereby attract a better class of men as the wages in other industries and in other branches of railway service decline. In contrast with the action with reference to track foremen, the Labor Board has decreased the spread slightly between skilled mechanics and their foremen.

The reduction of a year ago removed the increase given unskilled labor in July, 1920, and the present reduction takes away 5 of the 12 cents granted the men in Supplement No. 8 to General Order No. 27 of the Railroad Administration, issued in September, 1918. Insofar as skilled labor and foremen are concerned, the new rates will be approximately the same as those established in July, 1920.

This decision again emphasizes the impracticability of fixing uniform wages which are equally applicable over a wide area, because of the wide variation in local conditions and the constant change in these conditions from day to day. In most localities, the roads can take advantage of the reductions authorized and still retain their forces because of the fact that the new rates will still be considerably above those prevailing in other industries. However, in the industrial centers where activity is becoming more marked there are already indications of a shortage of labor, even with the rates now paid, and predictions are now being made freely that the roads will not only not be able to take advantage of the reductions authorized in these centers, but may even be forced to raise their rates to secure the necessary men. In other words, as the wages of railway employees are gradually approaching those in other industries, it is evident that they must be fixed as they always have been fixed by the relation between the supply and demand in each locality if the roads are to secure the quality and numbers of men they require at reasonable rates.

New Books

Mechanical Appliances for Handling Railway Traffic, by George Bulkeley. 132 pages, 5 in. by 7½ in., illustrated, bound in cloth. Published by the Railway Gazette, London, England.

As the importance, and in many cases the absolute necessity, of material handling devices is being more clearly recognized every day, any book as suggestive as this will be of interest to many. While the author, who is connected with the Great Western Railway, has evidently had in mind primarily the needs of freight houses, transfer points, terminals and docks, many of the devices and methods shown are also of use at storehouses, shops, roundhouses and other places.

Of the 94 illustrations, the majority show different types of material handling machinery in actual service moving various materials under diverse conditions. In addition to these application photographs there are several diagrams showing principles involved; also methods and arrangements that have been found to be successful. Such commonly employed devices as wedges, jacks, chain and rope blocks, hand cranes, winches, ropes, hooks and derricks are treated first. Following this is a chapter on portable devices, including hand trucks, industrial power trucks, tractors, trailers, portable cranes, stackers and various types of portable conveyors. The next chapter treats of cranes, continuous conveyors and various combined appliances. Electric telfers and overhead carrier systems are described and shown in use. Chapters on highway cartage, dock working and the equipment for medium sized freight stations and storehouses complete the book.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

“Stop” versus “Danger” at Highway Crossings

BALTIMORE, Md.

TO THE EDITOR:

What is the meaning of the word “Danger?” The traveler on the highway encounters a variety of signs such as “DANGER—CURVE AHEAD,” or “DANGER—SCHOOL—GO SLOW,” or “DANGER—ONE WAY BRIDGE.” The motorist becomes so accustomed to seeing these signs, that he seldom pays attention to them other than perhaps to slightly reduce the speed of his car. In fact, the observance of the word “danger” as applied to these warnings appears to mean merely driving at reduced speed.

A railroad crossing is always dangerous; but a crossing signal displaying the restrictive indication means but one thing—*train approaching, stop!* The motorist seeing the word “danger” displayed is likely to use his own judgment as to whether the situation is dangerous enough for him to stop his car. The word “stop,” however, has but one meaning; it can leave no doubt in his mind. “Stop” is a command addressed to the motorist personally. The word “danger” is merely descriptive of conditions as they exist at that point. It is impersonal.

A signal indication, to be effective, should be as simple and readable as possible. The word “danger” contains so many letters that it must necessarily be printed in smaller type than would be needed for a shorter word. It therefore cannot be read as easily or from as great a distance as this simple word, containing only four letters, displayed in large type—STOP.

CHARLES ADLER, JR.,
Signal Engineer, Maryland & Pennsylvania R. R.

Educate the Public as to Motor Truck Competition

ILLMO, Mo.

TO THE EDITOR:

Motor truck transportation on highways built and maintained at public expense, has been discussed from various angles in the technical journals, the magazines, and in the dailies. Some classes of people even take the view that the motor truck has come to displace the railways and that the latter are about to lose the pre-eminent place that they have held in the transportation field.

Numerous problems remain to be solved in the transportation field. As regards railroad transportation, stockholders, officials and employees do not always agree as to the solution of the varied problems; this is particularly true of questions relative to working conditions and compensation. There is, however, every reason why all three parties should agree as to just what our policy should be regarding highway construction.

Highway programs of large magnitude are going forward at a rapid pace. Should these highways, built at public expense, be designed and constructed to take care of transpor-

tation that is not now adequately furnished by the railways, thus making them feeders to the railways, or should they be designed and constructed with a view to making them competitors for the transportation that is now taken care of by the railways?

If motor truck transportation is as economical, or more so, than rail transportation, we could ignore the issue altogether; but if rail transportation is the more economical, should not the army of men interested in railroads make their views known to the public, with a united front, as to what they are paying for motor truck transportation? This has no reference to short hauls, which is the legitimate field for the motor truck.

Again, should not the army of men interested in railroads use their influence on the public to get more adequate license fees for vehicles using the highways so as to transfer a more just proportion of original cost and maintenance from the taxpayer to the user who receives the benefits? Certainly no large body of our citizens are better fitted to educate the public along these lines than those interested in the railroads. If this feature of the highway problem is put before the public on the basis of the economics involved, results should be obtained that will benefit us all. Each individual acting independently would have some effect but united action should be certain of success.

AN EMPLOYEE.

Some Queries from a Station Agent

PRAIRIE PLAINS, U. S. A.

TO THE EDITOR:

I hope it is not true, as you seem to imply in your editorial note (May 6, page 1049) that the Central of Georgia never has to apologize for poor service except in connection with the quality or quantity of its locomotive service; for any road which was so nearly perfect as that would exercise a baneful influence—in the envy which it would inspire in the breasts of the men on other railroads who have to meet the public. Most of us have to try to utilize the “human equation” in a good many different directions to make up for all sorts of equations, human and other, which are not up to the mark.

You expect us local agents to have a lively imagination; but where are we to get the material for it to feed on? When our freight claim department takes three months to decide whether or not to pay a damage bill that I know ought to have been paid within a week, I confess that my imagination is not equal to making up a suitable excuse. I want a full explanation from the general manager, worded just as he would word it if the claimant were a friend of his (he is a friend of mine) and called in person at headquarters. I can, of course, expatiate on the virtues of our road, and claim that its love for its patrons is so great that a three months' wait for a \$50 damage bill ought to be forgotten; but still I want to see the general manager's exact words—not a brief hint which he has never taken the time to put on paper.

Refusing to trust a consignee for a freight bill, or to accept his check, when he is a reputable citizen who is trusted everywhere else, is another feature in which an agent has to be able to spin out a large story of railroad virtues if he is to offset the determined ill-feeling of the patron. The man's freight bill may not be more than \$25. Someone ought to estimate how much money is lost in a year, or a series of years, by a road which allows its local agents some discretion in this matter.

Please answer these questions. Then I will send you some more.

L. F. A.

But the Traffic Is Not Always Light

SALT LAKE, Utah.

TO THE EDITOR:

The editorial in the issue of April 22, "Light Traffic an Aid to Construction," is interesting but some suggestions to the construction man may also be to the point. It is conceded that to a certain extent, at least, the use of the existing track is of great benefit in the construction of second track. However, under certain heavy traffic conditions work may be organized to avoid the use of the operated main line for construction purposes and in a way that may effect a saving in construction costs by eliminating delays to work trains attempting to use the operated main line.

The writer has in mind the closing of the gaps in the second track on the Union Pacific east of Granger in 1917, where a section 52 miles long was built with very little use of the existing main track. Traffic had reached over 70 train movements per day on single track. The schedule of passenger trains was such that the larger part of the day, from about seven in the morning until six in the evening, was free of passenger trains on this 52 miles. Naturally, the operating officers took advantage of this for freight train movements. A flock of seven or eight freight trains would reach one end of this piece of single track about 7 a. m. ready to be driven across. No sooner would the last one reach the other end of the single track than a flock from the opposite direction would take its turn.

The plight of the construction engineer with one or two work trains loaded with men and material can well be imagined. Five or six hours of this for a day or two soon brought him to time. He could get the chief dispatcher or the trainmaster on the telephone, but the voice on the other end, already with tears in it, would come back something like this: "Well, Mr. Man, you may know your construction end—we assume you do—but the general manager has told us what will happen if we do not get these trains over the road." The construction engineer had been an operating officer and understood "the language." On the other hand, that same general manager had said to the construction engineer that this piece of second track was worth something like a thousand dollars a minute to him.

The grading was therefore done by contractors with very little use of existing tracks. A Harris tracklayer was quickly installed at one end and an improvised tracklayer for handling rails with a bunch of teams for hauling ties, at the other. Everybody was happy at once. The tracklaying showed regular progress each day. Temporary bridges allowed the tracklaying to proceed with little delay; these were replaced later when time was easier. The cost of work incident to work train delay was eliminated.

It is well and good to do work when traffic is light but perhaps the gentleman at the head who furnishes the sinews of war is not always able to match up his "psychological moments." It is then up to the field man to meet the condition, and with a little ingenuity he may do this and perhaps show good progress.

W. R. ARMSTRONG,

Assistant Chief Engineer, Oregon Short Line, Salt Lake City, Utah.

Educating and Training Railroaders

MILWAUKEE STOPS, Wis.

TO THE EDITOR:

With reference to the letter from Chas. E. Parkes published on page 512 of your issue of March 4, in which some doubt is expressed as to what was meant by a certain statement in my paper on "Education" published in your issue of January 21, the paper in question was written for the Western Railway Club and your version of it was a considerably abbreviated one.

Had Mr. Parkes heard the full paper read, my meaning

would have been made clear to him. The paper was an answer to a question arising out of a previous paper on "Regulation—Super-regulation—Strangulation." What I had in mind was that railroads were unable to obtain the assistance from educational institutions, which, for instance, the engineering, medical or legal professions might. The railroad situation is so complex that a man given any stereotyped course of training is not likely to be able successfully to grapple with its problems.

For instance, it is a comparatively simple matter to design and construct a car to carry a certain load, but when drawings are made it is found there are many requirements of the safety appliance law to be met and this will alter the design; next shippers' requirements enter into its construction, and when these have been met it is found that the cost of loading and unloading have been increased, and moreover changes must be made to permit of the car being repaired at small points where facilities are poor; and so on through various changes until the car has increased in weight and greater braking requirements become necessary; ultimately the average weight of a train has grown so as to interfere with track conditions, bridge strains, etc. Larger engines are necessitated, coal bills become higher, round-houses have to be altered, turn-tables increased in length, etc., etc.

In every phase of railroading this dove-tailing throughout every move will be found until one realizes that it is necessary to have a very wide knowledge of railroad work in all departments before one can hope to attain success in his own particular branch. For this reason I believe it is simpler to take experienced railroad men and educate or teach them the requirements of modern improvements, altered designs and changed conditions than it is to take men who have had a good college or university education and teach them the various phases of railroading.

At the same time I strongly believe that the young man entering the railroad who has attended an up-to-date technical school is well equipped to commence learning the varied phases of railroading and I further believe that our educational institutions could develop a special course of training that would even better fit those wishing to take up this work.

In regard to Mr. Parkes' remark that most of the educational schemes yet inaugurated in railroads have failed I would say that we have no intention of allowing our scheme to collapse. It has been in operation for nearly four years now and by preparing and spreading the information among our employees and then holding monthly examinations, the results of which are duly recorded and used as a basis for promotion, we are going to continue to find among our employees men whose ability can be turned to mutual profit, that would otherwise remain in obscurity.

C. G. JUNEAU,
Master Car Builder.

PRESIDENT HARDING has reached the conclusion that action in Congress on a St. Lawrence waterway must await the conclusion of a treaty between the United States and Canada. The Canadian government is evidently not very keen about pushing the international waterway project. Montreal doubts its value, and from an economic point of view Canada as a whole has little to gain from trying to extend direct ocean-going traffic into the distant interior. Our lake states have also very little to gain. They are obsessed by empty dreams of maritime grandeur. Postponement in Congress of this costly and vague project will help to clear away illusions. If such a route is to be opened at national expense it should be made perfectly clear that the whole nation will profit by it and that the enterprise will come within at least long range of paying for itself. No serious efforts have been made yet in that direction.—*New York Tribune*.

Motor and Inland Water Versus Rail Transport

Necessity for Each Paying Its Way, Instead of Burdening Taxpayers, Emphasized at Transport Meeting

By Samuel O. Dunn
Editor of the *Railway Age*

LONDON, May 19.

AT TENDANCE at the three-day Congress of the British Institute of Transport, which ended today, would have convinced any American student of transportation that, at least when rival means of transport are involved, human nature is precisely the same in Great Britain as in the United States.

There were papers and discussions on both motor highway transport and inland waterways, as well as specifically on railway matters. There were speakers who emphasized the principle, as is done in the United States, that in comparing the cost of water or motor transport with that of railway service the total cost incurred, not merely the rates charged the shipper, should be compared. It was emphasized that the rates charged the shipper do not measure the total economic cost of water or highway transport, because waterways and highways are built and maintained mainly from taxes paid by the general public, and these taxes must be added to the rates paid by the shipper before any fair comparison can be made between the costs of water, motor and railway transport.

On the other hand, as is almost always the case in the United States, the advocates and defenders of inland water and highway transport persistently evaded the issue thus squarely presented. None of them would discuss the question whether, including the expense of providing and maintaining inland waterways or highways, the total cost of transportation for considerable distances by them actually is more or less than the total cost by railway. They preferred—as is always true in the United States—to dwell upon the general advantages derived by the public from taxing itself to provide and support waterways and highways—as if even greater general advantages are not derived from the development of railways, especially if and when the development of the railways results in passengers and goods being transported at a lower total cost than they can be transported by other means.

Moved to Generosity With Another's Funds

The defenders of motor transport service rendered largely at the expense of the taxpayer dwelt so much upon the supposed indirect benefits derived by the public from it that they caused Sir Alexander Gibb to tell a story. He said they reminded him of the Scotchman who on a Sunday morning was so moved by the parson's sermon on the duty of generous giving that he emptied his neighbor's purse into the collection plate. Automobile manufacturers and shippers in Great Britain have the same generous willingness as in the United States to empty the taxpayer's pocket to increase their sales and reduce their freight bills, largely regardless of whether thereby the total cost incurred by the nation as a whole is reduced or increased.

As waterway and motor highway transportation, in comparison with transportation by rail, are the subjects of animated discussion in both the United States and Great Britain and as motor transport especially is relatively much more highly developed in the latter country than in most parts of our own, a summary of the papers and discussions on these subjects at the Congress of the Institute of Transport will be of considerable interest to many readers of the *Railway Age*.

Great Increase of Taxes for Highways

"The Finance of the Modern Highway—A Problem and a Solution" was the subject of a paper presented by Dixon H. Davies. Mr. Davies said that freight shipped by railway in Great Britain pays probably eight to twelve times as much toward the provision, upkeep and renewal of the road upon which it travels as does freight shipped by motor truck. On the other hand, he said, it is probably twice as expensive to provide, maintain and renew a suitable track for heavy motor traffic as to provide, maintain and renew a first-class railway. To a great and increasing extent the difference is not made up, but, on the contrary, the maintenance and renewal of the highways is running into arrear. This is occurring in spite of the fact that an increasingly heavy expenditure from local taxes is being made on the highways. The sum annually provided from this source is now about £40,000,000 annually. This is three times what it was in 1913; and other speakers pointed out that in 1913 there had been a large increase since a few years before. "The call upon the rates" (local taxes), Mr. Davies said, "has reached the dimensions of a grievous burden. . . . The Ministry of Transport is receiving applications from all parts of the country for the closing of roads against motor traffic. The roads approaching the part of London are so inadequate that the movement is reduced to an average of five miles an hour, and is subject to occasional blocks so that it is impossible to predict how long it will take to reach a particular dock.

Cost \$22,500 to \$450,000 a Mile

"The mileage of the English and Scottish roads is 177,306, of which 36,589 miles are already listed as classified roads. The cost of reconstructing a road for motor traffic varies from £5,000 to £100,000 (\$22,500 to \$450,000 in American money at the present rate of exchange) varying according to local circumstances and the weight of the traffic passing. It is difficult to see how any satisfactory scheme for equipping the country with motor roads could be carried through for a capital expenditure less than 500 millions sterling (about \$2,250,000,000). The cost of this on a 5 per cent basis, with a provision for renewal every ten years would be about 65 millions (\$292,500,000) per annum, and this would be required in addition to the revenue from rates (local taxes) which would be no more than sufficient for the ordinary maintenance and the costs of other unclassified roads. It is hardly to be expected that the country can be equipped with a complete system of arterial communication adapted for fast moving and heavy mechanical traffic for much less than two-fifths of the cost of the railway system, constructed as that was when wages and prices were very much lower."

Mr. Davies expressed the opinion that the public would never be willing to pay in taxes the sums necessary to provide and maintain such a system of highways. "One is driven to the conclusion that the only sound method is a direct charge on the traffic itself, which can be passed and ultimately met as part of the price paid for the articles carried. It is submitted that it is quite without reason or justice that the manufacturer, or the packer, or the printer who receives cotton or cotton goods by rail should be charged for the provision and upkeep of the road over which they

have travelled, and that the trader who receives corresponding goods by motor lorry should have a present made to him of nearly the whole amount of these costs."

He pointed out that under such a system there would be a natural tendency for more and more freight to leave the railway and go by the highway; that the railways would be forced, in consequence, to raise their rates on the remaining traffic; that this would drive still more traffic to the highway, preventing development of the railways and increasing the cost of the highway maintenance and the burden on the taxpayers; that finally the public would refuse to pay any more taxes to maintain the highway, the result being its deterioration and destruction under the increased business; and that thus finally transportation both by the railways and by motors on the highways would become inadequate and demoralized.

Tax on Motor Vehicles Should Be Greatly Increased

The only preventive of this ultimate outcome, he contended, is to make motor traffic contribute its fair share of the cost of providing, maintaining and renewing the highway. A motor truck now pays a tax of 30 pounds (\$135) a year, which, on the assumption that it runs 30,000 miles a year, makes it a contributor to the roads to the extent of $\frac{1}{4}$ of a penny ($\frac{1}{2}$ cent, American money) per ton mile. In order to equate the position between road and rail this obviously inadequate tax should be raised to about 360 pounds (\$1,620). There are at present approximately 180,000 commercial vehicles on the road, and the number is increasing so that a tax of 360 pounds would produce the 65 millions a year required, allowing for a considerable rebate upon commercial passenger vehicles.

"The objection to a heavy vehicle tax is that it bears so hardly upon those who do not keep their vehicles in regular occupation; for them the fairest tax is unquestionably the petrol tax. A good many of the objections raised to a petrol tax levied at the source might be met by the device of a recording petrol meter attached to the car."

As a means of making the total cost of transport by highway less than it is now, Mr. Davies suggested the making of "plateways" on and off which vehicles using the highway could move at their pleasure. He suggested the provision of these plateways by private capital which would be allowed to charge a toll for their use.

Sir William Acworth's Opinions

Sir William Acworth concurred in the principle that commercial traffic, moved by highway, like railway traffic, should be made to contribute its fair share toward the interest and maintenance charges of the highway. He advocated taxing highway vehicles on the basis of the mileage run by them as being the fairest to all classes of users of such vehicles. Several shippers and persons interested in the manufacture of motor vehicles or interested in their operation for commercial purposes vigorously attacked Mr. Davies' proposition that taxes should be levied on such vehicles in proportion to their use of the highways. They contended the levying of the present taxes already had had an adverse effect upon the motor industry. They claimed the burden put upon the taxpayers for the maintenance of the highways was exaggerated. The highways, they contended, are provided and maintained for the general welfare, and it would be inequitable to single out a particular class of users and make them pay in proportion to their use. At no point in the discussion did any of those who took this position meet squarely the proposition that it is inequitable and contrary to public policy for those who provide one means of transportation (railway) to be forced to charge rates sufficient to cover the cost of providing and maintaining the highway, as well as cost of carriage, while those who provide another means of transportation (by motor) are furnished a highway virtually

at public expense and enabled to take traffic from the railway by making rates which cover the cost of carriage only.

Railway Seeks Power to Conduct Highway Transport

While this discussion was going on at the Congress of the Ministry of Transport, a Select Committee of the House of Commons was taking testimony on a bill promoted by the London & Northwestern Railway to give it the right to render motor transport service by highway. The bill is opposed by some shippers and others on the ground, among other reasons, that the London & Northwestern might so conduct its highway transport business as unfairly to compete with and drive out independent concerns furnishing motor transport. The London & Northwestern has agreed to the insertion of various provisions in the bill to safeguard against this. There is fear that if the bill is passed it will contain so many restrictions on the railway's freedom of action that it will not be very helpful in enabling it to meet motor truck competition.

Discussion of Inland Waterways

The trend of the discussion on inland waterways was the same as that of the discussion on motor transport.

Neville Chamberlain, a member of Parliament, presented a paper entitled "Inland Water Transport—A Practical Policy." Mr. Chamberlain is known in Great Britain as a politician who has advanced his career largely by his persevering advocacy of inland waterway development. He recalled that the report of the Royal Commission on Canals and Waterways in 1906 made a series of recommendations involving state ownership and state-assistance of waterways on a very considerable scale. He believed that if the recommendations of the commission had been carried out "the country would have recouped itself for the cost before now, but," he added, "there is no doubt that the very size and boldness of the conceptions defeated their own ends by frightening off the government and public of the day. Still less," he said, "would such proposals be likely to command assent today when costs have so enormously increased and when everyone is seeking how expenditures may be diminished rather than how new fields of enterprise may be developed. What we want is a new policy adapted to our times and likely to commend itself by its soundness and prudence to men of business.

A policy of waterway improvement must be founded upon expectations of increased business sufficient to give an adequate return upon the capital invested. But, he admitted, "there are no sufficient data in existence to enable anyone to make a reliable estimate of what that increase (in traffic) will be." Therefore, waterway development should proceed by steps, not all at once. The data secured as a result of each step will afford surer and more solid ground for the next advance. The waterway system of the country was divisible into a series of groups, each consisting of a central main route, fed by a number of auxiliaries. No "alarming sum" would be required to make the central artery a satisfactory waterway for barges of 100 to 120 tons.

Conditions of Successful Water Transport

He laid down three conditions which must be fulfilled. 1—Central management and control of each group of waterways. This would involve transferring from the railways the numerous canals they now control. 2—Properly equipped terminals. This would involve the expenditure of capital. Fortunately, the development of road transport in recent years had made it practical to construct great inland ports at a distance of several miles from the center of an industrial city from whence goods could be distributed either by rail, road or water. 3—Regular and punctual service, "the absence of which has been one of the principal causes of the failure of canals to give satisfaction to the

trader." He said he would prefer "that the whole thing should be left in the hands of private enterprise," but a large amount of capital must be invested, and he feared the returns may be for some time delayed, although he anticipated a very large indirect return in the additional prosperity of the localities served and the consequent increase in the wealth of the nation. "Therefore," he said, "the whole burden cannot be placed upon private enterprise, but there is a good case for inviting the co-operation of the principal local authorities interested, and, following the continental practice of the state itself."

Is Transport by Water Cheaper Than by Rail?

The discussion that followed forcibly recalled discussions of the same subject in the United States.

Sir William Acworth, whose writings on transportation are well-known in America, challenged the assumption underlying all the pro-waterway arguments in Europe as well as in America, that transportation on canals and canalized rivers is cheaper than by rail. From the standpoint of the public welfare he pointed out the cost of shipping by water that should be considered is not merely the rate paid by the shipper, but the *total cost*, including the interest on the investment in the waterway and the expense of maintaining it, which usually are defrayed from taxes paid by the public. He cited statistics based on European experience to show that in Germany and France this *total cost* by inland waterway almost always is greater than the corresponding total cost by rail.

As is usually true in the United States, this argument was ignored or evaded by the waterway advocates. Mr. Chamberlain answered that, in spite of Sir William Acworth's statistics, the people of Germany and France went on developing waterways. Was it to be assumed that they were ignorant of the facts about the results, or such imbeciles as to go on developing waterways when by so doing they were losing money which could be saved by shipping by rail? The influences exerted by politicians seeking to advance their careers by promoting waterways, and by business men desiring to save their own money by shipping partly at the taxpayer's expense, were ignored.

Canals No Longer Built by Private Enterprise

Sir William Acworth called attention to the striking fact that before the day of railways private enterprise had built canals because it could then operate them at a profit on the investment made in them, but that this has never been done since the advent of the railway.

The obvious implication was that a canal built without government aid could not be operated at a profit in competition with a railway likewise built without government aid, and that, therefore, differences of service considered, actual experience had shown that railway service could be rendered more cheaply. The advocates of waterways had no answer to this. Mr. Chamberlain finally dismissed foreign experience by contending that whether Great Britain's inland waterways could be made a success could be determined only by investing several millions of pounds in the more promising. He outlined a number of projects which he believed should be carried out, one after another.

The Work of the Institute of Transport

The Institute of Transport, at whose congress these discussions occurred, is an organization which was formed a few years ago and which is without a counterpart in the United States. Its membership consists of persons interested in all the various means of transport—by railway, waterway, highway and even airway. The papers and discussions deal with the problems of all these various means of transportation, and as discussions are participated in by representatives of all these various interests, the advantages

and disadvantages of each means of transportation are presented by men who are entirely competent to do so. In the United States the railway, automobile and waterway interests have many separate organizations, but no common one in which they present their claims and counterclaims face to face where they can be at once challenged and analyzed.

One of the most interesting features of the Institute of Transport's sessions is the prominence of the men who take part in its sessions. The recent congress was not one of theorists. Several men famous for their writings and lectures on transportation matters actively participated, but there were also present and participating successful "practical" men representing all the branches of transport.

Besides the papers mentioned, there was one by Col. J. W. Pringle, Chief Railway Inspector of the Board of Trade on "Safety in Railway Operation," an abstract of which will be published separately in the *Railway Age*. "Wireless as an Aid to Transport" was discussed in a paper by Capt. H. Riall Sankey, "Foreign Railway Practice" by Prof. J. Carlier; and "The Operation of Heavy Suburban Passenger Services on a Steam Railway with Particular Reference to Density of Service, Terminal and Other Facilities" by F. V. Russell.

Railroad Y. M. C. A. to Celebrate Fiftieth Anniversary

ON JUNE 11, 1872, a reading room was opened in the Cleveland, Ohio railroad station and placed in charge of George W. Cobb, an active Y. M. C. A. worker. This was the first step in developing the Railroad Y. M. C. A., which now operates 269 buildings and has a total membership of over 125,000. In the fall of 1875 the Cleveland association temporarily released its secretary to interest other railroads in starting associations. As a result the work was started on several systems, including the Baltimore & Ohio at Baltimore, the Pennsylvania at Altoona and Jersey City, the New York Central at New York, Detroit, Columbus and Erie, and the New Haven at Springfield, Mass. Arrangements are now being made to celebrate the fiftieth anniversary of the Railroad Y. M. C. A. at the local associations on June 11, 1922, or sometime during that week. There will be a special observance at the Union Station in Cleveland, also a luncheon at the Hotel Commodore, New York, on June 16, at which President Truesdale of the Lackawanna will preside.

The following facts about the present scope of the work of the R. R. Y. M. C. A. are taken from a statement which has been issued in connection with the celebration of this anniversary.

The Association at Work

"Visitors to the various types of R. R. Y. M. C. A. buildings, ranging from the great ones in New York, St. Louis and Philadelphia to the small establishments in such towns as Hanley, W. Va., Field, B. C., and Hoxie, Ark., remark upon the strong place these hold in the affections of the men. They see the reason in the fact that these organizations—operating on a 24-hour schedule, and always open to railroad workers—provide homelike creature comforts, and acceptable, stimulating programs for mental and moral development and for physical recreation. And, seeing these things they rejoice that those in whose direct care lies the safe transportation of travelers and goods are not left to shift for themselves at isolated division points; but rather that they have a homelike place and care "at the other end of the run," to insure proper rest, wholesome environment and stimulus to the qualities that make for sound character.

"From the beginning the Railroad Y. M. C. A. has under-

taken a service to the sons and families of railroad men. In the early days this work was naturally limited, but during the years as the association has grown in numbers and extent, it has expanded accordingly, until at the present time many of the associations located in the smaller railroad communities are conducting very definite programs to the

A FEW FACTS FROM THE FIFTY YEARS' RECORD

	1875	1880	1890	1900	1910	1921
Number R.R. Y. M. C. A.'s	10	52	82	151	234	269
Total members	790	2,096	17,453	37,074	83,881	125,047
Value buildings and equipment			\$410,002	\$1,035,600	\$3,991,980	\$8,627,500
Operating expenditures	\$3,600	\$27,677	\$126,607	\$350,086	\$1,216,758	\$6,570,472
No. social and entertainments				1,116	2,477	5,049
Dormitories, times used		100,000		345,286	2,275,067	3,509,000
Restaurant, meals served				997,654	4,930,100	9,374,000
Average daily attendance		71	609	1,116	2,477	5,049
In Bible classes			4,730	23,500	50,933	63,072
Number baths			1,050	2,500	7,088	10,937
			156,697	450,461	1,468,748	2,330,000

families of railroad men and others as well as to the men distinctly in railroad employ.

"The association is not limited in its service to railroad men to the great cities, but very frequently finds its largest opportunities for helpfulness at the isolated and out of the way division points over a system. The physical features, such as dormitories and game room, have always been well patronized, but this does not constitute the entire service, which also includes educational work, social work and religious work—the secretary often being the only religious leader in the community—and other forms of association effort, such as work with the boys in the community, have made the association a centre from which has radiated all that is wholesome and best.

"Another phase of association service is the physical work particularly with reference to health and recreation. Programs of group games, such as volley ball, quoits, etc., during the comparatively few minutes at noon hour, which are available to shop men, prove to be very popular. These and other games similarly organized for the road service men and office men prove interesting and helpful to large numbers of railroad men.

"The railroad men of tomorrow are the boys of today. The railroad associations realize that here is an opportunity for a service, the influence of which it is impossible to describe adequately. Through well organized boys' work, reaching these sons of railroad men in groups ranging from 12 to 18 years of age, the railroad departments conducting this program are endeavoring to hold before these coming railroad operators and managers the highest ideals of American young manhood."

What Men Who Know Say

"Eighteen years of association with the Railroad Y. M. C. A. has convinced me that nothing too good can be said about the work of this splendid organization. The ten branches established on these lines are ten centres of inspiration for all that is best in railway life—healthy exercise, comradeship, mental improvement, and the atmosphere of home. The high standard of citizenship which prevails among the railway men of Canada is due largely to the influence of the Y. M. C. A., the efforts of which to promote the mental and moral, as well as the physical well being of its members, have been highly successful"—*E. W. Beatty, president Canadian Pacific.*

"The Railroad Young Men's Christian Association serves the most useful purpose in bringing together the men of the various departments in a mutually helpful way, and also in throwing together in its varied program men and executives, thereby promoting a more friendly feeling which is of real value in the working out of our co-operative interest"—*Thos. B. Morton, moulder, Southern Railway, (president, Federated Shop Crafts).*

"I have been a member of the Railroad Y. M. C. A. for 15 years and cannot speak too highly of its work. It is a veritable haven and a source of comfort and strength. While the 'Y' ministers to physical needs it does not forget to minister to the spiritual. Many a man can thank the 'Y' for a helping hand and encouraging work when he was down and out, bracing him to face the battle of life once more. Would that all railway men would become members of this splendid organization and realize the benefits to be derived therefrom."—*William J. Swift, engineer, Michigan Central.*

"I feel that it has been of great service in many respects. Our officers are all enthusiastic in their praise of the results which have been accomplished by the Y. M. C. A. work. While it is impossible to assess a money value to the results which have been obtained, yet I do feel that there is a very high money value and which I feel satisfied is far in excess of the amount which the Company has paid towards helping maintain these institutions."—*W. J. Harahan, president, Chesapeake and Ohio.*

"I can heartily commend the work which the Railroad Department of the Y. M. C. A. has done in the past 50 years. There can be no doubt that it is a lasting influence for good in developing and raising the standards of life of the employees of the transportation systems of the country, and those responsible therefor can well be proud of their enviable record over this long period of years. The sphere of usefulness of the Railroad Y. M. C. A. has continually broadened to the mutual advantage of the railroads and their employees, and I know of no activity that has contributed more to establishing a closer and more cordial relationship between railroad men."—*Samuel Rea, president, Pennsylvania System.*

"By personal observation I know that the practical service which it so unselfishly renders contributes a very important part in successful operation, and if only from a purely business viewpoint, the branches inaugurated on our line 22 years ago have proved a paying investment. The Association work has constantly grown in favor, and is of inestimable value to both the railroad company and its employees."—*William T. Noonan, president, Buffalo, Rochester & Pittsburgh.*

IN A REAR COLLISION on the Ulster & Delaware near Grand Gorge, N. Y., on May 26, six employees on a work train were killed. A freight train ran into the rear of the work train, crushing the caboose, in which the men were riding.



Photo by International

Fast Freight on Boston & Albany Wrecked Near Southville, Mass., by Bandits Whose Designs Were Against a Mail Train Due About the Same Time

Converting a Tunnel Into an Open Cut on a Busy Line

Bessemer & Lake Erie Adopts Interesting
Measures to Effect This Improvement
Without Delaying Traffic

By W. S. McPetridge,

Principal Assistant Engineer, and R. Ridgefield,
engineer, Bessemer & Lake Erie, Greenville, Pa.



While the Work Was in Progress

THE BESSEMER & LAKE ERIE is now converting a double track tunnel of limited clearance into an open cut without interfering with traffic in a manner which has given rise to a number of interesting problems. This tunnel is located near Culmerville, Pa., on the main line of the Bessemer & Lake Erie. It was built in 1897 and is 394 ft.

In 1909 a 5 ft. by 5 ft. timber-lined drainage tunnel was driven through the hill west of and parallel with the tunnel and about on a level with the crown of the arch, which relieved the situation somewhat in respect to water. This work was followed by a renewal of a part of the brick lining, and on the completion of the relining and the repointing of the brick, the tunnel was grouted.

Pipes three inches in diameter were put through the brick lining at the crown of the arch and cement grout was pumped through the pipes into the crevices and openings back of the lining by means of a grout gun. The pumping was continued at each pipe until no more grout could be forced into the cavities, the pipes being spaced from 25 to 50 ft. apart. About 2,000 barrels of cement and 75,000 brick were used in the above repairs.

This expedient proved effective for some time but in the winter of 1920-1921 bricks again began to spall out and the tunnel showed signs of a slight distortion. As a precaution-



Steam Shovels Working Over the Tunnel

long and 26 ft. wide at the springing line. The tunnel was designed for two tracks, although the clearance is very limited for present equipment.

The permanent lining consists of cut stone walls up to the springing line and a six-ring brick arch, with cut stone facades at the portals. The lower part of the tunnel is in shale rock but the overlying material is a mixture of clay, loam and soft shale.

Tunnel Has Given Trouble for Many Years

The tunnel is in a saddle in the hills and has always given trouble because of the seepage of water through the lining. The ground above the tunnel is bad and liable to slide, especially when wet. Considerable trouble was encountered with slides in building the tunnel and it was necessary to place a timber lining first and then build a permanent lining within the timber. Trouble was also encountered after the tunnel was in service and in 1909 a settlement in the arch required that heavy timber bracing be put in.



Removing the Arch at the North End of the Tunnel

ary measure a further timber lining was put inside of the brick and the tracks were gauntleted through the tunnel. Studies were then made to determine whether to permanently reline and enlarge the tunnel or to make an open cut at the place by removal of the tunnel. The latter plan was adopted and on September 3, 1921, a contract was made with the Arthur McMullen Company of New York, for all the work

in connection with the removal of the tunnel, with the exception of the structural steel in the highway bridge, which was awarded to the American Bridge Company.

Highway Traffic Created Special Problem

At the time of the original construction the tunnel was probably cheaper than an open cut and it is more than likely that the conditions above the tunnel, involving litigation with property owners and extensive highway changes, influenced the decision for the tunnel. These same conditions exist today for five improved highways converge into one road crossing over this tunnel. The traffic over these roads is very heavy; on July 4, 1921, 87 pedestrians, 18 horse-drawn vehicles and 3,887 automobiles crossed over the tunnel. No detour for this road was possible during construction and, finally, the highway had to cross the cut on a bridge, practically in its original position, near the center of the tunnel.

Among the first considerations in opening up the work was



The Timber Lining in the Tunnel

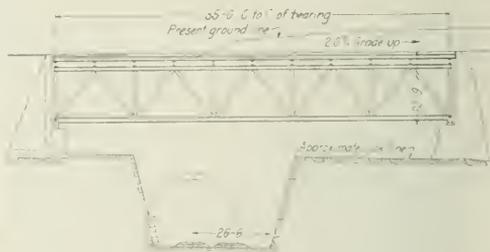
the provision for the handling of highway traffic while building the highway bridge. A temporary road was graded across the south end of the tunnel and this road was used from the beginning of the work in September, 1921, until traffic was turned over the new bridge on April 1, 1922. No change is made in the location of the main tracks and the work has to be carried out so as not to interfere with traffic on the railroad. As the tunnel is on the main line with very heavy traffic and with no possible detour in case of a blockade of the tracks, the contractor is not allowed to use the tracks or to interfere with them in any way.

The method of procedure was to make the excavation in the cut down to the rock line from the north portal to the temporary road over the south end of the tunnel. When this excavation was completed in December, the work was in such shape that the abutments for the highway bridge could be built, these abutments being completed late in January. The steel bridge work was erected by the American Bridge Company during February, very little excavation being done in the cut while the bridge was being built.

The highway bridge is to have a reinforced concrete floor or pavement and as the winter weather prevented this

from being placed at once after the erection of the steel work only the forms for the floor and the reinforcing bars were placed at that time and a temporary floor of 7 in. by 9 in. bridge ties was laid so that traffic could be turned over the bridge in order to release the temporary road and allow the work of excavation in the cut to be continued.

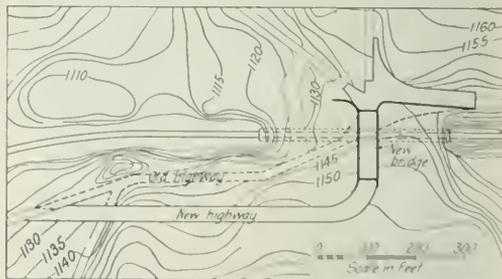
The permit for building the highway bridge required that the bridge be opened for traffic before the temporary road was removed and as there was no way of making a detour for the road it was necessary to get the permanent highway bridge in service as early as possible. For this reason the temporary floor was laid and the bridge put into service.



Cross Section of the New Cut at the Location of the Bridge

This floor is laid so that one-half can be taken up and the concrete floor put in while the other half is in use. After the half floor of concrete is sufficiently cured traffic will then be turned over it and the other half built.

The abutments for the bridge are of a general U shape with curved wings to provide easy approaches to the bridge. The abutments are both of the gravity type and the bridge is centered over the center line for four tracks or off center for the present two tracks, thus providing for the widening of the cut for two more tracks on the east of the present tracks whenever four tracks become necessary without further



It Was Necessary to Relocate Five Highways

changes in the bridge. The concrete was placed during the winter months but, owing to the open season, elaborate methods for preventing freezing were not required, the ordinary precautions of heating all of the materials and keeping a canvas cover over the concrete with fires around the abutments and steam lines under the covering sufficed for the work. The foundations were placed in the shale rock found in the lower part of the excavation, the berm between the rock slope and the earth slope being about at the top of the foundation course. The entire construction of the bridge is much heavier than ordinarily used as it provides for future electric cars in addition to the 16-ton trucks which are now permitted for highway traffic.

During March good progress was also made in the widening of the east slope of the cut south of the tunnel, the material above the rock line being excavated with traction shovels and auto trucks. Since April 1 the excavation of the cut over the tunnel has also been pushed to the limit of the amount of plant which can be handled economically in the limited area. Also, beginning at the north portal of the tunnel, where the top excavation was completed several months ago, the work of stripping the brick arch of the tunnel has been in progress. This work has been done by hand below the rock line, the material being loaded in skips and handled to the dinky cars by stiff leg derricks erected on the rock berm of the cut.

The Removal of the Tunnel Arch

The stripping of the arch has been of particular interest because of the fact that it revealed the results obtained by pumping the grout in behind the arch in 1910. It has been found that, except in a few places just over the crown, the entire tunnel excavation behind the lining was a solid mass of concrete, in which the original timbering and the stone packing between the timbering were imbedded.

The method used in opening up the tunnel has been to remove the original rock and shale material to expose the concrete encasing the tunnel arch. A row of holes is then drilled around the arch through the concrete but not extending into the brickwork and the grouted concrete is broken up by very light shooting. The material can then be removed by pick and shovel, leaving the brick arch exposed. The brick arch is then drilled and a section about three feet long around the arch is shot off by light charges in the holes. This shooting is done very lightly and is intended to loosen the brick so that they can be handled by pick and shovel men working on top of the arch. All but the inner ring of brick is being removed in this manner, this last ring being knocked down onto the track where the material is thrown to the sides at once, to be picked up later as the opportunity between trains affords. The timber lining is removed later, or at the time the brick is torn down. It is to be noted, however, that the timber rings inside the tunnel serve as a support so that a considerable length of one ring of brick has been left standing during a day when a section of the brick arch is being taken down. This work of taking down the brick arch has been done on Sundays when it has so happened that the traffic on the railroad has been very light, but it can be carried on at any time.

Various features of this work have proved of special interest. In taking out the top lift of the excavation the improved highways were utilized by the contractor who secured various dumping grounds along these roads and used auto trucks loaded by traction shovels to remove and dispose of a great deal of the excavated material. The sand and

coarse aggregate for the abutments were also brought to the work by auto trucks and delivered at the mixer by the dealers supplying the material. This material was only supplied as fast as required so that no large amount accumulated on the work, which was desirable on account of the work being done during winter weather.

The main dumping ground for material excavated on this work is located about half a mile north of the tunnel and is reached by a dinky track laid on the railway right-of-way. All of the material excavated below the rock level is being hauled to this dump.

It was first planned to take practically all of the excavated material to this dump but owing to the possibility for the use of auto trucks to handle it the contractor arranged with various owners of property having low grounds along the improved highways, to fill in their property for them, and thus disposed of a large portion of the top cut, the improved highways furnishing excellent roads to haul this material over. Owing to the poor quality of the material over the tunnel and on account of its running and sliding qualities when wet, none of it was dumped in the railroad embankments, and all of it was wasted, or used in filling low ground.

The work embraced 100,000 cu. yd. of excavation in cut, 12,000 cu. yd. of excavation for changes in highways, 285,000 lb. of structural steel, 2,000 cu. yd. of foundation excavation, and 1,700 cu. yd. of concrete. The entire work will be completed this spring.

This work has been handled under the direction of the writers and under the general supervision of H. T. Porter, chief engineer of the Bessemer & Lake Erie. Thomas McGuire, superintendent for the Arthur McMullen Company, contractors, is in direct charge of the work and is responsible for the development of many of the methods described above.

The "Prosperity Special"

THE BALDWIN LOCOMOTIVE WORKS, which has recently completed for the Southern Pacific fifty 2-10-2 type freight locomotives, oil burners, has sent 20 of them in a single special train to East St. Louis, Ill., over the Pennsylvania Railroad; and it is expected that they will arrive in that city on Monday, June 5. From East St. Louis they will be sent over the St. Louis Southwestern to Corsicana, Tex., where they will be delivered to the Southern Pacific.

This train left Eddystone, near Chester, Pa., on May 26 at 11 a. m., and should arrive at East St. Louis on Monday, June 5, at 6 p. m. The movement was by way of Wilmington, Del.; Perryville, Md.; Harrisburg, Pa.; Altoona, Pa.;



Special Train of Twenty Locomotives Leaving Eddystone, Pa., on May 26

Pittsburgh, Pa.; Crestline, O.; Ft. Wayne, Ind.; Richmond, Ind.; Indianapolis, Ind., and thence to East St. Louis.

Except on steep grades the train is being moved by three Pennsylvania locomotives, two in front and one pusher. Around the Horse Shoe Curve, six or more engines are required, divided between the front, middle and rear of the train. This train is nearly a half mile long, each locomotive with its tender measuring about 100 ft. in length. The train weighs, exclusive of the locomotives propelling it, over 6,000 tons.

The train travels only in the daytime and, to promote the object suggested by its name the locomotives are to be exhibited at the principal cities on its route, circulars being sent in advance calling the proposed exhibition to the attention of boards of trade, school authorities, public officers and citizens generally.

At Eddystone on the departure of the train there was an impressive ceremony at a specially erected grandstand alongside the Pennsylvania railroad tracks. Messages from Governor Sproul and President Harding were read by J. P. Sykes, vice-president of the Baldwin works. Speakers at the demonstration in addition to Mr. Vauclain were Elisha Lee, vice-president of the Pennsylvania; Richard Weglein, president of city council, and John P. Sykes, superintendent of the Baldwin works. Senator G. W. Pepper sent a letter explaining that he was unable to be present as he had planned, and conveyed the congratulations of President Harding.

The fact was recalled that in 1898 the Baldwin works shipped a long train of locomotives for the Chicago Elevated Railroad in similar fashion. Those were small engines of the Forney type.

Railroads Act on Commission's Freight-Rate Decision

THE EASTERN railroads—about 60 executives being present—voted on May 29 to comply with the decision of the Interstate Commerce Commission issued last week (*Railway Age*, page 1221) calling for a general reduction in freight rates, but to protest against the decision fixing 5¼ per cent as a reasonable annual income for the railroads. Following the conference L. F. Loree, chairman of the conference, issued a statement saying:

"* * * Since the commission finds that rates in excess of those determined by it shall be unreasonable after July 1, 1922, it was felt that the roads had no alternative except to put the rates in effect without a formal order.

"The roads also determined to enter a formal protest of the finding of the commission that on and after March 1, 1922, the fair return, as contemplated by the Transportation Act, will be 5¼ per cent, believing that this return is lower than is required by law and will not enable the railroads to finance themselves to the extent that they should be able to do in order to render adequate service to the public. * * * If the future demonstrates the need for additional revenues, the railroads feel confident that the commission will take steps to grant relief."

Southeastern Roads Accept

Executive and traffic officers of the southeastern roads, at a meeting in Washington on Monday, May 29, decided to put into effect the reductions in rates prescribed by the Interstate Commerce Commission without the issuance of a formal order, and a letter was addressed to the commission advising it of that fact. The roads do not concede that the reduction was justified but see no object to be gained in compelling the commission to go to the length of issuing a legal order. They also express the hope that the increase in traffic which

has been in progress for some time will continue so as to enable them to stand the reduction, even if the reduction itself does not cause any increase in business. W. R. Cole, president of the Nashville, Chattanooga & St. Louis, presided at the meeting. Consideration was also given to the details of getting tariffs ready for publication to become effective on July 1 on ten days' notice.

The Southern carriers in their letter to the commission said they do not accept all the reasoning by which the commission reached its judgment and specifically they except to the finding of the commission that a fair return is or will be 5.75 per cent. "They further specifically except to the conclusion that a general reduction in rates in the Southern group is at this time justified and can only express the hope that further reductions in labor costs where warranted and a substantial increase in traffic will yield results more nearly approximating a reasonable return upon the aggregate property value and so justify their action in the premises."

Conference with I. C. C.

The committee of railroad executives appointed following the White House dinner at which the President urged voluntary reductions in freight rates on basic commodities, held a further long conference with the Interstate Commerce Commission at Washington on May 25, pursuant to appointment made before the issuance of the rate decision, but no announcement was made except that "further discussion of the questions under consideration continued, including the bearing and effect of the recent decision of the commission relating to reductions in freight rates." At the conclusion of the meeting the railroad executives stated that the subject would be reported to their associates in the several portions of the country, at meetings to be held early this week, for further consideration, but that before leaving Washington it was their purpose to call upon the President "so as to express their appreciation of his interest in the general subject." The executives then went to the White House, where they remained about 15 minutes.

Secretary Hoover, who is credited with having inspired the effort of the President to induce the railroads to agree on a program of voluntary reductions in the rates on basic commodities in place of the general reduction prescribed by the Interstate Commerce Commission, expressed considerable disappointment with the outcome, although recognizing some of the difficulties of the situation. In commenting on the rate decision, he said he was inclined to agree with the minority members of the commission who favored reductions in basic commodities rather than spreading the reductions over all traffic. He said that a reduction of ten per cent in rates on silk, for instance, will do no good and that as far as the higher grade articles and luxuries are concerned "the money would better be used to employ labor to repair cars." If the commission cannot reduce rates in accordance with the value of commodities and at the same time give proper consideration to the earning power of the railroads, he said, the fact emphasizes the need for an entire readjustment of the rate structure. He thought probably some of the railroad executives might ask relief from the decision as to the rates on high grade articles.

Mr. Hoover said, however, that the Interstate Commerce Commission was faced with many difficulties because of the complexity of the situation and the differing degrees of dependence of different roads upon different commodities.

Secretary Mellon of the Treasury Department was quoted in the press as having suggested a five-year holiday from rate regulation, on the ground that if freed from restrictions the railroads could adjust their rates to meet varying conditions.

As we go to press the only word from the Western roads is that they will further consider the decisions of the Eastern and Southeastern lines before taking definite action.

Labor Board Cuts Wages of M. of W. Employees

Reduction of Five Cents An Hour for Unskilled Workers Effective

July 1. Labor Group Dissents

AFTER JULY 1, the rates of pay of maintenance of way employees and railway shop laborers will be reduced slightly more than 13 per cent under the terms of the first of a series of wage reduction orders announced by the Railroad Labor Board on May 28. The lower rates of pay were agreed upon by the three railroad representatives and the three public representatives on the Board, the two groups constituting the majority necessary to hand down the ruling.

The three labor members on the Labor Board voted against the ruling and attached thereto a lengthy dissenting opinion vigorously denouncing the decision of the majority.

The Board's decision adopts as a base the rates fixed in Decision 147, the last wage decrease, from which the following decreases per hour are authorized:

- "Sec. 1. Bridge, building, painter, construction, mason and concrete, water-supply, and plumber foremen (except water-supply and plumber foremen coming under the provisions of Sec. 1 of Article IV, Decision 147.).....5 cents
- Sec. 2. Assistant bridge, building, painter, construction, mason and concrete, water-supply, and plumber foremen, and for coal wharf, coal-chute, and fence-gang foremen, pile-driver, ditching and hoisting engineers and bridge inspectors (except assistant water-supply and plumber foremen coming under the provisions of Sec. 1 of Article IV, Decision 147).....5 cents
- Sec. 3. Section, track and maintenance foremen, and assistant section, track and maintenance foremen.....3 cents
- Sec. 4. Mechanics in the maintenance of way and bridge and building departments (except those that come within the scope of agreements with the Federated Shop Crafts).....4 cents
- Sec. 5. Mechanics' helpers in the maintenance of way and bridge and building departments (except those that come within the scope of agreements with the Federated Shop Crafts).....1 cent
- Sec. 6. Track laborers, and all common laborers in the maintenance of way department and in and around shops and round-houses not otherwise provided for herein.....5 cents
- Sec. 7. Drawbridge tenders and assistants, pile driver, ditching and hoisting firemen, pumper engineers and pumpers, crossing watchmen or flagmen, and lamp lighters and tenders.....5 cents
- Sec. 8. Laborers employed in and around shops and round-houses, such as engine watchmen and wipers, fire builders, asphalt men, flue borers, coal passers (except those coming under the provisions of Sec. 3 of Article VIII, Decision 147), coal-chute men, etc.....5 cents
- Sec. 9. For miscellaneous classes of foremen and other employees named in connection with a carrier affected by this decision, but not specifically listed under any section in the classified schedules of decreases, deduct an amount equal to the decreases specified for the respective classes to which the miscellaneous classes herein referred to are analogous.

Wages of M. of W. Employees Have Not Been Standardized

In discussing the new wage scale, the Board in its decision said in part:

The wages of this class of employees have not been standardized and made uniform throughout the country, as many people seem to think. Prior to Decision No. 2, they were not so standardized, and the increases made by that decision were arrived at by adding to the various existing rates a uniform increase of a certain number of cents per hour.

To illustrate the "absence of uniform standardization of the wages of the classes of employees herein covered" the Board cited the rates prevailing under Decision 147 on the Illinois Central, the Southern, the Chicago Great Western, the Northern Pacific, the New York Central and the Atchison, Topeka & Santa Fe and showing that the rates of pay of track laborers, for instance, range from 28 cents per hour to 40 cents per hour.

"As a matter of fact, the 28 cent rate is found on only a

few roads and applies to a comparatively small number of employees," the Board added.

Reduced Rates of Pay Still Above Industrial Levels

The decision continues:

The Labor Board is of the opinion that after the reductions made under this decision, common labor on the railroads will still be receiving, as a rule, a wage in excess of that paid to similar labor in other industries, and that the same will be true of all other classes of labor covered by this decision. The Board is of the opinion, however, that the hazards and hardships of the employment, the training and skill required, the degree of responsibility to the public, and other elements mentioned in the statute combine to justify the payment of a better wage to these employees than is paid to similar labor in outside employment.

On a very considerable number of the roads, the foremen and section men are furnished living quarters and fuel by the carrier.

Moreover, the Board is not in sympathy with the idea that a governmental tribunal, empowered to fix a just and reasonable wage for men engaged in serving the public in the transportation industry, should be controlled by the one consideration of the low wages that may be paid to other labor in a period of temporary depression and unemployment. It is but just to say that railway managements have indicated no desire for such a result.

Based upon the evidence before the Board, the statistical department of the Board has made a study of the comparative purchasing power of the wage herein fixed for so-called common labor and the purchasing power of the wage paid such labor on the railroads in December, 1917, immediately prior to government control of the carriers; in January, 1920, just prior to the termination of federal control; on May 1, 1920, the effective date of the decision No. 2; on July 1, 1921, the effective date of Decision No. 147; and in March, 1922.

The result of this study is as follows:

Average Hourly Rates	
December, 1917.....	19.3c.
January, 1920.....	37.7c.
May, 1920.....	46.3c.
July, 1921.....	37.7c.
Under present decision.....	32.7c.
Percent of Increase in Average Hourly Rates Over December, 1917	
January, 1920.....	95.3%
May, 1920.....	139.9%
July, 1921.....	95.3%
Under present decision.....	69.4%
Increase in Cost of Living Over December 1917	
January, 1920.....	40.0%
May, 1920.....	52.0%
July, 1921.....	26.7%
March, 1922 (latest available Government data).....	17.2%
Percent of Increase in Purchasing Power of Earnings of Subsequent Dates as Compared with December, 1917	
January, 1920.....	39.5%
May, 1920.....	57.8%
July, 1921.....	54.1%
Under present decision.....	44.5%

Although average hourly earnings of this class of employees are below the earnings prior to Decision No. 2 by five cents per hour, their value is 3.6 per cent greater due to the decrease in cost of living. The cost-of-living figures set out in the foregoing tables have been compiled by the reports of the United States Department of Labor and are for the latest date for which such data are available.

Regulations Governing the Application of the Decision

Among the general regulations governing the application of this decision, are the following provisions:

Sec. 1. The provisions of this decision will not apply in cases where amounts less than \$30 per month are paid to individuals for special service which takes only a part of their time from outside employment or business.

Sec. 2. Decreases specified in this decision are to be deducted on the following basis:

(a) For employees paid by the hour, deduct the hourly decrease from the hourly rate.

(b) For employees paid by the day, deduct eight times the hourly decrease from the daily rate.

(c) For employees paid by the month, deduct two hundred four (204) times the hourly decrease from the monthly rate.

Sec. 4. It is not intended in this decision to include or make

decreases in wages for any officials of the carriers affected except that class designated in the Transportation Act, as "subordinate officials," and who are included in the act as within the jurisdiction of this Board. The act provides that the term "subordinate officials" includes officials of carriers of such class or rank as the Interstate Commerce Commission shall designate by regulation duly formulated and issued. Hence, whenever in this decision words are used, such as "foremen," etc., which may apply to officials, such words are intended to apply to only such classes of subordinate officials as are now or may hereafter be defined and classified by the Interstate Commerce Commission as "subordinate officials" within the meaning of the Transportation Act.

The decision of the Board with respect to the wage reductions, as outlined in the specific paragraphs given above, is effective on those roads and with respect to those particular classes of employees that were specifically named in the submissions made to the Board by the various railroads. The decision includes a long list of all railroads indicating in each case what classes of employees are affected.

Dissenting Opinion of the Labor Group

The dissenting opinion, signed by A. O. Wharton, Albert Phillips and W. L. McMenimen, labor representatives on the Board, gave the following as specific reasons for the refusal of these members to join in the majority opinion:

(1) The rates of pay established under this decision as the basic minimum rates of the transportation industry will merely perpetuate the low level of purchasing power possessed by this large class of workers in pre-war years. The opinion expressed in the majority decision, that "The Board is not in sympathy with the idea that a governmental tribunal, empowered to fix a just and reasonable wage for men engaged in serving the public in the transportation industry, should be controlled by the one consideration of the low wage that may be paid to other labor," would seem to indicate a feeling that the decision should not perpetuate the injustices of a former unregulated period. We show clearly the fallacies of attempting to show that the rates of the decision will mean increased purchasing power over pre-war levels.

(2) The rates of pay established under this decision will mean annual earnings far below any minimum standard of subsistence which has been formulated, even below those of most conservative employer groups.

(3) The rates of pay established under this decision are not based upon the human needs of the hundreds of thousands of families involved. They are insufficient to provide these families with the absolute essentials. The earnings of this large group of railroad employees will not provide the father of a family with as much food as is allowed convicts in the Cook County, Ill., jail.

(4) The pre-war standard perpetuated by this decision was the product of inequitable wage bargains. It was considerably below the level recognized at that time as necessary for the maintenance of health and energy.

This opinion, much more voluminous than the decision itself, also includes a lengthy analysis of part of the majority decision in part as follows:

The statistical study of the comparative purchasing power of the wage for common labor fixed by this decision and the purchasing power of the wage paid such labor in December, 1917, which serves as the major justification in the majority report, is unfair and misleading.

In the first place it fails to take account of the change in the number of hours constituting the basic working day as between the two periods. During the period covered, the basic day was reduced from 10 hours to 8 hours. According to Wage Series Report No. 3 issued by the Labor Board, the average daily rate of pay for this class of labor was \$1.93 in December, 1917, and will be \$2.62 under this decision. This shows a wage increase amounting to 35.8 per cent, not 69.4 per cent as stated. This would bring a consequent reduction in the figure for the increase in the value of earnings from 44.5 per cent, the figure in the majority report, to 15.9 per cent, which is the correct figure.

The Railroad Labor Board has decided that 8 hours shall constitute the basic day for this class of labor, and it must, therefore, in good faith, recognize that the basic earnings of these employees under the decision will be only 35.8 per cent above the level of December, 1917, meaning an increase in purchasing power of only 15.9 per cent instead of 44.5 per cent as stated in the majority report.

In the second place, consideration of the entire comparison leads one to the conclusion that the period chosen presents an unfair picture. During the period 1915 to 1917 the cost of living had been rising far more rapidly than the wages of this class of

employee. In other words, the \$1.93 per day representing the average wage in December, 1917, meant a lower purchasing power than the average wage in 1915.

It is hardly necessary to point out that a fairer comparison would have gone back to 1915. In that year, according to the Interstate Commerce Commission, the average hourly earnings of section men were 15 cents. For the 10-hour day this meant earnings of \$1.50. Comparing this with the earnings for the standard pay under the majority decision—namely, \$2.62—we find that the level of money wages will be 74.4 per cent above the 1915 level. According to United States Department of Labor reports the cost of living in March, 1922, was approximately 60.5 per cent above the average for 1915. Combining these two figures we arrive at the correct per cent by which the value of a section man's wages under the majority decision will exceed the value of his wages in pre-war days. It amounts to only 8.7 per cent instead of 44.5 per cent as indicated in the majority report.

There is a third way in which the majority report fails to show the real effect of this decision upon the value of the wages of common labor in the maintenance of way department. The statistics presented deal only with section men. There are roughly 100,000 other unskilled workers who will also be affected by the decision. In the Interstate Commerce Commission classification these are classed as "other unskilled laborers." In the Labor Board's Wage Series Report No. 3 the number of "other unskilled laborers" is set down as 108,977.

According to the Interstate Commerce Commission report for 1915, this group received an average hourly rate of 18.2 cents in that year. Under the majority decision this same group will average approximately 35.9 cents per hour. Extended to a daily basis this will mean \$2.872 for the standard work day compared with \$1.82 in 1915. In other words, the money wages of this group of employees under the decision will be only 57.8 per cent above those which they received in 1915. This contrasts with an increase in the cost of living, already noted, of 60.5 per cent, showing a decrease of 1.7 per cent in value of their earnings.

Combining the two classes of unskilled employees in the maintenance of way department, we have approximately 180,000 men who will receive money wages for the standard day under the decision only 69.7 per cent above those which they received in 1915. In other words, the increase in the real value of the wages of this group as between the two periods will only amount to approximately 5.7 per cent.

New Rates of Pay Correspond With Minimum Wage for Women

There followed a long argument, replete with statistics, to show that the minimum rates of pay established by this decision correspond closely with the minimum wage for women without families to support as established in different states and that the pre-war wages of these employees were "inadequate."

"It is obviously unjust to expect the railroad employees," the minority opinion continued, "who should be responsible for the maintenance of families to endure wages at a level designed as the minimum for the support of single women. Such a comparison shows the inherent absurdity of expecting a male employee to renew his strength and to maintain his home from day to day on the wages provided in the majority decision."

The pre-war wages of this class of workers were established in a labor market which to all intents and purposes was subject to no regulation. The carriers bought this labor as a commodity at the lowest possible figure. Just and reasonable wages could not result from such a process which is the very antithesis of the function which the Labor Board is supposed to perform under the Transportation Act. It seems strange that a responsible body created to establish just and reasonable wages, with certain clearly defined principles laid down, should arrive at wage rates so closely approximating the value of those arising in an utterly unregulated labor market.

"Living, Subsistence and Saving" Wages Discussed

The dissenting opinion then launches into an extensive discussion of "living," "subsistence" and "saving" wages, budgets for the employees involved (even to the point of quoting specific menus, the number of calories therein necessary to maintain a worker and his family), and closing with the statement that "the most important grounds for dissent from the majority decision lie in the contrast between the wage therein provided and any minimum standard of sub-

sistence which has ever been suggested whether by governmental or state departments, investigators for charitable institutions, city bureaus, or by representatives of labor. The wages provided in the decision will enable the average employee of this class to secure little more than one-half of the necessities specified in the majority of these budgets as absolutely essential. This decision will provide the section men with only about two-thirds of the goods provided by the lowest budgets of the National Industrial Conference Board. As a matter of fact the minimum rates under this decision will scarcely buy the food part of the minimum subsistence budgets which will be cited, with nothing left for clothing, rent, furniture, heat, light and other essentials.

"It is clear, then, that on the basis of the rates of pay established under the majority decision, some quarter of a million railroad employees, an entire class, must forego the thought of a family in order to be sure of enough food to keep themselves from actual starvation. With the development of families under-nourishment will immediately appear."

Labor's Reaction to the Order

The usual quota of comments by labor leaders and railroad executives followed the announcement of the Board's wage cut order and by Wednesday attention was centered on what reception the new rates of pay will receive from the officers of the union whose membership is involved. The latest report from the Detroit headquarters of the United Brotherhood of Maintenance of Way employees and Railway Shop Laborers indicated that the executive council of that organization favored the rejection of the lower rates of pay and the submission to its membership of a strike ballot. E. F. Grable, grand president of the Maintenance of Way Brotherhood, had previously predicted that a strike vote would be ordered but explained that a strike would be called only if the referendum of the brotherhood membership favored it. It is probable that the action of the maintenance of way organization will depend upon the action taken by

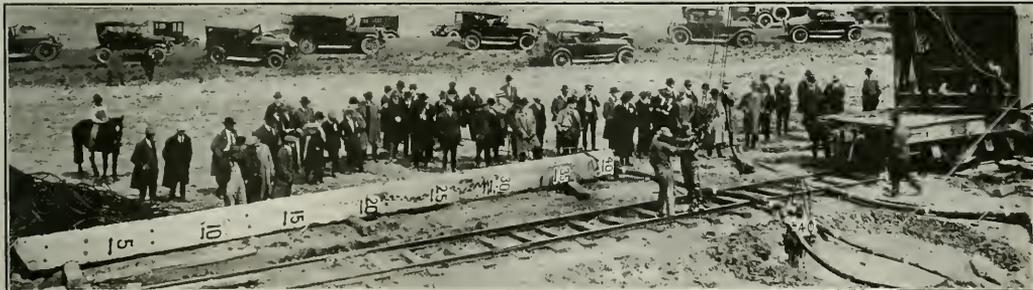
and the third on the question of reduced rates of pay. All of the strike talk carries the threat of a general walkout on the part of those railway employees affected by the Board's recent decisions some time between July and September.

Wage reduction orders of the Labor Board do not follow the recent freight reduction order as "the effect of cause." Chairman B. W. Hooper of the Board has frankly stated that the Interstate Commerce Commission's order would in no way influence the Board in reaching its wage decision. Wage reduction orders involving all other classes of railway labor involved in the recent controversy over wage scales will be issued in time to become effective on July 1 according to representatives of the Board.

Pile Jetting Tests Show Unusual Results

A REMARKABLE DEMONSTRATION of pile jetting was conducted on April 26, near Omaha, Neb., in the presence of a large crowd of spectators, including a number of prominent railway officers. The piles employed in this test were the Bignell reinforced concrete piles which have been in use for a number of years in locations where the use of reinforced concrete was desirable and where conditions made jetting of the piles imperative or of considerable advantage. The test was conducted by the Woods Brothers Construction Company of Lincoln, Neb., for the purpose of showing the advantage of this form of piling.

The Bignell piles are equipped with a four-inch pipe extending through the center for the entire length which is attached to a one-inch nozzle at the bottom and with small outlets on all four sides at intervals throughout the entire length. Thus, water delivered through this pipe not only serves to bore a hole to receive the pile in its downward movement but also insures thorough lubrication throughout its entire length. As a consequence, these piles will sink



After the First Sheet Pile Was Sunk, the Second Was Driven Beside It

the Federated Shop Crafts who are facing a comparable or larger cut in their rates of pay as the result of another order of the Board which is to be handed down in the immediate future. B. M. Jewell, president of the Federated Shop Crafts, has already termed the cut in wages of maintenance of way employees as "unwarranted" and "indefensible." Mr. Jewell opened his campaign against the impending wage cut by requesting a conference with the members of the Railroad Labor Board at which a formal request was made for immediate action on all charges of violations of the Board's orders by various carriers. Mr. Jewell has indicated that the strike ballot which he will send out will embody three questions: The first on the contracting of shop work; the second on the elimination of time and one-half for overtime for the ninth and tenth hours of consecutive service;

of their own weight as long as the water is kept running where the soil conditions are in any way favorable for jetting.

One photograph shows the Bignell sheet pile for use in sea wall, dock construction, etc. The one shown in the picture is 10 in. in thickness and has a 20-in. face. The sheet piles may be made in any thickness, width and length that accords with reasonable requirements. They are reinforced and are sunk in the same manner as the other Bignell piles. The tongue of one fits into the groove of the other making a water-tight wall. If it is desired, thin wood sheets may be inserted in the groove and as these expand with a greater content of moisture they afford a further assurance of water-tight construction. The point of the pile is bevelled somewhat which tends to force it against the pile

previously driven as it makes its way downward to the desired depth.

The demonstration was made in Missouri river bottom land. The first test was the sinking of 40-ft. sheet piles, 10 in. by 20 in. in section, reinforced by $\frac{7}{8}$ -in. bars and woven wire, and weighing 4.2 tons. The first sheet pile was sunk under water pressure of 175 lb. per sq. in. to a penetration of 30 ft. in $1\frac{1}{2}$ min. The water pressure was turned off and this pile remained stationary in its position during the sinking of the second pile. The time required in sinking the second pile was 4 min., the same water pressure being applied.

The second test was the sinking of a 45-ft. foundation pile, 16 in. by 16 in., weighing 5.7 tons, supported by an inclined scaffolding at an angle of $12\frac{1}{2}$ deg. from the vertical. This pile made a penetration of 43 ft. in four minutes and maintained the same degree of inclination as the scaffolding.



Interested Spectators Witnessed the Demonstration

The third test was the sinking of a pile of the same dimensions perpendicularly to a depth of 84 ft. in nine minutes under a pressure of 250 lb. Each of the piles was withdrawn under somewhat reduced water pressure for use elsewhere, with the exception of one of the 45-ft. by 16-in. by 16-in. piles which was sunk nearly its entire length and upon which a heavy weight was placed as a test of its supporting strength.

The fourth test was that of placing a pile 20 ft. by 14 in. by 14 in. which is the standard size of the anchor piling used in the river protection work along navigable streams. The weight of this pile is $2\frac{1}{4}$ tons. It was sunk to a depth of 70 ft. in six minutes under 250 lb. water pressure.

THE NEW YORK, ONTARIO & WESTERN announces that its locomotive shops will be operated with full forces beginning June 5. Since early in April, large numbers of men have been laid off because of the light freight traffic following the strike of the coal miners.

"The Commission Declares Its Independence"

THIS IS THE title of a circular to members, issued by the Railway Business Association on May 24, and signed by A. B. Johnson, president, which reads in part as follows:

Railway managers are justified in feeling and we understand do feel that the compromise announced by the Interstate Commerce Commission on May 24 warrants hopeful confidence and a steady enlargement of purchases for maintenance and additions. By dating the reduction in freight rates July 1, the date when the Labor Board decision is generally expected, the commission has employed perhaps the only expedient properly available to it for practically synchronizing the rate and wage adjustments. This will inspire railway managers with confidence in continued improvement of income. We have urged that the commission should in some way make clear that the rate level to go into effect July 1 is intended to be stable for a considerable period.

Attention on the Labor Board

Attention will now be focused upon the Labor Board. Whether that Board is to enjoy favorable public opinion will depend upon the degree to which it co-ordinates its forthcoming action with that of the commission.

By clipping off $\frac{1}{4}$ per cent from the rate of the return at which its regulation will be aimed the commission makes a concession which may be accepted as responsive by those who have urged that 6 per cent was too much. Time must test this adjustment.

By making the decision horizontal the commission gives its answer to those who through political pressure have attempted to obtain reductions on selected commodities. The victorious horizontalists were represented by the National Industrial Traffic League, which rigidly restricted its efforts to testimony presented in an orderly manner before the commission and deprecated the enlistment of political leaders for exertion of influence. There are impartial economists who favor a permanent policy under which certain grades of commodities would be carried at lower rates than has been the American tradition and certain other grades at rates higher than our usage. By initiating its own reductions in its own way the commission has asserted its independence and thereby given the country new reason for holding it in respect. Appeal to the railroads from the commission's judgment not only is repugnant to the law but portends destruction of the commission as a quasi-judicial body. There is no middle ground. Either the task of restoring railway credit as a basis for railway rehabilitation is the task of the Interstate Commerce Commission or it is not. If it is, then every attempt to evade acquiescence in the judgments of the commission is a repudiation of judicial process and a proclamation of private warfare in the settlement of disputes.

We have no means of verifying current reports imputing to candidates for re-election an effort to make railway rate reductions a claim for consideration at the polls. We would prefer to discredit them. If, however, there are even a few candidates who have a confused idea of what ought to win the approval of constituencies we counsel them to draw wisdom from this latest refusal of the commission and the railroads to surrender their independence of judgment.

The best advice to give candidates for office from now until November is that they give the railroads, the industries, the farmers and the commission an opportunity to work out the rehabilitation of the transportation machine upon which depends upon prosperity and preparedness for future traffic.

Proceedings of the Fuel Association

Later Sessions Dealt with the Relations of the Railroads to the Coal Mining Industry

DURING the later part of the fourteenth annual convention of the International Railway Fuel Association, which was held at the Auditorium Hotel, Chicago, May 22 to 25 inclusive, a number of papers and addresses were presented which dealt with the coal mining industry

in its various relations to the railroads and the public. The earlier part of the program, which dealt more directly with the problems of the railroads with respect to the economical use of fuel, was presented in last week's issue of the *Railway Age*, page 1233.

Status of the Coal Mining Industry

Addresses discussing the present status and future prospects of the bituminous coal mining industry were delivered during the convention by F. S. Peabody, chairman of the board, Peabody Coal Company, and by T. H. Watkins, president, Pennsylvania Coal and Coke Corporation. Mr. Peabody discussed the subject of idle day cost and Mr. Watkins dealt with the relations of the government with the coal industry. In a paper on the over-development of the industry to transportation, C. E. Leshner, editor of the *Coal Age*, pointed out that the over-development has not been without its benefits to the consumer because of the effect on selling price of the desperate competition thereby effected.

Mr. Peabody's Address

Mr. Peabody, using the operations of his own company as a basis, estimated the capacity of the bituminous mines actually developed in the United States, working 300 days a year, to be 1,000,000,000 tons a year. The total investment in the bituminous mining industry, on the same basis, was estimated to be approximately \$2,000,000,000 with about 700,000 men employed in the industry. The average output of the bituminous mines runs between 450,000,000 and 500,000,000, the mines working approximately 200 working days, leaving 100 working days idle. The annual loss on the capital because of the 100 idle days amounts in the aggregate to \$123,912,000. This total is made up of \$40,000,000 interest, \$51,968,000 for labor and supplies required in the maintenance of the mines during the idle days, a depreciation charge of \$26,666,000 and taxes and insurance amounting to \$5,278,000. The depreciation is charged on a basis of an average life of the mining property of 25 years before exhaustion.

Mr. Peabody estimated the average wage of mine employees, including all classes of labor, at \$4.00 a day. For 700,000 employees this amounts to a total annual loss of \$280,000,000 for the 100 idle days, an economic loss which could have been saved if the surplus labor represented by the idle time had been employed in other productive work.

Mr. Peabody expressed the opinion that neither the repeal of the Sherman anti-trust law or government control of the industry would prove to be the solution of its present difficulty, but advocated unrestricted competition as the best means of ultimately restoring the industry to its proper relation to the public demand. This would result in the elimination, through bankruptcy, of excess mines and a gradual discharge and redistribution of the excess labor. Mr. Peabody expressed the opinion that ten years will be required to bring about such a readjustment but that in the long run this is the cheapest way out of the situation from the public standpoint.

Mr. Watkins' Address

An abstract of Mr. Watkins' address follows:

I fully agree with the statement made by our former

Fuel Administrator, Dr. Harry A. Garfield, that "when basic necessities are involved, government, representing and speaking for the entire public, must charge itself with responsibility to see that capital does not impose upon labor, nor labor upon capital, nor either or both of them upon the public."

Today our laws restrict and prohibit certain activities of capital; trade agreements are not yet clearly defined. On the other hand, labor associations have by statute been made exempt from anti-trust laws. The responsibility of labor organizations has not been defined. Organized labor has by statute been made a privileged class. This great crisis may bring the people of the nation to a realization that labor organizations, together with capital, must be bound by proper and reasonable restraints.

Too often has it been the case in the past that orders for railroad coal are placed where five or ten cents a ton difference in the price has been the controlling factor in shifting hundreds of thousands of tons from one mine to another, or worse, from one district to another. Too often has the temptation of a guaranteed car supply offered to certain operators resulted in breaking the whole market structure.

You might quite easily say, that the purchasing agent's duties are to buy his coal as cheaply as possible. But how seldom the purchasing agent or the superintendent of motive power, who may have the decision, considers in the shifting of his orders the effect that it has on the working men and the communities dependent upon those particular mining operations. The tonnage consumed by our railroads is of such magnitude that displacement of any considerable amount from district to district, year by year, contributes enormously to the unrest and discontent with earnings and working conditions in the coal mines.

Railroads in many instances, owing to the desirable character of the traffic, have encouraged the development of new fields in advance of the market's normal requirements. The result of over-development and supply in excess of the market requirements has been costly, causing many wasteful practices in the mining, distribution and selling methods. Intermittent operation at the mines increases costs enormously, also making it extremely difficult to handle the mine labor problem satisfactorily either to the operator or the miner.

From the standpoint of production there is no other industry, taking the country as a whole, wherein the production is as uniform as between summer and winter seasons as in the coal industry. Anthracite is practically uniform throughout the year, very little fluctuation in the production having occurred for many years. Bituminous shows that the production in the so-called summer months, running from April first to October first, has not fallen below 45 per cent of the total annual production for nine years. There were local districts where these percentages did not apply. It would be impracticable to try to improve to any

great extent on the present situation as far as production and demand as a whole are concerned.

What is needed above all else in order to stabilize production and demand is a method of handling our labor problems both on the railroad and at the mine by which strikes or threatened strikes will be avoided. Then, within the industry stabilization will come about naturally without risking dangerous experiments.

The enormous amount of intermittency of employment which has existed for the past year has been due to the fact that through the award of the Bituminous Coal Commission the union operators of the country were forced into a contract, binding upon them up to the first of April, which compelled them to pay a rate of wages from 30 to 40 per cent in excess of the wages of non-union operators, which naturally resulted in the displacement of great volumes of tonnage from one district to another union operators and miners losing tonnage to their competitors, whole communities thrown out of gear, railroad facilities idle, while in other sections the opening of new mines, increasing the capacity of old mines, was rapidly proceeding.

The union operators subject to the competition referred to would fail in their duty to their own interests, to the public interests, and to their employees if they should agree to repeat the mistakes of the past, or to abide by arbitration that did not settle a wage basis for their competitors as well as for themselves. I do not see how this fact can be ignored. The union leaders do not ignore it; they are waging a battle to control the non-union fields of the United States; they seek domination of the whole industry. Whether they can secure it or not remains to be seen. If they do, what then will be the policy of this government? Will that aggregation of labor be left free under the present liberal construction of labor's rights to tell the country how it is going to secure its coal, at what price and when?

In the fixing of wages a general principle should be admitted. The wages in any industry must bear some fair relation to the wages in related industries. It would inevitably follow that a material departure from this standard in the way of high wages for any particular class results in attracting to that industry a surplus of labor, finally resulting in short time employment or lower earnings. In other words, the law of supply and demand is inexorable, and follows into the wage structure as it does into the price of commodities.

I can think of no other solution, as applied to basic industries, than one that is based upon fair wage standards of related industries with a minimum wage that takes into consideration the cost of living and the nature of employment. Neither the government, nor any other agency of inquiry, investigation or arbitration, would be able to build up a wage structure satisfactory to the miner, operator or the public. The only way to a solution lies between miner and operator on the principle of collective bargaining, bearing in mind at all times the economic and competitive situation surrounding the industry. From these general principles the union organization has departed. Operators generally have not believed that the industry can be controlled in a practical manner by any national policy. So that the practical solution is the return to district agreements. The laws now on our statute books leave that method as the only practical procedure.

Mr. Leshner's Address

After citing statistics to show that the coal mining industry is over-developed, Mr. Leshner stated that the public interest in this fact centers largely around its effect on labor on the reduced opportunity of the individual to work and the high unit wage required thereby to insure a sufficient annual income. He called attention, however, to the effect of the excess of mines as a safeguard to the consumer of soft coal against high prices, stating that few bituminous coal mines

have reached the happy state of a steady profit year in and year out. To demonstrate that the charge carrying the excess capital invested in coal mines is not a direct tax on the consumer, Mr. Leshner referred to a recent statement of T. T. Brewster, an Illinois coal operator, in which he estimated that the price of the coal at the mine should be \$1 over the combined labor and material cost in order to take care of capital charges. Since the \$1 was calculated on the basis of an annual output of 500,000,000 tons and the production in 1921 was but 407,000,000 tons, the \$1 actually becomes \$1.23 a ton. This was actually 55 cents more than was received in the average selling price of \$3.04. In other words, the consumer of coal in 1921 saved nearly a quarter of a billion dollars because of the competition in the bituminous coal industry, resulting from its over-development.

Mr. Leshner then sketched the relation of the railroads to the development of coal mines, showing that the desire for traffic has led railroads to build branch lines into all districts carrying coal deposits, as a deliberate policy, partly to develop traffic for immediate handling and partly to protect the individual interests of the railroads in future mining developments. The availability of the transportation, however, encouraged over-development in the mining industry. Continuing, Mr. Leshner said: "Because the soft coal mines out at the ends of the feeders can load more coal than these feeders can carry and because these feeders can carry more coal than the main line, assembling yards, junction points, and terminals can handle, a car shortage arises when all the mines try to run full time. Cars are portioned out in accordance with capacity of the mines. It, therefore, happens that an operator who desires to be assured of a given output per day every day, say 1,000 tons, must build a mine with a capacity of 2,000 tons per day. The rules of car distribution during periods when cars are short, and those of the times when everyone is calling for coal, force over-development.

"There is one way to avoid such over-capacity and yet get coal to market in times of tight car supply. That way is to own cars. Privately owned cars are not subject to the rules of distribution affecting the cars of the railroad, unless they are what are known as assigned cars. Thus the coal operator who would be assured of always putting a given minimum of coal to market each day or week must either double his mining capacity or own a string of open top cars. His extra investment is about the same in either event."

Mr. Leshner then discussed the possibility of effecting a cure for the evils of over-development in the industry and dismissed the proposal that this be done in a reduction of the number of men employed in the mines as impracticable because of the fact that it would still leave the burden of excessive capitalization on the industry. He then took up the suggestion that the improvement be effected by the elimination of mines, that is, of capital investment, and stated that the specific development to be selected for elimination may be determined by one of two methods, either the arbitrary action of a super-authority appointed by the government or the process of natural law. There is a choice of two criteria in carrying out the arbitrary method of elimination. One is to select the newest mines and the newest fields, because these are the units of production that have been superimposed on the industry. But these are the most profitable units, with the lowest operating costs and their elimination would, therefore, raise the average cost of production of bituminous coal by 25 per cent. The other method is the selection of the mines with the shortest running time for elimination. This would leave the more economic fields in operation but obviously would meet with much opposition from the industry itself, if its accomplishment were attempted by arbitrary methods.

Taking up the process of natural law, Mr. Leshner said: "The Transportation Act of 1920 has already provided for calling a halt to indiscriminate encouragement of coal

field development. We appear to have passed that hazard. One with half an eye and any belief in the future growth of this country must see that the over-development of today in this basic industry may become the under-development of the next decade. That is exactly what happened to the railroads, to our national sorrow. I believe the growing pains of the industry are about over, that it is entering the period of sturdy young manhood. It will shortly be decided whether it is to reach maturity under the tutelage of government or under the guidance of private initiative and enterprise. The United Mine Workers and the operators are now striving for the control of the industry. The union will never be

permitted to secure that control directly. The operators would much prefer that the government have their mines. . . .

"This over-development is not an unmitigated evil. I hope we never remove it completely, for that would be poor national policy. We trust that it is halted now, for the rate of growth of the past five years was leading in the wrong direction. It would, however, be good public policy to introduce measures designed steadily to reduce it. These measures will be feasible and sane only when they look to make operation unprofitable for some mines and thereby put them out of the running and provide for keeping them out of the running during boom periods."

The Relation of the Maintenance of Way Department to Fuel Conservation

By W. S. Burnett

Engineer, Maintenance of Way, Cleveland, Chicago, Cincinnati & St. Louis

On the Big Four, the maintenance of way department handles the coaling stations. There is not much opportunity at these stations to conserve coal, unless it be to watch the loading of engine tanks, to see that these are not overloaded, that coal spilled at the dock is kept picked up and all coal is cleaned out of the cars. If the dock is operated by steam, careful firing of the boiler is required to avoid extravagant fuel consumption. The fuel compartment of the dock should be cleaned regularly, so as to avoid accumulation of fine coal and consequent waste if this fine coal is loaded to engine tanks; also to avoid loss by spontaneous combustion if the coal should take fire in the dock.

Coal dock attendants should keep a sufficient supply of coal in the dock so that the breakage of coal will be reduced to a minimum. If the coal is permitted to fall from a considerable height it will break up and locomotives will be furnished too large a proportion of fine coal. This has been the cause of numerous complaints from engineers. By keeping the docks nearly full there is less likelihood of the lumps rolling away from the fine coal and causing a decrease in value of the fuel when used on engines.

Neither the locomotive engineer nor the fireman can be held responsible for all of the coal consumed on the engines while they are on duty, because of the indirect responsibility of officials and other employees. The maintenance of way department carries a lot of this responsibility and I will mention a few instances where it can greatly aid in the conservation of fuel.

The work in connection with maintenance of tracks and bridges in many instances requires slow orders for the safety of trains. These slow orders mean greater fuel consumption, more especially if the speed is restricted below 30 miles per hour. The laying of new rails and the reballasting of the tracks mean reduced speed. The program of the work should be carefully considered, so as to prevent the stopping or slowing up of trains. In laying rail this can be partly avoided where there is double track by using single track during the hours the work is in progress. On single track the best time between trains should be selected so that a considerable stretch of track can be laid in a short time and full spiking and bolting carried on under traffic. While reballasting tracks care should be taken not to strip too far ahead of the gravel supply so as to avoid skeleton track. The track should be in shape for the passage of all scheduled trains during work period, and if filled with ballast should be left in condition for full speed during the night.

Where slow orders are placed on bridges for the protection of workmen and not required for the safety of the structure, these orders should be maintained during working hours only.

Due to increased tonnage of trains the question of extending passing tracks is continually arising. When deciding on

the question of extension of passing tracks, consideration should be given to the saving of fuel, as the doubling over of a few trains greatly increases operating expenses.

Industrial tracks should be planned to consume the smallest amount of time in switching, and this can be done by seeing that the grades are easy and curvature low. In placing yard tracks the grade should be laid so that the cars will require a minimum amount of power from engines. The location of the ground selected for yards is sometimes favorable to this, but if not, with a small additional expense for grading the cars can be made to run by gravity, at least for movement in one direction. The fuel saving here will be enormous and more than compensate for the extra cost of grading.

The failure to properly consider the arrangement of signals results in delays to or stopping of trains, more especially when interlocking plants are closely located and do not work in unison. It is, of course, apparent that the maintenance of interlocking plants should be followed up closely, renewals anticipated and every effort made to keep them in continuous service.

The operation of work trains under the jurisdiction of the maintenance of way department is another factor which materially affects fuel consumption. Representatives of the maintenance of way department in charge of work trains should keep in very close touch with the dispatcher so that they can efficiently conduct their work with the least possible delay to their own or to other trains. This is especially important when work is being done on track where the grade is heavy or in yards where several switch engines are working. The stopping of passenger or local freight trains to unload maintenance of way employees or maintenance of way material should be watched carefully and unnecessary stops avoided.

In addition to handing coal at coaling stations, the maintenance of way department also distributes coal for other facilities, such as water stations, power plants, etc. They also unload the coal for use at passenger and freight stations and for offices. Most of the coal consumed at these points comes from that picked up on the line, principally in yards where there is a large movement of coal. A large number of hopper cars are dumped in yards, either through rough handling or defective equipment. It is the duty of the maintenance of way men to pick up this coal. It should be reclaimed promptly and loaded free from dirt and cinders. In the event of an excess of this coal, it may be used for the coaling of locomotives and the inclusion of dirt and cinders will greatly reduce its economical use. Lumps of coal falling from engine tanks or cars should be picked up currently and free from dirt.

At maintenance of way steam plants, boilers should be assigned to the best advantage for the work to be performed.

These boilers should have regular inspection and be kept free from leaks and other fuel wasting items. The grates, dampers, flues, etc., should be given special attention so that the most economical service can be maintained. Maintenance

of way employees should be instructed to report to the miner, the mine operator and the railroads. Steady and regular mine operation at capacity production means lower cost as compared with intermittent operation and lessened production."

Report of Committee on Storage Coal

Although a large amount of coal has been stored during the year by many industries and by the railroads, particularly during the latter part of 1921 and the early part of 1922, owing to the expected suspension at the coal mines, there are few significant developments to report since the last report of the committee was made in May, 1921, in regard to new methods or appliances for storing coal.

W. L. Robinson reported to the committee regarding the storage of coal on the Baltimore & Ohio railroad for 1921 that a program covering the storage of 180,000 tons of 34-in. carefully selected lump high volatile steam coal was worked out. The coal was from selected mines operating the Pittsburgh Seam in the Fairmount and Ohio No. 8 field. Typical proximate analysis as follows:

Moisture	0.80
Volatile	40.50
Fixed carbon	52.50
Ash	6.20
Sulphur	2.50

The method of unloading into storage by dropping the doors of hopper cars, dragging out the coal and lifting track on the coal was adopted on account of the relatively low cost of this method.

The detailed instructions as to storage coal were as follows:

The pile should not be over 15 ft. in height, the base to be approximately 60 ft., the leveled off portion on top of pile to be 15 ft. With these sectional measurements, the pile will run about 14 tons per lineal foot.

If more than one pile is made, a distance of 20 ft. is to be maintained between piles for purposes of installing track for reloading.

As soon as pile is completed, the track will be moved from the top of pile to the surface level and parallel with the storage pile, thus making provision for quick removal of any portion of pile that might fire, by use of standard railroad non-revolving steam shovel, American type railroad ditcher, or locomotive crane for reloading the coal, either in case of emergency, heating or for current use.

The reloading track should be maintained, readily accessible for prompt use in event of spontaneous firing, and the shovel, crane or ditcher kept readily accessible and in condition to be used.

The storage was made at six locations remote from the mines, the work was let on contract and supervised by the local superintendents, the initial placing of unloading tracks having been done by company forces and the subsequent track raising by contractor's forces. Unloading of coal was started on September 7 and completed on December 29. A total of 190,000 tons was stored, the largest single storage being 50,000 tons.

The cost of unloading, including contract labor and supervision, work train service and coal used, crane service and coal used and excluding initial cost of track which was of used material, averaged 13.1 cents per ton.

President Harding recognized the importance of the storage of coal as a stabilizing agent in his message to the American Mining Congress when he said: "Is there no way of regulating the demand so as to distribute it more uniformly over the 12 months? Is it not possible to provide storage reservoirs which will enable the large consumers and large producers to accommodate their conditions to a need of a more continuous rate of production?"

In commenting on this suggestion of the President, Doctor H. Foster Bain, Director of the United States Bureau of Mines, said in part: "The adoption of a general policy which will provide reservoirs of bituminous coal to be drawn upon in times of great demand or of low production is entirely a commercial question. A lower reasonable price could

be brought about by concessions on the part of the miner, the mine operator and the railroads. Steady and regular mine operation at capacity production means lower cost as compared with intermittent operation and lessened production."

Under date of January 5, 1922, Mr. James M. Kinkead, division engineer, Trenton Division, Pennsylvania Railroad, reported the storage of approximately 81,000 tons of coal at Runyon, near South Amboy, N. J., which was received from mines in Cambria County, Pa., and is known as the Miller vein. The chemical analysis is as follows:

	No. 1	No. 4
Moisture .....	.53	.41
Volatile matter	21.09	17.94
Fixed carbon	72.49	77.12
Ash	5.89	4.53
Sulphur	per cent .82	.69
British thermal units	14766	15085
Sesquioxide of iron in ash	3.82	3.61
Softening point of ash	above 2,600 deg. F.	2,600 deg. F.

The storage was started on October 3, 1921, in three piles averaging 13 ft. in height by 35 ft. to 40 ft. width at the base and was unloaded by dropping the car doors and jacking up the track. The coal was very slack and one of the piles ran a temperature of 150 deg. F. for a length of 600 ft. out of a total length of 3,200 ft. The heated coal was turned with a steam shovel.

An interesting example of under-water storage, under practically unfavorable climatic condition, was that in connection with the storage plants of the United States Government at Balboa and Cristobal, in the Canal Zone. These plants were illustrated and described in detail in Bulletin 116, Engineer Experiment Station, University of Illinois, page 122. It is interesting to note that after using both ground storage and under-water storage, under the conditions prevailing in the Canal Zone, the United States Government has felt justified in giving up the under-water storage, and while no direct statement has been made, this would seem to indicate that the government considers that ground storage is safe.

One of the mining companies in central Illinois reported to the chairman of the committee during the year that upon shipping to a customer a car of coal that had been in storage under water, the customer reported back that the coal burned faster than the freshly mined coal. The coal was removed from the water pit by a centrifugal pump and the mining company has reported that the small bits of pyrites and fire clay seem to have been separated from the coal and to have gone to the bottom of the pit, thus making the reclaimed coal really purer than that which was stored.

Stocks of Coal Held by Railroads

According to statistical reports of the United States Geological Survey the stocks of coal held by the railroads for several years past and at various times since the last report of the committee were as follows:

Date	Tons
January 1, 1919	11,740,847*
March 1, 1919	13,503,385
June 1, 1920	2,808,057
January 1, 1921	511,47
April 1, 1922	540,180
November 1, 1921	8,058,380
January 1, 1922	13,000,000
March 1, 1922	14,850,000**

*Taken from U. S. Geological Survey Bulletin dated November 1, 1921. A Bulletin of the U. S. Geological Survey dated January 1, 1922, gave the amount in storage January 1, 1919, as 13,644,000 tons.

**Under date of March 1, 1922, the U. S. Geological Survey Bulletin said

"The American Railway Association has courteously supplied information

as to the quantity of coal held by the carriers on March 1 for railroad fuel and all other railroad use. The roads already heard from had a total of 14,850,000 tons, and it is expected that complete reports will show over 16,000,000 tons. As the largest stocks of record in the past are 13,640,000 tons on January 1, 1919, it will be seen that the railroads have accumulated what is for them an enormous reserve of coal. It is sufficient to last on the average of 42 days at the present rate of consumption. The stocks on the day of the armistice were sufficient for only 31 days, part of the difference being the greater requirements of the roads at that time."

Under date of April, 1922, the monthly supplement of the Commerce Reports gave the amount of coal in storage by railroads as 22 per cent greater than on January 1, 1919.

Coal Storage Literature During the Year

In the Factory for April 15, 1921, after the last report of the committee had been printed, W. L. Abbott, chief operating engineer, Commonwealth Edison Company, had a very interesting article upon general principles of coal storage and the appliances used. Mr. Abbott has been one of the foremost advocates of coal storage, and under his direction the Commonwealth Edison Company of Chicago has successfully stored hundreds of thousands of tons for a number of years past. Mr. Abbott concludes his article as follows:

Coal may also be stored so that it surely will take fire—notice I say, will—if kept in storage during a few months of warm weather. The way to obtain this generally undesirable result is to select for the purpose mine-run coal which will ordinarily contain about 20 per cent of fine coal which would go through a ½-in. screen. Handle this coal into storage with a crane. Drop each successive bucket of coal on the top of the pile already formed, for by doing so, the fine coal will remain in the center and the coarse coal will roll down to the edge of the pile. When your pile is complete, you will have coarse coal around the edges and the lower slope of the pile; in the center of the pile all the way from the top to the bottom will be most of fine coal; there will also be a zone about half way up the side of the slope where the coarse and the fine coal are mixed. In the central section of the pile, the mixture is so well proportioned and so densely packed that air cannot circulate to support combustion. Along the outer edge and the lower slope the coal is too coarse to heat, but about the middle of the slope or higher up the voids between the coarse coal are partially filled with fine coal and through the remaining portion of the voids air can circulate just freely enough to support the slow oxidizing which is going on, and not too freely to carry off the heat. It is along in this zone at a depth of from five to eight feet, that the greatest heating occurs.

Mr. Abbott's specifications for storing coal so that it will

surely take fire are pertinent because they represent the practice of too many railroads.

Bulletin No. 128, Engineering Experiment Station of the University of Illinois, by Ray W. Arms, entitled "The Ignition Temperature of Coal," is an important contribution to the subject of spontaneous combustion. At the present time an investigation is in progress under the direction of F. R. Wadleigh, chief of the Fuel Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., in regard to the operating and maintenance costs of coal storage. No definite statement has yet been made as to just what will be included in this investigation.

The report is signed by H. H. Stock, chairman (University of Illinois); A. H. Davies (Belmont Coal Co.); C. G. Hall (Walter Bledsoe & Co.); O. H. Hertel (Old Ben Coal Corporation); O. P. Hood; J. B. Hutchison (Pennsylvania System); W. J. Overmire (Big Four); B. P. Phillippe (Pennsylvania System); R. E. Rightmire (Consolidation Coal Co.); A. P. Wells (Central of Georgia); H. Woods (Colorado & Southern), and S. L. Yerkes (Griider Coal Sales Agency, Inc.).

Discussion

The discussion brought out a number of instances where coal in storage piles built up according to the best known principles, had fired and when the same coal stored under much more adverse conditions had not fired. In closing the discussion Professor Stock made no attempt to explain these instances, saying that the best that the committee could do was to gather all available information concerning the circumstances surrounding as many storage piles as possible, and recommend as safe practices those which in the majority of cases have met with success. Two conditions were most stressed by the members taking part in the discussion as being of the greatest benefit in preventing spontaneous combustion. These are the avoidance of wet coal in the piles or the location of the pile on wet ground and avoiding as far as possible the mixing of different coals in the same piles. Coal high in sulphur and ash was considered most undesirable for storage purposes, especially if piled in wet weather.

Educational Work for Fuel Economy

By D. C. Buell

Director, Railway Educational Bureau

Education on a railroad is so intimately bound up with supervision that the two are almost synonymous. One of the present indications of the realization of the importance of educational work is the endeavor being made on many railroads to relieve their supervising officers of office work and keep them out on the road mingling with the men as much as possible. In the past few years the greatest advance in educational work on our American railroads has been due to the practice, which has become almost universal, of holding frequent staff meetings at which matters of vital importance to the operation of the property are discussed by the officers and the men together. These staff meetings started first as an outgrowth of the safety movement and later developed into general meetings with splendid results.

In spite of the universal mental unrest of officers and men of our railroads during and following the period of federal control, there has been a willingness on the part of railroad men to take advantage of educational opportunities of a practical nature which have been presented. This willingness is growing month by month and the prediction is made that during the next ten years railroad men will not be willing just to get by with their job, but will welcome and take advantage of any practical opportunities offered them to in-

crease their knowledge and become more proficient in their work.

From the very nature of the case the greatest economy in the use of fuel on railroads is directly in the hands of the locomotive fireman. In the old days, a man was not allowed to fire a locomotive until he had served his apprenticeship in the roundhouse or on the ash pit, or in some capacity where he became somewhat familiar with firing practice, but the present method is merely to hire the most likely looking man applying and put him right to work as a fireman without previous training or experience other than a couple of road trips for the purpose of breaking him in to his new work.

It is believed that the growing realization of the importance of educational work on our railroads will result in certain definite methods of procedure in the not too distant future, as follows:

The establishment at large railroad centers of schools for the training of new firemen. At these schools, men selected for the position of fireman will be given thorough instruction on fuel and its use. Dummy fire boxes will be set up where men can be given actual practice in shoveling coal and be taught the proper handling of a scoop, and the proper plac-

ing of coal in the fire box. At these schools men also will be taught the principles of various types of stokers and stoker operation, as well as the flagging rules, the giving and interpreting of hand, lamp, and other signal indications, the principles of the injector, etc. A week or ten days' intensive instruction along these lines will mean much during the following years that the applicant holds the position of locomotive fireman.

Supervising officers will be relieved more and more of clerical work, attendance at meetings, and other duties which reduce the amount of time they spend on the work with the men in actual supervisory and instructional work.

Moving pictures will be used to a much greater extent than at present and with regularity to instruct men in fuel economy as well as in the other phases of railroading that they must learn as they progress as firemen. These moving pictures will interest and improve the service of older firemen and engineers.

Supervising officers will encourage their men to take advantage of other educational opportunities which may be offered from time to time and will work with the men to help them take advantage of such educational opportunities.

There is a possibility that, as this educational problem assumes more importance, the railroads will select from among their employees those who are best informed to act as instructors and will perhaps find it economical when the

right kind of man is available to use such a man as an instructor on the division on which he is employed.

Discussion

In presenting his paper Mr. Buell said that about ten per cent of the men in railroad service are studying to better themselves through personal ambition, while 90 per cent must be induced to study by some outside means. This necessary inducement can be brought into effect by the local fuel organization, by some form of bonus, by competition through the natural satisfaction which all individuals feel in the knowledge of a good job well done and by progressive examination. He expressed the opinion that compulsory educational work is not likely to be highly successful.

That the most difficult task is not that of educating the men, but educating the higher officers to the requirements of fuel economy, was expressed by a number of those who took part in the discussion. This was illustrated by the experience of the Southern Pacific in its campaign for fuel economy in stationary plants. For a year or two emphasis was laid on the education of the men operating the plants, but with very meagre results. The matter was then taken up with the division superintendents, the performance of the plants on each division being rated competitively, with the result that last year the co-operation of the superintendents was obtained and a marked improvement effected.

Report on Fuel Accounting

The committee concurred in the recommendation of the Purchases and Stores Division of the American Railway Association that locomotive fuel be accounted for by individual locomotives, both as to quantity and value chargeable to each account by divisions, main and branch line districts, freight and passenger service and by states, for yard switching service; also, a charge for quantity and value by accounts for all fuel used for miscellaneous purposes, and submitted the following conclusions on the three points carried over from the 1921 meeting:

1. Other than locomotive fuel; 2. coal picked up in yards and on right of way, and 3. coal removed from overloaded commercial cars.

1. Fuel used for all purposes other than locomotive operation, such as stations, elevators, power plants, etc., should be charged out to the facility and in the month in which it is used. Fuel ticket and department invoice, properly received, should be required to cover the issue.

2. Coal picked up in yards and on right of way and fuel oil reclaimed in sump should be charged to the service in which it is used and locomotive fuel account credited, as it is the clearing house for all such over and under charges.

The labor cost of recovering such fuel should be charged as follows:

(a) "Roadway Maintenance" ("General Cleaning") if outside of shop yards and used for other than locomotive operation, or recovered in hump or classification yards.

(b) "Shop Expenses" if within shop yards and used for other than locomotive purposes.

(c) "Fuel Station Operation" if such fuel, after being recovered, is used on locomotives.

3. The overload removed from commercial cars may be used by the company for its own operations, and payment made to the shipper for the actual amount of coal removed at a price agreed upon, with deduction covering cost of labor, switching and reweighing. Where car is returned to mine from scale for lightening by the shipper a switching charge should be assessed.

The report was signed by J. N. Clark, chairman (Sou. Pac.); C. N. Beverly (B. & O.), E. E. Chapman (A. T. & S. F.), R. R. Hibben (M. K. & T.), R. E. Jones (D. & I. R.), Joseph McCabe (N. Y., N. H. & H.), Hugh McVeagh (Big Four), C. F. Needham (Grand Trunk), and W. J. Tapp (D. & R. G. W.).

Report on Firing Practice

Mechanical firing on locomotives, like hand-firing, is subject to careless and extravagant practices. Correct supervision is as necessary here as in hand-firing. The successful and economical performance of a stoker depends, first, upon the proper condition of its parts, and, second, on proper operation (granting of course, that the locomotive may be in proper condition). The things that constitute proper firebox conditions on hand-fired locomotives similarly apply to stoker-fired locomotives.

It should be understood that a mechanical stoker is in no sense automatic.

For economy in firing locomotives which are equipped with mechanical stokers, the committee recommends the following practices:

Before a fire is built in a locomotive, the distributing features of the stoker should be inspected and known to be in proper condition. The fire should be free from clinkers and banks when the locomotive is delivered to the engine crew.

The stoker should not be used in building up the fire, either by roundhouse force or engine crew. Build up the fire by using the hand shovel. Commence the operation of the stoker as soon after starting the train as conditions require.

The fire should be maintained with the hand shovel when standing, drifting or doing short switching.

Use shovel to build up spots in the firebed which may be thin or undersupplied by the stoker. In that way maintain a uniform distribution of coal over entire grate surface. Every square foot of burning surface requires coal.

Because of the thinness of the fire on stoker-fired locomotives greater care should be exercised when shaking the grates than is required on hand-fired locomotives. If practical, grates should be shaken only when the locomotive is not using steam.

Attention should be given coal as it feeds into conveyor; removing any foreign material which would tend to clog or interfere with the operation of the stoker.

Frequently observe the condition of the fire to know that it is properly maintained. Best results are obtained by continuous stoker operation, care being taken not to crowd the fire.

See that the locomotive, the fire and the firing apparatus are properly adjusted to produce the minimum amount of smoke.

When approaching grades the fire should be properly prepared, to meet the heavier demands. Do not wait until the train is on the grade before speeding up the stoker.

Before beginning a descending grade or before taking on coal the conveyor slides should be closed.

In case the stoker stops, due to clogging by foreign matter, the stoker throttle should be closed before any attempt is made to remove the obstruction. The fire should be maintained by hand until opportunity presents itself to remove the obstruction.

When approaching terminal, have all slide plates closed. This should be done at a sufficient distance so that without waste all coal may be worked out of conveyors. The engine crew should close all valves of stoker apparatus before leaving the locomotive.

To supervising officers who give attention to fuel, firing practice will always consist of two distinct things: first, the methods themselves for securing practical economy, and, second, the maintenance of those methods in practice. Proper

methods are at hand. To develop in every-day routine the habitual use of those proper methods is the unending work of supervising officers.

Habitual clinkers and "banks" in a locomotive fire at terminals usually indicate improper firing, or improper engine handling if no mechanical defects exist. A supervising officer may select one of these extreme cases and proceed to improve the performance. A fair improvement, if permanently effected, could easily save five per cent in coal consumption. Now, since a freight crew burns approximately \$15,000 to \$20,000 worth of coal a year, the five per cent improvement would amount to \$750 or more per case improved. If a supervisor did nothing else but improve five habitual "bankers," this alone would save \$3,750, a sum which would go some distance toward paying his salary. But, who would work on only five cases a year? This illustration shows that lack of supervision means waste while well directed supervision means saving.

But it is not only the fireman who sometimes relaxes. Let us consider the engineer. Since the stoker is inanimate, an engineer may become indifferent, and perhaps his fireman too, though he may smile at his escape from a firing abuse that is now borne by a machine instead of by his back. With a locomotive equipped with a mechanical stoker the engineer may not now be able to overburden his fireman, but he is still able to "punish" the engine and the coal pile. Supervision can correct these faults.

The report is signed by M. A. Daly, chairman (Nor. Pac.); D. C. Buell (Railway Educational Bureau); M. Cavanaugh (C. St. P. M. & O.); B. F. Crolley (B. & O.); Chas. P. Dampman (P. & R.); J. W. Dodge (I. C.); J. C. Harris (Sou. Pac. Lines); L. R. Pyle (Locomotive Firebox Co.); F. P. Roesch (Standard Stoker Co.); A. N. Willsie (Locomotive Stoker Co.), and James Wilson.

Indirect Losses From the Use of Poor Quality Coal

By Earl Cobb

President, Southwestern Coal Company

In advocating the selection of coal of the most suitable quality for a specific purpose, Mr. Cobb stated that neither the policy of buying on price or on heating value alone, was likely to produce the lowest fuel costs per unit of service. He called attention to the fact that two coals with the same heating value might differ widely in the moisture content, the per cent of volatile and in the clinkering character of the ash. Mr. Cobb then illustrated the effect of these differences by assuming two coals, one with 11,500 B.t.u. and a combined ash and moisture content of 20 per cent, the other with a heating value of 13,500 B.t.u. and a combined ash and moisture content of ten per cent, the latter selling at \$2.70 at the mine and the former at 40 cents a ton less, on an equated B.t.u. basis. This, he said, is a difference which is not uncommonly found in coals coming from the same district, especially in the Southwest. In this case the saving from the use of the higher quality coal is of two kinds, first, the direct dollars and cents saving and, second, the reduction in engine failures, delays and the possible effect on the length of locomotive runs resulting from the difference in the amount and clinkering character of the ash.

Assuming an average haul of about 200 miles on the home rails in each case, at six mills per ton-mile, the cost of the haul amounts to \$1.20 a ton. The difference between 20 per cent and 10 per cent of combined moisture and ash content, therefore, effects a saving of 12 cents a ton in favor of the better quality of coal in the cost of movement on the home rails alone. Most western roads receive at least a part of their coal from off the lines at an approximate cost of \$1.50 a ton in freight. Here then is an additional saving

of 15 cents a ton in favor of the better quality of coal. To this must be added to the cost of handling the additional 10 per cent waste material through the coal chute to the locomotive tender and the loss of heat utilization due to the additional moisture content, to which, Mr. Cobb said, few railroads give the attention its magnitude deserves.

Taking up the indirect savings, and assuming the average cost of an engine failure as \$200, it is evident that one engine failure due to the poorer quality coal would cost enough to pay the difference in price of 500 tons of the better quality coal.

The practice of many purchasing agents of buying coal on price rather than on a cost of service basis, Mr. Cobb said, is not an indictment of the purchasing agent but of the fuel supervisor and others who use the coal and understand the importance of service value, but fail to present their case to the purchasing agent in a sufficiently convincing manner.

Discussion

O. J. Brown (Boston & Maine) concurred in Mr. Cobb's presentation. He stated that the Boston & Maine had adopted a policy of buying coal on a quality basis with the result that during the year ending April 31, 1922, there had not been a single engine failure due to poor coal, whereas the coal failures during previous years had run from a minimum of 435 to a maximum of 1,380. Furthermore, there had been an increase of four locomotive miles per locomotive hour and a saving of \$46,000 in the time of firemen cleaning fires on the road.

Incentives for Promoting Fuel Economy

By O. S. Beyer, Jr.
Consulting Engineer

If we simply consider as incentives those administrative devices which managements in the past have designed and applied in order to secure the interest and support of the engine crew in fuel saving, my task would be largely a descriptive one. But in my estimation such a consideration of the subject would be too narrow. It seems to me more important to get at the bottom of this question of incentives, and determine, if possible, what the motivating forces are which create an interest in and desire for fuel economy—on any other type of economy for that matter—on the part of railroad workers.

The first aspect encompasses individual fuel performance records, as applied to enginemen and locomotives, or the maintenance of individual efficiency records jointly with the usual discipline, health and reliability, or service records. This aspect would also include extra records in the form of individual bonuses or premiums for economical performances. Such special types of recognition as assigning a locomotive to an engineer and naming it for him, or painting the number plate red, or polishing up the cylinder head casings, are in this class too.

We recognize, on the other hand, as constituting the second aspect of incentives, the tendencies making for a community of interest in or mutuality of concern for better fuel performance on the part of the groups composing the human element of the railroad industry, namely, the workers, the supervision, and the investors. These tendencies come into being not so much by virtue of any special bit of administrative technique which management may devise, but rather by virtue of basic policies as established largely by the groups at interest. These are the result of deeper and more fundamental attitudes and actions. They arise automatically, spontaneously, i. e., as the interests concerned get together and lay the necessary foundations towards such ends.

The reception accorded most attempts to establish incentives when considered simply as devices for intriguing the individual engineman's interest in fuel economy has usually been characterized by apathy and indifference on the part of the rank and file. Some good has been done, nevertheless, by the utilization of these methods for stimulating economical fuel utilization, sometimes positive, but usually negative. The positive good which followed resulted from the added detail information furnished with regard to individual performance of the crew or locomotive in question. This detail information, when trustworthy, makes an appeal to his pride of craftsmanship, his instinctive desire to do well in his chosen work.

The negative good accomplished came from the revelations with reference to the absence of much needed data and means for securing it in order that genuine confidence and sound judgments might be developed with reference to the constituent elements concerned, namely, the locomotives and their operators. Among other things, the necessity for weighing devices at fueling stations was thus shown up. The result has been that some roads, at least, are now finding it worth while to introduce such devices as rapidly as circumstances will permit. In other words, the attempt to measure individual performance for the sake of securing a greater measure of co-operation from the rank and file in the direction of economies disclosed the fact that railroad managements were really operating in the dark owing to inadequate measuring facilities. They were not able to present evidence sufficiently detailed and accurate to convince any individual of the quality of his particular performance.

More important than all of this, however, is the revelation which has followed attempts to introduce incentive devices

in respect to the limits within which good in the direction of improved fuel economy may be hoped for as a result of introducing them. And this in turn has emphasized the very profound interrelation which exists between the two aspects of the subject here considered. It is chiefly because basic conditions have been unsatisfactory that most of these "interest creating schemes" have been received with only a temporary show of concern, or, as more frequently happens, with conspicuous apathy.

What are the practical things which can be done, the next steps which might be taken, in order that incentive devices may yield worthwhile results? These steps consist in developing a greater community of interest between the management and the workers for the sake of their mutual benefit. This requires first the recognition that the railroad workers have as great an interest at stake in the welfare of steam transportation as those whose capital is invested in the industry, and second, by this token, that the workers are as greatly concerned as the investors in the economy and efficiency with which the railroads are operated.

Assuming that this basic conception is acknowledged and understood by those who supervise as well as those who disburse the fuel, how, then, are we to proceed in order to develop this potential will for improved fuel consumption? The answer is to recognize the workers' inherent right to a voice in the conduct of his industry consistent with the degree of responsibility he and his associates collectively are able to exercise in respect to the operation of the industry. This implies dealing with the workers—in our case, for instance, with the local district and regional organizations of the enginemen and firemen—in the interest of fuel economy as well as in the interest of wages, hours of work and working conditions.

However, this opportunity for co-operation is none too prevalent at the present moment. On most roads the managements barely tolerate the existence of only a few of the workers' organizations and are more or less openly hostile to the majority of them. The relationship which exists between management and those workers' organizations which are tolerated is furthermore chiefly concerned with what are usually known as "labor problems." Unfortunately the continual emphasis on this phase of railroad operation has quite successfully precluded a thorough and interested consideration of the possibility of developing a deeper concern for economical fuel utilization via the route herein considered.

It is not inconceivable that the chief prerequisite necessary to make possible the development of a genuine interest in incentive for better fuel performance, namely, stabilized wages, employment and working conditions consistent with American standards, may some day come into being. At least on such roads where this is accomplished the next step will be in order. And this step will be the co-operation of the workers and the supervision in the direction of betterments in fuel consumption. When this becomes possible then, and only then, will detail devices for promoting the individual interest of the engineer and the fireman in the efficient use of coal acquire real value and achieve lasting results.

Other Papers

The following reports and papers were also presented: Report of Standing Committee on Fuel Stations; Standard Form of Contract Covering Purchase of Railway Fuel, by W. J. Tapp (Denver & Rio Grande Western); Locomotive Fuel as a Comparative Performance Unit for Different Railroads, by Harrington Emerson; Fuel Conservation from the

Standpoint of the Locomotive Engineer, by C. J. Barnett (Illinois Central); Effect of Circulation on Locomotive Boiler Efficiency, by F. G. Lister (El Paso & Southwestern); Colloidal Fuel, by Linden W. Bates, and Assigned Cars for Railroad Fuel, by C. G. Hall (Walter Bledsoe & Co.).

Election of Officers

The following officers were elected for the coming year: J. N. Clark (Sou. Pac.), president; M. A. Daly (Nor. Pac.), P. E. Bast (D. & H.), and J. W. Dodge (Ill. Cent.), vice-presidents; O. J. Brown (Boston & Maine), E. E. Chapman (A. T. & S. F.), Robert Collett (N. Y. C.), J. R. Evans (M. K. & T.), and T. Duff Smith (Can. Nat.), members of the executive committee.

Exhibitors at the Fuel Association Convention

AT THE ANNUAL MEETING of the International Railway Supply Men's Association, held at the Auditorium Hotel, Chicago, on May 23, the following officers were elected for the coming year: V. W. Ellet, Hunt-Spiller Manufacturing Corporation, president; C. W. Sullivan, Garlock Packing Company, vice-president; A. W. Clokey, American Arch Company, secretary, and A. C. Beckwith, Ohio Injector Company, treasurer. At a board of directors' meeting it had been decided to honor the past presidents of the association with permanent badges. These badges were presented to F. N. Bard, Barco Manufacturing Company, first president and organizer of the association; C. W. Floyd Coffin, Franklin Railway Supply Company, second president; W. G. Clark, Locomotive Stoker Company, third president; C. L. Mellor, Barco Manufacturing Company, fourth president, and to the retiring president, G. E. Ryder, The Superheater Company.

The following is a list of exhibitors at the 1922 convention of the International Railway Fuel Association at the Auditorium Hotel, Chicago:

American Arch Company, New York.—Represented by J. T. Anthony, T. M. Mahar, Chas. Pfeiffer, E. L. Mulcahy, W. W. Neale, M. L. Smith, F. G. Boomer, J. Brondon, A. M. Suceese, H. Darby, J. P. Neff and W. L. Allison.

Barco Manufacturing Company, Chicago.—All-metal engine and tender connections, reservoir joints, smoke box blower fittings, power reverse gear, and crosshead and shoes. Represented by F. N. Bard and C. L. Mellor.

Boss Nut Company, Chicago.—Lock nuts, bolts and rivets. Represented by J. W. Fogg and A. W. MacLean.

Dearborn Chemical Company, Chicago.—Literature. Represented by Geo. R. Carr, I. H. Bowen, L. P. Bowen, O. H. Rehmyer, I. H. Beebe, N. F. Dunn, J. G. Arn and H. P. Ross.

Detroit Lubricator Company, Detroit, Mich.—Literature. Represented by A. G. Machesney.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Lubricators, injectors, boiler fittings, reflex gages, fire extinguishers, cold water squirt. Represented by H. A. Glem and F. S. Wilcoxon.

Fairbanks, Morse & Co., Chicago.
Franklin Railway Supply Company, New York.—Power reverse gear. Represented by W. H. Coyle, J. L. Randolph, H. M. Evans, M. H. Roberts, Paul Willis, J. A. Talty and J. L. Bacon.

Garlock Packing Company, Palmyra, N. Y.—Asbestos packings for locomotives and general railway supplies. Represented by John L. Fisher and Stanley McDale.

Hudson Grate Company, Keokuk, Ia.—Locomotive grate equipped with shaking dump gate. Represented by A. W. Hulson and J. W. Hulson.

Johns-Manville, Inc., New York.—Pipe and boiler insulation, monolithic baffle walls, steam traps, packings and gaskets, high temperature cements. Represented by P. R. Austin, L. S. Wilbur, H. J. Crowe, P. C. Jacobs and A. H. Purdon.

Locomotive Firebox Company, Chicago.—Thermic syphon. Represented by C. M. Rogers.

Locomotive Stoker Company, Pittsburgh, Pa.—Working model of stoker. Represented by A. C. Deverell, A. M. Willis, J. B. Ball, I. C. Jordan, C. F. Fahler, V. B. Emerick, E. F. Milbank and E. R. Funk.

Manning, Maxwell & Moore, Inc., New York.—Gages, safety valves, inspirators, boiler checks and other locomotive appliances. Represented by C. L. Brown, J. Soule Smith and C. W. Corning.

Nathan Mfg. Company, New York.—Injectors, lubricators, boiler checks, water column, gage cocks, water gages, coal sprinkler, fire extinguishers, boiler washer and tester whistles. Represented by Richard Welsh, Frederick C. Davern and Fred Ehredt.

National Railway Devices Company, Chicago.—Radial and vertical fire door. Represented by Jay G. Robinson and E. J. Gunnison.

Ohio Injector Company, Chicago.—Lubricators, automatic drifting valves, automatic flange oiler, injectors, fire jet, boiler check, low water alarm. Represented by William S. Furry, Frank W. Edwards, W. H. Malone, F. B. Farnsworth, N. W. Barker and A. C. Beckwith.

Okadee Company, The, Chicago.—Valves, water glass protectors, front end hinges, cylinder cocks. Represented by W. H. Heckman, G. S. Turner, Chas. R. Long and A. G. Hollingshead.

Peabody Coal Company, Chicago.—Photographs and moving pictures of coal production. Represented by J. H. Westervelt, F. E. Sammons and W. F. Royce.

Railway Review, Chicago.—Publications. Represented by L. G. Plant.

Roberts & Schaefer Company, Chicago.—Photographs of locomotive coaling plants and cinder conveyors, and combination portable coaling and cinder handling and storage plant. Represented by Clyde P. Ross and David E. White.

Simmons-Boardman Publishing Company, New York.—Publications. Represented by L. B. Sherman, C. B. Peck, Homer Beach and J. M. Rutherford.

Standard Stoker Company, New York.—Literature and photograph of locomotive equipped with stoker. Represented by F. P. Roesch.

Superheater Company, The, New York.—Feed water heating apparatus and steam pyrometer. Represented by G. E. Ryder, J. E. Mourne, R. M. Osterman, H. V. Jones, C. H. True, H. B. Oatley, Geo. Dolan, R. R. Porterfield, Bard Browne, W. A. Buckley and R. J. VanMeter.

Vissering & Co., Harry, Chicago.—Packing and sanders. Represented by W. H. Heckman, G. S. Turner, Chas. R. Long and A. G. Hollingshead.

Worthington Pump & Machinery Corporation, New York.—Photographs and literature on locomotive feed water heater. Represented by John M. Lammede.

The Development of Welded Flexible Staybolts

THE INCREASE in the size of boilers, accompanied by higher pressure, led to considerable trouble with staybolts in the breaking zone of the firebox. This difficulty was almost entirely overcome by the development of the flexible staybolt, consisting of a threaded sleeve screwed into the sheet, a bolt having a spherical head seating in the

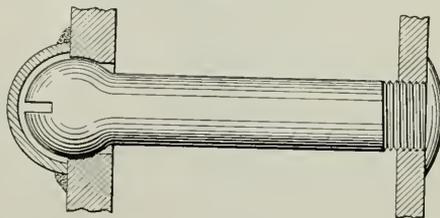


Fig. 1

sleeve and screwed into the other sheet, and a cap covering the sleeve. This type had certain disadvantages principally due to the necessity of making a threaded connection that would remain absolutely steam tight. Steam-tightness in a threaded sleeve requires perfect threads, which in turn necessitates the use of steel sleeves, regardless of the fact that steel

sleeves are subject to crystallization and consequent breakage when caps are removed at inspection intervals or when fire-boxes are being renewed. The use of sleeves of the threaded type also demands the cutting of large holes in the wrapper sheet which is detrimental. These holes must be carefully reamed and threaded with straight and taper tools. This is an expensive operation and if not properly performed will cause continuous trouble or possible failure in service.

To overcome these difficulties and to obtain a rigid, steam-tight connection, R. S. Mennie early in 1914 conceived the idea of utilizing the electric welding process as a means of making an absolutely steam-tight connection for the wrapper sheet housing of a flexible staybolt. In his original patent, Mr. Mennie covers broadly all forms of welded-on flexible

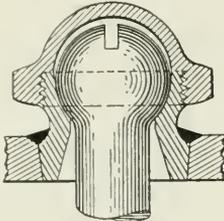


Fig. 2

staybolt connections. His first welded staybolt application is shown in Fig. 1 and while exceedingly simple has the objection that staybolt inspection is not provided for. To overcome this defect the staybolt head was enclosed in a sleeve or housing which was welded to the sheet. This construction is shown in Fig. 3 except that Mr. Mennie used a flat head bolt and cap to correspond.

In 1915 the Flannery Bolt Company patented a tapered sleeve type, the sleeve being secured by arc welding and providing a recess in which rested the head of the flexible bolt. The sleeve was also provided with a removable cap for inspection purposes, as shown in Fig. 2.

The original Mennie type had shown possibilities in

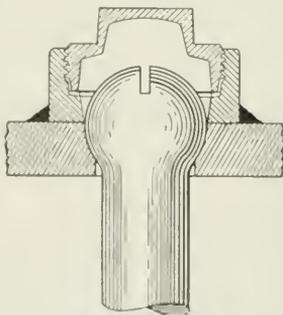


Fig. 3

eliminating two great defects in the threaded type of flexible staybolt; namely, the large hole in the sheet and the great number of sleeves required to take care of all angles in the sheets. It was found that the tapered welded sleeve possessed these two great defects of the threaded type of sleeve, as practically as large a hole and as many different sizes of sleeves were required. The large opening in the boiler sheets has been objected to, particularly in combustion chamber areas, and in crown sheet installations, in which it was

it was attempted to meet the A. S. M. E. Boiler Code Committee formula with the threaded sleeve.

A modification of the Mennie type was made, as shown in Fig. 3, in which the bolt rested in a counterbored recess in the sheet and was enclosed in a housing welded to the sheet and provided with a removable cap for inspection

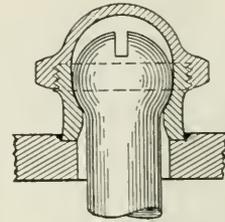


Fig. 4

purposes. This type was confined to flat surfaces and was not applicable to curved sheets and bolts set at an angle with the sheet. A sleeve resting on the sheet, as shown in Fig. 4, and a sleeve in the sheet but having a shoulder resting on the sheet, Fig. 5, and secured by welding were tried but lack of simplicity, economy and other disturbing factors

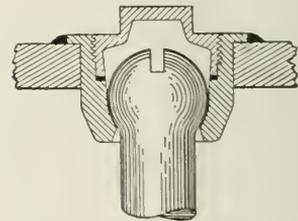


Fig. 5

finally led to their rejection. Numerous other types followed without success.

Continued investigation brought out the universal type, Fig. 6, which provided a sleeve with a seat formed as a segment of a sphere resting in a corresponding counterbore in the sheet. This accommodates itself to any curvature

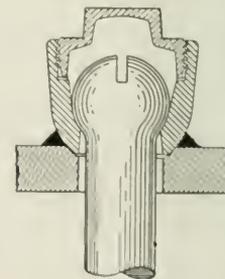


Fig. 6

of the sheets, and to any degree of angle at which stays are ordinarily applied, the opening in the boiler sheets being only sufficient to provide clearance for the size of bolt used. Where there is not enough clearance for the head outside the sheet the special flush type, shown in Fig. 7, is used.

The welded flexible staybolt, with a sleeve having a

spherical seat in the sheet, was first publicly introduced in 1919 and has been widely used since that time. In this type a single size of sleeve replaces the many styles and standards formerly required. The sleeve is also more satisfactory because being forged from the ductile material it does not

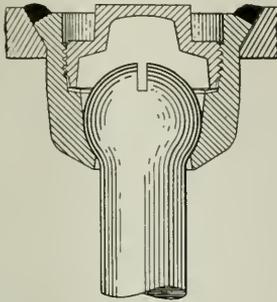


Fig. 7

crystallize and crack, does not require the expensive care and skill for application that was needed with the threaded type and eliminates the leakage troubles experienced in that type.

With the introduction of the welded flexible staybolt in 1919, the question was raised by some users whether the electric weld might be injurious to the sheets. It was pointed out that for several years built-up bosses were welded on the wrapper sheet to give a better threaded surface where the

bolts enter the outside sheet at an excessive angle. Thousands of locomotives in daily service for a long period had unquestionably demonstrated that the sheets are not injured by the bosses and inasmuch as far less welding is required for a flexible welded sleeve than has been the practice in building up bosses, it follows that the small amount required for the welded sleeve should not be injurious.

A typical application of the universal type is illustrated by the boiler for a Santa Fe type locomotive, shown in Fig.

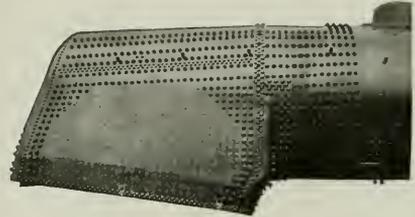


Fig. 8

8. With the exception of seven flush sleeves in the back head, the entire installation of 1,160 bolts in each boiler requires only the one style universal sleeve. The manner in which this type adapts itself to installation in seams and flanges is noteworthy, the sleeve being but little larger than the rivet heads and the hole only sufficient to provide clearance around the bolt, practically no larger than is used for rivet holes. This aids in maintaining maximum strength.

Northern Pacific Ton-Mileage Cut 33 Per Cent

Has Surplus After 7 Per Cent Dividends of \$4,705,399 Due
to Burlington's Extra Disbursements

THE MOST IMPORTANT question in reference to Northern Pacific is as to how soon it may be able to restore its former annual dividend rate of 7 per cent on its stock. This statement is based on the presumption that the company has in mind to restore the 7 per cent rate and that the reduction to 5 per cent, made last March, was a temporary step taken because of the Northern Pacific's earning position at that time. The company has been paying dividends at a rate of 7 per cent since 1903.

At the meeting in March, the quarterly rate was made $1\frac{3}{4}$ per cent and Howard Elliott, chairman of the board, made the following statement: "In declaring a dividend of $1\frac{3}{4}$ per cent . . . the directors feel that they are best serving the interests of the stockholders and are hopeful that conditions will warrant the resumption of the rate of $1\frac{3}{4}$ per cent quarterly in the future." More recently, Mr. Elliott wrote in reply to a stockholder, that "at the recent meeting of the directors, at which the dividend was reduced, it was decided that it would not be conservative, in view of the prevailing conditions of uncertainty, to pay the full rate. I cannot say when it will be restored, but at that time the board hoped that business would resume next autumn to such an extent as to justify that action. The returns of the Northern Pacific for the first three months of this year are discouraging. Business is better, but there are still many elements of uncertainty."

The Northern Pacific was enabled to pay its 7 per cent dividends in 1921 because of the extra dividends which it received on its Burlington shares, which extra payments ag-

gregated \$13,000,000 more than Northern Pacific will receive from the Burlington this year. The road's annual report showed for the year an income balance after dividends of \$4,705,399, as compared with \$1,734,183 in 1920. The 7 per cent dividends totaled \$17,360,000. The explanation of the size of the 1921 surplus was an increase in dividend income, as compared with 1920, of \$17,505,094. In 1920 the road's dividend income was \$4,353,552, whereas in 1921 it was \$21,858,646. It was this increase which enabled the road to make up for the extremely poor showing which it had in its railway operating results.

Has Not Been Doing Well Since 1918

The road had not been doing very well since 1918. It had a standard return or compensation for operation by the government during federal control of approximately \$30,000,000. In 1918 it nearly earned this amount with a net after rentals of \$28,000,000. In 1919, however, it earned for the government only \$18,000,000. In 1920, operating for two months under federal control, six months with the benefit of the guaranty, and four months "on its own," it realized on an extremely heavy traffic to the extent only that it was able to earn a net after rentals of \$7,949,458. The 1921 revenue ton-mileage was 32.64 per cent below the 1920 business but the road was able to come through the year with a net after rentals of \$10,843,826. This is one-third of the amount that it would need to be on something like the pre-war basis of net income.

In view of these facts, it is not hard to understand why the

Northern Pacific directors should have decided to decrease the dividend rate from 7 to 5 per cent. If it had not been for the Burlington's extra dividend declarations, the deduction would have presumably had to be made much sooner than it actually was made, although, of course, the fact still remains that the road might have maintained the regular dividends and paid them from surplus. The Northern Pacific directors, however, prefer to adopt the conservative course.

In the statement which Chairman Howard Elliott recently made to one of the stockholders, as above noted, Mr. Elliott commented upon the fact that business had not enabled the road to show very good earnings for the first quarter of 1922. The actual figures showed for March a net after rentals of \$1,100,077, as compared with a deficit of \$261,017 in March, 1921. The March, 1922, earnings, however, were in rather sharp contrast with the earnings in January and February with the result that the three months net after rentals was only \$338,802. This compared with a deficit of \$861,880 in the first three months of 1921, but it can easily be seen that the Northern Pacific earnings are far from being on a rate which properly called for a 7 per cent dividend basis. Of course, there is also the circumstance that the roads in the northwest make the better part of their earnings in the latter half of the year and the earnings for the first few months of the annual period must be regarded with that in mind.

The Northern Pacific car loadings at the present time are picking up in fairly good shape. They are running ahead of the loadings for the corresponding period of last year and this is another factor which must be taken into consideration. The Northern Pacific does not seem to be hurt very much by the present coal strike; in fact, its coal business is not such a very essential part of its total traffic. The lumber business, however, is showing a very pleasing improvement. The ore traffic has not yet begun to show any sign of life.

Northern Pacific No Exception to Other

Roads in Northwest

One of the most striking features of railway operations in 1921, as a whole, was the rather unfortunate manner in which the depression of 1921 was reflected in the operation of the roads serving the northwest. The Northern Pacific, the Great Northern, the St. Paul, and even the North Western, went through a very similar sort of year. Each of them had difficulties of a very unusual sort. The Great Northern, because of the year's operations, has been put in a position where it is looked upon with more or less uncertainty, particularly since it decided to put its dividends on a semi-annual instead of a quarterly basis. The St. Paul, with a problem of its own, approached the dangers of receivership. The Northern Pacific was compelled to reduce its dividend rate. The details of what it did during the year may be summarized as follows:

The road's revenue tonnage in 1921 was 17,670,162, as compared with 23,448,182 in 1920. This was a reduction of 24.64 per cent. There was a reduction in revenue ton-mileage of 32.64 per cent, due to a decrease in the average haul from 334.9 in 1920 to 299.4 in 1921. The decrease in freight revenue was 14.61 per cent, this lesser proportionate decrease being due to an increase in the receipts per ton mile from 1,033 cents in 1920 to 1,309 cents in 1921. The reductions in the passenger business were equally severe, the decrease in number of revenue passengers being 26.87 per cent; in revenue passenger miles, 29.71 per cent, and in revenue, 19.53 per cent.

The Northern Pacific divides its total tonnage into that originating on the road and that received from connections. The 1921 tonnage, as was noted above, totaled 17,670,162. Of this total 14,125,875 originated on the Northern Pacific's own rails and 3,544,287 was received from connections. This points out the degree to which the Northern Pacific

originates its own tonnage. The reductions in tonnage which took place in 1921 as compared with 1920 were general, except that there was an increase in the tonnage of grain. The 1921 grain figure was 2,657,431 tons, an increase of 374,350 over 1920. Products of agriculture totaled 4,545,776, an increase of 143,529 over 1920. The tonnage of products of animals in 1921 was 302,120, a decrease of 136,441 from 1920. The decrease in products of mines was decisive; the 1921 figure was 4,667,842, as compared with 7,328,036 in 1920, a decrease of 2,660,194 tons. This decrease was embodied primarily in the reductions of traffic in coal and ore. The 1921 bituminous tonnage of 2,896,070 compared with 4,264,262 in 1920 and the ore tonnage of 517,034 compared with a 1920 figure of 1,377,337. The tonnage of products of forests in 1921 was 5,525,854, as compared with 7,253,665 in 1920, a reduction of 1,727,811. The manufactures and miscellaneous tonnage carried in 1921 totaling 2,032,244 compared with 3,194,497 in 1920.

Revenues and Expenses

The Northern Pacific's 1921 freight revenues were \$69,246,505 as compared with \$81,090,390 in 1920. The total revenues in 1921 were \$94,538,059 as compared with the 1920 figure of \$113,084,408. As against a decrease of \$18,546,348 in railway operating revenues, which amounted to 16.4 per cent, there was a decrease of \$23,353,007 in operating expenses. The actual operating expenses in 1921 were \$77,630,867, as compared with \$100,983,874 in 1920. The reduction was 23.3 per cent. In 1921 the road operated on a ratio of 82.12, as compared with 89.3 in 1920. In 1917, the last year before government control, the road had a ratio of 60.41. This indicates what has already been said above concerning the fact that the Northern Pacific is far from being on a pre-war basis in net earnings, but at the same time, it indicates a rather favorable condition because it must be borne in mind that this reduction in operating expenses and in the operating ratio, was made in the face of reductions of nearly one-third in freight and passenger traffic.

The reductions in operating expenses were made as follows: The charges for maintenance of way were \$14,312,916, a decrease of \$6,699,882, or 31.88 per cent. Maintenance of equipment was \$21,825,817, a decrease of \$3,768,106, or 14.72 per cent. Transportation totaled \$35,797,967, a decrease of \$12,641,035, or 26.10 per cent. The reductions in maintenance were, to some extent, due to lesser work being done, as well as to economies through decreased cost of wages and materials. In 1921 the road relaid 26 miles of rail, as compared with 154 in 1920. It ballasted 183 miles of track as compared with 238 in 1920. Main line tie renewals were 1,072,530 as compared with 1,395,094 in 1920, and a proportionate reduction was made in branch line tie renewals. The larger part of the road's main line is laid with 90-lb. rail. The maintenance of equipment condition, which evidences the result of the reductions in maintenance expenses, is shown by a percentage of bad-order cars on the Northern Pacific on May 1 of 10.4 per cent, which compared with the country's average on that date of 14.4. The unserviceable locomotive percentage on the same date was 19.2, as against the country's average of 20.2. This indicates savings in maintenance of equipment such as were evidenced in the case of maintenance of way, but the Northern Pacific is in better shape than the average of the roads of the country.

Students of Northern Pacific railway affairs are watching with interest the progress which the company is making with reference to oil traffic from the fields along its line. The annual report says that "during 1921 there was marked progress in oil exploration in Montana. . . The Cat Creek field continued to be a large producer. During the year 1,317,143 barrels were produced and shipped from 68 wells, making a total since the first shipment in August, 1920, of

1,547,261. In the Devil's Basin field there are two producing wells. In February, 1921, the Soap Creek oil field, in southern Bighorn County, was discovered. Drilling is actively in progress in both the Devil's Basin and Soap Creek fields, as well as in a number of other localities in central and eastern Montana. So far the production of oil from any lands owned or controlled by your company has been very small. The company, however, owns a large acreage

in districts, the geology of which indicates oil possibilities."

One of the reasons for the recent change in the fortunes of the southwestern carriers has been the oil development along their lines. The situation as to Northern Pacific, however, does not yet seem to partake quite of that character. The total crude petroleum traffic which it originated in 1921 totaled only 1,178 tons, which shows that oil traffic is not yet very evidently much of a factor in earnings.

Turbine Locomotive Saves 52 Per Cent in Fuel

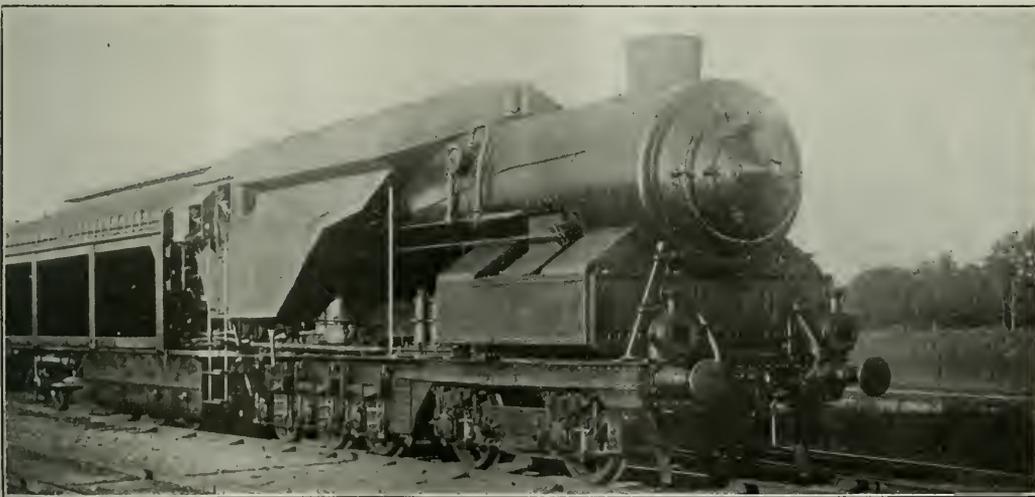
Design Brought Out by Ljungstrom Turbine Company of Sweden
Has Many Novel Features

A CONDENSING TURBINE locomotive, designed by F. Ljungstrom and constructed by Aktiebolaget Ljungströms, Angturbin, Stockholm, Sweden, was placed in service on the Swedish State Railways a few months ago. According to reports, the locomotive has performed satisfactorily and has shown remarkable economy in fuel. Complete details of the construction are not yet available but the photograph shown herewith indicates that it is a radical departure from conventional locomotive design.

The turbo-locomotive designed by Mr. Ljungstrom is intended to displace the Pacific type locomotives now used in

barrel of the boiler being made up of large flues, each of which carries a superheater element, thus giving a high degree of superheat.

Another innovation is the arrangement for heating the air supplied to the fire. The space between the mud ring and the ashpan is tightly closed and the air needed for combustion passes through a special air preheater under the smokebox, where the temperature is raised by escaping gases from the smokebox. Draft is created by a fan propelled by a small turbine. A damper connected with the firebox door shuts off the draft when the door is open, thus preventing unnece-



Turbine Locomotive on the Swedish State Railways

passenger service on the Swedish State Railways. It is not a mere adaptation of the turbine to reciprocating locomotives, but is a new design in all respects. Unlike ordinary steam locomotives, there is no driving machinery under the boiler. Instead it is supported by two trucks, the forward with two and the rear with three axles. The driving machinery is located under the tender unit, which also contains the condenser and the necessary fans for aiding in condensation. The coal supply is carried in bunkers placed above and on each side of the cab, having a capacity of seven tons. The boiler is of the ordinary fire-tube type, carrying 285 lb. pressure. It has no small tubes, the heating surface in the

sary cold air entering the firebox flues. The exhaust steam is not discharged from the stack but is led to a condenser on the tender.

The driving machinery consists of a high-speed turbine suitably geared to the six-wheel connected running gear which has drivers 58 in. in diameter and is located under the tender. The condensing tank has a capacity of 3,650 gallons but only half of that amount has been carried on the trial trips and has been found sufficient as the exhaust steam is not wasted through the stack but returns to a hot well from which it is pumped into the boiler as feedwater. As the feedwater is used over and over, very little scale will

be formed in the boiler. The preheating of the air for combustion should also add to the life of the firebox.

The locomotive is being used in passenger service out of Stockholm on turn-around trips of 66 kilometers, or about 41 miles, each way. The time between the departure from Stockholm and the return is 2 hrs. 30 min. As no information is given as to the time at the turn-around point or the length of the stops en route, no estimate can be made as to the speed while on the road.

On a local run on this route with a passenger train weighing 603 tons, the coal consumption was 20.8 kilograms (45.8 lb.) per 1,000 ton kilometers, or about 67 lb. per 1,000 gross ton-miles. In through service the consumption was reduced to about 11.6 kilograms (25.6 lb.) per 1,000 ton kilometers, or 37.4 lb. per 1,000 gross ton-miles. Considering that this performance was obtained during the winter season the figures are indeed remarkable. Compared with the reciprocating superheated Pacific type locomotives used on the same run, the turbine locomotive shows a reduction of 52 per cent in the consumption of fuel. Further details of the locomotive will be published in a later issue.

Separation of Southern Pacific and Central Pacific Ordered

WASHINGTON, D. C.

REVERSING the decision of the district court for the eastern district of Utah the United States Supreme Court, in a decision handed down on May 29, directed that a decrease be entered severing the control by the Southern Pacific of the Central Pacific by stock ownership or by lease. Action to effect the dissolution was begun by the federal government in 1914, the defendants being the Southern Pacific and Central Pacific companies, the Union Trust Company of New York and the directors of the Southern Pacific. The government asked that the lines of the Southern Pacific and the Central Pacific be decreed to constitute competitive systems and that the Southern Pacific be required to dispose of its ownership of stock and relinquish any control over the Central Pacific. A large part of the opinion by Justice Day reviewed the history of the organization of the roads and the case in which the separation of control of the Union Pacific and Southern Pacific was required, holding that the Southern Pacific-Central Pacific case does not differ from the former in principle.

"Such combinations," the court said, "not the result of normal growth and development but springing from the formation of holding companies or stock purchases resulting from the unified control of different roads or systems naturally competitive, constitute a 'menace and a restraint upon that freedom of commerce which Congress intended to recognize and protect and which the public is entitled to have protected.'"

After citing a number of cases as supporting this principle the court said: "These cases collectively establish that one system of railroad transportation cannot acquire another nor a substantial or vital part thereof, when the effect of such acquisition is to suppress or materially reduce the free and normal flow of competition in the channels of interstate trade." It added that proof was ample that the policy of the Southern Pacific system has been to favor transportation on its lines by securing for itself, whenever practicable, the carriage of freight which would normally move eastward or westward over the shorter line of the Central Pacific for its own much longer and wholly owned southern route, and reached the conclusion that the stock ownership in the Central Pacific acquired by the Southern Pacific is violative of the Sherman act within the principles settled by the court in previous cases.

So far as compatible, the court said, the mortgage lien of the Union Trust Company of New York should be protected.

The several terminal lines and cutoffs leading to San Francisco Bay, which have been constructed or acquired during the unified control of the two systems for convenient access to the bay and to the principal terminal facilities about the bay, should be dealt with, the court declared, "either by way of apportionment or by provisions for joint or common use, in such manner as will secure both companies such full, convenient and ready access to the bay and to terminal facilities thereon that each company will be able freely to compete with the other, to serve the public efficiently and to accomplish the purpose of legislation under which it was constructed."

A like course should be pursued, Justice Day added, "in dealing with the lines extending from San Francisco Bay to Sacramento and to Portland, Ore."

"The Central Pacific with its eastern connection at Ogden, forms one great system of transportation between the East and the West," the opinion stated, "and the Southern Pacific with its roads and connections and steamboat lines forms another great transcontinental system for transportation from coast to coast. The Central Pacific constitutes some 800 miles of transcontinental line, of which it is a part. The Southern Pacific system has practically its own line of railroads and steamboat connections to New York, via Galveston and New Orleans."

The acquisition of the Central Pacific stock by the Southern Pacific was held to be unlawful under the opinion of the court in the Union Pacific case, "unless justified by the special circumstances relied upon" for that purpose, but the court after analyzing the special circumstances discarded them as not justifying the control.

"These two great systems are normally competitive for the carrying trade in some parts from the East and Middle West to the Coast," Justice Day said, "and in greater volume for the traffic moving to and from central and northern California, including a great volume of the ocean-borne traffic which lands on the coast destined across the continent to the Atlantic seaboard and intermediate Western and Eastern points or is destined from the latter points to foreign ports via San Francisco or other Pacific coast points." The court said the roads "were always separate and distinct corporations. They were so recognized in the acts of Congress making land grants to them . . . and otherwise conferring rights on them which only Congress could confer."

"For a good part of the time," it added, "the roads had boards of directors not consisting of the same persons. At times the majority of the stock was separately held."

The court refused to accept the theory of prior practical consolidation as a justification for a violation of the Sherman act. The bearing of the 99-year lease of the Central Pacific, made in 1885, was reviewed, the court reaching the conclusion that it could not have been legally made without authorization by Federal legislation, which was never given.

"We find nothing in these leases to the Southern Pacific company," the justice said, "which justifies the continued control of the Central Pacific by the Southern Pacific after the Sherman act became effective."

In a dissenting opinion Justice McKenna said he considered the decision of the court unjust; that there was no thought in anyone's mind that the acquisition of stock by the Southern Pacific would be a restraint upon competition or a detriment to the public interest.

The tentative consolidation plan issued by the Interstate Commerce Commission last year leaves the Central Pacific in the proposed Southern Pacific-Rock Island system, although Professor Ripley in his report had recommended that the Central Pacific be made a part of the Union Pacific-Chicago & North Western system.

Canadian Political Situation and Railway Policy

Progressives Hold the Balance of Power in Parliament and Favor Nationalization of Railways

By J. L. Payne

CANADA IS NOW definitely committed to public ownership of railways on a large scale. There was some doubt after the general elections of December last as to what would be the policy of the new Government; but that doubt no longer exists. The administration has announced its determination to follow pretty closely the course laid down by its predecessor. At all events the departures are few and unimportant.

The political situation as it bears on railway policy is somewhat extraordinary. The Liberals, under Hon. W. L. MacKenzie King, are in power, yet they have not a majority in Parliament. The key is held by a group of 65 Progressives, representing the same interests as does the "farm bloc" at Washington. Among the Liberals there is a strong feeling against public ownership. It is understood, for example, that the Quebec contingent, representing more than half of the entire Government strength, is a unit on that point. The Conservatives are about evenly divided on the issue; but they make up not more than 55 in a House of 235. The Progressives, standing somewhat aloof, hold the balance of power, and they are practically to a man in favor of nationalization. Speaking broadly, they represent the farmers of the country, although chiefly those of the western provinces.

Parliament Has Never Sanctioned Nationalization

The foregoing explanation is perhaps necessary in order that the Canadian situation may be understood by American readers—I mean the situation in Parliament. As for the people at large, it would be quite impossible to say where they stand on the question of railway policy. They have never declared themselves. They have never once had an opportunity to do so. Although two general elections have been held since nationalization was tacitly begun in 1914—one of them since that policy was definitely adopted in 1918—the matter has not been an issue before the electorate. That may seem extraordinary; but it is strictly true. The Conservatives, who held the reins of power from 1911 down to December last, were overwhelmingly defeated at the polls; yet that defeat could not be construed as a rebuke for their attitude in respect of public ownership, for the sufficient reason that it was scarcely mentioned in the campaign.

To outsiders it must seem inexplicable that a nation like Canada, intensely democratic in sentiment, could be committed to a course of action quite radical in its broad features, and involving the assumption of enormous liabilities, without public approval. The facts of the case rather intensify the anomalous aspect of what has happened; for it might be said that this important policy was fastened on the Dominion without even the direct sanction of Parliament. The positive steps in the matter were taken by Government, and all that can be said is that Parliament did not intervene. The Government at that time had a numerically strong majority at its back, and in this negative, or passive, position of its supporters one gets a vivid flash of the party system.

Progressives in Control

The pivotal position of the Progressives at the present time is well illustrated by an occurrence which may be of interest to American readers. In 1897 the Canadian Pacific desired a loan of \$3,300,000 to finance the building of its

Crow's Nest Pass line in the west, and the Minister of Railways of that day took advantage of this need to drive a bargain. He required the Canadian Pacific to make certain specific reductions in rates in return for the loan; and that was done. The Railway Commission did not come into existence until six years later. Freight tolls actually moved downward in slight degree until 1916, and then in 1918 they moved violently upward. Under the War Measures Act the whole question of rates was referred to the Railway Commission, and the Crow's Nest Pass agreement was suspended by that Board until July 7 next. With tolls 65 per cent higher than in 1897, the Progressives are now tacitly demanding that the agreement in question shall become operative in July next. Of course, on analysis, it has developed that there are both legal and other difficulties in the way, and the whole matter is being considered by a committee of Parliament; but one gets in this incident a glimpse at the general attitude of these western Progressives toward railway policy. When that agreement was made the Canadian Pacific operated about 8,000 miles of lines, as compared with nearly 14,000 at the present time, and it was the only trunk line in the west. Now there are three.

When the first session of the present Parliament began, with a new Government at the helm, there was great uncertainty as to what would be done in the matter of public ownership; but all doubt was dispelled by the announcement made at the formal opening, and confirmed later by definite statements from the Minister of Railways and Canals. All changes in contemplation were comprehended within the somewhat indefinite term of "co-ordination." It transpired that this did not mean very much—certainly nothing which would in any material way alter the policy that had been followed ever since nationalization received its first demonstration. When explanations came to be made, it was found that Government merely proposes to abolish the old Canadian Northern board and the Grand Trunk board and have but one executive body. This will be done under the Canadian National Railways Act of 1919; so that there is no room for surmise as to the precise nature of the administration under which the public railways of Canada will be carried on.

The Canadian National Railways Act provides for a board of directors which will not only be appointed by Government, but will be at all times, and under all circumstances, answerable to the Minister of Railways. The minister may remove any member of the board at will "for cause." That term is so comprehensive and elastic, there is no question whatever that the door will remain wide open for political control. It had been urged in the public press that steps be taken to place a board in charge which would have the power and courage to make sweeping changes, especially in the removal of wasteful parallels in the west; but that appeal has not been heeded. All the evils and drawbacks which attached to the public railway system since its inception, with the measuring of all administrative policy in terms of political expediency, may be perpetuated.

It is not suggested that the lessons of experience will be disregarded; but there can be no doubt that the way is clear for the assertion of the same measure of direct political control which obtained from 1914 downward. In other words, "co-ordination" simply means the substitution of an obvi-

ously practicable form of executive organization for one which was irregular and contrary to the statute. It does not, however, place an independent board in charge.

It would also appear that the enforced absorption of the Grand Trunk has been ratified by the new Government, in which matter we see again the play of political expediency. The Quebec members, numbering 65 out of a total of 117 on the Liberal side, was understood to be strongly opposed to the wrenching of the Grand Trunk out of the hands of its corporate owners. But the Progressives favored that step, and, as has been pointed out, the farmers' party holds the balance of power in the House. The Grand Trunk cannot contribute anything of value to the government system. On the contrary, it stands a good chance of adding to its weakness by being ruined.

The Grand Trunk Question

There are serious objections to the taking over by Government of this pioneer Canadian road, which held a unique position in that it had not received that generous measure of public aid which had been lavished on enterprises of modern date. In the first place, it was not bankrupt. It was in a stronger financial situation than is, for example, the Chicago, Milwaukee & St. Paul at the present time. It was simply embarrassed by reason of its endorsement of the securities of its subsidiary, the Grand Trunk Pacific, and if Government had relieved it of that liability it could have gone ahead indefinitely.

But that is not the most serious matter. The Grand Trunk must be regarded as more of an American than a Canadian road. Its western terminal is at Chicago and its eastern at Portland, Maine. It owns and operates nearly 1,700 miles of line in the United States. It derives 70 per cent of all its revenue from its American connections. Will it be able to maintain that valuable traffic, which is its very life-blood, when owned and operated by the Canadian government? Another objection is that its absorption by Government creates in the east a new series of those deadly parallels which make economical operation of public railways practically impossible in the west. Nor does it better matters to have the English shareholders crying out over what they call "the confiscation" of their stocks without a penny of compensation.

This reference to the American aspect of the Canadian railway situation suggests a matter of some importance which has not up to this moment been considered on its potential merits. With the taking over of the Grand Trunk, the Dominion Government becomes the owner and operator of 2,000 miles of line in the United States. It will be seen that this changes quite vitally the comity which has hitherto prevailed. That is to say, there is a material difference between the railway corporations of one country operating within the territory of the other country and the government of either country doing so. The question of rights of eminent domain may arise at any moment. Rivalries for traffic between Canadian and American companies, on both sides of the line, is one thing, and competition between American companies and the Canadian government on United States soil may be quite another. I am not raising this point. It has been definitely raised by influential journals in the United States, and put forward as a possible ground for serious international complications. In it we must all see one of the drawbacks which attach to the venture of the Canadian government into public ownership of railways.

Results of Government Operation

What has been the result thus far of the operation of 22,500 miles of railway by the Canadian government? Not encouraging. On the contrary, very discouraging. The deficit for 1921, as recently announced to Parliament, was placed at \$72,500,000. For 1920 it was \$70,300,000. On the oper-

ating side there was a betterment of about \$20,000,000; but that was more than counterbalanced by the increase in fixed charges. Of course, the actual shortage on the government system was much larger than that given out in the public statement, since it omitted probably \$60,000,000 of fixed charges on 4,000 miles of line and a capitalization of considerably more than a billion dollars. It must be understood that Government has bookkeeping methods which are all its own. There was some talk a few months ago about deferred charges, in order to help out the situation as to unemployment, and the facts in that regard are to be brought down.

There was a fair demonstration of economy on the government lines; yet that must be measured against the room that existed for retrenchment. Nothing is clearer than that the public railways in 1920 and 1921 were not only over-manned, but that they paid more for labor and got a much lower return in service than did the corporate roads. For example, on the Canadian Pacific, operating side by side with the Canadian Northern, which is the chief unit of the government system, the number of ton and passenger miles handled per employee in 1920 was 222,495, as compared with 153,019 on the latter.

The average trainload on the Canadian Northern was 350 tons, as against 529 tons on the Canadian Pacific, although the former has a much more favorable grade. Perhaps the most conspicuous difference between the two roads was in the matter of employees. When traffic began to fall off seriously between 1918 and 1919, the Canadian Pacific met the situation by reducing its working staff by 2,596. The Canadian Northern actually added 8,052. In government hands, by every reasonable and accepted test, efficiency on the Canadian Northern seriously declined, and it was certainly bad to begin with.

Perhaps the most alarming aspect of the entire public railway situation is the rapid rise of fixed charges. Government has been pouring out money by hundreds of millions on the capital side. Since 1914 the payments to meet deficits for extensions, equipment, standardization of lines and so on, has exceeded \$600,000,000. The Canadian Northern has been the chief beneficiary. These advances to public railway units have passed into the Dominion debt, which has not been a comforting thing for a nation of less than nine millions of people already heavily burdened by their participation in the war. Nor is the outlook hopeful. There may come a time, with traffic buoyant, when the operating deficit will be balanced by earnings; but meanwhile the accumulation of capital liability will inevitably make the problem of ultimate solvency more difficult. The national credit is beyond question, although as high a financial authority as the Wall Street Journal has published "A Friendly Warning to Canada," in which the rather obvious truth in that regard was plainly discussed.

Not a Failure of Private Ownership

The defenders and advocates of public ownership insist that the Canadian railway problem was created by the failure of private ownership. They are only technically on good ground. The assertion of state control followed the collapse of the Canadian Northern and the Grand Trunk Pacific, both of which were on the surface like any other railway corporation. But only on the surface. When the veneer of corporate status is removed, it is discovered that they were wholly government enterprises. They were essentially political roads in every respect, and it was political expediency which lay back of the insane additions to mileage that brought about their downfall under their own weight.

One fact alone should determine their proper classification. They did not have to finance their capital on the merits of their undertaking. Not at all. Practically every penny of their hundreds of millions of outstanding bonds

were endorsed by Government, in which case the purchasers were absolutely indifferent as to whether or not the railways themselves ever earned a farthing. They were secure. And the very moment the inflow of public money ceased—not after years of struggling and then being pinched by adverse circumstances—these roads were cast at the door of Government. Why? Because Government, as the guarantor of their liabilities, was the real owner. Government also subsidized them heavily, and, in the case of the Canadian Northern, gave a large grant of public lands.

This being the plain and incontrovertible truth, it is in the last degree misleading to speak of public ownership being forced on the Canadian government because of the failure of corporate ownership. The Canadian Northern would have remained a relatively small and obscure railway if it had been dependent on its own resources, and the Grand Trunk Pacific would never have been heard of at all. These two roads were financed entirely on the credit of the country, and their merits as legitimate railway enterprises were wholly subordinate to their value in the winning of elections. There is not a shadow of doubt about that.

The outlook is not stimulating. The hope aroused by the primary announcement that a substantial reduction in the operating deficit had been won in 1921 was crushed by a later statement as to the large increase in fixed charges.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING again increased during the week of May 20 to 792,459 cars, which was 15,100 more than the total for the week before and compares with 770,991 during the corresponding week of last year and 862,074 in 1920. Increases as compared with the week before were shown in all classes of commodities except livestock and increases as compared with the corresponding week of last year in all classes except coal and ore. In the Pocahontas and Southern districts, which are enjoying a heavy coal traffic during the strike, the total loadings were in excess of those of 1920, but in the Eastern, Allegheny and Southwestern districts the loading was less than that of last year. The coal loading for the week was 81,967 cars, an increase as compared with the week before, but 78,665 less than for the corresponding week of 1921. With this amount of coal added the loading for the week would have exceeded that of 1920 as it was more than offset by the increase of 62,540 cars in the loading of miscellaneous freight and 26,797 in merchandise, L. C. L. In two weeks the total increase in loading has been over 36,000. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED

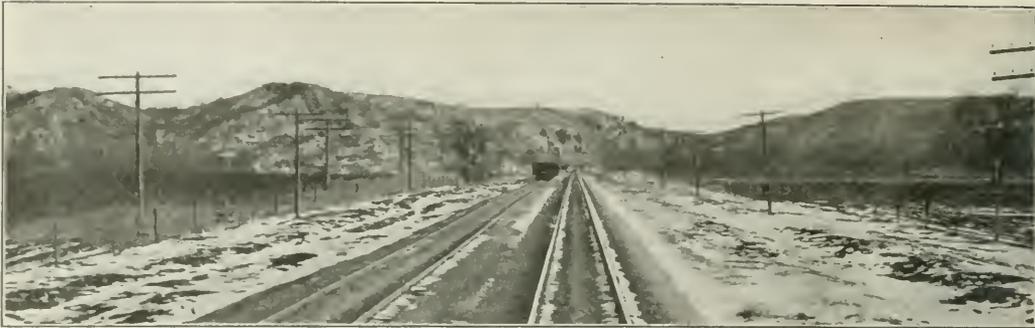
SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MAY 20, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	9,393	2,748	8,802	1,442	5,933	2,837	69,981	86,992	188,128	.....	.....
	1921	7,019	2,644	44,548	1,183	5,384	2,428	58,526	68,215	.....	189,947	199,939
Allegheny	1922	2,329	2,838	13,479	4,654	3,100	2,355	51,374	68,868	148,997	.....	.....
	1921	2,152	2,924	50,645	2,552	2,385	6,438	43,796	49,597	.....	160,489	182,041
Pocahontas	1922	187	90	28,447	883	1,338	34	6,133	4,079	41,186	.....	.....
	1921	155	114	24,221	185	1,190	23	5,115	3,559	.....	34,562	32,770
Southern	1922	3,267	2,202	21,930	709	19,711	915	37,854	41,511	78,099	.....	.....
	1921	4,594	2,056	18,779	575	14,278	764	35,841	33,957	.....	110,824	125,958
Northwestern	1922	11,202	7,728	3,424	1,296	18,109	8,160	30,353	36,701	118,973	.....	.....
	1921	7,985	6,617	4,129	700	14,350	18,571	26,805	30,564	.....	109,721	144,624
Central Western	1922	12,096	10,784	3,695	196	6,053	2,308	32,367	42,802	110,301	.....	.....
	1921	10,812	9,717	14,229	190	5,447	800	30,835	33,532	.....	105,562	115,434
Southwestern	1922	4,303	2,743	2,190	155	7,686	308	18,909	23,481	58,775	.....	.....
	1921	5,106	2,695	4,081	118	6,354	806	16,256	24,470	.....	59,886	62,208
Total Western districts	1922	27,601	21,255	9,809	1,647	31,848	10,775	78,629	104,984	276,049	.....	.....
	1921	23,903	19,029	22,439	1,008	26,151	20,177	73,896	88,566	.....	275,169	322,266
Total all roads	1922	42,772	29,133	81,967	9,335	61,930	16,917	243,971	306,434	792,459	.....	.....
	1921	37,823	26,747	160,632	5,503	49,388	29,830	217,174	243,894	.....	770,991	862,074
Increase compared	1921	31,316	28,204	160,649	11,235	62,226	59,268	160,009	340,767	.....	.....	862,074
	1920	4,949	2,386	.....	3,832	12,542	.....	26,797	62,540	21,468	.....	.....
Decrease compared	1921	.....	.....	78,665	.....	.....	12,913	.....	.....	.....	.....	.....
	1920	11,456	929	.....	.....	.....	.....	83,962	.....	.....	.....	.....
Increase compared	1920	.....	.....	87,082	1,900	.....	296	42,251	34,333	69,615	.....	.....
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May 20	1922	42,772	29,133	81,967	9,335	61,930	16,917	243,971	306,434	792,459	770,991	862,074
May 13	1922	42,270	29,940	79,170	8,813	60,661	14,403	241,418	300,684	777,359	751,186	843,145
May 6	1922	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,751	755,749	721,772	843,184
May 29	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	721,064	800,960
April 22	1922	33,371	28,114	63,445	7,609	55,859	9,770	239,484	276,536	714,088	704,632	717,772

Competent and sympathetic students of the facts of the case would have preferred an increase in the operating loss if it had been counterbalanced by a decrease in fixed charges. For the current year, there has thus far been a reduction of about \$10,000,000 in gross earnings; but "with no general election in hand," as a member of Parliament observed the other day, there has been leeway for a practically corresponding cutting down of expenses. Meanwhile, the whole railway problem is receiving an increasing amount of public attention, in Parliament and out. It was created amid absolute indifference, because the war excluded the consideration of all other topics.

The freight car surplus during the period from May 15 to 23 averaged 329,634, a decrease in a week of about 14,000. Of the total 79,534 were box cars and 208,691 were coal cars.

TWENTY CENTS A MEAL, or a total of \$163,000, was the loss sustained by the Chicago, Milwaukee & St. Paul in the operation of its dining cars for the year 1921. About 817,000 meals were served and the average amount received was \$1.05. It appears, however, that the cost, \$1.25, was calculated without including the interest on the investment—say \$50,000 per car—or the cost of hauling the cars.



On the Gulf, Colorado & Santa Fe Near the Washita Canon, Okla.

Santa Fe Back on Pre-War Earnings Basis

Income Available for Dividends, \$39,331,662. Best Year But One in Company's History

THE ATCHISON, TOPEKA & SANTA FE's net corporate income available for dividends and surplus, amounting for the year ended December 31, 1921, to \$39,331,662, made 1921 the best year in the company's history with the exception of 1919, in which year the net corporate income was \$43,098,658. This means that the Santa Fe must be awarded the distinction of being one of the first large systems to report its return to normalcy, which statement, of course, is made with due regard to the fact that the Santa Fe still has its problems of high wage costs, and that in 1921 it suffered, like all the other carriers of the country, a reduction in traffic.

The improvement which the Santa Fe showed in 1921 as compared with 1920 is not particularly marked. This is about what is to have been expected, for the simple reason that the system did not at any time lose as much ground as was the case with practically every other carrier in the country. In other words, the Santa Fe has not had as long a distance to travel to restore its net to its standard return level. The Atchison, Topeka & Santa Fe was one of the very few carriers of the country which earned for the Railroad Administration its compensation during the 26 months of federal control. For that period its standard return was about \$95,000,000. Its net after rentals for that period, however, was \$98,919,277. This is the outstanding feature which must be borne in mind in analyzing Santa Fe operating results.

In 1921 the system had a net after rentals of \$41,268,307 as compared with \$37,380,591 in 1920, an increase of \$3,887,717. The 1921 results were not quite as good as were obtained during the federal control period; in 1918 the figure was \$44,206,339; in 1919, \$42,025,618. Presumably, if the road had had more traffic in 1921, it would have exceeded its federal control record.

The business handled in 1921 was less than in 1920. The total tonnage for the year was 29,059,538 as compared with 36,850,553 in 1920. Reductions were made in almost all commodities with the exception of wheat, concerning which more will be noted below. The actual reduction in ton miles was 17.64 per cent. The freight revenues naturally were not reduced in the same proportion because of the increased rate per ton-mile. The freight earnings were \$160,217,450 or \$8,254,679 less than in 1920. The total

operating revenues were \$228,925,070 or \$25,323,932 less than in 1920. The operating expenses totaled \$173,217,915, a reduction of \$31,484,224 as against the 1920 figure. There was a reduction of \$8,387,514 in maintenance of way; of \$5,902,986 in maintenance of equipment and of \$18,231,691 in transportation.

Large Credit Per Diem Balance

The Santa Fe is fortunate in the matter of equipment. In 1921 it had a net credit for equipment rents of \$1,165,608 as against \$897,998 in 1920, which item further improved its net railway operating income. During 1921 the



Views on the Gulf, Colorado & Santa Fe

road acquired 50 locomotives and 3,459 freight cars, etc. On the other hand, it retired 79 locomotives and 1,373 cars. At present its percentage of bad order cars is one of the lowest for any road, which indicates a favorable condition of equipment maintenance.

The Gulf, Colorado & Santa Fe

One of the most interesting developments during the year was the change in the fortunes of the Gulf, Colorado & Santa Fe, the system's line to Galveston, and the results of which are included in the totals given above. This part of the Santa Fe has a mileage of 1,908. It has a standard re-

turn of \$2,828,218, which it did not quite earn during the period of federal control. In 1920, however, it had the poor fortune to have a deficit after rentals of \$1,072,202. In 1921 it accomplished the spectacular by bringing into the system a net after rentals of \$6,339,396. This reflects the prosperity of the southwest, if nothing else, but the increase in net was primarily due to the manner in which the grain movement from the central west was directed towards the gulf ports and particularly Galveston.

It will be remembered that the car loadings of grain in 1921 were considerably in excess of those for 1920. This was due, for one thing, to the fact that a large part of the 1920 crop moved in the early months of 1921. Further than that, the movement was directed towards the gulf ports rather more than towards the east as had been the tendency in the past. All of the lines serving the ports along the gulf will show this same increase in grain movement and naturally, because of its position and affiliations, the Gulf, Colorado & Santa Fe was in a specially advantageous situation.

As a matter of fact, it will be found that the Gulf, Colorado & Santa Fe is one of the very few railroads of the country which showed a higher total of net ton-miles in 1921 than it did in 1920. The actual figure of net ton-miles, including revenue and non-revenue freight, was 2,012,101 as compared with 1,784,350 in 1920. We believe this is the only important Class I railroad which showed a similar result. The effect on gross earnings can be readily appreciated. Combined with the reductions which were made through economies in operation, reduced wages, etc., it is not hard to explain the reason for the great increase in net as shown.

The situation of the Texas lines or the Texas subsidiaries of the large systems in the west and southwest has always been an interesting problem of American railroading. The Gulf, Colorado & Santa Fe, as a subsidiary of the Atchison, Topeka & Santa Fe, has been no exception. An analysis of the figures of the other Texas lines will show that they also succeeded in 1921 in returning to the parent companies sizable net income and in most cases much in excess of that for 1920. While it is true that the grain movement in 1921 was a development singular to that year, the other changes in traffic and operation which have taken place because of the development of the states of Texas and Oklahoma have apparently put an entirely new aspect on the situation which will be watched in future months with great interest.

The Gulf, Colorado & Santa Fe is a real part of the Atchison, Topeka & Santa Fe System. It will be found to have the same excellent standards as the parent company, and the illustrations which are given of Gulf, Colorado & Santa Fe track will presumably be studied with interest.

The Corporate Net Income

The Santa Fe's corporate net available for dividends in 1921—\$39,331,662—was, as noted above, the best in the company's history with the exception of one year, 1919. The company's dividends are at the rate of 5 per cent on the preferred stock—\$6,208,685—and 6 on the common, making \$13,518,420 or a total for dividends of not quite \$20,000,000. In 1921, in other words, the corporate net was equal to double the amount required for dividend payments, as in fact has been the case for a long period of years. It is further worth noting that interest on bonds in 1921 was only \$11,953,002, which amount is less than it was in 1907; in 1912 bond interest approached \$14,000,000. Figures of this kind give one a ready picture of the Santa Fe's remarkable financial position. They indicate further how extremely favorably situated the road will be with reviving traffic.

In 1919 the company's corporate net available for dividends totaled \$43,098,658. This high figure for 1919 is of more than ordinary interest, for it was the unusual for the

road to increase its corporate net while it was being operated by the government at a certain rental. The reason for the improved corporate net in 1919 in the Santa Fe's case was "Other Income"; namely interest and dividends on securities owned in companies the transactions of which are not included in the system accounts and similar income. Unfortunately, the Santa Fe does not give its stockholders further details concerning this factor. At any rate, in 1918 this other income totaled \$4,310,952; in 1919 it was \$18

ATCHISON, TOPEKA & SANTA FE SYSTEM			
Comparison of Operating Results			
	1921	1920	Increase or decrease
Mileage	11,678	11,584	94
Operating Revenues:			
Freight	\$160,217,450	\$168,472,129	—\$8,254,679
Passenger	52,594,551	63,473,165	—10,878,614
Mail, express and miscellaneous	16,113,069	22,303,707	—6,190,638
Total operating revenues	\$228,925,070	\$254,249,002	—\$25,323,932
Operating Expenses:			
Maintenance of way and structures	\$31,734,122	\$40,121,636	—\$8,387,514
Maintenance of equipment	52,472,941	58,375,927	—5,902,986
Traffic	3,748,700	3,173,383	575,315
Transportation, rail line	80,283,618	93,513,309	—13,229,691
General	5,425,602	5,216,198	209,404
Total operating expenses	\$173,217,915	\$204,702,139	—\$31,484,224
Net operating revenue	\$55,707,154	\$49,546,863	\$6,160,292
Railway tax accruals	14,836,268	12,004,141	2,832,128
Uncollectible railway revenues	77,318	50,435	26,883
Railway operating income	\$40,793,563	\$37,492,287	\$3,301,281
Equipment rents—Net—Credit	1,165,608	897,998	267,611
Joint facility rents—Net debit	690,869	1,009,694	—318,825
Net railway operating income	\$41,268,307	\$37,380,591	\$3,887,716

Note—The operating expenses reported above exclude maintenance equalization charges and credits, so as to reflect actual expenditures applicable to each year.

denly increased to \$15,100,116, which great increase was explained at the time by the meagre statement that: "The income account in this respect does not reflect a normal year's showing but constitutes a record of income credits, applying in part to prior years, received or determined during the year." The other income in 1920 was \$9,842,116, and in 1921 but \$5,293,888, which again emphasizes the favorable character of the 1921 railway operating results.

The Matter of Equalization Charges

The Santa Fe in 1920 included in its maintenance expenses certain so-called equalization charges amounting to a total of \$13,374,976 "for the purpose of approximating the amount of maintenance expenses to which the company was entitled under the Transportation Act." The charge was shown in an item under maintenance of way and structures as "Equalization-Way and Structures, \$8,711,056" and under maintenance of equipment as "Equalization-Equipment, \$4,663,919." In the 1921 income account there appears an item of \$2,612,564, "equalization charges four months ending December 31, 1920, and offsetting credit in 1921." With reference to this item the report states:

"In the last annual report reference was made to the setting up of an equalization reserve for maintenance of way and structures and maintenance of equipment for the purpose of approximating the amount of the maintenance expenditures to which the company was entitled under the Transportation Act. This practice was carried over into the year 1921, but owing to the great difficulty of definitely determining a monthly proportion of the normal amount of annual expenditures under the fluctuating conditions which subsequently developed, the practice was discontinued and under instructions of the Interstate Commerce Commission the unexpended balance in the reserve was written off by credits to operating expenses during the remainder of the year. This has resulted in an abnormal credit to the income of the current year of \$2,612,564, being the portion of the reserve applicable to the four months ending December 31, 1920. The remainder of the reserve, viz., \$10,762,412, which pertained to the guaranty period, while credited to the current expenses, is offset by a charge to income of a corresponding amount as an adjustment of amount due under Section 209 of Transportation Act, 1920."

General News Department

The American Association of Passenger Traffic Officers will hold its annual meeting at the Seelbach Hotel, Louisville, Ky., on Tuesday and Wednesday, October 10 and 11.

Wage Reduction for Shop Men to Be Announced Soon

The Labor Board's decision regarding the reductions to be made in the wages of shopmen has been completed and will be announced as soon as a dissenting opinion which will be signed by the three labor members on the board has been completed. Unauthorized reports indicate that the scale of reductions for shopmen will range from 5 to 9 cents per hour, the wages of apprentices and laborers to be cut 5 cents an hour, of mechanics and passenger carmen 7 cents an hour and of freight carmen 9 cents an hour. The leaders of the sixteen railroad unions have been requested by E. H. Fitzgerald, president of the clerk's organization, to meet in Cincinnati on June 6 to discuss the future attitude and action of the organization as the result of the recent orders of the Board.

Election on the Pennsylvania

Clerks and miscellaneous employees of the Pennsylvania Railroad have recently completed their second election, by secret ballot, for representatives on the joint committee which deals with the officers of the road in questions of mutual concern. They were to fill vacancies and the places of representatives whose term of office expires this year. Approximately 15,000 employees in the Eastern Region were concerned in the elections. The results indicate that the plan is working with increasing satisfaction. The spirit in which the elections were carried on gives evidence of keen interest on the part of the employees. For the 72 places, 120 candidates were nominated. The number of candidates for each office varied from one to seven. Candidates were nominated by petition and the ballots were counted by tellers representing the employees and the management; and the results were certified by the Regional Joint Committees.

President Harding Endorses

Careful Crossing Campaign

The American Railway Association publishes the following statement issued by President Warren G. Harding relative to the four months' campaign for safety at highway crossings:

"The complete success of such an effort would mean the saving of thousands of lives, the prevention of many more thousands of injuries and, incidentally, the prevention of a great property loss. Of course, the ideal solution is elimination of grade crossings, to which all possible energy and means should be unceasingly directed. But the extent of our country and its railroad mileage make apparent that not for many years of utmost effort could this be affected. There should be constant pressure for elimination of these danger spots, particularly in the more populous areas; pending which there is need for just the kind of preventive effort that your association is planning. Among these measures, the most effective would seem to be to arouse in the minds of drivers a sense of their personal responsibilities. When thoughtlessness is allowed to usurp the place of vigilance, as too often happens, the scene is set for tragedy. Reminders and still more reminders of the need for caution at railway crossings are needed.

"Surely, the effort you are undertaking is appealing and it ought to have the most generous and general support."

Preliminary Report of April Earnings

A preliminary compilation of reports just received by the Interstate Commerce Commission from 137 Class I railroads show that in April those roads had a net operating income of \$35,239,000, compared with \$21,886,000 during the same month last year.

Total operating revenues for the 137 railroads amounted to

\$297,300,000, a decrease of 4.6 per cent compared with April, 1921, while their operating expenses totaled \$240,533,000, or a reduction of 11 per cent, compared with the same month one year ago. The roads from which reports have already been received represent a mileage of 169,586 miles.

Reports from 66 railroads in the Eastern district showed that their operating revenues in April totaled \$150,897,000, a decrease of 3.8 per cent, while their operating expenses totaled \$120,489,000, a reduction of 10.6 per cent under April, 1921. The net operating income for those 66 roads totaled \$19,931,800, compared with \$12,671,900.

Reports from 19 roads in the Southern district showed that their total operating revenues were \$29,524,400, an increase of only two-tenths of 1 per cent, while their operating expenses amounted to \$23,004,700, which was a decrease of 13.4 per cent. The net operating income of those 19 roads in April totaled \$4,748,400, compared with \$1,338,600 in April one year ago.

Fifty-two railroads in the Western district had operating revenues totaling \$116,878,400, which was a decrease of 6.7 per cent, while the operating expenses of those same roads totaled \$97,039,300, a reduction of 11 per cent. The net operating income of those roads totaled \$10,559,300, compared with \$7,875,500.

Complete reports for the Class I railroads of the country are expected to be available late this week.

A Safety Message by Radio

Of the various editors of "safety first" news in this country one of the best is the Insurance Department of the Pennsylvania Railroad; and a brief message from this source was sent out by radio telephone on the evening of May 17 from the Westinghouse broadcasting stations in Pittsburgh, Chicago, Newark, N. J., and Springfield, Mass. Some of the things said were the following:

During the last 10 years 84,000 people have been killed and injured in this country while trespassing or walking on railroad tracks and trains; and 9,000 of this great army of killed and injured were children under 14 years of age; 12,000 were between 14 and 21 years; 9,000 were hoboes and tramps and 54,000 were useful members of society. Notwithstanding the unavoidable hazards of railroad operation nearly one-half of all the fatal injuries that occur on the railroads is chargeable to trespassing. This needless waste of human life is a sad reflection upon the intelligence of the American people; it will be stopped when public spirited citizens in every town become awakened.

Indeed, great improvement has already been made. Prior to 1916 trespassers killed and injured on the railroads numbered about 10,000 a year, but during the last three years this has been reduced to an average of about 5,000 a year, notwithstanding a large increase in population and in railroad business. This great result, preventing untold suffering, is directly due to safety education in the home, the schools, the mines, the manufacturing enterprises and to the general influence of the safety first movement; and particularly to the untiring efforts put forth by the railroads through their police departments to keep persons off the tracks. Teachers, preachers, and all public-spirited citizens are urged to use their influence in securing attention to the simple rules many times published [and quoted in the message].

Grand Trunk Rally at Stratford

At Stratford, Ontario, on the evening of May 18, about 2,200 employees of the Grand Trunk Railway participated in a grand re-union in the Stratford Armory; and about 800 others, unable to get into the building, held an overflow meeting at the Avon Casino. Sir Joseph Flavelle, chairman of the board of directors, W. D. Rebb, vice-president, and other prominent officers of the road were present, and there was a brief address by Chair-

man Flavell. Superintendent W. J. Piggott was chairman of the meeting.

A bronze tablet, in memory of employees who gave their lives in the Great War, was unveiled, and an ambulance, presented to the railway company, for use in Stratford, by an association of employees, was on exhibition. The presentation of medals and other trophies as rewards in athletic and other contests also formed a feature of the meeting.

Stratford is the location of large shops of the company and employees in the shops and other departments of the service presented a musical and literary program.

Program of the Mechanical Division Convention

The program of the third annual meeting of Division V—Mechanical—of the American Railway Association, which will be held at Atlantic City, N. J., June 14-21 inclusive, is as follows:

First day (Wednesday, June 14, 1922)—Opening exercises; association business; discussion of reports of the following committees: Nominations, Safety Appliances and Scheduling of Equipment through Repair Shops.

Second day—Discussion of reports on Prices for Labor and Material, Arbitration, Tank Cars, Loading Rules, Train Lighting and Equipment.

Third day—Discussion of reports on Car Construction, Couplers and Draft Gears, Brake Shoe and Brake Beam Equipment, Train Brake and Signal Equipment, and Car Wheels.

Fourth day (Monday, June 19, 1922)—Discussion of reports on the Manual, Specifications and Tests for Materials, and Locomotive Headlights and Classification Lamps; election of officers.

Fifth day—Discussion of reports on Locomotive Construction, Feed Water Heaters, and Modernization of Stationary Boiler Plants.

Sixth day—Discussion of the report on the Design and Maintenance of Locomotive Boilers; topical discussion; Closing Exercises.

No reports will be received from the following committees: Autogenous and Electric Welding; Design, Maintenance and Operation of Electric Rolling Stock; Engine Terminals, Design and Operation; Lateral Motion on Locomotives; Mechanical Stokers; Standard Blocking for Cradles of Car Dumping Machines; Train Resistance and Tonnage Rating; and Car Repair Shop Layouts.

Lumber Standardization Proposed

Representatives of the American Railway Association, the American Electric Railway Association, and the wood manufacturing industries met with manufacturers, wholesalers and distributors of lumber, architects and building engineers at the Department of Commerce in Washington on May 26, and concurred in the decision previously arrived at by the last named groups regarding the subjects of standardization of lumber sizes, simplification of grades, guaranties of quantity and quality and national inspection.

It was resolved:

"That all organizations representing producers, distributors and consumers of lumber, be invited to appoint representatives to meet in general conference on the call of the National Lumber Manufacturers' Association, with the assistance of the departments of Commerce and Agriculture, for the purpose of arranging for holding meetings in as many sections of the United States as may be deemed necessary in order to arrive at definite recommendations concerning the three subjects here under discussion. Such recommendations to be placed before another general conference of all interests involved after the series of sectional conferences shall have been concluded."

Another resolution which was adopted included national inspection in the matters to be brought before this committee. It is intended to proceed expeditiously with the creation of this committee and it may be able to hold its first meeting within 30 days.

W. F. Kiesel, Jr., (P. R. R.) speaking for the American Railway Association, said that his association was in entire accord with the proposed lumber trade reforms, in all the fundamentals.

V. R. Hawthorne, secretary of the mechanical division A. R.

A., endorsed Mr. Kiesel's statement; the association had for a number of years devoted much attention to the problems of standardization and simplification.

F. Tingley, Washington, representing the American Electric Railway Association, pledged the co-operation of that organization.

Mechanical Division Issues Manual of Standard and Recommended Practice

The standard and recommended practice of the former American Railway Master Mechanics' and Master Car Builders' Associations has been consolidated and harmonized by appropriate committees of the Mechanical Division, American Railway Association, and together with practices adopted since amalgamation with the American Railway Association incorporated in a loose-leaf volume, designated "Manual of Standard and Recommended Practice, Mechanical Division, American Railway Association." This work has been done under the direction of the Committee on Manual.

This manual contains text and drawings for all standards and recommended practice adopted by letter ballot by the former Master Car Builders' and American Railway Master Mechanics' Associations and the Mechanical Division, American Railway Association, and is arranged in 12 sections, as follows:

- A—Specifications for Materials.
- B—Gages and Testing Devices.
- C—Car Construction—Fundamentals and Details.
- D—Car Construction—Trucks and Truck Details.
- E—Brakes and Brake Equipment.
- F—Locomotive Wheels, Tires and Miscellaneous Locomotive Standards.
- G—Safety Appliances for Cars and Locomotives.
- H—Train Lighting, Headlights and Classification Lamps.
- I—Rules for Fuel Economy on Locomotives.
- J—Inspection and Testing of Locomotive Boilers and Rules and Instructions for Inspection and Testing of Steam Locomotives and Tenders.
- K—Specifications for Tank Cars.
- L—Miscellaneous Standards and Recommended Practice.

The pages in each of these sections are numbered consecutively and each section is provided with separate index. There is also a general index of the contents of the entire manual with proper reference to section and page.

The Code of Rules Governing the Condition of and Repairs to Freight and Passenger Cars for the Interchange of Traffic, and the Rules Governing the Loading of Lumber, Logs, Stone, etc., and Loading and Carrying of Structural Materials, Plates, Rails, Girders, etc., while adopted standards are not published in this manual.

The manual contains nearly 1,000 pages of text and drawings and is bound in special hinged back binder, so that it may be kept up to date by issuing from time to time corrected pages without the necessity of printing the entire book. It will also be possible to secure separate sheets covering only such matter as is desired without the necessity of purchasing the entire book.

This manual will be supplied on requisition at the following prices:

To members of the association:

Manual complete, including binder, per copy.....	\$6.00
Separate sections complete, self-covered in paper, per copy .....	.50
Separate sheets, each .....	.05

To other than members of the association the manual is sold at double the prices quoted.

Meetings and Conventions

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

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, June 19-21, Hadden Hall Hotel, Atlantic City, N. J. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.—J. F. Gettrust, The Ashton Valve Company, 318 W. Washington St., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago. Annual meeting, Oct. 17-20, San Francisco, Cal.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 28 and 29, Minneapolis, Minn.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, October 10 and 11, Seelbach Hotel, Louisville, Ky.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 23-25, 1922, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Bercherdt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Annual meeting, November, 1922.

Division I.—Operating.
 Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
 Medical and Surgical Section. J. C. Caviston, 75 Church St., New York.
 Protective Section (including former activities of the American Railway Chief Signal Agents and Chiefs of Police Association). J. C. Caviston, 75 Church St., New York.
 Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y. Annual meeting, September 20-22, 1922, Colorado Springs, Colo.

Safety Section.—J. C. Caviston, 75 Church St., New York.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III.—Traffic. J. Gottschalk, 143 Liberty St., New York.

Division IV.—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Exhibit by National Railway Appliances Association. Construction and Maintenance Section. E. H. Fritch.

Electrical Section.—E. H. Fritch.

Signal Section.—(Including former activities of the Railway Signal Association). H. S. Balliet, 75 Church St., New York, N. Y. Next meeting, March 13 and 14, Drake Hotel, Chicago. Annual meeting, June 14-16, 1922, Monmouth Hotel, Spring Lake, N. J.

Division V.—Stores (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 14-21, 1922, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Store Keeper, New York Central, Collinwood, Ohio. Annual meeting, June 19-21, 1922, Hotel Traymore, Atlantic City, N. J.

Division VII.—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next convention, October 17-19, 1922, Cincinnati, Ohio. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—A. Leckie, Industrial Agent, Kansas City Southern Ry., Kansas City, Mo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN STRAIGHT TIE AND MECHANICS' ASSOCIATION.—Whitelsey, Union Trust Bldg., Washington, D. C. Annual meeting, May 10, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisman, 1600 Prospect Ave., Cleveland, Ohio. Annual convention, Oct. 27, 1922, General Motors Building, Detroit, Mich.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 26-30, 1922, Chalfonte Hotel, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays 10 o'clock, except July and August, 33 W. 39th St., New York.

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

Railroad Division A. F. Stuebing, Manager Editor, Railway Mechanical Engineer, 1614 North Blvd., New York.

AMERICAN TRAILING CARRIAGE ASSOCIATION.—L. L. Darling, 1110-1111 Mallers Bldg., Chicago, Ill. Next convention, June 18, 1923, Chicago.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—S. D. Cooper, A. T. & S. Fe R. R. T. Co., Kan. Next meeting, January 23, 1923, New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—L. A. Andreucetti, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next meeting, June 19, Deoria Hotel, Atlantic City, N. J. Exhibit by Railway Electrical Supply Men's Association.

ASSOCIATION OF RAILWAY ELECTRICIANS.—Thomas De Witt Chrysler (chairman), 411 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SHUFFLE MECHANICS.—A. W. Clarke, 1858 McCormick Bldg., Chicago, Ill. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TRIPWAGON SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION TO REGULATE AND CAR ACCOUNTING OFFICERS.—See American Railway Association, Division II.

AMERICAN RAILROAD MASTER CARBONERS' ASSOCIATION.—J. H. Hoop, American Bridge and Iron Co., 31 S. Michigan Ave., Chicago. Meeting with National Association of American Railway Bridge and Building Ass'n. Col. A. J. C. W. A. Paris, 51 Railroad St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION.—(See American Railway Association, Division V.)

CLUB.—Regular meetings, 1st Monday in month, except June, July and August, New Meridian Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in January, March, May, September and November, Hotel Ironopolis, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

EASTERN RAILROAD ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Railroad, Chicago. Regular meeting, Wednesday preceding 3d Friday in month, Room 1414, Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, August 5-17, Hotel Commodore, New York, N. Y. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George F. White, 747 Railway Exchange, Chicago. Meeting with International Railway Fuel Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Washaba Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—C. W. Sullivan, Garlock Packing Co., 326 W. Madison St., Chicago. Meeting with International Railway Fuel Association.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY UTILITIES COMMISSIONERS.—James B. Walker, 399 Lafayette St., New York. Next convention, September 26, 1922, Detroit, Mich.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Annual meeting, June 7, 1922, Hotel Cleveland, Cleveland, Ohio.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Linnery Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual dinner, February 1, Waldorf-Astoria, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Coway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, at 300 W. 10th St., Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers, New York.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va. Next meeting October 10-13, 1922, Pittsburgh, Pa.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division V.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A., Division V.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 W. 39th St., New York.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, 100 N. W. Ry. Station, Ill. Annual convention, September, 1921, 1922, Hotel Statler, Cleveland, Ohio. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Fraubenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SIGNAL AND SUPPLY OFFICERS' RAILWAY CLUB.—A. J. Merrill, P. O. Box 1305, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—I. I. Carrier, Car Serv. Art. Term. Cent. Y. S. Ry., 319 Southern Ave., North Nashville, Tenn. Regular meetings, September 19, St. Augustine, Fla.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, C. N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Annual convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Regular meetings, 3d Monday each month except June, July and August.

Traffic News

The State Department has communicated to the Canadian government its willingness to begin negotiations in connection with the St. Lawrence Canal project, the governments of the United States and Canada having on January 21, 1920, referred to the International Joint Commission for investigation and report all questions relating to the importance of the St. Lawrence river between Lake Ontario and Montreal, both for navigation and the development of water power.

The railroad commission of Alabama announces that an order will be issued requiring that all intrastate freight rates which were advanced 25 per cent during the war in conformity with the order of the Interstate Commerce Commission, shall be reduced 12½ per cent on July 1, when the new interstate rates become effective. The order provides that the rates on velvet beans, velvet bean products, and mixed feed for animals and poultry must be given the same reduction. It also provides that no change shall be made in the rates on raw materials for furnaces, which the commission refused to permit the railroads to increase when the last advance was authorized.

New England Rate Decision Sustained

In the federal court at New York City on May 25 Judges Hough, Manton and Mayer denied the application of the trunk line railroads for an injunction restraining the Interstate Commerce Commission from putting into effect its order of January 30 increasing by 15 per cent the divisions allowed the New England lines on through freight.

The petitioning lines contended that the order of the commission was discriminatory and contrary to the purpose of the Interstate Commerce act. The reason for increasing the rates in behalf of the New England lines was to help them financially, and in effect the order of the commission, if executed, would take money from one group of railroads in order to aid another group.

The opinion of the court calls attention to the heavy costs of operating the New England lines because of terminal characteristics, a density of branch lines, stations, switches, yards, etc., and states that the standardization of wages on railroads by the War Labor Board had increased the cost of operation of the New England lines relatively more than other lines, and that their fuel expense was heavier than that of roads within easy reach of the coal producing territory.

It states that nothing was found in the record to justify any claim of abuse of discretion in rate making. "We are satisfied," the opinion continues, "that a reasonable investigation was made by the commission. . . ."

Coal Production

The eighth week of the coal strike opened with a decided increase in production. The returns so far received indicate an output of soft coal close to 5,000,000 tons, according to the weekly bulletin of the Geological Survey. Production of anthracite, however, remains practically zero.

Final reports for the seventh week of the strike (May 15-20) show an output of 4,472,000 tons of bituminous coal and 8,000 tons of anthracite, a total of 4,480,000 tons.

The increase during the week of May 22-27 may be judged from the fact that car-loadings on Monday exceeded by 652 cars the highest figure previously reported since the strike began. An increase on Tuesday carried loadings above the 15,000 mark.

NUMBER OF CARS LOADED, BY DAYS

	1st Week	3d Week	5th Week	7th Week	8th Week
Monday	11,445	7,898	11,598	13,366	14,688
Tuesday	11,019	10,041	12,160	12,830	15,026
Wednesday	11,437	11,088	12,861	13,422	14,684
Thursday	11,090	11,193	12,487	13,445	14,612
Friday	11,296	11,596	12,778	14,036	.....
Saturday	8,888	10,194	11,265	12,357	.....

The increase is said to be largely in response to higher prices and more active demand, calling into production mines which have hitherto been working only part-time in the districts not affected by the strike.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from June 1 until September 29 the operation of schedules, which propose increases in rates of 3 cents per 100 pounds on grain products, carloads, from Montana points to various California points.

The commission has suspended until September 23, the operation of schedules which propose to increase from 75 cents per 100 lb. to \$1.08 the rate on iron and steel from Utah common points to various California points.

The commission has suspended until September 29, the operation of schedules No. 21 which propose increase in minimum weight on grain and seeds, beans, peas, or pop corn in mixed carloads. At present 30,000 lb. minimum is applicable.

The commission has vacated its order in the Nebraska interstate rate case, the Nebraska State Railway Commission having by order on May 5 set aside its order which prevented the railroads from applying the rate increases authorized by the commission in Ex Parte 74.

The commission has suspended from June 1 to September 29 the operation of schedules, which propose changes in routing of shipments of grain, grain products, cereals and cereal products, carloads, on traffic originating in Colorado, Iowa, Kansas, Missouri, Nebraska, and Wyoming, destined to Idaho, Montana, Oregon, Utah, Washington, Wyoming and British Columbia.

The commission has suspended until September 23, the operation of tariffs on dried and evaporated fruits between points in Arizona, California, Nevada, Oregon and Utah on the one hand and points in Utah, California, Wyoming, Nevada, Idaho, Montana and Oregon on the other hand which propose to increase by 25 per cent the rates on these commodities in case of failure on the part of shippers to observe proposed box specifications and requirements.

The commission has rescinded its order in the railway mail pay case of November 18, 1921, in so far as it modifies Section 8 of its order of December 23, 1919. This is now modified to provide that whenever a regular authorization is exceeded on 50 per cent or more of the trips in any calendar month the appropriate higher unit shall be authorized. This rule is never to be used in the month of December. This is in response to a joint petition of the postmaster general and the carriers.

The commission has suspended from June 1 to September 29 the operation of Southern Pacific schedules, which propose to establish proportional round trip basing fares from Long Beach, Los Angeles, Ontario, Pasadena, Pomona, Colton, Riverside and San Bernardino, California to Ogden, Utah, to be granted passengers holding or who purchase round trip excursion tickets from Ogden, Utah, to West Yellowstone, Montana.

The following will serve to illustrate the effect of the suspended fares:

Regular summer excursion fare, Los Angeles to Ogden, \$48.82.
Proportional basing fare, Los Angeles to Ogden, \$44.17.

The commission has issued a decision finding not justified the proposed joint proportional rates on grain and grain products from Minneapolis and other points in the Northwest to points in trunk line territory and New England which had been filed to become effective on November 1. The schedules had been suspended and are now ordered cancelled. At the time the suspended rates were originally determined upon they represented substantial reductions in the then existing rates. Subsequently the proportional rates east of Chicago were reduced by eastern lines and the proportionals west of Chicago were reduced following the commission's decision in the Western grain case. At the present time the schedules would not lower the existing combination rate on wheat and would accomplish only slight reductions in the rates on grain products and coarse grains. The re-

port says that the railroads concede that these reductions would not affect the situation very materially or afford marked relief to Minneapolis shippers who expect at some future date to propose other rates.

Conference Ruling on Creosoted Lumber

The commission has amended conference ruling 232 to read to the effect that for creosoting lumber a transit privilege of eighteen months is not excessive. The commission has heretofore expressed the view that a transit privilege extending through a period of more than one year is *prima facie* unreasonable; but experience has shown, that as applied to the creosoting of lumber a period of 24 months is not unreasonably long, provided full local rates on the inbound material are required to be paid.

Southern Freight Rate Investigation

At the hearing in the southern class rate investigation now being conducted by Commissioner Eastman at Atlanta, Ga., the commissioner has announced that hearings will be discontinued after presentation of the carriers' case, on or about June 20, until July 12, at which time opportunity will be afforded at Atlanta for cross examination of the carriers' witnesses. Subsequent hearings will be held in Atlanta, Asheville, New Orleans, Chicago and New York, for the presentation of evidence by others than the carriers. These hearings will not be held prior to September 1. Shippers and other interested parties are requested to advise the commission as to the probable amount of time they will require and as to whether they desire to present evidence as to intraterritorial and interterritorial rates at one time.

Personnel of Commissions

J. C. Roth has been promoted from assistant director, Bureau of Service, to director, Bureau of Service, Interstate Commerce Commission, effective on June 1; vice, Colonel F. G. Robbins, who has been elected vice-president of the Chicago & Erie, with headquarters at Chicago.

United States Supreme Court

Reading Dissolution Decree to be Modified

The Supreme Court on Monday directed that the decree of the district court for the eastern district of Pennsylvania, which ordered dissolution of the Reading system, be modified and the case remanded for further proceedings and hearings before the district court in conformity with the opinion. The court said the case presented the questions, first, whether a decree of the district court entered under a mandate from the Supreme Court was in accordance therewith, and, second, whether it did equity to the appellants. The court said the difficulty in the separation of interest of the Reading Company, and of the Reading Coal Company was that the lien of the general mortgage covered much of the property of the Reading Company, and all the stock and property of the coal company, and that the general mortgage was not redeemable until 1907. It said the plan required the railroad company to assume the whole liability of the general mortgage. The case had to do wholly with the method of carrying out the dissolution previously ordered.

Saying that since the time of settling the decree a change for the better has come in the financial situation of the country, Chief Justice Taft said:

"We think the plan should be changed in accord with the following suggestions. The district court should, after a hearing of all interested parties, determine the respective values of the properties of the merged Reading Co. and the coal company which are subject to lien of the general mortgage. Then the decree should direct that the liability of each on the bonds and the pledge under the mortgage shall be modified as between the mortgage and the mortgagor, so that the liability of the Reading Co. on the bonds and mortgage, and the lien of the mortgage upon that property, properly to secure them, shall be reduced to an amount proportionate to the ratio of the value of its pledged property to the value of all the property pledged including that of the coal company. The obligation of the coal company upon such bonds and the lien upon its property to secure them should

be reduced in corresponding proportion. The amount that each company is to pay as interest should be similarly fixed and specific provisions for foreclosure of these separate liens on default and requisite machinery and other necessary changes to carry out the result will be made by the district court in its discretion. By this arrangement the interests and joint obligations of the Reading Co. and the coal company will be completely severed and the purpose of this court carried out.

"The Reading Co.'s first plan contemplated the securing of a voluntary release of the coal company's property by the bondholders through payment of 10 per cent of the par value of his bonds to each bondholder, but the proposal did not meet with favor. We leave it to the district court to determine what, if any, injury to the security this modification of the terms of the debt and mortgage may cause and to compensate for it by such a payment to the bondholders by both or either of the bondholders as may seem equitable and convenient.

"The changes involved in these suggestions may interfere with, or make inapplicable the provisions of the present plan looking to a proper working capital for the Reading Company. Authority is, therefore, given to the district court to amend the plan in any way which seems wise to leave the Reading Company properly financed to meet its obligations to the public.

"It does not seem necessary to change the general form of that feature of the plan by which through the distribution of certificates of interest to the stockholders of the old Reading Company in the stock of the new coal company, the stock relations of the old Reading Company and the present coal company are to be ended, though we would not limit the power of the district court in this regard. The adopted plan was nicely adjusted to secure a practical working basis for both companies, and we would not embarrass the district court, after a full hearing of all the parties in the detailed changes which it may find practically necessary to adopt in following the general outlines of our modification of the plan.

"We think it not unreasonable to accept the suggestion made at the bar, namely, that not only shall the stockholders of the coal company upon receiving and registering their stock be required to make affidavits that they have no stock ownership in the Reading Company and are not acting for, or representing, any one who has, but also that the merged Reading Company shall be required to adopt a by-law effective till the further order of the court permitting registration of transfers of shares of its capital stock in the names only of persons who shall make affidavit that they are not stockholders, registered or actual, in either the new or the old coal company, and have not been and are not holders of proxies to vote shares of stock therein.

"As to the New Jersey Railroad Company and the Wilkes-Barre Coal Company, we have heard no criticism and the provisions as to them are approved. By the decree the new coal company, its officers and directors are enjoined from voting the coal company stock so as to form a combination between the coal company and the Reading Company. The Reading Company and all persons acting for or in its interest are perpetually enjoined from acquiring, receiving, holding, voting or in any manner acting as the owner of any shares of the new coal company, and the new coal company and all persons acting for it are enjoined from acquiring, or voting, any of the shares of the Reading Co.

"The coal company shall be permanently enjoined from issuing to the Reading Company, and the Reading Company from receiving, any stock, bonds, or other evidences of corporate indebtedness of the coal company. On default the trustee of the mortgage is required to vote the coal company stock so as not to bring about a recurrence of the conditions condemned in this case, and if it shall be necessary to sell the properties they are to be sold to different interests. The attorney general and his successors in office are given by the decree full opportunity to keep watch upon the relations between the two companies and to appeal to the court for prompt enforcement of the injunctions of the decree as they may be advised. The court retains large control of the decree, with power to assure its continued efficacy by the summary remedy of contempt. With these restrictive provisions and the modifications of the plan outlined above, we think that the independence of the four companies will be fully achieved.

"The decree of the district court is affirmed with modifications already indicated and the case is remanded for further proceedings in conformity to this opinion."

Foreign Railway News

Locomotive Exports in March

Fourteen steam locomotives were exported from this country in March, valued at \$112,243. Seven of these, valued at \$49,716, went to Canada; one (\$5,350) to Guatemala; one (\$12,377) to Cuba; one (\$20,000) to Chile; three (\$21,100) to China; and one (\$3,700) to British South Africa. These figures were compiled by the Bureau of Foreign and Domestic Commerce.

Concession for 2,400 Miles of Railway in Peru

Press dispatches from Lima, Peru, carry the information that a concession has been granted to a financial syndicate calling for the construction of 2,400 miles of railway. The syndicate also receives a grant of 25,000,000 acres of land with valuable mineral and petroleum rights and a 33-year monopoly on the nation's tobacco business.

Another British Equipment Combine

An amalgamation of great interest is that of the Vacuum Brake Company in France, Belgium, Spain and Portugal, with Tyer & Company, manufacturers of signal equipment, in the same countries. The new firm will be known as the Société Anonyme des Appareils de Sécurité de Chemins de Fer. As is well known the vacuum brake is largely used on British freight trains, a fact which may influence the adoption of this form of brake for continental railways, inasmuch as when freight cars are exchanged either by train, ferry or the proposed Channel tunnel it will be the British cars that will have to be used, since they can travel without alteration on continental railways, whereas the continental freight cars are too large for English clearances.

Rate Reductions in Britain

A number of important rate reductions have been made by British railways. These include:

1. Restoration of pre-war demurrage regulations.
2. Reduction of increase over pre-war rates from 100 per cent to 75 per cent on coal, coke, iron and steel and raw materials used in making iron and steel, and reduction in flat rate on coal from 6d. per ton to 4d.
3. Varying reductions in fuel handling charges at railway docks and ports.
4. Warehouse charges reduced and free time increased.
5. Shippers' tickets issued for £600 of business instead of £1,000.
6. Unsold exhibits of machinery at agricultural shows returned to owner at one-half regular rates.
7. Lower rates on milk.
8. Lower rates for passenger train parcel service.

Electric Traction on Norwegian Railways

The work of electrifying the line of the Norwegian State Railways from Lulea to the northern Norwegian border at Riksgränsen is proceeding again after being suspended by war-time conditions. The total length of the line from Lulea to Riksgränsen is 263 miles, and there is a continuation of the line across the northern part of Sweden, a distance of 24 miles, to Narvik, an Atlantic port.

The original electrified section was 80 miles long and extended from Kiruna to Riksgränsen. This was described briefly in the July 11, 1919, issue of the *Railway Age*, page 61.

The electrified section was extended southward from Kiruna to Nattavara, a distance of about 90 miles. This work was completed in October, 1921. By the first of this year the electrified section had been extended to Boden, about 74 miles farther south, and it is expected that the remaining distance to Lulea will be under electric operation by the first of July this year.

The part of the line which extends across the northern part of Norway, known as the Ofot Railway, is also being electrified

and it is expected that this work will be completed by the first of October, 1922. The greater part of the entire line is north of the Arctic Circle.

The Drammen line from Christiania to Drammen, Norway, a distance of 32 miles, has just been converted and put under electric operation early in May of this year.

Car Exports in March

But one passenger car, valued at \$4,000, was exported in March. It went to Mexico. Freight car exports, however, totaled 149, valued at \$136,665, as follows: 19 to Canada (\$17,884); 59 to Mexico (\$8,706); 17 to Cuba (\$14,680); one to Argentina (\$1,500); 30 to Peru (\$18,900); and 25 to Portuguese East Africa (\$74,995). These figures were compiled by the Bureau of Foreign and Domestic Commerce.

March Exports of Car Wheels and Axles

Exports of car wheels and axles in March weighed 4,019,524 lb. and were valued at \$116,802, according to the compilation of the Bureau of Foreign and Domestic Commerce. Detailed figures follow:

Countries	Pounds	Countries	Pounds
Belgium	227,000	Jamaica	32,183
France	226,700	Cuba	190,837
England	8,925	Brazil	6,300
Canada	477,405	Chile	22,500
Costa Rica	48,055	Colombia	2,500
Guatemala	73,620	Ecuador	15,171
Honduras	5,528	British Guiana	10,483
Mexico	1,073,132	Japan	1,421,509
Peru	6,796	Australia	27,172
Venezuela	2,958	British South Africa	3,585
British India	13,300	Other countries	1,752
Chosen	120,079		
New Zealand	2,133		
		Total	4,019,524
		Value	\$116,802

\$8,000,000 Placed in Contracts for

French Electrification

A quantity of equipment for electrifying 125 miles of main line, including 80 freight locomotives and 80 passenger motor cars, is to be furnished to the Paris-Orleans Railway by a group of French manufacturers headed by the Compagnie Française Thomson-Houston. The Paris-Orleans Railway is one of the six large systems of France which operate something more than 5,000 miles of route. The Compagnie Française Thomson-Houston is the representative of the International General Electric Company. The 1,500-volt direct current system will be used and, according to dispatches received recently, this installation is the beginning of a more extensive program. The greater part of the equipment will be manufactured in France, but it is understood that considerable material of American manufacture will also be required.

The locomotives will be used on an extension of the original electrification, made about 25 years ago by the French Thomson-Houston Company. The first section of the new 1,500-volt section will cover 125 miles of main line between Paris and Vierzon. The motor cars will replace and extend the present suburban steam service out of Paris.

According to plans, high speed, through passenger service from Paris to Vierzon will be handled by 1,500-volt, direct current electric locomotives weighing 125 tons each and capable of regular running speeds of between 80 and 85 miles an hour. These locomotives are not included in the contracts thus far awarded, but the railway company is expected to announce the placing of this business at an early date and to give consideration soon to the purchase of additional locomotives for use in the Central Plateau Region.

Earnings of Chinese Railways

From the standpoint of earnings Chinese railroads do not suffer by comparison with the best American roads, according to the *Wall Street Journal*. In 1918, the last year for which accurate figures are available, average earnings a mile of all Chinese government railroads was: Gross, \$22,700; operating expenses, \$10,400; net operating revenue, \$12,300; deductions, \$2,890; net income, \$9,410.

The Peking-Mukden line showed a net income per mile of \$23,107 for 1918. These extraordinary earnings were made by roads which are practically without branches, feeders or connections. Each Chinese road originates its own traffic. When

branch lines and links between existing lines shall have been built it is reasonable to suppose that an astonishing increase will show in earnings.

According to Merle R. Walker, who made an extensive study of Chinese railroad conditions and prospects, Chinese railroads operate for less than any other in the world. The average operating ratio for all government roads in 1918 was 44.2 per cent. The Peking-Hankow road (with average miles operated of 815) showed as low as 33.5 per cent, while the Peking-Mukden (with average miles operated of 605) showed an operating ratio of 33.1 per cent.

This discrepancy in the amount of gross revenue consumed may be accounted for by the enormous saving of labor costs. A Chinese section hand is paid approximately \$100 a year.

Chinese roads are used intensively. Although they are greatly under-equipped and the cars and locomotives are much smaller than those in use on American roads, nevertheless freight and passenger densities are astonishing. Average capacity for all freight cars is 22 tons, comparing with 42.2 tons in the United States. The average tractive effort of Chinese freight locomotives is 22,300 pounds, against 64,500 pounds on American roads.

In 1916 the Canton-Sanshui line had a passenger density of 1,447,030. The Shanghai-Nanking line showed over 1,272,000 in 1918. The passenger density for all railroads in China in 1918 was nearly 424,000. Average freight density for all Chinese government railroads is 616,126.

A great many miles of road have been projected and an era of rail construction is not far off. China is theoretically committed to government ownership of railroads. This has been probably the chief factor in the great cost of these roads. But so widespread is the need for transportation that no matter how costly the road or poor the judgment shown in its location, it is bound to pay. Total mileage does not exceed 7,000 and a network of 275,000 would be inadequate to serve the needs of the country.

British Railways Announce Great Extensions in Tourist and Excursion Services

Last year from various causes, summer excursion and tourist services were not introduced in Great Britain until late in July. This year, for the first time since 1914, holiday train service is inaugurated at the beginning of June on a liberal scale and will gradually be augmented until July when the full summer service will be in operation. The railways will provide, in addition to the ordinary train services, all descriptions of excursion trains and will give cheap fare facilities so numerous as to suit not only large numbers of people, but individuals and small pleasure parties as well.

It is the hope of the railways that with the special facilities for traveling which will be provided, those members of the public who are able to do so will find it to their advantage to take their holidays in the month of June or early in July, when the days are long and accommodation at pleasure resorts can be more readily obtained than in August during the school holidays.

On the first day of June the earlier holiday movement began with the introduction of tourist tickets, the issue of which will be continued until the end of October. This form of ticket provides for breaking the journey en route and resuming the tour at any time during the two months for which the ticket is available. Tours in the most picturesque parts of the country have been arranged and there will be a wide choice to suit every taste. Tickets will be issued at a single fare and two-thirds.

Throughout the season frequent day and half-day excursions at about a single fare for the double journey will be provided by special trains to many favorite resorts. It is also the intention of the railways to run excursion trains to any town where a local event of sufficient importance is being held. Long period excursions for a week or a fortnight at about a single fare and a third for the round trip are being arranged, and will in certain cases commence on Friday, June 9.

Long distance excursions have been arranged to run over two or more railway systems, and it will be possible to travel from towns in England to pleasure resorts in Scotland and Ireland; the north of England to the Midlands, Wales, the Southern and Western counties and in the reverse direction. There will be a restoration of the popular cross country excursions, and excursions from and to large industrial centres.

Guaranteed day, half-day and long period excursion trains, a popular feature of railway travel before the war, will again be revived. Under this system the Railway companies will provide a special train by arrangement with organizers who will guarantee not less than 300 adult excursion fares. In pre-war days these excursions were frequently organized on behalf of societies, schools, factories and even whole towns on holiday bent. Where the fare is not less than ten shillings a guarantee of 200 adult fares will be accepted.

Amongst the novelties in cheap fare facilities will be the issue of return tickets at a reduced rate by specified regular trains to individual passengers traveling on early closing days from towns to holiday resorts within a radius of 60 miles. Cheap tickets by specified regular trains will also be issued in connection with important local events. Attractive day and half-day bookings will be given enabling passengers to take combined rail, road, river and sea trips, rail and river tours, and many other pleasure excursions. Certain companies will also issue combined hotel and travel tickets. Other arrangements embrace the collection, conveyance in advance, and delivery of passengers' luggage at a small inclusive charge.

Pleasure parties, members of clubs and associations (minimum number 12 adult tickets) will be able to take day trips at a reduced charge of about a single fare and a third for the double journey by any regular train by prior arrangement with the railway involved. The popular Saturday to Monday tickets will continue to be issued between any two stations by regular train at about a single fare and a third for the double journey. Minimum fare 5 shillings third class and ten shillings first class. Improved facilities will be provided in connection with the regular train services, i. e., express trains will be duplicated or strengthened as required, additional through cars run between distant points, and other improvements introduced.

Exports of Track Materials in March

In March 26,066 tons of rails were exported, valued at \$1,431,004. Other track material exports were: 2,995,042 lb. of rail joints splice bars, fish plates and tie plates (\$104,084); 525,223 lb. of switches, frogs and crossings (\$40,808); 1,437,263 lb. of spikes (\$40,808); and 602,476 lb. of bolts, nuts, washers and lock nuts (\$28,571). These figures were compiled by the Bureau of Foreign and Domestic Commerce and are in detail:

Countries	Rails, Tons	Rail Joints, Splice Bars, Fish Plates, and Tie Plates, Pounds	Switches, Frogs and Crossings, Pounds	Spikes, Railroad Pounds	Bolts, Nuts, Washers and Lock Nuts, Pounds
Denmark	14,907	.....	.....	.....
Spain	36	26,716	.....	.....
Switzerland	50,695	.....	.....
England	702	8,500	1,495	5,812
Canada	587	75,662	133,883	110,100
Costa Rica	104	19,331	.....	20,000
Guatemala	10,000
Honduras	28,030	48,800	30,202
Panama	1,814	.....	200
Mexico	322	67,261	80,413	207,575
Other British W. Indies	8,662	5,412	1,899
Cuba	1,910	374,757	44,392	237,000
Dominican Republic	15,000	5,079
Brazil	51,000	7,425	41,266
Chile	43,466	.....	2,830
Colombia	1,137	178,005	674	99,274
Feudor	3,450	1,973	10,900
Peru	2,993	35,000
Venezuela	1,000
China	139	8,062	1,625	13,031
Chosen	565	64,960	.....	42,560
Honkong	436
Japan	14,001	1,061,080	108,500	290,923
Kwantung, leased territory	6,290	1,032,940	.....	224,000
Philippine Islands
Other countries	6	221	9,565	4,438
Total quantity	26,066	2,995,042	525,223	1,437,263	602,476
Total valuation	\$1,431,004	\$104,084	\$40,806	\$40,806	\$28,571

State Co-operation Proposed for Spanish Railways

LONDON.

In consequence of the difficulty experienced by the Spanish railways in maintaining a service adequate to the public requirements the state has declared itself willing to co-operate in the manner laid down in a Project of Law of April 4, 1922, which has been presented to the Cortes.

According to the proposed law, which was published in the "Gaceta de Madrid" of April 5, 1922, the operation of the railways shall be regulated as follows from the date of its promulgation:

The state shall organize at its own expense any work of development or improvement, and shall acquire any material which may be considered necessary in order to adapt to public requirements the railways of public service at present in existence, even though they may be the object of concessions, if the improvements, etc., have not already been put in hand by the concessionaires. The joint undertaking (the result of the co-operation) shall be managed by the concessionary companies, but in accordance with standards set by the Railway Board (a newly-formed body). These standards, while safeguarding the interests of the state, shall leave as free as may be possible the management of the railway companies.

The Railway Board, among other powers, may propose re-distribution of the lines, either by means of transferring the working or administration, or by redeeming the concessions, or other means, the rights of the concessionary companies being always considered. They may propose the buying up of the remainder of a concession, and may supervise the technical, economic, and financial management of the companies and their respective railways. (A delegation shall be formed for this purpose, which shall attend meetings of shareholders, etc., and can apply for the intervention of the Board if anything illegal or detrimental is noticed in the management).

The Board shall also approve of the railway tariffs, taking into consideration certain expenses. The rates may last for a period not exceeding six years.

As regards profits, the costs of operation and pensions shall be deducted from the gross receipts, and the remainder shall be divided between the companies (in proportion to the actual and present value of the business, the working of which belongs to them during the period concerned) and the state (in proportion to the actual and present value of the share of capital contributed by it). In both cases the Board will fix the value, taking as basis the effective capital invested by the concessionary company. The actual value to the concessionary shall in no case exceed capitalization at 5 per cent of the average net proceeds during the previous fifteen years. The company are to have $\frac{1}{2}$ per cent of the remainder above-mentioned for their services in managing the joint undertaking, this claim being given priority.

In certain cases, however, when the actual value of the business, the working of which belongs to the concessionary, exceeds the nominal capital of the mortgage bonds guaranteed by the business and issued before the establishment of the joint undertaking, the first expenses to be deducted from the remainder of proceeds each year shall be the interest and the money for amortisement of the said bonds. In this case the concessionary shall have the right of preference not exceeding 3 per cent of the difference between the actual value of its participation in the business and the nominal value of the bonds in circulation when the joint undertaking came into being. An account shall be opened, called the "Redeemed Bonds Account," to be divided between the concessionary and the State, the latter's share being repayable by the concessionary to the state.

The concessionary shall be subject to the provisions of this law, including those relating to the redemption of the concession or the consolidation of national ownership of the railways, and if the concession was conceded in perpetuity, the working of the same shall be reduced to 99 years, counting from the date on which the state assistance began.

The consolidation of national ownership may anticipate the expiry of the respective concessions, and shall include everything used in connection with the railways, their working or administration, but shall not include mining concessions or works belonging to the concessionary companies, although the produce is consumed by the railways.

The amount to be paid annually to the concessionary when the concession is redeemed before expiry shall be fixed by the Consejo de Ministros on the proposals of the Railway Board, taking into consideration the proceeds of the working in the past and the estimates for the future, not counting the portion brought by the state.

Equipment and Supplies

Locomotives

THE ERIE is having 5 2-10-2 type locomotives repaired at the shops of the Baldwin Locomotive Works.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 5 Mountain type and 5 Mikado type locomotives.

JOHN MARSCH, INC., Chicago, has ordered four 6-wheel switching engines from the Baldwin Locomotive Works.

THE AKRON, CANTON & YOUNGSTOWN has ordered 2 Consolidation type locomotives from the Baldwin Locomotive Works, Philadelphia.

THE BROWNELL IMPROVEMENT COMPANY, Chicago, has ordered two 4-wheel locomotives from the American Locomotive Company.

THE PACIFIC STATE LUMBER COMPANY, Tacoma, Wash., has ordered 1 Mikado type locomotive from the Baldwin Locomotive Works.

THE ARGENTINE STATE RAILWAYS have ordered 8 Mountain type locomotives and 1 Pacific type locomotive from the Baldwin Locomotive Works.

Freight Cars

THE BUFFALO & SUSQUEHANNA is inquiring for 100 gondola car bodies.

THE PITTSBURGH CRUCIBLE STEEL COMPANY is inquiring for 15 flat cars of 100 tons' capacity.

THE CHICAGO GREAT WESTERN is inquiring for repairs to 245 box cars of 40 tons' capacity.

THE UNION REFRIGERATOR TRANSIT COMPANY, Milwaukee, Wis., is inquiring for 150 steel underframes for 40-ton refrigerator cars.

THE PERE MARQUETTE, reported in the *Railway Age* of May 13 as inquiring for 500 box cars, has ordered this equipment from the Pressed Steel Car Company.

KANSAS CITY SOUTHERN.—The notice in the *Railway Age* of May 29 that this road was inquiring for 1,000 40-ton box cars was premature. The road is not in the market for these cars at the present time.

THE BALTIMORE & OHIO has ordered 1,000, 70-ton low-side gondola cars from the Cambria Steel Company, and will have repairs made to 1,000 gondola cars and 1,000 hopper cars at the shops of the Pressed Steel Car Company; also to 1,000 coke cars at the shops of the Standard Steel Car Company.

THE SEABOARD AIR LINE, reported in the *Railway Age* of May 27 as inquiring for 900 steel underframe ventilated box cars of 40 tons' capacity, and for 100 phosphate cars of 50 tons' capacity, has ordered the box cars from the Pressed Steel Car Company and the phosphate cars from the Magor Car Corporation.

THE CHESAPEAKE & OHIO has arranged for the purchase of 300, 40-ton box cars in addition to the 1,400 already ordered as noted in the *Railway Age* of April 29. The company expects, also, to place orders early in June for the 500 ventilated box cars mentioned in the *Railway Age* of May 13. Specifications are now being made for 50 refrigerator cars.

Passenger Cars

THE NEW YORK, CHICAGO & ST. LOUIS, reported in the *Railway Age* of April 22 as inquiring for 5 coaches and 2 steel baggage cars, has ordered 7 cars from the Pullman Company.

Iron and Steel

THE PENNSYLVANIA is inquiring for 300 tons of plates, bars and sheets.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 300 tons of structural steel.

THE WABASH is inquiring for 1,000 tons of draft arm plates and channel plates.

THE ILLINOIS CENTRAL has ordered 123 tons of steel from the Kenwood Bridge Company for signal bridges.

Machinery and Tools

THE SOUTHERN PACIFIC has ordered a 200-ton overhead traveling crane from the Niles-Bement-Pond Company.

THE DELAWARE & HUDSON has ordered a 42-in. center drive car wheel lathe from the Niles-Bement-Pond Company.

THE CAMBRIA & INDIANA has ordered a 79-in. driving wheel lathe and a thirty six-inch planer from the Niles-Bement-Pond Company.

THE ILLINOIS CENTRAL is inquiring for 28 lathes of various types, four steam hammers and a power hammer, four carwheel borers, four grinders of various types, two sets of bending rolls, two vertical boring mills, two forcing presses, two drill presses, two forging machines, a slotter, a slab miller, a punch and shear, a crank shaper, a hack saw, a bolt threading machine and a heavy duty planer.

Track Specialties

THE BALTIMORE & OHIO is inquiring for 5,000 kegs of spikes.

THE TOLEDO, ST. LOUIS & WESTERN has ordered 13,000 Continuous joints from the Rail Joint Company.

THE AURORA, ELGIN & CHICAGO has placed an order with the Rail Joint Company for 6,400 Continuous joints.

THE HOCKING VALLEY has placed an order with the Rail Joint Company for 1,500 insulated and compromise 100 per cent rail joints.

Signaling

THE SOUTHERN PACIFIC has ordered from the General Railway Signal Company a Saxby & Farmer interlocking, 8 levers, for Houston, Texas.

THE DELAWARE & HUDSON has ordered from the General Railway Signal Company an electric interlocking, 8 levers, for installation at Watervliet, N. Y.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered from the General Railway Signal Company an electric interlocking, 20 levers, for installation at Des Moines, Iowa, together with 13 switch machines.

Miscellaneous

THE ARGENTINE STATE RAILWAYS are inquiring for 1 dynamometer car.

THE EVANSVILLE, INDIANAPOLIS & TERRE HAUTE will receive bids until June 12 for 15 bridge spans.

THE CLEVELAND, CINCINNATI CHICAGO & ST. LOUIS, will receive bids until June 12 for 15 bridge spans and 1,500 barrels of Portland cement to be supplied for the period from June 1 to September 1.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon, June 7, at Roanoke, Va., for its requirements of steel springs from July 1, 1922, to December 31, 1922, also for 2,500 pounds of wire fence staples.

Supply Trade News

Walter R. Pfästerer has been appointed agent of the Track Specialties Company, New York. Mr. Pfästerer's office will be at 527 Manhattan building, Chicago.

The Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., recently let a contract for the construction of a one-story foundry building to cost equipped \$250,000.

The Dressel Railway Lamp & Signal Company, Arlington, N. J., has been incorporated with A. D. Hobbie, president and treasurer, F. Hallett Lovell, Jr., vice-president, F. W. Dressel, vice-president, and L. L. Pollak, secretary.



A. D. Hobbie

The new company succeeds the Dressel Manufacturing Corporation, formerly known as the Dressel Railway Lamp Works, New York City, originally established in 1882, with factory formerly located at 3860-80 Park avenue, New York City. All the officers of the new company have for a long time been identified with the railroad lighting and signal field. Increased facilities and equipment have been acquired at the new plant located at Arlington. The company recently developed and made improvements in electric headlights, switch and signal lamps and intends to bring out in addition a number of new devices. A. D. Hobbie is also vice-president and general manager of F. H. Lovell & Co., Arlington, and he has been active in the railroad field for over 20 years. F. Hallett Lovell, Jr., is president and treasurer of F. H. Lovell & Co., and was president of the Klaxon Company until it was taken over by the General Motors Company. F. W. Dressel has a long record as a lighting expert in signal and maintenance of way departments and was for a number of years president of the Dressel Lamp Works. L. L. Pollak has been for a number of years, production manager of F. H. Lovell & Co.



F. W. Dressel

The Mississippi Valley Structural Steel Company has been formed by a merger of the Decatur Bridge Company, Decatur, Ill., and the Christopher & Simpson Iron Works Company, St. Louis, Mo.

W. B. Murray, for the past 12 years chief engineer of the Miller Train Control Corporation, Danville, Ill., has been elected a vice president, which position he will assume in addition to his present duties as chief engineer.

The National Bronze & Aluminum Foundry Co., Cleveland, Ohio, is building an addition of 150 ft. to its new plant at

East Eighty-eighth street and Laisy avenue, and is in the market for a few molding machines and some miscellaneous foundry equipment.

M. G. Snow, formerly assistant engineer in the valuation department of the New York Central, Cleveland, Ohio, has resigned to become cost engineer of the **Froehlick & Emery Engineering Company**, Toledo. This company is at present appraising all interurban railways operating in Michigan for the public utilities commission.

Philip L. Maury has been elected a vice-president of the **Detroit Graphite Company** with headquarters at Detroit, Mich. He will have direct charge of all activities of the



P. L. Maury

company pertaining to its paint and varnish business with railroads. Mr. Maury was born in Denver, Colo., on October 5, 1884. After leaving school he entered the paint business and has been connected with that industry ever since, having served for many years with the Sherwin-Williams Company as manager of railway and industrial sales, which position he leaves to take up his new duties with the Detroit Graphite Company. During the war he was in charge of the government activities of the Sherwin-Williams

Company and was closely identified with the work of the War Service Committee of the Paint Manufacturers' Association.

J. M. Duncan, whose selection as general sales manager of the **Detroit Steel Casting Company**, with headquarters at Detroit, Mich., was announced in the *Railway Age* of May 20 (page 1196), was born at Toronto, Canada, on February 22, 1888. Mr. Duncan has entered the railway supply field on November 27, 1905, in the employ of the Detroit Steel Casting Company. He was later made "follow-up engineer" of this company in which position he personally followed every important shipment to its destination to see how the castings were applied, and to ascertain whether more satisfactory results could be obtained by closer co-operation between the management and the user. He was



J. M. Duncan

serving in this capacity at the time of his recent promotion.

A. R. Ludlow, vice-president in charge of sales of the **Air Reduction Company, Incorporated**, New York, has been elected first vice-president; M. W. Randall, secretary, has been elected vice-president and secretary; Herman Van Fleet, chief engineer, has been elected vice-president and operating manager and Dr. F. J. Metzger has been elected vice-president in charge of research and development.

The **Railroad Buyers' and Sellers' Service Bureau** has been organized with W. H. Hassett, general manager and J. L. Newman, editor in chief, with headquarters in the Railway

Exchange building, Chicago. Its service will include a condensed weekly review of market conditions, a department of scientific research, a personal emergency service for clients who require immediate information, and a telephone directory and buyers guide of Chicago and adjacent territory.

John F. Schurch, vice-president of the T. H. Symington Company, with office at St. Paul, Minn., has left that company and has been elected a vice-president of **Manning, Maxwell & Moore, Inc.**, New York. He will be in charge of sales in the middle west and west, with headquarters at Chicago, 27-29 North Jefferson street. Mr. Schurch was graduated from the University of Minnesota in 1893. He entered the service of the Minneapolis, St. Paul & Sault Ste. Marie the same year, serving consecutively in the office of the auditor and of the general superintendent and in the transportation department, resigning in 1905 after having attained the position of chief clerk to the vice-



J. F. Schurch

president. From 1905 until 1914 he was associated with the Railway Materials Company of Chicago. In February, 1914, he was elected vice-president of the **Damascus Brake Beam Company** with office in Cleveland, Ohio, and in June, 1914, he was elected president of the same company, which position he resigned the same year and was elected vice-president in executive charge under President T. H. Symington, of the Symington Company. Mr. Schurch is president of the **Railway Supply Manufacturers' Association**, which has in charge the exhibits at Atlantic City in connection with the meetings this month of Division V—Mechanical, and Division VI—Purchases and Stores, A. R. A.

At a meeting of the board of directors of the **Joliet Railway Supply Company** held in Chicago this week, **Burton Mudge** and **Fred A. Poor** were elected directors. **Burton Mudge** was elected president to succeed **Frederick L. Sivyer**, who remains as a director. Messrs. Mudge and Poor have acquired a controlling interest in this company, but Mr. Sivyer and his associates and the **Northwestern Malleable Iron Company** will continue to hold a substantial interest in the company and will be represented on its board. Mr. Mudge states that this is a preliminary step in the reorganization of the business and in the enlargement of the personnel and facilities of the company to handle properly its growing business. He adds that there will be no change in the direct management of the business, **James H. Slawson**, first vice-president, continuing as heretofore in charge of manufacturing and all other departments, and **Charles A. Carscadin**, vice-president in charge of sales. The company owns and operates a steel fabricating plant in Chicago where it manufactures car truck bolsters and brake beams. Its general offices are in the Railway Exchange, Chicago.

Changes in Baldwin Personnel

Several changes in the official personnel of the **Baldwin Locomotive Works** were made recently; **J. P. Sykes**, vice-president in charge of manufacture, has been appointed senior vice-president in charge of plant and manufacture; **C. A. Bourgeois**, works manager, has been appointed vice-president in charge of manufacture; **J. L. Vauclain**, in the plant and equipment department, has been appointed vice-president in charge of plant and equipment. **Harry Glaenzler**, chief mechanical engineer, has been appointed vice-president in charge of engineering to succeed **Kenneth Rushton**, deceased, and **W. A. Russell**, purchasing agent, has been appointed vice-president in charge of purchases.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has authorized the construction of a new boiler and tank shop at Albuquerque, N. M., to cost approximately \$400,000; also the construction of boiler washing plants at Amarillo, Texas and Winoka.

ATCHISON, TOPEKA & SANTA FE.—This company is receiving bids for station extensions and alterations at Lobbock, Texas, and Waynoka, Okla., to cost approximately \$15,000 at each place and has awarded a contract to Jerome Moss, Chicago, for the construction of bunk houses at Ottawa, Kans., Cherryville and Strong City, Kansas, and at Newkirk, Oklahoma, to cost approximately \$37,000.

CHICAGO, BURLINGTON & QUINCY.—This company will soon close bids for the construction of a passenger station at Mitchell, Neb., and for station extensions at Thermopolis, Wyo. The company has awarded a contract to A. J. Armbruster & Company, Aurora, Ill., for the construction of a passenger station at Aurora to cost approximately \$100,000.

ERIE.—This company expects in the near future to call for bids for an extension to its shops at Hornell, N. Y.

ILLINOIS CENTRAL.—This company has awarded a contract to W. J. Zitterall, Webster City, Iowa, for the construction of a brick station at Ziegler, Ill.

PACIFIC FRUIT EXPRESS.—This company is accepting bids for the construction of artificial ice plants at Nampa, Idaho, and Poacello, each of which will involve the expenditure of approximately \$50,000.

PENNSYLVANIA.—This company is asking for bids on raising tracks and change of line near Phoenix, Md. Approximate quantities include about 135,000 cu. yd. excavation, 1,300 cu. yd. of masonry, two miles of track material unloaded, distributed and laid, 20,000 cu. yd. cinder fill removed, 10,000 lin. ft. track removed, 4,600 lin. ft. raised, 5,000 cu. yd. ballast unloaded and surfaced, etc. This company is also asking for bids for work necessary to complete the engine terminal facilities at Hagerstown, Md., on the Cumberland Valley division. Approximate amount of materials includes about 13,500 cu. yd. excavation, 2,000 cu. yd. concrete masonry, 32,000 cu. yd. cinders unloaded, 7,000 cu. yd. cinder ballast, 2.5 miles track material unloaded and laid, 28 turnouts in place, etc. Bids will be received up to June 7. J. W. Craig, assistant engineer, Baltimore, Md., will be in charge of the former, and W. K. Martin, engineer of construction, Harrisburg, Pa., of the latter work.

PERE MARQUETTE.—This company has resumed the construction of its Flint Belt line, started last year, and expects to complete the work this season, the total cost of which will approximate \$650,000.

ST. PAUL UNION STATION.—This company will close bids on June 14 for approximately \$5,000,000 of construction work on the new Union station at St. Paul, Minn., this work to involve the completing of the third and fourth periods of the project, for each of which separate bids are being called. The work will involve extensions to the waiting rooms, track elevation and street subway.

WESTERN MARYLAND.—This company has awarded a contract to the M. A. Long Company, Baltimore, for the erection of a 100 ft. by 300 ft. Mallot locomotive repair shop at Port Covington, Baltimore. The shop will be fully equipped with cranes and other machinery.

WICHITA FALLS & OKLAHOMA. The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Byers, Texas, to a point on the Texas-Oklahoma state line, 5.8 miles, and authorizing the Wichita Falls & Oklahoma of Oklahoma to construct a line from a connection with that extension to Waurika, Okla., 7 1/2 miles.

Railway Financial News

CAROLINA & GEORGIA.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$350,000 of first mortgage 6 per cent gold bonds, \$135,000 to be exchanged for outstanding bonds and the remainder to be sold at 85, the proceeds to be used in constructing and equipping the road.

CENTRAL OF NEW JERSEY.—*Authorized to Issue Equipment Bonds.*—The Interstate Commerce Commission has authorized an issue of \$2,000,000 of 6 per cent equipment bonds in connection with the procurement of 25 locomotives, 50 passenger coaches, 10 combination cars and 10 baggage and express cars.

CENTRAL PACIFIC.—*Southern Pacific Must End Control.*—See article on another page entitled "Separation of Southern Pacific and Central Pacific Ordered."

CHICAGO & NORTH WESTERN.—*Asks Authority to Sell Bonds.*—This company has applied to the Interstate Commerce Commission for authority to sell \$1,815,000 general mortgage gold bonds of 1987 now held in the treasury and to issue and sell \$418,000 of similar bonds to reimburse the treasury for expenditures.

CHICAGO UNION STATION.—*Bond Sale.*—Kuhn, Loeb & Co., Lee, Higginson & Co., The National City Company and the First National Bank of New York, and the Illinois Trust & Savings Bank of Chicago have purchased, subject to the approval of the Interstate Commerce Commission, \$6,150,000, face value, Chicago Union Station Company first mortgage 5 per cent gold bonds, series B, due July 1, 1963. The bonds have been placed privately.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Authorized to Assume Liability.*—The Interstate Commerce Commission has authorized this company to guarantee principal and interest of \$2,118,000 of first mortgage 4 1/2 per cent bonds of the Evansville, Mt. Carmel & Northern which are to be used for acquiring certain securities issued by the Peoria & Eastern.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Application to Acquire Stock of Peoria & Eastern Dismissed.*—The Interstate Commerce Commission has dismissed the application of this company to purchase additional capital stock of the Peoria & Eastern, of which it already owns a majority, and its outstanding bonds in the amount of \$4,000,000. The report says the purchase of the remaining stock will not give the applicant any other or further control than that which it acquired prior to the enactment of the new law and that the application is not within the scope of Paragraph 2 of Section 5 of the Interstate Commerce Act.

COLUMBUS & GREENVILLE.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment as to interstate and foreign commerce of two branch lines from Stoneville, to Percy, Miss., 23.26 miles, and from Itta Denia to Webb, Mo., 24.38 miles.

ILLINOIS CENTRAL.—*Authorized to Issue Preferred Stock.*—The Interstate Commerce Commission has authorized the issue of \$10,929,000 of preferred stock to be sold at not less than par for cash and the proceeds to be used for construction purposes in connection with the electrification and enlargement of its Chicago terminals.

INTERNATIONAL & GREAT NORTHERN.—*Reorganization Plan Announced.*—The reorganization plan of the International & Great Northern, in receivership since August, 1914, has been announced by J. & W. Seligman & Co. and Speyer & Co. The plan has been accepted by the committee of holders of the company's three-year 5 per cent notes of which Frederick Strauss is chairman.

The plan gives the new company a capitalization of \$44,150,000. The fixed charges will be \$1,179,000 as compared with the present company's fixed charges of \$1,597,175, a reduction of \$418,175. The contingent interest charges on the new company's adjustment mortgage bonds will be \$1,020,000. Under the plan there will be authorized \$40,000,000 first mortgage bonds, \$25,000,000 adjustment mortgage bonds, interest on which will be cumulative after January 1, 1925, and \$7,500,000 common stock. For the present there will be issued \$10,000,000 of the first mortgage bonds in Series A at 6 per cent and maturing July 1, 1952. Of this amount

\$2,750,000 will be used to secure a note of \$2,400,000 to the director-general of railroads. The amount of adjustment mortgage bonds to be issued will be \$17,000,000, Series A, paying 6 per cent and with a 30-year maturity. Speyer & Co. and J. W. Seigman are forming a syndicate to underwrite the cash requirements of the plan which are estimated at approximately \$18,000,000. The plan provides a working fund of approximately \$4,000,000 for the new company. The deposit of bonds by the various classes of holders is asked under the plan, the limit of time for such being set at July 1.

Under the terms of the plan the stock of the new company is to be assigned to Willard V. King, James Speyer and Frederick Strauss as trustees to be held by them jointly subject to a trust agreement for a five-year period.

Holder of the various classes of International & Great Northern securities who agree to the terms of the reorganization and deposit their holdings will, on completion of the reorganization, be entitled to the following:

For each \$1,000 International & Great Northern first mortgage gold bond with coupon maturing November 1, 1922 (amount outstanding \$11,290,500), \$1,000 first mortgage 6 per cent bonds, Series A, of the new company, carrying interest from July 1, 1922, and \$35 in cash.

For each \$1,000 Colorado Bridge Company first mortgage gold bond with coupon maturing November 1, 1922 (amount outstanding \$130,000), \$1,000 first mortgage 6 per cent bonds, Series A, of the new company, carrying interest from July 1, 1922, and \$57.50 in cash.

For each \$1,000 International & Great Northern Railroad Company three-year note with coupon maturing August 1, 1914 (amount outstanding \$11,000,000), \$1,222.92 adjustment mortgage 6 per cent bonds, ranking for interest from January 1, 1923, and \$222.92 in common stock.

For each \$1,000 International & Great Northern Railroad Company first and refunding mortgage bonds with coupons maturing May 1, 1914, and all subsequent coupons (amount outstanding \$1,108,000), \$978.34 adjustment mortgage bonds ranking for interest from January 1, 1923, and \$467.50 in common stock.

Provision is made in the plan to pay off in cash at maturity November 1, 1922, holders of first mortgage bonds of the International & Great Northern Railroad Company and the Colorado Bridge Company who do not elect to deposit their securities under the plan.

MISSOURI, KANSAS & TEXAS.—*Annual Report*.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Operating revenues.....	\$63,020,975	\$72,914,737
Operating expenses.....	50,055,784	69,880,879
Taxes, etc.....	2,624,764	2,106,352
Operating income.....	10,340,427	927,506
Other income.....	4,525,705	761,013
Gross income.....	14,866,132	1,688,519
Interest, rents, etc.....	8,964,783	8,989,899
Net income.....	5,901,349	Def. 7,301,376

NEW YORK, NEW HAVEN & HARTFORD.—*Equipment Notes Offered*.—Edward B. Smith & Co., Halsey, Stuart & Co., and Edward Lower Stokes & Co., of New York, are offering \$2,561,000 6 per cent equipment gold notes at prices to yield from 5.00 per cent to 5.70 per cent according to maturity. The notes are dated January 15, 1920, due \$197,000 per annum, January 15, 1923, to January 15, 1935, both inclusive. They are part of an authorized issue amounting to \$4,438,500.

NORFOLK & WESTERN.—*Equipment Trust Certificates Authorized*.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$6,700,000 of equipment trust certificates to be issued by the Commercial Trust Company of Philadelphia, to be sold so as to net not less than 97 3/4 per cent.

NORTHERN PACIFIC.—*Annual Report*.—This company's annual report for 1921 is received in an article on another page of this issue entitled "Northern Pacific Ton-Mileage Cut 33 Per Cent." See also excerpts from annual report on adjacent pages.

PHILADELPHIA & READING.—*Six Months' Guaranty Certified*.—The Interstate Commerce Commission has issued a final certificate stating the amount necessary to make good this company's guarantee for the six months of 1920 at \$9,509,080, of which \$1,656,060 was still to be paid.

PORTLAND TERMINAL COMPANY.—*Authorized to Issue Bonds*.—The Interstate Commerce Commission has authorized an issue of \$195,000 of first mortgage 5 per cent bonds to be guaranteed by the Maine Central and to be pledged with the director general of railroads in connection with the funding of indebtedness to the United States.

SOUTHERN PACIFIC.—*Control of Central Pacific Ended*.—See article on another page entitled "Separation of Southern Pacific and Central Pacific Ordered."

WICHITA FALLS & SOUTHERN.—*Authorized to Issue Securities*.—This company has been authorized by the Interstate Commerce Commission to issue \$161,000 of common stock, \$644,000 of non-cumulative preferred stock to be sold at not less than 80, and \$688,000 of first mortgage, 6 per cent gold bonds to be sold at not less than 85. The common stock is to be issued in part payment of advances for capital purposes and the proceeds

of the preferred stock and bonds for construction and equipment and to discharge certain indebtedness.

More Equipment Trusts Sold

The director general has announced additional sales at par plus accrued interest, of railroad equipment trust certificates maturing January 15, 1923, to January 15, 1935, inclusive, held by the government, to:

Potter & Company, New York City, and Cassatt & Company, Philadelphia, Pa., Toledo, St. Louis & Western Railroad Company, approximately two-thirds of each annual maturity from January, 1923, to January, 1935, inclusive.....	\$682,500
Commercial Trust Co., Philadelphia, Pa., Minneapolis & St. Louis Railroad Company, two-thirds of each annual maturity from January, 1923, to January, 1935, inclusive.....	873,600
Edward Lower Stokes & Co., Philadelphia, Pa., Halsey, Stuart & Co., New York City, and Edward B. Smith & Co., Philadelphia, Pa., The New York, New Haven & Hartford Railroad Company, approximately two-thirds of each annual maturity from January, 1923, to January, 1935, inclusive.....	2,561,000
Alfred Borden, New York City, and The Chase National Bank of New York, New York City, Chicago, Rock Island & Pacific Railway Company, approximately one-third of each annual maturity from January, 1923, to January, 1935, inclusive, being the portion heretofore subordinated under the plan mentioned above.....	2,344,550
Chesapeake & Ohio Railway Company, one-third of each annual maturity from January, 1923, to January, 1935, inclusive, being the portion heretofore subordinated under the plan mentioned above.....	3,283,800
Alfred Borden, New York City, Chicago Junction Railway Company, approximately one-third of each annual maturity from January, 1923, to January, 1935, inclusive, being the portion heretofore subordinated under the plan mentioned above.....	137,800
	<hr/> \$9,883,250

The total amount of equipment trust certificates sold by the government to date, at par plus accrued interest, reaches the total of \$263,258,750.

Tentative Valuations

The Interstate Commerce Commission has issued tentative valuation reports, in which it states the final value as follows:

	Property owned	Property used
Bonlee & Western.....	1916	\$7,300
Augusta & Summerville.....	1916	71,121
Washington Western.....	1917	164,310
		<hr/> \$79,721

Dividends Declared

Beech Creek.—\$50, quarterly, payable July 1 to holders of record June 15.
 Boston & Albany.—\$2.50, quarterly, payable June 30 to holders of record May 31.
 Buffalo & Susquehanna.—Common, 1 3/4 per cent, quarterly; preferred, 2 per cent, semi-annually; both payable June 30 to holders of record June 15.
 Cleveland, Cincinnati, Chicago & St. Louis.—2 per cent, payable June 15 to holders of record June 2.
 New York & Harlem.—Common and preferred, \$2.50, semi-annually, payable July 1 to holders of record June 15.
 Pittsburgh, McKeesport & Youngstown.—\$1.50, semi-annually, payable July 1 to holders of record June 15.
 Reading Company.—2d preferred, 1 per cent, payable July 13 to holders of record June 25.

Trend of Railway Stock and Bonds Prices

	May 29	Last Week	Last Year
Average price of 20 representative railway stocks.....	67.22	66.64	55.41
Average price of 20 representative railway bonds.....	86.28	86.65	73.86

W. J. HARAHAN, president of the Chesapeake & Ohio, officiated in the office of the Richmond Dispatch on the evening of May 25 as broadcaster, to send out a radio message calling attention to the Careful Crossing Campaign which is being conducted by the American Railway Association.

RADIO EXPERIMENTS made on a passenger train of the St. Louis-San Francisco between Oklahoma City and Lawton, a distance of about 100 miles on May 31 were very successful, music and other communications being received in a satisfactory fashion throughout the trip.

Annual Report

Twenty-Fifth Annual Report of the Northern Pacific Railway Company

Office of the
NORTHERN PACIFIC RAILWAY COMPANY,
St. Paul, Minnesota.

April 5, 1922.

To the Stockholders of the
Northern Pacific Railway Company:

The following, being the twenty-fifth annual report, shows the result of the operation of your property for the year ending December 31, 1921.

INCOME ACCOUNT.

	1920	1921	Increase— Decrease—	I D
Average mileage operated.	6,653.36	6,658.03		4.67
OPERATING INCOME.				
Operating revenues.....	\$113,084,407.78	\$94,538,059.44	D	\$18,546,348.34
Operating expenses.....	100,983,874.19	77,630,867.23	D	23,353,006.96
Net operating revenue.	12,100,533.59	16,907,192.21	I	4,806,658.62
Railway tax accruals.....	10,108,686.38	9,014,120.50	D	1,094,565.88
Uncollectible railway revenues.....	18,468.90	17,895.63	D	573.27
Railway operating income	1,973,378.31	7,875,176.08	I	5,901,797.77
Equipment rents—net.....	4,696,161.69	1,445,605.83	D	3,250,555.86
Joint facility rent—net.....	1,279,918.22	1,523,044.26	I	243,126.04
Net railway operating income.....	7,949,458.22	10,843,826.17	I	2,894,367.95
NONOPERATING INCOME.				
Income from lease of road	289,703.28	319,651.44	I	29,948.16
Miscellaneous rent income	674,576.12	698,165.20	I	23,589.08
Miscellaneous nonoperating physical property.....	49,250.60	104,544.58	I	55,293.98
Separately operated properties—profit.....	31,067.31	94,816.69	I	63,749.38
Dividend income.....	4,353,552.00	21,858,646.00	I	17,505,094.00
Income from funded securities.....	926,686.48	2,346,638.70	I	1,419,952.22
Income from unfunded securities and accounts.....	937,803.20	806,462.67	D	131,340.53
Income from sinking and other reserve funds.....		47.92	I	47.92
Miscellaneous income.....	2,574.27	323,709.52	I	321,135.25
Total nonoperating income.....	7,265,213.26	26,552,682.72	I	19,287,469.46
Gross income.....	15,214,671.48	37,396,508.89	I	22,181,837.41
DEDUCTIONS FROM GROSS INCOME.				
Rent for leased roads.....	51,322.02	51,320.65	D	1.37
Miscellaneous rents.....	9,643.07	10,328.04	I	684.97
Interest on funded debt.....	12,134,437.60	14,480,679.83	D	2,346,242.23
Interest on unfunded debt.....	14,060.08	10,631.28	D	3,428.80
Amortization of discount on funded debt.....		304,273.42	I	304,273.42
Miscellaneous income charges.....	231,895.32	473,876.50	I	241,981.18
Total deductions from gross income.....	12,441,358.09	15,331,109.72	I	2,889,751.63
Net income.....	2,773,313.39	22,065,399.17	I	19,292,085.78
Compensation under contract with United States Government.....	5,301,309.04		D	5,301,309.04
Guaranty under Transportation Act of 1920.....	14,760,606.14		D	14,760,606.14
Deduct, Federal income, January and February, 1920, included above.....	3,741,045.26		D	3,741,045.26
Net corporate income.....	19,094,183.31	22,065,399.17	I	2,971,215.86
Dividend appropriations of income.....	17,360,000.00	17,360,000.00		
Income balance for the year, transferred to profit and loss.....	\$1,734,183.31	\$4,705,399.17	I	\$2,971,215.86

REVENUE TRAIN MILEAGE

Revenue passenger train miles during the year were 9,925,634, a decrease of 52,319 miles compared with the previous year.
Revenue freight and mixed train miles during the year were 8,893,013, a decrease of 3,017,442 miles.
Revenue special train miles during the year were 11,525, a decrease of 1,295 miles.
All revenue train miles during the year were 18,830,170, a decrease of 3,065,065 train miles.

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was \$69,316,505.06, a decrease of \$11,843,884.57, or 14.61 per cent compared with the previous year.
The revenue train miles of revenue freight were moved one mile, a decrease of 2,563,061,399 tons one mile or 1.64 per cent compared with the previous year.
The average earnings per ton mile increased from 0.1013 to 0.1019.
The revenue train miles of revenue freight, increased from 659.66 to 594.82 tons. The total train miles of revenue freight, increased from 761.31 tons to 700.49.
The number of miles run by revenue freight trains was 8,902,829, a decrease of 1,011,100 or 12.38 per cent.

PASSENGER BUSINESS.

Passenger revenue was \$17,017,158.15, a decrease of \$4,128,522.79 or 19.51 per cent compared with the previous year.

Mail revenue was \$1,699,835.15, a decrease of \$1,191,234.25 or 41.20 per cent; making allowance for hack mail pay received, there was an increase of \$273,640.82, or 24.19 per cent.
Express revenue was \$2,081,541.60, a decrease of \$244,535.30, or 10.51 per cent.

Sleeping car, parlor and chair car, excess baggage and miscellaneous passenger revenue was \$881,763.72, an increase of \$80,236.50, or 10.01 per cent.
Total revenue from persons and property carried on passenger and special trains was \$21,675,295.62, a decrease of \$3,484,085.84, or 20.19 per cent compared with the previous year.
The number of passengers was 6,178,296, a decrease of 2,269,670 over the previous year, and the number of passengers carried one mile was 505,701,937, a decrease of 213,744,024, or 29.71 per cent.
The number of miles run by revenue passenger trains was 9,925,632, a decrease of 52,328, or .52 per cent.
The average rate per passenger mile was 3.365 cents against 2.939 cents last year.

EARNINGS AND EXPENSES PER MILE OPERATED.

	1917	1918	1919	1920	1921
Operating revenues per mile.....	\$13,526.37	\$15,594.28	\$15,282.27	\$16,996.59	\$14,199.10
Operating expenses per mile.....	8,171.39	10,857.13	11,934.71	15,177.88	11,659.73
Net operating revenue per mile.....	5,354.98	4,737.15	3,347.56	1,818.71	2,539.37
Taxes per mile.....	1,059.52	1,236.01	1,365.42	1,519.34	1,353.87
Net.....	\$4,295.46	\$3,501.14	\$1,982.14	\$299.37	\$1,185.50

RATIOS.

	1917	1918	1919	1920	1921
Operating expenses to operating revenue.....	60.41%	69.62%	78.10%	89.30%	82.12%
Taxes to operating revenue.....	7.83%	7.93%	8.93%	8.94%	9.53%

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were \$35,797,966.62, a decrease of \$12,641,034.66, or 26.10 per cent, as against a decrease in total operating revenue of 16.40 per cent.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were \$21,825,817.02, a decrease of \$3,768,106.32, or 14.72 per cent.

LOCOMOTIVES.

	1920, the date of the last annual report.....	1,446
Additions:		
Locomotives purchased.....	10	
Locomotives remodeled.....	1	
Locomotives acquired.....	1	
		13
Deductions:		
Locomotives sold during year, from active list.....	1	
Locomotives dismantled and withdrawn from service.....	21	
		22
Total locomotives on active list December 31, 1921.....		1,437
In addition to the locomotives on active list there were:		
Withdrawn from service and on hand December 31, 1920.....	36	
Withdrawn from service during the year.....	21	
		57
Less—Rebuilt and reinstated on active list.....		2
Leaving on hand locomotives withdrawn from service which may be sold.....		55

HAULING CAPACITY

	Number	Tractive power (Horsepower)	Total weight on drivers (Pounds)	Total weight of locomotives (Pounds)
Assignment December 31, 1920.....	1,446	52,136,870	233,398,783	298,555,918
Added during year, locomotives purchased and remodeled.....	13	836,900	3,819,100	4,278,500
* Added during year.....		16,900	178,550	174,500
Total.....	1,459	52,990,670	237,396,433	303,008,768
Locomotives sold and withdrawn from service.....	22	417,800	1,279,487	2,356,862
Total.....	1,437	52,572,870	236,116,946	300,651,906
* Account compound locomotives changed to simple, locomotives having superheaters applied, changes in steam pressure, etc.				
Dec. 31, 1920.....				
Condition.....	Number	Per cent	Number	Per cent
Good.....	1,172	81.05	1,182	82.26
Fair.....	101	6.98	76	5.29
At shops and waiting shop.....	156	10.79	164	11.41
Unavailable, waiting disposition.....	17	1.18	13	1.04
	1,446	100.00	1,437	100.00
Number of oil burning locomotives.....	10	.69	9	.63
Number of locomotives equipped with superheaters.....	600	41.40	630	43.84

PASSENGER EQUIPMENT

On December 31, 1921, the Company owned 1,154 passenger train cars, an increase of 113 cars, consisting of 135 express refrigerator cars transferred from freight equipment, less 22 other passenger cars transferred to other classes of equipment during the year.
Of the 1,154 cars owned, 774 were not due in shops for two months or more.
During 1921, 63 passenger train cars had steel underframes, steel platforms and steel sheathing applied; 102 cars are being remodeled in 1922. By July 1, 1922, all passenger train cars in transcontinental trains will have been strengthened and remodeled. The purchase of 70 passenger train refrigerator cars has been authorized and these cars will be delivered in 1922.

FREIGHT EQUIPMENT

The purchase of freight train cars has been authorized as follows and cars will be received during 1922:

Box	1,000
Refrigerator	1,000
Coal	250
Stock	250
Hart Convertible	250
Total	2,750

BAD ORDER CAR SITUATION ON DECEMBER 31ST.

	1920	1921	Increase— Decrease—D
Owned cars on line	29,233	38,319	8,986
Total cars on line (N.P. and foreign)	47,165	47,166	1
Number of cars unserviceable	3,856	3,960	I 104
Percentage of unserviceable to total cars on line	8.18	8.40	I .22
Number of cars requiring heavy repairs	2,087	3,170	I 1,083
Percentage of total cars on line	5.95	6.72	I .77
Number of cars requiring light repairs	1,049	790	D 259
Percentage of total cars on line	2.33	1.68	D .65

MAINTENANCE OF WAY AND STRUCTURES

The charges for maintenance of way and structures were \$14,312,916.45, a decrease of \$6,699,881.73 or 31.88 per cent.

The following statements give particulars of some of the work done.

PERMANENT WAY

	Year	Year
	1920	1921
Main line relaid with 90 pound rail	151.09	25.09
Main line relaid with 85 pound rail	3.09	.62
Branch lines relaid with 90 pound rail	4.79	9.00
Branch lines relaid with 66, 66, 72 and 85 pound rail	38.97	33.30
Second track relaid with 85 pound rail .....	.67	.....
Second track relaid with 90 pound rail	27.34	19.96
New second track laid with 90 pound rail .....	.27	2.90
Sidings and spurs constructed	10.81	21.55
Track ballasted	227.50	182.98
Track ballasted	372.260	356.743
Track ballasted (patch or repairs)	144,906	121,630
Embankments	107.60	72.66
Cross, bridge and switch tie renewals, main line	1,395,094	1,072,502
Cross, bridge and switch tie renewals, branch lines	973,303	734,065
Timber bridges replaced by permanent structures and embankments	28	53
Equal to	1.11	1.13
Timber bridges renewed	134	115
Timber culverts renewed	24	24
Timber culverts replaced in permanent form	173	370
New stock fences constructed	80.27	46.32
New snow fences constructed .....	.14	.....

BRIDGES

During the year 173 bridges were replaced, of which 115, 11,539 feet in length, were replaced by timber structures, and 5 permanent and 53 timber structures were replaced in permanent form as follows:

Replaced by embankment

Replaced by steel viaduct, plate girders

I-beams and reinforced concrete trestles

Total

In addition to changes referred to above, one temporary and one permanent bridge were abandoned, 37 temporary and 42 permanent structures were added; 127 culverts were rebuilt, 37 in temporary form and 140 in permanent form.

There are now under construction 535 lineal feet of steel girder I-beam spans for single track, 54 lineal feet for double track, 32 lineal feet for three tracks, 145 lineal feet of steel truss for single track, and 32 lineal feet of reinforced concrete trestle for double track.

BUILDINGS AT STATIONS

New buildings and structures or increased facilities have been provided at the following stations:

- Minnesota: Bald Eagle, Hinckley, Cluett, Brainerd.
- North Dakota: Jamestown, Sentinel Bluff, Dickinson, Beach.
- Montana: Laurel, Logan, Trout Creek.
- Washington: Ellensburg, Spokane, Olympia.

BLOCK SIGNALS AND INTERLOCKINGS

An eight lever section was added to interlocking plant at Sauk Centre, Minnesota.

No additional automatic lock signals were installed.

WATER SUPPLY

Additional or increased facilities have been provided at the following points:

Minnesota: Brainerd.

Washington: Cooper, Lester, Yakima, Sumas.

GENERAL

FINANCIAL RESULTS OF OPERATION

1921 was a very poor year for the railroads, particularly in the country between Lake Superior and Puget Sound.

The volume of passenger business was 26.87 per cent and of freight business 24.64 per cent less than in 1920. The freight business was the smallest since 1912, except for the year 1915, when the amount was practically the same. In consequence the operating revenues of the Company decreased \$18,546,348.34, or 16.4 per cent. Expenses were taken hold of vigorously and were reduced \$23,353,006.96, or 23.13 per cent. Net operating revenue increased \$4,806,658.62, or 39.72 per cent.

CLAIMS FOR BALANCE DUE FROM GOVERNMENT

As stated in the last annual report there was received from the Director General, \$2,000,000 in account of settlement with the contract with the Government for the period of Federal Control ended February 29, 1920. Since then there has been received \$1,599,914.03 in final settlement.

The claim of the Company for payment for the Guaranty Period of six months ended August 31, 1920, is before the Interstate Commerce Commission; \$12,000,000 has been received on account and it is expected a final adjustment will be made in the year 1922.

VALUATION WORK

The Bureau of Valuation continued the work of valuing the property and land in 1921; filed its preliminary engineering report. Your officers are of the opinion that some of the quantities and unit prices used in this

report are inadequate. A statement of objections has been filed with the Bureau and it is hoped that some increases will be obtained before the Interstate Commerce Commission serves its tentative valuation.

The preliminary land and accounting reports have not yet been filed by the Bureau of Valuation, but it is expected that they will be received some time during the summer or fall of 1922.

The number of company employees engaged in this work at the present time is ninety-six, and the total expenditure for the Company's proportion of the work up to December 31, 1921, was \$1,698,091.97.

LAND DEPARTMENT

The operations of the Land Department for the year 1921 are shown in the report. The depression in business, and particularly in agriculture in the territory served by your lines, was even more pronounced and its effect upon the business of the Land Department more widespread than last year. It was necessary to continue the policy of cancellation of contracts and although a considerable acreage of land was secured including lands in cancelled contracts exceeded the acreage in new sales by 76,293.56 acres. Attention is directed to the fact, however, that the payments made under these cancelled contracts are retained and the lands may be resold. Although it is unfortunate that conditions have required the termination of such a large number of contracts in the last few years, it may be possible that in the long run the present apparent monetary loss may be overcome to a certain extent, at least, by resale at higher valuations. The deficit in the net proceeds is caused by the heavy cancellations. Payments of principal and interest under outstanding land contracts are less than in the previous year. The money has not been available for contract holders to make the necessary payments under their contracts.

OIL DEVELOPMENT

During 1921 there was marked progress in oil exploration in Montana. New wells to the number of 190 were commenced and at the end of the year drilling was in progress on 27 wells. Oil was produced in three fields were producing oil; 3 wells were being used as water wells; 80 wells had been abandoned. The Cat Creek field continued to be a large producer. During the year 1,317,143 barrels were produced and shipped from 68 wells, the highest single well being the first in the series of 1,547,261 barrels. In the Devil's Basin field there are two producing wells, but, lacking pipe line connection, the oil has been used for fuel in the field. In February, 1921, the Soap Creek oil field, in southern Bighorn County, was discovered. Three wells have been drilled to date. The oil is chiefly valuable for fuel and appears in considerable quantity. Drilling is actively in progress in both the Devil's Basin and Soap Creek fields, as well as in a number of other localities in Central and Eastern Montana. Large quantities of oil from any lands owned or controlled by your company has been very small. The Company, however, owns a large acreage in districts, the geology of which indicates oil possibilities.

The Alsaroka Oil Development Company, which was organized last year under the control of your company, was active throughout the year. A large acreage was covered and reported upon by its geological parties and although in its first season's operations no oil has been found, a large amount of valuable information has been obtained which will be of assistance in the future. Arrangements were effected with a number of other companies for drilling test wells in various localities and that work is now in progress.

REFUNDING OF NORTHERN PACIFIC-GREAT NORTHERN, C. B. AND Q.

COLLATERAL, JOINT 4% BONDS

As indicated in the last annual report, the joint 4% bonds issued in 1901 were retired on July 1, 1921, by proceeds of issue of joint collateral bonds of the Northern Pacific and Great Northern Railway Companies to the amount of \$340,000,000, payable in 15 years, bearing interest at 6 1/2 per cent annum and convertible to the extent of \$115,000,000 each, into Great Northern General Mortgage 7% Gold bonds, Series A, due July 1, 1936, or Northern Pacific Railway Company Refunding and Improvement 6% Mortgage bonds, Series B, due July 1, 1947, and redeemable as a whole at the option of the Northern Pacific Railway Company on or after July 1, 1936, at 110% and accrued interest.

The Great Northern proportion of \$115,000,000 of these bonds was converted into its 7% General Mortgage bonds. Of the Northern Pacific proportion of these bonds only \$9,950,400 was converted as of December 31, 1921, leaving a balance of \$105,049,600 which will doubtless be converted in due time. Steps are now being taken to convert all the outstanding 6 1/2% bonds and it is thought the conversion will be completed within a few months.

Through the issue of these bonds, the Company owns 830,102 shares of Chicago, Burlington and Quincy Railroad Company stock, and the dividends received pay the interest on the bonds.

FREIGHT RATES AND PASSENGER FARES

Increased rates and fares authorized by the Interstate Commerce Commission August 26, 1920, were in effect at the beginning of the year, except as to certain intrastate rates in North Dakota and Montana, but numerous reductions have been made during the year. Some reductions were proposed by the carriers on commercial conditions, and some were made by order of the Interstate Commerce Commission over the rates on rates on agricultural products and livestock. The general level of rates for 1922 is, therefore, below that in effect for 1921.

COMPARATIVE STATEMENT OF PAYROLLS

During the year there has been a reduction in payrolls due to some reductions in wages authorized by the United States Labor Board and decrease in the number of employees and smaller amount of work done.

Comparison for a period of years follows:

Total payroll for year ending June 30, 1915	\$24,846,852.00
Total payroll for year ending December 31, 1916	28,204,669.00
Total payroll for year ending December 31, 1917	35,877,879.00
Total payroll for year ending December 31, 1918	49,632,127.00
Total payroll for year ending December 31, 1919	52,605,396.00
Total payroll for year ending December 31, 1920	66,503,794.00
Total payroll for year ending December 31, 1921	50,643,526.00

SECURITY OWNERS AND EMPLOYEES

There are now about 37,000 owners of stock, 30,000 owners of bonds of the Company. The average number of employees in 1921 was 28,911 and on March 15, 1922, 27,475.

TAXES

The tax question is serious for all forms of business and bears heavily upon the railroad. The following statement shows the increase since 1917:

State	1917	1918	1919	1920	1921
taxes	\$5,169,742.57	\$5,865,666.69	\$6,913,707.44	\$8,453,990.33	\$8,339,049.60
Federal	1,727,242.85	2,264,762.40	2,055,483.31	1,620,591.91	638,983.26
Canadian	13,742.77	26,654.17	31,546.72	34,104.14	36,087.64
and miscellaneous					
Totals	\$6,910,728.19	\$8,157,083.26	\$9,000,737.47	\$10,108,686.38	\$9,014,120.50

CHANGES IN DEBT

During the year the Company paid off \$9,183,000 of debt, including \$6,000,000 5% note due the Government. This results in an annual saving in interest of \$501,540. There is an increase of \$8,637,500 in the bonds in hands of the public issued to represent the Chicago, Burlington and

Quincy stock owned; the dividends from that stock pay the interest on these bonds.

By order of the Board of Directors,
 HOWARD ELLIOTT, Chairman. CHARLES DONNELLY, President.

GENERAL BALANCE SHEET, DECEMBER 31, 1921

ASSETS			Increase or Decrease	LIABILITIES		
1920	1921	1920		1921	Increase or Decrease	
Investments:						
Road and equipment.						
Road	\$435,819,316.31	\$437,779,244.79	\$1,959,928.48	Capital stock—common ..	\$248,000,000.00	
Equipment	87,215,926.09	88,471,598.69	1,255,672.60	Governmental Grants ..	248,000,000.00	
General	2,883,388.83	3,192,838.78	309,449.95	Grants in aid of construction	3,406.60	
	525,918,631.23	529,443,679.26	3,525,048.03	Long Term Debt:		
Sinking Funds	3,019.94	4,808.54	1,788.60	Funded debt (see p. 20).	324,214,500.00	
Deposits in Lieu of Mortgaged Property (Net moneys in hands of Trustees from sale of land grant land etc.)	594,150.83	430,704.77	-163,446.06	Less—held by or for the Company	9,149,500.00	
Miscellaneous Physical Property	7,485,182.20	7,639,109.57	153,927.37		315,065,000.00	
Investments in Affiliated Companies:				Total Capital Liabilities	563,068,406.60	
Stocks	144,045,402.60	144,035,477.01	-9,925.59	Current Liabilities:		
Bonds	37,065,697.25	31,065,697.25	-6,000,000.00	Traffic and car service balances payable	1,254,255.54	
Notes	2,556,599.35	8,489,399.35	5,932,800.00	Audited vouchers and wages payable	11,512,467.55	
Advances	2,976,081.13	3,148,469.99	172,388.86	Miscellaneous accounts payable	841,200.38	
	186,643,780.83	186,739,044.10	95,263.27	Interest matured unpaid. Unmatured dividends declared	1,830,860.44	
Other Investments:				Unmatured interest accrued	4,340,000.00	
Stocks	1.00	1.00	.....	Unmatured rents accrued	528,073.61
Bonds	9,773,668.30	9,529,180.11	-244,488.19	Other current liabilities ..	6,147.20	
U. S. Treasury certificates of indebtedness	3,305,000.00	4,133,893.28	828,893.28	Total Current Liabilities	20,708,547.64	
U. S. Treasury notes .....	.....	510,000.00	510,000.00	Deferred Liabilities:	
Contracts for sale land grant lands	13,571,498.75	12,085,607.89	-1,485,890.86	Other deferred liabilities.	136,524.87	
	26,650,168.05	26,258,682.28	-391,485.77	Due U. S. Government account various transactions	61,932.07	
Total Capital Assets ..	747,294,933.08	750,516,028.52	3,221,095.44	Due U. S. Government account expenditures for additions and betterments	11,109,411.05	
Current Assets:				Due U. S. Government account various transactions	138,975.88	
Cash	9,778,593.45	17,307,315.44	7,528,721.99	Due U. S. Government account expenditures for additions and betterments	17,412,603.48	
Time drafts and deposits.	.....	3,183.81	3,183.81	Due U. S. Government for value of material and supplies turned back ..	10,650,577.61
Special deposits	6,155,299.69	1,984,428.25	-4,170,871.44		39,309,117.01	
Loans and bills receivable	57,679.03	1,073.19	-56,605.84	Unadjusted Credits:		
Traffic and car service balances receivable	2,333,853.25	1,640,122.97	-693,730.28	Tax liability	6,527,116.63	
Net balances receivable from agents and conductors	1,022,744.94	970,309.29	-52,435.65	Operating reserves	1,771,257.68	
Miscellaneous accounts receivable	7,513,362.38	6,309,975.54	-1,203,386.84	Accrued depreciation of equipment	35,473,839.97	
Material and supplies	14,372,325.02	15,084,505.51	712,180.49	Other unadjusted credits.	2,967,385.33	
Interest, dividends and rents receivable	479,071.97	263,145.93	-215,926.04		46,739,599.61	
Due from U. S. Government under Federal control contract	19,046,122.87	102,930.48	-19,046,122.87	Corporate Surplus:		
Other current assets	133,854.56	.....	-133,854.56	Additions to property through income and surplus	128,184.59
Total Current Assets	60,892,307.16	43,666,990.41	-17,225,316.75	Funded debt retired through income and surplus	15,214,356.79	
Deferred Assets:				Miscellaneous fund reserves	206,362.77	
Working fund advances ..	66,350.09	41,123.38	-25,226.71		15,548,904.15	
Other deferred assets	18,004.27	17,578.49	-425.78	Profit and less balance ..	158,254,796.17	
	84,354.36	58,701.87	-25,652.49	Total Corporate Surplus	173,803,790.32	
Due from U. S. Government—account various transactions	12,379,707.21	2,581.60	-12,377,125.61		\$843,679,371.18	
U. S. Government—value of material and supplies turned over	9,998,851.11	.....	-9,998,851.11		\$808,067,776.13
	22,378,558.82	2,581.60	-22,375,977.22		-\$35,559,595.05	
Unadjusted Debts:						
Rents and insurance premiums paid in advance ..	41,238.99	37,699.99	-3,539.00			
Balance of Guaranty due from Government	9,760,606.14	2,760,606.14	-7,000,000.00			
Discount on funded debt ..	.....	8,888,150.80	8,888,150.80		
Other unadjusted debts	3,177,372.63	2,139,016.80	-1,038,355.83			
	12,979,217.76	14,825,473.73	846,785.97			
	\$843,679,371.18	\$808,067,776.13	-\$35,559,595.05			

PROFIT AND LOSS ACCOUNT
 DECEMBER 31, 1921.

To	Balance December 31, 1920	\$158,254,796.17
By	Balance of income for year ended December 31, 1921, see page 5	4,705,399.17
	Profit on road and equipment sold	56,166.75
	Unfunded overcharges	1,631.00
	Decreases for installing spur tracks and sidings	89,617.00
	Debt discount extinguished through surplus	6,262,770.00
	Settlement of claims vs. U. S. Government	86,110.77
	Discount on mortgage bonds purchased and canceled	6,656.48
	Unclaimed wages 3 years old	22,844.59
	Unpresented checks, drafts and vouchers written off	26,442.58
	Profit and salvage on miscellaneous property, etc.	7,522.89
	Unpresented mileage and baggage coupons written off ..	.....
		\$169,511,319.97

[ADVERTISEMENT]

Railway Officers

Executive

G. W. Webster, whose promotion to vice-president of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., effective May 15, was reported in the *Railway*

Age of May 20, page 1204, was born in Oshkosh, Wis., on December 1, 1870, and entered railway service on September 1, 1886, as a clerk on the Milwaukee, Lake Shore & Western. He was employed in various clerical capacities on this road until September 27, 1893, when he became secretary to the receiver of the Wisconsin Central. Thereafter he was consecutively the secretary to the receiver and chief clerk to the president from July 1, 1899, to October, 1906, and secretary of the corporation from that time to Sep-

tember 21, 1909, when he was also elected secretary of the Minneapolis, St. Paul & Sault Ste. Marie, the latter road having acquired control of the Wisconsin Central by lease a few months earlier. Thereafter he continued as secretary of these properties until March 1, 1920, when he was promoted to assistant to the president and elected secretary of the corporation controlling the Minneapolis, St. Paul & Sault Ste. Marie, the Duluth, South Shore & Atlantic and subsidiary companies, which position he occupied until his recent election to vice-president.

Franklin G. Robbins, director of the Bureau of Service of the Interstate Commerce Commission, has been elected vice-president of the Chicago & Erie. Mr. Robbins

was born at La Crosse, Wis., on February 15, 1876. He attended the public schools at Minneapolis, Minn., and the Shattuck School at Fairbault, Minn. He began railroad work in 1888 with the Minneapolis, St. Paul & Sault Ste. Marie, working during school vacations as a messenger and later as a rodman and operator. After leaving school in 1896 he entered the employ of Kenneth Hopkins & Company on the Chicago Board of Trade and in 1906 entered the service of the Chicago, Burlington & Quincy as special car agent. He then served consecutively

as traveling yardmaster, assistant trainmaster, trainmaster, assistant superintendent and superintendent for the same company, and in 1913 became superintendent of the Elmira, Corning & Waverly (an Erie subsidiary). In 1916 he was appointed general superintendent of the Erie at Chicago. In 1917 he resigned this position to enter the army as a major. Later he was promoted to lieutenant-colonel. In 1920 he was appointed director of the Bureau of Service of the Interstate Commerce Commis-

sion, in which position he was serving at the time of his election to the vice-presidency of the Chicago & Erie.

W. E. Brown has been elected president of the Cowlitz, Chehalis & Cascade with headquarters at Chehalis, Washington, succeeding **C. L. Brown**, who has been elected vice-president.

Robert S. Parsons, general manager of the Erie with headquarters at New York, has been elected vice-president in charge of operation with the same headquarters. Mr. Parsons was born at Hohokus, N. J., and attended Rutgers College. He began railroad work in 1895 as a rodman for the Erie and the following year was promoted to assistant engineer. In 1899 he was appointed division engineer of the New York, Susquehanna & Western. He returned to the Erie in 1913 as engineer maintenance of way and three years later was promoted to assistant general superintendent. He was appointed superintendent of the Susquehanna division in 1907 and three years later was transferred to the New York division, in

the same capacity. On January 1, 1913, he was appointed assistant general manager of the lines east of Buffalo and Salamanca with headquarters at New York. The following year he was appointed general manager of the Ohio grand division (the Erie's western lines) with headquarters at Cleveland, Ohio. In January, 1916, he was appointed chief engineer. The following year he became assistant to the president and chief engineer and in November, 1917, he was appointed assistant to the president and general manager. Under the Railroad Administration he served as chief engineer and, in 1920, became general manager.



R. S. Parsons

Financial, Legal and Accounting

Louis A. Bell, auditor of the New York, Chicago & St. Louis, has been elected comptroller with headquarters at Cleveland, Ohio, effective May 29.

W. T. Hughes, vice-president and associate publisher of the Courier-Journal, Louisville, Ky., has been elected to the newly created position of general attorney of the Chicago, Rock Island & Pacific, with headquarters at Chicago, effective June 1, to represent the road in federal matters.

G. J. Bunting, assistant director of the Division of Finance of the Interstate Commerce Commission, has been elected comptroller of the Illinois Central, with headquarters at Chicago, effective May 15, to succeed **W. D. Beymer**. **L. A. Harkness**, assistant to vice-president in charge of accounting, has been appointed general auditor.

Traffic

V. P. Summerfield has been appointed assistant general freight agent of the Pennsylvania, Eastern region, and **J. T. Carbine** has been appointed coal freight agent, both with headquarters at Philadelphia. **J. S. Murphy** has been appointed division passenger agent at Atlantic City, N. J. These appointments were effective June 1.

Richard B. Lend has been promoted to chief of the tariff bureau of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., to succeed **H. A. Mintz**, who has been promoted to assistant general freight agent, with headquarters at St. Paul, to succeed **L. A. Mitzener**, resigned. Effective the same date, **Thomas J. Kenniff** has been promoted to assistant general freight agent.



G. W. Webster



F. G. Robbins

Operating

A. S. Brainard has been appointed second chief train dispatcher of the Southern Pacific with headquarters at San Francisco, succeeding J. T. Bell, assigned to other duties.

I. B. Sinclair, whose appointment as superintendent of the Delaware division of the Pennsylvania was announced in the *Railway Age* of April 22, page 998, was born at Bernard Castle, England, on April 2, 1879. He entered the employ of the Pennsylvania as a clerk in the office of the general superintendent of transportation at Philadelphia on April 18, 1898. He remained in that position until April 1, 1907, when he was transferred as a clerk to the office of the superintendent of freight transportation of the Eastern Pennsylvania division. On November 1, 1909, he became an assistant section foreman (a position in the car service department equivalent to that of assistant chief clerk) on the Eastern Pennsylvania division and on April 1, 1911, became a clerk in the same department. In May of the same year he was appointed timekeeper and, the following November, to assistant foreman again. On July 1, 1912, he went to the office of the general superintendent of transportation in the same capacity. On August 1 he was appointed a special agent in the same department and on June 1, 1913, was promoted to inspector. On June 7, 1915, he was transferred to the Maryland division in the same capacity and on December 18, was promoted to assistant trainmaster. He was promoted to freight trainmaster on February 1, 1918, and to assistant superintendent of the Philadelphia division on March 1, 1920. He was serving as assistant division superintendent on this division at the time of his recent promotion.



I. B. Sinclair

Mechanical

S. B. Riley has been appointed superintendent of motive power of the Western Maryland with headquarters at Hagerstown, Md., succeeding G. F. Wieseckel, resigned.

Engineering, Maintenance of Way and Signaling

E. L. Martin, engineer maintenance of way of the Missouri, Kansas & Texas, has resigned effective June 1, to become vice-president of the Hutt Contracting Company, Kansas City, Mo., in which he has purchased a substantial interest. Mr. Martin was educated at the Texas College of Agriculture and Mechanics Arts, immediately following his graduation from which in 1899 he entered railway service as an axman on the Texas & New Orleans. He remained in the service of the Southern Pacific in Texas and Louisiana consecutively as rodman, instrumentman and assistant engineer on various projects until 1902 when he entered the employ of the Kansas City Southern as assistant engineer, with headquarters at Pittsburg, Kan., a position he held until August, 1905, when he became division engineer on construction on the Gulf, Colorado & Santa Fe. He continued in the service of the latter road consecutively as division engineer and assistant construction engineer on the building of about 200 miles of line in Louisiana and Texas until 1912 when he resigned to handle the location and construction of 20 miles of line for an industry. Upon the completion of this work he re-entered railway service as district engineer on the Missouri, Kansas & Texas of Texas, a position he held until May, 1916, when he was placed in charge of the construction of the San Antonio, Tex. terminals of this company. Upon the comple-

tion of this project in 1917 he was promoted to engineer maintenance of way of the Texas Lines and held this position in Texas and later in Kansas until March 1, 1919, when he was made chief engineer, under the Railroad Administration, of the Missouri, Kansas & Texas, the Missouri, Kansas & Texas of Texas, the Missouri, Oklahoma & Gulf and the Wichita Falls & Northwestern. At the termination of federal control he was appointed assistant chief engineer in charge of maintenance of way of the Missouri, Kansas & Texas lines, the title of which position was later changed to engineer maintenance of way, which he carried until his resignation.

Obituary

J. E. McNeil, inspector of track and roadway of the Atchison Topeka & Santa Fe, Coast lines, died on May 28.

Harry C. Howe, freight claim agent of the Chicago & North Western with headquarters at Chicago and an employee of this company for more than 37 years, died May 24 at his home near that city at the age of 57.

Arthur F. Morris, for the past two years auditor of capital expenditures on the Chicago & North Western, with headquarters at Chicago, and an employee of that company continuously for 19 years, died May 22, at his home in Oak Park, Ill., after a three months' illness. Mr. Morris was born in Chicago in 1880 and was graduated in civil engineering from Princeton University in 1903, immediately following which he entered the service of the Chicago & North Western as a chairman. He served consecutively with that road as chairman, rodman, instrumentman and assistant engineer on location, construction, maintenance, track elevation and valuation until 1918, when he was appointed engineering auditor, in which capacity he served until 1920, when he was promoted to auditor of capital expenditures, the position he held at the time of his death.

Albert F. Rust, consulting engineer of the Kansas City Southern, with headquarters at Kansas City, Mo., whose death at his home in Kansas City, Mo., May 11, was reported in the *Railway Age* of May 27, page 1264, was born in Fultonville, N. Y., on April 29, 1849, and was educated at Ripon College, Ripon, Wis., from which he was graduated in 1871. He entered railway service in 1872 as an axman on the Sheboygan & Fond du Lac (now a part of the Chicago & North Western), where he remained for a year, when he entered the employ of the New York Central as a rodman. Consecutively thereafter he was rodman and assistant engineer on the Midland Pacific from 1874



A. F. Rust

to 1876, assistant engineer on the Union Pacific from 1876 to 1885, and division engineer on the Missouri Pacific thereafter until 1887, when he left railway service to engage in private practice at Omaha, Neb. He re-entered railway service in 1889 as division engineer on the Missouri Pacific and was consecutively a division engineer on the Kansas City, Pittsburg & Gulf (now Kansas City Southern) from 1893 to 1894, assistant engineer on the Missouri, Kansas & Texas from 1894 to 1895, resident engineer on the Kansas City, Pittsburg & Gulf from 1895 to 1897, and engineer maintenance of way on the same road from 1897 to 1899. He entered the service of the Kansas City Southern in 1899, as chief engineer, in which capacity he served until 1911, when he became consulting and valuation engineer. He was relieved of the duties of valuation engineer in 1918, and thereafter continued as consulting engineer until the time of his death.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

A train dispatcher, in a laudable endeavor to avoid delay, recently instructed an operator *by message* (which was unwarranted by rule or practice) to change a "31" train order to a "19"

Save Minutes Safely

order. A head-on collision in which two employees were killed and four passengers and two employees were

injured was the result. This was the toll paid in an effort to save a few minutes' delay to an extra train. If others learn a lesson from this accident it may be worth the price. This dispatcher, in an effort to be a "Hundred Point" man, defined by Elbert Hubbard as "one who is true to every trust," attempted to save minutes—but not safely. It was the desire of the railroad that trains should be moved with dispatch, but still there was no adequate block system in operation. Such a system would have acted as a check against errors. The moral is obvious. The time is approaching when progressive managements, in an effort to provide a "Hundred Point" system as well as "Hundred Point" men, will operate their trains by an adequate block system, without train orders and—save minutes safely.

One of the most serious handicaps under which the maintenance of way department has labored from time immemorial has been the practice of deferring the

inauguration of its program of seasonal work until the spring is far advanced.

Maintenance Work Should Be Pushed

For many years the termination of the

fiscal year on July 1 caused many roads to postpone heavy expenditures until after that date. With the changing of the fiscal year to conform to the calendar year several years ago this incentive for delaying the work was removed, but the habit of long standing was hard to break and some roads have still continued it. While the large expenditures which have been authorized in recent weeks for new equipment and for improvements to the physical property indicate the railway managements are facing the future with more optimism than in recent years, there has still been a tendency to delay routine maintenance work to such an extent that prompt action is now necessary. The reduction in the wages of maintenance of way employees announced last week and effective July 1, is estimated to reduce the cost of labor approximately 13 per cent, and will naturally stimulate activity. The elimination of penalty overtime for the ninth and tenth hours a year ago offers an incentive for the return to the ten-hour day where this has not already been done. There are increasingly numerous indications that the roads will soon face a labor shortage, for it is already being felt in the industrial centers. With the harvest season approaching it is to be expected that heavy inroads will be made upon the track forces in the agricultural areas. In view of the impending shortage of labor and because of the outlook for steadily increasing traffic with the correspondingly heavier demands upon the track and structures, it is important that the roads organize at once to get as much of their season's work done as possible while a sufficient number of men are still available. Prompt action is necessary if the maximum and most economical results are to be secured.

We have received from the traffic department of the Lehigh & New England an attractive little booklet called "Locating the Factory." This pamphlet is not

"Locating the Factory"

advertising matter in the ordinary sense; it is not devoted to singing the praises of plant sites along the lines of the Lehigh & New England. Instead it is a rather thorough study of the various angles of the problem of factory location and is filled with sound theory and practical suggestions. The concluding chapter of the book is devoted to a free offer of expert advice and assistance to manufacturers who are seeking favorable locations for their plants. The mere fact that the Lehigh & New England has issued such a booklet is not the most interesting point, however; the company is securing distribution for it by advertising in industrial papers. We have not had any figures on the number of inquiries there have been for this book to date, but it seems reasonable to suppose that there will be a heavy demand for it which should lead to many requests for direct personal assistance by the railroad's traffic officers. The results should be beneficial to all concerned—the railroad, the manufacturer, and the cities selected for industrial development. The Lehigh & New England is to be congratulated not only for having issued such a commendable book, but for advertising it and for offering expert advice to those who seek it.

Five members of the New York Central's police department at Buffalo, N. Y., were recently convicted in that city of

Corrupt Railroad Police

the stealing of contents from their company's freight cars. One of these men carried the title of police inspector, and another that of captain, supposedly responsible and executive positions. These two men were given sentences of 10 years each, while their three accomplices received prison terms ranging from two to seven years. From the evidence uncovered at the trial it was learned that a car burglarizing gang had been operating in the New York Central's freight yards for some time under the protection and direction of its "railroad police leaders." This was the second of two groups to be tried and convicted within the last month on a charge of stealing from the New York Central's freight cars and it is also probable that other members of the department who have been indicted will soon be convicted. It is unfortunate that such a condition should exist and it causes one to wonder if it is prevalent within railroad organizations. Such exhibitions of flagrant disloyalty are sometimes hard to believe, but this recent escapade should serve as a warning. Car robberies, a wasteful and extravagant cause of loss of revenue which claim an annual toll of millions of dollars, should and must be curbed. Assuming that the New York Central's case is not unusual, it would seem that the remedy for this difficulty lies in the selection of the proper personnel for a railroad police department, for the situation mentioned above could not have developed if the same type of men had been in charge of police protection as are selected for executive positions in the operating, traffic or engineering departments. The chiefs of police,

chief special agents or superintendents of police, as they are usually called, are directly responsible for the administration of that department and their position is, or should be one of importance requiring the services of first-class men. It is not always necessary for a carrier to secure men for this position from outside sources, for there are men in railroad service who have had years of experience in railroad police protection work, in both legal and field practice, and who are able to organize and maintain a police department of efficient, honest men. The extensive powers of patronage accompanying a position of this kind make it an absolute necessity that it should be held by one who will be most discriminating in the choice of subordinate officers, who in turn will be equally careful in picking their men. Unfortunately, the class of men seeking employment of this nature is frequently not the best. Therefore, unless stringent precautions are exercised in selection, trouble will follow. Judge Howe, in sentencing the guilty New York Central police officers, stated: "I firmly believe the New York Central Railroad Company would suffer fewer losses if it would discharge its entire police department." A rather broad statement, but nearly true, as a partially efficient and somewhat dishonest police department could hardly be called a protective body. The best insurance against this evil is the maintenance of close supervision over the department and careful selection of the personnel, from chief on down.

Reductions of Wages and Strike Talk

THERE IS WIDESPREAD talk of a strike because of the recent decisions of the Railroad Labor Board authorizing reductions in wages of maintenance of way and shop employees on July 1. This talk is accompanied by statements regarding the effect of the decisions which, if allowed to go unchallenged, will mislead the public. Some of these statements are based upon data presented by the labor members of the board in their minority opinions.

The majority members of the board in making the award in the maintenance of way employees' case expressed the opinion that "after the reductions made under this decision common labor on the railroads will still be receiving as a rule a wage in excess of that paid to similar labor in other industries and that the same will be true of all other classes of labor covered by this decision." They said practically the same thing regarding the new wages fixed for shop employees. They believed, however, that the conditions of railway employment justified the payment of higher wages to railway employees than to men in other industries. The average hourly rate of common labor which will be paid under the award after July 1 will be 32.7 cents an hour. This represents an increase of 69.4 per cent over the average hourly wage in effect in December, 1917. The difference between the cost of living in December, 1917, and March, 1920, was 17.2 per cent. Therefore the majority estimated "the increase in purchasing power of earnings under the present decision as compared with December, 1917," as 44.5 per cent. Computing in the same way they estimated the purchasing power of the new wages of the machinists will be 19 per cent and those of carmen 46 per cent greater than in December, 1917.

The labor members challenged this conclusion in both cases. In their dissenting opinion on the maintenance of way case they said that eight hours has been established as the basic day. The average daily earnings of maintenance of way employees in December, 1917, were \$1.93. On an eight hour basis the average daily earnings under the new wages would be \$2.62. Therefore, the minority argued, this showed a wage increase amounting to only 35.8 per cent. This would make the purchasing power of the new wages only 16 per cent more than in 1917.

Of course this is based on the assumption that the employees will work only eight hours. But the board has authorized the railways to pay common labor the same wages in the ninth and tenth hours as in the first eight. When conditions justify it the railways will employ the men ten hours a day if they are willing to work that much. In many cases this is being done already. On the ten-hour basis a wage of 32.7 cents per hour would, of course, yield daily earnings of \$3.27, or, as the majority of the board said, 69.4 per cent more than an employee could earn in ten hours at the average wage of December, 1917.

If the employees refuse to work ten hours, why will they do so? 'Because they value two hours of leisure more than they do two hours' pay. But if they decide that eight hours' work for \$2.62 and two hours' leisure is worth more to them than ten hours' work for \$3.27, how can they justly complain if they do not get the 69.4 per cent higher earnings than in 1917 which they could get by working ten hours? The minority members of the board argued that a reduction of hours should not be counted as an increase in pay. But if two hours' leisure is worth more than two hours' pay, why should a man complain because he gets the two hours of leisure instead of the two hours' pay? Of course, if the additional work would be injurious to the employee the case would be different, but maintenance of way work on railroads is not arduous or unhealthful work. On every farm by a railway right of way men work more hours than this.

The minority members of the board also say that in determining the relative purchasing power of the new wages, the board should have gone back to 1915. They figure that a ten-hour day in 1915 yielded earnings of \$1.50, while an eight-hour day after July 1 will mean earnings of \$2.62, or an increase in money wages of 74.4 per cent. The cost of living is approximately 60.5 per cent more than in 1915. Therefore as compared with 1915, the wages of these men after July 1, they conclude, will show an increase of only 8.7 per cent. But if the men work ten hours a day their earnings will be 118 per cent greater than in 1915, and the purchasing power of the wages not 8.7 per cent, but 36.5 per cent, more than in 1915.

The main ground upon which the labor members attack the decisions in which the public and railway members have joined, however, is that the earnings which the employees involved can make under the new wages will be insufficient to enable them to maintain an "average American family of five" according to a reasonable standard of living. It cannot be denied that railway employees can earn more under the new scales fixed than is earned by most employees in other industries doing similar work. It cannot be denied that railway employees, by working the same number of hours as in 1917, can under the new scales make earnings which will buy them much more food, clothing and other necessities and comforts than they could buy with the wages they received five years ago. In fact, the earnings of most of them, even though they work only eight hours a day, will have substantially greater purchasing power than the earnings they made five years ago while working ten hours a day. Now, the Transportation Act specifically makes the wages paid in other industries and the cost of living the two principal standards for determining the reasonableness of railway wages. It has always been assumed that if the wages fixed will yield the employees earnings having greater purchasing power than their earnings before government regulation of wages began, the board would have given the consideration to the cost of living which the law requires.

The labor members reject this view. The cost of living which the board should consider, they contend, is the amount which will enable a railway employee to maintain a family of five according to what they call a "minimum decency standard." The average earnings required to maintain this standard according to evidence introduced by representatives

of the labor unions is \$2,637 a year, and the labor members virtually take the position that this is the cost of living which the board should adopt in applying the cost of living measure to wages.

It is easily demonstrated that industry in general, including the railroads, could not under present conditions pay this high an average wage without being speedily bankrupted. The wages of industry annually would then greatly exceed the largest total production of the country in any past year. Since industry in general could not afford to pay this average wage it necessarily follows that if it were paid to railway employees they would be favored far above any other class of workers. The railroads would have to charge much higher rates than at present which means, of course, that the high wages of railway employees would be paid at the expense of other workers who are receiving much lower wages.

No intelligent or humane person will challenge the statement that it is desirable that all working men should be paid wages of greater purchasing power than those provided for in the decisions of the Labor Board. But it will never be possible to do so without a very large increase in the total annual production of the country. The decisions of the Labor Board simply require railway employees, under the conditions actually existing at present, to bear their share of the downward readjustment of money incomes which other people have been, or are being, required to bear. They will, in fact, be better off than other classes of men doing similar work after the reductions of wages go into effect. In these circumstances it seems probable that reason will prevail and that there will be no serious strikes. The employees cannot hope to gain anything by striking. On the contrary, by striking they are sure to cause heavy losses to themselves and others.

Record-Breaking Shipments of Most Commodities

THE STATISTICS regarding the number of carloads of freight which have been shipped within recent weeks are highly significant in some important respects.

Because of the coal strike the loadings of coal have been small. It is a remarkable fact, however, that in every week of the four weeks ending with May 21 the number of cars loaded with commodities other than coal has been larger than in the corresponding week of any other year since car loading statistics have been published. The loadings of commodities other than coal in these four weeks of the last four years have been as follows: 1919, 2,362,310 cars; 1920, 2,675,832 cars; 1921, 2,349,883 cars; 1922, 2,771,674 cars. The loadings of commodities other than coal in these weeks in 1922 represent the following increases over those for the same weeks of the other years mentioned: 1919, 409,364 cars; 1920, 95,842 cars; 1921, 421,791 cars.

The loadings of coal in these weeks were as follows: 1919, 660,608 cars; 1920, 673,531 cars; 1921, 608,627 cars; 1922, 312,179 cars. It will be seen that the loadings of coal in 1922 represent a decline of more than one-half as compared with those of any of the other years mentioned. If the loadings of coal had been as large this year as in either of the preceding years, the number of cars of all kinds of freight shipped would have been larger than in any of the preceding years.

The average number of tons shipped per car probably was somewhat smaller than in preceding years, but in spite of this the figures indicate that if there had been a normal movement of coal the total freight handled in this period would have equalled any previous record.

If the increase in shipments shown had occurred after the

reduction in rates which has been ordered by the Interstate Commerce Commission had gone into effect, those who have claimed that high rates have been preventing a revival of business would have attributed it to the reduction of rates. But changes in rates, actual or prospective, had nothing to do with it. It was obviously due to an improvement in general business conditions, just as the decline of traffic in 1921 was due to bad general business conditions.

Probably the coal strike will not last many weeks longer. After it is ended the railways will have to handle very largely increased shipments of coal to offset the deficiency in coal supply caused by the strike. The total amount of bituminous coal produced this year to the end of May was slightly greater than last year in spite of the strike, but business activity, and especially manufacturing activity, is much greater than a year ago. If this continues to be the case the demand for coal and the amount of it the railways will have to transport will be much larger in the latter half of this year than in the latter half of last year.

If other commodities continue to move in relatively a large volume as recently, and it becomes necessary for the railways to handle, say, two and one-half times as much coal as at present—a conservative estimate—it is evident that their operating officers will have their hands full. It seems not altogether improbable that the country may even get some more experience with traffic congestions and car shortages.

Nobody now looks forward with much fear to the coming of such a condition of affairs. The railways have suffered so long from an acute shortage of traffic and earnings that they would welcome a large traffic and the large gross earnings which would result, even though for a while they did not have enough cars to meet all demands. They still have over 500,000 idle freight cars, of which about 330,000 are in good repair and ready to serve anybody who can furnish loading for them. If, however, traffic in general continues to increase as rapidly as it has recently, it will not be many months until shippers will be quite as much interested in the question of how they are going to get enough railway service as they have been recently in how they could get lower rates.

Giving Force to a Hackneyed Word

ONE HEARS NOWADAYS a lot of talk on "co-ordination." It is unfortunate for a word which means so much to come into such common use that it loses its force. Most of us have heard so much about the "co-ordination of rail and highway transportation," and the same of railways and merchant ships, that we become weary of the terms and bored at the outpourings of statesmen and others who often speak of them. And yet anyone who sees the competition between motor trucks and busses and the railways must realize that "co-ordination" is sadly lacking. One gets the same impression when he sees the fleets of lighters in New York harbor carrying freight from railroad piers to steamships simply because so many railway terminals and steamship terminals have been developed with no thought of each other and with no provision for direct transfer from car to ship, and vice versa. Fortunately some few steps are being taken to co-ordinate rail transportation with highway and water transportation. Such movements, however, are unconscionably slow.

There is one effective method of bringing about co-ordination of the different agencies of transportation which has never been given a thorough trial. That is the working of these several agencies by the same company.

The advocates of store door delivery have made out a good case for the co-operation of the motor truck people and the railways in local deliveries. If the railway should own and

operate these trucks or should be closely associated with the operators, there would be no logical reason why shipments offered to either the railroad or motor truck line and accepted by them for movement beyond the local zone could not be turned over to the other agency if it could handle the shipment with greater economy. This is the kind of co-ordination which would make savings for carriers and ultimately for the public generally.

Similarly, if our merchant ships and railroads were under the same management, we should find more railroad piers with ocean vessels alongside, instead of separate railroad and steamship piers with lighters plying between them. If a few large trunk line railroads should own and operate ocean vessels, co-operation would soon effect such economies that co-ordination would become general, a means of self-preservation for competing railway and steamship lines.

Unfortunately, present legislation does not permit such co-ordination. The ship subsidy bill now before Congress, however, authorizes railway ownership of ships not using the Panama Canal, the Great Lakes or in the coastwise trade. This provision of the bill is worth fighting for.

The professional railroad baiters will probably contest a provision of this kind just as they would any proposal to allow the railways to engage in highway transportation on any considerable scale. Such vehement opposition to measures of this kind is difficult to understand when one bears in mind that if there were any clear indication that the railways were using these other agencies to bring about unfair competition, it would be a very easy matter for Congress to regulate rates by motor or ship as they do such rates on the railroads.

The irretrievable loss brought about by lack of co-ordination is too important a problem to be perpetuated simply because of a vague fear that bringing it about might involve the solution of other problems. Without co-ordination we have a constant loss which is not recoverable. If we do co-ordinate motor, rail and ocean transportation we may have a problem of determining a just distribution of the savings effected. Most readers of the *Railway Age* will agree, we believe, that the constant loss due to present methods is more serious than the problem of distributing the savings once the losses are ended.

New Books

Proceedings of the Thirty-first Annual Convention of the American Railway Bridge & Building Association. Edited by the Secretary; 268 pages, illustrated, 6 in. x 9 in. Bound in cloth and paper, Published by the Association, C. A. Lichty, secretary, Chicago & North Western, Chicago.

This volume contains the proceedings of the thirty-first annual convention of the American Railway Bridge & Building Association, which was held in New York on October 18 to 20, 1921. In addition to a record of the business transactions of the association, including the opening address, etc., it contains the complete reports of eight technical committees, together with the discussion following their presentation. These reports cover tool equipment for pile driver outfits, the recruiting of bridge and building employees, the repair of leaks in water mains, the construction and maintenance of cinder pits, the lining of tunnels under traffic, and the construction and maintenance of passenger platform. There is also an address by C. M. Taylor, superintendent of timber preservation, Central Railroad of New Jersey, on treated timber. Owing to the fact that the larger part of the members of this association are concerned with maintenance and actual construction rather than design, the subjects are treated largely from the standpoint of the man in the field, rather than the office. The volume is well illustrated and the typography is good.

The Story of the Rome, Watertown & Ogdensburgh Railroad; by Edward Hungerford. 269 pages. 5 in. by 7½ in. Robert M. McBride & Co., 7 West Sixteenth Street, New York.

This is not a mere brochure devoted to the railroad named in the title; it is, rather, a quite detailed railroad history of the whole of northern New York State west of the Adirondack wilds and north of the New York Central main line. The author looks first at the human side of every event and incident, and one gets the impression that he is determined to make a vivid story, whether cold history can keep up with him or not; but he seems to have kept his feet on the ground.

The keynote of the book is perhaps best expressed by the frontispiece, a halftone reproduction of an old photograph of the passenger locomotive "Antwerp." The "Antwerp" was one of those handsome flyers—a wood burner with 6 ft. drivers—which gave to the American people of 1845-1865 a conception of the iron horse and its mission that combined utility and poetry in a way never seen elsewhere—or since.

The first chapter of this book sketches transportation history from 1829, and the next four outline the three principal railroad efforts—the Ogdensburgh & Lake Champlain, the Potsdam & Watertown, and the Watertown & Rome. The enlarged company, the R. W. & O., had its ups and downs—glorious ups and severe downs; these vicissitudes, and the absorption of the Utica & Black River, occupy the next five chapters. Charles Parsons, the chief owner of the R. W. & O. from 1883 until he sold out to the New York Central, brought to the road a new general manager, H. M. Britton; and Parsons and Britton were, we judge, the most notable figures after the early pioneers. The New York Central took control in March, 1891, and thenceforward the people of northern New York had to make a virtue of necessity and pretend that the swallowing of their pride was an agreeable process. However, the notable improvements that were made gradually tended to obscure the past, and the successive superintendents sent up there by the New York Central are characterized as brilliant managers.

While Mr. Hungerford writes like a novelist, the reader finds constant evidence of as careful attention to details and to essential business facts as would be expected from a civil engineer or an accountant. Evidently he was brought up in that part of the country from his infancy, and he knew the locomotives, the locomotive runners, the local freight conductors, the telegraphers and all hands; and whatever interesting facts about these people he has had to take second-hand are put together so skillfully that the whole seems to be the narrative of an eye-witness.

This is not saying that the book is chiefly a compendium of roundhouse gossip or a summary of local newspaper stories. The author evidently was acquainted with railroad promoters, presidents and attorneys, as well as with the rank and file and the gossips. The name of the first president of the Watertown & Rome was Orville Hungerford, which suggests that probably our author absorbed all sorts of railroad ideas with his mother's milk.

Being at heart a romancer the author had a difficult task; for the railroad—and also the towns whose fortunes were largely affected by the good or the ill which came to them through the railroads—went through some rather violent changes from prosperity to despair, and vice versa; so that fidelity to the truth made it necessary now and then to tell unpleasant facts and to skim lightly over others too unpleasant to be mentioned. It is even admitted that some of the New York Central superintendents were not paragons.

Not the least interesting feature of the work is to be found in the appendices, one of which is a copy of the flowery prospectus issued by the directors in 1847. The book lacks a map. Most of its readers will be people who know the country perfectly with their eyes shut; but a good map is often useful, even for a study of one's native town.

Letters to the Editor

[The RAILWAY AGE welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about 250 words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.]

"Locomotive Engineer" Comes Back

CHICAGO.

TO THE EDITOR:

I seem to have started something. In the issue of May 13 a "Dispatcher" took a crack at me and in that of May 20 we hear from another. I had no idea that dispatchers are so thin-skinned. However, I did not intend to start any argument as to the relative merits of dispatchers and engineers, but hoped that what I had to say would be accepted as constructive criticism, which I believe to be good for business generally, the same as an honest confession is good for the soul. I'll concede everything the Minneapolis dispatcher says of some engineers, for it would be folly to claim that of over 200,000 engineers there are no poor ones. But that only strengthens my plea for better dispatchers and yardmasters, for if an army has some poor privates, it certainly is not going to help the situation to put poor officers over them. I have a deep and profound respect for a good dispatcher, for I can realize what they are up against. And I have worked under enough of them to know a good one by his work, having served upon 16 different divisions of seven roads, from the Great Lakes to the Gulf and from Kansas to the Alleghenies. But please don't confuse me with the old type of "booze-hoisting boomer," for I never was one of that class, always giving the best I had and always leaving a clear record. I'm merely cursed with itching feet.

There are two sides to the issue of breakdowns. While admitting without argument that there are engineers who are lost in such cases, the large majority do know what is wrong and what to do. I've had plenty of them myself and have had an awful time with some, trying to explain to the dispatcher what the trouble was, but could not get it through his head simply because he was not mechanically educated enough to understand. But that is not to his discredit—he has enough to do without knowing the anatomy of a locomotive.

Your Minneapolis correspondent makes a broad assertion when he says that the engineer of today would rather be proficient in brotherhood schedules than in machinery. There are some like that (more shame to them) but they are in the minority. An engineer positively has to know something to run the engines of today and if additions and appliances keep being added, it will soon take a graduate mechanical engineer to run them; they have already reached a point where they are no longer locomotives; they are power plants on wheels.

But if we have some poor engineers now just sit tight and wait a few years and there will be far worse to be seen, except upon those roads which are using the mechanical stokers. The rising generation is getting a better education, and an educated young man absolutely will not take a job firing the present-day hogs with a scoop. I don't blame him—I wouldn't do it for a dollar a mile. Therefore, as firemen, we are already commencing to get men who would not have been considered as anything but common labor for such jobs as track repair work a few years ago. We have some right now who cannot speak clear English and have to ask the engineer to write their names on the time-slip as

their own chirography is illegible. Can you imagine the type of engineers they are going to make?

The correspondent says there is no doubt as to my preferring old methods. I distinctly stated in my letter that I do not. He mentions indefinite terminal delays. Preparatory time we shall always have, for it takes 30 minutes to get a big engine ready to go. As to 30 minutes for eating and 30 more for adjusting suspenders, etc.—if such conditions exist on his road, it is sadly in need of some new operating officers. In all my travels I have never seen a place where anybody could get away with that kind of delay, with one exception. A new superintendent changed that in just two weeks.

Now for the thing which seems to stir the dispatchers most. For reasons of my own, I'm not going to mention the particular road where so many trains were operated over single track, but I have covered enough ground to be able to cite an example to convince the "doubting Thomases" that it can be done. The winter of 1912-13, I worked over a piece of single track from Ft. Worth to Whitesboro, Tex., jointly operated by the T. & P. and the M. K. & T. If my memory is correct, the distance is 71 miles. I can recall coming out of Ft. Worth as high as the 10th or 12th section of a schedule and still carrying "green"; and meeting one to three trains at every siding from there to Whitesboro, to say nothing of letting a couple of passenger trains by. I never saw finer dispatching anywhere than right there, for when you had a meet with a train, the other fellow was either there or in sight when you arrived. Also, they didn't give you five minutes on a first-class train when she was 35 minutes late—they gave it all to you, provided, of course, that the connecting divisions gave them correct figures on when to expect them. Things certainly went well there, though some fellow would frequently upset calculations by stalling on Black Riley or Brickyard hills.

I'll not make any statement as to the number of trains operated, but will ask some officer of the T. & P. at Ft. Worth to let us know through this column, what the average and record high numbers of trains moved per 24-hour period were during the winter of 1912-13.

LOCOMOTIVE ENGINEER.

The Control of Segregation in Rail Steel by Use of Silicon or Titanium

NAGARA FALLS, N. Y.

TO THE EDITOR:

In view of the interest which is being aroused among railway engineers in the prevention of segregation in rail steel, a consideration of the possible means of attaining this object might be worth while at the present time. The main principle is to produce a steel which solidifies perfectly quietly in the molds, without any gas evolution. Then practically all the segregate which is formed in the selective freezing of the alloy is held in minute particles between the branches of the dendritic crystals throughout the ingot, instead of being swept up into one large body at the center of the top of the ingot by rising gases, or concentrated in somewhat smaller amounts in the blowhole cavities. The addition of a deoxidizer in sufficient amount to the liquid steel is a simple means of securing the desired quiet solidification in the molds, and the question resolves itself into a choice of which deoxidizer should be used, aluminum, manganese, silicon or titanium.

Aluminum is ruled out by most of the rail specifications, because of the probability that steel in which it is used will be seriously contaminated by its infusible oxide, alumina. Manganese is used in all steel on account of its effect on sulphur, but its deoxidizing power is not strong enough to insure thoroughly "killed" steel by its use alone, even when

it is present to such an extent that the steel becomes too hard and brittle for rails. This leaves silicon and titanium as the two practical deoxidizers on which reliance is ordinarily placed for the production of sound, quiet-setting steel.

Silicon is, of course, used to a certain extent in all rail steel, but generally in too small quantities to insure thorough deoxidation, because of the fear that larger quantities will cause too deep a pipe in the ingots. The opinion is prevalent that segregation may be readily controlled by this element, but unfortunately this is not always the case. Some interesting data on this point are given in rail report Bulletin No. 7, published in 1914 by the Titanium Alloy Mfg. Company. On page 4 there is a summary of the analyses of all the rails exhaustively tested for this series of bulletins, and the degree of segregation in each rail is shown by the difference between the low and high values for carbon. The silicon contents are also given for each rail, so that the degree of segregation corresponding to each silicon content may be conveniently studied by rearranging the data for the 17 untreated rails according to the table given below. The rails are here classified into five groups according to their silicon contents, determined by averaging the high and low values given in the bulletin, and the percentage of segregation as shown by the carbon determinations is given for each group.

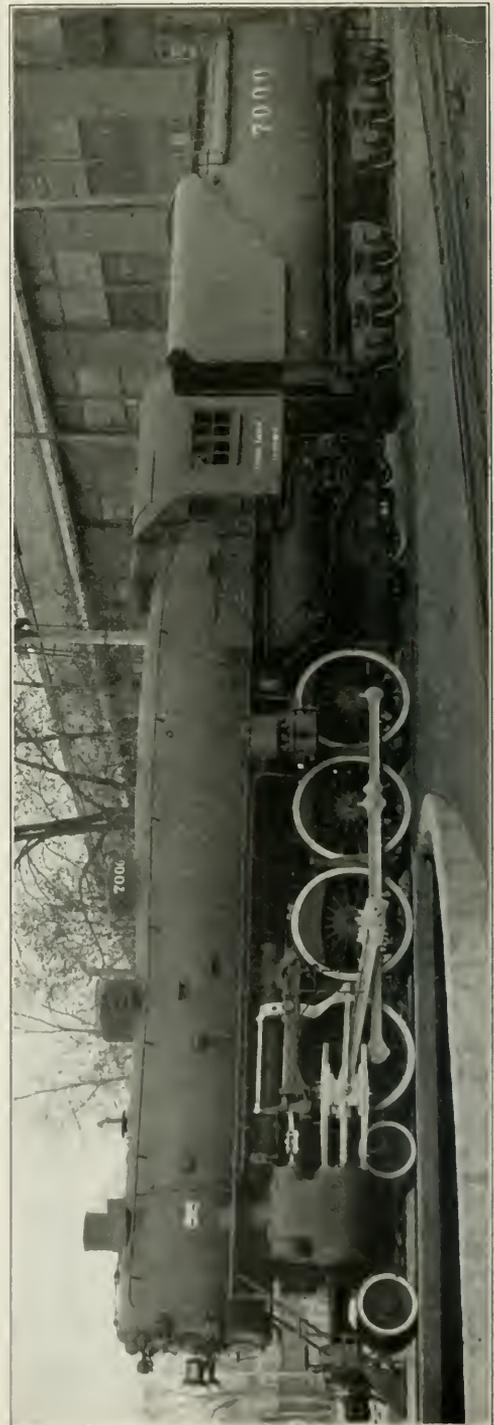
Sample No.	Silicon content	Carbon determinations		Per cent segregation
		Low	High	
13	.193	.55	.82	..
1	.175	.64	.89	..
9	.160	.58	.90	..
Average	.16 to .20	.59	.87	47.
5	.150	.70	.95	..
15	.141	.64	.88	..
6	.135	.67	1.03	..
8	.135	.63	.84	..
Average	.13 to .16	.66	.93	41.
7	.120	.54	.76	..
3	.117	.71	.93	..
4	.111	.65	.95	..
Average	.11 to .13	.63	.88	40.
11	.109	.64	.71	..
15	.108	.53	.81	..
10	.105	.63	.89	..
12.	.100	.64	.92	..
Average	.10 to .11	.61	.83	36.
14	.074	.64	.88	..
17	.054	.43	.64	..
16	.053	.38	.57	..
Average	.05 to .10	.48	.70	46.

This table shows that in this series of 17 representative heats from various mills and rollings the rails with the highest silicon content were the most segregated, and differed very little in segregation from those with the lowest silicon. The least segregated rails were those of the group with the next to the lowest silicon content. Thus it is evident that the degree of segregation in these rails had no definite relation to the silicon content of the steel, and the conclusion seems inevitable that it is not safe to rely on a minimum limit for silicon as an assurance that dangerous segregation will be avoided.

The effect of titanium-treatment on segregation has been investigated more thoroughly, and shows more interesting and consistent results. This subject is discussed in detail in the Titanium Alloy Mfg. Company's rail report bulletins 8 and 9, and the results have also been published in the technical press. Out of 401 titanium-treated A-rails from various mills and rollings only six showed segregation over 12 per cent, while among 111 untreated rails rolled at the same time 66 were segregated to that extent. Furthermore, the only two treated rails that were seriously segregated (over 15 per cent) showed less than the minimum titanium content (0.005 per cent) which is normal for a properly treated heat. Titanium-treatment, therefore, checked by a determination of residual titanium content, gave a truly effective safeguard against excessive segregation in this large series in which it was investigated. This deoxidizer does not contaminate the steel with its oxidation products, as aluminum and silicon do, and it is unquestionably efficient in controlling segregation.

G. F. COMSTOCK,

Metallurgist, The Titanium Alloy Manufacturing Co.



Union Pacific Mountain Type Locomotive for Heavy Passenger Service

A Mountain Type Locomotive for High Capacity

New Union Pacific Locomotive Is Lightest Per Unit of Power of Any 4-8-2 Yet Built

THE FIRST Mountain type locomotive to be employed on its line was recently delivered to the Union Pacific by the American Locomotive Company. This locomotive is the lightest in proportion to maximum horsepower capacity, of any locomotive of this type which has yet been built and the design is the result of an unusually painstaking study both by the railroad staff and by the builders.

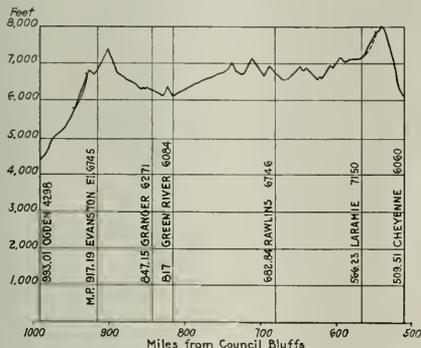
The locomotive has a total weight of 345,000 lb. of which 230,000 lb. is on the drivers. It has a maximum tractive effort of 54,800 lb., and, using Cole's ratios as a basis of comparison, has a maximum horsepower capacity of 3,030

Rawlins to Green River and from 30.9 to 36.4 miles an hour from Green River to Evanston. Eastbound the schedules call for average speeds of from 33.4 to 36.1 miles an hour between Evanston and Green River, 34.3 to 36.6 miles an hour from Green River to Rawlins and 35 to 37 miles an hour from Rawlins to Laramie. Few stops are called for on any of the overland trains except at division points.

To maintain these schedules with Mikado type locomotives it has been necessary to resort to high running speeds on the down grades to make up for the comparatively low speeds on the heavy up-hill pulls. This has had a marked effect in increasing track maintenance and to some extent the cost of locomotive maintenance. The Mountain type locomotive with its high sustained capacity is expected to bring the maximum and minimum operating speeds more nearly to the average which, in addition to its effect on maintenance costs will produce more economical locomotive operation and facilitate the operation of the road generally.

The design of a locomotive of this type was first considered in the fall of 1920. During the preliminary stages many valuable suggestions were received both from the Baldwin Locomotive Works and the Lima Locomotive Works, Inc., as well as from the American Locomotive Company. The final design, however, was worked out practically complete in detail by the railroad's own staff.

In general the boiler is similar in capacity and dimensions to the boiler of the Union Pacific 2-10-2 type locomotive. It is conical in form with an outside diameter of 84 in. at



Profile of the Line Over Which the New Mountain Type Locomotive Will Operate

with a 98.5 per cent boiler and a grate area about 4 per cent greater than that called for by Cole's ratios, in proportion to the evaporative capacity. The locomotives will burn a semi-bituminous coal, low in ash but high in moisture, which has a heat value of about 12,000 B.T.U. per lb. In point of weight per unit of capacity the new locomotive compares very favorably with No. 50000, the American Locomotive Company experimental Pacific type. This engine established a record of 110.8 lb. total weight of locomotive in working order per cylinder horsepower, by Cole's method of calculation. The new Union Pacific locomotive weighs 113.9 lb. per cylinder horsepower and 115.8 lb. per boiler horsepower. The No. 50000, with a 92 per cent boiler, weighs 120.5 lb. per boiler horsepower.

The new Mountain type locomotive is intended primarily for use in passenger service between Cheyenne, Wyo., and Ogden, Utah, a distance of 484 miles over which, because of the long and frequent grades encountered, passenger trains are now handled by Mikado type locomotives. The character of the line is shown in the accompanying profile. With trains varying from 8 to 13 cars the time card calls for schedules averaging from 28 to 31 miles an hour between Cheyenne and Laramie and from 26 to 32½ miles per hour between Evanston and Ogden.

Although the net difference in elevation between Laramie and Evanston is not as great as on either of the above named districts, the grades are long and numerous. Westbound the schedules vary from 33.3 to 43.7 miles an hour between Laramie and Rawlins, from 35 to 42.4 miles an hour from



The Firebox Side Sheets and Crown Sheet and Combustion Chamber Are All in One Piece, the Throat Sheet Being Welded in as Shown by the Light Line

the front barrel course, increasing to 96 in. at the combustion chamber course. The firebox measures 126 in. by 96 in. at the grate and includes a combustion chamber the length of which is such as to provide for tubes 22 ft. long. One of the notable features in the design of the boiler is the location of the steam dome on the conical course at a point above the center of oscillation of the water in the boiler. This provides a uniform steam space under all conditions of grade, considerably removed from the zone of violent ebullition over the crown sheet. The firebox is fed by a Duplex stoker and the boiler is fitted with a 48-unit superheater.

The boiler shell courses are of ¾-in., 13/16-in. and 7/8-in.

At a speed of 60 miles an hour this locomotive produces a dynamic augment of 27 per cent. At a speed of 73 miles an hour, which is equal to the diameter of the drivers, the dynamic augment is 39 per cent.

One of the notable features in the design of this locomotive is the care which has been exercised in locating the cab fittings and the piping, and in securing rigidity in the attachment of air drums, piping and other apparatus commonly secured to the running board. All the apparatus on the back boiler head and all piping on the locomotive was carefully located in the drawing room. One of the photographs shows the resulting neat and uncrowded appearance of the back head. It will be noted that the operating handles of the valves controlling the admission of steam from the turret to the auxiliaries have been carried out by means of flexible shafts to a location at a convenient height above the head of a person standing on the cab deck, where they are all supported in a horizontal rack, each one identified by a

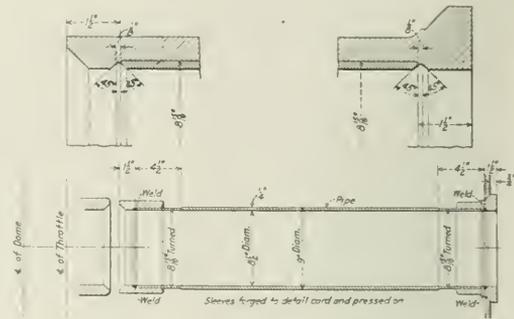


A Front View of the Locomotive

suitable label. All outside piping has been located under the running board, as little in evidence as possible, an arrangement which not only improves the appearance of the locomotive but offers an opportunity for the employment of effective clamps, subjected to the minimum of vibration. The main reservoirs are located well down under the barrel of the boiler, to which they are securely attached. The distributing valve, instead of being attached to the running board where it is subjected to considerable vibration, is carried on a heavy plate bracket which is secured directly to the cradle casting. The driver brake cylinders are bolted to pads which are cast integral with the main frames, each forming in effect an extension of the inside face of the frame just back of the cylinder casting.

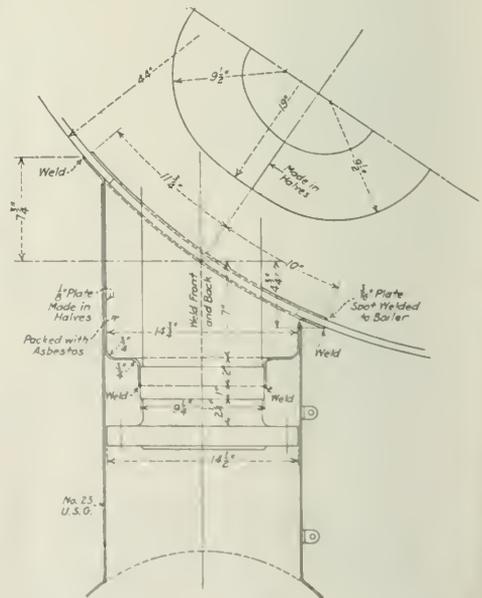
Each side of the cab in front of the window opening is hinged at the front and may be opened outward to facilitate staybolt work or other jobs requiring access to the narrow space at the sides of the boiler. When the locomotive is in service and the doors do not need to be opened they are permanently closed with bolts.

The tender is of the Vanderbilt type with a water capacity of 12,000 gal. and a coal capacity of 20 tons. The tank is carried on a Commonwealth cast steel underframe. The transverse members of the underframe, which form the tank saddles, are cored out to receive thin filler blocks of wood which are accurately surfaced to conform to the contour



Method of Welding the Dry Pipe

of the tank. The tank is secured to the underframe by cast steel brackets of angle section the vertical flanges of which are bolted to the cross members of the underframe. The tender is carried on Commonwealth six-wheel trucks with 6-in. by 11-in. journals and 33 in. wrought steel wheels.



Arrangement of Outside Steam Pipe Casing Gland

The engine and tender are connected by Unit safety draw bars and are fitted with Radial buffers.

Among the specialties with which the locomotive is equipped are Pyle-National headlight equipment, Nathan non-lifting injectors and lubricator, Paxton-Mitchell piston and valve rod packing, and Okadee blow-off valve, feed water strainers, cylinder cocks and smokebox hinges. The locomotive

is also equipped with a Madison-Kipp force feed lubricator.

The principal dimensions and data of the locomotive are as follows:

GENERAL DATA

Service	Passenger
Fuel	Semi-bituminous coal
Tractive effort	54,800 lb.
Weight in working order	345,000 lb.
Weight on drivers	230,000 lb.
Weight on leading truck	59,000 lb.
Weight on trailing truck	56,000 lb.
Weight of engine and tender in working order	582,800 lb.
Wheel base, driving	19 ft. 6 in.
Wheel base, total	41 ft. 3 in.
Wheel base, engine and tender	79 ft. 1 1/2 in.

RATIOS

Weight on drivers ÷ tractive effort	4.19
Total weight ÷ tractive effort	6.29
Tractive effort × dia. drivers ÷ equivalent heating surface*	585.5
Equivalent heating surface* ÷ grate area	81.4
Firebox heating surface ÷ equivalent heating surface, per cent.	5.6
Weight on drivers ÷ equivalent heating surface*	33.6
Total weight ÷ equivalent heating surface*	50.5
Volume both cylinders	21.5 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	330.9
Grate area ÷ vol. cylinders	4.1

CYLINDERS

Kind	Simple
Diameter and stroke	29 in. by 28 in.

VALVES

Kind	Piston
Diameter	14 in.
Greatest travel	9 in.
Maximum cut-off	90 per cent.
Steam lap	1 1/2 in.
Exhaust clearance	3/16 in.
Lead	3/4 in.

WHEELS

Driving, diameter over tires	73 in.
Driving journals, main, diameter and length	12 in. by 16 in.
Driving journals, others, diameter and length	10 in. by 12 in.
Engine truck wheels, diameter	33 in.
Engine truck journals, diameter and length	6 1/2 in. by 12 in.
Trailing truck wheels, diameter	45 in.
Trailing journals, diameter and length	9 in. by 14 in.

BOILER

Style	Conical
Working pressure	200 lb. per sq. in.

Outside diameter, first ring	84 in.
Tubes, number and outside diameter	239—2 1/4 in.
Flues, number and outside diameter	48—5 1/2 in.
Tubes and flues, length	22 ft.
Firebox, length and width	126 in. by 96 in.
Firebox water, space	Front, 6 in.; others, 5 in.
Firebox plates, thickness	Tube and throat, 1/2 in.; others, 3/8 in.
Heating surface, firebox (including arch tubes)	382 sq. ft.
Heating surface, tubes	3,084 sq. ft.
Heating surface, flues	1,508 sq. ft.
Total evaporative heating surface	4,974 sq. ft.
Superheating surface	1,242 sq. ft.
Equivalent heating surface*	6,837 sq. ft.
Grate area	84 sq. ft.

TENDER

Tank	Cylindrical
Frame	Commonwealth
Weight, loaded	237,800
Truck	6-wheel
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	10 tons

*Equivalent heating surface = evaporative heating surface + 1 1/2 times superheating surface.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight showed another large increase during the week of May 27 to a total of 821,121 as compared with 795,335 in the corresponding week of last year and 898,169 in 1920. This was an increase of 28,000 in a week. With a normal coal movement the total would have been greater than that for 1920. All classes of commodities except coke showed an increase as compared with the week before and all except grain and grain products, coal and ore showed increases as compared with last year. Decreases as compared with last year, however, were shown in the Eastern, Allegheny, Central Western and Southwestern districts. The coal loading, 91,370 cars, was the largest since the beginning of the strike, an increase of over 9,000 as compared with the week before, but this was a decrease of 74,241 as compared with last year. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MAY 27, 1922

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year, 1922	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	9,960	2,893	8,253	1,335	5,879	3,028	71,173	89,871	192,392		
	1921	7,574	46,071	3,920	1,124	3,315	2,788	58,965	68,716	194,000	212,401	
	1920	2,741	3,090	15,670	4,856	2,796	2,739	52,492	71,183	155,567		
Allegheny	1922	2,533	3,521	52,971	2,657	2,664	7,180	45,594	51,329	168,449	185,251	
	1922	224	140	30,482	210	1,526	41	6,223	4,118	42,964		
	1921	127	127	23,733	183	1,386	71	5,136	3,338	34,026	31,485	
	1920	24,304	24,304	673	20,415	966	37,544	33,409	40,591	109,748	132,561	
Poconchos	1922	3,554	2,205	24,304	673	20,415	966	33,409	40,591	114,717	125,487	
	1921	4,912	1,751	18,972	475	15,121	893	36,261	36,332			
	1920	12,923	8,047	6,555	1,425	18,656	14,100	30,494	36,489	128,689		
Northwestern	1922	11,384	4,682	7,329	14,384	16,688	28,424	21,498	31,498	113,024	151,802	
	1921	12,048	10,501	3,986	202	6,535	2,476	33,409	40,591	109,748		
	1920	14,691	9,990	14,994	194	5,964	693	30,259	34,575	111,270	121,563	
Central Western	1922	4,262	2,626	2,120	150	8,213	521	15,996	25,312	59,200		
	1921	5,278	2,466	4,188	169	6,497	701	15,496	24,994	59,849	70,180	
	1920	29,233	21,174	12,661	1,777	33,404	17,097	79,899	102,392	297,637		
Southwestern	1922	31,353	19,758	23,864	1,092	26,802	17,542	72,625	91,067	284,143	343,545	
	1921	45,712	29,502	91,370	8,851	64,020	23,871	247,331	310,464	821,121		
	1920	42,270	29,940	79,611	5,531	51,728	28,424	218,581	250,782	795,335		
Total Western Dist.	1922	33,038	28,677	174,612	11,680	62,247	69,426	150,537	367,932	898,169		
	1921		1,425		3,320	12,292		28,750	59,682	25,786		
	1920	889		74,241		4,553						
Increase compared	1921	12,674	825	83,242	2,829	1,773		45,535	96,774	37,468		
Decrease compared	1920											
May 27	1922	45,712	29,502	91,370	8,851	64,020	23,871	247,331	310,464	821,121	795,335	898,169
May 20	1922	42,272	29,133	81,967	9,335	61,930	16,917	243,971	306,434	792,459	770,991	862,074
May 13	1922	42,270	29,940	79,611	8,813	60,661	14,403	241,418	300,684	777,352	751,186	843,145
May 6	1922	40,125	30,496	75,410	8,124	57,132	11,766	242,945	289,753	735,749	721,722	843,184
April 29	1922	36,398	30,488	75,632	7,952	59,112	14,053	242,565	292,086	758,286	721,084	800,960

Valuations Served on 231 Railroads

FIGURES COMPLETE to May 12, 1922, show that tentative valuations have been served on 231 railroads by the Interstate Commerce Commission. This statement is taken from a bulletin prepared by Frederick H. Lee for the Presidents' Conference Committee. This indicates that 47 tentative valuations have been issued since the last previous statement on this matter which was abstracted in the *Railway Age* of February 18, 1922, page 433. Some of the valuations are for railroad systems which include a number of properties so that the tentative valuations actually served include 326 properties with a total of 32,987 miles of road and 46,349 miles of track. In addition to the tentative valuations, 248 preliminary engineering reports, 260 land reports and 153 accounting reports have been sent to the carriers for examination and informal objection or protest.

Most of the carriers served with valuations have filed protest. The principal objection to the estimated cost of reproduction is due to the application of low unit prices, improper classification, inadequate quantities and insufficient estimates for interest during construction and general expenditures. The carriers also claim that the amount reported as the present value of lands is too low, that the excess cost of acquisition as reported by the commission but not included in the figure of final value should be added thereto. The status of valuation work is expressed in the first of the following tables showing mileage for Class I, II and III carriers on which the tentative valuations have been served.

The large table gives valuation data on the railroads which have been served tentative valuations subsequent to January 20, 1922, and supplements similar tables published in the *Railway Age* of August 1, 1921, page 288 and February 18, 1922, page 433.

Number of carriers and mileages on which tentative valuations have been served to May 12, 1922, together with the percentage relation the complete mileage bears to the total mileage of railroads in the United States.

	Number of tentative valuations	Number of carrier properties	*Miles owned (Used and not used)		Percentage relation completed		Mileage of railroads in the U. S. from 1916, 1918 and 1919 I. C. C. Statistical Vals.	
			Road	All tracks	Road	All tracks	Road	All tracks
Class I and Leased Lines	34	125	27,376	39,389	114%	10%	232,411	375,425
Class II	51	53	3,428	4,214	20	18%	16,967	22,832
Class III	69	90	1,874	397	26	21%	7,195	9,994
Terminal Companies	40	40	108	20	6	7 1/2%	17,05	5,138
Electric Companies	2	2	16	20	...	...	None	Not reported
Unclassified	15	16	185	214	3	...	6,088	Not reported
	231	326	*32,987	*46,349	13%	11%	264,366	413,889

*These figures are very close approximations. A small amount of undivided joint mileage is included in the mileage of some of the joint owners and not allocated. To this extent a slight duplication of mileage occurs in the totals.

TENTATIVE VALUATIONS

STATEMENT SHOWING ORIGINAL COST TO DATE; COST OF REPRODUCTION; ORIGINAL COST, PRESENT VALUE AND EXCESS COST OF LANDS, ETC.; "FINAL VALUE"; INVESTMENT IN ROAD AND EQUIPMENT AND CAPITALIZATION AS STATED IN THE VALUATIONS BY THE INTERSTATE COMMERCE COMMISSION.

Date of valuation, June 30, Year	†Owned, Used and not used (includes undivided joint mileage)		Carrier	"Final value"				Investment in road and equipment (general balance sheet account 701 as of date of valuation)	Capitalization (general balance sheet accounts 751 to 753, 755 to 757, as of date of valuation)			
	Miles of road	Miles of all road tracks		Wholly owned and used	Owned but not used	Used but not owned	Total owned		Total used	Carriers' books	Accounting section's restatement (italics only)	Stock (common and preferred)	Debt (bonds, equipment trust and receivers' certificates)
1917	38	43	Durham & S. Car. R. R. Co.	460,796	.....	.....	460,796	460,796	\$74,591	\$57,001	\$0,000	\$30,000
1916	129	163	The Ulster & Del. R. R. Co.	6,468,019	.....	4,870	6,485,019	6,472,889	5,780,913	5,117,898	1,900,000	3,000,000
1916	156	124	New Mex. Central R. R. Co.	1,365,024	.....	.....	1,365,024	5,364,598	.....	.....	5,000,000	3,250,000
1915	237	297	Southern Ry. Co. in Miss.	4,470,534	.....	208,017	4,270,534	4,678,545	610,856	.....	50,000	836,149
1915	321	515	N. Y., Ont. & W. Ry. Co.	34,495,193	.....	10,556,177	34,495,193	45,051,370	85,101,627	71,588,062	58,117,983	30,128,000
	13	17	Rome & Clinton R. R. Co.	.....	405,000	.....	405,000	.....	360,000	.....	345,360	.....
	31	52	The U. C. & B. R. R. Co.	1,275,000	.....	1,275,000	1,275,000	.....	1,690,566	1,690,566	849,224	800,000
	7	9	Wharton Valley Ry. Co.	200,000	.....	.....	200,000	.....	145,000	145,000	70,000	75,000
	72	158	Ont. Carb. & S'n Ry. Co.	6,250,000	.....	.....	6,250,000	.....	3,807,954	3,574,000	1,500,000	1,500,000
1916	4	5	Pecksport Cmn'g Ry. Co.	100,000	.....	100,000	100,000	.....	80,061	80,061	40,000	40,061
	28	35	Ellenv. & King R. R. Co.	900,000	.....	900,000	900,000	.....	950,000	950,235	300,000	650,000
	38	44	P. Jer., M. & S. R. R. Co.	875,000	.....	875,000	875,000	.....	860,000	860,000	110,000	453,000
	514	915	New York Ontario & W. Ry. Co. (Total for Val. Docket)	34,495,193	10,005,000	.....	44,500,193	45,051,370	92,665,808	78,947,924	70,000	.....
1917	42	46	Artesian Belt R. R. Co.	443,281	.....	.....	443,281	443,281	92,044	92,044	20,000	15,000
1916	48	100	Butler County R. R. Co.	900,490	.....	2,906	907,490	910,396	1,034,394	1,027,070	290,000	155,000
1915	...	...	C. U. D. & Ry. Co. of Cin.	670,808	300,000	.....	424,870	970,808	1,095,678	1,199,649	1,193,399	712,500
1916	...	1	F. Worth U. Pas. Sta. Co.	210,230	.....	.....	210,230	210,230	91,866	.....	90,800	1,064
1916	30	32	Frank & Pittsford R. R. Co.	328,308	.....	76,000	328,308	404,388	285,741	.....	202,650	.....
1916	35	38	Chesv. & N. W. R. R. Co.	517,348	.....	.....	517,348	517,348	782,562	.....	750,000	.....
1916	21	26	Greene & Imbody Ry. Co.	901,912	.....	.....	901,912	901,912	791,563	819,562	225,000	517,360
1916	36	83	Lake S. & Ishpeming Ry. Co.	4,902,156	.....	1,292	4,902,156	4,903,378	3,750,466	3,917,456	1,000,000	1,201,000
1916	2	2	Minneapolis West Ry. Co.	712,592	.....	81,496	712,592	794,088	769,058	627,375	750,000	19,058
1915	1,014	1,879	Chic. & East. Ill. R. R. Co.	64,612,109	1,470,000	4,594,644	66,087,109	69,706,751	78,990,279	71,136,042	18,301,752	68,800,150
1917	5	47	The Newb'g. & S. S. Ry. Co.	3,227,897	.....	481,649	3,227,897	3,754,546	3,451,223	3,450,741	1,500,000	316,293
1916	14	18	Salt Lake & Los A. Ry. Co.	315,191	.....	38,517	315,191	353,901	660,293	.....	300,000	300,000
1916	19	19	Hilltop Interurban Ry. Co.	200,349	.....	656,000	200,349	856,119	336,678	337,357	200,000	100,000
1916	613	975	Maine Central R. R. Co.	3,340,557	56	17,060,778	44,010,762	61,091,384	37,234,526	35,814,268	15,029,415	15,727,500
	13	15	Dexter & Newp. R. R. Co.	350,000	.....	.....	350,000	.....	311,206	311,706	122,000	175,000
	18	18	Belt & M'ch. I. R. R. Co.	925,000	.....	.....	925,000	.....	119,391	819,103	648,100	33,500
1916	188	188	The Port & N. Amer. Ry. Co.	5,100,000	.....	.....	5,100,000	.....	4,035,011	4,24,210	2,490,000	1,000,000
	4	4	Eastern Maine R. Co.	650,000	.....	.....	650,000	.....	89,762	29,762	200,000	.....
1916	190	190	The Pen. & Odgensburg Ry.	5,072,640	.....	.....	5,072,640	.....	6,740,767	6,670,501	4,193,538	2,119,000
	17	17	Dex. & Newp. R. R. Co.	485,000	.....	.....	485,000	.....	313,384	313,084	122,000	175,000
1916	4	61	Wolverine R. R. Co. (I. I.)	800,000	.....	.....	800,000	.....	1,160,750	1,160,029	350,000	1,043,000
	2	3	Upper Coosa R. R. (V. I.)	87,500	.....	.....	87,500	.....	26,796	26,796	79,407	.....
	12	13	Coosa Valley R. R. Co.	760,000	.....	.....	760,000	.....	257,100	252,107	60,000	231,673
	67	77	Port & Rumford Falls Ry.	2,800,180	.....	791	2,840,757	2,841,550	2,344,900	2,344,900	2,000,000	2,051,000
	36	41	Ram F. & Ra. I. R. R. Co.	875,000	.....	.....	875,000	.....	962,908	784,953	300,000	700,000
	1,112	1,410	Maine Central R. R. Co. (Total for Val. Docket)	44,030,606	17,544,586	.....	61,575,193	61,091,384	54,983,162	52,588,942	.....	.....

Date of valuation, June 30, Year	Owned, Used and not used (includes undivided joint mileage)		Miles of all road tracks	Carrier	"Final value"					Investment in road and equipment (general balance sheet account 701 as of date of valuation)	Capitalization (general balance sheet accounts 751 to 753, 755 to 757, as of date of valuation)					
	Owned and used	Not used			Wholly owned and used	Owned but not used	Used but not owned	Total owned	Total		Carriers' books	Accounting section's restatement (italics covers)	Stock (common and preferred)	Debt (bonds, trust and receivers' certificates)		
1917	11	13	222	348	102	Port. & Southw. R. R. Co.	330,616	.....	.....	330,616	330,616	371,740	451,388	360,000	.....
1915	92	92	348	102	.....	Arizona Eastern R. R. Co.	10,681,198	.....	2,711,016	10,681,198	13,392,214	14,232,694	12,381,208	9,000,000	11,348,496
						Phoenix & East. R. R. Co.	.....	2,325,000	.....	.....	2,325,000	4,994,954	4,994,954	2,381,500	3,902,449
	314	450				<i>Arizona Eastern (Total for Val. Docket)</i>										
1916	1	2				Sainte Marie Un. Depot Co.	10,681,198	2,325,000	.....	13,006,198	13,392,214	19,227,648	17,826,162	.....	.....
1918	9	9				The Tabor & North. Ry. Co.	175,360	.....	4,181	175,360	175,360	120,553	123,497	75,000	45,553
1918	1	1				Delray Terminal R. R. Co.	154,264	.....	.....	154,264	154,264	131,291	83,088	25,000	50,000
1916	2	6				Duluth Terminal Ry. Co.	515,000	.....	.....	515,000	515,000	407,464	402,339	400,000	7,464
1916	13	14				Linnville River Ry. Co.	249,662	.....	47	249,662	249,709	160,557	255,757	60,000	185,259
1917	331	428				Louisiana Ry. & Nav. Co.	10,796,479	60,000	.....	10,856,479	10,796,479	20,963,665	20,958,567	8,131,000	10,346,328
1916	106	150				Northern Alabama Ry. Co.	3,189,429	.....	.....	3,189,429	3,189,429	3,834,854	3,831,554	1,943,768	2,344,768
1916	1	2				Columbia Union Station Co.	162,331	.....	13,340	162,331	175,671	135,015	None	100,000	30,922
1916	1	2				The Dul. & Sup. Bridge Co.	640,000	.....	.....	640,000	640,000	1,359,693	None	200,000	950,000
1916	20	39				Raritan River R. R. Co.	1,215,416	.....	1,230	1,215,416	1,216,646	1,311,073	1,289,755	540,000	400,000
1916	4	6				Wildwood & Delaware Bay Short Line R. R. Co.	190,000	.....	704	190,000	190,704	757,719	None	378,000	428,100
709	1,382	1,382				Boston & Maine R. R. Co.	101,712,971	58,016	132,475,845	101,770,987	234,189,816	90,653,840	88,900,755	49,156,811	42,774,000	
126	313	313				Hos. & Lowell R. R. Corp.	26,500,330	.....	.....	26,500,330	.....	15,549,289	15,619,822	9,067,144	6,520,000
14	49	49				Nash. & Lowl. R. R. Corp.	1,860,017	.....	(3-2 Lands)	1,860,017	.....	911,601	917,316	800,000	.....
13	22	22				Stoney Brook R. R. Corp.	530,000	.....	.....	530,000	.....	301,101	301,101	300,000	.....
21	11	11				Peterborough R. R. Co.	410,000	.....	.....	410,000	.....	242,749	250,207	240,000	.....
110	162	162				The Connecticut & Passumpsic Rivers R. R. Co.	580,000	.....	.....	580,000	.....	631,038	631,038	385,000	25,882
82	108	108				Northern R. R. Co.	6,008,801	.....	.....	6,008,801	.....	3,557,173	3,557,173	2,500,000	2,278,101
72	85	85				Cen. & Clare. N. H. R. R.	4,407,716	.....	(3-2 Lands)	4,407,716	.....	3,068,400	2,809,126	3,068,400	.....
18	20	20				The Peterb. & Hills. R. R.	2,250,000	.....	.....	2,250,000	.....	1,131,306	1,172,182	412,000	500,000
87	207	207				Connecticut Riv. R. R. Co.	275,000	.....	.....	275,000	.....	209,298	209,298	45,000	165,000
353	546	546				The Concd. & Mont'r. R. R.	10,805,669	.....	.....	10,805,669	.....	6,715,633	6,659,272	3,233,300	2,259,000
40	56	56				Proprietors of Wells R. R.	18,259,163	.....	.....	18,259,163	.....	14,526,382	13,355,215	9,048,466	7,023,000
18	21	21				Concord & Portsmouth R. R.	5,500	.....	.....	5,500	.....	.....	.....	6,300	15,000
20	24	24				Suncook Valley R. R. Co.	1,550,000	.....	.....	1,550,000	.....	350,000	350,000	.....	.....
1914	5	5				Nashua & Acton R. R. Co.	350,000	.....	.....	350,000	.....	348,199	348,199	341,700	.....
21	3	3				Ferngusset Valley R. R. Co.	665,850	.....	.....	665,850	.....	300,000	300,000	300,000	.....
5	8	8				New Boston R. R. Co.	590,000	.....	.....	590,000	.....	588,632	588,632	541,500	47,370
5	8	8				Franklin & Tilton R. R. Co.	97,000	.....	.....	97,000	.....	87,005	87,005	84,000	3,005
7	21	21				Low. & Andover R. R. Co.	270,000	.....	.....	270,000	.....	271,755	270,622	265,600	6,155
5	5	5				Kenneb. & Kennebec R. R.	640,000	.....	.....	640,000	.....	767,500	770,506	625,000	.....
24	37	37				Manchester & Law. R. R.	120,000	.....	.....	120,000	.....	65,000	64,846	65,000	.....
394	858	858				Fitchburg R. R. Co.	45,000	.....	.....	45,000	.....	1,279,065	1,256,920	1,000,000	274,000
5	6	6				Troy & Bennington R. R.	1,900,000	.....	.....	1,900,000	.....	50,416,170	49,561,958	24,856,637	25,939,000
59	178	178				Vermont & Mass. R. R. Co.	46,337,309	.....	.....	46,337,309	.....	236,953	235,019	150,800	.....
11	13	13				Proprietors of Con. Riv. Br.	360,100	.....	.....	360,100	.....	7,005,384	2,672,439	3,193,000	772,000
24	46	46				York Har. & B'h R. R. Co.	7,401,200	.....	.....	7,401,200	.....	3,117,151	3,084,814	1,500,000	2,306,391
24	46	46				Vermont Valley R. R. Co.	407,843	.....	.....	407,843	.....	316,003	325,639	300,000	.....
24	49	49				The Sullivan County R. R.	2,450,000	11,921	.....	2,461,921	2,450,000	2,079,689	2,079,689	1,000,000	1,500,000
2,272	4,280	4,280				Boston & Maine R. R. Co.	2,100,000	.....	.....	2,100,000	.....	1,264,057	1,264,057	500,000	357,000
1915	15	16				<i>(Total for Val. Docket)</i>					106,670,814	132,590,532	.....	.....	.....
1916	18	21				Hill City Ry. Co.	335,046	.....	.....	335,046	335,046	1,010,765	788,780	476,300	480,000
1916	7	23				L. Ch. & Mohiaw R. R. Co.	853,020	.....	42,000	301,104	342,000	460,026	758,926	50,000	200,000
1916	14	18				Middlet. & Un'w. R. R. Co.	389,847	.....	.....	389,847	389,847	609,875	597,028	150,000	440,000
1916	57	64				Tallah. Falls Ry. Co.	1,808,822	.....	132	1,808,822	1,808,954	1,684,651	1,688,468	323,400	1,519,000
1915	64	94				Northwest Vermont Ry. Co.	80,000	.....	.....	80,000	.....	678,855	513,866	1,000,000	.....
1916	23	58				Mineral Range R. R. Co.	2,849,177	.....	1,030,018	2,849,177	3,879,195	3,317,151	3,084,814	1,500,000	2,306,391
						Hanc'k & Calu. R. R. Co.	775,000	.....	.....	775,000	.....	955,106	787,812	350,000	325,000
1912	8	9				<i>(Total for Val. Docket)</i>					2,849,177	1,030,018	3,624,177	3,879,195	4,272,257	3,872,626
1917	2	6				Bay Point & Clay. R. R. Co.	136,000	.....	2,000	136,000	138,000	225,299	.....	150,000	.....
1916	11	12				The Troy Union R. R. Co.	1,082,305	1,741	.....	1,084,046	1,082,305	1,195,761	1,165,867	30,000	97,390
1916	77	89				Northwestern Ry. Co.	140,576	.....	.....	140,576	140,576	178,609	.....	165,750	.....
1916	15	35				Danville & West. Ry. Co.	1,978,347	.....	780	1,978,347	1,979,127	2,082,667	.....	368,000	2,297,774
1916	4	10				Will'n & Pond Cr. R. R. Co.	1,222,044	.....	.....	1,222,044	1,222,044	1,247,947	.....	50,000	1,453,038
1916	4	10				Augusta Belt Ry. Co.	95,000	.....	.....	95,000	95,000	73,127	.....	65,000	6,147

Note 1.—Italics ours in these tabulations. Valuations are not being made by systems.
 Note 2.—Items in "Capitalization" column should not be totaled, as some duplications are present.
 Note 3.—Where a number of carriers are included in one valuation docket the details of the property "Used but not Owned" are not in all cases set up in the name of the owner, but the total amount is included in the totals for this classification.
 Note 4.—The figures in the column "Accounting Section's Restatement" represent the amount reported by the Commission after an examination of the carriers' books, and an attempted restatement of Account 701 in conformity with its present accounting rules and methods. This column should not be totaled.
 Note 5.—Unit prices used in estimating cost of reproduction new and cost of reproduction less depreciation are those termed normal prices as of June 30, 1914.
 These figures are very close approximations. A small amount of undivided joint mileage is included in the mileage of some of the joint owners and not allocated. To this extent a slight duplication of mileage occurs in the totals.

THE DELAWARE & HUDSON COMPANY is reported a loser to the amount of \$50,000 by a flood in the valley of the Lackawanna river, Pennsylvania, on June 3 and 4, the total losses of which are said to aggregate more than a million dollars. The loss of the Hudson Coal Company is given as \$600,000.

line is now in operation from Squamish, B. C., at the head of Howe sound, northeast to Quesnel, in the heart of the Cariboo district, and has recently been graded between Quesnel and Prince George, on the Grand Trunk Pacific. The government is considering a proposal to build from Prince George into the Peace river country to a connection with the Edmonton, Dunvegan & British Columbia, which is now being extended from Spirit river, Alberta, to Pouce Coupe, B. C. Reports on the engineering, operating and traffic conditions of the P. G. E. have already been submitted.

J. S. DENNIS, head of the natural resources department of the Canadian Pacific, has been engaged by the provincial government of British Columbia to make a survey of the natural resources of the territory adjacent to the Pacific Great Eastern Railway. This

Report on Collision Near Plains, Kan.

THE INTERSTATE COMMERCE COMMISSION has issued a report on a collision of passenger trains—No. 311 westbound and No. 312 eastbound—on the Chicago, Rock Island & Pacific near Plains, Kansas, on April 19, in which both engines were killed and four passengers and two employees were injured.

Improper handling of a train order at Kismet, seven miles west of Plains, is given by the inspector as the cause of the collision, which occurred about 2 a. m. in clear weather; yet both locomotives had electric headlights burning brightly and the line of road is perfectly straight for seven miles or more.

Each train consisted of a locomotive and three cars and was moving at something between 20 and 40 miles an hour. In each train the baggage car was telescoped by the tender for the full length of the tender; but the passenger cars were not damaged. The locomotives were damaged but remained upright. The firemen were thrown off, or jumped off, and were seriously injured. Each of them said that he knew nothing of the approach of the opposing train until he felt the application of the air brakes, at which time the opposing train was only a few rods distant; and neither could give any reason for the failure of the enginemen sooner to set the brakes.

The enginemen and firemen of both trains, before departing from Plains and from Kismet, respectively, observed the headlight of the opposing train and in each case commented upon the fact; and thought that the opposing train was waiting at the next station.

The inspector's account of the sending and delivery of the train orders is long and filled with many details. The order in question was No. 211, form 31. Orders on this form are made complete as soon as repeated, and the station operator is responsible for getting the conductor's signature. When the train-order signal is displayed, a train must not leave without a clearance card specifying the numbers of the orders which are delivered with it; and if the orders are on form 31, the operator must repeat this clearance card, including the numbers of the orders, to the dispatcher before delivering it; but with form 19 this repetition is not required.

The trouble occurred at Kismet. Eastbound stock train, extra No. 1913, was waiting at Kismet for train No. 311.

To help 1913, Train Dispatcher Forsyth had telephoned to Operator Noland, at Kismet, at his house, requesting him to report for duty at the station. When Noland reached the office, about 2 a. m., order No. 210, form 31, was issued providing that trains 1913 and 311 should meet at Plains. Forsyth next issued order No. 211, form 31, changing the meeting point of the passenger trains from Kismet to Plains, and permitting the freight to run ahead of No. 312 from Kismet to Plains. Then, a little later, he sent a message to the operator at Kismet to regard this last order as form 19; and this allowed Noland to deliver the order to No. 312 without having his clearance card approved by the dispatcher.

After order No. 211 was delivered, the conductor of the freight decided that he must go behind the passenger train. When the dispatcher learned this he issued order No. 212, form 31, addressed to the operator at Plains, and to the operator and the freight at Kismet, annulling orders 210 and 211; but in the meantime train 312 departed, expecting to meet train No. 311 at Plains, according to order 211.

Operator Noland said that in view of the fact that order No. 212 was addressed only to himself and to the freight he overlooked the fact that it also affected train No. 312. Not until he reported the departure of train No. 312 was the error discovered. The train dispatcher and Operator Noland gave conflicting statements as to the conversations which they

had held, and it appears that Forsyth intended to have order No. 211 delivered as form 19 only to the freight; for the passenger train he expected it to be delivered as a 31 order; and it did not occur to him that he had authorized it to be delivered to both trains as a 19. The operator at Plains received the annullment order just in time to deliver it to No. 311 at 2:26 a. m.

As to whether the message changing the form of order No. 211 confined this authority to the freight train, the dispatcher and the operator tell conflicting stories; but whether the operator did or did not make an error in copying the message, the changing of the status of the order by any other method than the transmission of a new order, was entirely unwarranted; therefore it is held that the dispatcher must bear the responsibility for the collision. The informal message was irregular, but the operator and the passenger conductor are not criticized for acting on such instructions from the dispatcher, their immediate superior officer.

Had Noland been alert he probably would have discovered the dangerous situation; but if his mind was not bright the condition is held to be explainable by the fact that he had been called out of bed that night once before, at 11 o'clock. His regular tour of duty is from 8:30 a. m. until 5:30 p. m., with one hour out for luncheon. When Noland reached his office at two o'clock he failed to light the lamp in the train order signal, or to display any light indicating that he had train orders to be delivered. This practice of awakening operators from their sleep is denounced as dangerous.

The report concludes with the statement that the dispatcher was a telegrapher of experience. He had been train dispatcher about 10 months.

I. C. C. Air Brake Hearing Adjourned Until July

DURING THE SECOND WEEK of the hearing, Spencer G. Neal, chief engineer, Automatic Straight Air Brake Company, was on the stand for two days. He was followed by J. E. Grant, special agent of the Bureau of Explosives. Other witnesses called by the Automatic Straight Air Brake Company were H. B. McFarland and George L. Fowler, consulting engineers, and A. J. Schuyler, general car inspector, Virginian Railway.

The first two witnesses presented by the Westinghouse Air Brake Company were W. S. Bartholemew, vice-president, and George W. Wildin, general manager. They were followed by T. W. Dow, Erie; J. F. Gannon, New York Central; P. J. Langan, Delaware, Lackawanna & Western; and George E. Terwilliger, New York, New Haven & Hartford. The Westinghouse Air Brake side of the case was closed with evidence by Prof. S. W. Dudley, Yale University (formerly chief engineer W. A. B. Co.), and C. C. Farmer, director of engineering, W. A. B. Co. The only witness for the New York Air Brake Company was B. J. Minnier, local manager.

Others who appeared were J. H. Phillips, who described a metallic hose connector, and W. H. Sauvage, who requested permission to describe his air brake system and also the automatic slack adjuster made by the Gould Coupler Company.

The hearing was adjourned on Monday night, May 29, to a date to be fixed some time in July. This recess will enable the railroads to go over the record and prepare their case.

THE CHICAGO GREAT WESTERN has moved its division headquarters in St. Paul from the Commerce building to its new building at Robert and Wood streets.

Shifting of Bridge Pier Stopped After 35 Years

Interesting Story of Efforts to Abate Movement Under Large Span, Caused by an Unstable Hillside

By M. F. Clements

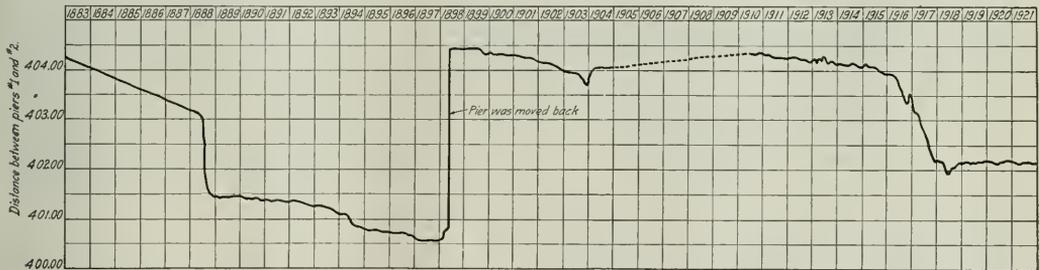
Bridge Engineer, Northern Pacific, St. Paul, Minn.

THE NORTHERN PACIFIC was built into Bismarck, Dakota territory, in 1873 and was constructed west from Mandan in 1880. In 1881 the location of a bridge over the Missouri river was fixed, and the substructure started and in 1882 the bridge was completed. The bridge, as first built, consisted of three 400-ft. through pin-connected whipple truss spans, two 113-ft. deck pin connected spans and 1,500 ft. of timber trestle. The trestle was filled later.

Long spans were selected on account of the absence of rock in the river bed as a foundation for the piers, the government requirement for a clearance of 50 ft. above water level and conditions which exist at the time the ice breaks up in the river. Cross sections of the Missouri river a number of miles north and south of this crossing show a bluff on one side of the river and a flat on the opposite side, with a bluff beyond. At the Bismarck bridge the bluff is on the east side, and a low flat on the west side extending into the valley of the Heart river at Mandan. The bed of the river consists

Portland cement concrete footing. Its base as first constructed was 50 ft. by 24 ft. and 18 ft. thick. The pressure on the base was 5,690 lb. per sq. ft. The excavation was carried down through a hard, dense blue clay for the full depth without the use of a pump, although the bottom of the base was 16 ft. below the water surface.

Practically from the date of completion of the bridge Pier I has moved intermittently toward the river. There was no settlement in the pier which could be measured and the whole movement was horizontal. A chart shows the total movement of the pier from 1883 to date. From 1883 to 1888 the measurements were not made accurately for individual months or years. From 1888 to 1905 the measurements were made at the ends of trusses with no adjustment for temperature. The record from 1905 to 1910 is incomplete, but in 1910 measurements were taken with a tested tape and the change in method of measuring accounts for the eastward movement recorded on the chart. The expansion



Graphical Record of the Movement of the Pier

of a fine sand and silt on top of a hard blue clay which lies from zero to 100 ft below the surface of the water.

Unusual ice conditions exist, caused by the different climatic conditions on the head waters of the Missouri and Yellowstone rivers. In the spring of the year the Yellowstone and the Missouri above the mouth of the Yellowstone, break up two or three weeks in advance of the Missouri river at Bismarck and the result is a succession of ice gorges and accompanying high water. The ice gorges, which sometimes measure 20 ft. in depth, cause a very heavy scour in the sand bed.

The piers supporting the 400-ft. spans were founded as follows:

- Pier I on blue clay 16 ft. below low water.
- Pier II on blue clay 48 ft. below low water.
- Pier III on blue clay 47 ft. below low water.
- Pier IV on pile foundation 6 ft. below low water

Immediately after the completion of the bridge, the Bismarck waterworks was established. A pumping plant was built near the river bank, adjacent to the bridge, and a pipe line was placed in a tunnel just east of the approach span and leading to reservoirs placed on the bluff east of the bridge. The reservoirs were completed in 1886.

Pier I was constructed of granite masonry resting on a

rollers for the original east span were on Pier II and wood blocks were inserted between the spans to prevent movement early in the life of the bridge.

The movement of Pier I was gradual from 1883 to 1888, when a very marked increase was noted. In August, 1888, it became necessary to remove the wooden blocks between the spans on Pier II and move the center and easterly spans westward. The east span was moved $17\frac{3}{4}$ in. at one time and a few weeks later was moved an additional 3 in.

Situation Became Serious in 1888

In September, 1888, a frame bent was built on the east side of the pier to carry the approach span, and in August, 1888 the supply pipe between the pump house and reservoir of the Bismarck waterworks pulled apart and the bluff was flooded with water. The movement of the pier became serious that year and an attempt was made to stop it.

It was assumed that the movement occurred on a plane surface at some point below the bottom of the pier and plans for stopping the movement have been based on that assumption. The original soundings located an 18-in. vein of lignite coal about four feet below the base of the pier and it was assumed that the surface of the coal was the plane of sliding.

The plan suggested for stopping the movement of the

bluff was to construct large concrete dowels which would extend above and below the plane of sliding and tie the upper mass to the lower. In addition, it was thought best to divide the slide by excavating a cut into the bluff, dividing the north side of the bluff, where the movement was greatest, from the south side. The excavated material, a total of 24,000 cu. yds., was deposited on the river side of Pier 1 to counteract the movement of the bluff.

In making the excavation for the concrete dowels, it was reported that directly on top of the coal was a slippery, muddy clay from $\frac{1}{2}$ to 1 in. thick. It was assumed that this substance lubricated the top of the coal so that the overlying material could slide. The dowels were located east of Pier 1, 24 ft. and 30 ft. and 25 ft. and 40 ft. on either side of the center line. They are 25 ft. square and contain approximately 400 cu. yd. of concrete each. They were reinforced with railroad rails set vertically in the concrete. The bottom of the dowels were 12 ft. below the bottom of the pier.

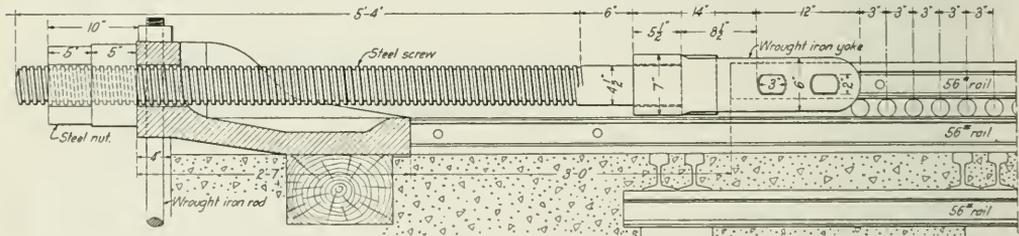
At this time, an effort was made to drain the water that collected in the crevices in the bank. On the completion of the work it was found that the pier continued to move, but it was assumed that such movement would stop when the material back of the dowels became thoroughly compressed. The assumption proved to be erroneous and the pier continued to move.

From 1888 to 1895 the movement was gradual. In 1895

erations and the method adopted for excavation beneath the footing of the pier consisted of tunneling.

The tunnels were driven under the pier in the direction the movement was to take place. The openings were 5 ft. 6 in. wide and 13 ft. deep and were 5 ft. apart. The bottom of the pier was smoothed off by stone cutters. Four 56-lb. rails were bolted together and placed in an inverted position under the pier in each section. The excavation in each section was filled with concrete and four 56-lb. rails, bolted together, were placed on the concrete so that the rails top and bottom were separated by 2-in. by 18-in. steel rollers with a clear space of one inch between them. The upper rails were filled with concrete before placing them and they were jacked into position and grouted to the masonry. Considerable difficulty was experienced in getting the rails to bear on all rollers and a maximum variation of $\frac{1}{32}$ in. was obtained. Five tunnels were driven in all, each having two sets of rollers, there being a total of 1,020 rollers. When the tunnels were completed, the space between them was excavated and filled with concrete up to a point 2 ft. 6 in. from the bottom of the pier, its weight being transferred to the rollers. One-inch wood blocks were placed between the rollers until the pier was ready for movement.

The movement was effected with the aid of ten screws, $\frac{1}{2}$ in. in diameter and with a $\frac{7}{8}$ in. pitch. One end of these screws was bolted to the upper rails and the other to steel nuts $9\frac{1}{2}$ in. in diameter, on which were fitted cast iron



Screw Rig Used to Move Back the Pier

it became evident that the leakage of water from the Bismarck waterworks reservoirs on the bluff was causing trouble. A series of tests indicated a leakage of 60,000 gal. daily and test wells showed that the water was collecting in hidden cavities and drains were constructed to carry it to the river. In 1897 three pipes were sunk to determine the plane of sliding and the rate of movement and the pipes broke from the movement below the bottom of the pier. In that year the movement had reached a maximum of 44 in., the approach span was supported on cribbing built up from the ground, and the 400-ft. span was resting on the edge of the bridge seat.

Decide to Move the Pier Back

To make the pier serve again as a support for both steel spans and correct a further movement, it was decided to rebuild the pier or place a new footing under the old and move it back to its original position. It was assumed that a pier of greater depth which penetrated the material below the lignite coal would be permanent. Consideration was given to various means of replacing the pier. If the pier was rebuilt, it meant placing both spans adjacent to it on falsework. A plan for moving the pier was adopted and the work was finally completed along those lines.

The material on which the pier was founded consisted of a hard blue clay. Laboratory tests on one-inch cubes, when dry, indicated that it had a compressive strength of 58 lb. per sq. in. when dry. The material was ideal for tunnel op-

wheels 27 in. in diameter, equipped with sockets for inserting levers.

The first concrete was placed in January 1, 1898, and it was completed on May 29. At the time of moving the pier, the wooden blocks between the rollers were removed and force was applied to the hand wrenches. It required two minutes to move the pier $\frac{1}{4}$ in., six minutes to move it 1 in. and nine minutes to move it 2 in. A cave then occurred in the bank on the west side of the pier and the pressure from the earth completed the movement of the pier. In 12 min. it had moved 5 in. and it continued unaided, stopping at approximately the original location. After the movement it was found that 163 rollers, or 16 per cent of the total were loose. These were removed and all spaces under the pier filled with concrete. The west end of the approach span was placed on rollers so that the pier moved under it.

The original height of the pier was $82\frac{1}{2}$ ft. The new height is $95\frac{1}{2}$ ft. The total load on the rollers was estimated at 8,172,000 lb., or 532 lb. per in. of rollers. The concrete in new footing totaled 840 cu. yd.

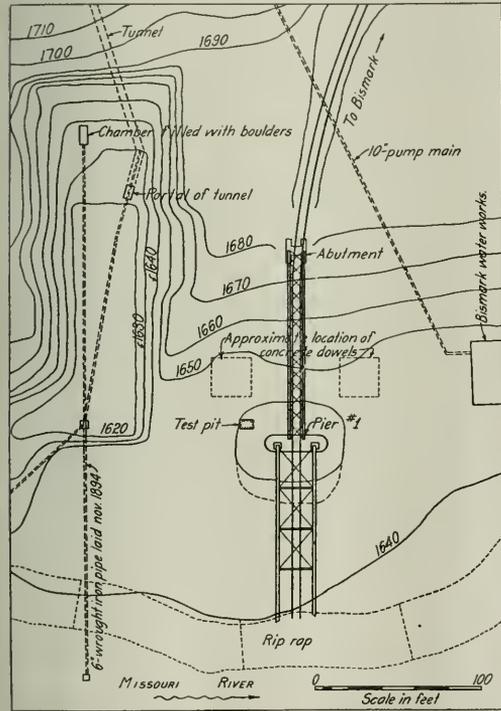
The Movement Continued

Although the new pier was of greater depth and penetrated the coal seam, the movement continued. In 1899 it was $\frac{3}{16}$ in. and in 1903 it had increased to $9\frac{11}{16}$ in. The excavation around the pier remained open for a time, but it gradually filled up so that the pressure of the moving bluff acted against it. To relieve the pressure, an excavation

was again made in 1904, when the pier readjusted itself and moved back $5\frac{1}{8}$ in., leaving a total displacement at the top of $4\frac{9}{16}$ in. A test pit sunk at the south end of the pier to the junction of the new and the old footings exposed a crack between them and it was assumed that the footing course had not been moved.

In June, 1903, a test disclosed a leakage of 100 cu. ft. per hour in the water company's reservoirs. The supply pipe to the reservoirs passes under the track east of the bridge in a tunnel. A movement of the bluff caused the pipe to pull apart in September, 1903, and the leakage found its way into cracks in the hillside and a movement of $2\frac{1}{2}$ in. in six weeks was noted.

In the winter of 1903-1904 a drainage system was in-



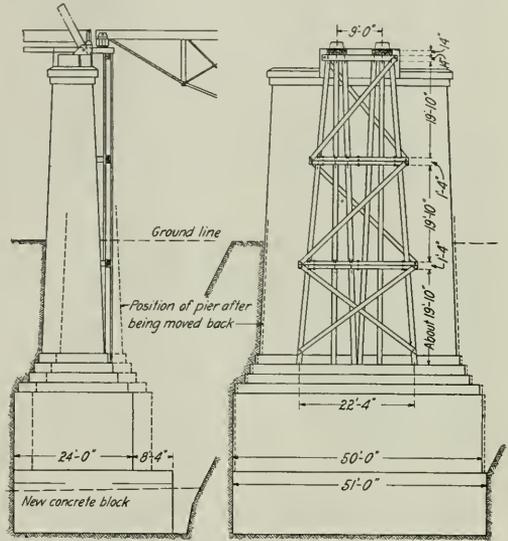
Contour Map of the Pier Site

stalled which consisted of two lines of perforated pipe extending from the surface and ending in tunnels built into the bluff. The pipes were to collect the water leaking from the reservoirs and carry it away through a drainage system into the river. The total length of main tunnel was 1,180 ft. and extended from the foot of the bluff on the north side of the track to a point near the reservoir, where it branched off on either side. The tunnel was lined with timber and when first built, the bents were four feet apart, with plank lagging behind. There were originally 180 bents in the main tunnel, 132 in the north branch and 114 in the south branch. In making repairs, intermediate bents were placed and in certain parts they are now together, so that lagging is not required.

Between 1904 and 1911 there was practically no movement in the pier. In the meantime the superstructure had become too light for heavy power and new steel designed for E-52 loading was placed in 1905. All of the old masonry

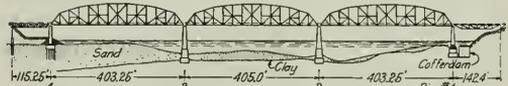
except the east abutment was used to support the new steel but the sliding of the bank made it necessary to lengthen the east span and it is now supported on piling capped with a timber grillage. The slope beyond the steel span is taken care of by a 15-ft. timber span.

For a number of years after 1904 the open pit back of Pier I was maintained, but it finally became filled with wash material from the slope and pressure was again brought against the pier. Previous to 1904 all measurements of move-



Pier 1 Before and After Moving Back

ment were taken from the steel work. After the new steel was placed no movement was detected in the roller bearings and a record of movement was not maintained, but in 1912 it was decided to institute monthly measurements made along standard lines with adjustments for temperature. From 1912 to 1917 Pier I moved 12 in. In 1917 it moved 12 in.



General Elevation of the Bridge Showing Conditions Since 1917

more. During the winter months the pier was stationary, so that in 1917 the movement exceeded one inch per month.

Movement Again Serious

It became evident that something would have to be done to stop the movement, or a support provided for the spans meeting on the pier. The expansion bearings of both spans rest on Pier I and the movement was taken care of by adjusting the rollers. Plans were prepared for building a new pier east of the present one and joining the two at the top with a concrete girder, which would provide a flat surface 30 ft. long that could move under the supports of the span.

The excavation for such a pier was made, requiring a pit 50 ft. by 40 ft. for the full depth of the foundation. By constructing a cofferdam in such a way that pressure does not bear against the existing pier, it has remained stationary

and the pit will be left open during the life of the timber in the cofferdam. This method of maintaining the pier has proved very satisfactory. There has been no movement from December, 1917, to date. The question of building a new sliding pier is still open and future developments will determine whether it is best to build such a pier or renew the cofferdam.

The early methods used to maintain the pier were based on the assumption that the bluff is moving on a plane surface and that the movement has been aggravated by the leakage of water from the city reservoirs. There is no doubt that the bluff is moving and that the water, either from springs or the reservoirs, has had something to do with the rate of movement, but the theory that the movement is on a plane surface is probably erroneous. The movement of the bluff is greatest at the surface and decreases to zero somewhere near the bottom of the pier. This is clearly shown by the fact that a 16-ft. timber span at the east end of the 140-ft. span moved about 14 ft. from 1904 until 1917 and the bottom of the pier moved 26 in. during the same period of time.

The movement has been zero in the winter months, with the greatest monthly movement immediately after the spring break-up of ice. It is probably caused by the deep scouring of the sand which, for short periods, is scoured to the surface of the clay and deposited again as the high water recedes. During the time the pressure of the sand is removed, the bluff seeks a new position of equilibrium by moving towards the river. The movement is in the nature of a flow with the greatest movement at the surface. Efforts to stop the movement of the bluff have proved to be of no avail and the problem of maintaining the pier can only be met by removing the pressure against it.

Railroad Legislation in Congress

WASHINGTON, D. C.

THREE RAILWAY BILLS were passed by the House of Representatives last week but practically no progress is being made toward action on the various bills to amend the Transportation Act, which have been rather numerous and which have been the subject of extensive hearings before House and Senate committees; and it now appears certain that no action will result at this session. The bills passed by the House were the valuation bill, already passed by the Senate, to strike out of the valuation act the requirement that the Interstate Commerce Commission report the cost of condemnation or of purchase of railroad lands; a bill to punish commercial bribery, which includes penalties against bribing switchmen, etc., to furnish cars, and an amendment to the law which deals with freight pilfering so as to provide that the interstate character of a shipment may be established by waybill evidence. The latter two bills have not yet been passed by the Senate.

The Senate committee on interstate commerce held another meeting on June 3 to discuss the Capper and Nicholson bills designed to reach the rate provisions of the transportation act and restore the powers of state commissions; but it took no action and it is understood that members of the committee have decided informally to make no report on these bills. Senator La Follette has given notice that he proposes to move that the committee be discharged from the consideration of these bills so that they may be brought up on the floor of the Senate. The House committee has held leisurely hearings on the Hoch and Sweet bills, of a similar character, and on Tuesday heard Bruce Scott, of the Chicago, Burlington & Quincy, as one of the railroad witnesses in opposition to the bills, but a majority of the members of the committee show no desire to hurry the proceedings. The committee has decided to report out a bill providing for reduced rate mileage

books but it is also understood that it is not intended to hasten its passage.

The House on June 2 passed by a vote of 49 to 18 the bill previously passed by the Senate, S. 539, to strike out of the railroad valuation act the requirement that the Interstate Commerce Commission ascertain and report "separately the original and present cost of condemnation and damages or of purchase in excess of such original value," of lands. This was substituted for the House bill, H. R. 6043. The legislation was requested by the Interstate Commerce Commission and the state commissions. Representative Merritt of Connecticut vigorously opposed the bill on the ground that it is an attempt to settle a judicial question by legislation and he pointed out that under the present law the commission is required only to take the information into consideration.

Until directed to do so by the Supreme Court in the Kansas City Southern case the commission had not included in its valuation reports any figure representing the excess cost of acquisition of land, stating that it was impossible to give anything more than an unreliable estimate of what it would now cost the railroads to acquire their lands. Since the decision it has been reporting such a figure, based on a system of multiples applied to zones of land of various kinds. There has been no evidence, however, that it has given much weight to the figure so ascertained in its consideration of the elements on which it bases its findings of final value, and shortly after the court decision it asked Congress to relieve it from reporting the excess cost. It has been argued, therefore, by those who favored the bill just passed, that it was useless to require the commission to make such a finding; but the railroads, at the hearings on the bill, insisted strongly that such a figure should be stated by the commission for the benefit of what weight might be attached to it in judicial proceedings affecting a valuation, and that without such a finding a court might delay the valuation work by ordering a report to be made over again.

The bill, H. R. 10,768, passed by the House on June 1, to punish the larceny of freight in interstate commerce, amends the act of February 13, 1913, to provide that "to establish the interstate or foreign commerce character of any shipment in any prosecution under this act the waybill of such shipment shall be prima facie evidence of the place from which and to which such shipment was made." The purpose of the bill is to make it unnecessary to call witnesses from long distances to prove the interstate character of the shipment.

The House on June 1 passed without discussion the bill, H. R. 10,159, to further protect interstate and foreign commerce against bribery and other corrupt practices, without a debate.

The mileage book bill reported was that passed by the Senate, which leaves the rate per mile to be determined by the Interstate Commerce Commission, with an amendment authorizing the commission to require railroads to issue scrip coupons, leaving to the determination of the commission the amount of mileage to be contained in mileage books and authorizing the commission to exempt any carrier from the provisions of the act if conditions warrant such action. Also, the word "interstate" was taken out of the bill.

Representative Newton of Minnesota has introduced a bill, H. R. 11,822, to amend section 15-a of the transportation act so as to leave out any provision for a definite percentage of return but stating that the carriers are entitled to the opportunity of earning a fair return providing the commission shall have reasonable latitude to modify any particular rates which it may find to be unjust or unreasonable.

TEN THOUSAND HORSES, or more, are sought in western Canada for shipment to Russia. Albert Champagne, ex-member of the Dominion Parliament, is expected to tour the provinces shortly, for this purpose, acting for a British syndicate.

Shopmen's Wages Cut Five to Nine Cents an Hour

Labor Board Authorizes Lower Rates of Pay for Mechanical Forces Effective July 1

THE RAILROAD LABOR BOARD, on June 6, authorized wage reductions of seven cents an hour for machinists, boiler makers, blacksmiths, metal workers, electrical workers, carmen (except freight carmen), molders, cupola tenders, and coremakers (including those with less than four years' experience), regular and helper apprentices and helpers of all classes; nine cents an hour for freight carmen, and five cents an hour for car cleaners. The decreased rates of pay go into effect on July 1, simultaneously with the decreases previously ordered in the rates of pay of maintenance of way employees. The Labor Board also found that the duties and responsibilities of shop supervisory forces are such as not to justify a decrease in the wages of this class of employees at the present time.

In analyzing the wage reductions so ordered, the board said in part:

The Labor Board is of the opinion that after the reductions made under this decision, shop employees on the railroads will still be receiving, as a rule, a wage in excess of that paid to similar employees in other industries.

The decreases have the effect of maintaining the uniform rates for the respective classes which were continued by Decisions Nos. 2 and 147. It will be noted that the differential between "freight carmen" and the other classes has been increased two cents per hour by providing a decrease of nine cents per hour for this class as compared with seven cents per hour for the other crafts named. The Board recognizes that there are certain branches of carmen's work that require the service of skilled mechanics, and for the classes so considered this decision provides a decrease of seven cents per hour. It is, however, believed that the work of "freight carmen" is not of a character which requires the service of men as skilled as in the other branches of work coming within the scope of carmen's work; therefore, the differential between the minimum rates of "freight carmen" and of the other shop crafts under this decision will be increased to seven cents per hour, which it is felt is just and reasonable considering the character of service performed and the rates of pay and working conditions applicable to this class of employees prior to the issuance of any wage order by the United States Railroad Administration.

It will be further noted that no decrease is provided herein for "supervisory forces." The Board, after due consideration, feels that the duties and responsibilities of these positions are of such a character as to warrant the maintenance of the present rates.

The "Real" Wages of Machinists and Carmen

Based upon the evidence before the Board, the statistical department of the Board has made a study of the comparative purchasing power of the wage herein fixed for certain of the shop crafts and the purchasing power of the wage paid such employees on the railroads in December, 1917, immediately prior to government control of the carriers; in January, 1920, just prior to the termination of federal control; on May 1, 1920, the effective date of Decision No. 2; on July 1, 1921, the effective date of Decision No. 147; and in March, 1922.

The results of these studies are as follows:

AVERAGE HOURLY RATES

	Machinists	Carmen
December, 1917	50.5c	37.7c
January, 1920	72.3c	68.0c
May, 1920	85.3c	81.0c
July, 1921	77.3c	73.0c
Under present decision	70.3c	64.4c

PERCENTAGE OF INCREASE IN AVERAGE HOURLY RATES OVER DECEMBER, 1917

January, 1920	43.2%	80.4%
May, 1920	68.9%	114.6%
July, 1921	53.6%	93.6%
Under present decision	39.2%	70.8%

INCREASE IN COST OF LIVING OVER DECEMBER, 1917

January, 1920	40.0%	.....
May, 1920	59.0%	.....
July, 1921	26.7%	.....
March, 1922 (latest available Government data)	17.2%	.....

PERCENT OF INCREASE IN PURCHASING POWER OF EARNINGS OF SUBSEQUENT DATES AS COMPARED WITH DECEMBER, 1917

January, 1920	2.3%	28.9%
May, 1920	11.1%	41.2%
July, 1921	20.8%	52.8%
Under present decision	18.8%	45.7%

Although average hourly earnings of machinists are below the earnings after Decision No. 2 was applied by 15 cents per hour, their value is 6.9 per cent greater due to the decrease in the cost of living.

The average hourly earnings of carmen are below the earnings after Decision No. 2 was applied by 16.6 cents per hour, but their value is 3.2 per cent greater for the same reason.

The cost of living figures set out in the foregoing tables have been compiled from the reports of the United States Department of Labor and are for the latest date for which such data are available.

Application of the New Wage Scales

The decision of the board, as outlined above, is effective on those roads and with respect to those particular classes of employees that were specifically named in the submissions made to the board by the various railroads and the various organizations. The decision includes a long list of railroads, indicating in each case the classes of employees affected.

The decreases specified in the decision are to be deducted on the following basis:

- (a) For employees paid by the hour, deduct the hourly decreases from the hourly rates.
- (b) For employees paid by the day, deduct eight times the hourly decrease from the daily rates.
- (c) For employees paid by the month, deduct 204 times the hourly decrease from the monthly rate.

Labor Group Append Lengthy Dissenting Opinion

A lengthy dissenting opinion signed by the three labor members on the board, A. O. Wharton, Albert Phillips, and W. L. McMenimen, was attached to the board's decision, this group summarizing the reason for their dissent as follows:

(1) The wage structure for the transportation industry which is being built up in this series of decisions rests upon no consideration of the human needs of the employees affected. These human needs were set forth by data and witnesses at the recent hearings with compelling force. The majority have not considered the evidence on this point, nor have they met the issue raised. Their failure to give this, the most vital element, consideration and to inform the public impartially on the subject, vitiates the whole decision.

(2) The evidence submitted in the present hearings tended to show that an income based on the 77-cent per hour rate does not enable representative shop-craft families, with the most economical management, to procure enough food for their families, or to maintain their own efficiency. This evidence included a tentative standard of living expressed in terms of goods and services to which mechanics naturally feel themselves entitled. At the current prices an increase in pay would be necessary to enable these employees to secure such a standard. Without any attempt to show that the employees affected by this decision are not entitled to such a standard, and further without any attempt to show how families can make good the food deficits, the majority decision further reduces the ability of these employees to meet the needs of their families. The undersigned dissenting members feel that the Labor Board must initiate a study which shall determine the amount necessary to meet some recognized standard, that it must use the results as a basis for its decisions, and that it must through this decision transmit this information to the public.

(3) The rates of pay contained in the award, being insufficient to provide for a family of five, tend to substantiate the position taken by the management to the effect that wages need not be established with reference to the needs of a family of this

size. The most careful and comprehensive investigation on this subject shows that wages which do not provide for a family of that size mean that 72 per cent of all children in families receiving this wage will be inadequately provided for during at least five critical years of their lives. Permanent traces of this malnutrition will be left on the physique of the next generation.

(4) The failure of the majority to consider the real merits of the case has created a wage structure which has no relation to any existing standards. Based on evidence in possession of the Labor Board, the minimum for the industry should have been nothing less than fifty cents per hour. Without, for the moment, questioning the justice of the differentials resulting from the majority decision, this would place the mechanics' rate at least as high as 87 cents per hour.

(5) The ordering of a larger decrease in the case of freight carmen is unjust and wholly inconsistent with former decisions of the Labor Board. In ordering such a change, the majority disregard the fact that any difference in skill which may exist has been already provided for in the 5 cent differential which dates from the days of the United States Railroad Administration. They also disregard the fact that under the classification rules of the Board freight carmen are mechanics and as such are entitled to the minimum rate for mechanics.

(6) The rates of pay established in this decision will mean to the employees affected lower purchasing power and lower standards as compared with pre-war years. From December, 1917, to the present decision, inclusive, the maintenance of equipment forces have suffered a constant deficit, their wages at all times failing to keep pace with living costs. The figures cited by the majority to the contrary effect are a misrepresentation of the true facts as to the relative earnings involved.

(7) The savings to the railroads, as a result of the decisions of the Labor Board and of the lay-off of men, far exceed anything justified by the savings to the public in reduced rates. The employees covered by this decision alone have had their payroll cut to the extent of \$371,817,996 per year, as hereinafter set out, based on number of employees in service as of December, 1917, while the total payroll cuts due to decisions alone total half a billion dollars. During the last six months of 1921, the total payroll slash, including the lay-offs, was running at the annual rate of \$1,300,000,000. This diminished purchasing power of the employees as a group appears in strong contrast with the increasing prosperity of the railroads noted by the Interstate Commerce Commission in its recent opinion and by the financial press.

(8) The increasing antithesis between profits and just wages will result in lower morale among the railroad employees; thus the present wage reductions will not result in economies and will prove contrary to the real needs of efficient and economical management.

(9) The majority have failed to carry out the function for which the Labor Board was created. Such decisions, containing no explanation of the process by which the majority arrive at the rates established, give the public an impression that these rates are not founded upon a careful consideration of the facts. A strong contrast is presented with the decisions of other wage boards, not only in this country but in other parts of the world, as well as with the decisions of the Interstate Commerce Commission, which show the public at considerable length how the evidence was weighed and the conclusions reached.

In the light of the Transportation Act it is the clear duty of the Board: First, to act as a constructive, impartial body in providing means whereby railroad employees can have their legitimate human needs satisfied without recourse to stoppages; and, second, to enlighten the public so that through the disordered state of unregulated industry and the confusion of propaganda, they shall be able to see the real facts as they affect the holy politic. The decision in question fulfills neither of these duties.

Board Estimates "Savings" at \$59,669,547.32 a Year

There followed an extensive analysis of the reasons for the dissenting opinion, including a discussion of workers' budgets, the basis for the present wage structure, an alleged lack of justification for the majority decision, the purchasing power of the employees involved, the present financial situation of the carriers and their ability to pay higher wages, the effect of the decision on the morale of the employees and the proper functions of the Railroad Labor Board as conceived by the minority. The length of these discussions and the involved manner in which they are presented, prohibit their presentation either in whole or in part, at this time. However, the basis for the dissenting opinion is completely outlined in the portion quoted above.

A memorandum prepared by the statistical department of

the Labor Board estimates the savings that will accrue to the carriers per year by these decreases, based on the hours worked during December, 1921, and January and February, 1922, will be \$59,669,547.32. The same statement shows that after the new rates are placed in effect, the rates of pay of supervisory forces will be five cents above their rates on February 29, 1920, the rates of pay of skilled workers (except freight carmen) and regular and helper apprentices and helpers of all classes, will be two cents per hour below their rates on February 29, 1920, the rates of pay of freight carmen will be four cents an hour below their rates on that date and the rates of car cleaners will be ten and one-quarter cents an hour below their rates on that date.

Labor Leaders Meet at Cincinnati to

Formulate Future Policies

With wage reduction orders involving practically all railway employees in the maintenance of way and mechanical departments and effecting as they do a majority of railway employees, scheduled to go into effect on July 1, interest is now centered in Detroit where the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers has its headquarters and in Cincinnati, where all of the railway leaders except those of the train service organizations gathered on June 6 to formulate their future policy toward the recent decisions of the Labor Board.

The latest reports from Detroit indicate that the maintenance of way brotherhood leaders are carrying out their announced intention of submitting a strike ballot to the membership as the result of the Labor Board's wage cut order last week. The returns on this strike referendum will be complete by July 1, E. F. Grable, president of the brotherhood, said. The attitude of these employees toward wage reductions was indicated at a meeting of general chairmen representing these employees on the western railroads who met recently at Chicago and voted unanimously to reject the Board's decision. Approximately 75 union officers representing 18 railroad systems centering in Chicago, attended this meeting and messages were received from representatives of the men on many other roads supporting the stand taken by Mr. Grable in calling for a strike ballot.

In calling the meeting of labor leaders at Cincinnati on June 6, B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, said:

"The question of acceptance or rejection of the decisions now being issued by the Labor Board rests entirely in the membership of the different organizations. A decision reducing wages, which are today insufficient to provide the barest essentials of family life, is of vital importance to the employees affected and there can be no question about the duty of the union executives to submit the matter to them in such a way that they may determine upon the action which will best protect their interests.

"The meeting in Cincinnati is for the purpose of enabling the executive officers to advise with each other as to how, in conformity with the laws of their respective organizations, the matter shall be submitted to the membership for their action upon it."

The net result of the Cincinnati meeting was a decision to send out a strike ballot to the shop employees affected by the Board's last decision and to take similar action in regard to the other classes of employees whose wage scales are now under consideration by the Board if that body orders reductions in their rates of pay.

The submission of a strike ballot to the shopmen was authorized on June 7 by the executive council of the Federated Shop Crafts in session at Cincinnati. In announcing the ordering of a strike vote B. M. Jewell, head of the Federated Shop Crafts, said in part:

"A strike vote is now being sent out returnable June 30. "By no stretch of the facts can this decision be justified.

It is obvious that the decision was not reached through any consideration of the merits as contained in the evidence submitted. I am astonished that a body of the Board's prestige and dignity should be willing to send out such a hastily dressed up and obviously unfair apology for the rates of pay awarded. The Board was offered evidence as to the amount necessary to obtain the necessities of life for families in railroad communities. The rates which result from the decision are so far below those necessary that this evidence must have been ignored.

"At this early date I can forecast but two of the effects of this decision:

"The first will be an immediate confirmation of the belief among our membership and among railroad employees in general that the Labor Board is not an impartial court created to dispense justice but is a body created to help the railroads carry out their labor policy.

"Railroad employees cannot view these decisions separately. The highest paid man must be ready to fight for the lowest paid man."

Indications at the Labor Board are that the decision affecting the wages of telegraphers, the next class of employees to be dealt with in a wage order, would not be available for some time and undoubtedly would not be issued in time to become effective on July 1. The principal question to be decided in the telegraphers' case is not how much money shall be paid but how inequalities of pay on the different roads shall be settled, and it is believed that this problem will take considerable of the Board's time for several weeks.

The Board's reply to Mr. Jewell's request for action on disputes between the shop crafts and various carriers and involving alleged unauthorized wage cuts, piece work and the farming out of shop work was given on June 6, the Board setting aside June 8 and 26 for the hearing of evidence in these cases.

Pennsylvania—Labor Board Dispute

Before Appellate Court

The legal controversy between the Pennsylvania and the Labor Board, the developments in which have been described in previous issues of the *Railway Age*, was re-opened on June 2, when hearings were held in the United States Circuit Court of Appeals at Chicago, as the result of an appeal from the recent decision of Federal Judge George T. Page. Judges Baker, Alschuler and Evans heard the arguments by Messrs. Blackburn, Esterline and W. D. Riter, representing the Railroad Labor Board, and T. J. Scofield and J. B. Heiserman, representing the Pennsylvania.

In making the closing argument on behalf of the Board, Mr. Esterline held that the Board is an arm of the government, analogous to the president or committees of Congress and that, therefore, the Board could not be sued or enjoined. He pointed out that the injunction issued by the Circuit Court, restraining the Board from issuing a decision inimical to the Pennsylvania's interests, stated that the Board's powers were only advisory. He therefore declared advisory powers could not be enjoined any more than the President could be enjoined from submitting a message to Congress or a congressional committee from reporting its recommendation.

These contentions apparently did not meet with the approval of Judge Baker, who frequently took issue with Mr. Esterline and said:

"I do not consider that that question is involved. The fundamental question is whether the Board acted within its jurisdiction in its order to the railroad and, if it did, whether or not the power under which it acted is constitutional."

Mr. Scofield and Mr. Heiserman for the Pennsylvania, argued that the Board acted without jurisdiction in issuing the order and while admitting the right of the Board to prescribe just and reasonable rules, denied the Board's power to direct how the rules governing employees should be made.

The arguments of the railroad's and the Labor Board's attorneys followed the arguments which have been made in previous hearings in this case and which have been outlined in other issues of the *Railway Age*.

The court subsequently took the case under advisement and Mr. Esterline announced that if the Pennsylvania's injunction is upheld by the court of appeals, the Board will carry the case to the United States Supreme Court.

Lovett Denies Railroads Controlled by Bank Combine

WASHINGTON, D. C.

ROBERT S. LOVETT, chairman of the board of the Union Pacific, testifying on June 1, before the Interstate Commerce Committee of the Senate in connection with the railroad inquiry, branded as "a fabrication without any foundation in fact," charges recently made before that committee by W. Jett Lauck on behalf of the railroad unions that a group of New York bankers and financiers dominate the railroads of the country and the Association of Railway Executives and direct the railroad managements in the purchase of fuel, equipment and supplies and in their attitude towards labor.

"The statement made by Mr. Lauck, so far as it relates to matters within my knowledge, is the most misleading and deceitful narrative I ever have read," said Judge Lovett, who added that Mr. Lauck's "ingeniously worked out diagrams and charts designed to show the alleged control of bankers over the principal transportation systems are from beginning to end an invention and fabrication without any foundation in fact."

"I know of no men," he continued, "in any important business which they do not themselves own, who are as independent and free from control by bankers, boards of directors and others (except commissions and many other public regulatory authorities and the various labor organizations) than the presidents of the principal railroad systems of this country in all matters relating to the maintenance and operation of the railways in their charge, the purchase of materials and supplies therefor, and the wages paid and relations with labor employed thereon; and this same independence is, of course, carried by each executive when he acts as a member of the Association of Railway Executives."

Judge Lovett said in the 18 years he has been connected with the Union Pacific not one of the 15 banking and financial institutions mentioned by Mr. Lauck has ever exerted or sought to exert the slightest influence with respect to purchases of equipment or supplies, wages paid or the policies to be pursued, or in any other respect whatsoever.

"Eleven of the 15 named do not, according to our records of stockholders, own a single share of the stock of any of the roads composing the Union Pacific system, and the remaining four own altogether \$1,618,200 par value of the preferred and \$61,900 of the common stock out of a total aggregate outstanding of \$321,836,600, though I believe and hope that the life insurance companies and others acting as trustees own large amounts of our bonds," said Judge Lovett. "The stock of the Union Pacific is widely scattered and is held by over 50,000 different owners. No one person, firm, corporation or institution owns as much as 2 per cent of our capital stock.

"I state now and as broadly and as emphatically as I can that during all the years I have been a director and officer of the railroad companies named, the management and policies of each system have been in its own interest alone, as distinct from the other systems, and have been as separate in all respects as if there had been no common directors; that there has been no combination or common control or direction of

them; that none of the banks or financial institutions mentioned by Mr. Lauck or shown on his exhibits, and no other bank, banker or financial institution or groups of such have controlled or sought to control them, or had anything to do with the policies or management or with the business or affairs of any of said railroad companies, so far as I know or believe except in lending them money or buying their securities. Where bankers were on the boards, they were there as individuals, the same as other directors and with no more influence except perhaps as to when and how best to raise new capital, as to which they were, of course, experts, and their expressed opinions were heard with interest but not always accepted."

Judge Lovett said that he was unable to find in Mr. Lauck's testimony or exhibits any facts or evidence "to support his unqualified and sweeping charges that a 'New York bank combine' through a 'spread of control of 25 railroad directors linked together 99 Class One railroads operating 211,280 miles or 82 per cent of the country's steam transportation systems.'"

"I am, however, not surprised at such lack of evidence for I know the charge is absolutely untrue and consequently there is no real evidence to support it," said the witness.

Judge Lovett said that Mr. Lauck apparently based his charge wholly upon the fact that some directors who are among the directors of one company are also directors of others.

"The witness fails utterly to distinguish between association and combination," said Judge Lovett. "No body supposes for a moment that because men belong to the same church or to the same club or play golf together or reside in the same community, or commute on the same train, or otherwise associate themselves, that they are in a common conspiracy against somebody and that all their separate interests are brought into the combination. If two rival and competing merchants or bankers happen to have an interest in some other enterprise—a street car line, or a light and power plant for example—or are elected directors of it to represent their interest, no one supposes that their separately owned stores or banks are thereupon combined or cease to compete.

"No banker on any board of directors, or committee, or in other circumstances, or at any time, or place, has ever given me any advice or sought in any way to influence me as to the 'deilation of wages' of railroad labor, or as to what wages should be paid to, or what working rules and regulations should be established for, or what if any contract should be made with railroad labor, or had anything whatever to do with the policy of railroad management with respect to railroad labor. All the bankers with whom I have had anything to do or with whom I have come in contact, on or off railroad boards, or in railroad management, have shown a friendly attitude toward labor, and union labor at that, so far as I ever heard any expression from them on this subject.

"The fact is that the bankers are no more concerned about railroad labor than are other wide-awake citizens and manifest no more interest in this subject. The larger private banking firms in New York at which much of the denunciation has been levelled, and other investment bankers, own little if any railroad stocks. These bankers do not buy stocks to keep but to sell just as the merchant buys goods to sell. They sell as quickly as possible after they buy in order to buy again, for their profit is in the turn-over. What interest have they, therefore, in the railroad wage question, more than any other citizen? It is the stockholder, and on weak roads, sometimes the bondholders, who are interested in wages and working rules and conditions, because as they had been going in recent years these expenses may mean the loss of their property.

"No board of directors nor banking firm or group of financiers can manage a large railroad system. Only dis-

aster would follow such an effort. No board of directors on which I have served has tried. In no business is organization more important or necessary. It would be folly and disastrous to the property for a board of directors, without any request from the president for its advice and suggestion, to interfere with his initiative and instruct him how to deal with wage schedules, working rules, train operations, freight rate adjustments and other matter of operation, which neither the board of directors nor the president alone can settle since they are all matters of agreement with others, after infinite and most complicating negotiations and controversy.

"With reference to Mr. Lauck's charges that this alleged 'inner group of New York bankers and financiers' have combined, through control of directorship, the coal industry, the railroad equipment industry and other industries, so that the railroads pay without protest exorbitant prices for such materials, I will state that so far as it refers to any company of which I am director and, as I believe, to any others, it is absolutely untrue. We have paid exorbitant prices in recent years, as has every individual who has bought anything, but only because we could not avoid it."

"Some of our directors (I think not over three) prior to the effective date of the Clayton law were directors of manufacturing concerns among the many from which we sometimes buy materials. Two are still directors and interested in such concerns but in one such case we buy upon public bidding under the act, and as to the other we discontinued buying because I was anxious for the director to remain on our board.

"No director of the Union Pacific or any of its subsidiaries since my connection with it has ever influenced or sought to influence the purchase of any of our equipment, rails or materials and supplies of any kind. As a matter of fact railroad directors as a rule do not know when or from whom or how railroad purchases are made except in some cases such as the purchase of engines and cars.

"The only function the board ever exercises within my experience with respect to compensation is to require its approval of salaries in excess (usually of \$400 or \$500 per month and exceptions are made even as to this in the case of train service employees, some of whom earn that much."



Phot. by International.

The "Collis P. Huntington," Southern Pacific Locomotive No. 1, the First Locomotive West of the Rockies—It Made Its Trip to the Pacific Coast Around Cape Horn on a Sailing Vessel

Missouri & North Arkansas Resumes Operation

Dormant for Ten Months—Restores Service In Five Counties Without Transportation

By K. H. Koach



One of the Mills Left Without Transportation

ON JULY 31, 1921, the Missouri & North Arkansas, a railroad extending from Joplin, Mo., in a southeasterly direction to Helena, Ark., a distance of approximately 368 miles, suspended operation, following a long series of difficulties which culminated in a strike of its employees. The suspension of activities by this carrier left more than 145,000 people without transportation service and literally paralyzed all business in an area of nearly 10,000 square miles, with property valued at more than \$10,000,000; it was also a detriment to an equal additional area in that state, and a somewhat smaller area in southwestern Missouri.

This is the only railroad that passes through Carroll, Searcy, Van Buren, Stone and Cleburne counties, and is also the only rail facility available for the citizens of a con-

During the nine months that the line has been dormant several attempts have been made to revive it, citizens in northern Arkansas and southwestern Missouri volunteering to patrol the tracks and guaranteeing to prevent further destruction of bridges and other properties of the railroad by the strikers and their sympathizers. Some effort was even made to raise a three-months payroll by popular subscription to move the materials on hand, but this also failed.

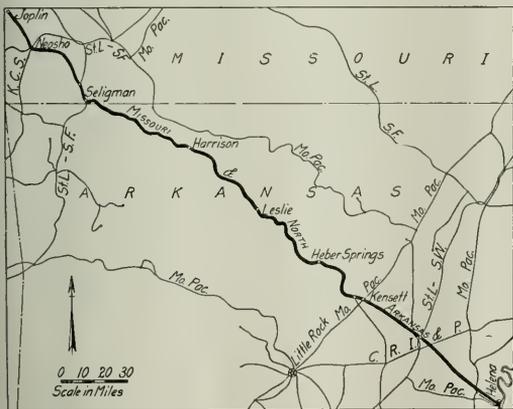
Final action leading to the restoration of service was taken in two hearings held before the Interstate Commerce Commission in December and January, respectively, the second of which resulted in a 25 per cent increase in rate divisions and a loan of \$3,500,000. The Labor Board soon after authorized a 25 per cent decrease in wages, and still more recently the Arkansas Railroad Commission consented to an increase in rates on grain, grain products, petroleum, cement, brick, fertilizer, ties, salt, packing house products, merchandise and coal. With these concessions the company set about to place the road in operation. Upon inspection, the property was found to be in better condition than was anticipated, and service was re-established on June 1.

The M. & N. A. Has Had a Checkered Career

The Missouri & North Arkansas, with all its trials and tribulations, has had an interesting and unusual history. It first came into existence on February 27, 1882, when a company known as the Eureka Springs Railway was chartered to construct a line approximately 20 miles in length, extending from Seligman, Mo., on the St. Louis-San Francisco, to Eureka Springs, Ark., a popular health resort. When completed, it was the only railroad tapping a territory which comprised nearly one-fifth of the entire state of Arkansas, although, of course, the road was of comparatively slight importance when considered in connection with the territory as a whole.

About 1899 new financial interests acquired control of the Eureka Springs Railway and prepared plans to extend the line from that point to Leslie, Ark., a distance of 111 miles, which extension was completed in September, 1903. The new owners also changed the name of the road to the St. Louis & North Arkansas. Nearly \$2,400,000 had been expended on the line up to that time, and, with an inadequate financial return derived from the investment during the few years following, the venture was deemed a failure. Nevertheless, the project was revived in 1906 by the reorganizers of the St. L. & N. A., and the line was again extended, this time to Helena, Ark., on the south, a distance of about 178 miles, and on the north, from Seligman, Mo., to Joplin, a distance of 61 miles, the extensions being completed for through operation by the summer of 1909. The company also entered later into equal joint ownership in the Joplin Union Depot Company with the Atchison, Topeka & Santa Fe, the Missouri, Kansas & Texas, and the Kansas City Southern.

The road has never been a consistent paying proposition.



Map Showing the Missouri & North Arkansas

siderable portion of White, Faulkner, Conway, Hope, Madison, Benton, Boone, Marion, Baxter and Independence counties. To reach another railroad many have been compelled to go 40 to 75 miles over roads that are almost impassible except during the late spring, summer or early fall. The Missouri Pacific is the nearest road on the north, paralleling the M. & N. A. about 15 to 60 miles away. On the south, where these two lines extend in the same general direction, the intervening distance varies from approximately 60 to 100 miles.

Federal Control Causes Collapse

The period of federal control was the direct cause of the collapse of the Missouri & North Arkansas. The Railroad Administration practically doubled the payroll of that company and, after having entangled the operation of the road in other ways, could not relinquish its hold too quickly.

This may possibly be attributed to the supposition that it was built for speculative purposes, rather than for efficient operation, as was the case with many small roads built in that section of the country, or to the fact that the territory traversed by the line did not warrant its construction. Supporters of the latter theory believe that feeders or extensions from the neighboring trunk lines would have been sufficient and would have been built if the original road had not been constructed. Some have also wondered why the road has never been taken over by one of the larger trunk lines. As a matter of fact several roads have made inspection of the property with this object in view, but these investigations showed that it was poorly located and constructed, with many sharp curves and heavy grades.

The road was sold under foreclosure on May 29, 1906, and on August 4 of that year the company was reorganized and chartered for 50 years in Arkansas under the name of the Missouri & North Arkansas Railroad. From that date until 1911, the Missouri & North Arkansas continued to accumulate annual deficits, the net operating deficit for the fiscal year ended June 30, 1911, being \$20,652.

On April 1, 1912, upon the application of the St. Louis Union Trust Company, trustee of the first mortgage bonds amounting to \$8,340,000, dated July 1, 1906, the road went into receivership with W. S. Holt, George L. Sands and Jesse McDonald as receivers. On March 4, 1914, John Scullin, who was president of the Missouri & North Arkansas for a number of years, was appointed a receiver to succeed Mr. Sands, who had resigned, and, on July 1, 1916, Festus J. Wade, president of the Mercantile Trust Company, St. Louis, Mo., was appointed sole receiver to succeed the three above named. From that date until the end of 1917, Mr. Wade operated the road, during which period a surplus was shown at the end of both years, after paying operating expenses and interest on the receiver's certificates.

The government assumed control of the road on January 1, 1918, and three months later raised the standard of wages to conform to that of the trunk lines generally. At the end of another three months the federal authorities returned the M. & N. A. to its owners by telegram. Upon taking charge the receiver found the forces disorganized, no money on hand, wages greatly increased, unadjusted demands for back pay increases, and operating expenses in general greatly in excess of the operating revenues. Conditions went from bad to worse until a few weeks later the director general of railroads offered to lease the road from the receiver for \$175,000 per annum. This was not entirely satisfactory to the owners, who claimed that their original investment was more than \$8,500,000 in addition to which there were outstanding receiver's certificates of more than \$2,000,000, without considering accumulated interest. Notwithstanding this, however, the lease was made.

Under federal control for the year ended December 31, 1919, the road sustained a deficit of \$633,557, the property having incurred a total deficit of \$956,482 up to and including that year. In March, 1920, the road was again turned back to the receiver, this time under the six months' guaranty provision in the Transportation Act. The new wage scale was still in effect, the labor costs having increased to almost twice what they were before the Railroad Administration acquired the road. Apparently regarding the situation as hopeless, Mr. Wade resigned as receiver and on March 6 of that year C. A. Phelan was named receiver and general manager to succeed him. For the year ended December 31, 1920, there was a total deficit of \$378, the smallness of this figure being accounted for by the fact that \$265,000 was received from the government under the guaranty provision.

Strike Brings Climax to Difficulties

The receiver, recognizing the need for drastic economy, ordered wage reductions, effective February 1, 1921, after

having applied for and received permission for this action from the federal judge of the Eastern district of Arkansas, under whose jurisdiction he served. The reductions were contested immediately by the employees of the company, who brought the controversy before the United States Labor Board. When the Board remanded the dispute to a conference between the management and representatives of the men, the latter immediately notified the officers of the road that the employees would walk out unless the wage reduction order was rescinded. This threat materialized on February 27, when the enginemen, trainmen, telegraphers and station agents left their work.

The strike was attended with considerable violence and the property of the company was seriously menaced and damaged, although traffic was resumed on March 24, under armed guards, and with many of the regular employees replaced by strike breakers. During the reign of terror which followed a number of the strikers were given from one to six months' jail sentences for abusing the strike-breaking employees. Locomotives were damaged frequently, sometimes by the use of explosives, and firearms were brandished and used in regular outlaw fashion. At first the citizens within the territory served by the Missouri & North Arkansas were extremely antagonistic towards the strike breakers, their sympathy being with the original employees who had lived in that country for years and who had a comparatively large sum of money invested there. However, inconvenience soon changed their minds and it is said that a number of the labor agitators were later deported from that section under threat of death.

Receiver Phelan, after a nervous breakdown, resigned on July 14, and J. C. Murray, then traffic manager, was appointed in his place. He immediately encountered difficulty in raising the July payroll of \$28,000 and was forced to announce on July 22, by authority of the federal court, that the road would cease to function on the last day of the month. This gave barely one week's notice to thousands of people that they were to be deprived of their only rail transportation. The Western Tie & Timber Company was left with 250 carloads of ties and other forest products on hand awaiting shipment which it has been unable to move since last July; the White County Lumber Mills, a subsidiary company, had 200 cars; the National Lumber & Creosoting Company between 100 and 400 cars, and several coopeage concerns reported similar shipments of perishable forest products awaiting transportation. It has been estimated that altogether more than 3,000 carloads of freight were ready to be shipped when operation was stopped.

M. & N. A. Not a Logging Road

The Missouri & North Arkansas is not to be classified as a logging road, although the lumber industry is its principal source of traffic. The tonnage of forest products originating on this line increased from 60,951 in 1908, to 395,390 in 1913, and then declined to 234,108 in 1919. Outside of the lumber industry, several counties served by the M. & N. A. are rich in mineral deposits; Joplin, Mo., is a lead and zinc mining center. The area between Neosho, Mo., and Wayne, produces live stock, wheat, flour and strawberries. From Seligman, Mo., as far south as Leslie, Ark., live stock, ties, lumber, vehicle materials, fence posts, dairy products, poultry and general farm produce originate in considerable quantities. From Leslie south cedar posts and live stock, and from Boone and Carroll counties, orchard products and strawberry shipments are received.

Joplin and Helena are the two largest cities on the line, Helena being the third largest city in Arkansas. Harrison, the next largest town served by this road, is located midway between Joplin and Helena and has a population numbering but a few thousand; further south is Heber Springs, a health resort of considerable renown.

Plans for Resumption of Operation

The security holders of the Missouri & North Arkansas applied to the Interstate Commerce Commission last December for a loan of \$3,500,000 and an increase in their division of rates, pledging the entire railroad property as security for the loan, and stating that the money was to be used to pay the receiver's certificates and debts, place the road in condition to operate, and provide working capital. The first hearing before the commission failed because eight connecting lines, the Missouri, Kansas & Texas; the Missouri Pacific; the St. Louis-San Francisco; the St. Louis Southwestern; the Atchison, Topeka & Santa Fe; the Kansas City Southern; the Yazoo & Mississippi Valley and the Chicago, Rock Island & Pacific, opposed the increased divisions, denying the claim of the petitioner that the Transportation Act permitted such action.

The M. & N. A. was then asked to provide further information, the substance of which was presented at a second hearing held in Washington, D. C., from January 16 to 20. At this time the road testified that if it could secure a 25 per cent increase in rate divisions and a 25 per cent decrease in labor costs, it could operate at a profit and repay its debt to the government.

It was necessary—those interested in the Missouri & North Arkansas claimed—that favorable decisions be received from both government bodies if the road were again to resume operation. This was finally accomplished, the United States Railroad Labor Board allowing a 25 per cent reduction from the present wage scale, and the Interstate Commerce Commission a 25 per cent increase in the division of rates, and a loan of \$3,500,000. The commission's order for increased divisions is alone expected to provide additional revenue of \$250,000 to \$275,000 annually. In the Labor Board's decision provision was made for any surplus remaining after operating expenses, taxes and interest on the government's loan have been paid, to be divided among the employees up to the amount of the wage scale paid by other carriers.

A new application of the Transportation Act was advanced in this hearing before the Interstate Commerce Commission by the attorneys for the petitioning railroad. It was pointed out that the Missouri & North Arkansas was included in a group of railroads whose total valuation was considered as the basis for the establishment of such rates as would yield an average return of six per cent on the combined investment. The petitioning carrier, it was stated, had earned nothing on its investment, while the connecting lines had thereby benefited by this provision of the Transportation Act, and had received more than their share. This was held to be true even during the past year when the road has been out of service, since the M. & N. A.'s valuation was included in the group's total, upon which each road's earning capacity was based in so far as fixing rates is concerned. The attorneys further contended that the Transportation Act contemplated that the small independent carrier was to receive the same return upon its investment as the larger railroads, and that this return should be equalized within this group, the same as would have been done if the Missouri & North Arkansas had been a branch of one of the larger trunk lines.

Of the \$3,500,000 borrowed from the government, \$750,000 is being spent to place the property in normal condition. All legal matters were settled on April 10, when the road was sold at public auction at Harrison, Ark., to the Missouri & North Arkansas Railroad Company, which has been incorporated under a new 50-year charter and, on May 6, when the commission authorized the issuance of \$3,000,000 of common stock, consisting of 30,000 shares of \$100 par value each, and of \$5,000,000 first mortgage 15-year gold bonds, the latter to be pledged with the secretary of the treasury as further collateral security for the government loan.

Several hundred men have been re-employed, although the

local labor organizations have refused to abide by the decision. However, there is no longer a possibility that outside union labor will decline to handle interchange freight as was first reported. Trainmen on the connecting lines state that the striking employees surrendered their right to sympathy when they refused to accept the decision of the United States Railroad Labor Board. Many of the former employees have returned to service, and the Harrison shops are now being operated with the full quota of 135 men.

On May 15 Mr. Murray announced the inauguration of mixed train service for freight and passengers destined to and from points on the line between Seligman, Mo., and Kensett, Ark., and service was restored over the whole line by June 1. The public has welcomed the return of its only railroad as a means to prosperity and normalcy in place of the primitive mode of living to which they have been subjected. With the support of the people it serves, combined with the awards from both government regulating bodies, the Missouri & North Arkansas should have no further difficulties in performing its function as a common carrier.

**Accident Investigations—
October, November and December**

THE INTERSTATE COMMERCE COMMISSION has issued its tenth quarterly summary of accident investigations made by the Bureau of Safety, covering the reports completed in the three months ending with December, 1921. This pamphlet of 27 pages contains reports on 12 train accidents; and also a tabular list giving condensed information concerning all of the accidents investigated during the 12 months ending with December 31.

The preceding quarterly summary was reported in the *Railway Age* of December 10, 1921, page 1145; and the one before that in the issue of September 3, page 459.

The 12 accidents now reported, together with one (Saybrook) not included in the pamphlet, occurred as follows:

Deraiment.....	Pennsylvania	Edinburg, Ind.	Sept. 17
Deraiment.....	N. Y., N. H. & H.	Saybrook Junc.	Oct. 7
Collision.....	Pennsylvania	Sunbury, Pa.	Oct. 7
Collision.....	Long Island	Bay Ridge, N. Y.	Oct. 26
Collision.....	Pennsylvania	Manhattan Tr., N. J.	Oct. 28
Deraiment.....	Baltimore & Ohio	Green Ridge, W. Va.	Oct. 29
Collision.....	Delaware & Hudson	North Albany, N. Y.	Oct. 31
Collision.....	Texas & Pacific	Addis, La.	Nov. 9
Collision.....	Texas & Pacific	Camps, Tex.	Nov. 10
Collision.....	Salt Lake & Utah	Taylorville, Utah	Nov. 18
Collision.....	Oregon-Washington	Celilo, Oregon	Dec. 1
Collision.....	Illinois Central	Woodmont, Pa.	Dec. 5
Deraiment.....	Phil. & Reading	Chicago, Ill.	Dec. 14

Following are abstracts of the Bureau's reports:

The first report is that of a derailment on the Pennsylvania near Edinburg, Ind., on September 17, 1921, concerning which the chief of the Bureau of Safety, after making an investigation, disallowed the statement of the railroad company as to the cause, declaring that it was the failure of a bridge pier, when the railroad company said that the derailment of the train before it reached the bridge, from some cause unknown, was the real explanation.

The train was northbound passenger 327, which left Edinburg at 8:52 p. m., and shortly after was derailed at bridge No. 18, while running at about 30 miles an hour. The engineman was killed and three mail clerks and two employees were injured. The locomotive and the mail car, with the bridge floor, were overturned to the right. The trouble was a weakness in the center pier of the bridge. This pier, built of native limestone, because of long exposure to the elements, had been weakened by exfoliation and disintegration. This masonry was built 67 years ago. By successive stages of high water some of the mortar of the interior of the pier had been washed away and mud had taken its place.

The theory of the railroad officers that the locomotive had

left the rails before entering upon the bridge is declared to be unfounded, no satisfactory evidence being adduced to support it. The report issued by the commission contains halftone engravings of photographs of the broken face of the center pier of the bridge and other photographs showing disintegration of limestone ashlar masonry in the faces of the abutment.

On the New York, New Haven & Hartford, near Saybrook Junction, Conn., on the morning of October 3, about 2 o'clock, the eastbound Boston night express, No. 32, was thrown off the track at the derailing switch at the approach to the bridge over the Connecticut River, and the engine slid down a bank and lodged on its side. The train was moving at about 30 miles an hour and five cars ran off the track; but no person was seriously injured.

The signal for this train was clear, but the derailing switch had been maliciously loosened by some person or persons unknown. The interlocking had been overhauled two or three months before the occurrence of this derailment and the government inspector found it to be in good condition. Examination of the derail shortly after the derailment disclosed that the cotter pins had been taken out of the throw rod, the bolt lock and the facing point lock; and the facing point plunger had been removed.

The trains in collision on the Pennsylvania Railroad near Sunbury, Pa., on October 7, were an eastbound freight and a following train consisting of two locomotives, 1676 and 1097, moving backwards. The locomotives ran into the rear of the freight, crushing the caboose and doing other damage; and the fireman of one of the locomotives was killed. This collision occurred in a dense fog about 5:40 a. m. The freight, moving toward Sunbury yard, had entered a middle siding and had stopped; and the locomotives, which should have passed on the main track, entered the siding, the engineman on the leading engine not being aware that he was on the wrong track. He had passed the switch on the indication given by an interlocking signal, the arm of which, when inclined 45 degrees from the horizontal, governs movements to either track. The signalman had neglected to change the switch after the passing of the freight train, although he had ample time to do so. The inspector places the blame on the engineman of engine 1676 (he seems to have had control of both of the locomotives) for not knowing on what track he was moving, and failing to move under control while on the siding, as required by the rules. The engineman admitted that his failure was the main cause of the collision.

The collision of October 26 on the Long Island occurred in a freight yard; one employee was killed and two injured. The cause was failure to control the train (a locomotive and a caboose, moving backwards), the conductor being responsible for the lookout.

The collision at Manhattan Transfer on the Pennsylvania, October 28, a rear collision of passenger trains, was charged to the negligence of an engineman and a flagman, the engineman running past three signals. This collision was reported in the *Railway Age* of December 31, page 1328. Among the passengers injured in this collision were two government officials, the postmaster general of the United States and a member of the Interstate Commerce Commission.

On the Baltimore & Ohio, near Green Ridge, W. Va., on October 29, eastbound freight extra No. 4415 was derailed and one car—the 37th car in the train, which was thrown off by the breaking of one of its wheels—fell on the westbound track and was run into by westbound train No. 29, consisting of a locomotive and 21 express cars; and the engine of No. 29 fell down a bank. The engineman was killed.

The inspector finds that the wheel which failed had been heated very hot, but he cannot determine certainly whether this was due to a hand brake having been set, or to a stuck air-brake. The train had been on the road about one hour,

from Cumberland, and it appears that the brakes were not properly inspected at that point; and an inspection of the triple valve of the 37th car after the derailment indicated that when the brakes were applied, before the train started from Cumberland, the engineman probably did not release those on this car. The triple valve, it is believed, was stuck in such a position that communication was established between the brake pipe and the brake cylinder.

The brakes in the train were not properly tested at Cumberland and there was no report made to the conductor as to the percentage of brakes in operation; in fact, no one had any definite knowledge as to the condition of the brakes in the train. The inspector finds that this kind of neglect has been common. The train was being made up about 7:00 a. m., and the night inspector, going off duty at that time, did not properly finish his task; nor did he give suitable notice to the day inspector. This loose practice is recommended to the immediate attention of the officers of the road.

The collision on the Delaware & Hudson at North Albany, N. Y., on October 31, was between a train of empty passenger cars and a switching locomotive; the fireman of this locomotive was killed. The accident occurred about 5:40 p. m. The empty cars were being pushed, and the locomotive, which had been switching on a side track, was carelessly backed out a little too far so that it struck a passenger car in the side. A flagman had been out while the switching was going on, to flag the train of empty cars, but he had been called in. The switcher was being managed by the fireman, the engineman sitting on the other side of the cab; and the inspector is unable to say why the fireman allowed the engine to foul the main track. The conductor was on or near the engine, where he could see the whole situation, and it is held that he and the engineman should have taken prompt measures to see that the engine did not foul the main track.

The collision on the Texas & Pacific on November 9, near Addis, La., occurred at a crossing, a locomotive from a sugar plantation on the sugar company's track being run into by westbound passenger train No. 23. The passenger engine was overturned and the other one was badly damaged. The plantation engine was moving slowly, but the view of the passenger train was obscured by a field of sugar cane. The engineman had run this engine on the sugar tracks about two months each year for the past three annual sugar seasons and had had no accident of this kind before; but he failed to stop before passing over the main line. He admitted that he had been in the habit when moving a locomotive without cars, to ignore the rule requiring a stop at the crossing. There were some indications that his steam brake may have been out of order. The engineman of the passenger train was killed and one passenger and three trainmen were injured.

The collision on the Texas & Pacific at Camps, Tex., November 10, between a westbound passenger train and an eastbound freight, was due to disregard or forgetfulness of a train order on the part of the passenger train. This collision was reported in the *Railway Age* of February 11, 1922, page 374.

The trains in collision on the Salt Lake & Utah (electric) Railroad, near Taylorsville, Utah, on November 18, were southbound passenger No. 3 and northbound passenger No. 2, each consisting of a single motor car. The southbound train was waiting on a gravel pit spur track to meet the other train; and that train came on at 25 miles an hour and, passing over the misplaced switch, collided with No. 3, badly damaging both cars. The motorman of No. 3, an assistant train master and an electrician, were killed and 28 passengers and seven employees were injured. The conductor of the standing train had gone to the switch to straighten it, but in sweeping away snow he forgot the switch; and forgot it so completely that he signaled by hand to the northbound train to come on. That train had slackened

speed; but, on receiving the motion, put on more power; and the motorman evidently did not see the switch target, although it was in plain view. The rule requires all trains to approach all switches under control, and for not doing so the motorman of No. 2 is censured.

The collision on the Oregon-Washington at Celilo, Oregon, on December 1, was briefly reported, with an illustration, in the *Railway Age* of December 17, page 517. An abstract of the report of the Bureau of Safety will be found in the issue of April 29, page 1031.

The collision on the Philadelphia & Reading at Woodmont, Pa., on December 5, was reported in the *Railway Age* of December 10, page 1163; and the report of the Bureau of Safety was abstracted in the issue of January 14, page 173.

The train derailed on the Illinois Central at Thirtieth street, Chicago, on December 14, was southbound suburban passenger No. 379 on track 5. One passenger was killed and another fatally injured; and 17 other passengers and

one employee were injured. Northbound suburban passenger train No. 400, on track 6, moving at about 40 miles an hour, had its cars scraped the entire length of the train by a car of the southbound train which was derailed and fell toward track No. 6. The derailment of the car in the southbound train was due to the pulling out of the coupler or drawbar of the tender, immediately in front of this car; and this failure was due to the breaking of one of the plates composing the extension shank of the coupler. The fracture was concealed by the end sill. There had been an old fracture. The investigation developed that the fractured plates were of smaller size than are now standard. The repair shop foreman testified that the couplers on locomotives of this class are removed, inspected and supplied with new rivets every 90 days. The coupler in question had been removed at the regular inspection period on August 8. The plate which failed was $1\frac{1}{8}$ in. in diameter, or $\frac{3}{8}$ in. less than the latest standard.

To Make Railroad and Highway Signals Consistent

Conference at New York to Improve Highway Signals—

A. H. Rudd Outlines Railroads' Attitude

A MOVEMENT to standardize colors for [street] traffic signals was begun in New York City recently by the American Engineering Standards Committee, and the plan, as formulated, includes consideration of the same subject as related to signaling in railroad and steamship operation, and also in aerial service, the purpose being to seek the establishment of codes so differentiated, one from another, that there shall be no inconsistency, and no conflict in practice, as between these different fields of transportation. Pursuant to this end the Signal Section of the American Railway Association was invited to be represented at the meeting of this committee; and A. H. Rudd, chief signal engineer of the Pennsylvania Railroad, acted as the representative.

This meeting was held at 29 West 39th street, New York City, on May 23, Dr. P. W. Agnew, chairman of the Standards Committee, serving as chairman of the conference. Other interests invited to this conference were the American Association of State Highway Officers; automobile interests, electric light and insurance interests, the Safety Institute of America and in general all classes officially or professionally interested in safety on the highways. The conference was called at the request of the Illuminating Engineering Society and the International Traffic Officers' Association. Resolutions were adopted expressing it as the sense of the meeting that an attempt should be made to standardize colors, as proposed, with a view to covering not only highway traffic of all kinds, but emergency exits of buildings and all lights and signs by which the public is guided.

Mr. Rudd presented his conclusions, not as an official statement from the American Railway Association, but simply as logical deductions from incontrovertible facts. He spoke, in part, as follows:

The railroads are interested in eliminating the use of the red light for purposes other than that of indicating danger or stop and desire that any scheme devised may conflict as little as possible with their own signal systems. The unification of colors for traffic signals should be undertaken and laws should be promulgated and enforced for the observance of the systems adopted; everyone interested should attempt to mold public opinion, as enforcement or non-enforcement of the law depends largely upon the state of public opinion. Uniformity is not only desirable but absolutely necessary;

but it is only the beginning of the solution of the problem of accident prevention. The most difficult problem is to guide public opinion.

Signal systems of railroads differ but the fundamentals are largely standardized and the results have been remarkably successful. But, even with these systems and skilled and disciplined engineers, accidents occur. The railroads are attempting to educate their employes in self-preservation. The underlying cause of most accidents is the apparent inherent disposition of the American people to take chances. Uniformity is desirable but uniformity will not cure the trouble. To satisfy the traveling and shipping public, passenger trains must be run at high speed, and it cannot be expected that such trains may be stopped ordinarily when an automobile stalls on a crossing.

[Mr. Rudd then went on to give an interesting and detailed summary of the record of automobile accidents and their causes on the Pennsylvania System in five months ending with February last, during which time accidents of this class resulted in 55 persons being killed and 251 injured. The total number of such accidents was 576, of which 406 did not result in bodily injury and therefore would never be heard of in any vital statistics. He then continued:]

It would seem that, for the good of the country, the regulations should be such that no incompetent or criminally careless driver should be permitted to operate a machine; that, if uniform colors are established, drivers should be required to pass a test for acuity of vision and color perception; and that the violation of traffic signals at street intersections, or at highway crossings of steam and electric lines, and exceeding speed limits in towns and villages, should incur penalties, backed up by public opinion.

The American Railway Association, in connection with a committee of the National Association of Railway and Utilities Commissioners, and representatives of some of the automobile associations some years ago adopted four standards: (1) An approach sign for railroad crossings to be erected on the highway by the public authorities. Co-operation of public authorities in erecting these would be of great assistance. Some States require them by law; others by order of Commissions. They ought to be adopted universally and the people made to regard them. (2) Crossing gates (where

used) striped black and white. As most of the railroads use these stripes, they should be reserved for this purpose. Penalties should be enacted for the careless breaking of gates. (3) Red lights on gates and in the hands of crossing watchmen. Their use should be extended. (4) Stop signs [disks, not flags] in the hands of crossing watchmen. This disk should be made universal.

With these provisions enforced there remains, as far as the railroads are concerned, only the standardization of the automatic highway crossing signal. This is now in the hands of the Signal Section of the American Railway Association, and it is expected that the matter will be discussed and perhaps sent to letter ballot at its meeting on June 14. If some uniform arrangement is recommended, as seems possible, and then adopted by the American Railway Association, it may well be embodied in the requirements of this body, and its use reserved solely for the purpose indicated. Automatic apparatus at crossings should give the stop sign only when trains are approaching. The use of gates should be reduced to a minimum. Gates unattended and standing erect during certain hours of the day are a potential menace instead of a safeguard, as they encourage people to cross. The colors of signals used on the railways are, generally: red for danger (stop), yellow for caution and green for clear (proceed). The public is primarily generally educated along the line that red means danger, but the color has been so misused that its significance has been greatly weakened. We believe it should be restricted by general agreement to that for which it is best adapted, namely, danger, and that it should not be used for any other purpose. The use of a red light for fire exit in a theatre is absolutely wrong in principle. The light should indicate Proceed instead of Stop.

If a movement toward uniformity is to be carried to a successful conclusion, the work will have to be divided among various committees and subcommittees. This is no place to submit details, but we have gone into the matter far enough to be convinced that the principles underlying railway signaling may be applied absolutely and correctly to the signaling of highway traffic, industrial plants, and the marking of dangerous points, etc., without undue complication, except in some cases, the chance of the enginemens of high speed trains possibly mistaking lights on highways for their own signals. The ideal arrangement, of course, would be to have the colors entirely different, but Nature has not provided us with a spectrum sufficiently long. If all men believed as I do confusion would be eliminated by giving railroad signals by position and highway signals by color; but there is no chance of this arrangement being adopted for many years and, therefore, we must take the situation as we find it.

This body should, we believe, adopt—

1. The principle of red for stop everywhere unless qualified by a more favorable indication; that is, at highway crossings with railroads if a train is approaching, at street intersections, both in fixed signals and in the hands of traffic officers; at the ends of streets, and possibly to indicate excavations, in the streets.
2. Yellow for tail lights of automobiles, possibly for excavations in streets, and for calling policemen, or for any other purpose where caution is required; possibly at busy street intersections to indicate that the traffic lights will be changed from red to green, or from green to red.
3. Green lights for fire escapes; for Proceed at street intersections and [at other places] to indicate the way is clear

TO ADVERTISE IN FRANCE—The Canadian Government is said to be preparing to send an exhibition train through France this year. An item of \$4000 to cover the cost of the train has been approved by the House of Commons. Both agricultural and industrial exhibits will be shown.

Educational Transportation Institution Proposed

WASHINGTON, D. C.

THE JOINT COMMISSION of Agricultural Inquiry in its report on transportation will recommend "the establishment of a private research and educational institution under disinterested auspices for the purpose of promoting education in the principles, operation and practices incident to transportation."

Sydney Anderson, chairman of the commission, discussing this recommendation said: "There are approximately \$50,000,000,000 invested in transportation in this country, including steam railways, electric railways, highways, automobiles, motor trucks, waterways and shipping. These agencies of transportation, which should function as a co-ordinated system in the aid of commerce, have come into existence without relationship to transportation facilities already existing. There is no agency through which the basis of fact and principle necessary for the co-ordination of these transportation facilities so as to give the most efficient service at the lowest cost, can be secured. There is no place today where the business of transportation can be learned except in the apprenticeship of the business itself. An institution such as the commission suggests would furnish a means of definitely establishing the facts and principles of transportation upon which sound decisions respecting transportation policies can be predicated; the relationship of the different agencies of transportation to each other, and the relationship of these agencies to agriculture, industry, trade and commerce. It would also furnish a means for the dissemination of education in the principles, operation and practices incident to transportation."

Mr. Anderson further said in discussing this recommendation, "I understand that the organization of a National Transportation Institute is under way, and I believe that the organization of such an institute should and will deserve the co-operation and support not only of the transportation agencies, but of the people generally who use these agencies and are primarily interested in the services which they render."

One of the principal causes of increased living costs in the United States as found by the Joint Commission of Agricultural Inquiry and to be fully disclosed in the final section of the commission's report, soon to be rendered to Congress, consists of an unwieldy system of marketing and distribution which includes relatively inefficient means and uneconomic methods, coupled with wasteful buying habits and practices on the part of the consuming public.

"We have now reached a point," said Chairman Sydney Anderson, "where it costs more to distribute and serve than it costs to produce. Commodity values are lost in a mass of service costs and the time has come for a consideration of the fundamental problem of the economic distribution of the essentials of living."

"The commission is convinced that the problem of distribution is one of the most important economic questions before the American people. Only through its correct solution can there be an equitable adjustment of the relations of agriculture, industry, transportation, labor, finance and commerce as among themselves and as correlated with the interest of the public."

Chairman Anderson said that the commission found no fundamental data of a governmental or public character with respect to marketing and distribution, and it was, therefore, necessary to undertake a pioneering effort to secure from the original sources the basic facts of the problem. For this purpose the commission secured the technical assistance and the co-operation of trades and industries covering the manufacture or conversion and the wholesale and retail distribution of more than 200 essential commodities.

"We have found no single factor in this complex price structure," said Chairman Anderson, "which can be held to be solely responsible for the spread between producers and consumers. Neither is the commission able to point out a remedy, legislative or economic, which of itself will reduce this spread.

"The commission will be able, however, to make certain suggestions which it believes will indicate the method by which improvements and economies can be made in our distributive system.

"The Joint Commission does not believe that Congress can correct the faults of existing conditions and methods of distribution. We believe that the responsibility rests on the entire people to make such readjustment of custom and habit as will permit the development of a system of economic distribution which will result in a more equitable relationship between what the producer receives and consumer pays.

"The cost of distribution is made up of an endless number and variety of costs of material and service, each of which influences the others and all of which combine to make the price which the final consumer pays. These factors

vary in influence upon one another and upon the final price from year to year and month to month and even day to day. Each of them is part of a complex and flexible price structure which is extremely sensitive to fundamental economic and psychologic forces such as taxes, interest rates, freight rates, custom, habit, usage and practices of producers, consumers, manufacturers and distributive agencies.

"The distributive situation will be better appreciated when consumers realize that out of 41,614,248 people engaged in gainful occupations, 29,570,867 are engaged in manufacture, transportation, distribution and allied activities. There is hardly a commodity in daily use that does not reflect the joint services of several million people. All of us need to realize more clearly that not only must the producer receive proper compensation for the raw materials, but that out of the charge for service along the way to the consumer the men who operate railroad trains, the men who drive trucks, the men who operate machines, the men who nail boxes, the men who wrap packages and the men who make deliveries must be enabled to purchase their share of the finished commodity for their families."

Reorganized I. & G. N. Will Need Much Improvement

Not in Good Physical Shape—Should Be Able to Meet Lowered Fixed Charges

By Charles W. Foss

THE INTERNATIONAL & Great Northern has been in receivership since August 11, 1914. Last week a plan was announced for its reorganization (*Railway Age*, June 3, page 1312). This plan proposes a reduction in the company's fixed charges of \$418,175. The fixed interest charges of the old company were \$1,597,175; for the new company they will be \$1,197,000. In addition, there will be contingent interest charges on an issue of \$17,000,000 of adjustment mortgage six per cent bonds, which interest charges will total \$1,020,000, making the total fixed and contingent interest charges \$2,199,000. Judging by the results which have been obtained since the beginning of the receivership, it is apparent that the new company should be able without any particular difficulty to earn its fixed interest charges. As to whether it can earn the contingent charges on its adjustment bonds is, however, a question. The reorganization is termed a drastic one. The characteristics of the property, physical and otherwise, require it to be.

The International & Great Northern is far from being a rich road. It needs a great deal in the way of improvements and for some reason it does not seem to have had that expansion of earnings which has been more or less general in the case of the other lines in the southwest. The road, however, serves a good territory which is expanding in wealth and prosperity in fairly large degree. It also has its importance as a connecting carrier serving Houston, Galveston, etc., and one of the most interesting features of its location are the possibilities in case traffic with Mexico is restored to anything like its pre-revolutionary importance. The line to Laredo, Tex., at present is not one of the important links in the system. The importance of Laredo as a border point is shown by the fact that 72 per cent of all the land movement from the United States into Mexico passes through this point. The I. & G. N. has competitors at Laredo, as well as at the other places where United States carriers connect with the National Railways of Mexico, but it should be in a preferred position because of its relationships with the Texas & Pacific

and the Missouri Pacific in what is known to passenger men as the Sunshine Route.

It is, of course, a familiar fact that the railroad mileage of Texas was built much ahead of the growth of population and the agricultural and other production of the state. In recent years, however, this situation has been remedied in considerable extent because of the rapid growth which the state has experienced and also largely because of the prosperity which accompanied the development of oil. The International & Great Northern, however, does not seem to have had a full part in this development up to the present time. Further than that, it is confronted with a large amount of competition. This is not particularly unusual for the lines in Texas, but, nevertheless, the situation wherein practically every important town served by a railroad is also served by two or three competing lines, is not without its drawbacks.

The I. & G. N. serves Houston with its own lines, and Galveston by means of trackage rights. There is much friendly rivalry between these two cities. Houston has a ship channel and has aspirations of being a port in its own right. It is of interest to point out that the I. & G. N. has a large amount of property along the south side of this channel and that its position in that city is benefited thereby.

The I. & G. N. Lines

The mileage of the International & Great Northern totals 1,160 inclusive of trackage rights. The Gulf division extends from Longview to Houston, 232 miles. Connection with the Texas & Pacific is made at Longview and access to Galveston is obtained by trackage rights from Houston over the Galveston, Houston & Henderson, 48 miles. The San Antonio division includes the line from Palestine to Laredo, 413 miles. The Fort Worth division is a diagonal line extending from Spring on the Galveston division, crossing the San Antonio division at Valley Junction, and then north to Fort Worth, where another connection is made with the Texas & Pacific. The road has a number of branches but

it is an exception to most of the roads in the southwest in that its branch lines constitute but a relatively small proportion of its total mileage.

The road has maximum grades up to 1.25 per cent, except on the line from Fort Worth to Houston, where the maximum grade is only 0.7 per cent, this being the lowest grade line between north and south Texas. The road receives a large proportion of its traffic from connections. In 1920, which was the best year in the company's history from the standpoint of tonnage, it carried a total tonnage of 4,973,659, of which it originated 2,174,893 tons, and received from connections 2,798,766 tons. Its leading commodities are wheat, cotton, lumber and petroleum, both crude and refined.

Traffic Characteristics

The wheat tonnage is almost entirely received from connections; in the case of cotton, something about two-thirds. The road, however, serves a rich cotton territory; cotton is raised in every county in Texas which is reached by the International & Great Northern. In the cotton year of 1921 it handled into Galveston, a total of 1,230,000 bales. In 1920 the cotton tonnage carried by the International & Great Northern totaled 274,020 tons, but the revenue from the transportation of cotton was, of course, much greater than the tonnage figures would indicate.

Lumber is received on its own lines in east Texas and there is an equal amount received from connections. The

thence to the north Atlantic ports by sea. Large agricultural areas are being brought into production yearly, to a great extent because of new irrigation projects. The I. & G. N. will presumably secure the benefit of this future development.

Long Haul

From what has been said, it should be evident that the International & Great Northern has the advantage of securing a long haul on a large proportion of its tonnage. The actual figures show that the average haul in recent years has averaged about 185 miles. Further than that, it receives a comparatively high revenue per ton-mile; this figure in 1920 was 1.516 cents; in 1919 it was 1.4 cents. As this is written, the 1921 figure is not available, but it is to be supposed that it will show for the year a slightly higher figure even than in 1921.

Passenger Service

The leading feature of the I. & G. N.'s passenger service results from its being a part of the so-called Sunshine Route and also because of the passenger service which it handles in connection with the National Railways of Mexico through Laredo, Tex. About 70 per cent of the road's total revenues are derived from freight service, which will give some idea of the relative importance of the passenger service to all the service performed by the road. The Sunshine Route is constituted by the line of the Missouri Pacific from St. Louis to Texarkana, the Texas & Pacific from Texarkana to Longview, and the I. & G. N. from the latter south to San Antonio and Houston. The Sunshine Special, which operates over this route, is one of the best trains in the southwest. This train was established in the latter part of 1915; it is an all-steel train. For a time the I. & G. N. had no steel cars of its own and had to pay equipment rentals to the other two lines. In 1916, however, it ordered 11 steel cars as its quota. The service in connection with the National Railways of Mexico is constituted in the cars which are run from San Antonio to Mexico City and to Tampico.

Physical Condition

The road, as would be expected from the general underlying conditions, is not built to high physical standards. It lacks heavy rail. Its motive power is not of high standard and its general physical appearance is not good. Immediately after the receivership was established in 1914, the first things that were taken in hand were the equipment situation and roadway. In a communication which is published with the reorganization plan, J. W. Kendrick makes the statement that since the beginning of receivership some \$5,000,000 has been spent on the property and this largely for ballast and for widening cuts and fills. It should be understood that while \$5,000,000 will cover a fairly large amount of work, the International & Great Northern has not been able by any means to carry out the same sort of an improvement program as the Katy, for instance, is now bringing to a completion.

The International & Great Northern annual reports give a considerable amount of information as to exactly what has been done with reference to the road's physical improvement during the receivership. Unfortunately the 1921 report is not yet available so that such figures as are given will relate to the road's physical condition as of December 31, 1920; it is to be presumed, of course, that a large amount of work may have been carried out during 1921.

On June 30, 1915, of the road's main line mileage of 916 (the road's total owned mileage is 1,106), 62 per cent was dirt ballast. The figure in miles at that time was 566; 217 miles was ballasted with gravel, 49 with shell, 38 with cinders and 35 with stone. On December 31, 1921, the ballast condition had been changed so that of the main line mileage only 144 miles still had dirt ballast, this including 91 miles of the line between San Antonio and Laredo and

TONNAGE CARRIED IN 1920

Commodities	Originating	Received	Total
Wheat	49,121	474,088	523,209
Corn	38,987	40,157	79,144
Cotton	114,043	159,977	274,020
Cott used and products, except oil	100,922	24,552	145,474
Other fresh vegetables	55,373	77,644	133,017
Total products of agriculture	473,011	1,050,844	1,523,855
Cattle and calves	58,453	40,303	98,756
Total products of animals	123,782	74,459	198,241
Bituminous coal	26,144	137,719	163,863
Lignite	285,653	60,925	346,578
Clay, gravel, sand and stone	242,723	89,428	332,151
Crude petroleum	68,205	161,400	229,605
Total products of mines	677,705	723,345	1,401,050
Lumps, posts, poles and cordwood	137,955	31,950	169,905
Lumber, timber, box shooks, etc.	188,919	220,383	409,302
Total products of forests	347,008	284,339	631,347
Refined petroleum and its products	104,297	128,179	232,476
Cement	45,979	16,088	62,067
Lime and plaster	38,433	8,898	47,331
Total manufactures and miscellaneous	438,299	566,275	1,004,574
Grand total, railroad traffic	2,055,805	2,699,762	4,755,567
Merchandise—All I. & G. N. freight	119,088	99,004	218,092
Grand total, carload and I. & G. N. traffic	2,174,893	2,798,766	4,973,659

oil traffic is received at various points; one of the most important sources is that from the Trinity & Brazos Valley at Houston for movement to Texas City. There is also a large movement to refineries at San Antonio, notably in the case of the traffic received from the T. & B. V. at Jewett. Another important part of the road's tonnage is lignite coal, which is peculiar in view of the fact that the road is in a territory which has large sources of fuel oil. The lignite is secured at various points along the line, such as Crockett, Rockdale, at points south of San Antonio, and near Palestine. It is largely used for local consumption in cotton gins, office buildings, etc. and traffic in it varies with the price of competing fuel oil.

Products of agriculture, outside of grain and cotton, also represent a very considerable part of International & Great Northern traffic. Fresh vegetables originate primarily in the territory immediately north of Laredo. The Laredo district is an important onion production center and the 1922 crop was expected to reach 4,000 cars with about 2,000 cars to the territory north of that immediately adjacent to Laredo. There was also a considerable tonnage of cabbage and squash. The I. & G. N. gets a large proportion of this production and, in addition, gets a long haul on the traffic because a large proportion of it moves to New York by rail, the I. & G. N. via Longview, having the short route to St. Louis. A small part of the tonnage moves to Galveston and

about 53 miles in the center of the Fort Worth division. The mileage of gravel ballast had been increased to 589; the shell ballast had been increased to 136; the cinder ballast was only 19, and stone had been reduced to a total of but 2. The attention given to track foundation is the outstanding improvement which has taken place in the International & Great Northern's physical conditions since receivership.

Rail

Considerable attention has been given to the matter of rail also, but far from the amount of attention that should be given this important factor. The report of the executive officer to the receiver for 1920 contains this important statement: "Approximately 300 miles of new 90-lb. rail should be provided, extending over a period not to exceed three years, for laying between Palestine and Houston, and Palestine and San Marcos, releasing 75-lb. rail for relaying on other portions of the line, particularly between San Antonio and Laredo." This indicates, at least, that there is still a large amount of work to be done and that this is one of the first things which the reorganized company will have to take care of.

However, it should be pointed out that there was some improvement made in this respect during the receivership.

ballasting; of course these cars can be used for revenue coal traffic as well. The above cars were the only new freight equipment which was acquired during the eight years of receivership.

The locomotive purchases were equally small. No new power was secured until October, 1921, when orders were placed for 4 Mikado locomotives and 4 six-wheel switching locomotives. In the rush of 1920 the road had to rent locomotives. The larger part of the road's motive power is of comparatively light weight. Prior to the purchase of the new locomotives just mentioned, the largest locomotives on the road were 16 Consolidations—22 in. by 30 in. cylinders with 182,000 lb. on the drivers. The road has made the best of what it has had in the way of motive power, however. In 1914 it did not have a single locomotive with a superheater; it has succeeded in putting superheaters on a considerable proportion of its locomotives; at present all of its heavier power is superheated, the actual figures being 48 superheated locomotives, including the eight new ones recently obtained. The locomotives on the road total 182.

The road needs new cars—that is, if its heavy per diem charges are any criterion. Further than that, it reported on May 1 a bad order car percentage of 18.1, which is rather high. Its percentage of locomotives held out of service for

INTERNATIONAL & GREAT NORTHERN OPERATING STATISTICS, 1912-1920

Year ended	Freight revenue	Total operating revenue	Total operating expenses	Net operating revenue	Operating ratio	Revenue tons	Revenue ton miles	Average haul	Revenue per ton per mile, cents	Revenue train load	Revenue car load	Ton miles per mile of line
June 30 1912	\$7,408,670	\$10,389,499	\$7,585,832	\$2,809,999	73.01	3,269,554	583,658,153	179	1.269	205	13.51	.....
1913	8,074,686	11,284,722	8,572,700	2,712,102	75.97	3,896,793	695,410,311	176	1.161	213	14.96	.....
1914	7,024,295	9,963,408	8,062,467	1,900,940	80.92	3,556,382	580,827,567	163	1.209	215	13.60	500,929
1915	6,674,082	9,083,626	7,871,449	1,212,177	86.66	3,592,579	637,154,661	177	1.045	249	14.40	549,508
1916	6,869,511	9,420,291	7,339,224	2,081,067	77.91	3,767,900	680,160,833	181	1.010	271	15.66	586,599
Year ended Dec. 31 1916	7,673,765	10,766,945	7,786,049	2,980,895	72.31	4,049,264	719,621,355	178	1.066	271	15.77	.....
1917	8,582,335	12,588,224	8,649,954	3,938,230	68.71	4,140,037	751,526,133	182	1.142	312	17.66	.....
1918	8,859,715	13,476,888	11,643,003	1,833,883	86.39	3,949,854	691,239,368	175	1.282	323	14.87	.....
1919	10,061,736	14,410,290	15,189,587	Def. 779,297	105.40	3,902,256	718,629,643	184	1.400	320	20.31	619,729
1920	13,988,645	19,514,093	20,027,879	Def. 513,786	102.63	4,973,659	922,502,143	185	1.516	336	21.10	795,603
1921	13,178,384	17,639,782	16,254,947	1,384,835	92.15	.....	.....	.....	.....	.....	.....	.....

On June 30, 1915, of the road's total owned mileage of 1,106, 4.7 miles were laid with 85-lb. rail, 37.6 with 80-lb. rail, 723.7 with 75-lb. rail, 14.2 with 70-lb. rail, 171.2 with 56-lb. rail, and 154.6 with 52-lb. rail. On December 31, 1920, the mileage of the different weights was as follows: 13.6 miles of 90-lb.; 66.1 miles of 85; 34.4 miles of 80-lb.; 700.3 of 75; 15.3 miles of 70; 171.5 miles with 56 and 124.8 miles with 52. The percentage of rail, 70-lb. or less, on June 30, 1915, was 30.8. On December 31, 1920, this had been reduced to 26.4. On June 30, 1915, the proportion of 75-lb. rail was 65.4, whereas on December 31, 1920, this had been changed to 63.3. In other words, the road has not made a very considerable amount of progress in improving its rail condition during these years. It is further of interest that all of the 52-lb. rail is to be found on the line between San Antonio and Laredo. This rail has been in track some 46 years.

Equipment Condition

On the first inspection trip which the officers took over the road after the creation of its receivership, they found that in addition to its poor ballast condition, the road had a poor equipment condition. There were found to be a large proportion of bad order cars and one of the first steps taken was the adoption of a program for their repair. In the latter part of 1915 it was deemed essential to secure a large number of new cars and there were purchased 500 steel frame box cars of 40-ton capacity, 200 steel underframe stock cars and 300, 50-ton combination ballast and coal cars. The purchase of the last named equipment is noteworthy because it shows the importance the new officers gave the matter of

repairs requiring over 24 hours on the same date was 13.8; this is considerably lower than the country's average on that date.

Increases in Train Load

The International & Great Northern in 1920 had a revenue train load of 336 tons. In the first report to the receivers, this statement occurs: "During the first year of the operation of the property by the receivers, strenuous efforts were also made to reduce the freight train miles by increasing the freight train loads. . . . Little attention seems to have been paid to this feature in the past, but a decrease in the freight train miles has been brought about in spite of an increased movement of freight traffic, and a material increase has been made in the net train loads. Statistical information for the operating officers, to enable them to know exactly what results they were getting in this respect, was sadly wanting. Amongst other things a weekly tonnage report has been compiled showing the weight of trains moved on each freight train district on all divisions, which is distributed promptly to superintendents, train masters and others in order that they may see the weak points and each see what the other is doing, thus creating the spirit of generous rivalry between divisions."

The work which was started at that time has been continued to the present with the result that in each year of the receivership there has been a steady and progressive increase in the average revenue train load. The average train load for the year ending June 30, 1914, was 215. In the first year of operation by the receiver this was increased 16 per cent, or 249 tons. In 1916 the average had become 271; in

1917, 312; in 1918, 322; in 1919, 320, and in 1920, 336. The revenue train load for 1921 is not yet available but there is available a figure of net tons per train, including both revenue and non-revenue freight, which shows for 1920, 413, and for 1921, an increase to 434.

The interesting feature is that these increases were brought about without the acquisition of new and heavier motive power; they were the result of improved operating supervision and a realization of the importance of this matter. The average train load for the International & Great Northern as compared with the other lines in the southwest is low. The figure of 434 net tons per train in 1921 compared with an average for the southwestern region of 514. The Gulf Coast Lines in 1921 had an average of 610; the Gulf, Colorado & Santa Fe, 468; the Missouri, Kansas & Texas, 473.

The road has had an increase in average car load similar to that which it has had in revenue train load. In 1914 its revenue tons per loaded car were 14.45. In 1920 this had increased progressively to 21.10. The 1921 figure for revenue car load is not available, but that for net tons per loaded car is; in 1920 the I. & G. N. had a net tons per loaded car of 24.5, and in 1921 of 24.7. The average for the southwestern region for the year was 25. Car miles per day in 1921 were 22.1 as against the average in the southwest of 22.9; in 1920, however, the I. & G. N. figure was 30.9 as against the region's average of 23.5. The locomotive miles per locomotive day in 1921 was 69.9 and in 1920, 92.8, whereas the average for the district was respectively 57.1 and 67.5.

Earning Power

An analysis of the International & Great Northern earning power is complicated by the factor of federal control and by the necessity of reconciling the results of the high costs of labor and material characteristic of the past three or four years. The road did not do well while it was being operated by the government. It had a standard return of \$1,394,946.

The International & Great Northern has practically no other income than that received from the operation of its own property. This brings us to the important fact that the government compensation of \$1,394,946 was about \$200,000 less than the interest charges on the property, which, for the past several years have run above \$1,500,000 annually and which, as of June 30, 1922, are placed at the exact figure of \$1,597,175. The fixed interest charges of the new company are set at \$1,179,000, a reduction from the present interest charges of \$418,175. The road has been operating at a deficit running from \$300,000 to \$400,000 and the evidence on the whole is that the property, even without any great expansion of traffic, should be able to earn its fixed charges without difficulty.

There is a certain interest in examining what the road did during the period of federal control, although the great improvement which has been made since that time gives these figures, at present, largely an academic interest only. The year 1917 was the best year in the company's history. It had a net after rentals in that year of \$3,254,787. In 1918, the first year of federal control, the road had a net railway operating income of \$1,378,645 or, in other words, it approximated its standard return. In 1919, however, there was a deficit of \$1,404,787, and in 1920, a further deficit of \$1,749,257, which latter deficit the government had to make up partly through standard return for two months and guaranty for six.

Difficulties in 1921

The year 1921 was not a good year for the company. It had a sharp falling off in traffic. In September it experienced an extremely severe storm in the San Antonio and Brazos Valley district which resulted in 72 washouts varying from 15 ft. to 5,000 ft. in length. The traffic was restored

in eight days, but the operating expenses were increased \$225,000 for repairing the damage and the road, in the meantime, lost a considerable volume of traffic which it otherwise might have carried. The International & Great Northern had a private train service strike of its own at the time of the general strike threat last November. Nevertheless, even with all these difficulties, the road came through the year with a deficit after rentals of \$324,441; a deficit to be sure, but an amount \$1,400,000 less than the deficit in 1920.

The corporate income account for 1921, when it is issued in the near future, will very likely make a poor showing for the year but this will be explained by the special conditions of a very trying year, the like of which presumably will not be experienced again in the same degree. The matter of revenues and expenses is complicated by the varying freight rates and varying costs. Because of this situation it seems hardly advisable to attempt an analysis of the figures. They are, however, given in the table in some detail. The revenues show the usual increase over a term of years resulting from a combination of increased traffic and an increased rate per ton per mile, whereas the expenses show a similar or even greater increase due to increased labor and material costs.

An interesting feature is the operating ratio. In 1914 this was 80.92; in 1915, 86.66, but in 1916 it reduced to 72.31, and in 1917, to 68.71. It increased in 1919 to 105.40. In 1921 the figure was 92.15.

J. W. Kendrick's Opinion

J. W. Kendrick, in his communication which is included with the reorganization plan, estimates that the property should be able, in 1923, to have a net income available for interest and dividends of \$3,031,512; in 1924, of \$3,178,135, and in 1925, of \$3,326,821. "If my recommendations with respect to operation and management are adopted," he says, "it will in my judgment be practicable to operate the road for not to exceed 76 per cent of its operating revenue, as stated in my report. Allowing eight per cent for taxes, hire of equipment and rental of joint facilities, in accordance with the results that have been obtained in the past, 16 per cent of the gross earnings would be available for interest charges and dividends."

Mr. Kendrick adds: "There is absolutely no reason why the results indicated in my report cannot be obtained, or why the International & Great Northern System cannot take a place with the best of the southwestern and Texas railroads as far as quality and economy of its operation are concerned."

At present the International & Great Northern is doing very much better than it did at this time last year. It operated in March with a net after rentals of \$61,701 as compared with a deficit in March of 1921 of \$178,005. For the three months it had a net after rentals of \$87,853 as compared with a deficit in the first three months of 1921 of \$534,112. Its operating ratio in March was 84.7; for the three months, 88.1.

THE GASOLINE purchased by the Illinois Central in 1921 was enough to have run an automobile, at the rate of 20 miles to the gallon, more than 400 times around the earth. It would keep the car going continuously 24 hours a day at 20 miles an hour for more than 50 years.

THE INTERNATIONAL BROTHERHOOD OF LOCOMOTIVE FIREMEN AND ENGINEEMEN has been holding a convention in Houston, Tex., which, it is estimated, has cost \$52 a minute. There was one delegate present from each of the 904 lodges and his pay was \$8 a day besides expense money amounting to \$6. The convention of this organization in 1919, which was held in Denver Colo., cost more than \$600,000. It was in session 32 working days.

General News Department

The Freight Claim Division of the American Railway Association will hold its thirty-first annual convention at Denver, Colo., June 20, 21 and 22.

Clifford Thorne, of Iowa, ran for the United States Senate in the Republican primaries in that state on June 5. The votes, when counted, showed that he came in a poor second. He received less than one-fifth of the total number of votes cast and less than 40 per cent of the number received by the successful candidate.

Fines Amounting to \$500 and costs were imposed on the New York, New Haven & Hartford Railroad in the Federal Court at New Haven, Conn., on June 1, for violation of the hours of service law in connection with working time of trainmen. The government brought suit on 12 counts, but on seven of them the prosecution was abandoned.

President W. G. Lee of the Brotherhood of Railroad Trainmen has been re-elected, defeating Vice-Presidents Fitzpatrick and Whitney. W. N. Doak, vice-president, was elected senior vice-president to succeed Mr. Fitzpatrick. T. R. Dodge, assistant to president; A. E. Kind, general secretary and treasurer, and D. L. Cease, editor, were re-elected by acclamation. Messrs. Lee and Dodge have been officers of this organization uninterruptedly for 27 years, and secretary King for 25 years.

The Newfoundland Railway resumed train service on May 23, after a suspension of eight days, owing to lack of funds to pay the wages of the trainmen. The management of the road said that the financial difficulty was due to the neglect of the government to make payments which had been agreed upon. It appears that the resumption of service follows a temporary advance of money by the government, made with the expectation that a permanent settlement of the difficulty would be reached by June 3.

The California Limited, No. 3, westbound, and the "Scout," No. 10, eastbound, of the Atchison, Topeka & Santa Fe, collided about 4 a. m. on May 29, near the bridge across the Mississippi river opposite Fort Madison, Iowa, and the engineer of the Limited and the fireman of the "Scout" were killed. The two other members of the engine crews sustained severe injuries and a number of the passengers received minor injuries. Both engines and two baggage cars were derailed and badly damaged. Preliminary investigation indicates that the collision was due to the westbound train running past a stop signal.

The Wrecking of an Automobile on a crossing by the westbound Pacific Express, No. 7, of the Erie Railroad, in Binghamton, N. Y., on the morning of June 6, resulted in the serious scalding of the engineer and fireman, burning gasoline having been thrown over them at the moment of collision by the explosion of the tank of the automobile. The automobile was a truck, stopped on the crossing because of an obstacle in the shape of an ash cart, and the driver and two other men on the truck were killed. The report that the locomotive was derailed in this accident appears to have been incorrect.

Columbus & Greenville Abandons Branch Line

Train service over the Webb branch (34 miles in length) of the Columbus & Greenville, was discontinued on May 27, the Mississippi Railroad Commission having granted authority for the abandonment. Very little traffic has been handled over this line in recent years, except during the cotton season. An application is now pending in the federal court for authority to sell the road at public auction. A meeting of the citizens of Leflore county who are served by the Webb branch was held last week and steps were taken to raise the necessary funds to purchase the line.

Station Agents to Meet

The Freight station Section of the American Railway Association, formerly the American Association of Freight Agents, will hold its annual meeting at the Bellevue-Stratford hotel, Philadelphia, Pa., beginning on June 20. The program for this meeting, besides the reports from both the standing and special committees, provides for a list of topics on which sectional organizations have prepared papers for a general discussion.

Imprisoned Trainmen Pardoned

Charles L. Evans and Walter Yeakel, conductor and engineer, who in March last were sentenced to imprisonment—9 months and 6 months respectively—and were fined \$500 each, on account of their responsibility for the disastrous collision on the Philadelphia & Reading at Woodmont, Pa., on December 5, 1921, were pardoned by the governor of Pennsylvania on May 31. The action of the governor was recommended unanimously by the State Pardon Board, following an inquiry in which the railroad company signified its willingness to give employment to the two men. It is said that the jury which convicted Evans and Yeakel was out all night and took more than 200 ballots.

Unions May Be Sued for Damages

The United States Supreme Court on June 5 handed down a decision to the effect that under sections 7 and 8 of the Sherman anti-trust law labor unions are suable; and that actions may be brought against them for damages for which they may be responsible by illegal conduct in connection with strikes. The court held that funds collected for strike purposes are assessable to pay the damages. This decision was rendered in the case of the United Mine Workers of America against the Coronado Coal Company of Arkansas. The court held, however, that in this case the national organization was not responsible for the damage and it ordered a retrial of the case against the district organization of the union.

Officers of Master Boiler Makers' Association

At the Thirteenth Annual Convention of the Master Boiler Makers' Association, which was held in Chicago on May 23-26, the following officers were elected: president, Thomas Lewis, general boiler inspector, Lehigh Valley, Sayre, Pa.; first vice-president, E. W. Young, general boiler inspector, Chicago, Milwaukee & St. Paul, Dubuque, Ia.; second vice-president, Frank Gray, general foreman boiler maker, Chicago & Alton, Bloomington, Ill.; third vice-president, Thomas F. Powers, assistant general foreman, boiler department, Chicago & North Western, Oak Park, Ill.; fourth vice-president, John F. Raps, general boiler inspector, Illinois Central, Chicago; fifth vice-president, W. J. Murphy, general foreman boiler maker, eastern region, Pennsylvania System, Allegheny, Pa.; secretary, Harry D. Vought, 26 Cortlandt street, New York; treasurer, W. H. Laughridge, general foreman boiler maker, Hocking Valley, Columbus, Ohio.

Decision in Stoker Infringement Suit

In the suit brought by the Locomotive Stoker Company against the Elvin Mechanical Stoker Company in the United States District Court for Delaware a decision has recently been rendered by Judge Morris which sustains the claim of infringement advanced by the Locomotive Stoker Company under its Street Patent No. 1,130,443. Claims 1 and 2 of this patent were urged and both of them were held valid and infringed by the Elvin Stoker. These claims read as follows:

1. In a locomotive, the combination with the boiler furnace and its firing door of a mechanical stoker apparatus mounted on the locomotive and comprising a fuel receptacle below the firing door, an elevator for conveying the fuel from said receptacle

to a point above the level of the fuel bed, and means for delivering the fuel therefrom into the furnace.

2. In a locomotive and tender, the combination with the boiler furnace of a mechanical stoker apparatus mounted on the locomotive and comprising a fuel receptacle below the firing floor, means below said floor for delivering fuel from the tender into said receptacle, an elevator for conveying the fuel from said receptacle to a point above the level of the fuel bed, and means for delivering the fuel therefrom into the furnace.

Judge Morris also decided that the Gee Patent No. 1,082,419, which was involved in this suit, was not infringed, and dismissed the bill as to it. The Elvin Mechanical Stoker Company states that it will take an appeal from the decision, as to the Street patent.

Program of Purchases and Stores Meeting

The program of the third annual meeting of Division VI—Purchases and Stores, American Railway Association, which will be held at the Hotel Traymore, Atlantic City, N. J., June 19, 20 and 21, is as follows:

MONDAY, JUNE 19

Opening exercises, including addresses by R. H. Aishton, president, American Railway Association; W. G. Besler, first vice-president, American Railway Association; Elisha Lee, vice-president, Pennsylvania System, Eastern Region; and by the chairman of the Division, H. E. Ray, general storekeeper, Atchison, Topeka & Santa Fe.

Reports of the following committees:

General committee.

Subject 1, Stores Department Book of Rules.

Subject 2, Classification of Material.

Distributing and Accounting for Gasoline, by L. V. Hyatt.

TUESDAY, JUNE 20

Reports on

Subject 4, Material Accounting and Mechanical Facilities.

Subject 21, Unit Piling of Materials and Numerical Numbering System (moving picture illustration of unit piling).

Subject 16, Supply Train Operation.

Subject 10, Scrap Classification—Handling and Sales.

Subject 12, Purchasing Agents' Office Records.

Subject 3, Reclamation of Material.

Inventories, by D. C. Curtis.

WEDNESDAY, JUNE 21

Reports on

Subject 13, Forest Products.

The Need of a Sinking Fund to Care for Deterioration, Obsolescence and Other Losses Incidental to the Handling, Use and Distribution of Materials, by H. H. Laughton.

Subject 15, Buildings and Structures and Facilities.

Office Routine in Purchasing and Stores Departments, by E. W. Thornley.

Stationery, Including Repairs to Typewriters, by C. B. Tobey.

Educating Employees of the Store Department for Their Duties, by V. S. McKelligon.

The Human Equation in Railway Service of Supply, by M. J. Wise.

Subject 19, Fuel Conservation Joint Committee.

Report of Memorials Committee

Election of officers.

The meetings will convene sharp at 9:00 a. m. Morning sessions only will be held, in order that the members may have ample opportunity for visiting the exhibits on Young's Million Dollar Pier.

"Prosperity Special" Attracts Crowds

The "Prosperity Special," the train of 20 monster locomotives (reported in the *Railway Age* of June 3) which was sent from the Baldwin Locomotive Works, Eddystone, Pa., on May 26, to the Southern Pacific Company, reached East St. Louis, Ill., on schedule and is now on the second lap of its journey which will end at Corsicana, Tex., where the locomotives will be turned over to the Southern Pacific. In Pennsylvania and Ohio, along the route followed by this half-mile train, thousands of men, women and children including state and city officials, school

teachers and students, members of chambers of commerce, boards of trade, manufacturers, etc., were on hand to see the train as it went by. At Mansfield, Ohio, the train stopped a half hour while the Chamber of Commerce, manufacturers and school children in a body conducted a review. At Fort Wayne, the engines were placed at Schiney Park where a grand stand and music pavilion had been erected. Here the president of the Indiana Chambers of Commerce addressed 4,000 people. At Indianapolis the locomotives stood at the passenger station over the week end and a "prosperity" celebration was held at which Governor McCray of Indiana and former Senator A. J. Beveridge of that state spoke. Similar celebrations occurred at numerous other stops. At St. Louis the train was transferred from the Pennsylvania to the St. Louis Southwestern. A luncheon was served on Tuesday to railroad officials, state and city authorities and leading manufacturers, following which motion pictures were taken of these men in official review of the train. The train left East St. Louis on June 7 and travelled by the main line of the Cotton Belt through Jonesboro, Ark., Pine Bluff, and Texarkana. It is scheduled to arrive at Corsicana on June 12.

April Earnings 3.93 Per Cent

The railroads in April had a net operating income of \$50,256,800 which on an annual basis represented a return of 3.93 per cent on their tentative valuation, according to reports filed with the Interstate Commerce Commission. In April, last year, their net operating income amounted to \$29,856,600, or at the annual rate of return of 2.33 per cent, while in March this year it was \$83,511,400, or 3.83 per cent.

The tabulations are based on reports filed by 201 Class I railroads, having a total mileage of 236,167 miles.

Operating revenues in April totaled \$416,853,600, or 3.8 per cent less than for the same month last year; operating expenses \$336,178,400, or 10½ per cent reduction.

Fifty-nine roads—28 in the Eastern district, 2 in the Southern and 29 in the Western—had operating deficits in April. In March there were 36.

For the first four months this year, the net operating income of the railroads totaled \$211,278,394, compared with \$57,408,900 during the same period last year. This is at the annual rate of return of 4.36 per cent, compared with 1.18 per cent during the first four months in 1921.

By districts the operating revenues for April were: Eastern \$206,104,100, a reduction of 2.8 per cent; operating expenses \$165,773,700, a reduction of 9.4 per cent; net operating income \$26,607,700, or at the annual rate of 4.42 per cent.

Southern, operating revenues, \$57,571,000, an increase of 1.1 per cent; operating expenses, \$43,875,900, a decrease of 12.3 per cent; net operating income, \$9,712,300, or at the annual rate of return of 5.62 per cent.

Western, operating revenues, \$153,178,300, a decrease of 6.1 per cent; operating expenses, \$126,528,770, a decrease of 11.1 per cent; net operating income, \$13,936,700, or at the annual rate of return of 2.76 per cent.

New Merger of Three Steel Companies

Announcement is made of the adoption of a plan by which the properties of the Midvale Steel & Ordnance Company, the Republic Iron & Steel Company, and the Inland Steel Company will be unified in the ownership of the Midvale Steel Company whose name will be changed to the North American Steel Company, or some other appropriate name. The terms of the plan are as follows: All existing obligations of the three companies are to be assumed by the unified company. Existing preferred and common stocks will be changed into preferred and common stocks of the unified company. The new preferred stock is to have a par value of \$100 per share, is to be 7 per cent cumulative is to be redeemable at \$115 per share and accrued dividends, and is to be convertible for twelve years into new common stock at the rate of five shares of new common for four shares of new preferred. The common stock is to be without par value.

All assets of the three companies are to be owned by the unified company, except the Nicetown plant (the armor-making, ordnance and forging plant) of the Midvale Steel Company, which is to be transferred to a separate company with a capital of 500,000 shares without par value.

Participation in the new stock will be as follows:

Under the plan Midvale Company stockholders are to receive 75 per cent in new common stock and 25 per cent in stock of the company formed to take over the Nicetown plant.

Republic Iron & Steel preferred stockholders are to receive dividends in cash up to the date when the new preferred dividend begins to accrue, and 100 per cent in new preferred stock.

Republic Iron & Steel common stockholders are to receive 170 per cent in new common stock.

Inland Company stockholders are to receive 25 per cent in new preferred stock, which is to be purchased from them at \$95 per share, and 70 per cent in new common stock.

It is intended to provide \$20,000,000 additional cash working capital by the sale of common stock. Negotiations are pending for the acquisition of other properties, but, irrespective of the outcome of these negotiations, Midvale, Republic Iron & Steel and Inland propose to proceed with the plan. Messrs. Kuhn, Loeb & Co. have agreed to act as bankers for the plan.

A statement was subsequently sent to the stockholders of three companies, in part as follows: It is proposed that the Midvale and Inland companies will consolidate and merge and take the name North American Steel Corporation. This corporation, hereinafter called the company, will acquire, subject to its liabilities, the assets of the Republic Company. Before the unification of the properties, Midvale will place its Nicetown plant and certain assets and liabilities connected with the operation of it in a separate corporation, stock of which will be distributed pro rata among the stockholders of the Midvale company, as hereinafter stated. This separate corporation will thereafter continue as a separate enterprise for the manufacture of the ordnance, armor plate and special steel products to which it is adapted.

Upon the consummation of the plan, the issued capital will be as follows: Bonds and other fixed charge obligations, \$79,173,500; new preferred stock of \$100 par value, \$50,331,475; shares of new common stock with a par value of \$3,309,612.

The \$79,173,500 bonds and fixed charge obligations will consist of \$60,599,500 bonds and guaranteed obligations of the Midvale Company, or its subsidiaries; \$13,357,000 bonds and other obligations of the Republic Company or its subsidiaries; and \$5,217,000 bonds and other obligations of the Inland Company, all of which, in addition to the other liabilities of the three corporations, are to be assumed by the company.

The \$50,331,475 preferred stock is to be 7 per cent cumulative and is to be convertible into 1,934,000 shares of common stock at the rate of four shares of preferred stock for five shares of common. It is to be redeemable at the option of the company at 115 per cent and accrued dividends. Of the amount to be presently issued, \$25,000,000 par value is to be issued to provide in part for the acquisition of the properties of the Republic Company, and \$25,331,475 par value is to be issued and the proceeds thereof, amounting to \$24,064,901, is to be paid by the company to the stockholders of the Inland Company.

The 3,309,612 shares of no par value common stock are to be issued as follows: To Midvale shareholders, 1,500,000 shares; to provide in part for the acquisition of the properties of Republic Iron & Steel Company, 510,000 shares; to inland shareholders, 709,281 shares; to be sold for cash, 599,331 shares.

On completion of the plan, each holder of one share of stock of Midvale Company will be entitled to receive: (1) Three-fourths of a share of the new common stock; and (2) one-fourth of a share of stock of the corporation which is to take over the Nicetown plant. Each holder of one share of stock of the Inland Company will be entitled to receive: (1) \$23.75 in cash, and (2) seven-tenths of a share of the new common stock. Each holder of one share of stock of the Republic Company will be entitled to receive: (1) with respect to each share of preferred stock, one share of new preferred stock and an amount of cash necessary to provide for the then unpaid dividends on such preferred stock of the Republic Company; (2) with respect to each share of common stock, one and seven-tenths shares of new common stock.

It is intended that a syndicate will be formed to provide for the cash requirements of the plan, including the provision of \$20,000,000 additional cash working capital, which will make the total working capital of the company over \$100,000,000.

Messrs. Kuhn, Loeb & Co. have agreed to act as bankers for the plan.

The plan contemplates that the company will sell to Mr. Thomas L. Chadbourne, for services rendered, 25,500 common shares at \$10 per share, and to Messrs. Kuhn, Loeb & Co., 59,500 common shares at \$10 per share.

At the consummation of the plan, the fixed charges of the company will amount to \$3,913,085 per annum (which is about 74 cents per ton of rated input capacity) and the preferred stock dividends to \$3,523,203 per annum (which is about 67 cents per ton of rated input capacity). The total rated input capacity of the company will be 5,249,000 tons per annum.

The book value as of December 31, 1921 (which is far below the present replacement figures) of total net assets of the Midvale, Republic and Inland companies, including the \$20,000,000 new cash working capital (but excluding the Nicetown plant) totals about \$284,000,000.

The earnings of these three companies (exclusive of the Nicetown plant earnings) applicable to dividends on the preferred and common stock, that is, net of the deduction of bond and other interest, federal and other taxes and adequate depreciation, as compiled from the annual accounts for the ten years ending December 31, 1921, averaged \$20,462,248 per annum and were as follows:

1912	\$7,435,421	1917	\$60,257,399
1913	10,164,892	1918	34,598,221
1914	3,799,545	1919	16,142,487
1915	13,702,110	1920	22,429,534
1916	52,595,325	1921	(Loss) 11,552,446

Since the year 1916 the three companies have expended more than \$120,000,000 for improvements and additional facilities, greatly increasing capacity and reducing operating costs so that the earnings reported for the past ten years do not fully reflect the earning power of the three companies as now situated.

Traffic News

The Southern Pacific reports the shipment from San Francisco for New York on June 4, of a trainload of silk, 351 tons, en route from Japan. This silk is valued at \$5,600,000, and occupies 19 cars.

Senator Capper of Kansas has introduced in Congress a bill to repeal Section 28 of the Jones merchant marine act, which provides that preferential rates by railroad on export and import freight shall be restricted to traffic carried on the ocean by American vessels. The Shipping Board is now holding hearings in various parts of the country regarding the method of enforcement of this provision of the law.

The Federal Sugar Refining Company of New York has entered suit in the Hudson County Supreme Court at Jersey City, N. J., against the Lehigh Valley Railroad to recover \$611,331 for sugar lost in the Black Tom explosion and fire of July 31, 1916. The refining company contends that the railroad was negligent in allowing the sugar to be stored at Black Tom when it was known there was danger of an explosion.

The movement of coal from the mines on the Cumberland Valley division of the Louisville & Nashville, which has been very heavy since the beginning of the countrywide strike in the bituminous mines, broke all records on May 29, the number of cars sent to Cincinnati on that day totaling 1,229. In normal times the number of cars loaded daily at the mines on the Cumberland Valley division is about 800.

Coastwise steamship lines operating between New York and Gulf of Mexico ports expect a lull in freight until July 1. These lines, while carrying freight generally at a lower rate than do the rail carriers, are similarly affected by the cut and shippers who ordinarily maintain a steady flow of commodities will probably hold off until the new rates become effective. After July 1, according to a representative of one of the larger coastwise lines, there is prospect of a very large business. Representatives in the south have been sending excellent reports as to prospects for the summer and fall business.

Observation cars are to be restored on August 1 on the fastest limited trains of the Pennsylvania System running between New York, Philadelphia, Baltimore and Washington on the east, and Chicago and St. Louis on the west. These cars were discontinued as a war measure in December, 1917. The trains are the Broadway Limited, east and west bound, the St. Louisan, and the New Yorker. Observation cars will be continued in service until December 1, when they will be withdrawn for the winter. A similar improvement is announced for the Twentieth Century Limited, of the New York Central.

Coal Production

The ninth week of the coal strike (May 29-June 3) will show a decrease in production, largely because of the observance of Memorial Day, according to the Geological Survey. The returns so far received point to an output of between 4,550,000 and 4,750,000 tons. Production of anthracite remains practically zero.

For the eighth week (May 22-27) complete returns indicate an output of 4,856,000 tons of bituminous coal and 10,000 tons of anthracite.

Loadings on Monday of the ninth week were 15,082 cars, the largest for any Monday since the strike began. Following is the daily record:

	1st week	5th week	7th week	8th week	9th week
Monday	11,445	11,598	13,366	14,772	15,082
Tuesday	11,019	12,160	12,830	15,085	11,142
Wednesday	11,437	12,861	13,442	14,677	15,067
Thursday	11,090	12,487	13,445	14,573	13,823
Friday	11,296	12,778	14,036	15,202	.....
Saturday	8,898	11,265	12,357	12,662	.....

No great change in the number of men on strike has yet occurred. Production is increasing very slowly in the Connells-ville region, and more rapidly in southeastern Kentucky and Tennessee.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has issued a decision finding rates on grain, grain products, hay and straw and related articles taking the same rates or rates basing thereon from points in Oklahoma to points in Texas to be unreasonable and unduly prejudicial and it has prescribed a scale of reasonable and non-prejudicial rates.

The commission has suspended from June 1 until September 29 the operation of schedules, which propose increases in rates on hosiery from Beaver Dam and Waupun, Wis., to Ohio River points, Elkhart, Indianapolis and Terre Haute, Ind. The present rate to Ohio River points is 70 cents per hundred pounds. The proposed rates range from 101½ to 128½ cents per hundred pounds.

Potato Embargo Cancelled

Division 5 of the Interstate Commerce Commission, Commissioners Aitchison and Potter sitting, held an informal conference on June 5 with representatives of the Pennsylvania Railroad, of the Port of New York Authority, and other New York interests upon a protest filed by the Port of New York Authority against an embargo issued by the Pennsylvania Railroad against the delivery of potatoes at Pennsylvania stations in New York, Jersey City and Brooklyn, to go into effect at midnight on June 5. A similar embargo was levied about two weeks ago and was cancelled, before becoming effective, at the request of New York interests.

After full discussion Division 5 expressed the opinion that the embargo ought not to be retained without further conference because it would seriously disrupt long established conditions. It suggested that the embargo be cancelled and that suggestion was accepted by the Pennsylvania under protest.

The commission's director of its Bureau of Service, John C. Roth, will investigate the situation on the ground.

The embargo was ordered because of serious congestion at the principal delivery piers, the total number of cars of potatoes received by the Pennsylvania at New York in the month of April having been more than 5,000. To relieve this congestion the road has just established a new delivery yard at Kearney, N. J., about five or six miles west of New York, and had requested consignees to send their trucks to that place for their freight. Potato merchants, in their protest, complain that such a change in the place of unloading would be very costly to them, and express doubts as to whether the ferryboats could accommodate the large number of trucks which would be necessary to move their wagons. They complain also that the railroad is offering no reduction in the transportation rates while it would shorten its haul about five or six miles. The Port Authority is trying to provide additional pier room for delivery of perishable freight, so as to relieve the congestion at piers 27, 28 and 29.

Court News

Application of Florida Fencing Law

Injury to animals from failure to fence makes the railroad liable under the Florida fencing statute only when the injury is inflicted by the operation of the company's engines, cars or trains. The statute does not apply to an injury to a horse whose foot was caught in a defective switch connecting a main and a side track while the horse was attempting to cross the tracks—*S. A. L. v. Coxeter* (Fla.), 90 So. 469.

United States Supreme Court

The Supreme Court of the United States on June 5, at the request of counsel for the Southern Pacific, granted leave to file within (4) days a petition for a rehearing in the Southern Pacific-Central Pacific merger case.

Labor Board Decisions

Pay of Foremen While Gang Is Laid Off

A case arose on the Buffalo, Rochester & Pittsburgh in connection with an extra gang that was laid off one day each week, the foreman contending that he was exempt from deductions from his monthly pay on this account. The decision of the board is that if the foreman is compensated on a monthly basis for all service rendered, including time worked in excess of the regular working hours or days assigned, he should receive not less than the monthly rate so established, provided he was ready and available. If on the other hand the foreman is compensated on the monthly basis but is paid overtime for work performed after eight hours and for all work performed on Sundays and holidays, no valid claim can be made for time lost under the provisions of Section 8 Article V of the agreement.—*Decision No. 896.*

Back Pay for State Holiday

Members of the Brotherhood of Railway and Steamship Clerks, etc., employed by the Southern Pacific at freight stations in San Francisco, requested back pay for "Admission Day," September 9, 1921, on which date they were notified not to work, the day having been proclaimed a holiday by the governor of California. The Labor Board quoted rules 56 and 64 of the clerks' national agreement in which seven holidays are listed of which either the employees or the employer may take advantage, unless other holidays are mutually agreed upon. The Board believed that the carrier would have been well within its rights in seeking the employees' concurrence in treating Admission Day as a holiday. However, in the absence of any such agreement, the Board decided that the daily-rated employees involved in this dispute are entitled to pay for that day.—*Decision No. 960.*

No Overtime for Employees Required

to Sleep on the job

A case was recently presented to the Labor Board in which two employees of the American Railway Express Company requested overtime pay for sleeping in the express office each night for a period of approximately six months. The employees say that they were required to spend the nights in the office of the company in question at Rouses Point, N. Y., after the expiration of their regular day assignment. They were required to report every night at 11:30 p. m. to sign for all valuables which were to be delivered to morning trains and to remain at the office in charge of fires, lights, etc., until 6 a. m., the time their regular tour of duty commenced. The employer contended that for a number of years it had been the custom to have employees a certain offices remain in the building at night in the capacity of guards. Suitable and proper quarters are furnished free of charge to employees agreeing to this arrangement. The carrier further stated that this proposition was fully understood by all employees who availed themselves of these sleeping quarters. The Railroad Labor Board denied the claim of the employees.—*Decision No. 907.*

Train Dispatcher Ordered Reinstated

A case was brought before the Labor Board by the American Train Dispatchers' Association requesting the re-instatement of a dispatcher at Pine Bluff, Ark., who had been dismissed by the St. Louis Southwestern on September 27, 1920, for alleged responsibility in connection with a failure to issue a slow order and which failure was said to have resulted in a derailment. Testimony developed that about 8 p. m. September 13, 1920, a message was filed at Camden, Ark., directing the issuance of a slow order requiring all trains to reduce speed to 10 miles an hour, three to five poles south of M. P. 325. It was claimed that the message was not transmitted to the relay office at Pine Bluff until 10:35 p. m. and that it lay in the latter office until 11:45 p. m. when it was delivered to the night chief dispatcher. It was then claimed that the message was placed before the second

trick dispatcher (who was dismissed from the service) or the third trick man. The second trick dispatcher consistently denied having seen it and the night chief did not state definitely that he placed the message before the second trick dispatcher. The carrier claimed the Labor Board had no jurisdiction in this dispute but the board decided that it had, and ordered the second trick dispatcher to be re-instated with seniority rights unimpaired; and that he be reimbursed for pay lost, less any amount earned in other employment.—*Decision No. 967.*

Sheet Metal Workers in M. W.

Department Included in Shop Crafts

The Federated Shop Crafts brought before the Labor Board the cases of two employees in the maintenance of way department of the Northern Pacific who were working under the master carpenter, contending that these men should be classified as sheet metal workers and should be represented by the federated shop crafts. Both men were rated as bridge carpenters, one doing tinner's work and the other pipe work in connection with water service. The road contended that these employees performed other mechanic's work as it was assigned to them from day to day. The Labor Board ruled that these men are sheet metal workers in the sense in which this term is commonly understood, and that they come properly under the jurisdiction of the Railway Employees' Department of the Federated Shop Crafts. Dissenting opinions were filed by J. H. Elliott and Horace Baker. In the dissenting opinions it is pointed out that these men have been employed in the bridge and building department for several years. The fact was also emphasized that the character of the work there and of that done in the locomotive department are entirely different and that the line of demarcation between employment in these departments has long been kept distinct. In their opinion the ruling of the Labor Board will create confusion between the work of the two departments.—*Decisions 946 and 947.*

Rules Can Be Revised Only by Agreement

In June, 1921, the Chicago Great Western announced its intention of abrogating the existing rules governing its clerical and station employees, which intention was carried out the following month. The employees state that a majority of their number are members of the Brotherhood of Railway and Steamship Clerks, etc.; that the rules promulgated were not agreed upon by the railroad and representatives of the employees, or established in accordance with the provisions of the Transportation Act; and that a conference was held between representatives of the employees and the management which the latter soon terminated with a statement that it did not propose to have another signed agreement similar to that of March, 1920. In the original submission to the Labor Board, the employees requested that the rules of the clerks' national agreement be restored, but at the hearing this request was amended to the restoration of rules of the agreement dated March 30, 1920, pending a conference. The carrier contends that it has never had any contract relations with the brotherhood in question, nor does it admit that such an organization has the privilege to legislate or make agreements for all or even a majority of the employees concerned; that a committee from the brotherhood stated in conference that it was prohibited from consenting to any changes in the existing rules, except those in the form of further concessions from the carrier; and that the committee further refused to approve a continuation of the rules that had been in effect since January 1, 1920, in the form that the management was willing to confirm, thereby forcing the latter to publish the new set of rules; which it believed to be just and reasonable. The carrier further contended that since the publication of its new set of rules there has been no indication on the part of the employees that the rules incorporated therein are unjust or unreasonable and that, therefore, a dispute within the meaning of the Transportation Act does not exist between the parties in question. In its decision the Labor Board stated that the carrier acted without authority when it published a new set of rules in lieu of the agreement of March 30, 1920, and that the matter should have first been referred to and decided upon by the Labor Board. Therefore the agreement of March 30, 1920, is still effective until changed by an agreement with the employees in the manner provided by law.—*Decision No. 963.*

Foreign Railway News

The American Monument to Brazil

Brazil will celebrate the centennial of her freedom by an international exposition to be held at Rio de Janeiro beginning September 1. The principal nations of the world will be officially represented, the United States government having appropriated \$1,000,000 for America's exhibits and official expenses. In connection with the exposition American friends of Brazil—especially those who have had commercial dealings there—are planning to give a monument to the country as a token of friendship. This monument is shown in the accompanying illustration. The large figure is called "Amicitia," the Latin word for friendship, typifying



"Amicitia"

the good feeling which exists between Brazil and our country. In one hand she bears a laurel wreath and in the other the flags of the two nations. The smaller figures represent four patriots—Washington and Lincoln of our country and Jose Bonifacio and Rio Branco of Brazil. The committee looking after the details of the presentation of this monument is made up of such men as Samuel Vaulain, C. M. Muehnic, Judge Elbert H. Gary, Newcomb Carlton, Kermit Roosevelt and others. Americans who wish to be represented among the contributors toward this project may make the necessary arrangements through John L. Merrill, president of All America Cables, Inc., 89 Broad street, New York.

Equipment and Supplies

Locomotives

NEW YORK, CHICAGO & ST. LOUIS contemplates buying about 10 locomotives.

THE CENTRAL OF BRAZIL has ordered one Pacific type locomotive from the American Locomotive Company.

THE CENTRAL OF GEORGIA has ordered 2 Mountain type locomotives from the American Locomotive Company.

THE MISSISSIPPI CENTRAL is having one locomotive repaired in the shops of the American Locomotive Company.

THE WESTERN MEAT COMPANY (Swift & Co., Chicago) has ordered one 0-6-0 type locomotive from the American Locomotive Company.

THE BOYNE CITY LUMBER COMPANY, Boyne City, Mich., has ordered one 2-6-2 saddle tank locomotive from the American Locomotive Company.

Freight Cars

THE MISSOURI PACIFIC is inquiring for 250, 50-ton ballast cars.

THE PHILADELPHIA & READING contemplates buying about 1,000 gondola cars.

THE WESTERN PACIFIC is said to be considering the purchase of a large number of refrigerator cars.

THE ST. LOUIS SOUTHWESTERN is reported to be contemplating purchasing new equipment next month.

THE ASSAM-BENGAL RAILWAYS (India) are inquiring through the car builders for 250, 12-ton box cars.

THE INDIAN STATE RAILWAYS are inquiring through the car builders for prices on 250 four-wheel steel box cars.

THE CHICAGO, MILWAUKEE & ST. PAUL is reported to be contemplating the early purchase of 2,000 refrigerator cars.

THE CHICAGO GREAT WESTERN is inquiring for 500 box cars and will have repairs made to 527 miscellaneous type box cars.

THE UNITED STATES METALS REFINING COMPANY has ordered 7 dump cars of 20 tons' capacity from the Magor Car Corporation.

THE WARASH is now inquiring for 1,500, 40-ton steel under-frame automobile box cars; also for 2,050, 50-ton gondola car bodies.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 500 box cars and 150 stock cars of 40 tons' capacity and for 100 flat cars of 50 tons' capacity.

THE NEW YORK, CHICAGO & ST. LOUIS will receive bids until June 12 for 1,000 single sheathed automobile cars and for an alternative of 1,000 double sheathed box cars.

THE BALTIMORE & OHIO, reported in the *Railway Age* of May 27 as inquiring for 500 box car bodies, has ordered 1,000 box car bodies from the Standard Steel Car Company.

THE ROXANA PETROLEUM CORPORATION, St. Louis, Mo., has ordered 25 insulated tank cars of 10 tons' capacity from the General American Tank Car Corporation. The cars will hold 8,000 gal.

THE PENNSYLVANIA SALT MANUFACTURING COMPANY, Philadelphia, has ordered 10 chlorine tank cars of 15 tons' capacity equipped with 40-ton trucks, from the General American Tank Car Corporation.

THE CHEFFAQUE & OHIO, noted in the *Railway Age* of May 13 as inquiring for 500 ventilated box cars of 40 tons' capacity, has ordered this equipment from the Newport News Shipbuilding & Dry Dock Company.

THE ERIE, reported in the *Railway Age* of May 27 as asking for prices on the repair of about 3,000 cars, will have 1,000 box cars repaired by the Standard Steel Car Company and 500 box cars repaired by the Illinois Car Company.

Passenger Cars

THE CANADIAN NATIONAL has ordered two 30-passenger gasoline motor cars from Ledoux, Jennings, Ltd., Montreal.

THE FRANKFORD ELEVATED RAILWAY, Philadelphia, Pa., reported in the *Railway Age* of May 6 as asking for bids on 50 steel passenger cars, has ordered this equipment from the J. G. Brill Company.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of May 6 as inquiring for 20 express cars and 10 coaches, has ordered this equipment from the Bethlehem Shipbuilding Corporation, Harlan Plant.

Track Specialties

THE MISSOURI PACIFIC is inquiring for 2,500 kegs of heat treated track bolts.

THE CHICAGO ROCK ISLAND & PACIFIC has placed an order with the Rail Joint Company for 10,000, 100 per cent joints.

THE MISSOURI, KANSAS & TEXAS is inquiring for 800,000 tie plates, 300,000 of which are for 66-lb. rails and 500,000 for 85 to 90-lb. rails.

Machinery and Tools

THE DETROIT UNITED RAILWAY has ordered a 36-in. lathe from the Niles-Bement-Pond Company.

THE SOUTHERN PACIFIC has ordered a 15-ton crane with 75 ft. span from the Niles-Bement-Pond Company.

THE ILLINOIS CENTRAL, in addition to its inquiry for 58 machines as reported in the *Railway Age* of June 3, is now inquiring for 17 lathes of various types, eight draw cut-shapers, eight grinders, three drill presses, three milling machines, two threading machines, two driving wheel presses, one bolt heading and forging machine, one radial drill and one combination punch and shear.

Miscellaneous

THE CHICAGO & NORTH WESTERN will receive bids until June 23 for 493 barrels of machine oils of various brands, 50,000 gallons of burning oil, approximately 200,000 gallons of kerosene and 63 cases of polar cup grease, all of which are to be supplied for a period ending December 31 of this year.

Signaling

THE DELAWARE, LACKAWANNA & WESTERN has placed an order with the Union Switch & Signal Company for automatic block signaling and electro pneumatic interlocking equipment required in connection with the East Orange elevation work now under construction between Newark, N. J., and Orange. On the three track section the middle track will be signaled for movements in both directions. The Roseville avenue mechanical interlocking will be superseded by an electro-pneumatic plant of 31 levers. All main line signals are to be color-light.

THE CHICAGO UNION STATION'S block and interlocking signals to be installed by the Union Switch & Signal Company, as reported in the *Railway Age* of May 20, page 1197, will include altogether 115 signals. All signals are to be of the position light type. The electro-pneumatic interlocking machine at the south approach will have a frame for 151 levers, 69 levers for 42 switches and 38 double slips with M. P. frogs, and 52 levers for 88 signals. At the north approach there will be a 95-lever frame; 41 levers for 39 switches and 15 double slips and 33 levers for 57 signals. The machines will have lever lights and illuminated track models of the spot-light type. Route locking is to be provided throughout with sectional release, and stick locking for all signals. All track circuits will be alternating current. The signal company will also install a complete train starting system.

Supply Trade News

A. L. Pearson, secretary of Mudge & Co., Chicago, has been appointed assistant to the president in addition to his secretarial duties.

A. D. Halporn, who has been associated with the Philadelphia sales staff of the **Combustion Engineering Corporation**, New York, for some time, has now become a member of its New York sales force.

C. E. Meyer has been placed in charge of railway sales of the railroad department recently organized by the **Parish & Bingham Corporation**, Cleveland, Ohio. This new department

has been formed for the purpose of manufacturing pressed steel car parts and other railway specialties. **P. O. Krehbiel**, a former engineer of the same corporation, has been appointed chief engineer of the railroad department. Mr. Meyer started in the railway supply business in 1911 with the **National Malleable Castings Company** at Cleveland. He left the employ of that company in February, 1913, to enter the stores department of the **Damascus Brake Beam Company**, Cleveland. With the exception of

eighteen months in the military service in this country and in France, he has been in the continuous service of the latter company in its purchasing, operating and sales departments until his recent appointment as above noted.

Harry B. Snyder, who recently returned from the foreign branch service of the **Baldwin Locomotive Works**, has been appointed assistant to the president of the **Pilliod Company**, 30 Church street, New York City.

The **United Alloy Steel Corporation**, Canton, Ohio, recently bought the **Canton Sheet Steel plant**. The plant will have a capacity of around 60,000 tons of ingots a month. This company's products now include common and alloy steel, blooms, slabs, billets, plates, bars, rods, sheets and anti-corrosive **Toncan iron**.

Frank Phalen, manager of sales of the **New York district** for the **Republic Iron & Steel Co.**, for the past 15 years, has resigned to associate himself with his brother **Charles G. Phalen** in the firm of **Phalen & Co.**, 342 Madison avenue, New York City. This firm handles railway equipment and specialties, also iron and steel products.

The **Firth-Sterling Steel Company**, McKeesport, Pa., has opened a branch office in **Los Angeles, Cal.**, at 336 East Third street, under **E. S. Jackman & Co.**, who will look after all of this company's business west of **Pittsburgh**. **William Ely Nelson**, Pacific Coast representative, is in direct charge of the work. **Fred J. Kuhlman**, **L. W. Mead** and **C. D. Moore** will assist Mr. Nelson.

Ralph Templeton, for several years manager of the **Whitman & Barnes Manufacturing Company's** New York office and store, will on **July 1** assume an important position in the company's executive offices in **Akron, Ohio**. Mr. Templeton entered the employ of the **Whitman & Barnes organization** in 1898 and has served it in various capacities continuously since that time. He was at first in the **Akron office**, then **Detroit representative**, and since 1910 manager of its **New York store**.

Joseph H. Perry, Jr., has been appointed **Philadelphia representative** of the **Edgewater Steel Company**, Pittsburgh, Pa. Mr. Perry will have his office in the **Finance Building**. He was for a number of years with the engineering department of the **Pennsylvania Railroad** at Pittsburgh. **M. Roy Jackson**, who was formerly vice-president in charge of the **Philadelphia office**, has resigned.

The **Pittsburgh Testing Laboratory**, Pittsburgh, Pa., has opened a sales office with a complete inspection bureau, at 1864 **Railway Exchange building**, **St. Louis, Mo.**, and has appointed **Colonel N. C. Hoyles** as district manager. He is a graduate of **Queens University**, and took a post-graduate course at the **University of Toronto**. In 1908 he entered the service of this company as an inspector at its **Birmingham office** and in 1912 was promoted to manager of that office. Two years later he was transferred to the **Vancouver office**; and at the breaking out of the war, he entered the service of the **Canadian Army**, serving with the **British Pioneer Engineers Corps** in France. He received decorations from both the **French and British governments**, and upon his release from the Army in 1919, he was appointed assistant sales manager at **Cleveland**. Since that time he has been consecutively assistant sales manager at **New York** and manager at **Cincinnati**, until his appointment to the new position above mentioned.

W. B. Murray, chief engineer of the **Miller Train Control Corporation**, with headquarters at **Danville, Ill.**, has been elected vice-president of that organization in addition to his present office. Mr. Murray was born at **Dunkirk, N. Y.**, on **August 5, 1875**. He entered railroad service in 1893 and was successively a fireman and engineer of the **Portland Mt. Tabor Railway**, **Portland, Ore.**, until 1897. From that date until 1899 he was engaged in engineering studies at **New Haven, Conn.** In 1900 he entered the service of the **Hill & Miller Electrical Company**, **Washington, D. C.**, as construction engineer. Two years later he became chief engineer of **Palais Royal** and in 1905 he

was general manager of the **Murray Engineering & Construction Company**, while from 1907 to 1911 he was a consulting engineer. He first became connected with the **Miller Train Control Corporation** in 1909, and since 1911 he has devoted his entire time to this organization.

Federal Trade Commission Opposes Steel Merger

The **Federal Trade Commission** has issued a formal complaint against the **Bethlehem Steel Corporation** and the **Lackawanna Steel Company** charging that the merger of the two companies will constitute an unfair method of competition in that it contains a dangerous tendency unduly to hinder competition and restrain commerce. The commission has reported to the Senate that the details of the plan are being carefully followed and so soon as the commission is in possession of sufficient information it will make a further report as to the proposed merger of other steel companies.

Obituary

I. B. Lesh, general superintendent of the **Railway Materials Company**, Chicago, with headquarters at **Toledo, Ohio**, died in that city on **May 22**.

Isaac Joseph, who was the founder of the **Edna Brass Manufacturing Company**, **Cincinnati, Ohio**, and its president for over 20 years, died on **May 23**.



C. E. Meyer



W. B. Murray

Railway Construction

AMERICAN RAILWAY EXPRESS.—This company has called for bids for the construction of a brick building at Waukegan, Ill., to cost approximately \$12,000.

BALTIMORE & OHIO.—This company has awarded a contract to the Vang Construction Company, Cumberland, Md., for the construction of a girder bridge at Gary, Ind., to cost approximately \$50,000.

BOSTON & ALBANY.—This company is contemplating the rebuilding of 17 culverts along its line. The company has recently completed a first-aid building at its Allston, Mass., shops, an additional baggage room at Natick, Mass., and additional accommodations for express traffic at Brookline, Mass. Steel trusses to carry air hoists for steel coach work have been installed at the Allston shops and a gas pumping plant has been installed at Charlton, Mass. A new water line and a new steam line have been put in at West Springfield, Mass., and a new tie yard at the same point. A new rest room, locker room and machine shop have been built at North Adams Jct. and a new caller's office and caboose supply store at Rensselaer, N. Y. An additional well has been provided for locomotive water supply at Chatham, N. Y. A new house and pit for a heavy track scale are being installed at Beacon Park yard.

CANADIAN PACIFIC.—This company has awarded a contract to the John Hayman & Sons Company, London, Ont., for the construction of a new freight shed and office building at Windsor, Ont. The office portion of the building will be 40 ft. by 60 ft. and the freight shed portion 40 ft. by 304 ft. The building will rest on concrete foundations and a basement will be provided under the office structure. The trucking and office floors will be finished entirely with hard maple and the roof throughout will be of tar and gravel.

CANADIAN NATIONAL.—This company closed bids on May 31 for the construction of a cast-iron pipe line three miles long at Kindersley, Sask., and for the construction of a four-mile line revision on the Grand Trunk Pacific between Ansell, Alta., and Bickerdike; also for a four-mile connection between the Bashaw and Battle River subdivisions near Camrose, Alta., and for a two-mile connection between the Viking and Battle River subdivisions at Ryley, Alta.

CHESAPEAKE & OHIO.—This company is calling for bids for the construction of a five-stall brick addition to its roundhouse at Peru, Ind., to cost approximately \$30,000.

CHESAPEAKE & OHIO.—This company is calling for bids for the construction of terminal facilities at Peach Creek, W. Va., involving a five-stall engine house addition, a shop and store-room and a power house.

CHICAGO, BURLINGTON & QUINCY.—This company will partially replace this season its bridge over the Platte river near Oreapolis, Neb., with a steel and concrete structure to cost about \$400,000, the steel for which has been ordered from the American Bridge Company. The company has awarded a contract to B. J. Martin, Billings, Mont., for the construction of station extensions at Thermopolis, Wyo., as reported in the *Railway Age* for June 3.

CHICAGO UNION STATION.—This company, which was reported in the *Railway Age* of May 27 as calling for bids for the construction of the first section of the head house of its station along with other work, has awarded the contract for this work to the R. C. Wieboldt Construction Company, Chicago, and is calling for bids for the construction of the superstructure of the power plant.

COLORADO & SOUTHERN.—This company has obtained authority from the Interstate Commerce Commission and will undertake in the near future the construction of an extension of its Wichita Falls and Oklahoma line north from Iyers, Tex., a distance of 13.3 miles, to Waurika, Okla., where a connection will be made with the Chicago, Rock Island & Pacific to provide a shorter

route for traffic into that section of the country tributary to Wichita Falls.

DELAWARE & HUDSON.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 500-ton, two-pocket, four-track, automatic electric, reinforced concrete locomotive coaling station and sanding plant at South Junction, near Plattsburg, N. Y., this plant to provide overhead coal crushing facilities and to cost approximately \$50,000.

DELAWARE, LACKAWANNA & WESTERN.—This company has undertaken the elimination of a number of grade crossings on its Black Rock branch.

GREAT NORTHERN.—President Budd of this company is reported to have announced plans to electrify the company's lines in the Rocky mountains, the work probably not to begin until 1924.

GULF PORTS TERMINAL.—The Interstate Commerce Commission, which on August 18, 1921, denied this company's application for a certificate authorizing an extension in Baldwin and Mobile counties, Ala., has reopened the proceeding at the request of the Alabama Public Service Commission and has dismissed the case on the ground that no certificate is required. It appears that the construction of the proposed extension was begun several years ago and that by 1914 the clearing, grubbing and grading on 18 miles from the track end to the east side of Mobile Bay had been done and piles for trestles had been driven. Various delays were encountered which prevented the completion but, the report says, there is nothing to indicate that the construction of the extension was ever definitely abandoned.

ILLINOIS CENTRAL TERMINAL.—This company has awarded a contract to the Great Lakes Dredge & Dock Company, Chicago, for the construction of an earth filled bulkhead to extend 435 ft. into Lake Michigan from the present shore line opposite Twenty-third street and on the center line of the proposed South Park boulevard viaduct, to the property line acquired by its company from the city of Chicago pursuant to its electrification program. This bulkhead to involve the placing of about 100,000 yards of excavation from the lake bottom and to permit in conjunction with an extension to be made by the city the filling in of all submerged property acquired from the city.

ILLINOIS CENTRAL.—This company is asking for bids for the installation of a mechanical hump and track scale, including a scale house and foreman's house, at Centralia, Ill., the work to cost approximately \$30,000.

NASHVILLE, CHATANOOGA & ST. LOUIS.—This company, jointly with the Mobile & Ohio, is receiving bids for a brick and stucco passenger station at Union City, Tenn., to cost approximately \$20,000.

ST. LOUIS-SAN FRANCISCO.—This company has awarded a contract to the T. S. Leake Construction Company, Chicago, for the construction of a passenger station at Jennings, Okla., to cost approximately \$12,000.

YAZOO & MISSISSIPPI VALLEY.—This company is accepting bids for the raising of its freight house at Vicksburg, Miss., including some filling and the placing of concrete team pavements, the total work to cost approximately \$30,000.

THE BOSTON & ALBANY has completed the new subway at the station at Springfield, Mass., and it was put in service on June 5. The subway connects the two stations on the north and south sides of the tracks, and has stairways leading to the three passenger platforms used by the trains at this station. The subway is eight feet in height and ten feet in width, and is constructed as a solid timber box, which has been waterproofed to keep the water out, the water being taken care of by a complete system of drainage below, so that it should be dry at all times. The timber box is plastered on metal lath on the inside, with an air space behind the plaster. The new subway is reached by stairs from each of the three platforms. The stairs are easy—two short flights in each stairway, and are equipped with Aluminum anti-slip treads. The walls and ceiling are of cement plaster and the floor is of asphalt. The subway is lighted by electricity. The tracks are carried over the subway on an independent steel structure, which takes the weight entirely off the subway. The subway was built by the New England Construction Company, Springfield.

Railway Financial News

ATLANTIC COAST LINE.—Asks Authority to Acquire Control.—This company has filed an application with the Interstate Commerce Commission which has been set for a hearing for authority to acquire the Rockingham Railroad, which extends from Gibson to Rockingham, N. C., by purchase of more than 50 per cent of its stock.

CENTRAL RAILROAD OF NEW JERSEY.—Annual Report.—The annual report issued this week shows the following corporate income account for the year ended December 31, 1921:

	1921	1920
Operating revenues	\$52,660,998	\$45,151,049
Operating expenses	43,621,696	47,180,812
Net operating revenue	9,039,301	Def. 2,029,763
Non-operating income	21,652,817	7,421,490
Total income	30,692,118	5,391,727
Tax accruals	3,017,327	2,997,392
Rent for leased roads	2,329,646	1,962,685
Interest on funded debt	2,906,888	2,460,500
Net income	21,336,232	Def. 5,228,451
Dividends	3,841,152	2,743,680
Balance for the year	17,514,080	Def. 5,272,161

*Ten months ended Dec. 31.

CHEESAPEAKE & OHIO.—Annual Report.—The income account for the year ended December 31, 1921, follows:

	1921	1920
Operating revenues:		
Freight	\$67,367,983	\$72,433,294
Passenger	11,739,627	11,814,187
Total operating revenues, including other	83,687,958	90,190,745
Operating expenses:		
Maintenance of way and structures	12,170,021	12,850,938
Maintenance of equipment	20,023,122	24,579,561
Traffic	890,518	690,362
Transportation	31,427,435	37,363,046
General	1,983,073	1,850,383
Total operating expenses, including other	66,603,077	77,744,521
Net operating revenue	17,084,881	12,446,224
Railway tax accruals	2,682,120	2,997,720
Railway operating income	14,382,012	9,446,264
Net railway operating income	13,660,926	11,158,326
Corporate net railway operating income	13,660,926	14,259,189
Gross income	14,781,677	16,160,773
Interest on debt	9,691,402	9,953,407
Total deductions from gross income	10,589,075	10,174,314
Net income	4,192,601	5,986,458

CHICAGO & NORTH WESTERN.—Asks Authority for Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to assume liability for \$5,250,000 of 15-year, 5½ per cent equipment trust certificates for the purchase of \$7,025,637 of equipment, including 1,250 box cars, 500 stock cars, 500 flat cars, 250 refrigerator cars, 250 gondolas, 300 Hart convertible cars, 20 freight locomotives, 10 passenger locomotives, and 20 switching locomotives. The company expects to invite bids for the certificates and to sell them at not less than 97½.

CHICAGO & WESTERN INDIANA.—New Director.—Franklin G. Robbins has been elected a director to succeed A. E. Wallace.

CHICAGO JUNCTION.—Commission Asked to Modify Order.—The trunk lines entering Chicago that protested against the acquisition by the New York Central of the Chicago Junction and the Chicago River & Indiana have filed a petition with the Interstate Commerce Commission asking for a modification of its recent order authorizing the acquisition, asking the commission to find specifically whether the order was issued under paragraphs 18 to 20 of Section 1, or under paragraph 2 of Section 5 of the Interstate Commerce Act. They also asked a finding as to whether the acquisition involves the consolidation of the carriers into a single system for ownership and operation and object because no certificate of convenience or necessity was included with the report.

CHICAGO UNION STATION.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$6,150,000 of first mortgage 5 per cent gold bonds guaranteed by the Chicago, Burlington & Quincy, Pittsburgh, Cincinnati, Chicago & St. Louis and Chicago, Milwaukee & St. Paul. These bonds have been sold subject to the commission's approval at 97.

ERIE.—Annual Report.—The corporate income statement for the year ended December 31, 1921, follows:

	1921	*1920
Operating revenues	\$113,539,098	\$49,066,924
Operating expenses	108,157,156	43,931,676
Net from railway operations	8,381,942	5,135,249
Railway tax accruals	3,738,449	1,204,268
Net hire of equipment and joint facility rents	4,600,588	3,923,235
Net railway operating income	2,466,891	634,615
Total compensation, guaranty and net railway operating income	2,133,697	3,288,620
Total non-operating income		13,812,064
Gross income	14,682,032	4,708,919
Deductions from gross income	16,815,729	18,516,593
Net income	14,123,344	14,078,287
Applied to sinking funds	2,694,425	4,438,586
Surplus	1,099,171	9,701,015
	1,595,254	3,462,570

*Operating results, Sept. 1 to Dec. 31.

ERIE.—Asks Authority for Equipment Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to guarantee an issue of \$4,500,000 of 15-year 5½ per cent equipment trust certificates for the reconstruction of 5,000 box cars, in accordance with an agreement with E. T. Stotesbury and the Commercial Trust Company of Philadelphia.

FLORIDA EAST COAST.—Annual Report.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Operating revenues:		
Freight	\$7,828,835	\$7,825,592
Passenger	4,010,329	2,499,196
Total operating revenues, including other	13,579,109	13,701,171
Operating expenses:		
Maintenance of way and structures	3,002,692	2,151,915
Maintenance of equipment	2,518,669	2,499,196
Traffic	122,273	122,273
Transportation	156,683	156,683
General	5,112,881	5,467,248
Total railway operating expenses	335,891	337,097
Net from railway operations	11,243,218	10,749,369
Railway tax accruals	2,360,474	2,583,622
Railway operating income	805,448	597,897
Total non-operating income	1,555,374	2,330,236
Gross income	442,789	1,161,822
Interest on funded debt	1,998,163	3,492,058
Total deductions from gross income	583,833	592,363
Net income	1,231,459	1,281,062
Income balance transferred to profit and loss	766,704	2,210,996
Net profit and loss—federal profit and loss for 1920	766,705	2,210,996
Net profit and loss—corporate	766,704	1,387,708

ILLINOIS CENTRAL.—Authorized to Issue Common Stock.—The Interstate Commerce Commission has authorized an issue of \$10,929,600 of common stock in conversion of a like amount of preferred stock, the issue of which was authorized by the commission's order of May 23. The preferred stock will contain a provision entitling the holder to convert it at his option into common stock after September 1 on the basis of share for share.

INTERNATIONAL & GREAT NORTHERN.—Operating Study.—See article on another page of this issue entitled "Reorganized I. & G. N. Will Need Much Equipment."

LONG ISLAND.—Authorized to Issue Equipment Trust Certificates.—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of \$980,000 of equipment trust certificates in connection with the procurement of 50 passenger cars.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Six Months' Guaranty Certified.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period of 1920 as \$5,127,467, of which \$592,467 was still to be paid.

MISSOURI & NORTH ARKANSAS.—Operation Resumed.—See article on another page of this issue.

MOBILE & OHIO.—Authorized to Issue Equipment Notes.—The Interstate Commerce Commission has authorized an issue of \$366,000 of equipment notes in connection with the procurement of 10 Mikado locomotives.

NEW ORLEANS, TEXAS & MEXICO.—Asks Authority to Acquire Stock.—This company has applied to the Interstate Commerce Commission for approval of a contract to purchase from P. S. Sterling the stock of the Dayton-Goose Creek Railway for \$750,000 and \$250,000 of N. O. T. & M. 5 per cent income bonds.

NEW YORK CENTRAL.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for

authority to issue \$25,000,000 of refunding and improvement mortgage 5 per cent bonds, series C, to be redeemable by October 1, 1931 at 105, the proceeds to be used to retire a like amount of 10-year, 7 per cent collateral trust gold bonds dated September 1, 1920, thereby reducing the interest charge. It is desired to call the 7 per cent bonds at 105 on September 1. The company is in negotiation with J. P. Morgan & Co. for the sale of the bonds and unless the market changes expects to sell them to net not less than 90.

READING COMPANY.—New Directors.—Samuel M. Curwen, president of the J. G. Brill Company, William A. Law, president of the Pennsylvania Mutual Life Insurance Company, and Ira A. Place, a vice-president of the New York Central, have been elected directors. They succeed Hugh L. Bond, Jr., and Henry Pratt McKeane, deceased, and Albert H. Harris, resigned.

Modification of Dissolution Decree Ordered.—See *Railway Age*, June 3, 1922, page 1306.

An order has been entered by Judges Bufington and Thompson of the United States District Court at Philadelphia permitting the Continental Insurance Company and the Fidelity-Phoenix Fire Insurance Company of New York to withdraw their petitions filed December 9, 1921, to set aside the sale by the Central Railroad of New Jersey of the Lehigh & Wilkes-Barre Coal Company stock to the Reynolds syndicate, under the Reading dissolution plan. The insurance companies had asked leave to withdraw in a motion they filed February 28, 1922. The decree also provides that the Central of New Jersey and representatives of the Reynolds syndicate be given ten days in which to file answer to the Starr petition.

TENNESSEE, ALABAMA & GEORGIA RAILWAY.—Asks Authority to Issue Securities.—This company, which has been organized to take over the property of the Tennessee, Alabama & Georgia Railroad, has applied to the Interstate Commerce Commission for authority to issue \$400,000 of common stock and \$400,000 of preferred stock.

TOLEDO, ST. LOUIS & WESTERN.—Annual Report.—The income account for the year ended December 31, 1921, follows:

	1921	1920
Average miles of road operated	454	454
Operating revenues:		
Freight	\$8,737,449	\$10,766,900
Passenger	365,358	461,017
Total, including other	9,503,970	11,758,921
Operating expenses:		
Maintenance of way and structures	1,531,323	2,317,092
Maintenance of equipment	1,966,428	2,371,601
Traffic	243,932	178,056
Transportation	1,383,736	4,425,344
General	194,390	201,312
Total operating expenses	7,319,662	9,492,917
Net revenue from railway operations	2,184,908	2,265,804
Railway tax accruals	338,369	350,150
Railway operating income	1,746,432	1,915,654
Total non-operating income	490,647	2,261,091
Gross income	2,237,079	4,176,283
Interest on funded debt	697,679	*1,146,228
Total deductions from gross income	1,093,088	3,814,807
Net income	1,143,991	361,476
Income applied to other reserve funds	700	.....
Income balance transferred to credit of profit and loss	1,143,290	361,476

*Includes interest on A. & B. sold bonds of 1917, amounting to \$461,080 defaulted.

TOLEDO TERMINAL.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue and sell to its proprietary lines \$321,000 of 4½ per cent first mortgage gold bonds at 91.78.

VIRGINIA & WESTERN.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$1,500,000 of first mortgage 5 per cent 50-year gold bonds guaranteed by the Virginian, the proceeds to be used to pay for the construction of a line now practically completed from Virvest to Glen Rogers, W. Va., 14.45 miles, now being operated by the Virginian.

Treasury Payments to Railroads

Since last announcement, dated May 1, 1922, payments under Sections 204, 209, 210 and 212 of the Transportation Act of 1920, as amended, have been made by the Treasury as follows:

(Continued on page 1367)

Annual Report

Thirty-eighth Annual Report of the Southern Pacific Company and Proprietary Companies for the Year Ended December 31, 1921

**SOUTHERN PACIFIC COMPANY
REPORT OF THE BOARD OF DIRECTORS**

New York, N. Y., June 1, 1922.

The Stockholders of the Southern Pacific Company:
Your Board of Directors submits this report of the operations and affairs of the Southern Pacific Company and of its Proprietary Companies for the year ended December 31, 1921.

TRANSPORTATION OPERATIONS

As stated in last year's report, your properties were operated by the Director General of Railroads during the first two months of 1920, and by the Company during the last ten months of that year. In the following table is shown which shows the net railway operating income for the year 1921 compared with that for the year 1920, the 1920 figures include the results from operation for the entire year, regardless of the change in control.

	Year Ended December 31, 1921	Year Ended December 31, 1920*	Increase Decrease	Pct.
Average miles of road operated	41,187.90	41,151.68	36.22	.1
RAILWAY OPERATING REVENUES:				
Freight	\$11,460,617.17	\$18,141,634.10	\$-6,680,976.93	1.00
Passenger	6,443,511.17	7,701,617.76	\$-1,258,106.59	11.52
Mail and express	11,435,644.4	11,660,156.2	\$-224,511.8	17.62
All other transportation	5,618,561.16	5,074,029.84	\$644,531.32	11.12
Total	6,951,143.55	8,347,711.13	\$-1,396,567.58	16.59
Operating expenses:				
Maintenance of way and structures	108,982.79	193,193.51	\$-84,210.72	57.73
Maintenance of equipment	36,311.34	50,987.11	\$-14,675.77	91.67
Traffic				
Transportation				
General				
Total	\$18,044,861.31	\$26,143,344.3	\$-8,198,533.02	4.51
Net railway operating income	\$-11,093,243.74	\$-17,795,633.17	\$6,702,389.43	37.71

12. Total maintenance	\$91,387,025.94	\$108,013,857.62	\$-16,626,831.68	15.39
13. Traffic	3,182,340.14	3,490,706.53	\$-308,366.39	19.81
14. Transportation	104,744,046.41	117,227,797.91	\$-12,483,751.50	10.65
15. Miscellaneous operations	4,153,650.67	5,609,662.74	\$-1,455,412.07	25.95
16. General	8,521,539.30	8,112,651.81	\$408,887.47	5.04
17. Transportation investment				
Credit	416,329.67	340,286.57	\$76,043.10	22.35
18. Total railway operating expenses	\$212,572,362.70	\$242,113,790.06	\$-29,541,527.27	12.20
19. Net revenue from railway operations	\$56,927,102.54	\$40,155,714.19	\$16,766,388.35	41.75
20. Railway tax accruals	\$15,539,169.20	\$14,792,063.67	\$747,405.53	5.05
21. Ineffectible railway revenues	1,345,684.09	112,945.09	\$1,232,739.00	10.29
22. Railway operating income	\$41,258,967.65	\$35,250,705.41	\$6,008,262.24	63.39
23. Equipment rents—Net	5,174,541.11	3,406,775.66	\$1,767,765.45	14.63
24. Intangible facilities—Net	156,713.00	\$58,414.37	\$98,298.63	128.07
25. Net railway operating income	\$59,616,711.11	\$41,117,344.04	\$18,500,367.07	68.67

*Credits.
The figures for the year 1921 shown in the foregoing table, do not represent the actual results from operations during the year, because the accounts, as stated, include estimates of unadjusted items, such as loss and damage claims and reparation claims, appertaining to operations during the guaranty period (March to August, 1920, inclusive). In the case of many of these items the Company's liability cannot be definitely determined in advance of final decision by State Commissions, by the Interstate Commerce Commission or by the courts. They are included in the current accounts, because the Interstate Commerce Commission decided on December 15, 1921, that the operating income accounts for the guaranty period should be closed as of December 31, 1921, and that no item would be considered in connection with the Company's claim under the guaranty provision of the Transportation Act of 1920 unless taken into the accounts as of that date upon an

actual or an estimated basis. If these guaranty period items were eliminated from the accounts, the net railway operating income for the year ended December 31, 1921, would amount to \$39,827,756.48. It should be understood, however, that, although these guaranty period items reduce the *Net Railway Operating Income*, they do not affect the *Net Income* for the year (line 56 of the income statement), because the result is a corresponding increase in our claim against the Government on account of the guaranty, which is included in the account Miscellaneous Income appearing on line No. 41 of the income statement.

The following summaries result from transportation operations for 1921 compared with 1920, also compared with the Federal control years, 1918 and 1919, and with 1917:

Operating revenues	\$266,494,365	\$282,269,504	\$239,657,272	\$221,611,206	\$193,971,490
Relative to 1917 (100)	139	146	124	114	100
Operating expenses	212,572,262	242,113,720	188,385,172	162,722,372	120,601,823
Relative to 1917 (100)	176	201	156	135	100
Net revenue from railway operations	56,922,103	40,155,712	51,271,200	58,888,834	73,369,667
Relative to 1917 (100)	78	55	70	80	100
Operating ratio, per cent.	78.88	85.77	78.61	73.43	62.18
Traffic units (ton miles plus 3 times passenger miles), thousands	17,451,417	22,010,458	20,198,015	20,836,033	20,876,908
Relative to 1917 (100)	84	105	97	100	100

Operating revenues were seriously affected by the national-wide business depression that began about the close of 1920 and continued throughout the year 1921, aggravated in your company's lines by diversion of transcontinental business, by much lower rates offered by the Panama Canal route, and by the competition on the highways of motor trucks substantially free from taxation and regulation. The traffic units handled show a decrease of 20 per cent. in the income statement, because of the result of a corresponding increase in our claim against the Government on account of the guaranty, which is included in the account Miscellaneous Income appearing on line No. 41 of the income statement.

The following summaries result from transportation operations for 1921 compared with 1920, also compared with the Federal control years, 1918 and 1919, and with 1917:

Operating revenues were seriously affected by the national-wide business depression that began about the close of 1920 and continued throughout the year 1921, aggravated in your company's lines by diversion of transcontinental business, by much lower rates offered by the Panama Canal route, and by the competition on the highways of motor trucks substantially free from taxation and regulation. The traffic units handled show a decrease of 20 per cent. in the income statement, because of the result of a corresponding increase in our claim against the Government on account of the guaranty, which is included in the account Miscellaneous Income appearing on line No. 41 of the income statement.

The following summaries result from transportation operations for 1921 compared with 1920, also compared with the Federal control years, 1918 and 1919, and with 1917:

tions were made to stem the tide of wholesale diversion of transcontinental traffic to the steamship lines operating through the Panama Canal. In 1921, the number of steamship voyages through the Panama Canal between Atlantic and Pacific ports of the United States increased 80 per cent, and the volume of freight increased 83 per cent, over the preceding year. Freight shipped by direct sailings between the Pacific Coast and Europe, and by direct sailings between Atlantic ports and trans-Pacific ports, much of which was formerly handled by transcontinental railroads, is not included in these increases. The steamship lines operating through the Panama Canal enjoy conspicuous advantages, because their rates, which are not subject to regulation by the Interstate Commerce Commission, may be freely

1921	1920	1919	1918	1917
\$266,494,365	\$282,269,504	\$239,657,272	\$221,611,206	\$193,971,490
139	146	124	114	100
212,572,262	242,113,720	188,385,172	162,722,372	120,601,823
176	201	156	135	100
56,922,103	40,155,712	51,271,200	58,888,834	73,369,667
78	55	70	80	100
78.88	85.77	78.61	73.43	62.18
17,451,417	22,010,458	20,198,015	20,836,033	20,876,908
84	105	97	100	100

changed from day to day. If these vessels are exempted from the payment of tolls, as pending legislation contemplates, their advantage will be increased at the expense of the entire country of the entire country. This competition is supplemented by barge lines operated by the Government on the Mississippi and Warrior rivers, which carry freight at reduced rates between interior points and Gulf ports in connection with the Canal steamship lines. The railroads have not made much progress toward securing a better competition for transcontinental freight, because of the unfair handicaps to which they are subjected. To make rates to or from Pacific Coast ports to secure a share of the traffic fostered by the railroads, for which the Canal steamship lines are exempted, the railroads are required by the long and short haul provision of the Interstate Commerce Law to reduce rates to the same basis as maxima at all intermediate points (where they are not necessary to meet the water competition), unless relief from that requirement is granted by the Interstate Commerce Commission, and even if such relief should be eventually granted, the railroads are subjected to the same loss of coast traffic during the many months consumed in hearings, argument, consideration, and decision. Applications made in June and August, 1921, have not yet been decided after nearly a year's delay.

Maintenance of way structures decreased \$6,266,582.67, or 12.93 per cent. Although the labor cost of maintenance was substantially decreased, the properties were satisfactorily maintained during the year. This is evidenced by the following table showing materials used in repairs and renewals in 1921 compared with 1920, and compared also with the Federal control years 1919 and 1918, when there was deficient maintenance on a part of your lines.

MATERIAL USED IN REPAIRS AND RENEWALS				
	1921	1920	1919	1918
New steel rail, miles	427.43	527.76	473.73	408.44
Ties, number	4,721,542	4,887,913	4,173,774	3,888,687
The-plates, number	4,112,875	3,169,915	3,672,221	1,910,311
Filing, linear feet	847,817	737,731	94,455	75,476
Lumber, feet b.m.	23,557,715	23,710,582	15,402,035	6,354,463

Maintenance of equipment decreased \$10,360,249.01, or 17.40 per cent. Locomotive mileage decreased 9.73 per cent, and total car mileage decreased 10.21 per cent. In the annual report for 1920 reference was made to the fact that at the close of Federal control 87.5 per cent of the company's box cars were on other railways. The deplorable condition of this equipment owing to the neglect of current repairs when away from home during Federal control was not realized until we regained possession of our cars in the fall of 1921. The following table shows the condition of freight equipment at the beginning and at the end of Federal control, on September 1, 1921, by which time most of our cars had been returned; at the close of 1921; and at May 1, 1922:

	May 1, 1922	Dec. 31, 1921	Sept. 1, 1921	Mar. 1, 1921	Dec. 31, 1920
All freight cars on line (including foreign and private)	63,545	67,463	66,411	69,335	63,702
All freight cars in shops or awaiting repairs	5,069	6,158	8,341	2,996	2,260
Per cent. of all freight cars in shops or awaiting repairs, to all cars on line	8.10%	9.13%	12.56%	4.32%	3.55%

Traffic expenses increased \$691,633.61, or 19.81 per cent, due to restoration of traffic agencies and increased activity to regain traffic diverted during Federal control; the increased expenditures being effective for twelve months ending in August, 1921.

Transportation expenses decreased \$12,483,761.50, or 10.65 per cent. Train mileage decreased 7.63 per cent, but there was an increase of 6.8 per cent in the average price of fuel. The consumption of fuel per thousand ton miles (oil equivalent) on the basis of four barrels of oil to one ton of coal) showed a decrease both in passenger service and in freight service, the combined saving through greater fuel efficiency compared with previous years, amounting to \$1,458,661. The improvement in use has been constant from year to year. It was thought about a saving of \$7,973,903 in the operating expenses of that year compared with 1920. The average car load decreased 4.55 per cent, largely due to an increase in the movement of products in refrigerator cars, where the car load is light, and to a decrease because of a decrease in grade heavy commodities. For this reason, and inability to fully load cars (on account of the heavy fall freight cars, due to relocation of cars to owning lines after their dispersion, due to common cars) during Federal control, the tons of freight per train decreased 7.83 per cent, but the gross ton miles per train increased 1.36 per cent.

Miscellaneous operations decreased \$1,455,412.07, or 25.95 per cent, following decreased incidental revenues.

General expenses increased \$408,887.47, or 5.04 per cent, due to increased charges for Federal taxation work, increased accounting requirements, and allowances for pensions.

The increase in taxes for 1921 over 1920 is \$747,405.53. This increase is the result of an increase of \$1,893,052.10 in state and county taxes, due, principally to an increase in the rate of taxation on gross earnings in California from 5 1/2 per cent to 7 per cent, under the King Tax Law capital stock tax; and to a decrease of \$1,316,233.50 in Federal income and profits tax for the year 1921. The increase in this report does not press the large increase in taxes of \$747,405.53, or 5.05 per cent, over 1920 seems trivial in com-

After the return of the roads and the passage of the Transportation Act, your company joined other railway companies in applying to the United States Railroad Labor Board to readjust wages to meet changes in living costs, and to equalize wages paid by others for skilled and unskilled labor for like work in the territory in which your lines are operated. Modification was also requested of the unjust and onerous working rules of National Agreement made by General Agents of the close of Federal control, whereby unearned wages and excessive amounts for overtime were paid. These applications have been granted in part, but a great many onerous conditions remain which increase expenses compared with those previous to 1920. The Federal control agents are seeking to remedy the same. On July 1, 1921, the Labor Board rendered a decision which lowered wages about 12 per cent, reducing by more than half the increase of 22 per cent. granted May 1, 1920. According to a statement recently issued by the Labor Board, railway wages are still nearly 60 per cent. higher than they were in December, 1917 when the roads were taken over by the Government. Whether justified or not, this higher scale profoundly affects expenses compared with the cost of operation previous to Federal control. The following table shows the average monthly wages earned by specified classes of employees on Southern Pacific line under the new scale. Notwithstanding the half of 1921, compared with the same period of 1920 when higher wages were effective, and compared with wages earned in the year 1916, the year preceding the passage of the Adamson Act, which increased wages by shortening the measure of a day's work for train service employees:

AVERAGE MONTHLY WAGES EARNED BY REPRESENTATIVE CLASSES OF EMPLOYEES 6 MONTHS ENDING						
	DECEMBER 31		YEAR		RELATIVE	
	1921	1920	1916	1921	1920	1916
Engineers	\$261.77	\$316.77	\$82.00	143	174	100
Conductors	234.66	262.33	149.54	157	175	100
Firemen	194.15	231.46	110.25	176	210	100
Other trainmen	188.35	219.50	107.30	176	205	100
Mechanics	161.81	204.06	102.00	168	202	100
Carpenters	139.23	175.63	79.41	175	221	100
Clerks	136.69	151.13	84.87	161	178	100
Employees, floating equipment	110.64	120.10	71.51	155	168	100
Employees, service employees	71.53	124.51	72.34	137	175	100
Sectionmen	71.08	106.43	69.43	140	180	100
All other employees	131.22	163.60	82.97	158	197	100
Total employees	\$130.57	\$154.85	\$79.45	164	195	100

The decrease of \$12,775,138.92, equivalent to 4.53 per cent, in operating revenues, in the face of increased freight and passenger rates which became effective during the latter part of preceding year, is principally attributable to the great increase in the cost of fuel, which has resulted in a depression of business, and which is reflected in a decrease of nearly 11 per cent in the aggregate operating revenues of the principal railroads of the country.

Revenue from passenger business was further diminished by a dearth of large conventions such as were held on the Pacific Coast during the preceding year, and by a substantial increase in travel by automobiles for which money is being appropriated by the Federal and State governments for the construction of highways that usually parallel the very railroads which are handicapped to provide an alternative means of transportation.

Decrease in revenue from mail is due to a large payment by the Government for previous years, included in the year 1920, with which comparison is made.

Freight revenue has been adversely affected by the smallest cotton crop in Texas and Louisiana that has been produced in twenty years, and by reduction in the acreage of rice planted in the same states; and by reductions of rates on such important commodities as beans, canned goods, dried fruit, fruit, lumber, apples, caneloupes, and vegetables. Some of these reductions were made in deference to public sentiment, and in response to the producers' plea that they required such assistance to market their products. Other reductions were made to restore market relationships that had been disturbed by previous horizontal increase, and again other reduc-

parison with the taxes for the first four months of 1922, which amount to \$6,393,726.28, an increase of 35.76 per cent. over 1921. At this rate taxes for the year 1922 will aggregate \$19,181,178.84, or 93 per cent. of the dividends distributed to stockholders for 1921. Taxes amounted to \$8.60 for every hundred dollars of freight revenue during the year 1921, and to \$12.42 for every hundred dollars of freight revenue during the first four months of 1922.

The total Railway Tax Accruals for the year consumed \$15,539,469.20, or 27.3 per cent., of the \$56,922,102.54 of Net Revenue from Railway Operations. With an increase of 138.76 per cent. in the miles of road operated over the miles operated in 1921, the first year of operation, taxes have increased \$14,679,964.14, or 1,707.96 per cent.

The heavy passenger travel in motor vehicles has introduced an element of great danger at railway grade crossings, as shown in the following state-

ment giving the casualties to persons in automobiles at crossings on your company's steam lines:

	1921	1920
Number of persons killed.....	76	57
Number of persons injured.....	360	293

Several states now require motorists to stop before attempting to cross railroad tracks.
It is gratifying to observe the rapid recovery from the conditions that prevailed during Federal control towards normal conditions of safety in the operation of your property in 1921, the first complete year of operation after Government control. In the three years of the test period ending in 1917, one fatality to employes in train accidents occurred to every 8,333,333 locomotive miles run; in the years of Federal control, to wit, 1918 and 1919, the fatalities were one to every 6,250,000 and 2,000,000 locomotive miles run

INCOME ACCOUNT

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
(Excluding offsetting accounts)

	Year Ended December 31, 1921	Year Ended December 31, 1920	+Increase -Decrease	Per Cent
OPERATING INCOME				
Railway Operating Revenues:				
1. Freight	\$181,409,691.87	\$157,220,043.42	+ \$24,189,648.45	15.39
2. Passenger	63,442,251.77	61,607,126.86	+ 1,835,124.91	2.98
3. Mail	3,617,146.23	3,764,550.44	- 147,404.21	3.92
4. Express	8,318,458.19	6,054,466.52	+ 2,263,991.67	37.39
5. All other transportation.....	5,638,563.36	4,639,538.20	+ 999,025.16	21.53
6. Incidental	6,958,343.55	7,035,752.12	- 80,408.57	1.14
7. Joint facility—Credit	166,168.78	81,889.56	+ 84,279.22	102.92
8. Joint facility—Debit	56,257.82	24,874.94	+ 31,382.88	126.16
9. Total railway operating revenues.....	\$269,494,365.33	\$240,381,492.18	+ \$29,112,873.15	12.11
Railway Operating Expenses:				
10. Maintenance of way and structures.....	\$42,198,382.59	\$41,938,579.91	+ \$260,302.68	1.62
11. Maintenance of equipment.....	49,189,143.35	49,921,811.29	- 733,667.94	1.47
12. Total maintenance	\$91,387,025.94	\$91,860,391.20	- \$473,365.26	.52
13. Traffic	4,182,340.14	3,097,893.12	+ 1,084,447.02	35.01
14. Transportation	104,744,036.41	100,486,655.12	+ 4,257,381.29	4.24
15. Miscellaneous operations	4,153,650.67	4,830,833.96	- 677,183.29	14.02
16. General	8,521,536.30	7,247,152.52	+ 1,274,383.78	17.58
17. Transportation for investment—Credit.....	416,329.67	336,066.68	+ 80,262.99	23.88
18. Total railway operating expenses.....	\$212,572,262.79	\$207,186,859.24	+ \$5,385,403.55	2.60
19. Net revenue from railway operations.....	\$56,922,102.54	\$33,194,632.94	+ \$23,727,469.60	71.48
20. Railway tax accruals.....	15,539,469.20	13,006,696.07	+ 2,532,773.13	19.47
21. Uncollectible railway revenues.....	124,365.69	95,346.40	+ 29,019.29	30.65
22. Equipment rents—Net	5,154,923.15	4,910,345.13	+ 244,578.02	26.95
23. Joint facility rents—Net	156,732.60	749,269.98	- 592,537.38	131.91
24. Net railway operating income.....	\$35,946,791.14	\$16,524,941.33	+ \$19,421,849.81	117.53
25. Revenues from miscellaneous operations.....		\$2,581,763.93	- \$2,581,763.93	.....
26. Expenses of miscellaneous operations.....		1,342,255.38	- 1,342,255.38	.....
27. Net revenues from miscellaneous operations.....		\$1,239,508.55	- \$1,239,508.55	.....
28. Taxes on miscellaneous operating property.....		46,346.16	- 46,346.16	.....
29. Miscellaneous operating income.....		\$1,193,162.39	- \$1,193,162.39	.....
30. Total operating income.....	\$35,946,791.14	\$17,178,103.72	+ \$18,228,687.42	102.88
NONOPERATING INCOME				
31. Income from lease of road—Standard return.....	\$852,740.80	\$8,043,288.03	- \$7,190,547.23	89.40
32. Other income from lease of road.....	45,436.51	34,705.27	+ 10,731.24	30.92
33. Miscellaneous rent income.....	1,153,623.15	809,388.70	+ 344,234.45	42.46
34. Miscellaneous nonoperating physical property.....	370,127.59	378,830.41	- 8,702.82	3.65
35. Separately operated properties—Profit.....	49,561.01	31,269.12	+ 18,291.89	58.50
36. Dividend income.....	7,997,537.76	5,251,333.94	+ 2,746,203.82	52.28
37. Income from funded securities—Bonds and notes—Affiliated and other companies.....	2,339,489.76	1,921,964.07	+ 417,525.69	21.72
38. Income from funded securities—Investment advances—Affiliated companies.....	217,658.79	389,326.77	- 171,667.98	44.08
39. Income from unfunded securities and accounts.....	1,365,145.38	1,370,528.13	- 5,382.75	43.39
40. Income from sinking and other reserve funds.....	803,055.66	774,710.08	+ 28,345.58	3.73
41. Miscellaneous income—U. S. Government guaranty.....	3,648,602.47	20,490,427.50	- 16,841,825.03	82.19
42. Other miscellaneous income.....	*91,393.07	*401,949.71	- 310,556.64	122.74
43. Total nonoperating income.....	\$19,350,585.81	\$39,892,611.94	- \$20,542,026.13	51.49
44. Gross income.....	\$55,297,376.95	\$57,610,715.66	- \$2,313,338.71	4.02
DEDUCTIONS FROM GROSS INCOME				
45. Rent from leased roads.....	\$204,436.26	\$226,277.70	- \$21,841.44	9.65
46. Miscellaneous rents.....	639,535.64	600,925.75	+ 38,609.89	6.42
47. Miscellaneous tax accruals.....	680,000.91	838,167.78	- 158,167.87	18.89
48. Interest on funded debt—Bonds and notes.....	20,404,924.12	22,533,488.13	- 2,128,564.01	9.45
49. Interest on funded debt—Non-negotiable debt in affiliated companies.....	2,675,257.71	136,478.00	+ 1,938,779.71	.....
50. Interest on unfunded debt.....	159,432.30	51,301.51	+ 108,130.79	210.76
51. Amortization of discount on funded debt.....	100,490.96	169,328.14	- 68,837.18	40.62
52. Maintenance of investment organization.....	25,368.30	24,789.93	+ 578.37	2.33
53. Miscellaneous income charges.....	389,189.10	959,580.09	- 570,390.99	59.44
54. Total deductions from gross income.....	\$24,678,599.30	\$25,540,441.03	- \$861,841.73	3.37
55. Net income.....	\$30,618,777.65	\$32,070,274.63	- \$1,451,496.98	4.53
DISPOSITION OF NET INCOME				
56. Income applied to sinking and other reserve funds.....	\$1,081,559.39	\$1,053,945.19	+ \$27,614.20	2.62
57. Income appropriated for investment in physical property.....	25,000.00	.....	+ 25,000.00	.....
58. Total appropriations.....	\$1,101,559.39	\$1,053,945.19	+ \$47,614.20	4.71
59. Income balance transferred to credit of profit and loss.....	\$29,515,218.26	\$31,016,329.44	- \$1,501,111.18	4.84
60. Per cent of net income on average amount of outstanding capital stock of Southern Pacific Company:				
(a) Railway income.....	8.11	7.53	-	1.41
(b) Other income.....	6.11	3.04	-	.23
(c) Total.....	8.91	10.57	-	1.64

*Debit. †Credit. In arriving at the figures for per cent. of railroad income and per cent. of other income on outstanding capital stock, an estimated apportionment of net income was made by allocating, as nearly as possible, the items relating solely to that class, the remaining items being apportioned between the two classes on an estimated basis.

respectively; in 1921 they were one to every 14,333,333 locomotive miles run. Not a passenger was killed in a train accident in the three test years, but under Government control the number killed was one to every 3,703,000 locomotive miles run in 1918, and 1 to every 10,000,000 locomotive miles run in 1919. In 1921 the number was only 1 to every 50,000,000 locomotive miles run.

The extent to which maintenance of way and equipment was neglected on the lines in Louisiana and Texas during Federal control is shown thus:

During the three years of the test period the number of derailments caused, principally by defective track and equipment was 1 to every 280,000 locomotive miles run; during 1918 and 1919, under Federal control, it was 1 to every 150,000 and 96,000 locomotive miles run respectively; in 1921, the first entire year of private operation, it fell to 1 to every 205,000 locomotive miles run.

The attention of the Federal Railroad Administration was directed to the neglect of maintenance and the unsafe condition of these lines by your corporate officers and by the Louisiana Railroad Commission, but without substantial remedy.

OPERATING INCOME

As stated in last year's report, your properties, during the months of January and February, 1920, were operated by the U. S. Railroad Administration under the Federal Control Act, and for that period your Company received the standard return rental as fixed in the agreement with the Director General of Railroads. During the ten months, March 1 to December 31, 1920, your properties were operated by your Company, and the amounts reported in the column headed "Year Ended December 31, 1920" (lines 1 to 24), represent the operating results for those ten months. The operating results for the entire year 1920, regardless of the change in control compared with the operating results for the year 1921, are shown in the table appearing at the beginning of the report.

The \$1,193,162.39, shown in the 1920 column as Miscellaneous Operating Income (line No. 39) represents the operating income for January and February, 1920, of the Fuel Oil Department which was sold to the Southern Pacific Land Company on February 29, 1920.

NONOPERATING INCOME

The item of \$8,043,288.03, shown in the 1920 column as Income from Lease of Road—Standard Return (line No. 31), represents the proportion for January and February, 1920, of the standard return rental as fixed in the agreement with the Director General of Railroads. For the year 1920, \$852,740.80, shown in the 1921 column (line No. 31), is made up of \$1,859,646.63, representing the approximate amount of additional compensation for the use of additions and betterments, new equipment, and road extensions completed during the period of Federal control, less \$1,006,905.83, representing the amount deducted from the standard return as fixed in the agreement with the Director General of Railroads and taken into account by the Company during the period of Federal control) resulting from changes and corrections made by the Interstate Commerce Commission in the accounts for the test period which were used as the basis of the standard return.

The increase of \$343,634.45 in Miscellaneous Rent Income (line No. 33) is due, principally, to the rental received this year, from Associated Oil Company and from Pacific Oil Company, for the use of oil pipe line formerly used by the Fuel Oil Department.

The increase of \$594,617.04 in Income from Unfunded Securities and Accounts (line No. 39) represents interest on U. S. Government Certificates of Indebtedness, and income from the sale of oil properties mentioned in last year's report.

The item of \$20,490,427.50, shown in the 1920 column as Miscellaneous Income—U. S. Government Guaranty (line No. 41) represents the estimated amount due from the Government, under its guaranty, for the six months ended August 31, 1920, such estimate having been based on figures available at December 31, 1920, as explained on page 8 of last year's report. The item \$3,648,602.47 shown in the 1921 column (line No. 41) is made up of \$2,380,965.34, representing estimates of unaudited items taken into account this year for the year ending on page 7, less \$2,323,362.87, representing an adjustment in the amount of the Government guaranty as booked to December 31, 1920, due to the adjustment made by the Interstate Commerce Commission in the amount of the standard return rental, as explained in the third paragraph above.

The decrease in Other Miscellaneous Income (line No. 42) is the result, principally, of charges made during the year by the U. S. Railroad Administration representing adjustments on account of revenues prior to January 1, 1918, credited to the Company during the period of Federal control.

DEDUCTIONS FROM GROSS INCOME

The decrease of \$2,128,564.01 in Interest on Funded Debt—Bonds and Notes (line No. 48), is made up of a decrease of \$2,024,614.79 resulting from the conversion of Southern Pacific Company Four and Five Per Cent Twenty-Year Convertible bonds into capital stock; a decrease of \$278,912.15 resulting from the retirement of bonds and equipment trust certificates maturing during the year; a decrease of \$85,757.83 resulting from the retirement of bonds through sinking funds; a decrease of \$294,894.17 resulting from the acquisition of bonds by Southern Pacific Company and Proprietary Companies; and an increase of \$504,583.33, resulting from a full year's interest, this year, on Southern Pacific Equipment Trust Certificates, Series E, issued as of June 1, 1920.

The increase of \$1,938,744.71 in Interest on Funded Debt—Nonnegotiable Debt to Affiliated Companies (line No. 49) represents, principally, interest on deposits with Southern Pacific Company made by Southern Pacific Land Company, resulting from the sale of oil properties by the latter company to the Pacific Oil Company.

The increase of \$108,128.79 in Interest on Unfunded Debt (line No. 50) is made up, principally, of interest on money borrowed before the proceeds from the sale of the oil properties were available, and of interest allowed on freight claims.

The decrease of \$68,737.18 in Amortization of Discount on Funded Debt (line No. 51) is the result of the conversion, during the year, of \$17,929,500 of Southern Pacific Company Five Per Cent Twenty-Year Convertible bonds into common stock, and of the retirement of \$1,841,000 of Southern Pacific Equipment Trust certificates maturing during the year, the unextinguished discount thereon having been charged to Prepaid Expenses.

The decrease of \$570,392.99, in Miscellaneous Income Charges (line No. 53) is the result, principally, of a decrease in the charges to that account for lap-over items of expenses appertaining to the period prior to January 1, 1918.

The dividends paid for 1921 were appropriated from the profit and less surplus, and therefore do not appear in the income account. They amount to \$20,639,249.82, an increase, compared with dividends paid for 1920, of \$2,428,653.00. This increase is caused by the dividends paid on \$17,939,500 of capital stock purchased this year against a like amount of Five Per Cent Convertible bonds retired, and a full year's dividends this year on capital stock issued last year against the retirement of such convertible bonds. The figures for this year include \$54.00 and those for last \$316.00, representing dividends on stocks of Proprietary Companies held by the public.

The Southern Pacific Company does not take into its income the interest on advances made by it for the construction of new railways by companies incorporated in its interest, or for the acquisition of new lines, until the

principal included in the cost of such railways is the amount authorized to be charged to such cost under the accounting regulations of the Interstate Commerce Commission.

On December 31, 1921, the principal of advances to the Southern Pacific Railroad Company of Mexico amounted to \$38,742,150.34. The interest accruing on these advances has not been taken into the income of the Southern Pacific Company.

CAPITAL STOCK

The capital stock of the Southern Pacific Company outstanding at the beginning of the year amounted to \$326,441,405.64 issued during the year:

Common stock issued in exchange for a like amount of Five Per Cent Twenty-Year Convertible Gold Bonds surrendered and cancelled 17,939,500.00

Amount of Southern Pacific Company capital stock outstanding December 31, 1921 \$344,380,905.64

There was no change during the year in the capital stocks of the Proprietary Companies.

The amounts outstanding December 31, 1921, were as follows:
Preferred stock \$29,400,000.00
Common stock 317,432,400.00 346,832,400.00

Amount of capital stocks of the Southern Pacific Company and of its Proprietary Companies outstanding December 31, 1921 \$691,213,305.64

Held as follows:

In hands of public:
Capital stock of Southern Pacific Company \$344,380,905.64
Capital stock of Proprietary Companies 62,000.00 \$344,443,105.64
Owned by Southern Pacific Company \$346,470,200.00
Owned by Proprietary Companies 300,000.00 346,770,200.00
\$691,213,305.64

FUNDED DEBT

The funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies outstanding December 31, 1920, was as follows:

Southern Pacific Company \$159,158,160.00
Proprietary Companies 443,157,610.93

Total outstanding December 31, 1920 \$602,315,770.95

Retired during the year:

SOUTHERN PACIFIC COMPANY
San Francisco Terminal First Mortgage Four Per Cent Bonds:
Purchased from payments to sinking fund \$7,000.00
Five Per Cent, Twenty-Year Convertible Gold Bonds:
Retired in exchange for a like amount of common stock issued 17,939,500.00
Four and One-half Per Cent. Equipment Trust Certificates:
Series B, Due March 1, 1921, paid off \$1,012,000.00
Series B, Due September 1, 1921, paid off 201,000.00
Series C, Due December 1, 1921, paid off 117,000.00
Series D, Due May 1, 1921, paid off 511,000.00
Six Per Cent Temporary Equipment Trust Gold Note, Due January 15, 1921, paid off 187,600.00 2,028,600.00

CENTRAL PACIFIC RAILWAY COMPANY

First refunding Mortgage Four Per Cent. Bonds:
Purchased from payments to sinking fund \$34,500.00
Three and One-half Per Cent. Mortgage Gold Bonds:
Purchased from proceeds of sale of lands \$105,000.00
Purchased from payments to sinking fund 32,500.00 137,500.00
Four Per Cent, Thirty-five Year European Loan of 1911:
Adjustment account difference in exchange 7.04 172,007.04

HOUSTON & TEXAS CENTRAL RAILROAD COMPANY

General Mortgage Four Per Cent. Bonds, matured:
Redeemed and cancelled \$42,000.00
Acquired and held alive by Southern Pacific Company 4,119,000.00 4,161,000.00

Carried forward \$24,308,107.04 \$602,315,770.95
Brought forward \$24,308,107.04 \$602,315,770.95

Retired during the year—Continued.

LOUISIANA WESTERN RAILROAD COMPANY
First Mortgage Six Per Cent. Bonds, matured 2,240,000.00
SOUTH PACIFIC COAST RAILWAY COMPANY
First Mortgage Four Per Cent. Bonds:
Purchased from payments to sinking fund 262,000.00
SOUTHERN PACIFIC RAILROAD COMPANY
First Refunding Four Per Cent. Gold Bonds:
Purchased from payments to sinking fund 15,500.00

TEXAS & NEW ORLEANS RAILROAD COMPANY		
Payment to State of Texas account of School Fund Debt	4,695.44	
Total retired during the year	26,830,302.48	
Amount of funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies outstanding December 31, 1921:		
Southern Pacific Company	\$139,183,060.00	
Proprietary Companies	436,302,408.47	\$575,485,468.47
Held as follows:		
In hands of public:		
Funded debt of Southern Pacific Company	\$139,183,060.00	
Funded debt of Proprietary Companies	322,181,990.90	\$461,365,050.90
Owned by Southern Pacific Company	\$98,084,417.57	
Owned by Proprietary Companies	1,359,000.00	
Held in sinking funds of Proprietary Companies	14,497,000.00	114,120,417.57
Total		\$575,485,468.47

RATIO OF CAPITAL STOCK HELD BY PUBLIC TO FUNDED DEBT AND TO TOTAL CAPITAL HELD BY PUBLIC

During the five years ended December 31, 1921, the ratio of capital stock of your companies held by the public to the funded debt of your companies held by the public, increased 53.31 per cent; and the ratio of capital stock

to the total capital of your companies held by the public, increased 30.53 per cent, viz:

	CAPITAL STOCK AND FUNDED DEBT HELD BY PUBLIC			
	December 31, 1921	December 31, 1916	+Increase -Decrease	Per Cent.
Capital stock held by public	\$344,443,105.64	\$272,905,505.64	+\$71,537,600.00	26.21
Funded debt held by public	461,365,050.90	560,398,362.71	-99,033,311.81	17.67
Total capital held by public	\$805,808,156.54	\$833,303,868.35	-\$27,495,711.81	3.30
Ratio of capital stock to funded debt	74.66	48.70	+	25.96
Ratio of capital stock to total capital	42.75	32.75	+	10.00

The increase in capital stock is the result of the issue of \$71,537,600.00 par value, capital stock of Southern Pacific Company against the surrender and cancellation of \$77,709,650.00, par value, Four and Five Per Cent. Convertible Bonds, less \$20,400.00, par value, capital stocks of Proprietary Companies acquired by Southern Pacific Company. The decrease in funded debt is the result of the retirement of \$77,709,650.00, par value, Southern Pacific Company Four and Five Per Cent. Convertible Bonds against the issue of capital stock, the retirement of \$21,410,831.83, par value, bonds of Southern Pacific Company and its Proprietary Companies redeemed out of general funds of the companies and by sinking funds, and the acquisition by Southern Pacific Company of \$17,726,779.93, par value, bonds of Proprietary Companies, less \$17,814,000.00, par value, Southern Pacific Equipment Trust obligations issued for the acquisition of new equipment.

BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED

ASSETS—DECEMBER 31, 1921, COMPARED WITH DECEMBER 31, 1920, EXCLUDING OFFSETTING ACCOUNTS

Assets	December 31, 1921	December 31, 1920	Increase	Decrease
INVESTMENTS				
Investment in road and equipment	\$1,055,929,559.56	\$1,023,128,725.51	\$32,800,834.05	
Improvements on leased railway property	4,365,285.80	4,307,067.10	58,218.70	
Sinking funds	16,669,768.59	15,894,531.86	775,236.73	
Deposits in lieu of mortgaged property sold	1,556,212.61	14,406,620.76	.....	\$12,850,408.15
Miscellaneous physical property	13,559,989.73	13,785,215.46	.....	225,225.73
Investments in affiliated companies:				
Stocks	282,753,616.78	328,460,971.48	.....	45,707,354.70
Bonds	149,365,499.94	148,424,714.44	940,785.50	
Stocks } Cost inseparable	10,728,251.70	11,267,951.70	.....	539,700.00
Notes	29,849,498.81	1,551,407.54	28,298,091.27	
Advances	121,249,766.21	107,281,536.58	13,968,229.63	
Other investments:				
Stocks	153,384.04	156,710.29	.....	4,326.25
Bonds	19,041,736.05	9,021,311.91	10,020,424.14	
Notes	1,740,538.99	2,032,491.77	.....	291,952.78
Advances	251,410.42	294,019.97	.....	42,609.55
Miscellaneous	251,972.90	2,295,565.08	.....	2,043,592.18
Total	\$1,707,465,492.13	\$1,682,308,841.45	\$25,156,650.68	
CURRENT ASSETS				
Cash	\$15,047,421.02	\$16,452,542.35	.....	\$1,405,121.33
Demand loans and deposits	4,044,702.97	.....	\$4,044,702.97	
Special deposits	378,993.66	224,119.20	154,874.46	
Trains and bills receivable	11,665,085.31	59,265.34	11,605,819.97	
Traffic and car-service balances receivable	2,468,425.21	6,212,714.73	.....	3,744,289.52
Net balance receivable from agents and conductors	3,517,339.84	5,694,542.13	.....	2,177,202.29
Miscellaneous accounts receivable	9,379,727.57	17,160,402.64	.....	7,780,675.07
Material and supplies	36,039,533.02	40,263,359.08	.....	4,223,826.06
Traffic and car-service receivable	2,555,437.97	2,921,318.00	.....	285,910.97
Rents receivable	237,191.62	1,163,735.30	.....	926,543.68
Other current assets	372,791.13	481,779.82	.....	108,988.69
Total	\$85,706,590.32	\$89,981,891.59	.....	\$4,275,292.27
ACCOUNTS WITH U. S. RAILROAD ADMINISTRATION				
Standard return	\$103,525,702.26	\$104,532,608.09	.....	\$1,006,905.83
Less received on account	74,125,000.00	74,125,000.00	.....
Balance due	\$29,400,702.26	\$30,407,608.09	.....	\$1,006,905.83
Additional compensation for use of additions and betterments completed during Federal control, cash and agents' and conductors' balances taken over January 1, 1918, revenues prior to January 1, 1918, and other corporate assets collected, etc.				
Material and supplies, December 31, 1917	40,066,865.25	38,005,388.11	\$2,061,477.14	
Prepaid interest on other reserves	23,542,273.75	23,663,556.32	.....	146,282.07
Interest on other reserves	9,736,468.41	9,736,468.41	.....
Road and equipment retired and not replaced	1,594,051.72	1,127,779.00	466,272.72	
Total	\$104,391,360.93	\$102,981,271.88	\$1,409,643.05	
U. S. GOVERNMENT				
U. S. Government deficit on guaranty theme	\$26,121,156.10	\$20,400,427.50	\$5,629,728.60	
DEFERRED ASSETS				
Working fund advances	\$43,804.06	\$1,309,766	\$40,468.40	
Insurance and other fund .....	.....	16,360.00	.....	\$16,360.00
Income deferred assets	10,495,522.84	8,382,913.27	1,069,609.62	
Total	\$19,758,381.95	\$8,592,665.93	\$1,993,718.02	
UNPAID STATE DEBTS				
Rents and insurance premiums paid in advance	\$15,117.57	\$30,708.36	.....	\$57,509.10
Debiting of casual claims	3,936,000.00	3,888,000.00	.....	35,000.00
Debiting of funded debt	1,000,000.00	2,400,000.37	.....	442,070.04
Owner guaranteed debts	1,031,380.13	2,343,607.62	.....	12,312,335.46
Contingent claims or assumed liabilities	5,764,435.09	5,988,178.00	.....	6,750.00
Debiting of other reserves	10,177,130	156,500.00	.....	53,750.00
Total	\$16,141,959.75	\$8,935,804.35	.....	\$12,812,764.60
Total	\$1,850,804,812.14	\$1,933,311,368.70	\$17,101,683.48	

(a) The value of the stock of Central Public Railway Company land grant bonds is not included in the above statement of assets. (d) Excluded from total assets, and a corresponding amount excluded from outstanding funded debt, in accordance with regulations of the Interstate Commerce Commission.

BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED

LIABILITIES—DECEMBER 31, 1921, COMPARED WITH DECEMBER 31, 1920, EXCLUDING OFFSETTING ACCOUNTS

Liabilities	December 31, 1921	December 31, 1920	Increase	Decrease
Stock				
Capital stock of Southern Pacific Company	\$344,380,905.64	\$326,441,405.64	\$17,939,500.00	
Capital stock of Proprietary Companies (a)	346,832,400.00	346,832,400.00		
Total stock outstanding	\$691,213,305.64	\$673,273,805.64	\$17,939,500.00	
Premium on capital stock of Southern Pacific Company	\$6,304,440.00	\$6,304,440.00		
Total	\$697,517,745.64	\$679,578,245.64	\$17,939,500.00	
LONG TERM DEBT				
Funded debt unamortized:				
Book liability	\$581,556,643.47	\$608,457,445.95		\$26,890,802.48
Less held by or for companies.	6,081,175.00	6,141,675.00		60,500.00
Actually outstanding:				
Southern Pacific Company	\$139,183,060.00	\$159,158,160.00		\$19,975,100.00
Proprietary Companies (a)	436,302,408.47	443,157,619.95		6,855,202.48
Total funded debt	\$575,485,468.47	\$602,315,770.95		\$26,830,302.48
Nonnegotiable debt to affiliated companies:				
Open accounts	25,004,008.35	47,792,526.82		22,788,518.47
Total	\$600,489,476.82	\$650,108,297.77		\$49,618,820.95
CURRENT LIABILITIES				
Loans and bills payable		\$5,000,000.00		\$5,000,000.00
Traffic and car-service balances payable	\$3,922,967.27	10,112,285.10		6,189,317.83
Audited accounts and wages payable	14,862,407.42	28,517,373.11		13,655,065.69
Miscellaneous accounts payable	1,724,373.58	3,395,273.09		1,670,899.51
Interest matured unpaid	4,349,558.62	4,534,009.33		204,450.71
Dividends matured unpaid	5,254,992.49	4,683,119.58	\$571,872.91	
Funded debt matured unpaid	16,213.92	29,213.92		13,000.00
Unmatured interest accrued	4,832,943.21	4,979,378.44		146,435.23
Unmatured rents accrued	308,102.25	294,176.59	13,925.66	
Other current liabilities	395,500.99	898,064.18		502,563.19
Total	\$35,667,059.75	\$62,462,993.34		\$26,795,933.59
ACCOUNTS WITH U. S. RAILROAD ADMINISTRATION				
Advances for additions and betterments	\$24,842,214.54	\$25,463,867.72		\$621,653.18
Advances for expenses prior to January 1, 1918, and other corporate liabilities paid, etc.	52,083,896.70	51,166,637.10	\$917,259.60	
Agents' and conductors' balances February 29, 1920	177,705.88	594,037.01		116,331.13
Federal material and supplies February 29, 1920	24,212,972.01	24,061,913.39	151,058.62	
Total	\$101,616,789.13	\$101,286,455.22	\$330,333.91	
DEFERRED LIABILITIES				
Other deferred liabilities	\$88,585.60	\$208,864.09		\$120,278.49
UNADJUSTED CREDITS				
Tax liability	\$5,795,175.25	\$1,878,273.38	\$3,916,901.87	
Insurance and casualty reserves	1,877,021.20	3,182,804.69		\$1,305,782.99
Operating reserves	5,619,793.03	4,342,251.64	1,277,541.39	
Accrued depreciation—Road	1,636,796.86	1,489,880.76	154,716.10	
Accrued depreciation—Equipment	58,205,617.84	54,583,951.21	3,621,666.63	
Other unadjusted credits (c)	116,483,389.46	86,553,083.02	29,930,306.44	
Total	\$189,624,794.14	\$152,039,444.70	\$37,595,349.44	
CORPORATE SURPLUS				
Additions to property through income and surplus	\$1,773,020.11	\$1,575,921.24	\$197,098.87	
Funded debt retired through income and surplus	23,795,752.09	23,333,510.55	462,241.54	
Sinking fund reserves	12,570,482.63	11,660,666.84	967,815.79	
Appropriated surplus not specifically invested	3,818,177.83	3,818,177.83		
Total appropriated surplus	\$41,957,432.66	\$40,330,276.46	\$1,627,156.20	
Profit and loss—Balance	283,431,168.44	247,286,791.48	36,144,376.96	
Total corporate surplus	\$325,388,601.10	\$287,617,067.94	\$37,771,533.16	
Total liabilities	\$1,950,393,052.18	\$1,933,291,368.70	\$17,101,683.48	

(a) The outstanding capital stock and funded debt include capital stocks and funded debt of Proprietary Companies of the par value of \$346,770,200.00 and \$114,120,417.57, respectively, a total of \$460,890,617.57, which securities are owned by the Southern Pacific Company or by Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the investments shown under "Investments in Affiliated Companies." Of said amount, stocks of the par value of \$249,653,161.00, which stand charged on the books at \$232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds. (d) Represents accrued depreciation on electric power plants and substation, general office building at San Francisco, wood preserving works, Sacramento rolling mill, oil storage plants, grain elevators, and similar facilities. (e) Represents, principally interest on construction advances which have not been repaid, as explained in the last paragraph but one under the heading "Income Account."

EQUIPMENT

All the equipment included in Southern Pacific Equipment Trust, Series E, mentioned in last year's report, has been received and placed in service. The tank steamer Tamaha, also mentioned in last year's report, was completed and placed in service November 22, 1921.

The following new equipment was completed at company shops during the year, or was under construction at company shops at the close of the year:

- 37 locomotives
- 281 freight-train cars
- 3 passenger-train cars
- 86 roadway service cars.

The cost of this equipment will be about \$1,900,000.

THE SUIT INVOLVING THE RIGHT OF THE SOUTHERN PACIFIC COMPANY TO OWN THE STOCK OF THE CENTRAL PACIFIC RAILWAY COMPANY

In last year's report it was stated that this case was, after all argument, submitted in the Supreme Court of the United States on April 19, 1921, and

by the Court taken under advisement. Two members of the Court were to be disqualified to take part in the decision of the case. After the submission the number of the justices qualified to consider the case was still further reduced by the death of Chief Justice White. The case was then assigned for reargument on April 10, 1922, and was reargued at length. On May 29th a decision was handed down by the Supreme Court to the effect that the common control of the Central Pacific and other Southern Pacific lines, which originated more than half a century ago, was in violation of the Sherman Anti-trust Law of 1890, and the termination of such common control was decreed. As the opinion of the Supreme Court was received on the day this Annual Report was to be placed in the hands of the printer, all that can be said at the present time is that it is believed from the usual procedure in such cases that time and opportunity will be afforded to carry out the decree of the Court with a minimum of injury and loss to the railroads concerned. The fact that the Interstate Commerce Commission is now engaged in regrouping the railroads of the country into a limited number of enlarged systems, under the Transportation Act of 1920, may require a delay until the Commission has determined its plan of consolidation for the railroads in the Western transcontinental region.

CONTROVERSY ARISING OUT OF THE OREGON & CALIFORNIA RAILROAD'S LAND GRANT

This is an accounting suit brought in 1917 by the United States seeking to offset against the compensation of \$3.50 per acre, due the Company for the unsold lands, moneys received by the Company, in excess of \$2.50 per acre, by reason of past sales, leases, and otherwise, as well as taxes levied since the forfeiture decision in 1913 and voluntarily paid by the Federal Government to the State of Oregon. The trial of this case is still going on.

ASSOCIATED PIPE LINE COMPANY

Since the incorporation of the Associated Pipe Line Company, in 1907, the capital stock of that company has been owned one-half by Southern Pacific Company and one-half by Associated Oil Company. The Pipe Line Company owns oil pipe lines running from the Southern California oil fields to various points on Southern Pacific Company's lines, and to tidewater, which have been used recently by Southern Pacific Fuel Department and by Associated Oil Company. Following the sale of the California oil properties to the Pacific Oil Company, mentioned on page 26 of last year's report, that company opened negotiations looking to the acquisition by it of a one-third interest in the Associated Pipe Line Company. As a result of these negotiations the capital stock of the Pipe Line Company was increased from \$7,000,000 to \$10,500,000, the \$3,500,000 of increased stock being sold to the Pacific Oil Company at par. The retention by your company of a one-third interest in the Southern Pacific Fuel Department, and by the delivery of fuel oil at points on its lines where it will be readily available, at a minimum cost for transportation.

PORTER FUEL COMPANY AND DURANGO LAND COMPANY

As of December 31, 1921, the Southern Pacific Company acquired the entire outstanding capital stock of the Porter Fuel Company and of the Durango Land Company. These companies own about 21,500 acres of high grade bituminous coal lands in southwestern Colorado, and the properties were acquired to provide a source of future fuel supply for your railroads.

SOUTHERN PACIFIC RAILROAD COMPANY OF MEXICO

The value of property damaged or destroyed from the beginning of the Madero revolution in 1910 down to December 31, 1921 (including the estimated cost of restoring the Alamos and Tonichi Branches and the main line from Acaponeta to Tepic, the operation of which it was necessary to abandon in the spring of 1913), now amounts to 11,535,260 pesos equivalent to \$5,767,630.

At December 31, 1921, the company's claims against the Mexican Government on account of revolutionary disturbances, stated in brief, were as follows:

Damage to or destruction of, property as mentioned above.....	11,535,260 pesos
Rental for, and maintenance of, road and equipment while under Government operation.....	9,838,850 "
Freight and passenger transportation furnished on Government orders.....	5,980,469 "
Materials and supplies furnished to or confiscated by various military authorities, telegraph service furnished, and other miscellaneous items.....	520,848 "
In addition to the foregoing claims the company has subvention and interest claims against the Mexican Government as follows:	
Unpaid portion of subvention of 12,500 pesos per kilometer, payable in ten equal annual installments commencing with July, 1912, as provided in the concession under which the company's line was constructed.....	3,591,354 "
Unpaid interest to December 31, 1921, on past due payments of above subvention.....	1,260,678 "
Unpaid interest to December 31, 1921, on Mexican Consolidated Public Debt bonds owned by the company.....	112,813 "
Total claims against Mexican Government.....	32,840,272 pesos
Equivalent, in U. S. currency, to.....	\$16,420,136

Of the foregoing claims, amounting to 32,840,272 pesos, claims to the amount of 26,781,100 have been filed with the proper departments of the Mexican Government, and the remainder will be filed as rapidly as the congested condition of the departments will permit. Since the inauguration of President Obregon on December 1, 1920, payments aggregating 672,851 pesos have been made on account of these claims, while claims to the amount of \$2,387,407 pesos have been approved for payment but have not yet been paid.

The average miles of road operated during the year was 1,054.70 miles as compared with 1,001.47 miles for 1920. Only such maintenance work has been carried on, however, as was found necessary for the operation of trains over these portions of the line open for traffic.

STATUS OF ACCOUNTS WITH U. S. RAILROAD ADMINISTRATION

The status of the accounts of your company and its Proprietary Companies with the U. S. Railroad Administration incident to the period of Federal operations, as booked to December 31, 1921, is shown in the combined balance sheet. The accounts as stated, however, do not include any charge either on account of under-maintenance during the period of Federal operations, or on account of the delinquency in material and supplies returned by the Director General at the end of Federal control.

Your company's claim for under-maintenance was filed on August 26, 1921, and a general claim, covering the balance due your company on all accounts with the U. S. Railroad Administration, including claims for under-maintenance and for delinquency in material and supplies, was filed September 18, 1921.

The U. S. Railroad Administration has completed its investigation of all items in your company's claim except the item of under-maintenance and the item of material and supplies. Administration engineers and accountants have been investigating these two items for several months, and it is hoped that they will complete their investigation in the near future.

STATUS OF ACCOUNT WITH U. S. GOVERNMENT UNDER ITS GUARANTY

As stated in last year's report, the Interstate Commerce Commission, on October 18, 1920, issued an order requiring each carrier which had accepted the guaranty offered by the Government, to file a statement showing the amount due the carrier under the Government's guaranty as computed by the carrier. On December 1, 1921, your company filed a statement in accordance with such order and subsequently received partial payment aggregating \$5,891,000, pending a complete review of the claim by the Commission.

On December 15, 1921, the Commission issued an order prescribing the course for computing the maintenance allowances to be included in operating expenses for the guaranty period, fixing December 31, 1921, as the time as of which all accounts pertaining to the guaranty period should be closed, and requiring each carrier to file with the Commission a final claim covering the amount due from the Government under its guaranty. Final claims were filed on or about January 1, 1922, and the Commission acted on March 24, 1922, and it is hoped that an early settlement will be obtained.

FEDERAL VALUATION OF RAILROADS

The Act of Congress, known as the Federal Valuation Act, approved March 1, 1913, directs the Interstate Commerce Commission to determine the value of the transportation properties of each railway corporation in the United States engaged in interstate commerce and subject to the Interstate Commerce Act.

In connection with the valuation of any property, the Act directs the Commission, among other things, to ascertain the original cost of such property to date of valuation, cost of reproduction new, cost of reproduction new less depreciation, present value of lands, present cost of acquiring lands, through condemnation proceedings or by purchase, in excess of present value, and numerous other factors set out in the statute and assumed to have a bearing upon the question of valuation. The Interstate Commerce Commission, in making such valuation, to take into account any and all elements of value which may be found to exist.

Upon the completion of the valuation of any property the Commission is further directed to prepare, and serve upon the owning carrier, a tentative valuation wherein shall be set forth the value placed upon such property by the Commission, together with the Commission's findings of fact concerning the matters hereinbefore enumerated. This tentative valuation is thereafter subject to appeal by the carrier, in which event provision is made for formal hearing and determination.

Immediately upon the passage of this Act a valuation organization was perfected for your company, and this organization has actively co-operated with the Federal Valuation Commission in the preparation of a complete field inventory of all the transportation properties of your company. In addition to this work, the valuation organization of your company, in anticipation of the receipt of the Commission's tentative valuation, has prepared a complete field inventory of the same, for application to the inventory, for purpose of comparison with the unit prices fixed by the Commission's Bureau of Valuation, and to serve as the basis of any protest thereto which may be necessary to the protection of the company's interest. For these purposes your companies have expended to December 31, 1921, the sum of \$3,213,354.42, of which the sum of \$628,330.19 was expended during the current year.

By reason of the enormity of the task involved, the Interstate Commerce Commission has not yet fixed a final value upon the properties of any railroad company, and the same is not expected to be done until a preliminary drawing to a conclusion, and it is anticipated that tentative valuations covering the properties of your company may be expected within the not distant future.

The importance of valuation work has been enhanced by the provisions of the Transportation Act, under which the basis of rates in the several rate groups, established by the Commission, is dependent upon the aggregate value of all properties therein, as found by the Commission, which valuations, as thus found, also govern the capitalization of any consolidated companies which may be created under the provisions of the Transportation Act.

PURCHASE OF SOUTHERN PACIFIC COMPANY CAPITAL STOCK FOR EMPLOYEES

In December, 1921, the Executive Committee approved a plan extending to all employees of Southern Pacific Transportation System lines the privilege of purchasing the capital stock of the company, a limited amount of its capital stock, for payment therefor in monthly installments, the company advancing the funds required to purchase the stock. Under this plan, which became effective February 1, 1922, an employ may purchase from time to time, from one to fifteen shares of stock, paying therefor the sum of \$5.00 per month for each share purchased. Additional shares may be purchased upon the same terms, provided, however, that in no event will the company, at any one time, carry more than fifteen shares in the aggregate for any one employee.

The company, at the request of an employee, purchases the required amount of stock at the current market price in the New York Stock Exchange, making no charge, however, for its services. Pending payment of the advances made for its purchase the stock is held by a trustee as security for such advances, the account of the employee, in the meantime, being charged with the interest on the rate of interest on the amount so advanced, and credited with the dividends accruing on the stock held for him. When advances for the purchase of the stock have been fully repaid, the stock will be registered in the employee's name and a certificate therefor delivered to him.

At the close of business May 1, 1922, six hundred and eighty-five employees had subscribed for an aggregate of 2,428 shares under this plan.

GENERAL

Dividends on the capital stock of your company were declared during the year, payable as follows:

1 1/2 per cent. paid April 1, 1921.....	\$5,142,198.99
1 1/2 per cent. paid July 1, 1921.....	5,165,569.67
1 1/2 per cent. paid October 1, 1921.....	5,165,713.58
1 1/2 per cent. payable January 3, 1922.....	5,165,713.58
Total.....	\$20,639,195.82

Your Board announces with sorrow the death, on August 22, 1921, of Colonel Epes Randolph, President of the Arizona Eastern Railroad Company, of the Southern Pacific Railroad Company of Mexico, who, for twenty-four years, served your companies with conspicuous ability and unwavering fidelity. The Board has caused to be entered in the minutes of its meeting a resolution reciting Colonel Randolph's long, faithful, and efficient service.

Under the pension system put into effect January 1, 1921, there were carried on the pension rolls at the end of the year 1,072 employees. The payments to pensioners for the year amounted to \$513,867.62, which is equivalent to six per cent per annum on an investment of \$8,564,000.00.

By order of the Board of Directors,
 JULIUS KRITTSCHNITT,
 Chairman of the Executive Committee.

(Continued from page 1360)

Section 204:		
Nevada-California-Oregon Railway	\$50,016	
Section 209:		
Bridgton & Saco River Railroad	2,996	
Bullfrog Goldfield Railroad	14,453	
Chicago, Milwaukee & St. Paul	676,636	
Georgia Northern	1,632	
Mississippi Central	38,581	
Philadelphia & Reading	1,656,061	
Texas Midland	58,368	
Tonopah & Goldfield	16,683	
Woodstock Railway	7,123	
Section 210:		
Chesapeake & Ohio	1,334,500	
Cisco & Northeastern	27,863	
Evansville, Indianapolis & Terre Haute	50,000	
New York, New Haven & Hartford	2,600,000	
Section 212:		
Chicago, Peoria & St. Louis, receivers	55,000	
Total	\$6,589,914	
Total payments to May 31, 1922.		
(a) Under Section 204, as amended by Section 212 for reimbursement of deficits during federal control:		
(1) Final payments, including partial payments previously made	\$1,637,550	
(2) Partial payments to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	1,684,195	
Total payments account reimbursement of deficits	\$3,321,745	
(b) Under Section 209, as amended by Section 212 for guaranty in respect to railway operating income for first six months after federal control:		
(1) Final payments, including advances and partial payments previously made	\$42,807,749	
(2) Advances to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	239,365,672	
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above	153,647,795	
Total payments account of said guaranty	435,821,216	
(c) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided	307,091,080	
Total	\$746,234,041	
Repayments to the loan fund amount to \$74,750,355.		

Dividends Declared

Albany & Susquehanna.—\$4.50, semi-annually, payable July 1 to holders of record June 15.
 Atchison, Topeka & Santa Fe.—Preferred, 2½ per cent, semi-annually, payable August 1 to holders of record June 30.
 Lehigh Valley.—Common, 1½ per cent, quarterly; preferred, 2½ per cent, quarterly; both payable July 1 to holders of record June 17.
 New York, Chicago & St. Louis.—Common, 2½ per cent, payable June 30 to holders of record June 19; 2nd preferred, three quarterly dividends of 1¼ per cent, payable June 30, September 30 and December 30, to holders of record June 19, September 19 and December 19, respectively.
 St. Louis, Rocky Mountain & Pacific.—Common, 1 per cent, quarterly; preferred, 1¼ per cent, quarterly; both payable June 30 to holders of record June 17.

Trend of Railway Stock and Bonds Prices

	June 3	Last Week	Last Year
Average price of 20 representative railway stocks	65.01	67.22	54.41
Average price of 20 representative railway bonds	86.06	86.28	73.86

BAGGAGE INSURANCE POLICIES are now offered by the Canadian Pacific. These policies are particularly designed for Atlantic and Pacific steamship traffic and cover all risks of transportation and navigation, except while in the permanent residence of the assured.

REDUCTION OF TAXES is demanded in a suit brought by the New York Central in Supreme Court at New York City on the ground that the property has been assessed this year at \$149,366,150, whereas the real value is only \$135,937,320, and assessments against other New York City realty average only 90 per cent of the actual value. The petition says the railroad has been taxed for tunnel support under public parks and thoroughfares where there should be no tax, and for footbridges constructed for the benefit of the owners of adjacent property.

Railway Officers

Executive

A. B. Ramsdell, who has been promoted to assistant vice-president of the Chicago, Rock Island & Pacific in charge of labor matters, was born at Tama, Iowa, on October 3, 1873,



A. B. Ramsdell

and entered railway service on July 1, 1891, as a clerk in the auditing department of the Chicago, Rock Island & Pacific. He was a clerk in this and the passenger department until March 15, 1893, when he became chief clerk to the superintendent of the Chicago Terminal. He was appointed trainmaster of the Chicago Terminal on February 15, 1904, and held this position at Chicago until May 1, 1906, when he was transferred to the Colorado division, where he remained until December 1, 1906, when he was transferred to the Iowa division. On January 1, 1909, he was transferred to the Illinois division, where he remained until December 15, 1909, when he was promoted to superintendent of the Chicago Terminal division. Consecutively from that time he served as superintendent of the Chicago Terminal division from February 1, 1912, to January 8, 1913; as superintendent of the Kansas division during the following year; and as superintendent of the Illinois division from June 1, 1914, to May 31, 1916, when he was promoted to assistant general manager of the First district with headquarters at Des Moines, Iowa. He was appointed assistant to the vice-president and general manager on April 1, 1919, and held this position until the time of his recent promotion to the newly created position of assistant vice-president in charge of labor.

A. E. Wallace, manager of the Chicago region of the Erie, with headquarters at Chicago, has been appointed general manager of the Minneapolis, St. Paul & Sault Ste. Marie,



A. E. Wallace

with headquarters at Minneapolis, Minn., effective June 1, to succeed G. R. Huntington. Mr. Wallace was born at Nashua, N. H., on March 2, 1879, and was educated at Harvard University, from which he was graduated with the degree of bachelor in arts in 1902. He entered railway service in November of the same year as a clerk on the Great Northern at Larimore, N. D., and remained at that point as a clerk and timekeeper until January, 1904, when he entered the employ of the Chicago, Rock Island & Pacific as yard clerk. He served in the consecutive capacities of yard clerk, timekeeper and chief clerk on the Rock Island until January, 1907, when he entered the service of the Chicago, Burlington & Quincy, with which he was employed

consecutively as special inspector, assistant extra gang foreman, foreman, assistant roadmaster and trainmaster until February, 1911. Thereafter he was special inspector from February, 1911, to September of the same year, and a member of the staff of the second vice-president and, later, assistant superintendent from September, 1911, until July, 1912, when he re-entered the service of the Chicago, Rock Island & Pacific as superintendent. He became connected with the Erie in January, 1918, as general superintendent with headquarters at Chicago and held this position until June, 1918, when he was transferred to Youngstown, Ohio, as assistant general superintendent and continued as assistant general superintendent until March, 1920, when he was promoted to manager of the Chicago region, the position he held at the time of his recent appointment on the Minneapolis, St. Paul & Sault Ste. Marie.

John C. Sesser has been appointed assistant vice-president of the Cuba Railroad with headquarters at Camaguey, Cuba.

C. S. Lake, assistant to the president of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been appointed assistant to the president of the St. Louis Southwestern, with headquarters at St. Louis, Mo., and with jurisdiction over all departments, effective June 5.

B. L. Winchell, long a railway executive and under the Railroad Administration regional director of the Southern region, has been elected president of the Remington Type-

W. R. Kettering, office engineer of the Chicago & North Western at Chicago, has been promoted to auditor of capital expenditures, with the same headquarters, effective June 1, to succeed A. I. Morris, deceased. Mr. Kettering was born in DeWitt, Iowa, in 1880, and was graduated from Cornell College, Iowa, in 1902, after which he entered railway service as an instrumentman in the track elevation department of the Chicago & North Western. He was promoted to division engineer on construction in 1907 and from 1908 to 1911 served as division engineer on the construction of the passenger

B. L. Winchell, long a railway executive and under the Railroad Administration regional director of the Southern region, has been elected president of the Remington Type-

writer Company. Mr. Winchell began his railroad career in July, 1874, as a clerk in the office of the superintendent of machinery of the Hannibal & St. Joseph (now a part of the C., B. & Q.). In 1875 he was transferred to the auditor's office of the same road and remained there until November, 1877, when he was promoted to chief clerk in the general freight and ticket office. In 1879 he was appointed assistant general passenger agent of the Atchison & Nebraska (now a part of the C., B. & Q.). From April 1 to June 1 he was assistant chief clerk in the general passenger department of the Kansas City, Fort Scott & Gulf (now a part of the Frisco) and the Kansas City, Lawrence & Southern Kansas (now a part of the A., T. & S. F.). He was then promoted to assistant general passenger agent of those roads. In May, 1895, he became general passenger agent of the Union Pacific, Denver & Gulf (now the C. & S.). From May 1 to December 1, 1898, he served the St. Louis-San Francisco in the same capacity and was then elected vice-president of the Colorado & Southern. On October 15, 1900, he was elected president and general manager of the Kansas City, Fort Scott & Memphis (Frisco). In 1902 he returned to the St. Louis-San Francisco as vice-president and general manager. He became first vice-president in October, 1903, and from then until April 5, 1904, he also served as third vice-president of the Chicago, Rock Island & Pacific and vice-president of the Chicago & Eastern Illinois and the Evansville & Terre Haute (now a part of the C. & E. I.). He was then elected president of the Chicago, Rock Island & Pacific and served in that capacity until December 1, 1909, when he returned to the St. Louis-San Francisco and the Chicago & Eastern Illinois as president, remaining as such until 1913 when he became one of the receivers of the St. Louis-San Francisco. Shortly thereafter he resigned to become director of traffic of the Union Pacific. During the period of federal control he served as director of the Southern region and thereafter was elected vice-president of the Pure Oil Corporation in charge of the railroad department.



B. L. Winchell

Financial, Legal and Accounting

Wallace T. Hughes, whose election to the newly created position of general attorney of the Chicago, Rock Island & Pacific, with headquarters at Chicago, effective June 1, was reported in the *Railway Age* of June 3 (page 1317), was born in Kentucky in 1877 and studied law at the University of Louisville.

Following the completion of his law studies he engaged in publication work as an associate editor of the Louisville Courier-Journal until 1909, when he entered the law department of the Chicago, Rock Island & Pacific, specializing in questions relating to federal regulation. After serving in this capacity until 1919 he returned to Louisville, Ky., to become vice-president and associate publisher of the Courier-Journal and its afternoon subsidiary, the Times, in which occupation he was engaged until June 1, 1922, when he reentered railway service in the newly created position of general attorney of the Chicago, Rock Island & Pacific, in which capacity he will devote special attention to interstate commerce matters.



W. T. Hughes

H. B. Dike, general counsel of the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at Minneapolis, Minn., retired from active service on June 1 after 35 years in the continuous employ of that road and is succeeded by **Henry S. Mitchell**, assistant general counsel. Mr. Dike was born in Wales, on November 20, 1847, and received his law education by private study. He entered railway service in 1887 as Wisconsin attorney for the Minneapolis, St. Paul & Sault Ste. Marie and continued in this capacity until May, 1894, when he was promoted to assistant general solicitor. He was advanced to general solicitor in March, 1908, and in October, 1912, was appointed assistant to the president, holding this position until January 1, 1918, when he became general solicitor in charge of the law department under the United States Railroad Administration. He was elected general counsel on March 1, 1920, following the period of federal control and, while intending for some time to retire, continued to represent the road in this capacity until June 1 of his 75th year, as noted above.



H. B. Dike

W. R. Kettering, office engineer of the Chicago & North Western at Chicago, has been promoted to auditor of capital expenditures, with the same headquarters, effective June 1, to succeed A. I. Morris, deceased. Mr. Kettering was born in DeWitt, Iowa, in 1880, and was graduated from Cornell College, Iowa, in 1902, after which he entered railway service as an instrumentman in the track elevation department of the Chicago & North Western. He was promoted to division engineer on construction in 1907 and from 1908 to 1911 served as division engineer on the construction of the passenger

terminal in Chicago. Thereafter he served in the maintenance department at Boone, Iowa, and later in various capacities in the valuation department until the period of federal control in 1918, when for a year he was assistant in the office of the corporate engineer. Following the termination of federal control in 1920 he was appointed office engineer, which position he held until the time of his recent promotion.

L. Albert Harkness, whose promotion to general auditor of the Illinois Central, with headquarters at Chicago, effective May 15, was reported in the *Railway Age* of June 3



L. A. Harkness

(page 1317), was born in London, England, on November 22, 1874, and entered railway service in September, 1891, as a messenger on the Illinois Central. Thereafter he served consecutively as messenger, clerk, statistician and chief clerk in the office of the vice-president in charge of accounting, with headquarters at Chicago, until July, 1912, when he left the service of the Illinois Central to become assistant auditor of the Insular government of Porto Rico, with headquarters at San Juan. After engaging in this work for two years, he re-entered the service of the Illinois Central at Chicago in May, 1914, as assistant to the comptroller, and continued in this position and later as assistant comptroller until June, 1918, when he was promoted to comptroller for the corporation during federal control. Following the termination of federal control on March 1, 1920, he assumed the duties of assistant to the vice-president and continued in this service until the time of his recent promotion.

G. J. Bunting, whose appointment as comptroller of the Illinois Central with headquarters at Chicago, effective May 15, was reported in the *Railway Age*



G. J. Bunting

of June 3 (page 1317), was born at Portsmouth, Va., July 14, 1881, and entered railway service in 1900 as general accountant for the Cashie & Chowan, in North Carolina, a position which he later relinquished to become associated in an accounting capacity consecutively with the Audit Company of New York and the Indiana Audit Company, in which service he remained until May, 1909, when he was appointed examiner of accounts for the Interstate Commerce Commission. He re-entered railway service on July 15, 1911, as general accountant for the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, a position which he held until March 15, 1913, when he was promoted to assistant general auditor. He left the service of this road on November 1, 1920, to become assistant director of the Bureau of Finance of the Interstate Commerce Commission, in which capacity he was engaged in effecting settlements between the carriers and the government for the guaranty period until May 15 of the current year, when he resigned to become comptroller of the Illinois Central as noted above.

Operating

T. R. Tompkins has been appointed supervising agent of the Michigan Central with headquarters in the general superintendent's office at Detroit, Mich., effective May 20.

O. H. Frick, whose promotion to superintendent of the LaCrosse division of the Chicago, Milwaukee & St. Paul, with headquarters at Portage, Wis., effective May 1, was reported in the *Railway Age* of May 6 (page 1046), was born at Manitowoc, Wis., on September 25, 1879, and was graduated from the University of Wisconsin in 1902. He started his railway career the same year as a levelman on the Louisville & Nashville, and a short time later became an assistant engineer for the Chicago, Rock Island & Pacific, which position he held until 1904, when he became resident engineer for the Missouri, Oklahoma & Gulf. Leaving this position in September, 1904, he was employed for two months as resident engineer for the Apalachicola Northern and thereafter entered the service of the Chicago, Milwaukee & St. Paul, serving continuously with the road in the consecutive capacities of assistant engineer, pilot engineer and field engineer on valuation work until April, 1919, when he was promoted to district engineer, with headquarters at Milwaukee, Wis., the position he held at the time of his recent promotion.

Traffic

F. E. Pennington has been appointed traveling passenger agent of the Missouri Pacific at Birmingham, Ala.

W. Ray Wilson has been promoted commercial agent of the Gulf Coast Lines, with headquarters at Pittsburgh, Pa., effective May 15, to succeed L. B. Williams, resigned.

J. R. Chisman has been promoted to general agent of the Nashville, Chattanooga & St. Louis, with headquarters at Memphis, Tenn., effective June 1.

J. M. Mallory, industrial agent of the Central of Georgia, will henceforth be designated as general industrial agent and **J. F. Jackson**, agricultural agent, will henceforth be general agricultural agent.

H. J. Earley has been appointed assistant general freight agent of the Denver & Rio Grande Western with headquarters at Denver, Colo., with charge over the issuance of tariffs, division sheets and the quotation of rates.

John V. Mahon, has been promoted to general agent of the Chicago, Minneapolis & Omaha, with headquarters at Duluth, Minn., effective May 16, to succeed **T. J. Kenniff**, promoted to assistant general freight agent.

Arthur W. Large, chief clerk to the agricultural agent of the Chicago, Rock Island & Pacific, has been promoted to agricultural agent, with headquarters at Chicago, effective June 1, to succeed **Alexander Jackson**, deceased.

B. W. Herrman, general freight agent of the Norfolk & Western with headquarters at Roanoke, Va., has been appointed assistant freight traffic manager with the same headquarters. **G. F. Butler** succeeds him as general freight agent. **O. W. Cox**, division freight agent at Roanoke, has been appointed coal freight agent, succeeding **W. A. Huse**, who has been appointed assistant general freight agent. **F. H. Pitman** succeeds Mr. Cox as division freight agent. **J. H. Wilson** has been appointed assistant general freight agent with headquarters at Roanoke and **G. C. Vanzandt** to a similar position at Cincinnati, Ohio. **F. W. Jones** has been appointed general agent at Cincinnati. **S. F. Thacker** has been appointed commercial agent at Bristol, Tenn.

Ira S. Auch, whose appointment as assistant general freight agent of the Lehigh Valley, with headquarters at Buffalo, N. Y., was announced in the *Railway Age* of May 27, page 1263, was born at Chalfont, Pa., on May 24, 1881. He entered railway service with the Philadelphia & Reading as a clerk in the freight claim department in 1899 and in 1902 was promoted to rate clerk in the general freight office of the same company. In 1906 he went with the Lehigh Valley as soliciting agent at Philadelphia. In 1909 he returned to the

Philadelphia & Reading as assistant chief clerk in the general freight office where he remained until 1913, when he was appointed general agent of the Erie at Philadelphia. He served there until the closing of the office in 1918, when he was transferred to the Erie headquarters at New York and remained there until January, 1920, when he went to Bethlehem, Pa., to organize the Nazareth Traffic Bureau. On March 1, 1920, he was appointed district freight agent of the Lehigh Valley and remained in that position until the time of his recent promotion.

Harry A. Mintz, whose promotion to assistant general freight agent on the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., to succeed L. A. Mitzner, was reported in the *Railway Age* of June 3 (page 1317), was born in St. Paul, Minn., in 1889, and entered railway service on October 1, 1908, as an employee in the tariff bureau of the Chicago, St. Paul, Minneapolis & Omaha, in which department he served in various capacities until his recent promotion.

T. J. Kenniff, whose promotion to assistant general freight agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., was reported in the *Railway Age* of June 3 (page 1317), was born in Marquette, Mich., on February 16, 1883, and was educated at the Wisconsin Normal College, which he left in 1903. After spending some time on railway construction work in the employ of contractors, he entered railway service in 1901 as an employee on the Lexington-Jefferson City branch of the Missouri Pacific, where he served for a year, when he was transferred to the White river line of that road. He entered the service of the St. Louis-San Francisco in 1902 and worked with that road at St. Louis and later at Memphis until 1905, when he was engaged on the construction of the Emporia-Ottawa cutoff of the Santa Fe for a year. He left railway service in 1906 to spend a year in irrigation work on the Platte river in Nebraska and Wyoming, following which he re-entered railway service as an engineering assistant on the Western Pacific in Nevada. He became connected with the Chicago, St. Paul, Minneapolis & Omaha in 1908 as a clerk and served continuously on that road in the consecutive capacities of clerk, agent, soliciting freight agent, commercial agent and general agent until his recent promotion.

Mechanical

F. C. Simpson, master mechanic of the Southern with headquarters at Bristol, Va., has been transferred in a similar capacity to Knoxville, Tenn. **M. D. Stewart** succeeds Mr. Simpson at Bristol.

J. P. Roquemore, acting superintendent of motive power of the International & Great Northern since May 9, and prior to that mechanical engineer of the same company, was on May 30 appointed superintendent of motive power. **L. E. Temple** has been appointed mechanical engineer.

Engineering, Maintenance of Way and Signaling

H. A. Israel, assistant engineer of the Missouri Pacific, with headquarters at St. Louis, Mo., has been promoted to division engineer of the Kansas City Terminal division, with headquarters at Kansas City, to succeed C. A. Hewes.

H. Coppertwhait, assistant supervisor of signals of the Central of New Jersey, with headquarters at Elizabeth, N. J., has been promoted to supervisor of signals, with headquarters at Long Branch, N. J., effective May 24, to succeed **F. A. Rooney**, transferred to Phillipsburg, N. J., to succeed **J. F. Jacobs**, deceased.

Purchasing and Stores

B. W. Griffith has been appointed general storekeeper of the Michigan Central with headquarters at Detroit, Mich., succeeding **G. T. Dunn**, resigned.

C. R. Painter has been appointed assistant to the general purchasing agent of the New York, New Haven & Hartford with headquarters at New Haven, Conn., succeeding **B. L. Northam**, resigned.

Obituary

E. F. Needham, formerly superintendent of motive power of the Wabash, whose death on May 18 in Boston, Mass., was reported in the *Railway Age* of May 27 (page 1264), was born at Batavia, Ohio,



E. F. Needham

on December 25, 1864, and entered railway service in 1880 as a repair track laborer on the Wabash at Butler, Ind. Shortly thereafter he became a boilermaker's apprentice at the Fort Wayne, Ind., shops, and at the conclusion of his apprenticeship in 1894, was promoted to foreman of the boiler shops at Fort Wayne. He was transferred to Springfield, Ill., as boiler foreman in January, 1899, was advanced to assistant master mechanic with headquarters at Decatur, Ill., on December, 1901, and held this position at Decatur and, after April, 1902, at Ashley, Ind., until October, 1902, when he was promoted to master mechanic with headquarters at Fort Wayne, Ind., having supervision over the Detroit, Peru and Buffalo divisions. He was transferred to Springfield, Ill., as master mechanic in charge of the Decatur and Springfield divisions in March, 1906, and on September 1, 1907, became superintendent of motive power, a position he held until June 1, 1920, when he resigned on account of ill health.

William C. Edes, ex-chairman and former chief engineer of the Alaska Railroad Commission, died on a train near Merced, Cal., May 25, at the age of 65 years. Mr. Edes was born at Bolton, Mass.,



Wm. C. Edes

on Jan. 14, 1856, and was educated at the Massachusetts Institute of Technology, from which he was graduated in civil engineering in 1875. He entered railway service three years later as a member of a railway location party on the Southern Pacific and continued in the employ of this company in various engineering capacities in Arizona, New Mexico and Texas until 1882, when he entered in private practice in Massachusetts. He re-entered railway service in 1886 as assistant engineer on location and construction for the Southern Pacific and continued in that work for 10 years, during which time he had charge of the construction of a portion of the Oregon & California. He became chief assistant engineer of the San Francisco & San Joaquin Valley in 1896, and in 1901 re-entered the service of the Southern Pacific as assistant engineer, where he was engaged in locating new lines and supervising the reconstruction of other lines, including the Central Pacific from Rocklin, Cal., to Truckee, until 1905, when he became district engineer maintenance of way, with headquarters at San Francisco. A year later he was appointed chief engineer of the Northwestern Pacific. In May, 1914, he was appointed chairman and chief engineer of the Alaskan Engineering Commission. In 1919, he assumed the title of consulting engineer, a position he relinquished in March, 1920, to engage in private consulting work.

Railway Age

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WE GUARANTEE that of this issue, 12,000 copies were printed; that of these 12,000 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; 1,100 copies for distribution at Atlantic City.

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It is hard for business and industry to settle down to normal after the jolts that they received from the World War. Time will, of course, iron out the wrinkles, but much discomfort and even suffering may be relieved if the underlying economics of the situation are carefully studied and intelligent steps are taken to improve the conditions. The necessity for studying economy and promoting efficiency in all lines of endeavor was never so great; moreover, while this country is particularly favored, it has drawn upon its natural resources with too lavish a hand and must awaken to a full realization of the necessity for conserving these resources to a far greater extent than it has in the past. In considering our resources, however, we too often stress unduly the material resources. One of our greatest extravagances has been the carelessness with which human effort has often been utilized. Comparatively little study has been given to personnel problems. This applies with special force to the railroads, although it would be unfair to say that they are very far behind the average industry or business in this respect. Incidentally, one of the greatest mistakes that has been made has been the haphazard way in which foremen have been selected, trained and supervised. These men are the keystone of the arch and must measure up to a high standard if they are successfully to interpret the spirit of

The Keystone of the Arch

War. Time will, of course, iron out the wrinkles, but much discomfort and even suffering may be relieved if the underlying economics of the situation are carefully studied and intelligent steps are taken to improve the conditions. The necessity for studying economy and promoting efficiency in all lines of endeavor was never so great; moreover, while this country is particularly favored, it has drawn upon its natural resources with too lavish a hand and must awaken to a full realization of the necessity for conserving these resources to a far greater extent than it has in the past. In considering our resources, however, we too often stress unduly the material resources. One of our greatest extravagances has been the carelessness with which human effort has often been utilized. Comparatively little study has been given to personnel problems. This applies with special force to the railroads, although it would be unfair to say that they are very far behind the average industry or business in this respect. Incidentally, one of the greatest mistakes that has been made has been the haphazard way in which foremen have been selected, trained and supervised. These men are the keystone of the arch and must measure up to a high standard if they are successfully to interpret the spirit of

the management to the men, and hold the confidence of the men. If in some way this truth, and what it means to the railroads in the way of improved efficiency and economy, could be deeply impressed upon the minds of the higher officers, the results would be astounding.

The Railway Supply Manufacturers' Association, in placing a 350-page pocket notebook in the hands of each member of the railway associations meeting on the pier during the next two weeks, has provided the railroad men with a real convenience. One of the pages is devoted to each exhibitor, whose name, with a description of the exhibit, is printed at the top. These pages are arranged alphabetically so that each one may be located without difficulty. Notes kept in this book will be in excellent form for later reference, which in itself will add considerably to their value. But the distribution of this convenient notebook also carries with it a suggestion. The exhibit should be taken seriously and not considered as a rather elaborate form of entertainment. It has been brought together at large expense and it offers an educational as well as a business opportunity to railroad men which fully justifies the expense, but only if the opportunity which it offers is seriously and consistently utilized. Let the notebook be liberally used.

A Convenience and a Suggestion

The exhibit should be taken seriously and not considered as a rather elaborate form of entertainment. It has been brought together at large expense and it offers an educational as well as a business opportunity to railroad men which fully justifies the expense, but only if the opportunity which it offers is seriously and consistently utilized. Let the notebook be liberally used.

There is always a certain amount of car work which necessarily must be done on small repair tracks with simple, inexpensive devices. Work done at these outlying points is costly, but oftentimes they are allowed to handle work that could have been done much more cheaply by a large shop with better facilities. A typical example is the changing of wheels on passenger cars. How often wheels near the condemning limit are allowed to run until the inspector at some out-of-the-way terminal finds that they take the gage. Then the repair track force has a job on its hands. The body has to be jacked high to roll out the trucks and the trucks in turn must be jacked up to remove the wheels. At a larger shop, where a drop pit is available, the work could be done in one-fifth the time. Is this not typical of what goes on every day? There seems to be a need for a different viewpoint with regard to the methods and facilities for car repairs. As much of the work as possible should be done at the principal shops. At the more important points the work should be systematized and an effort should be made to apply power operated devices and efficient tools instead of doing the work by an extravagant expenditure of manual labor.

Keep Work Off the Small Repair Track

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The supply of skilled shop mechanics is not being recruited nearly as rapidly as it should be to take care of future requirements. Steps should be taken at least to make sure that each shop maintains its full quota as provided for in the national shop agreement. Moreover, it is important that measures be taken to insure that the best possible mechanics will be made from the boys who are now enrolled in apprenticeship courses. One superintendent of motive power, a skilled observer and a man of vision, indicates that the following are essential features of an apprenticeship course: (1) Follow the progress of each apprentice through the shops and see to it that he does not stagnate on any one class of work; (2) determine, if possible,

Suggestions as to Apprentices

Moreover, it is important that measures be taken to insure that the best possible mechanics will be made from the boys who are now enrolled in apprenticeship courses. One superintendent of motive power, a skilled observer and a man of vision, indicates that the following are essential features of an apprenticeship course: (1) Follow the progress of each apprentice through the shops and see to it that he does not stagnate on any one class of work; (2) determine, if possible,

what class of work he is best suited to and develop him accordingly; (3) make the drawing room work interesting and if possible have the more advanced apprentices work on drawings that are actually to be used in connection with their shop assignments; (4) allow both the regular and the helper apprentices to assist in work in connection with the making of locomotive indicator tests and similar special work.

The advent of the radio broadcasting station has focused more attention upon wireless communication during the past year than has ever been given to it during the entire 25 years since its inception. The reason lies obviously in the successful development of the radio telephone by which wireless transmission of speech has been made possible. Prior to this development general interest in the art was restricted to a limited number, largely boys, who would take the trouble and time to learn the telegraph code. The radio telephone has changed all this and subsequent applications of this new invention bid fair to reach no mean proportion. On railroads, experiments showing the possibility of communication between stationary and moving equipment have proved to be most successful. Just what these experiments may ultimately lead to, is more or less a matter of conjecture. If there is a demand for public communication facilities on moving trains, such facilities will certainly be installed. From a purely operating standpoint, there is great likelihood of establishing communication between dispatchers and train crews, and on long freight trains between locomotive and caboose. The value of such communication is difficult to estimate, but it is almost a certainty that over a period of time it would prove to be an important factor in expediting the movement of trains. For roads employing tug boats, wireless communication between dispatchers and boats will prove to be of inestimable value. It has already proved its value for emergency conditions. Just what lies in the immediate future as regards the adoption of radio communication by the railroads is difficult to predict, but there can be no longer any doubt that the subject is one deserving of careful consideration.

From the theoretical standpoint the superiority of friction draft gear over draft springs is easily demonstrated. The capacity of springs is so low that they can take up the energy in a car only if it is moving at extremely low speeds and they do not give the proper protection to heavy cars. Nevertheless it is a fact that some roads maintain that springs give as good results as friction gears, which suggests that the springs may have some advantages that are not apparent from the theoretical standpoint. The explanation is probably to be found in the condition of many of the friction gears in service. A spring exerts a considerable force to return to normal position. Observation shows that friction gears often have free slack or "stick" so that the travel and capacity are reduced. The statement has been made that the coupler key bearing on the sill often takes the shock of pulling and hitting, but this is probably a rare condition. Granting that friction gears sometimes are ineffective, the gear is not entirely to blame. A friction draft gear is a machine for dissipating energy. Like any machine it cannot operate properly for an indefinite period without attention. Would it not be worth while to inspect and it

necessary overhaul friction draft gears periodically to get the benefits that can be obtained from these devices when they are operating properly?

The members of the Railroad Labor Board who are attending the conventions in a body deserve to be congratulated on the wisdom and discrimination shown by them in their recent decision in the shop crafts wage case in refraining from awarding any reduction in the compensation of supervisory officers in the mechanical department. For years most supervisory officers of railways were paid too little in proportion both to the salaries of the officers above them and the wages of the employees whose work they directed. In the long run this was bound to have a bad effect on railway efficiency. It discouraged many supervisory officers and in some cases made it difficult to get the most competent men to accept such positions. The most capable men available are needed in supervisory positions, both because of the immediate importance of their work and because an ample supply of able and experienced men should always be available for promotion from supervisory positions to higher and more responsible places in the railway organization. The board has done not only the supervisory officers, but the railways, a good service by using its influence to cause the former to be paid as they should be.

One of the most noticeable recent developments of transportation methods has been the application of the light gasoline engine driven car for handling passenger and baggage traffic on branch lines or other places where the amount of business has not been sufficient to meet operating expenses of a locomotive and one or two cars. To be sure somewhat similar attempts were made a number of years ago but the anticipated economies were not realized. This lack of success was due partly to the fact that the gasoline engine was then in the early stages of its development, and partly to a failure to realize the limitations of this type of prime mover. Since that time the gasoline engine has been highly developed and is used in an enormous number of automobiles and trucks; the size of such engines, however, still remains at less than 75 hp. Auxiliary devices, such as transmission, clutches, etc., have also reached a high stage of development. A few years ago several railroads converted road motor trucks or busses to rail use by substituting special wheels and making a few other changes. Some of the truck builders soon saw that here might be a new field for business and built a number of similar converted busses. Later on other cars were constructed, the design of which was worked out by co-operation between railroad engineers and the truck builders. In a general way the results have been highly encouraging and it would appear that there is a field where such vehicles can replace a steam-operated train with decided economies in operation and with satisfaction to the public. In considering new applications of such motor cars the vital necessity of keeping the weight of every part of the car down to a minimum and the utilization of highly developed engines of the size now used in road motor trucks should not be overlooked. With these limitations, however, the seating capacity of the cars will not exceed 35 or 40 persons. Future developments will doubtless be along the line of improvements in details of construction, particularly in running gear.

**Railroad
Radio
Application**

**Wages of
Supervisory
Officers**

**Light Gasoline
Rail Motor
Cars**

**Maintenance
of Friction
Draft Gear**

The Present Status of Piecework

UNDER THE RAILROAD Administration all railroad shops in the United States were put on a day-work basis and a uniform rate of pay given for similar work, irrespective of the relative efficiency of the men, their geographical location, or variable living costs. Without doubt the abolition of piece work was one of the most serious mistakes of the Railroad Administration and one which entirely disorganized many shops throughout the country, changing them from smooth-running organizations with high production to shops in which the men were continually dissatisfied and patently endeavoring to curtail production. Admitting that certain features of piece work are undesirable and admitting that some railroad men of considerable prominence can be found who do not favor the system, piece work, or some equivalent method of paying men in proportion to their industry and skill, is absolutely essential to bring shop production up to the point where it ought to be and reduce correspondingly the cost of locomotive and car repairs.

When there is a surplus of labor there may not be a great need of piece work because the desire to hold their jobs provides men with the incentive necessary to produce a fair day's work. When the shoe is on the other foot, however, and there is more work than men, production naturally tends to fall off. It is simply a case of psychology. Not one man in a thousand ever works just for the love of working. There must be some incentive, whether desire for advancement, hope for greater remuneration, or fear of losing one's job.

The stock arguments against piece work are many, and yet most of them can be refuted by other arguments which stand the test of common sense. One of the principal difficulties and one which perhaps influenced the Railroad Administration more than any other in its decision to eliminate piece work, was the difficulty of determining a proper basis upon which to raise the piece work rates. This is perhaps the most serious objection to piece-work but it would seem that some system could be devised of expressing definite operations on a time basis rather than a price basis. If necessary, as a result of changes in the cost of living, to reduce the rate of compensation, the general wage rate could be reduced correspondingly without making any change in the time rate for the operation. This would indicate to the shop men just where and why the necessary reduction was made and there would be no feeling that the time rate for the individual job was being cut.

It has been said that inferior work is done under piece-work systems, and the answer is that a careless workman will do careless work under any system, *if he can get away with it*. The most effective way to checkmate him is for the inspector to discover one or two defective jobs and make him do them over again at his own expense. One or two examples of this kind are usually sufficient. The arguments that work will be hidden away and that some work may be paid for twice can doubtless be substantiated in a few cases, but it is safe to say that in the main, with competent inspectors and rates fairly set, piece-work represents the best system of wage payment from the standpoint of both management and men which has yet been tried. Within recent months the Labor Board has removed the inhibition against piece-work and at the request of a large proportion of the men certain shops have gone back on the piece-work system of payment, in one case at a 25 per cent increase over 1917 piece-work rates. In view of the good showing of railroad and contract shops operated on a piece-work basis and because of the need for reducing expenses, it will be interesting to note the success attained by those shops which are now reinstating piece-work systems.

Program for This Week

THE MEETINGS of Division V—Mechanical, American Railroad Association, will be held in the Greek Temple on the Million Dollar Pier. The official headquarters of the Division will be at the Marlborough-Blenheim Hotel. The sessions will open at 9.30 a.m. and the members are requested to be in their seats promptly.

Wednesday, June 14, 1922

9:30 a. m. to 12:30 p. m.

Prayer.

Address of Welcome by Mayor of Atlantic City.

Opening Exercises, Including Address by Chairman.

Action on Minutes of Annual Meeting of 1920.

Appointment of Committee on Subjects, Resolutions, Correspondence, Obituaries, etc.

Unfinished Business.

New Business.

Report of General Committee.

Discussion of Reports on:

Nominations.

Safety Appliances.

Scheduling of Equipment Through Repair Shops.

ENTERTAINMENT

10.30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 p. m.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 p. m.—Tea will be served in Entrance Hall.

9.00 p. m.—Informal Dance including Special Features, Ball Room, Million Dollar Pier.

Thursday, June 15, 1922

9:30 a. m. to 12:30 p. m.

Discussion of Reports on:

Prices for Labor and Material.

Arbitration.

Tank Cars.

Loading Rules.

Train Lighting and Equipment.

ENTERTAINMENT

10.30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 p. m.—Tea will be served in Entrance Hall.

9.30 p. m.—Grand Ball, Ball Room, Million Dollar Pier.

Friday, June 16, 1922

9:30 a. m. to 12:30 p. m.

Discussion of Reports on:

Car Construction.

Couplers and Draft Gears.

Brake Shoe and Brake Beam Equipment.

Train Brake and Signal Equipment.

Car Wheels.

ENTERTAINMENT

10.30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 p. m.—Tea will be served in Entrance Hall.

9.00 p. m.—Informal Dance, Canadian Night with Special Features Ball Room, Million Dollar Pier.

Saturday, June 17, 1922

Entire Day Set Aside by Mechanical Division V to View the Exhibits.

ENTERTAINMENT

10.30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

9.00 p. m.—Informal Dance, Carnival Night with Special Features by H. T. McConnell of Chicago, Ball Room, Million Dollar Pier.

Long Distance Telephone Service

A SWITCHBOARD with necessary operators will be established on the Pier in connection with several long distance booths, conveniently located in different sections of the pier.

Cornell Dinner on Monday

THE DINNER of the Cornell alumni, which is a regular feature of convention week, will be held Monday evening, June 19, at the Traymore. All who expect to attend should register with A. F. Stuebing at the *Railway Age* booth.

Post Office and Mail

UNITED STATES MAIL addressed care of Secretary's Office, Million Dollar Pier, Atlantic City, N. J., will be taken care of and distributed to exhibitors' booths.

Members are requested not to send general circular matter for distribution to other exhibitors, as this is a violation of the association rules.

R. S. M. A. Annual Meeting and Election

THE ANNUAL meeting of the Railway Supply Manufacturers' Association will be held in convention hall on the pier at 12 o'clock Saturday. District meetings for the election of executive committee members will be held Saturday morning from 10:30 to 11:30 o'clock.

President Schurch, of the Railway Supply Manufacturers' Association, has appointed the following members to serve as a nominating committee to select the Association's officers for the following year: S. P. Bush, chairman; Sam Allen, Horace Parker, Frank Lanahan, Burton Mudge, George L. L. Davis and Walter B. Leach.

This is Flag Day

TODAY IS THE 145th anniversary of the adoption of the national flag by the Continental Congress. It may be properly observed by displaying a small American flag in your buttonhole. Several members of the Mechanical Division have made a point of religiously observing this day in past years and have felt that more of the convention attendants should recognize it. To make sure that the matter would not be overlooked, the *Daily News* two years ago commissioned R. D. Smith, superintendent motive power and rolling stock of the Boston & Albany, to see that this important event was not overlooked in the *News* this year. He has discharged his duty faithfully and we hope that the result will be a generous display of flags.

Railroad Club Secretaries

Meet Tomorrow

THE SOCIETY OF RAILWAY CLUB SECRETARIES will hold its annual meeting at the Marlborough-Blenheim tomorrow, Thursday morning, at 10:00 a. m. It will be followed by a "round-table luncheon" immediately after the adjournment of the meeting of the Mechanical Division, or about 1:00 p. m. The "round-table luncheon" was started several years ago and allows the secretaries and their guests to have an informal discussion on matters relating to the growth and development of the clubs. Each secretary is privileged to invite to this luncheon as a guest of the Society the president of his club or the next highest ranking officer who may be present at the

convention; also the chairman of the subjects committee. Several of the clubs have incorporated new features in their programs during the past two years and have taken important forward steps. It is anticipated, therefore, that a discussion of this sort will be most fruitful. Since the last annual meeting of the Society of Railway Club Secretaries the Western Railway Club has resumed its membership in the organization.

Rolling Chairs

THE TRANSPORTATION COMMITTEE will provide rolling chairs for members and guests of the convention wearing official badges within the time limits and at the places mentioned below.

Convention chairs are not allowed to wait more than fifteen minutes. The Transportation Committee will consider it a favor if members or guests of the associations will report to the committee any inattention on the part of an attendant. If the number on the chair is given, it will facilitate checking the complaint.

Unoccupied chairs may be stopped at any point on the boardwalk, except between the Marlborough-Blenheim and the pier, and they may be used in either direction.

Rolling chairs will be provided from the following stations, between the hours indicated, from June 14 to June 21, inclusive:

The Pier	A.M.	P.M.
Marlborough-Blenheim	9:00 to 6:30	9:00 to 6:00
Traymore	9:00 to 6:00	9:00 to 6:00
Chalfonte Hotel	9:00 to 6:00	9:00 to 6:00
Chelsea Hotel	9:00 to 6:00	9:00 to 6:00
Alamac Hotel	9:00 to 6:00	9:00 to 6:00
St. Charles Hotel	9:00 to 6:00	9:00 to 6:00
The Breakers	9:00 to 6:00	9:00 to 6:00
Ambassador Hotel	9:00 to 6:00	9:00 to 6:00
	P.M.	P.M.
To all Entertainments on Pier	8:30 to 10:00	

Enrollment Regulations

THIS YEAR special badges have been set aside for the officers and members of the executive or general committees of the various associations involved in the Atlantic City meetings. This applies also to the committee men of the Railway Supply Manufacturers' Association. All those included in these classifications should request the special badges when they enroll; this will be of great assistance to the Enrollment Committee and will facilitate the handling of registration.

Any mechanical department officer of the rank of general foreman or above is entitled, upon presenting proper credentials either in the form of a letter from his company instructing him to attend the conventions, or his annual transportation, to receive a Division V, Mechanical, membership badge. Guest badges will be issued to those below the rank of general foreman.

In the case of Division VI—Purchases and Stores, all officers in these departments having the title of assistant storekeeper or higher will be entitled to membership badges. Guest badges will be issued to those below the rank of assistant storekeeper.

Badges positively must not be loaned and no badges will be given to any one to be delivered to someone else.

Enrollment started on Monday afternoon at two o'clock. The enrollment booth will be open, during the conventions, as scheduled below.

	Morning	Afternoon	Evening
Wednesday, June 14	9 to 11	2 to 6	7 to 8
Thursday, June 15	9 to 11	2 to 6	7 to 8
Friday, June 16	9 to 11	2 to 6	7 to 8
Saturday, June 17	9 to 12	2 to 4	7 to 9
Sunday, June 18	11 to 12		7 to 8
Monday, June 19	9 to 11	2 to 6	8 to 9
Tuesday, June 20	9 to 12	2 to 5	
Wednesday, June 21	9 to 11		



C. D. Jenks
Vice-President



J. F. Schurch
President



J. D. Conway
Secretary-Treasurer

Railway Supply Manufacturers' Association

Pier Not Large Enough to Accommodate Exhibit; Many
Prospective Exhibitors Turned Away

THE PROBLEMS that the Railway Supply Manufacturers' Association had to solve in arranging for this year's conventions were both numerous and difficult. No convention was held last year, and at the time the decision was reached to hold one this year business was bad, and there was little assurance that it would get much better.

In consequence, many concerns hesitated about exhibiting at all, and considered sending only a much-reduced representation here. The confidence shown and the work done by the officers and members of the executive committee helped to arouse interest; and, of course, the interest rapidly became intensified when railway earnings began to improve and many lines began to come into the market for cars, locomotives and supplies of all kinds.

The result is that the convention will open today with the largest exhibit of equipment and supplies in history. In this connection it may be stated that the executive committee greatly regrets its inability to accommodate all those who applied for exhibit space. The pier simply was not large enough.

It is hardly necessary to say this is largely due to the fact that within the next ten days the Purchases and Stores Division convention, the Air Brake Association and the

Railway Electrical Engineers' convention, as well as the Mechanical convention, will be held here. The equipment and supply interests never before had opportunity to show their goods to officers in so many branches of the railroad business at one time and place, and as a result of the strenuous and efficient work of the officers and executive committee of the Railway Supply Manufacturers' Association, the exhibit is not only ready unusually early, but is one of the best, if not actually the best, ever given.

The object in preparing the entertainment program has been to incur as little expense as is compatible with providing pleasing and satisfactory entertainment in the intervals between sessions daily, throughout the time the conventions are in session. While the expenditure made for entertainment will not be large, it is believed the program will prove to be all that could be desired.

The conventions follow immediately on the heels of the worst business depression in 50 years—a depression in which many railway equipment and supply concerns that have been successful for years encountered serious financial difficulties. It would not have been surprising, therefore, if the exhibit had been comparatively small and other arrangements of the Supply Association in connection with the conventions had been made on a correspond-



G. W. Denyven



J. M. Gillespie



W. L. Krepps



G. L. Morton

Members of Executive Committee, Railway Supply Manufacturers' Association



L. S. Wright

L. B. Sherman

E. M. Savercool

H. G. Thompson

Members of Executive Committee, Railway Supply Manufacturers' Association

ingly limited scale. The fact that this is not the case is due not only to the natural optimism of the supply fraternity, but to the courage, energy and ability with which the officers and members of the executive committee have shouldered their responsibilities and done their work.

John F. Schurch was elected president of the association at the 1920 meeting and because there was no meeting last year, has had to head up the organization during two difficult years—troublesome because in 1920, after making all arrangements for the convention and a big exhibit, it was thought necessary to cancel them, and this year because of the difficulty in organizing the exhibit after missing a year. Mr. Schurch has been a most active worker in the association for many years, and with his associates is to be heartily congratulated upon the success of the big exhibit this year.

Mr. Schurch is a vice-president of Manning, Maxwell & Moore, Inc., in charge of sales in the middle west and west, with headquarters at Chicago. He is brand new on the job, having assumed this position June 1. He is a graduate of the University of Minnesota, going directly from that institution in 1893 to the Minneapolis, St. Paul & Sault Ste. Marie. He remained with that road until 1905, serving in the office of the auditor, the general superintendent, and in the transportation department, finally attaining the position of chief clerk to the vice-president. For the next eight or nine years he was associated with the Railway Materials Company of Chicago. He was elected vice-president of the Damascus Brake Beam Company in February, 1914, and in June of that year was elected president of the company. He resigned later in the year, however, to become vice-president of the Symington Company and remained with that company until the first of this month.

The vice president of the association is Charles D.

Jenks, president of the Damascus Brake Beam Company, Cleveland, Ohio.

The secretary-treasurer, John D. Conway, has officiated in that capacity for many years, making his headquarters at Pittsburgh, Pa. Naturally a large part of the detail work of the organization devolves upon his shoulders.

Executive Committee

The executive committee consists of the president, vice-president and twelve members who represent seven geographical districts. Several of the members of the executive committee are chairmen of sub-committees, although three important committees—entertainment, enrollment and transportation—have chairmen who are not members of that committee.

The names of the members of the executive committee and the districts they represent are as follows:

First district (New England states and Canada) one member: George W. Denyven, George W. Denyven & Co., Boston, Mass.

Second district (New York and New Jersey) three members: Charles W. Beaver, Yale & Towne Manufacturing Company, New York; W. K. Krepps, Crucible Steel Company of America, New York; and H. G. Thompson, American Radio & Research Corporation, Medford Hill-side, Mass. (Mr. Thompson has moved outside the district since the 1920 meeting).

Third district (Pennsylvania) two members: W. H. S. Bateman, The Parkesburg Iron Company and the Champion Rivet Company, Philadelphia, Pa.; and John M. Gillespie, Lockhart Iron & Steel Company, Pittsburgh, Pa.

Fourth district (Ohio, Indiana and Michigan) two members: George A. Cooper, Frost Railway Supply Company, Detroit, Mich.; and Edward M. Savercool, S. F. Bowser and Co., Inc., San Francisco, Calif. (Mr. Saver-



S. H. Campbell

W. H. S. Bateman

G. A. Cooper

C. W. Beaver

Members of Executive Committee, Railway Supply Manufacturers' Association

cool moved out of the district since the 1920 meeting).

Fifth district (Illinois) two members: L. B. Sherman, *Railway Age*, Chicago; and L. S. Wright, National Malleable Castings Company, Chicago.

Sixth district (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee) one member: George L. Morton, Galena-Signal Oil Company, Atlanta, Ga.

Seventh district (states west of the Mississippi river, including Louisiana, Minnesota and Wisconsin) one member: S. H. Campbell, Western Railway Equipment Company, St. Louis, Mo.

The members of the executive committee who were elected at the 1920 convention were Messrs. Denyven, first district; Krepps, second district; Savercool, fourth district; Sherman, fifth district, and Campbell, seventh district.

Three new members will be elected this year to suc-

- W. A. McWhorter, Bradford Draft Gear Company, Chicago.
- A. R. Miller, The B. F. Goodrich Rubber Company, New York.
- C. R. Naylor, T. H. Symington Company, Chicago.
- N. C. Naylor, Railway Steel-Spring Company, Chicago.
- George A. Nicol, Jr., Johns-Manville, Inc., New York.
- Leslie R. Pyle, Locomotive Firebox Company, Chicago.
- S. Worcester Sargent, American Steel Foundries, Philadelphia, Pa.
- Gardner W. Taylor, The R. T. Jones Lumber Company, Inc., New York.
- H. A. Varney, Sunbeam Electric Manufacturing Company, Chicago.
- Fred W. Venton, Crane Company, Chicago.
- Kal. R. Walsh, The Glidden Company, Chicago.
- W. M. Wilson, Flannery Bolt Company, Pittsburgh, Pa.

Enrollment Committee

The work of this committee is difficult and arduous. The committee is comparatively small for so difficult and tedious a task. It works in several shifts. The members are:

- F. H. Smith, Chairman, Gold Car Heating & Lighting Co., Brooklyn, N. Y.
- G. A. Baden, King Pneumatic Tool Company, Chicago.
- C. L. Bates, Railway Review, New York.
- J. E. Brown, O'Malley-Bear Valve Company, Chicago.
- J. E. Dodson, United States Rubber Company, Baltimore, Md.
- Arthur Haller, American Locomotive Company, Chicago.
- F. C. Koch, Railway Age, New York.
- S. I. Leslie, The Leslie Company, Lyndhurst, N. J.
- H. V. McKedy, The Glidden Company, New York.



H. E. Daniels



R. J. Himmelright



F. H. Smith

Chairmen of the Transportation, Entertainment and Enrollment Committees of the Railway Supply Manufacturers' Association

ceed Messrs. Beaver and Thompson of the second district, and Cooper of the fourth district.

Exhibit Committee

This committee, which has charge of all exhibit arrangements, is composed of five members, all of whom are also members of the executive committee. Charles W. Beaver is chairman, and the other members are John M. Gillespie, H. G. Thompson, Edward M. Savercool and L. B. Sherman.

Entertainment Committee

This committee, as its name implies, has charge of all entertainment features. Each of the various important events is entrusted to a sub-committee. The members are:

- R. J. Himmelright, Chairman, American Arch Company, Inc., New York.
- Charles L. Brown, Manning, Maxwell & Moore, Inc., Chicago.
- Lewis O. Cameron, Edgewater Steel Company, Washington, D. C.
- W. J. Carrigan, International Machinery & Supply Company, Ltd., Montreal, Que.
- J. Cizek, The Leslie Company, Lyndhurst, N. J.
- W. G. Cook, Garlock Packing Company, Philadelphia, Pa.
- R. P. Cooley, Vapor Car Heating Company, New York.
- C. W. Floyd Coffin, Franklin Railway Supply Company, Inc., New York.
- R. L. DeArmond, Lowe Brothers Company, Dayton, Ohio.
- W. J. Doherty, Continental Iron & Steel Company, New York.
- Arthur N. Dugan, Bronze Metal Company, New York.
- Clark D. Eaton, American Car & Foundry Company, New York.
- D. L. Euhank, Galena Signal Oil Company, Cincinnati, Ohio.
- T. W. Fogg, Boss Nut Company, Chicago.
- George E. Haas, Pyle-National Company, Chicago.
- Oscar C. Hayward, Williams-Hayward Company, Chicago.
- L. D. Hiner, Joseph T. Ryerson & Son, Chicago.
- Arthur G. Johnson, Armspear Manufacturing Company, New York.
- Webb G. Krauser, Union Draft Gear Company of Chicago, Montreal, Que.
- L. J. McCoombs, The Patterson-Sargent Company, Boston, Mass.

- L. D. Mitchell, Detroit Graphite Company, Chicago.
- H. S. Patterson, Walworth Manufacturing Company, Boston, Mass.
- G. E. Ryder, The Superheater Company, New York.
- R. Van Steenburgh, The Okonite Company, Passaic, N. J.
- C. W. Sullivan, Garlock Packing Company, Chicago, Ill.
- H. K. Williams, Safety Car Heating & Lighting Company, New York.
- Edward Wray, Railway Purchases & Stores, Chicago.

Transportation Committee

The transportation committee looks after the assignment of rolling chairs and other local transportation matters. Its members are:

- H. E. Daniels, Chairman, West Disinfecting Company, Chicago.
- W. S. Atkinson, Cook Paint & Varnish Company, Kansas City, Mo.
- G. E. Anderson, The Duff Manufacturing Company, St. Louis, Mo.
- C. Beaumont, Boss Nut Company, Baltimore, Md.
- G. R. Boyce, A. M. Castle & Co., Chicago.
- Ralph Brown, The Curtain Supply Company, Chicago.
- T. F. Clifford, Globe Seamless Steel Tubes Company, Chicago.
- H. A. Clark, The Garlock Packing Company, Montreal, Que., Canada.
- Howard P. Cook, Columbia Nut & Bolt Company, Bridgeport, Conn.
- F. E. Finley, La Glede Steel Company, St. Louis, Mo.
- F. J. Coolidge, The Buckeye Steel Castings Company, Chicago.
- F. M. Cmidt, Fairbanks, Morse & Co., Chicago.
- C. D. Derby, The Joyce-Gridland Company, Dayton, Ohio.
- Frank B. Flinn, Griffin Wheel Company, Chicago.
- E. C. Folsom, The Railway Materials Company, Chicago.
- J. N. Gallagher, O'Malley-Bear Valve Company, Chicago.
- C. H. Gaskill, Baldwin Locomotive Works, Philadelphia, Pa.
- E. L. Geoger, Pratt & Lambert Co., Chicago.
- C. J. Gorman, Union Draft Gear Company, Chicago.
- William Hickey, Magnus Metal Company, Chicago.
- Cyrus J. Holland, The Wine Railway Appliance Company, Chicago.
- George Hannaway, The National Refining Co., Chicago.
- W. A. Houston, Joseph Dixon Crucible Company, Baltimore, Md.
- J. W. Hackett, The Okonite Company, Passaic, N. J.
- S. M. Hamilton, The Bettendorf Company, Chicago.
- W. J. King, Hewitt Rubber Company, Chicago.
- Henry S. LaBarge, H. B. Channon Company, Chicago.
- George J. Lawrence, J. B. Ford Company, Wyandotte, Mich.
- Floyd K. Mays, Bradford Draft Gear Company, New York.

A. J. McNeil, General Electric Company, Chicago.
 J. A. M. Farnham, The B. & O. Company, St. Louis, Mo.
 J. J. N. Brown, G. B. Sealed Steel Tubes Company, New York.
 Bruce K. Owens, Magnus Metal Company, Chicago.
 H. A. J. Stre, Liberty Manufacturing Company, Pittsburgh, Pa.
 H. R. Parfitt, The Superheater Company, Chicago.
 T. J. Pave, Galena Signal Oil Company, St. Louis, Mo.
 H. D. Richardson, American Steel Foundries, New York.
 A. E. Biers, Grip Steel Company, Chicago.
 W. B. Russ, Edwin S. Woods Company, Chicago.
 George H. Snyder, American Steel Foundries, St. Paul, Minn.
 E. E. Thalen, Duff Manufacturing Company, Chicago.
 J. H. Trent, Johns-Manville, Inc., St. Louis, Mo.
 G. S. Turner, Harry Vissering & Co., Chicago.
 A. H. Weston, T. H. Sington Company, New York.
 W. F. Walsh, Galena Signal Oil Company, Chicago.
 S. C. Workman, Southern Wheel Company, Atlanta, Ga.
 R. R. Wells, U. S. Metal Packing Company, Philadelphia, Pa.
 T. H. Williams, Chicago-Cleveland Car Roofing Company, Chicago.

Other Committees

There are several other important committees which are made up entirely of members selected from the executive committee.

The finance committee includes George A. Cooper as chairman, W. K. Krepps and George W. Denyven.

The badge committee consists of L. S. Wright, chairman, George W. Denyven and Sterling Campbell.

The hotel committee consists of W. K. Krepps, chairman, L. S. Wright and W. H. S. Bateman.

The by-laws committee consists of George L. Morton, chairman, W. H. S. Bateman and Sterling Campbell.

Chairman Tollerton on His

European Trip

W. J. TOLLERTON, chairman of the Mechanical Division, has recently returned from Europe, where he attended the ninth congress of the International Railway Association, held at Rome, Italy, April 18 to 28, inclusive. During the trip Mr. Tollerton traveled some 4,000 miles over the railroads of England, Belgium, France, Switzerland and Italy, and had a splendid opportunity to compare railroad practices in Europe with those in America.

Commenting on the wide differences in the character of equipment and methods of the railroads of the two continents, Mr. Tollerton said that, generally speaking, they have been developed under such widely different commercial and traffic conditions that, in fairness both to Europe and to America, no direct comparison can be made and that if one looks far enough he will find that there are just as good reasons for the light freight trains and small cars of the Continental railroads as there are for the heavy trains of large capacity cars common in America.

"Take the fuel situation in Italy as an illustration," he said. "This country is an extensive producer of raw silk. Mulberry trees are grown for the leaves, which are stripped from the branches as food for silkworms. As soon as the leaves are harvested, the trees are cut back and the year's growth of branches is carefully collected and laid on the bare stumps of the trees to season. These branches are practically the only native fuel; the entire coal supply is imported. In Milan coal retails for 700 lire, or about \$42 a ton, American money, and is distributed in pounds, not in tons. Few dealers could afford to purchase coal in 50-ton lots, and the small 10-ton cars commonly used are as large as are justified by the economy of the trade.

The respect of the Italians for coal is indicated by the frequency with which loaded coal cars are covered with tarpaulins," he continued. "When not protected in this way, the tops of the loads are invariably covered with a coat of whitewash to detect and discourage pilfering."

To the American railroad man probably one of the most

marked differences between the practices of the two continents is in the weight and character of passenger equipment. Mr. Tollerton was the American reporter on the subject of passenger carriages at the Rome meeting of the International Railway Association, and says that in the discussion of this subject the European railway delegates objected to the American type of passenger car construction as being entirely too heavy. In France, before the introduction of steel underframes, the weight of passenger cars averaged about 400 lb. per passenger carried, and since the introduction of steel underframes the average does not exceed 600 lb. per passenger, which is considered to be the practicable limit. In this country the weight of coaches per passenger seating capacity seldom runs below 1,400 lb. and in sleeping cars is as high as 6,000 lb. All consideration for the convenience and safety of passengers seems to be entirely omitted in the design of coaches on the Continental railroads, but here again a strict comparison can not be made with our cars because the average journey, except on De Luxe trains, is much shorter in Europe than in America.

In Europe, Mr. Tollerton says, first cost is a greater factor in determining the character of equipment than it is in this country. Continental European roads show a marked preference for gas lighting rather than electric lighting in passenger cars. They admit the economy of operation of the electric lighting equipment, but stick to the gas lighting system because of the greater expense of installing the electrical equipment.

Generally speaking, Mr. Tollerton found passenger car conditions rather poor on the Continent, but motive power conditions very fair, particularly in France, England and Belgium, the cost of fuel compelling attention to the motive power in the interests of fuel economy. In this connection most train schedules have been very greatly lengthened in order to reduce the fuel consumption, a practice which is made possible by the fact that all employees in the train service are paid either on a weekly or a monthly basis.

"The trip was most interesting," said Mr. Tollerton in conclusion. "We were received with the utmost courtesy by railroad officials in every country we passed through, who did everything that conditions would permit to make our journey a pleasant and comfortable one."

Mr. Tollerton is accompanied to the convention by Mrs. Tollerton, and they are at the Marlborough-Blenheim.

Special Train From Chicago

THE SPECIAL ATLANTIC CITY convention train over the Pennsylvania Lines left Chicago at 1:40 o'clock Monday p. m. It ran in two sections and the story goes that if the Pennsylvania officials had not been handicapped for passenger equipment, they would have run the train in three sections. The make up of the two sections was almost identical—1 baggage, 1 buffet, 2 dining, 3 sleeping, 1 compartment and 1 observation car.

Though the starting time was slightly delayed, both sections arrived in Atlantic City at 10:45 o'clock yesterday A. M., practically on time.

The journey to the seashore was without incident all the passengers enjoying the trip.

New Purchasing Officer for the Frisco

A. H. LARIE has been appointed assistant to the vice-president and chief purchasing officer of the St. Louis-San Francisco with headquarters at St. Louis, Mo.

Conventionalities

"Uncle Bill" Lewis arrived early, hale and hearty, having fully recovered from a rather serious accident last winter. He joined the Master Car Builders' Association in 1878, when it was eleven years old.

Clement F. Street is celebrating the fact that it is thirty years since he attended his first convention. He was at Saratoga in 1892, and has missed only one convention since. This was in 1904, when he was in Australia.

W. B. Storey, president of the Atchison, Topeka & Santa Fe, arrived yesterday to attend the convention. Mr. Storey is the A. R. A. executive committee member for the Mechanical Division and is therefore, especially interested in the conventions and the exhibit.

Charles R. Ellicott of the Westinghouse Air Brake Company will be missed at the conventions this year. He has found it necessary to seek relief from business activities for a short time and is now on a trip in the west; it is expected he will follow that plan of recreation during the remainder of the summer.

Robert B. Rasbridge, superintendent car service, Philadelphia & Reading, one of the workers of the Mechanical Section, arrived early and is at the Dennis. Mr. Rasbridge's many friends at the convention greatly regret the passing by death of Mrs. Rasbridge, some two weeks ago.

Mr. and Mrs. George A. Barden, Philadelphia, were among the early arrivals. It is their twenty-first convention. This year Mr. Barden is announcing his new business connection—that of district manager of the King Pneumatic Tool Company, with headquarters at Philadelphia.

R. H. Aishton, president of the American Railway Association, is expected to arrive in Atlantic City on Sunday. He will attend a meeting of the executive committee of the A. R. A. in New York on Thursday, and it is thought that some other members of the executive committee will come down with him.

Leslie R. Pyle, of the Locomotive Firebox Company, is among those whose plans for attending the convention went wrong. Mr. Pyle went out on the Southern Pacific to be present at a test of the thermic syphon, and the work has been delayed so he will spend the convention weeks on the Pacific Coast instead of on the Boardwalk.

John Hennessey and John Lentz, two old-time conventionalities known to all, are here as usual. "J. H." has fully recovered from an operation two years ago when he missed the 1920 gathering of the clans. He is now enjoying good health. "J. L." seems to be minus his market basket and umbrella and his many friends are mystified thereat.

Charles D. Jenks, vice-president of the Railway Supply Manufacturers' Association, will be a late arrival at the convention. At his home in Cleveland he is making a full recovery from a serious abdominal operation performed some five weeks ago in a Cleveland hospital. Mr. Jenks expects to join his many friends here within a few days.

C. F. Giles, superintendent of machinery of the Louisville & Nashville, reports that traffic recently has picked up remarkably on his railway and that it is now handling a large business. The northbound movement of fruits, vegetables and other perishables is especially heavy. The Louisville & Nashville's territory plainly is entering a new period of prosperity.

George Cooper came early with news about a long day's drive in an automobile he took the other day and a reduction of his weight. There was some confusion at first as to whether he said he drove 290 miles in one day and formerly weighed 364 pounds, or vice versa. The matter finally has been cleared up. Just before he left he drove from Detroit to Traverse City, Mich., 364 miles in a single day. It wasn't the drive that caused it, but he announces also that he recently has been wasting away, his avoirdupois having declined from 290 pounds to a trifle of only 266. Even at this rate, it will take George some time to qualify as a featherweight.

E. M. Harshbarger, formerly assistant manager of the St. Louis district office, also in charge of railway sales in that district for S. F. Bowser & Co., Inc., manufacturers of oil storage systems, has been appointed manager of the railroad sales department, with headquarters at the home office in Ft. Wayne, Ind. During the war it was necessary for the Bowser Company to devote almost its entire facilities to the requirements of the government. Since the war its railroad department has been reorganized on a basis which now makes it possible to extend engineering and sales service to railways from any and all of its branch offices, which are located in every large city in the United States. This is Mr. Harshbarger's first convention, but it will not be his last.

A. W. Lemme, who completed his apprenticeship as a moulder in the Bloomington, Ill., shops of the Chicago & Alton in 1892 and who since that time has had a very wide foundry experience in various capacities, has recently joined the staff of the O'Malley-Bear Valve Company, Chicago. He was for eleven years general superintendent of the Chicago Bearing Metal Company and will function in his new connection as a bearing metal specialist in charge of the O'Malley-Bear journal bearing and locomotive brass casting service. Mr. Lemme is a past president of the Chicago Foundrymen's Club and is acting as a member of the Fuel Auxiliary of the Illinois Manufacturers' Association.

J. M. Davis, president of Manning, Maxwell & Moore, Inc., will come to the convention today as a railway supply man for the first time. He was elected to his present position a year ago, after having been in railway service almost exactly 30 years, and after having climbed the ladder all the way from a freight brakeman on the San Antonio & Aransas Pass to vice-president in charge of operation of the Baltimore & Ohio. Few men have as broad a knowledge of general railway conditions in North America as Mr. Davis, since he worked at different times as an employee or officer on the San Antonio & Aransas Pass; Gulf, Colorado & Santa Fe, Mexican Central, Great Northern, Erie, Oregon Short Line, Southern Pacific, of which he was general superintendent, Cincinnati, Hamilton & Dayton, and Baltimore & Ohio Southwestern, of which he was general manager, and Baltimore & Ohio, of which, as already indicated, he was vice-president. He left the Baltimore & Ohio in 1919 to become president of the Rock Hill Iron & Coal Company and associated corporations, including the East Broad Top Railroad & Coal Company.



Exhibit Characterized by Many New Devices

Machine Tool Exhibit the "Best Ever"; Large Track Exhibit; Important Developments in Specialties and Equipment Since 1920

THE RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION and its exhibit committee made a record this year. Shipments of exhibits arrived earlier than usual in Atlantic City and were promptly taken to the pier and installed with clock-like precision. Everything worked smoothly and on time. Last evening the final touches were given, the cleaning up finished, and all was in readiness for this morning.

The scope of the exhibits is without question the largest in the history of the R. S. M. A. It ranged from the many new features in small equipment devices for cars and locomotives to the complete cars and locomotives themselves. The track exhibit on Mississippi avenue near the Boardwalk shows a number of locomotives and passenger and freight cars. A careful inspection and study of this exhibit should be made by all convention people before they leave Atlantic City.

At one time during the past winter it looked as if the entire space in Machinery Hall would not be used by the manufacturers of machinery and tools. Subsequently, however, every square foot of space was taken and today there is presented for the inspection of the railway men the most complete machine tool exhibit ever made. In order to take care of such an exhibit it was found necessary for operating purposes to increase the air and electric power service more than 50 per cent over previous years.

Ninety-six thousand square feet of exhibit space—all the available space on the pier, except the balcony, which has been found to be not desirable—is being used this year by 341 exhibitors—and it was found some time ago

less space to applicants than had been asked. Many of the larger companies in the full convention spirit of co-operation, readily cut down their requirements for space in favor of those who had none. Even at that it is a regrettable fact that 75 applications for space could not be granted.

List of Exhibitors

Aeroil Burner Company, Inc., Union Hill N. J.—Portable oil burners; thawing outfits for track and maintenance departments; kerosene blow torches; blue flame kerosene gas burners; pitch and asphalt kettle burners; locomotive and steel car repair torches; combination soldering iron and blow torch. Represented by George P. Kittel and Gustav Kittel. Space 704.

Air Reduction Sales Company, New York.—Demonstrations of Airco-Davis-Bournonville specially designed machines for automatic oxy-acetylene welding and cutting (radiograph, oxygraph and camograph) and of hand welding and cutting torches; cylinders of Airco oxygen and Airco acetylene and various other units of Airco and Airco-Davis-Bournonville manufacture. Represented by B. U. Law, E. M. Sexton, R. T. Peabody, J. L. Anderson, H. H. Melville, W. H. Ludington and A. Blaser. Spaces 639 and 700-701.

Ajax Manufacturing Company, The, Cleveland, Ohio.—New model upsetting forging machine with automatic self-adjusting safety pitman; samples of railway forgings made by Ajax forging machine methods. Represented by I. R. Blakeslee, H. D. Heman, A. L. Guilford and J. A. Murray. Spaces 65-67.

Allegheny Steel Company, Brackenridge, Pa.—ASCO hoodless type A. R. A., and hood type M. C. B. journal box lids; ASCO standard A. R. A. truck spring plates, miscellaneous pressed steel stampings for railroad work. Represented by L. W. Hostetter and B. E. Eudy. Spaces 170-171.

American Abrasive Metals Company, New York.—Feralun brake shoes and structural safety car step treads; anti-slip floor plates; heat resisting castings; Brenabon, Vitulcon and Alumalun safety treads and saddles. Represented by H. Weaver Mowery and Ralph C. Davison. Space 620.

American Arch Company, New York.—Locomotive arch brick. Represented by L. Grand Parish, William J. Allison, J. P. Neff, R. T. Himmelwright, J. T. Anthony, George Wagstaff and G. M. Lean. Spaces 414-416-422-424.

American Automatic Connector Company, The, Cleveland, Ohio.—Latest improved American automatic connectors, special lug location for attaching automatic hose connectors as applied to the A. R. A. type D. car coupler. Represented by M. A. Barber, F. R. Bolles and L. C. Sprague. Spaces 362-363-364-365.

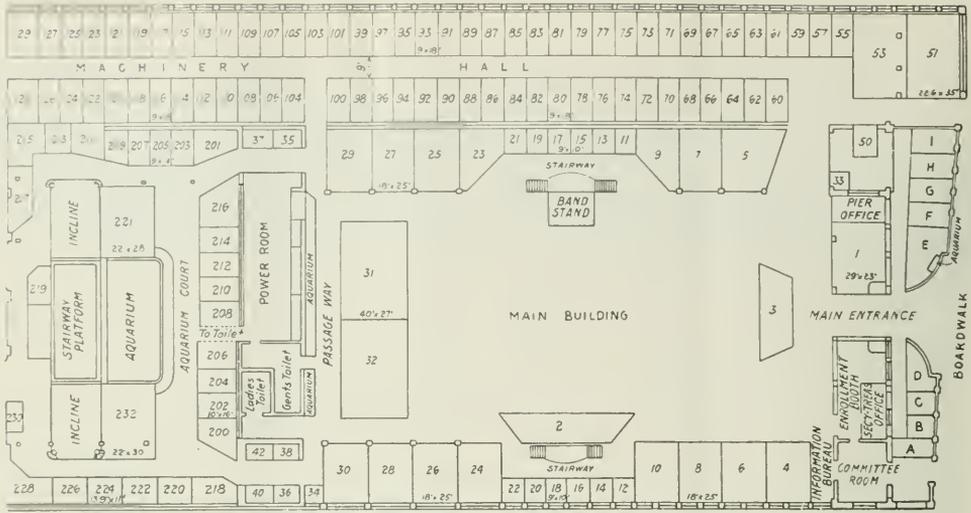
American Brake Shoe & Foundry Company, New York.—Standard patterns and types of locomotive and car brake shoes. Represented by Thomas Finigan, William B. Given, Jr., F. W.

	Exhibit space*	Number of exhibits
1926	80,411	341
1925	71,019	312
1924	76,110	245
1923	81,007	262
1922	87,676	277
1921	92,678	266
1920	79,417	232
1919	78,714	158
1918	78,714	114
1917	78,714	103
1916	78,714	103
1915	78,714	103
1914	78,714	103
1913	78,714	103
1912	78,714	103
1911	78,714	103
1910	78,714	103
1909	78,714	103
1908	78,714	103
1907	78,714	103
1906	78,714	103
1905	78,714	103
1904	78,714	103
1903	78,714	103
1902	78,714	103
1901	78,714	103
1900	78,714	103

*Excludes space reserved and free. Does not include free space to exhibitors. Figures are approximate and do not include the meetings and future will be published in the next issue of the Railway Supply Manufacturers' Association Year Book.

that there was not enough space to go around and make every exhibitor happy. In many instances, therefore, the exhibit committee was simply compelled to allot much

- Sargent, E. L. James, M. N. Trainer, R. E. Holt and F. H. Coolidge. Space 418.
- American Car & Foundry Company, New York.—Three-electrode Berwick electric rivet heater; two-path Berwick electric rod heater; Berwick electric drop-forging heater. Represented by F. C. Cheston, J. W. Sheffer, W. M. Earl and J. S. Helt. Space 144.
- American Chain Company, Bridgeport, Conn. Reading car replacers; Reading rail benders; all types of railroad chains. Represented by A. P. Van Schaick, G. C. Isbester, A. H. Weston and H. M. Bridgewater. Spaces 305-307.
- American Locomotive Company, New York.—Alco reverse gear; Alco reduced body and flexible staybolts with threaded and welded sleeves. Represented by A. Fletcher, L. Bert, J. Davis, J. B. Ennis, D. W. Fraser, W. F. Weller, W. P. Steele, O. P. Parsons, G. Weiler, W. F. Weller, A. W. Bruce, W. E. Corrigan, J. Kindervater, J. Partington, C. J. Mellin, F. Dickinson, R. Anderson, C. C. Jones, H. J. Downes, A. Haller, C. P. Robinson, C. M. Muehnic, A. Hamilton, E. N. Boswell, L. S. Carroll, W. K. Farrell, H. Swoyer, G. Curry, H. C. Butler, R. H. White, J. Magarvey, J. H. Link, C. T. Markel, D. Van Alstyne, A. M. Sheffer, J. G. Blunt, S. Miller, R. Rennie, C. H. Apps, H. C. Penticost, R. J. Finch and J. J. Jones. Space 614.
- American Malleable Castings Association, Cleveland, Ohio.—Exhibit descriptive of the mechanical and physical properties of malleable iron castings; miscellaneous line of general castings for car construction. Represented by Frank J. Lanahan. Spaces 110-112-114.
- American Mason Safety Tread Company, Lowell, Mass.—Stanwood car steps for passenger and baggage cars; Karbolith composition car floorings; Mason safety car tread brass base; Mason safety car tread steel base. Represented by E. F. Kummerle. Space 544.
- American Steam Gauge & Valve Manufacturing Company, Boston, Mass.—American special locomotive, steam heat and air brake gauges; open and muffled locomotive pops; dead weight gauge testers. Represented by H. B. Nickerson, G. A. Binz and C. A. Allen. Space 380.
- American Steel Foundries, Chicago.—Cast steel bolsters, side frames and couplers; Davis cast steel wheels; Simplex clasp brakes; Ajax and Hercules brake beams; coupler yokes; Economy cast steel draft arms and miscellaneous castings. Represented by G. E. Scott, R. H. Ripley, W. J. Lynch, J. V. Bell, Theodore C. Cook, J. W. Dalman, R. F. Darby, F. B. Ernst, George G. Floyd, W. R. Gravener, T. H. Hopkirk, D. T. Harris, L. E. Jones, R. E. Janney, T. D. Kelley, P. A. Martin, F. S. McNamara, A. H. Peycke, H. D. Richardson, G. F. Slaughter, W. S. Spieth, W. S. Stearns, J. H. Stuart, J. H. Tinker and W. G. Wallace. Spaces 149-151.
- American Tool Works Company, The, Cincinnati, Ohio.—Fourteen-inch lathe, with complete tool room equipment; 24-in. heavy pattern lathe; 12-in. lathe with four-step cone head; 3-ft. and 6-ft. Triple-Purpose radial drills; 3-ft. high speed sensitive radial drill; 24-in. heavy service shaper. Represented by F. L. Stubenroth, J. C. Hussey, Robert Alter, L. S. Alter, H. W. Shatz, J. W. Barr and E. R. Conners. Spaces 57-59-61 63-65.
- Anchor Packing Company, The, Philadelphia, Pa.—Packing; mechanical rubber goods; asbestos products. Represented by B. J. Miller, J. P. Landreth, A. G. Benson, J. D. Robb, W. R. Haggart, D. J. P. Murray, L. E. Adams and Frank S. Bulkiety. Spaces 366-367.
- Ashton Valve Company, The, Boston, Mass. Master Mechanic standard style locomotive muffled and open pop safety valves; locomotive, steam heat and air gauges; quadruplex air brake gauges; locomotive driving wheel quartering gage; standard test gauges; weight gage testers; portable boiler test pump; wheel press recording gauges; protected dial gauges; locomotive whistles; three-speed air brake inspector's recording gauges; air brake appliances; illuminated dial master pressure and pilot gauges. Represented by E. F. Boyle, H. O. Fettingier, J. F. Gettrust, G. E. Knight, J. W. Motherwell and H. J. Tierney. Space 518.
- Association of Manufacturers of Chilled Car Wheels, Chicago.—Standard 33-in. A. R. A. car wheels as follows; 650-lb. for 30-ton car; 700-lb. for 40-ton car; 750-lb. for 50-ton car; 850-lb. for 70-ton car. Represented by George W. Lyndon. Spaces 301-303.
- Atkins & Co., E. C., Indianapolis, Ind.—“Silver” steel saws of all kinds; foundry plates; Kwik-Kut power hacksaw machines; metal band saw machines; Cantol wax belt dressing; machine knives. Represented by Edward Norvell, Lewis Okey and R. H. Hunter. Space 40.
- Atlantic Hand Brake Corporation, Buffalo, N. Y.—Worm gear hand brakes. Represented by J. H. Weidmiller. Space 540.
- Baker R & L Company, The, Cleveland, Ohio.—Three-wheel electric tractor; elevating platform trucks; three-way crane (locomotive type). Represented by Nathaniel Platt, M. A. Watter-son, H. B. Greig and W. F. Hebard. Space 336.
- Baldwin Locomotive Works, The, Philadelphia, Pa.—Oil-burning locomotive of the Santa Fe type built for the Southern Pacific Lines and equipped with superheater, feedwater heater and booster. Represented by G. Greenough, Charles Riddell, A. H. Ehle, A. S. Goble, S. McNaughton, Jr., and C. H. Gaskill. Space on exhibit track.
- Barco Manufacturing Company, Chicago.—Power reverse gear; crosshead and shoes; metallic engine tender connections; metal passenger car steam heat connections; joints for locomotive piping; joints for roundhouse blower and blow-off; metal connections for stations and yards; automatic smokebox blower fittings; large joints for expansion lines. Represented by C. L. Mellor, A. S. Lewis, F. H. Stiles and W. J. Behlke, Jr. Space 641.
- Barrett Company, The, New York.—Roofing; waterproofing; paving; creosoting. Represented by William S. Babcock and Walter Buehler. Space 621.
- Bastian-Blessing Company, Chicago.—Space 707.
- Beandry & Co., Inc., Boston, Mass.—Working model of Beandry hammer. Represented by A. Parsons. Space 209.
- Besly & Co., Charles H., Chicago.—Pattern makers' grinder; taps. Represented by Edward P. Welles and Charles A. Knill. Space 108.
- Bettendorf Company, The, Bettendorf, Iowa.—Bettendorf swing motion caboose car truck; 40, 50 and 70-ton Bettendorf T-section and U-section side frames; 40, 50 and 70-ton cast steel truck bolsters. Represented by J. W. Bettendorf, J. H. Bendixen, C. J. W. Clasen, K. M. Hamilton, E. J. Bettendorf, F. K. Shults and Peter P. Beck. Spaces 218-220-222.
- Billingsley Company, The, P. L., Cincinnati, Ohio.—“Flexway” woodworking machine, with attachments for sawing, boring, routing and planing; rotary spoke shave and emery wheel. Represented by P. L. Billingsley. Space 165.
- Bird-Archer Company, The, New York.—Polarized chemicals; Anti-foam; blow-off cocks; washout plugs; Harter circulator plate. Represented by P. B. Bird, C. A. Bird, L. F. Wilson, T. A. Peacock, John Barnes and J. A. McFarland. Space 31.
- Black & Decker Manufacturing Company, The, Baltimore, Md.—Portable electric grinder; portable electric drill; electric valve grinder; electric screw driver; bench drilling stands. Represented by R. D. Black, H. G. Smith and G. R. Lundane. Space 217.
- Blackall, Robert H., Pittsburgh, Pa.—Blackall ratchet brake lever; improved Lindstrom brake lever; Blackall ratchet. Represented by Robert H. Blackall, D. K. Coyle and Harris Potter. Space 627.
- Boss Nut Company, Chicago.—Boss lock nuts. Represented by J. A. McLean, F. K. Shults, J. W. Coleman, J. W. Fogg, C. Beaumont, W. G. Willcoxson and T. W. Callahan. Spaces 370-371.
- Bowser & Co., Inc., S. F., Fort Wayne, Ind.—Complete equipment for oil and gasoline storage at central oil houses; underground outfit for installation along the right-of-way. Represented by T. D. Kingsley, W. T. Simpson, E. M. Harshbarger and L. E. Porter. Space 28.
- Bradford Draft Gear Company, New York.—Bradford rocker type draft gear; Bradford three-spring draft gear; Bradford draft arm; Bradford boltless truck column; Chambers throttle valve. Represented by Horace Parker, Floyd K. Mays, Harry F.



Arrangement of Exhibit Spaces at the Boardwalk End of the Pier

Lowman, Frank H. Clark, W. W. Rosser, W. A. McWhorter, H. C. Priebe, E. H. Smith, J. C. Keene, E. L. Nusz and E. J. Barnett. Spaces 554-555.

Brewster, Inc., Morris B., Chicago.—Packings for piston rods, valve stems and air pumps; Security wrist pin. Represented by Morris B. Brewster. Space 610.

Brill Company, The J. G., Philadelphia, Pa.—One 42-ft. 6-in. combination passenger and baggage gasoline rail car; standard steam car seat. Represented by C. J. McPherson and George Frey. Space G.

Brown & Co., Inc., Pittsburgh, Pa.—Samples of staybolt and engine bolt irons. Represented by J. Wallace Mitchell, L. E. Hassman and E. R. Mason. Space 530.

side frames; 120-ton Virginian Railway gondola car, equipped with Buckeye six-wheel trucks. Represented by J. G. Bower, F. J. Cooledge, G. A. Macpherson, S. P. Bush, G. T. Johnson, M. S. Simpson, E. W. Campion, J. C. Larsen and J. C. Whitridge. Spaces 603-605 and track exhibit in Philadelphia & Reading yards, foot of Mississippi avenue.

Bucyrus Company, South Milwaukee, Wis.—Spreader plows; railway wrecking cranes; excavating machinery; unloading plows. Moving picture films of equipment in operation. Represented by E. G. Lewis. Space 334.

Buffalo Brake Beam Company, New York.—Brake beams and brake beam parts. Represented by S. A. Crone, A. E. Crone,

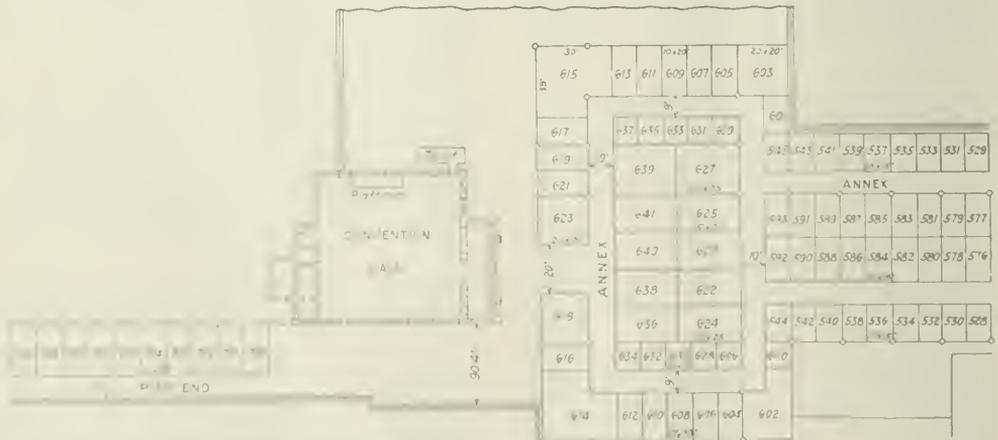


Exhibit Spaces at the Convention Hall End of the Pier

Brusher & Sons, Company, W. I., New York.—Special boiler truck trapezoid. Represented by W. Searle Rose, J. A. W. Brubaker, R. F. Hook and H. B. Morrison. Space 504.

Buckeye Steel Castings Company, Columbus, Ohio.—A. R. A. type "D" coupler and Major coupler, cast steel yoke, bolsters and

E. C. Larlow, E. Strassburger, A. Gordon Jones, C. R. Busch and F. F. Gladwell. Spaces 548-549.

Burden Iron Company, The, Troy, N. Y.—Staybolt iron, engine bolt iron, iron boiler rivets, hollow staybolts. Represented by John C. Kuhns. Space 219.

Burry Railway Supply Company, Chicago.—Side bearings and center plates. Represented by V. J. Burry and O. E. Quinton. Space 526.

Cambria Steel Company, Philadelphia, Pa.—See Midvale Steel & Ordnance Company. Spaces 590-591.

Camel Company, Chicago.—Full sized models of box car door fixtures; box car door locks; door starting and closing arrangements; automobile car door fixtures; steel doors for freight cars; door repair parts. Represented by P. M. Elliott, H. E. Creer, H. H. Hendricks, A. B. Wegener, B. D. Jones, Arthur Allan, W. W. Darrow. Spaces 532-534-536.

Carbo-Oxygen Company, Pittsburgh, Pa.—Oxy-carbo-hydrogen cutting and welding apparatus; carbo-hydrogen gas and carbo-oxygen gas. Represented by F. S. Austin and H. A. Wellings. Space A.

Carborundum Company, The, Niagara Falls, N. Y.—Carborundum refractories, including Carbofrax, brick, tile, muffles; refractory cements; Carborundum and Aloxit grinding wheels. Represented by C. E. Hawke, R. S. Marvin, Walter Meek, F. E. Gridley, J. W. Fraser and S. C. Courter. Spaces 582-583.

Carnegie Steel Company, Pittsburgh, Pa.—Engine truck wheel; freight and passenger car wheels; pair of 36-in. wheels which have given an aggregate of 581,139 miles of service under a passenger car. Represented by W. G. Clyde, John E. Woods, C. L. Wood, L. C. Bihler, N. B. Trist, C. Orchard, R. W. Steigerwalt, J. A. Ralston, G. R. Schreiner and R. L. Twitchell. Space 420.

Champion Railway Equipment Corporation, New York.—Universal car and hose coupler; standard flexible compound. Represented by A. A. Anderson, A. B. Bellwood, C. M. Kidd, J. H. Funk and W. R. Black. Space 368.

Chase & Co., L. C., Boston, Mass.—Goat brand mohair upholstery plush; Chase renovator for cleaning upholstery; Chase Leather-wove. Represented by H. T. Wight and W. P. Underhill. Space 10.

Chicago-Cleveland Car Roofing Company, Chicago.—Car roofs; carlines; pressed steel car parts. Represented by H. F. Finney, T. H. Williams, J. L. Stark, R. C. Munro, T. N. Russell, R. C. Dudley and F. A. Jacobs. Space 506.

Chicago Pneumatic Tool Company, New York.—Portable pneumatic and electric hammers; drills; air hoists; portable electric drills; spike driving, rail bonding and drilling devices; sand

rammers; hose couplings. Represented by A. C. Andresen. Space 623.

Chicago Railway Equipment Company, Chicago.—Brake beams; brake beam supports; side bearings. Represented by E. B. Leigh, A. C. Moore, F. T. DeLong, G. N. Van Swearingen, E. E. Griest, R. J. Sheridan, E. A. LeBeau and E. G. Busse. Space 640.

Clark Company, West Pittston, Pa.—Retainer valve and brackets. Represented by E. L. Clark. Space 157.

Clark Car Company, Pittsburgh, Pa.—Photographs of 30-yd. extension side dump cars; catalogues. Represented by H. E. Chilcoat and R. L. Mason. Space 625.

Clark Tractor Company, Buchanan, Mich.—Clark Truklift; tractor model of Clark Tractor. Represented by Louis J. Schneider, A. S. Rampell and W. B. Eldred. Space 137.

Cleveland Car Specialty Company, Cleveland, Ohio.—Pressed steel carlines. Represented by J. A. Costello and A. B. Hummel. Space 374.

Cleveland Pneumatic Tool Company, The, Cleveland, Ohio.—Riveting and chipping hammers; air drills and grinders; sand rammers, sand hammers; core breakers; oscillating valve grinders; portable bench and lathe grinders; angle gears; Cleco air fittings; and seven types of Cleco pressure seated air valves; Bowes couplings. Represented by H. S. Covey, Arthur Scott, F. E. Schwarze, R. B. Van Norman, G. Gregory and C. D. Garner. Spaces 329-331-333-335.

Cleveland Steel Tool Company, The, Cleveland, Ohio.—Punches; dies; chisels; rivet sets. Represented by R. J. Venning, George L. Connelly, W. J. Devlin and W. F. Delaney. Spaces 153-155.

Cleveland Twist Drill Company, The, Cleveland, Ohio.—Reception booth. Represented by Harley G. Smith, John G. Ladrack and Harry P. Jenson. Space 224.

Cochrane-Bly Company, Rochester, N. Y.—Duplex universal vertical miller and shaper; metal sawing machine; automatic saw sharpening machine, all motor driven. Represented by W. H. Welch. Space 107.

Commonwealth Steel Company, St. Louis, Mo.—Models, drawings and illustrations of cast steel underframes, end frames, and four and six-wheel trucks for passenger-train cars; pilots; pilot beams; engine and tender trucks; cradles and trailer truck frames; tender frames; ash pans. Represented by H. M. Pfaffer, George E. Howard, B. V. H. Johnson, C. S. Shallenberger,

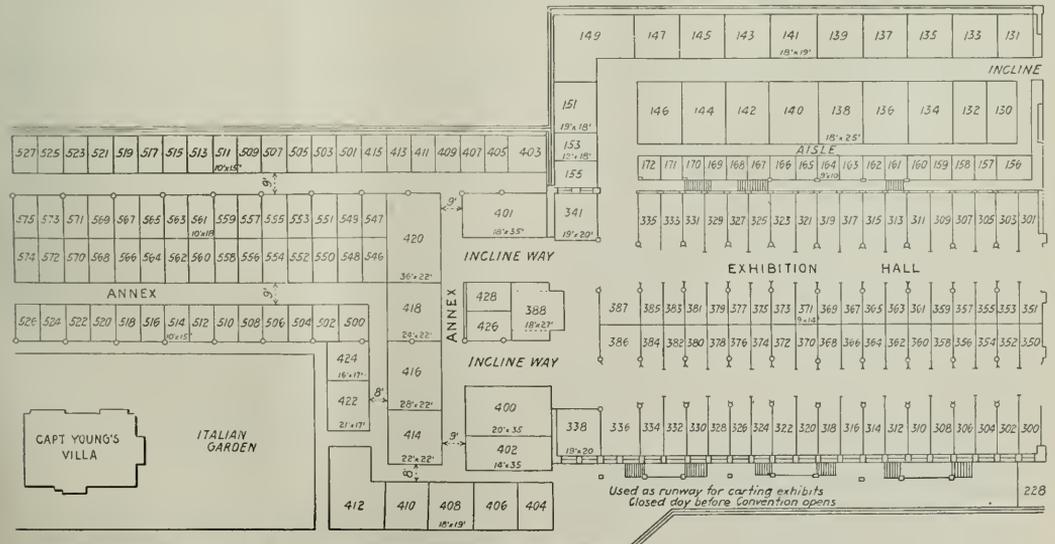


Exhibit Spaces in Exhibition Hall, Machinery Hall Extension and Part of the Annex

- George H. Gibson, C. F. Frede, C. P. Whitehead and H. R. Bartell. Spaces 386-387.
- Continental Works Company, Chicago.—Lucas car roof cement applied to various types of surfaces; test panels exposed to acids, brines, blow torch, etc.; graphic charts showing various applications of cement. Represented by Arthur B. Chapin, George Sutherland and H. T. Hutchinson. Space C.
- Covington Machine Company, Inc., Covington, Va.—Hose dismantling and assembling machine; miniature of No. 6 punch; photographs of other machines. Represented by E. H. Arcœur, S. A. Patterson and Edgar H. Archer. Space I.
- Craft, Inc., New York.—Cleveland light weight railroad inspection car. Represented by F. W. Edmunds, Albert J. Leonard and W. T. Manogue. Spaces 321-323.
- Crosby Steam Gage & Valve Company, Boston, Mass.—Steam gages; safety, blow-off and globe valves. Represented by John J. McCormick and E. L. Taylor. Space 632.
- Curtain Supply Company, The, Chicago.—Car curtains; Rex vestibule curtains; Rex automatic release handles; Rex opening shields and roller bearing hooks; Rex canvas and steel diaphragms, brass sash, weatherstripping and deck sash ratchets. Represented by T. W. Holt, Ross F. Hayes, Ralph Brown and T. P. O'Brian. Space 638.
- Dale Machinery Company, Inc., New York.—Lassiter-Millholland model "B" horizontal staybolt machine; Nos. 2 and 6 Colburn heavy duty manufacturing drill presses; 42-in. new type Colburn heavy duty vertical boring and turning mill; 26-in. Betts Bridgeford heavy duty screw cutting lathe; modern chaser grinder. Represented by J. J. Dale, R. R. Lassiter, J. W. Blackford, H. W. Breckenridge, William Brown, M. D. Neady and Alfred Trosch. Spaces 95-97-99-101.
- Damascus Brake Beam Company, Cleveland, Ohio.—Forged brake beam fulcrums and Brasscott freight car ladders. Represented by C. D. Jenks. Space 559.
- Davis Boring Tool Company, Inc., St. Louis, Mo.—Expansion car wheel and machine shop boring tools; expansion reamers; cutter grinding attachment; grinding arbors. Represented by O. L. Chapman and Burney Davis. Space 201.
- Davis Brake Beam Company, Johnstown, Pa.—Davis solid truss brake beams for freight cars, passenger cars and locomotive tenders; pressed steel journal box lids. Represented by Frank J. Lanahan, George W. Fox, Charles F. Perkins, C. K. Stillwagon and W. E. Fowler, Jr. Space 625.
- Dayton Pneumatic Tool Company, The, Dayton, Ohio.—Champion riveting hammers; new Dayton chipping and caulking hammers; jam riveters; hose couplings and accessories. Represented by L. B. Smyser, A. B. Clausen, A. B. Inness, George C. Towle and I. B. George. Space 324.
- DeArbom Chemical Company, Chicago.—Scientific water treating preparation; No. oxid rust preventive. Represented by Robert F. Carr, George R. Carr, Grant W. Spear, J. D. Purcell and W. H. Kinney. Spaces 68.
- Detroit Injector Company, Detroit, Mich.—Bulls-eye locomotive lubricators; automatic lube oils; air cylinder lubricators; transfer lubricator; automatic exhaust nozzle covers. Represented by A. G. MacIntosh and C. H. Perrine. Spaces 205-207.
- Detroit Tool & Die Company, Detroit, Mich.—Drill, reamer and reamer centers, "DD" drill. Represented by H. T. Scott, W. E. Smith, J. J. Smith and R. D. Winslow. Space 156.
- Industrial Machine Company, Providence, P. I.—Heavy duty face grinder, top "C" surface grinder; polly grinder, wet tool grinder, center drive floor grinder, ball bearing disc grinder; ball center grinder. Represented by George S. Squibb, Luther Barril and Morris Slepjak. Spaces 113-115-117.
- Dixie Iron Works, Inc., Chicago.—Smoke jacks for enginehouses, exhaust fans for small buildings; Aeris roof ventilators for enginehouses and shops; cast iron exhaust head, model of engine exhausts with smoke jacks and ventilators. Represented by A. I. Laska, H. Knutson and K. E. Cates. Space 203.
- Dixson & Sons, Inc., Henry, Philadelphia, Pa.—Metal cutting circular saws and metal cutting hand saws in operation; metal saws of all kinds, files and tools. Represented by Joseph L. Dorrington, L. M. Willard and Edward Ludy. Space 141.
- Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite productions; silica-graphite paint; pencils; crucibles. Represented by L. H. Snyder, J. J. Tucker, William Ernst, W. A. Houston and H. A. Nealley. Space 24.
- Dressel Railway Lamp & Signal Co., New York.—See F. H. Lovell & Co.
- Duff Manufacturing Company, The, Pittsburgh, Pa.—Duff high speed ball bearing screw jacks, journal box jacks, car separator jack and car sill jack; genuine Barrett car and track jacks; drop forgings and trench braces. Represented by G. E. Anderson, E. A. Johnson, T. A. McGinley, C. A. Methfessel, W. G. Robb, C. N. Thulin and G. E. Watts. Space 401.
- Eagle Manufacturing Company, Wellsburg, W. Va.—Seamless welded steel oilers and oil containers. Represented by S. O. Paul and J. B. Webb. Space 380.
- Edgewater Steel Company, Pittsburgh, Pa.—Locomotive tires and rolled steel wheels. Represented by W. V. D. Wright, J. H. Baily, L. O. Cameron and C. H. Sherburne. Space 509.
- Edison Storage Battery Company, Orange, N. J.—Storage battery cells cut away to show parts and construction; map showing railroads using Edison batteries; car lighting battery box with installation of Edison batteries; model of Railway Storage Battery car; seven-cell battery for signal service; five-cell battery for portable lighting; three, four and five-cell batteries for car lighting. Represented by F. D. Fagan, D. B. Mungan, A. S. Knox, D. C. Wilson, Paul Sutcliffe, R. Baird, W. F. Bauer, W. W. Coleman and J. A. Cassedy. Space 636.
- Edna Brass Manufacturing Company, The, Cincinnati, Ohio.—Locomotive injectors, lifting and non-lifting; locomotive lubricators, hydrostatic and forced feed types; locomotive water column; cold water coal sprinkler; Reflex water gage. Represented by E. O. Corey, B. I. Kaufmann, D. B. Joseph, R. B. Buram, H. A. Glenn, F. S. Wilcoxon and W. W. Fetner. Space 308.
- Edson Manufacturing Corporation, Boston, Mass.—Various styles of genuine Edson diaphragm pumps; special suction hose, couplings and strainers; improved diaphragms. Represented by J. W. Wickwire and W. S. Courtney. Spaces 564-565.
- Edwards Company, Inc., The O. M., Syracuse, N. Y.—Window fixtures; trap doors; sash balancers. Represented by O. M. Edwards, R. Harold Edwards, J. J. Edwards, E. F. Chaffee, C. H. Rockwell and A. J. Horgan. Spaces 527-529-531.
- Electric Arc Cutting & Welding Company, Newark, N. J.—Rivet cutting apparatus; welding and cutting apparatus; electrodes; supplies. Represented by C. J. Holslag, J. E. Gunning, J. I. Mitchell and E. J. Knapp. Space 37.
- Electric Controller & Manufacturing Company, Cleveland, Ohio.—E. C. & M. control, consisting of push button operated automatic starting compensators and across-the-line starting switches, with thermal overload relays; direct-current automatic starters and machine tool controllers, contactors, relays, etc. Represented by R. G. Widdows and H. K. Harlecastle. Space 85.
- Electric Service Supplies Company, Philadelphia, Pa.—Golden Glow locomotive headlights, reflectors and floodlights; Keystone turbo generators, headlight switches, classification and marker lights, gage lights, rear tender lights and roundhouse lighting fixtures. Represented by Charles J. Mayer, A. H. Englund, I. W. Porter, J. R. McFarlan, I. A. Darling, T. M. Childs, W. H. Smaw and H. J. Garham. Spaces 312-314.
- Electric Storage Battery Company, Philadelphia, Pa.—Exide body hung axle light equipment with Exide battery in operation; Exide batteries "A" and "B" for railway signal service, industrial trucks, starting and lighting equipment for automobiles, and radio service. Represented by H. B. Marshall, J. L. Woodbridge, T. J. Mount, F. G. Beem, H. E. Hunt, R. I. Baird, H. M. Beck, W. C. Hooven, George Hayes, H. S. Mills, M. C. Pope, Jr., A. W. Pierce, P. G. Downton, I. F. Lighton and H. W. Beedle. Space 624.
- Elvin Mechanical Stoker Company, New York.—Elvin mechanical stoker. Represented by A. G. Elvin, E. W. Flegelbright, A. B. Fahnestock, F. H. Elvin, H. D. Eckerson and H. J. Charles. Space 146.

- Elwell-Parker Electric Company, Cleveland, Ohio.—Type CK crane platform truck; TL tractor; EG elevating platform truck; truck power plant; Elwell-Parker combination trailer-platform. Represented by Lucian C. Brown, George W. Brown, Charles C. Dietz, W. C. Kershaw, C. E. Cochran, F. B. Neely, R. C. Howell, C. B. Cook and J. M. Brown. Space 341.
- Emery, E., Pittsburgh, Pa.—Self-locking brake shoe keys; Standard machined taper pins and keys, and full machined channel pins manufactured by the Standard Horse Nail Company. Represented by E. Emery. Space 19.
- Enterprise Railway Equipment Company, Chicago.—Models of various types of hopper and gondola cars; door operating mechanisms for load discharging cars; Ingoldsby door latches; grain doors and grain discharge for box cars; combination hingebutt and hopper brace castings for hopper cars. Represented by Argyle Campbell, A. E. Zimmer and W. L. Gunnison. Spaces 584-585.
- Everlasting Valve Company, Jersey City, N. J.—Flatplug valve for enginehouse service; Everlasting valve for locomotive boiler off; Everlasting tandem valve for power plant blow-off; Everlasting tender tank valve. Represented by John H. Allen and Edward N. Corning. Space 17.
- Ewald Iron Company, Louisville, Ky.—Solid and hollow staybolt iron. Represented by Baylor Hickman, G. O. Boomer, S. F. Sullivan, J. P. Bourke, E. V. Shackelford and R. F. Kilpatrick. Space 535.
- Fireboard Company, Boston, Mass.—Bullseye dust guards. Represented by William E. Eaton and Midgley & Borrowdale. Space 42.
- Fire-Gun Manufacturing Company, Inc., New York.—Fire-Gun carbon tetrachloride extinguishers from one quart to one and a half quart capacities; Fire-Gun type B soda and acid extinguisher, 2½-gal. capacity. Represented by Henry L. Heulings and Harry E. Tunnell. Space B.
- Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolts; F B C welded flexible staybolts; Reacock nuts and grease cups; Flannery rigid stays, taper head crown stays and button head stays. Represented by J. Rogers Flannery, E. S. Fitzsimmons, W. M. Wilson, R. W. Benson, F. K. Landgraf, M. M. McCallister and Ethan I. Dodds. Spaces 592-593.
- Ford Company, J. B., The, Wyandotte, Mich.—Wyandotte metal cleaner, with equipment showing how metals and repair parts are cleaned with it. Represented by B. N. Goodell, G. E. Gordon, W. E. Ratz, G. J. Lawrence, C. S. Thompkins, W. P. Scott and H. M. Green. Space 519.
- Forged Steel Yoke Corporation, Chicago.—Forged steel draft yoke. Represented by LeRoy Kramer, C. R. Naylor and A. J. Canfield. Space 572.
- Fort Pitt Malleable Iron Company, Pittsburgh, Pa.—Freight car and locomotive castings; dump cars; tank car fittings. Represented by Frank J. Lanahan, J. S. Lanahan, E. H. Holmes, Joseph H. Kumer and P. S. Aaron. Space 625.
- Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa.—Locomotive and car elliptic and coil springs; springs for industrial concerns. Represented by William McBride, Fred A. Meckert, Robert L. Leitch and Lewis O. Cameron. Space 550.
- Foster Company, The, Walter H., New York.—Improved turning and threading machine equipped for radial, crown and side stays, turning and threading from forged blanks; semi-automatic valve finishing machine for triple and other valves used on air brake equipment. Represented by Walter H. Foster, J. A. Eden, Jr., and H. L. Kenah. Spaces 87-89.
- Four Wheel Drive Auto Company, Clintonville, Wis.—FWD railway two-car unit; seating capacity 52 passengers, with baggage, express and mail compartments about 88 sq. ft. Represented by W. A. Olen, H. B. Dodge, C. J. Cassese, H. M. Daniels, L. H. Jones, R. W. Pachaly, George E. Reynolds and A. L. Foote. Space 35.
- Franklin Railway Supply Company, New York.—No. 8 and No. 9 firedoors; driving box spreader; automatic wedge; Precision reverse gear; booster; lateral motion device; Ragomnet reverse gear; McLaughlin joint and ball joint models; Radial buffer and Unit safety bar; Unit safety bar. Represented by J. S.
- Coffin, Samuel G. Allen, H. F. Ball, W. H. Coyle, J. L. Randolph, H. M. Evans, W. T. Lane, Paul Weiler, Paul Willis, J. A. Talty, M. H. Roberts, F. R. Peters, C. W. F. Coffin, J. L. Bacon and C. J. Burkholder. Spaces 414-416-422-424.
- Frost Railway Supply Company, The, Detroit Mich.—Harvey friction spring gears; Detroit metal weather strip. Represented by Harry W. Frost, George A. Cooper and George L. Harvey. Space 560.
- Futrell Coupler Company, Streator, Ill.—All-metal train pipe connector. Represented by Thomas J. Futrell, John H. Haseroth and W. H. Crowell. Space 230.
- Galena-Signal Oil Company, Franklin, Pa.—Reception booth. Represented by L. J. Drake, L. F. Jordan, W. A. Trube, W. P. Wescott, G. L. Morton, W. J. Walsh, J. E. Linahen, T. J. Powell, P. G. O'Hara, R. P. Birtel, C. W. Hochette, G. E. McVicar, W. F. Walsh, P. H. Stack, W. O. Taylor, D. L. Eubank, E. G. Johnson, Charles McNair, J. S. Brown, S. S. Shields, J. W. Bunn and J. C. O'Connor. Space 32.
- Garlock Packing Company, The, Palmyra, N. Y.—Packings for locomotive throttles, air pumps, power reverse gears, shop machinery, and slip, ball and expansion joints, boiler and pipe flange gaskets; rubber pump valves. Represented by W. G. Cook, Phil Arnold, C. W. Sullivan, H. J. Ramshaw, R. J. Hinkle and P. D. Miller. Space 508.
- Geist Manufacturing Company, Atlantic City, N. J.—Wiederwax compressed air or steam non-carbonizing crude oil burners; Wiederwax non-carbonizing kerosene oil torches; Wiederwax preheater for acetylene welding. Represented by Carlton Geist, P. E. Wicke and A. O. Leeds. Space 702.
- General Electric Company, Schenectady, N. Y.—Various applications of industrial control apparatus in operation; semi-automatic electric arc welding equipment in operation. Represented by J. G. Barry, E. P. Waller, F. S. Hartman, A. H. Armstrong, C. K. West, John Roberts, C. Dorticco, W. J. Clark, C. F. Lawrence, R. S. Bennett, J. J. Liles, D. K. Frost, C. H. Williams, F. P. Jones, L. W. Shugg, P. O. Noble, R. D. Reed, C. W. Kenyon, John Eaton and C. C. Peirce. Spaces 119-121-123-125-127-129.
- Giessel Company, Henry, Chicago.—North Pole sanitary drinking fountains; water filters for dining cars. Represented by Arthur W. Barth, Frank N. Grigg, S. W. Midgley, C. H. Kadie and C. G. Elliott. Spaces 40-42.
- Gill Railway Supply Company, Peoria, Ill.—Grisco cooling compound; emergency hose clamp. Represented by S. S. Pinkney, E. H. Hartenstein and A. F. Buescher. Space 325.
- Gold Car Heating & Lighting Company, Brooklyn, N. Y.—Vapor and other systems of car heating; automatic temperature regulation for railway cars, buildings, etc.; pressure regulators; ventilators. Represented by Edward E. Gold, E. B. Wilson, A. B. Strange, F. O. Bailey, J. O. Brumbaugh, F. R. Cooper, F. W. Dearborn, W. J. Roehl, Allen Sheldon, F. H. Smith and A. D. Stuver. Spaces 350-353.
- Gould Coupler Company, New York.—Couplers; truck bolsters; truck side frames; journal boxes, slack adjusters; friction draft gears; electric car lighting equipment with batteries; locomotive headlight generator. Represented by Charles A. Gould, W. F. Richards, W. F. Bouche, G. B. Young, W. B. Osborne, M. R. Shedd, D. C. Davis, G. R. Berger, G. F. Collins, C. W. Gould, W. H. Sauvage, J. W. Reifsnyder, H. C. Johnstone, P. H. Simpson, William Garstang, W. L. Kraemer and F. J. Beard. Space 221.
- Gray Company, G. A., Cincinnati, Ohio.—Gray maximum service plunger. Represented by August Marx, Tell Berna and Phillip Leisinger. Space 51.
- Griffin Wheel Company, Chicago.—Chilled iron car wheels. Represented by C. K. Knickerbocker, G. D. Casgrain, A. A. Hale, F. B. Flink, J. L. Grant and E. T. Cassidy. Space 620.
- Grip Nut Company, Chicago.—Grip lock nuts; Grip locomotive nuts; Grip unit and holding nuts. Represented by W. E. Sniar, A. B. Chadwick, H. E. Passmore, Albert Roberts, B. R. Radcliffe, H. J. Tierney, J. B. Whitenack, J. E. Weatherford, C. S. Carter, C. W. Cross and W. R. Richards. Space 142.
- Hagy Waste Works, The J. Milton, Philadelphia, Pa.—Wool journal box and armature packings; cotton wiping and polishing

- waste; washing and packing cloths. Represented by Ralph L. Hays, J. Milton Hays and H. P. Ogdan. Space 311.
- Hale & Killbuck Corporation (American Motor Body Company, successor), Philadelphia, Pa.—Car seats, steel doors; mouldings. Represented by R. D. Day, H. L. Beyer, W. M. Swope, H. R. Rochester, A. F. Old, J. B. Killbuck, W. L. Jefferies, E. A. Thernwell and W. D. Jenkins. Spaces 408-410.
- Hall Air Lock & Railway Supply Company, Chicago—Safety pocket coupler; continuous rail manganese frog; one-piece guard rail. Represented by B. A. Johnson and J. J. Connors. Space 133.
- Hall Draft Gear Corporation, Watervliet, N. Y.—Friction draft gears; cast steel yokes. Represented by C. W. Sherman, J. M. Hall, G. H. Gordon and E. C. McDowell. Space 372.
- Hammett, H. G., Troy, N. Y.—Metallic piston rod and valve stem packing; locomotive bell ringers; triple valve bushing rollers. Represented by H. G. Hammett and A. O. Van Dervort. Space 512.
- Hanna Locomotive Stoker Company, The Cincinnati, Ohio.—Improved Hanna locomotive stoker, type H-2. Represented by W. T. Hanna, C. D. King and G. D. Feverall. Space 139.
- Harrington, Son & Co., Inc., Edwin, Philadelphia, Pa.—Chain hoist; I-beam travelers; multiple spindle drill. Represented by Roger Sherron, A. M. Harrington and W. J. Somerset. Space 143.
- Hartford Tap & Gauge Company, Hartford, Conn.—Taps; gages; thread milling machine samples; spline milling machine samples; vertical milling machine samples; forgings. Represented by Joel W. Johnson. Space H.
- Heald Machine Company, The, Worcester, Mass.—Rotary surface grinding machine; cylinder grinding machine; two styles of internal grinding machines. Represented by J. N. Heald, S. T. Massey, A. R. Sleath and J. L. Moran. Spaces 69-71.
- Hendey Machine Company, Torrington, Conn.—Lathe and shaper. Represented by E. E. L. Taylor and P. A. Rebok. Spaces 109-111.
- Heywood-Wakefield Company, Wakefield, Mass.—Coach seats in various upholsterings, special exhibit showing stages of upholstery; motor-driven reversing mechanism. Represented by Bertin Berry, Frank N. Grigg, Edward Baker, C. G. Elliott, W. E. Foreman, E. F. Boyle, G. F. Cornwall, C. A. Van Derveer and E. Copeland Lang. Space 520.
- Howell Electric Motors Company, Howell, Mich.—Polyphase induction motors; stationary motor showing detailed construction. Represented by Charles F. Norton, H. N. Spencer and O. A. Reed. Space 161.
- Hunt Spiller Manufacturing Corporation, South Boston, Mass.—Locomotive parts made of Hunt-Spiller gun iron: cylinder bushings and packings; rod pistons; piston bull rings; piston valve bushings and packing; tie rings; crosshead shoes; knuckle pin bushings for freight service, air pump bushings, driving boxes; pedestal bars and wedges; eccentrics and eccentric straps. Represented by W. B. Leach, J. G. Platt, F. M. Weymouth, V. W. Platt, A. B. Root Jr., E. J. Fuller, C. L. Galloway and F. B. Hartman. Spaces 502-563.
- Hutchins Car Roofing Company, Detroit, Mich.—Model of Hutchins all steel day loading roof; Hutchins chamel steel ends for box and open top cars; Hutchins uncoupling device, model of Burtitt reinforced box car end. Represented by F. C. Dunham, M. T. Ryan, C. F. Cape, A. R. Wilson, J. F. Comee and W. D. Thompson. Space 616.
- Hyatt Roller Bearing Company, New York—Large aluminum model showing operating details of Hyatt roller bearings; glass mounted Hyatt bearings showing lubrication features; Hyatt bearings for railway cars, baggage wagons, trucks, locomotive turntable mechanism, gasolene-propelled cars, hand cars and power traction hoists. Represented by D. Gløsen, P. C. Campbell, W. B. Wachtler, H. K. Porter, W. J. Hoff, and J. F. McGinness. Space 4.
- Illinois Steel Company, Chicago.—Track spikes and bolts; screw spikes, rail joints, tie plates. Represented by C. B. Friday, Grant Monk and C. R. Moffatt. Space 420.
- Independent Pneumatic Tool Company, Chicago.—Complete line of Thor pneumatic and electric tools for railway use, including latest developments. Represented by John D. Hurley, R. S. Cooper, R. T. Scott, Adolph Anderson, H. F. Keller, A. L. Schulz and W. H. Rosevear. Spaces 356-357.
- Individual Drinking Cup Company, Inc., Easton Pa.—Dixie penny cup vending machine and cups; Dixie cup dispensing machine for parlor cars; Dixie cups and silver holders for club and dining car use; cloth towels and towel vendors. Represented by A. R. Lilliecrapp and M. E. Morrison. Space 373.
- Ingersoll Milling Machine Company, Rockford, Ill.—Ingersoll slabbing and channeling cutters; motion pictures of Ingersoll horizontal spindle and vertical adjustable rotary milling machines milling locomotive rods. Represented by A. A. Braid. Spaces 87-89.
- Ingersoll-Rand Company, New York.—Air compressor; pneumatic riveting hammers; chipping hammers; close-quarter drills; staybolt tapping machines; motor hoists; grinders; wire brush cleaning machines and jam riveters. Represented by George A. Gallinger, W. A. Johnson, J. F. Kroske, L. W. Schnitzer, J. R. Randle and George C. Williams. Space 53.
- International Motor Company, New York.—Mack rail car leading truck; rear axle; rubber shock insulated spring suspension; motor and transmission parts. Represented by E. M. Post, Jr., R. A. Hauer and R. M. Newbold. Space 326.
- International Signal Company, The, New York.—Webb automatic train stop. Represented by Jean F. Webb, Jr. Space F.
- Inter-State Safety Appliance Company, Inc., Norristown, Pa.—Safety attachment for freight car hand brakes. Represented by Vincent M. Haas, Irvin F. Kershner and William Wagenhorst. Space on exhibit track.
- Jacques, H. W., Philadelphia, Pa.—Shovels, scoops, spades, railroad tin and galvanized ware; locks of all kinds for railroad use. Represented by H. W. Jacques, Harold Cunningham and C. H. Gibbs. Spaces 328-330.
- Jenkins Brothers, New York.—Brass globe, angle, gate and Y-blow-off valves; mechanical rubber goods; Selco blower valve, marine, rapid action valve and air gun. Represented by B. J. Neely and George Royal. Space 317.
- Johns-Manville, Inc., New York.—Roofing, building and water-proofing materials; asbestos shingles; J-M industrial floorings; Transit and ebony asbestos wood; Transit asbestos wood smoke jacks and ventilators; pipe coverings; high temperature and asbestos cements; locomotive boiler lagging; passenger refrigerator and tank car insulations; spiral locomotive pipe insulation; power reverse gear packing sets; I-M air brake cylinder expander rings; steam traps; brake band lining; asbestos-metallic friction brake blocks; friction tapes and splicing compounds; "Success" fire extinguishers; packings and gaskets. Represented by J. E. Meek, G. A. Nicol, J. C. Younglove, P. C. Jacobs, J. H. Trent, C. E. Murphy, H. G. Newman, F. J. Horne, R. A. Hamaker, H. Flannagan and George Christenson. Spaces 580-581.
- Johns Pratt Company, The, Hartford, Conn.—"Vulcanston" air pump packing sets; J-P combination air pump packing sets, Mallet compound locomotive packing, C-C locomotive throttle valve packing, red fibre sheet packing, molded union washers, pump valves, rope packing and asbestos groove packing; Noark cartridge end-seal tissues; Noark cutout bases. Represented by Hudson Dickerman. Space 708.
- Johnson Bronze Company, New Castle, Pa.—Small brass castings; brake bushings; balance wheel glass protector. Represented by F. H. Babcock. Space 528.
- Joliet Railway Supply Company, Chicago.—Huntton brake beams and truck bolsters; Joliet brake beams and journal boxes. Represented by C. A. Carscaden, James E. Simons, Hamilton Vose, Jr., and Charles Benz. Space 611.
- Jones & Laughlin Steel Company, Pittsburgh, Pa.—Nails, wire and wire products; hot rolled sections; tin and black plate tubular products; beams, channels and angles; spikes and concrete reinforcing bars; woven wire fencing. Represented by A. A. Wagner, J. D. Allen, E. D. Batcheler, R. T. Rowles, Boyden Kinsey, Roland Gerry, G. C. Fogwell, C. W. Gage, R. M. Kilgore and T. G. Roberts. Spaces 409-411.

- Joyce-Cridland Company, The, Dayton, Ohio.—All kinds of lifting lowering, pushing, pulling and traversing jacks. Represented by W. F. Bippus, C. D. Derby, A. S. Beattys, R. L. Skidmore, W. I. Clock and H. Brock. Spaces 607-609.
- Keller, Inc., William H., Grand Haven, Mich.—Pneumatic riveting, chipping, calking, scaling, flue beading and staybolt riveting hammers; portable pneumatic drills and wood boring machines; pneumatic sand rammers, holders-on, rivet busters, jam riveters, etc. Represented by W. F. Delancy, W. J. Devlin, J. C. Campbell, C. W. Gellinger and L. H. Olsen. Spaces 153-155.
- Kerite Insulated Wire & Cable Company, The, New York.—Insulated wires and cables. Represented by B. L. Winchell, Jr., Azel Ames, P. W. Miller, J. W. Young, J. A. Renton, R. E. Butrick, W. H. Fenley, E. L. Adams, J. A. Hamilton and Carl Reeb. Spaces 523-525.
- Key-Bolt Appliance Company, Orchard Park, N. Y. Space 162.
- Keycoke Railway Equipment Company, Chicago.—Murray all cast steel friction draft gear and several designs of cast steel coupler yokes. Represented by George C. Murray and R. J. Cook. Space 309.
- King Pneumatic Tool Company, Chicago, Ill.—King molybdenum steel sleeve valves for riveting hammers; King molybdenum steel riveting and chipping hammers; King molybdenum steel rivet cutters; King rivet cutter chisels; King rivet sets, hose couplings and accessories; King electric drills. Represented by George A. Barden, H. O. King, H. A. Torson, W. H. S. Bateman, C. E. Walker and J. E. Otis, Jr. Spaces 375-377.
- Landis Machine Company, Waynesboro, Pa.—Four-inch Landis pipe threading and cutting machine; 1½-in. Landis double-head pipe and nipple threading machine; Landis chaser grinder; five sizes of new type of Landis automatic die heads. Represented by C. F. Meyer, C. N. Kirkpatrick, F. C. Delcher, G. A. Mid-dower and W. F. Ruppert. Spaces 79-81-83.
- Laughlin-Barney Machinery Company, Pittsburgh, Pa.—New tube shearing machine. Represented by Harry Barney, W. E. Amberg, T. A. Oakley and H. C. Watson. Space 705.
- Lehman Machine Company, St. Louis, Mo.—Twenty-two inch geared head lathe. Represented by L. A. Carter and P. Lehman. Space 92.
- Lehon Company, The, Chicago.—Mule-Hide plastic car roofing; canvas car roofing; insulating paper; roll roofing; insulating fabric; asphalt shingles; miniature car model. Represented by Tom Lehon, John Eipper, F. T. Carpenter and E. A. Leonard. Space 18.
- Lewis-Shepard Company, Boston, Mass.—Jacklift elevating truck; Lewis-Shepard "stacker" self-loading warehouse trucks; platforms for elevating trucks. Represented by G. E. Squier and J. H. Burwell. Space 302.
- Libbey Glass Manufacturing Company, The, Toledo, Ohio.—High pressure gage and lubricator glasses; bulls-eye glasses; reflex gage glasses; lantern globes and lenses; battery jars. Represented by J. A. Carson. Spaces 304-306.
- Liberty Manufacturing Company, Pittsburgh, Pa.—Liberty locomotive tube cleaners; Lagonda locomotive tube cleaners; new type superheater flue cleaner. Represented by H. A. Pastre and W. A. Darrow. Space 131.
- Loco Light Company, The, Indianapolis, Ind.—Headlight turbo-generator in operation; headlight case. Represented by H. H. Tomlinson. Space 202.
- Locomotive Firebox Company, Chicago.—One full-sized firebox with two complete Nicholson thermic syphons installed; one working model demonstrating circulation features and the other advantages gained by use of Nicholson thermic syphons. Represented by John L. Nicholson, Leslie R. Pyle, C. M. Rogers and Harry Clewer, Jr. Spaces 382-383-384-385.
- Locomotive Stoker Company, Pittsburgh, Pa.—Full size type "D" Duplex stoker and one-third size model; slope sheet coal pusher. Represented by W. S. Bartholomew, J. J. Byrne, O. B. Capps, W. G. Clark, A. C. Deverell, H. B. Gardner, J. J. Hannahan, N. M. Lower, L. V. Stevens, A. L. Whipple, A. N. Willisie and H. C. Woodbridge. Spaces 403-405-407.
- Logan Iron & Steel Company, Philadelphia, Pa.—Reception booth. Space 319.
- Long, Jr. Company, Chas. R., Louisville, Ky.—Samples of railway paints, paint panels; paint films. Represented by Charles R. Long, Jr., Harry Vissering, G. S. Turner, J. M. Monroe, J. S. Lemley, W. H. Heckman and Samuel W. Russell. Space 575.
- Lovell & Co., F. H., Arlington, N. J.—Lighting equipment for locomotives, cars and maintenance of way; switch classification, marker, signal and bridge lamps. Represented by A. D. Hobbie, F. W. Dressel, L. L. Pollak, H. S. Hoskinson and B. P. Claiborne. Spaces 631-633.
- Lowe Brothers Company, Dayton, Ohio.—Red lead lute; Metal-cote; signal enamel; varnishes; freight car paints. Represented by J. A. McFarland, E. T. Wade, George A. Barden, Langley Ingraham, R. L. DeArmond, R. H. Blackall, H. R. Potter and D. K. Coyle. Space 629.
- Lunkenheimer Company, The, Cincinnati, Ohio.—Valves, lubricators, oil and grease cups and other engineering appliances. Represented by W. Morgan Hood, W. W. Beal, Andrew Lauterbach and Howard J. Evans. Spaces 313-315.
- MacRae's Blue Book Company, Chicago.—MacRae's Blue Book. Represented by Thomas H. MacRae, D. N. Peirce, W. F. Miller and F. L. McCabe. Space 22.
- McCabe Manufacturing Company, Lawrence, Mass.—Working model flanging machine with flanged flue sheets, heads and car parts. Represented by red H McCabe and Hugh McCabe. Space 310.
- McConway & Torley Company, The, Pittsburgh, Pa.—Car couplers; quadruple shear yokes; uncoupling arrangements for passenger couplers. Represented by William McConway, Jr., Stephen C. Mason, I. H. Milliken, J. J. Hughes, W. H. Graul and Robert Huff. Spaces 501-503-505.
- Machinery, New York.—Engineering publications as follows: Machinery; Machinery's Handbook, Encyclopedia, Books on Shop Practice, Library for Machinists, Library for Toolmakers, Library for Designers and Draftsmen, Dollar Books and Fifty Cent Books; exhibit of machine tool advertising. Represented by Erik Oberg, J. N. Wheeler and Victor Brook. Space 360.
- Madison-Kipp Corporation, Madison, Wis.—Locomotive lubricators. Represented by Thomas E. Colman and William B. Wheeler. Space 36.
- Mahr Manufacturing Company, Minneapolis, Minn.—Mahrvel rivet forges, torch, outfits, babbitt furnaces, spring furnaces, calorimeters, safety automatic shut-off valves and blast gates; Mahrvac torch. Represented by W. M. Horner, W. G. Barstow, R. B. Ecker, W. H. White and J. L. Edwards. Space 134.
- Main Belting Company, Philadelphia, Pa.—Complete car lighting belt, belting and belt fasteners. Represented by H. W. Lyndall. Space 234.
- Manning, Maxwell & Moore, Inc., New York.—Hancock inspirators; Hayden & Derby injectors, ejectors, high pressure valves and oil cups; Ashcroft steam and hydraulic gages; Consolidated safety valves; Tabor engine indicators; Putnam double axle lathe, 54-in. vertical boring mill, 48-in. car wheel borer, and 26-in. by 14-ft. traverse shaper; two types of Woodward & Powell 24-in. crank planers; Columbia 32-in., 24-in. and 16-in. shapers; Snyder 25-in. and 36-in. vertical drills; National wedge grip heading and forging machine, automatic hammer header, double staybolt cutter, and die sharpener; electric rivet header; Cone Automatic Machine Company's 3½-in. screw machine. Represented by J. M. Davis, P. M. Brotherhood, H. D. Carlton, E. M. Moore, John F. Schurch, B. T. Williston, C. H. Graesser, Joseph Wainwright, T. S. Stephens, John Dunn, W. C. Chapman, J. S. Whalen, F. M. Maley, Norman Alderdice, H. J. Hair, E. F. Winship, R. S. Dean, L. E. Brayton, L. A. Gluckler, E. D. Garfield, Joseph Bush, H. E. Eddy, W. H. Williston, J. Soule Smith, C. L. Brown, P. H. Ryan, J. C. Blanton, James Briscoe, Phillip G. Darling, E. B. Crocker and O. W. Heise. Spaces 60-86, inclusive.
- Massachusetts Mohair Plush Company, Boston, Mass.—Mohair plush for car seats. Represented by W. W. Melcher and A. B. Mason. Spaces 635-637.

- Mercury Manufacturing Company, Chicago.—Mercury twin-three tractor; Mercury freight house trailer; motion pictures of "The Trackless Train" operating in railroad passenger and freight terminals. Represented by C. H. Clare, J. S. Kunkle and L. J. Kline. Space 404.
- Merrill Company, Chicago.—Merco Nordstrom plug valve. Represented by H. P. MacGregor, Thomas Jabine and Confort E. Brown. Space 164.
- Metal & Thermit Corporation, New York.—Materials, appliances and samples of Thermit welding, including a new application of Thermit welding to locomotive superheater tubes; specimen of a section cut through weld in a large crank shaft. Represented by W. R. Hulbert, F. W. Cohen, J. H. Deppeler, H. D. Kelley and H. S. Mann. Space 136.
- Midgeley & Borrowdale, Chicago.—Water coolers and filters; weather-stripping; dust guards; steel and malleable iron castings. Represented by S. W. Midgeley. Space 42.
- Midland Company, The South Milwaukee, Wis.—Midland, Wilbern and anti-friction baggage car door hangers; safety stop for baggage car doors. Represented by C. P. Nourse and I. W. Davis. Space 332.
- Midvale Steel & Ordnance Company, Philadelphia, Pa.—New Symington wrought steel side frame; complete truck with wrought steel side frame; reproduction of Knobbling furnace for making charcoal iron with samples of lump bloom pile, etc., showing different stages in manufacture of charcoal iron; solid rolled steel pistons and piston center; rolled steel wheels; tire for cushion wheels for railway auto-buses; stone ties from old Portage Railroad with cast iron rail chair and bolts, and section of English rail rolled about 1832. Represented by William Aertsen, H. E. Rowe, James Connor, H. W. Hibsham, R. E. Sharp, H. P. Hubbell, R. E. Dexter, J. C. C. Holding, Stuart Hazelwood, Ward Miller, L. B. Morris, Walter Smyth, A. C. Howell G. A. Richardson. Spaces 588-589.
- Milburn Company, The Alexander, Baltimore, Md.—Acetylene welding and cutting equipment, including acetylene welding generators; welding torches; cutting torches; combination welding and cutting torches; pre-heaters; portable carbide lights for railroad, repair and construction work. Represented by A. F. Jenkins, C. R. Pollard, C. E. Mitchell, E. P. Boyer, G. B. Malone and F. Knecht. Space 217.
- Milwaukee Tank Works, Milwaukee, Wis.—Hand pump for use at section tool houses; lubricating and paint oil battery tanks and pumps; power driven automatic barrel filling pump; waste saturating tank and pump. Represented by Leo Davis and Thomas E. Cbatto. Space 376.
- Miner, W. H., Chicago.—Friction draft gears; side bearings; safety hand brakes; refrigerator car door fasteners; drawbar yokes. Represented by A. E. Biddle, Bradley S. Johnson, G. O. Lewis, J. H. Link, C. F. McCuen, J. R. Mitchell, J. F. O'Connor, W. F. Robertson, H. F. Schwartzberg, Keith Williams, A. P. Withall and George A. Johnson. Spaces 586-587.
- Minieh Railway Appliance Corporation, Philadelphia, Pa.—Super Safety hand brake and parts. Represented by R. H. Minieh, Harry E. Karr, Alex. I. Cummins, Walter J. Burns, N. S. Kenney, J. Bayard Embick, W. Harding Davis and John L. Cornog. Space 369.
- Morton Manufacturing Company, Chicago.—Buffing mechanism for top of vestibule diaphragm face plate; canvas and steel vestibule diaphragms with hoods and attachments; vestibule curtains and fixtures; folding tail gates; safety treads for steps; step boxes for passenger cars; brake steps for freight cars; steel doors and Aft-Pinch door hold; window curtains and fixtures; car window weatherproofing; steel flooring; pressed and drawn steel shape of all kinds. Represented by H. U. Morton, C. D. Morton, William Wampler, G. H. Ord, H. B. Chamberlain, C. A. Keating and F. N. Grigg. Spaces 568-569.
- Morton Manufacturing Company, Muskegon Heights, Mich.—Special railroad draw cut shaper for machining driving boxes, with attachments for planing shoes and wedges, rod brakes and driving box bolts, photographs of draw cut cylinder planer and boring machine. Represented by Harry E. Morton and George F. Goble. Space 50.
- Nathan Manufacturing Company, New York.—Injectors; sight level lubricators, mechanical lubricators, water columns, boiler checks; balanced starting valves; coal sprinkler; water gages; gage cocks; locomotive fittings. Represented by Otto Best, J. F. Farrell, A. Kassander, Richard Welsh, William Wesh, William E. Brumble and W. D. Jenkins. Spaces 578-579.
- National Boiler Washing Company of Illinois, Chicago.—Reception booth. Represented by Frederick A. Gale, T. G. Dalton and Fred W. Gale. Space 608.
- National Brake Company, Inc., Buffalo, N. Y.—Two types of Peacock blind end baggage car brakes; Peacock freight car and passenger car brakes. Represented by F. D. Miller and W. D. Brewster. Space 322.
- National Car Wheel Company, Pittsburgh, Pa.—Arch plate A. R. A. wheels of 650, 700, 750 and 850 lb.; new 850-lb. arch plate reinforced flange Star Special wheel for 70-ton cars; similar wheel after five years' service under car of 70 tons capacity. Represented by J. H. Yardley, J. S. Bucknam, J. F. Weisbrod, E. H. Chapin, H. L. Garvin and H. E. McClumpha. Spaces 516-518.
- National Lock Washer Company, The, Newark, N. J.—Models of car curtains, curtain fixtures and rollers; car window fixtures including sash locks, balances and anti-rattling devices; National rib lock washers. Represented by C. H. Loutrel, J. Howard Horn, Daniel Hoyt, R. B. Cardozo, G. LaRue Masters, A. W. Preikschat and F. B. Archibald. Space 543.
- National Malleable Castings Company, The, Cleveland, Ohio.—Couplers; journal boxes; draft gears; miscellaneous railroad castings. Represented by T. W. Aishton, A. J. Bazeley, A. O. Buekings, Jr., J. J. Byers, R. W. Chambers, W. E. Coffin, E. H. Schmidt, E. H. Fathauer, C. Garspar, H. W. Gilbert, J. H. Jascha, C. H. Krakau, H. T. Krakau, E. V. Sthler, J. A. Slater, S. L. Smith, F. K. Leyake, W. C. Lewis, O. W. Loomis, G. V. Martin, H. L. Mausk, L. H. McCrea, B. Nields, G. R. Rasmusen, F. Snyder, H. L. Spence, E. O. Warner and L. S. Wright. Spaces 613-615.
- National Railway Appliance Company, New York.—Reception booth. Represented by B. A. Hegeman, Jr., W. C. Lincoln, Charles C. Castle, W. C. Peters, Fred C. J. Dell, Harold A. Hegeman and R. B. MacDonald. Space 622.
- National Railway Devices Company, Chicago.—Shoemaker radial and vertical firedoors. Represented by Jay G. Robinson and E. J. Gunnison. Space E.
- National Tube Company, Pittsburgh, Pa.—Reception booth. Spaces 546-547.
- Nazel Engineering & Machine Works, Philadelphia, Pa.—Nazel motor driven air hammer. Represented by Ralph W. Nazel and C. H. Wackernagel. Space 73.
- Neville Lubricator Company, Pittsburgh, Pa.—Lubricator for air pumps. Represented by Louis W. Garratt. Space 528.
- Newton Machine Tool Works, Inc., Philadelphia, Pa.—Crank planing machine; continuous milling machine. Represented by N. P. Lloyd, R. G. Holmes and W. B. Zietz. Spaces 91-93.
- New York Air Brake Company, New York.—Samples of new centrifugal air pump strainer; new oil atomizing lubricator. Represented by Scott R. Hayes, C. E. Leach, George Kleifiges, N. W. Lyon, B. Hyanes and N. A. Campbell. Space 30.
- Nicine Company, Chicago.—Absorbent, deodorant, disinfectant and germicide in bottles and cans. Represented by H. R. Millard and J. J. McCarthy. Space 318.
- Niles-Bement Pond Company, New York.—New type turret tool post for wheel lathes, new 32 in shaper for driving box work; new 25-m. lathe; N. B. P. Right Line radial drill; gages and small tools. Represented by William G. Flag, Edward L. Leeds, Charles I. Kyle, George C. Mills, Paul Renno, John Ross, D. H. Teas, N. C. Walpole and H. F. Welch. Spaces 116-118-120.
- Norton, Inc., A. O., Boston, Mass.—Improved self-lowering speed controlled jacks; ball-bearing bridge and wrecking jacks; ball-bearing journal jacks. Represented by H. A. Norton, F. I. Gormley, G. R. Law, C. H. Smith, Jr., R. D. Bates and W. R. Kelly. Space 551.
- Norwalk Iron Works Company, The, South Norwalk, Conn.—Air and ammonia compressors. Represented by C. L. Thompson, A. R. Betts and Don B. McCloud. Space 138.

- Nuttall Company, R. D., Pittsburgh, Pa.—Heat treated gearing and miscellaneous parts for various applications; BP treated gearing for electrified steam roads. Represented by J. E. Mulen and R. F. Fiske. Space 94.
- Okadee Company, Inc., The, Chicago.—Blow-off valves; blower valves; water glass protectors; tender hose couplers; automatic cylinder cocks; automatic drain valves; reflex water gages; model of Okadee front end hinge. Represented by A. G. Hollingshead, G. S. Turner, W. H. Heckman and J. M. Monroe. Space 573.
- Okonite Company, The, Passaic, N. J.—Rubber covered wires and cables for railroad service; varnished cambric covered wires and cables; insulating tapes. Represented by W. R. Van Steenburg, F. J. White and J. D. Underhill. Space 538.
- Oldham & Son Company, George, Baltimore, Md.—Pneumatic riveting, chipping and scaling hammers, foundry rammers, jam riveters, holders-on, and accessories. Represented by H. J. Bannister, R. W. Nelson, J. T. Biles, P. J. Christy, F. W. Gau and F. R. Fraser. Space 320.
- Oliver Electric & Manufacturing Company, St. Louis, Mo.—Plugs and receptacles; train line connectors; headlight switches; tender signal lamps; portable hand lamps; cab light fixtures; classification and marker lamps; flexible conduit couplings; safety-first switches; miscellaneous wiring devices; terminal and junction boxes. Represented by J. A. Amos and W. A. Ross. Space 316.
- O'Malley-Bears Valve Company, Chicago.—Multiplate globe, angle, check and special locomotive valves; Multiplate Dullex blowoff cocks; Perfection gage cocks and water glass drains; driver brasses; engine castings; journal bearings. Represented by Thomas O'Malley, J. N. Gallagher, J. M. Pigott, A. W. Lemme and J. E. Brown. Space 133.
- Otis Automatic Train Control, Inc., Spokane, Wash.—Automatic train and speed control; automatic brake setting valves and train line on small engine; ramp for operating brake setting valves automatically. Represented by A. F. Gammond, John T. Dickinson, A. L. Gesche, George Schweitzer and R. C. Miller. Space 706.
- Oxweld Railroad Service Company, Chicago.—Oxy-acetylene equipment. Represented by M. C. Beymer, R. R. Browning, G. M. Crowover, Fred Gardner, H. V. Gigandet, F. C. Hasse, O. D. Hays, William Hogan, William Leighton, A. N. Lucas, J. P. McWilliams, C. B. Moore, C. M. Mendenhall, R. Rivett, E. S. Richardson, L. C. Ryan, H. W. Schulze, George Thompson and A. W. Whiteford. Space 2.
- Page Steel & Wire Company, Bridgeport, Conn.—Page Armco welding rods and electrodes; Page Armco signal bond wires, line wire and strand; wire mesh for refrigerator car construction; panel partitions for store and stock rooms. Represented by W. T. Kyle, C. A. McCune, W. H. Bleecker and E. L. Schaeffer. Spaces 305-307.
- Paige & Jones Chemical Company, New York.—Water softening tanks; boiler feedwater treatment. Represented by Fred O. Paige, Lucius A. Fritze and C. B. Flint. Space 358.
- Pantasote Company, The, New York.—Agasote panels, wainscoting, ceilings, roofs; Pantasote artificial leather. Represented by John M. High, William Anderson and William A. Lake. Space 400.
- Parish & Bingham Corporation, Cleveland, Ohio.—Pressed steel car parts. Represented by P. O. Krebbiel and C. E. Meyer. Space D.
- Parkesburg Iron Company, Parkesburg, Pa.—Samples of genuine charcoal iron boiler tubes for locomotive boilers; sample of Parkesburg iron tube removed after 42 years of continuous service. Represented by I. A. Beale, Jr., George Thomas, 3rd, W. H. S. Bateman, J. R. Wetherald, G. W. Denyven, R. J. Sheridan, J. F. Wiese, G. H. Woodroffe, W. P. Canby and G. A. Cardwell. Space 388.
- Paxton-Mitchell Company, Omaha, Neb.—Metallic piston rod and valve stem packing. Represented by James L. Paxton, E. L. Chollman, J. J. Kellner and W. S. Murrian. Space 533.
- Peerless Machine Company, Racine, Wis.—Peerless 6-in. by 6-in. universal and plain metal sawing machines; 13-in. by 16-in. plain metal sawing machine. Represented by R. T. Ingalls and Charles Rasmussen. Space 215.
- Pels & Co., Inc., Henry, New York.—Universal punch, plate, shear, bar, angle, tee, beam and channel cutter; combined punch, splitting shear, bar, angle and tee cutter; gate shear; double ended bar and angle shear; single ended coping machine. Represented by R. W. McPhee, T. C. Sternblad and C. A. Miller. Spaces 122-124-126.
- Penn Iron & Steel Company, Creighton, Pa.—"Lewis" staybolt, engine bolt and chain iron, hollow staybolt iron and double refined iron. Represented by Charles J. Nieman and Wenman A. Hicks. Space 552.
- Philadelphia & Reading Railway Company, Reading, Pa.—Consolidation type locomotive; Pacific type locomotive; hopper car; passenger coach. Space on exhibit track.
- Pilliod Company, The, New York.—Baker locomotive valve gear; sillind low water alarm. Represented by Burton Mudge, J. J. Donovan, William McGee, R. H. Weatherly and Harry Snyder. Spaces 576-577.
- Pilot Packing Company, Inc., Chicago.—Pilot packing for various uses; Ripken automatic steam drifting valve. Represented by Joseph Sinkler and Robert Sinkler. Space 542.
- Pittsburgh Steel Foundry Company, Pittsburgh, Pa.—Reception booth. Represented by H. V. Seth, John Allison and E. R. Williams. Space 168.
- Pittsburgh Testing Laboratory, Pittsburgh, Pa.—Specially designed compression testing machine for testing samples of sand and cement in compression; specially designed brass molds for making test specimens used by the machine. Represented by James Milliken, A. R. Ellis, H. B. Landerbaugh, H. W. Bates and H. M. Wey. Space 33.
- Pocket List of Railroad Officials, The, New York.—Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Outside of space 5.
- Porter-Richards Machinery Company, Philadelphia, Pa.—Cisco 18-in. lathe; Clark portable electric drills, reamers, screw drivers, toolpost grinders, hand and suspended surface grinders; Clark electrically driven drill presses and emery grinders; Sweetland lathe chucks. Represented by S. G. Porter, E. I. Porter and J. R. Richards. Space 75.
- Pratt & Lambert, Inc., Buffalo, N. Y.—Vitalite railway enamel system. Represented by J. P. Gowing and E. L. Georger. Space 521.
- Pressed Steel Car Company, New York.—Reception booth. Represented by N. S. Reeder, J. F. MacEmuly, C. E. Postlethwaite, K. C. Gardner, H. H. Gilbert, C. C. Clark, J. G. Morrissey, F. L. Johnson, H. S. Hammond, J. S. Turner, W. H. Wilkinson, C. H. Jackman, J. T. Markham, J. F. Streib, H. P. Hoffstot, and F. O. Schramm. Spaces 545 and 601.
- Princeton Foundry & Supply Company, Princeton, W. Va.—Perfection cone stove sand drier. Represented by C. J. Hilty and W. H. Golden. Space 163.
- Production Machine Company, Springfield, Mass.—Cylindrical (centerless feed) polishing machine; automatic flat polisher; combined disk grinder, surfacer and polisher; Miller & Crowningshield hand millers; F. O. Wells Company broaching tools, taps, dies and screw plates. Represented by W. S. Howe and A. H. Behnke. Space 103-105.
- Pugh, Inc., Job T., Philadelphia, Pa.—Augers and bits; hollow mortising chisels. Represented by M. H. Fussell, Jr. and E. T. Wade. Space E.
- Pyle-National Company, Chicago.—Turbo-generators; cast aluminum cases, complete with reflectors and focusing device; Armco iron headlight cases; back-up lamps; steam turbine; 10-in. portable lamp; switch engine headlight case; adjustable flood and searchlights; fan; Nonglare and crystal glass reflectors; 10-in. flood light. Represented by R. C. Vilas, J. Will Johnson, William Miller, T. P. McGinnis, Crawford P. McGinnis, George E. Haas, R. L. Kilker, L. H. Steger and Walter Smith. Spaces 602-604-606.
- Racine Tool & Machine Company, Racine, Wis.—New Racine Junior metal cutting machine; high speed metal cutting machine

- with three-speed attachment; heavy duty metal cutting machine; Racine high speed portable rail cutting machine; Racine broach slitter and keyseater. Represented by E. Erskine, William Reinhardt and Thomas A. Hyde. Space 130.
- Railroad Herald, The, Atlanta, Ga.—Reception booth. Represented by F. C. Laird. Space 20.
- Railway Devices Company, St. Louis, Mo.—Perfection brake catches; Western angle cock holders; spiral pipe clamps; "iron horse" or pedestal; Sta-Kite release rigging attachments. Represented by Louis A. Hoerr and Sterling H. Campbell. Space 618.
- Railway Materials Company, The, Chicago.—Railway brake shoes. Represented by W. M. Sumpson, E. C. Tolson, George Huefle and Gustave Bluemel. Space 561.
- Railway Purchases & Stores, Chicago.—Magazines. Represented by Edward Wray and H. B. Kirkland. Space 11.
- Railway Review, Chicago, Ill.—Copies of Railway Review. Represented by Harold A. Smith, A. E. Jooven, Charles L. Bates, Willard A. Smith, L. G. Plant and J. E. Gougeon. Spaces 12-14.
- Railway Storage Battery Car Company, New York.—Reception booth; data and information covering operation of Edison storage battery cars. Represented by L. Klopman and F. N. Kozell. Space 634.
- Ralston Steel Car Company, The, Columbus, Ohio.—Reception booth. Represented by F. E. Symons, B. C. Hanna, C. S. Rea, and Charles P. King. Space 558.
- Reading Iron Company, Reading, Pa.—Full weight genuine wrought iron pipe; charcoal iron boiler tubes; genuine wrought iron railway signal pipe, nipples and couplings. Represented by Samuel L. Shoher, Jr. Space 228.
- Reed-Prentice Company, Worcester, Mass.—Reed-Prentice high speed 14-in. geared head lathe with apron, gear box and head-stock units; 14-in. new type cone head lathe; 4-ft. arm radial drill. Represented by F. W. McIntyre, F. O. Hoagland, J. A. Benson, F. K. Hendrickson and P. K. Dayton. Spaces 88-90.
- Regan Safety Devices Company, Inc., The, New York.—Regan automatic train control devices; animated technical drawings of the train control devices. Represented by J. Beaumont and F. J. L'Prean. Space 402.
- Republic Iron & Steel Company, Youngstown, Ohio.—Reception booth. Represented by W. B. Topping and W. H. Oliver. Space 517.
- Rivet Cutting Gun Company, Cincinnati, Ohio. Cincinnati rivet cutting guns. Represented by L. K. DeBus and J. M. Crowe. Space 513.
- Roberts Automatic Connector Company, Ltd., Sarnia, Ont.—Automatic steam and air pipe connector for passenger and freight service. Represented by John W. Roberts, Thomas Robinson and William F. Saylor. Spaces 159-160.
- Robinson Connector Company, The, New York. Automatic connector. Represented by Joseph Robinson and G. E. Matheson. Space 703.
- Rolling's Sons Company, John A., Trenton, N. J.—Gas and electric welding wire, steel and copper telephone and telegraph wire, lamp wires, etc.; wire rope from 1/8 in. to 3 in. diameter; wire rope contributions; wire rope fittings; wire rope splices; wire rope mud buckets; ball or barrel cord; wire cloth for wire screens; window screening, etc.; insulated wires and cables; reduction tools. Represented by H. E. Dean, A. E. Connor, L. Grayson, Mr. Nelson, A. W. Miller and E. A. Bennett. Space 14.
- Rothell Company, The, Baltimore, Md.—Adjustable cross-stock and post-in-hub rings. Represented by Theodor Reigtsma and George M. Harrison. Space 169.
- Four Iron Mills, Inc., New York.—Sample specimens of staybolt and pin-and-rod iron. Represented by B. A. Clement and C. C. Orin. Spaces 414-416-422-424.
- Rubbermat Company, Newark, N. J.—Rubbermat proof and varnish brushes. Represented by A. I. Heltzman. Space 16.
- Ryerson & Son, Joseph T., Chicago.—Ryerson-Conradson motor driven engine lathe; Ryerson flue shop model; Ryerson-Lennox rotary bevel shear model; Ryerson-Lennox rotary splitting shear model; Ulster Special seamless hollow staybolts; Ulster iron. Represented by J. P. Moses, H. T. Bradley, A. G. Moler, E. W. Kavanaugh, C. F. Barton and John Craigie. Space 132.
- Safety Car Heating & Lighting Company, New York.—Car lighting equipment (electric and Pintsch); batteries and lighting fixtures; electric fans; water coolers and water heaters. Represented by W. L. Conwell, W. L. Garland, J. H. Rodger, R. H. Harvey, S. I. Hopkins, H. D. Donnell, A. B. Mills, H. K. Williams, G. Scott, J. H. Henry, L. W. Siple, G. E. Hulse and L. Schepmoes. Space on stairway platform, Aquarium Court.
- Sargent Company, Chicago.—Loedige quick-acting blower valves; safety water gages; safety water glass gaskets; water columns; Renu gage cocks. Represented by George H. Sargent and L. L. Schultz. Space 600.
- Schaefer Equipment Company, Pittsburgh, Pa.—Schaefer truck lever connections, drop forged truck levers and brake rod jaws; collapsible stake pockets. Represented by F. A. Barby, H. G. Doran, S. M. Hindman, J. C. Little, Frederic Schaefer and E. J. Seales. Space 511.
- Sellers & Co., Inc., William, Philadelphia, Pa.—Locomotive injectors; locomotive valves and other accessories; annular disk boiler check; locomotive fire extinguisher; locomotive boiler tester. Represented by John D. McClintock, James R. New, Phillip E. Raymond, Edward L. Holljes and Charles T. Wilson. Space 627.
- Sharon Pressed Steel Company, New York.—Corrugated car roof sections; Sharon Brute trailers; Bluenose hand trucks; Bear-cat dollies; Sharon pressed steel castrax; Sharon pressed steel wheel. Represented by C. K. Strausbaugh, H. F. Ziegler, H. W. Torry and R. B. Reid. Space 232.
- Sherritt & Stoer Company, Inc., Philadelphia, Pa.—Hendey new model lathe and other machine tools. Represented by M. A. Sherritt, P. A. Rebek, H. M. Shaw, J. C. Carlton and G. A. Ebelhare. Space 109.
- Silumite Products Corporation, Philadelphia, Pa.—Silumite paint for iron and steel. Represented by David V. Ault and George N. Ault. Space 502.
- Simmons-Boardman Publishing Company, New York.—Railway Age; Railway Mechanical Engineer; Railway Maintenance Engineer; Marine Engineering and Shipping Age; Railway Electrical Engineer; The Boiler Maker; Car Builders' Cyclopaedia; Locomotive Cyclopaedia; Shipbuilding Cyclopaedia; Maintenance of Way Cyclopaedia; Material Handling Cyclopaedia; books on transportation subjects. Represented by S. O. Dunn, R. V. Wright, A. F. Stuebing, R. E. Thayer, C. B. Peck, C. N. Winter, A. G. Oehler, E. L. Woodward, R. C. Angus, C. J. Corse, F. W. Kraeger, J. G. Lye, A. E. Orthinghaus, E. A. Rohm, E. A. Simmons, L. B. Sherman, C. R. Mills, F. H. Thompson, F. C. Koch, R. H. Smith, J. M. Rutherford, H. L. Burrells, George Slate, H. B. Bolander, E. A. Lundy, J. F. Anderson, P. Traeger, J. F. Taylor, C. H. Knowlton, R. E. Duysters and J. Currie. Space 1.
- Simonds Manufacturing Company, Fitchburg, Mass.—Solid and inserted tooth metal cutting saws; wood cutting saws; planer machine knives; hack saw blades and files. Represented by Charles H. McKay, R. D. Baldwin and Spencer Patterson. Space 204.
- Spic & Co., James B., Bridgeville, Pa.—Reception booth. Represented by R. F. Rogers. Space 215.
- S. K. F. Industries, Inc., New York.—Deep groove ball bearings; self-aligning ball bearings; Atlas steel balls. Represented by W. J. Butt, S. B. Taylor, R. H. DeMott, H. E. Brunner, H. A. Allen and R. C. Byler. Space 147.
- Smith Locomotive Adjustable Hub Plate Company, The, Chicago, Ill.—Adjustable hub plates for locomotives. Represented by A. J. Smith, J. Will Johnson and C. P. McOmbs. Space 602.
- Southern Wheel Company, St. Louis, Mo.—Reception booth. Represented by F. C. Turner, J. B. Spencer and S. C. Watkins. Space 418.
- Southwark Foundry & Machine Company, Philadelphia, Pa.—Southwark Mason washer cutting press, die welder; bushing

- press; models of hydraulic spring banding press and continuous furnace mechanism. Represented by W. H. Harman, F. G. Schranz, G. H. Case, W. A. Lacke, W. L. DeLaney, F. M. Kepler, S. Bolling and J. T. Lee. Space 135.
- Stafford Roller Bearing Car Truck Corporation, Lawton, Mich.—Standard M. C. B. arch-bar type, 40,000 lb. capacity truck, equipped with Stafford roller bearings (shown in motion) and journal boxes. Michigan Central 80,000 lb. capacity box car, with trucks equipped for the past 20 months with Stafford roller bearings and journal boxes. Represented by L. K. Stafford and O. F. Packer. Space 206 and on exhibit track.
- Standard Car Truck Company, Chicago.—Barber lateral motion truck device; Barber roller side bearings; Barber universal coupler carrying iron. Represented by L. W. Barber, James T. Milner, F. L. Barber and E. W. Webb. Space 510.
- Standard Coupler Company, New York.—Various types of Sessions-Standard friction draft gears and Laughlin roller side bearings. Represented by A. P. Dennis, W. Eckles and E. G. Goodwin. Space 500.
- Standard Electric Crane & Hoist Company, Philadelphia, Pa.—New type of short-headroom monorail electric hoist of two to three tons capacity. Represented by H. S. Valentine, E. C. Roop and P. G. Basehore. Space 73.
- Standard Forgings Company, Chicago.—Stanforge friction draft gear; Stanforge forged steel yoke; standard A. R. A. journal box wedges; drop forged steel center plates. Represented by E. W. Richey, O. L. DeLano and M. A. Metzger. Space 535.
- Standard Railway Equipment Company, Chicago.—Murphy roofs, carlines, running board extensions, steel ends, release rigging, centering device; hopper doors; National side door. Represented by W. P. Murphy, A. A. Frank, S. G. Rea, George Cooke, A. C. Murphy, G. G. Gilpin, A. G. Bancroft, V. E. Sisson and T. J. Cralley. Spaces 426-428.
- Steele Fabricating Corporation, The, Michigan City, Ind.—Photographs and descriptive matter of Stecco ready-to erect structural steel buildings for industrial purposes. Represented by A. C. McGuire, George C. Jones and C. K. Drury. Space 42.
- Stone-Franklin Company, New York.—Standard single battery car lighting equipment (running exhibit); detail parts of equipment. Represented by R. G. Coburn, J. L. Hays, C. E. Walker, W. L. Gray, H. D. Rohman, R. E. Gallagher and R. Gerrard. Space 406.
- Stowell Company, The, South Milwaukee, Wis.—Wilbern adjustable door hangers for warehouses and factory doors. Represented by I. W. Davis. Space 332.
- Street, Clement F., Greenwich, Conn.—Street locomotive starter. Represented by Clement F. Street. Space 167.
- Stucki Company, A., Pittsburgh, Pa.—Frictionless side bearings; side bearing testing machine; side bearing after eight years' continuous service under 100-ton car. Represented by A. Stucki, A. B. Severn and W. C. Hansen. Space 539.
- Sunbeam Electric Manufacturing Company, Evansville, Ind.—Turbo-generator; standard locomotive headlight; cast metal headlight; cast metal cab lamp fittings; Sunbeam airtight headlight. Represented by F. W. Edmonds, W. T. Manogue and J. Henry Schroeder. Spaces 321-323.
- Superheater Company, The, New York.—Stationary superheater; marine superheater; exhaust steam injector; pyrometer; closed type feedwater heater; cab heater coil; system of superheater unit repairs. Represented by G. L. Bourne, F. S. Schaff, G. E. Ryder, R. M. Ostermann, C. H. True, H. B. Oatley, R. R. Porterfield, C. A. Brandt, W. A. Buckbee and Bard Browne. Spaces 422-424.
- Superior Steel Castings Company, Chicago.—Steel and malleable iron car castings. Represented by S. E. Doster and W. R. Gilmore. Space 38.
- Swanson Automatic Flange Lubricator Company, The, Denver, Colo.—Automatic flange lubricator; air-pump piston swab nut lock. Represented by O. W. Swanson and A. T. Arthur. Space 166.
- Swind Machinery Company, Philadelphia, Pa.—Gray 36-in. maximum service planer; Bradford 26-in. geared head lathe; Fordick 4-ft. radial drilling machine; No. 121 Baker boring and drilling machine. Represented by L. H. Swind, H. Wright, G. Helling, William J. Powers and R. W. Burk. Space 51.
- Symington Company, The, T. H., New York.—Freight and passenger car journal boxes; wrought steel truck bolster; wrought steel side frame; swivel butt coupler; Farlow draft attachments. Represented by T. H. Symington, C. J. Symington, LeRoy Kramer, D. S. Barrows, R. H. Gwaltney, T. C. deRosset, I. O. Wright, A. H. Weston, H. K. Smith, A. W. Brown, C. R. Naylor, Hlynos Sparks and H. W. White, Jr. Spaces 570-571.
- Talmage Manufacturing Company, The, Cleveland, Ohio.—Talmage system aspirin cleaner; Talmage ratchet hand brake; Talmage grease cup; Talmage blow-off valve; Talmage steam chest; Talmage cylinder lubricating drifting valves; Cleveland low water alarm. Represented by Frank M. Roby, H. B. Thurston, and Alfred F. Letherer. Spaces 354-355-356-357.
- Torchweld Equipment Company, Chicago.—Torchweld non-flash oxy-acetylene cutting and welding equipment. Represented by W. A. Slack and A. F. Dillon. Space E.
- Tuco Products Corporation, New York.—Flexolith plastic composition car flooring; National standard treated roofing canvas; National and Universal trap doors and locks; Resisto hair felt insulation; Tuco mineral insulation for car floors; Rockwul jacket insulation; Imperial car screens; Royal adjustable shoe car screens; Eclipse deck sash ratchets. Represented by David W. Pye, Frank N. Grigg, Thomas L. Miller, R. F. O'Leary, George Hricovsky, James C. Coleman and Frank A. Barbey. Space 628.
- Underwood Corporation, H. B., Philadelphia, Pa.—Locomotive boring bar for cylinders and valve chambers; circular planer tool for locomotive driving boxes; portable valve seat rotary planer; locomotive cylinder and dome facing machine; locomotive crank pin turning machine; link or curve planer attachment; flue cleaner; 3-hp. vertical engine. Represented by George A. Graham, George C. Flannigan and W. Weidermann. Spaces 379-381.
- Union Draft Gear Company, Chicago.—Cardwell friction draft gear type "G," classes 11-A, 25-A and 11A Duplex. Represented by J. R. Cardwell, L. T. Canfield, H. Barnard, J. W. Hathaway, J. E. Tarelton, W. G. Krauser, C. J. Gorman, F. E. Schmitz and J. A. King. Spaces 413-415.
- Union Metal Products Company, Chicago.—See Standard Railway Equipment Company.
- Union Spring & Manufacturing Company, Pittsburgh, Pa.—Reception booth. Represented by L. G. Woods, A. C. Woods, A. Pancoast, D. R. Warfield, F. E. Schaeffer, W. L. Jeffries and J. W. Chandler. Space 553.
- U. S. Light & Heat Corporation, Niagara Falls, N. Y.—USL car lighting equipment; car lighting generator with shaft drive; USL Planté type storage battery; USL regulator panel; USL 200 and 300-ampere portable arc welders. Represented by H. A. Matthews, W. L. Bliss, W. A. Turbayne, E. Bauer and O. R. Hildebrandt. Space 338.
- U. S. Metallic Packing Company, The, Philadelphia, Pa.—King metallic packing; King cylinder cock; King grease plug; King sanders; Leach track sanders; Gellmar bell ringer. Represented by Elliott Curtis, R. A. Light, L. B. Miller, R. R. Wells, J. T. Luscombe, J. S. Mace and H. E. Hyslop. Spaces 566-567.
- United States Rubber Company, New York.—Mechanical rubber goods; packings; hard rubber train lighting battery jars and accessories. Represented by G. A. Gardner, A. B. Means, F. E. Dodson, Thomas Plunkett, W. B. Wise and M. P. Junkin. Space 7.
- Universal Boring Machine Company, Hudson, Mass.—Original Tri-Way universal (horizontal) boring machine; universal precision level. Represented by Donald C. Watson. Space 77.
- Universal Draft Gear Attachment Company, Chicago.—Reinforcing draft arms; Rivles yokes; keyed yokes; riveted type of yokes; tandem draft castings; draft lugs; hand brake attachments. Represented by C. J. Nash, C. C. Kinsman, H. I. Wigley and H. E. Bartsch. Space 515.
- Universal Packing & Service Company, Chicago.—Spring journal packing. Represented by J. P. Landreth, G. H. Green, W. T. Davis and T. P. Williams. Space 501.

- Vanadium Alloys Steel Company, Latrobe, Pa.—Samples of high speed, alloy and carbon steels and tools made therefrom. Represented by John Theis, William R. Mau, A. F. Chilcott, H. E. Bardwell and H. P. Edison. Space 300.
- Vanadium Corporati n of America, New York.—Ferro-Vanadium, cold bent sections of normalized carbon vanadium steel locomotive forgings made by The Erie Forge Company and The United Alloy Steel Corporation. Represented by Merrill G. Baker, George N. Norris and Charles E. Fritz. Space 5.
- Van Dorn Coupler Company, Chicago.—Automatic couplers. Represented by J. McWilliam Stone. Space 38.
- Vapor Car Heating Company, Inc., Chicago.—Vapor system of passenger car heating; locomotive specialties for train heating, including pressure reducing valves; vertical coils for baggage and mail car heating; flexible metallic steam conduits for passenger cars; steam hose couplers; end train pipe valves; steam traps; specialties for hot water heating systems; auxiliary heating stove; miscellaneous fittings. Represented by E. H. Gold, J. E. Buker, R. P. Cooley, N. F. Burris, W. L. Garland, F. A. Purdy, H. I. Lowman, F. F. Coggin, E. A. Russell, E. E. Smith, L. H. Gillick, L. B. Rhodes, C. E. Lowell, P. B. Parks, H. D. Donnell. Spaces 208-210-212-214-216.
- Verona Tool Works, Pittsburgh, Pa.—Railroad jacks; mechanical department tools; track tools; track levels; rail springs; nut locks. Represented by E. Woodings, John S. Winerantz, W. W. Glosser, Porter L. Laughlin and William F. Hart. Space 617.
- Vissering & Co., Inc., Harry, Chicago.—Viloco lead lined sanders; Leach type sanders; Viloco bell ringers; Vil co duplex engineers' valve; Viloco bell ringer throttle valve; Viloco uncoupling lever attachment; Viloco rail washer; Viloco portable cylinder head crane; Crescent metallic piston rod and valve stem packing. Represented by Harry Vissering, G. S. Turner, W. H. Heckman and J. M. Monroe. Space 574.
- Walworth Manufacturing Company, Boston, Mass.—Genuine Walworth Stillson wrench; Kewanee unions and specialties; Walworth valves; cast and malleable iron fittings. Represented by L. F. Hamilton, H. S. Patterson, H. C. Goodwin and W. P. Kerr. Space 412.
- Waugh Draft Gear Company, Chicago. Models of draft gears; draft gears with auxiliary; platform buffers; Chaffee centering devices; freight car truck spring. Represented by J. M. Waugh, H. V. Conine, S. T. Rowley and C. E. Combs. Space 612.
- Wayne Tool Manufacturing Company, Waynesboro, Pa.—Car builders; bridge and locomotive reamers; drill chuck for salvaging broken twist drills. Represented by William H. Strauss, R. C. Gordon and E. H. Stickels. Space 172.
- West Disinfecting Company, New York.—Disinfectants; sanitary appliances; fumigators; liquid soap; metal polish; paper towels; steam sterilizers for water coolers; Holdem rat catcher. Represented by H. F. Daniels, E. C. Daniels and C. P. Williams. Space 26.
- Western Railway Equipment Company, St. Louis, Mo.—Western brake jaws, Top Notch journal bearing wedges. Represented by Louis A. Hoerr and Sterling H. Campbell. Space 618.
- Western Steel Car & Foundry Company, New York.—see Pressed Steel Car Company.
- Westinghouse Air Brake Company, Pittsburgh, Pa.—Motor driven compressor of 300 cu. ft. capacity; Wabco brake cylinder packing cup; new automatic lubricator for air compressors; rounded main reservoirs; friction draft gear. Represented by W. S. Bartholomew, G. W. Widm, S. G. Down, C. C. Farmer, C. J. Olmstead, C. H. Beck, Robert Burgess, J. B. Wright, R. E. Adron, C. P. Cass, A. K. Holmyer, F. H. Whitney, H. A. Waldert, T. W. Swaburn, J. S. V. Fralich, J. C. McInne, C. D. Stewart, E. B. Farmer, G. B. Pierce, R. W. Williams, J. F. Craig, F. H. Park, A. L. Berghane, C. H. Larimer, L. G. Desoe, F. W. Armstrong, L. Wilcox, R. J. Cunningham, H. H. Burris, F. B. Johnson, W. M. Sleet, A. G. Huston, M. H. Burchard and F. C. Young. Spaces 24-25-27-29-100.
- Wheatley Electric & Manufacturing Company, East Pittsburgh, Pa.—Portable arc welding outfit in operation, portable equipment in operation, locomotive headlight generator and equipment, overhead line material, drum controllers, automatic starting panels, motor starting switch box; industrial lighting exhibit. Represented by C. C. Pender, A. M. Candy, W. F. Cargo, F. W. Carter, R. L. Clegg, S. B. Cooner, J. L. Crome, A. L. Harvey, C. W. Hensley, H. A. Hinton, H. D. James, A. M. Jones, C. R. Jones, G. T. Keech, R. H. Kalner, H. D. Lynch, W. R. Marshall, J. C. McQuiston, Paul Orr, L. C. Paul, L. N. Reed, W. W. Reddie, R. J. Ross, E. F. Scels, W. R. Stinemetz, N. W. Storer, A. D. Turner, E. M. Wise and F. E. Wynne. Spaces 21-23-25-27-29-96-98-100.
- Wheel Truing Brake Shoe Company, Detroit, Mich.—Abrasive brake shoes. Represented by J. M. Griffin and F. F. Griffin. Space 507.
- White American Locomotive Sander Company, Roanoke, Va.—Graham-White Perfect sander with new operating valve. Represented by James Frantz and W. L. Ranson. Space 209.
- White Company, The, Cleveland, Ohio.—Gasoline rail cars. Represented by O. M. Crotty and D. B. Bugg. Space 709.
- Whiting Corporation, Harvey, Ill.—Model of locomotive hoist and crane trolley; photographs, drawings, etc. Represented by R. H. Bourne and A. H. McDougall. Spaces 359-361.
- Widgeon Company, J. M., Norfolk, Va.—Simplex reverse gear. Represented by J. M. Widgeon and A. W. Calcott. Space 709.
- Wilbert Manufacturing Company, Chicago.—Piston rod lubricator. Represented by J. J. McCarthy. Space 318.
- Willard Storage Battery Company, Cleveland, Ohio.—Standard two-compartment unit in rubber jars, with parts; special panel showing plate details; railway signal cells, sealed glass and hard rubber jar types; radio "A" and "B" batteries. Represented by A. E. Harrold and Louis Sears. Space 34.
- Williams Tool Corporation, Erie, Pa.—Power pipe threading machines with new Williams patent receding die head. Represented by Leslie S. Hall. Space 226.
- Wilson-Imperial Company, Newark, N. J.—Imperial interior and exterior car cleaners; Removerine flush cleaner; re-dyes; Imperial process for cleaning and re-dyeing plush seats and backs and pantasote shades and curtains. Represented by Frank Sherritt, D. J. Giles, C. A. Beaumont and Joseph Kempf. Space 200.
- Wine Railway Appliance Company, The, Toledo, Ohio.—Side bearings; steel ladders; ventilators; working models of drop door locks, showing application to gondola as well as hopper cars. Represented by W. F. Cremean, Peter P. Beck, Cyrus J. Holland, R. F. Tillman, W. E. Wine and W. M. Bosworth. Space 630.
- Wolfe Brush Company, Pittsburgh, Pa.—Wall brushes; varnish, whitewash and stencil brushes; car wash brushes; painter duster. Represented by H. R. Potter and D. K. Coyle. Space 629.
- Wood Iron & Steel Company, Alan, Philadelphia, Pa.—Special articles made of plates and sheets; "AW" Diamond pattern rolled steel floor plates for platforms, steps, locomotive aprons, running boards, etc. Represented by Charles O. Hadly, Willard S. Haring, F. C. Carter and J. R. Jones, Jr. Space 9.
- Woods & Co., Edwin S., Chicago.—Anti-friction center bearing; Tip Roller body side bearings for locomotive and freight cars; Counterbalance truck side bearings for freight cars; Pullman type and spring-controlled passenger car side bearings. Represented by A. G. Welch, W. B. Ross and H. M. Perry. Space 617.
- Worthington Pump & Machinery Corporation, New York.—No. 2 and No. 3 Worthington locomotive feedwater heaters. Represented by Thomas C. McBride, John M. Lammedee, D. R. Coleman, Paul B. Fenlon and H. E. Troutman. Spaces 13-15.
- Wright Manufacturing Company, Lisbon, Ohio.—High speed chain hoists; standard screw chain hoists; differential chain hoists; steel trolleys. Represented by William F. Wright and E. B. Low. Space 327.
- Wyoming Shovel Works, The, Wyoming, Pa.—Red Edge scoops; testing machines. Represented by H. T. Potter, N. E. Brooks, W. C. Wright and F. L. Ruby. Space 211.
- Yale & Towne Manufacturing Company, The, Stamford, Conn.—Electric crane truck; electric chain hoist with manual control; same hoist with push button control; spur geared chain block; screw geared chain block; differential chain block; plain and geared trolleys; I-beam track; samples of tested chain and hooks; railroad padlocks; guard locks; general exhibit of builders' locks. Represented by Charles W. Beaver, R. P. Anderson, James C. Morgan, H. J. Fuller, H. A. White and F. Juraschek. Spaces 104-106.
- Zapon Leather Cloth Company, New York.—Special vestibule curtain material, car curtain material; Zapon leather cloth; Zapon lacquers and enamels. Represented by G. Gurske, W. M. Lador, A. A. Atchison and W. H. Dawson. Space 158.

Railroad Labor Board at the Conventions

IT IS GRATIFYING to both railway men and equipment and supply men that the members of the Railroad Labor Board have been tendered and have accepted an invitation to attend this year's conventions and inspect the exhibit. All the members of the board will be here.

With the exception of the Interstate Commerce Commission, the Labor Board is the most important body for the regulation of the railroads ever established in the United States. It deals only with the relations of the roads and their employees, but, of course, there are no railroad problems more difficult or important at present than those arising out of the relations between the roads and the employees.

The board, as most readers of *The Daily* know, is composed of three members representing the railways, three the employees, and three the public. The railway members are Horace Baker, formerly general manager of the Queen & Crescent; Colonel J. H. Elliott, formerly general manager of the Texas & Pacific, and later a colonel of the Transportation Corps in France, and Samuel Higgins, formerly deputy president of the Brotherhood of Railroad Hartford. The labor members are A. O. Wharton, formerly president of the Railroad Employees Department of the American Federation of Labor; Albert Phillips, formerly vice-president of the Brotherhood of Locomotive Firemen & Enginemen, and W. L. McMenimen, formerly deputy president of the Brotherhood of Railroad Trainmen. The public members are Ben W. Hooper, formerly governor of Tennessee, who is now chairman of the board; Judge R. M. Barton, formerly its chairman, and G. W. W. Hanger, who long served as a member of the federal Board of Mediation and Conciliation.

The board has had to settle some of the most important labor controversies that have ever arisen on the railways since it came into existence early in 1920 when the railways were returned to private operation. Among these have been controversies between the mechanical departments and the employees in the shops over both wages and the rules in the national agreement made under government control. The members of the board evidently believed that it would be helpful to them in their work to hear the reports and discussions at the conventions, to inspect the exhibit and to observe generally what goes on here, and in this they are undoubtedly right.

The Mechanical Division of A. R. A. and the Railway Supply Manufacturers' Association have been glad to welcome them and have arranged to do whatever is possible to make their visit pleasant and profitable.

- Emerson, C. H., M. C. B., E. J. & E.
- Emerson, Chas., M. M., N. F., Princess.
- Flory, B. P., S. M. P., N. Y. O. & W., Marlborough.
- Fuller, C. E., S. M. P. & M. U. P., Marlborough.
- Fusch, Frank, S. M. P., C. M. & St. P., Traymore.
- Giles, C. P., Supt. Mach., L. & S. P., Traymore.
- Goodnow, T. H., S. C. D., C. & N. W., Marlborough.
- Goodwin, Geo. S., M. E., C. R. I. & P., Chalfonte.
- Greenough, Gratton, V. P., Baldwin Loco. Wks., Ambassador.
- Grimm, G. C., S. Shops, Morris & Co., Strand.
- Hall, John M., Asst. Ch. Insp. of Locos., I. C. & P., Princess.
- Hawthorne, V. R., Secy., Div. 5 Am. Ry. Assn., Marlborough.
- Thaymond, F. O., S. M. P., Bingham & Carfield, Marlborough.
- Hazel, J. F., S. M. P. & Equip., D. P. & Sht. Lines, Strand.
- Helwig, A. A., Supt. Equip., Kansas City Term. Strand.
- Hendrick, F. L., Ch. Joint Car Insp., Penn., Monticello.
- Hennessey, J. J., Asst. M. C. B., C. M. & St. P., Traymore.
- Hutchins, G. S., M. P., O. S. L., Chalfonte.
- Hodges, G. P., M. M. C. B. & St. P., 141 S. Illinois Ave.
- Hogarth, Wm., M. C. B., Cudaly Ref. Lines, Strand.
- Johnston, C. S., Est. Eng., A. T. & S. F., Ambassador.
- Johnson, N. W., M. C. B., M. & S. L., Alamog.
- Jones, E. F., M. M. B. Ry. of C., Glaslyn-Chatham.
- Kearney A., S. M. P., N. & W., Traymore.
- Kelly, Wm., G. S. M. P., G. N., Ritz Carlton.
- Kells, Willard, G. S. M. P., A. C. L., Lewlyn.
- Kempe, C. P., M. S. P. & W. Va., Pennhurst.
- Kilpatrick, R. F., Chalfonte.
- Kinney, W. H., Strand.
- Krutschmitt, John, Asst. M. E., S. P., Ambassador.
- Leese, W. H., S. M. P., Retired, N. & W., Marlborough.
- Machesney, A. C., Marlborough.
- Mac Rae, J. F., M. E. M. & St. L., Chalfonte.
- Mahan, J. E., G. C. F., C. M. & St. P., Traymore.
- Martins, John, Ch. Car Insp., Wabash Term., Strand.
- McQuillan, J. E., Mech. Supt., Gulf Col. & Santa Fe, Chalfonte.
- Milton, J. N., S. C. D., R. R., Chalfonte.
- Minnie, Eli, C. C. P., L. V. R. R., Monticello.
- Moore, R. D., S. M. P., D. & S. P., Traymore.
- Patmor, H. F., G. C. F. P. & W. V., Pennhurst.
- Peck, C. B., Western Mech. Editor, Railway Age, Dennis.
- Peters, J. W., M. C. B., Wst. Lines, Princess.
- Porth, H. W. J., M. C. B., Swift Reigr. Transp. Co., Traymore.
- Pownall, W. D., M. E., Wabash, Traymore.
- Powers, M. J., S. M. P., Midland Terminal, Arlington.
- Prendergast, A. P., M. S., T. & P., Ritz Carlton.
- Prendergast, John, Asst. to V. P., A. T. & S. P., Marlborough.
- Putnam, C. H., M. C. B., G. N., Ambassador.
- Rae, C. H., Asst. Supt. Mach., L. & N., Shelbyburne.
- Richardson, L. A., M. S., C. R. I. & P., Ambassador.
- Rice, Geo. N., S. M. P., Lake Terminal, Marlborough.
- Ripley, C. T., Ch. M. E., A. T. & S. P., Marlborough.
- Robertson, E. J., Supt. Car Dept., Soo Line, Ritz Carlton.
- Rohinson, Lee, Shop Eng., I. C., Traymore.
- Rookfellow, W. E., Div. Gen. C. F., N. C. & N. R., Pennhurst.
- Russell, F. D., S. M. P., Ambassador.
- Ryan, J. M., Gen. Insp., C. St. P. M. & O., Chalfonte.
- Schroyer, C. A., Rtd., Spt. C. D., C. & N. W., Strand.
- Schultz, F. C., Chf. Interchange Insp., All Chicago Lines, Traymore.
- Sedden, C. W., S. M. P., D. M. & N., Traymore.
- Seley, C. A., Ambassador.
- Selloy, S. H., Gen. C. F., B. & A., Pennhurst.
- Simms, H. A., Mech. Supt. Car Equip., Amer. Ry. Express Co., Chalfonte.
- Smith, R. D., S. M. P., D. & S. P., Dennis.
- St. Clair, James T., Asst. Eng. Car. Const.
- Schlaefle, Wm., Traymore.
- Smith, E. S., M. C. B., F. E. C., Sterling.
- Southouse, R. J., G. C. F., P. & R., Haddon Hall.
- Stoll, W. J., Ch. Interchange Insptr., Asso. Lines, Penbusht.
- Stuebing, A. F., Editor Mech. Dept., Railway Age, Dennis.
- Tatum, J. L., Supt. Car Dept. B. & O., Chelsea.
- Thomson, G. E., Dist. M. C. B., N. Y. C., Strand.
- Thayer, R. E., European Editor, Railway Age, Dennis.
- Thompson, J. G., M. M., L. V., Monticello.
- Tullerton, W. J., G. M. S., C. R. I. & P., Marlborough.
- Ward, G. S., G. C. F., C. & N. W., Chalfonte.
- Winterrowd, W. H., Ch. M. E., C. P., Marlborough.
- Woods, G. D., Supt. Car Works, A. T. & S. F., New England.
- Wright, Roy V., Mgr. Editor, Railway Age, Dennis.
- Wymer, C. J., S. C. D., C. & E. J., Traymore.
- Younge, J. P., Gen. Insp. Pass. Equip., M. P., Chalfonte.
- Zwight, S. M. S., N. P., Marlborough.

Special Guests

- Chambers, Andrew, Retired Engr., Penn.
- Baker, Horace, U. S. R. R. Labor Board, Marlborough.
- Baker, John, Ch. Ch. G. M. S., C. R. T. & P., Marlborough.
- Barton, Judge, R. M., Chairman, U. S. R. R. Labor Board.
- Bages, J. H., P. A., C. & E. O., Traymore.
- F. R. Campbell, Ch. Joint Car Insp., Twin Cities, Schlitz.
- Eklind, C. E., Ch., Draughtsmen, Penn., Ambassador.
- Hawk, R. R., Supt., Wagon Car Lines, Haddon Hall.
- Haymond, F. O., Jr., Marlet, Pa.
- Higgins, Samuel, U. S. Labor Board, Ambassador.
- Lynch, Geo., Ch. Joint Car Insp., Penn., Bouvier.
- McMerrimen, W. L., Railroad Labor Board, Traymore.
- Mitchell, C. J., Round House For., N. P., Princess.
- Owens, R. H., M. C. B., Casden Ref. Co., Strand.
- Peck, Nelson, Haddon Hall.
- Peter, N. M., Capt I. M. Marine Corp. Ritz Carlton.
- Peterson, Bror Viktor, M. E., Swedish Govt. Ry.
- Pope, F. H., Col. I. M. Corp., Ritz Carlton.
- Pownall, Wm. L., Traymore.
- Remick, J. H., Ch. Clerk M. C. B., N. P., Marlborough.
- Stayer, Edgar S., Lt. Co. I. M. Corp., Ritz Carlton.
- Storey, W. B. Pres., A. T. & S. F., Marlborough.
- Thompson, Wm. B., Therss, Pa.
- Wieberg, R. L., Asst. G. F. B. & A., Pennhurst.
- Wiswell, L. S., C. R. I. & P., Ambassador.
- Zuber, Joseph, Round House For., N. P., Princess.

Registration, American Railway Association, Div. V, Mechanical

- Alleman, Charles W., Supt. Stores, P. & L. E., Glaslyn Chatham.
- Alquist, P. M., C. B., P. M., Chelsea.
- Anderson, J. J., M. M., Challaoochee Valley, Osborne.
- Anderson, J. P., S. S., N. Y. P., Haddon Hall.
- Anderson, R. W., S. M. P., C. M. & St. P., Traymore.
- Beattie, J. A., G. S., Me. K. C., Traymore.
- Bell, J. Snowden, Wiltshire.
- Bell, R. W., G. S. M. P., I. C., Marlborough.
- Bilger, Orris, Mech. Engr., K. C. M. & O., Craig Hall.
- Blunt, J. G., M. E., Amer. Loco. Co., Traymore.
- Bohan, W. J., Asst. Gen. M. S., N. P., Marlborough.
- Brazier, F. W., Asst. G. S. R. Sta., N. Y. C., Marlborough.
- Browning, A. C., Supt. to Secy., Mech. Div., Am. Ry. Assn., Runnymede.
- Bryan, R. D., G. C. F., A. T. & S. F., Princess.
- Buzzell, O. D., G. C. F., A. T. & S. F., Chalfonte.
- Campbell, F. D., Asst. M. C. B., C. M. & St. P., Traymore.
- Chambers, C. E., Supt. M. P. & Equip., C. R. of N. J., Traymore.
- Coleman, James, Asst. to Gen. Supt. M. P. & Car Dept., G. T., Marlborough.
- Dow, A. M., G. F., E. P. & P. W., Strand.
- Eisele, H., Asst. Supt. Loc. Dept., Wabash, Strand.
- Endicott, G. F., Asst. M. C. B., N. P., Blenheim.

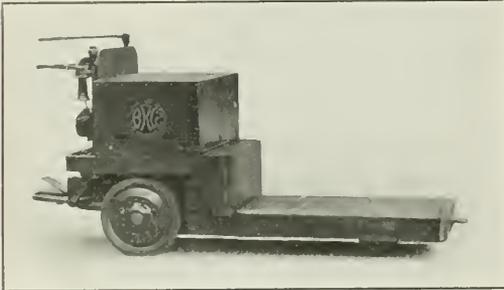
New Devices Among the Exhibits

Electric Trucks and Tractors

AN ELECTRIC CRANE TRUCK is being exhibited by the Baker R. & I. Company, Cleveland, Ohio, which is constructed on principles similar to those used in the construction of locomotive cranes. The complete equipment consists of a three-movement crane mounted on the standard type QUQ utility truck, built by the Baker Company. The truck drives and steers on all four wheels and is driven by a 24-volt motor with a 72-ampere rating at 115. or. p. m. The motor has a 300 per cent overload capacity for thirty minutes; it is connected to the wheels through single reduction worm drives, with

position on the operating platform, can control the three movements of the crane and hoisting mechanism with three push-button control switches located on the dash. The three movements consist of raising and lowering the hook, raising and lowering the boom, and swiveling or slewing the crane and hoisting mechanism through an arc of 370 deg. All of these movements may be performed simultaneously.

The hook and boom are operated by two identical special Sprague one-ton hoists with spur and worm gear reduction. The motors mounted on these hoists are 24-volt, series wound, totally enclosed motors which are provided with electric brakes. A smaller, similarly designed motor is used for slewing, this motor being connected through a worm gearing to a spur pinion which travels around a large stationary bull-ring gear mounted on the



Elevating Platform Truck, Type DELQ

four-pinion differentials of the bevel gear type, radial and thrust ball bearings, dished wheels with knuckle pivots over tire center lines, and full troller and brake pedal-floated drive shafts. The controller is of the drum type which permits three speeds forward and reverse, and an automatic switch is provided which interlocks the



Three-Movement Electric Crane Truck



Three-Wheel Tractor, Type DTS

controller and brake pedal. The brake is of the external contracting type operating on the worm shaft. A horizontal roller steering handle is used and all steering levers and handles are fitted with removable bushings.

The hoisting mechanism is self-contained with the battery compartment, the battery serving as a counterweight to the hoisted crane. The operator, without leaving his

truck platform. The boom and hook are operated by their respective motors through double reduction spur and worm gearings.

The hoisting mechanism has a capacity of 2000 lb. load on the hook with a 7-ft. boom radius, the height under the hook for this radius being 10 ft. The hoisting speed of the hook is 45 ft. per minute with no load and 16 ft. per minute with a load of 2000 lb. The time required to raise the boom through its complete travel is from 12 to 20 seconds with loads varying from nothing to 2000 lb. The crane can be swung through an arc of 270 deg. in 20 seconds, and the truck operates at a speed of about six miles an hour. The weight of the outfit without battery is 6000 lb.; with 12 cells of 21-plate Ironclad battery it is 6840 lb., and with 24 cells of G-11 Edison battery, 6710 lb. The rated capacity of hoisting and crane mechanism given above do not depend upon the use of outriggers to give the machine stability.

The other two machines being exhibited by the Baker Company are its type DTS 3-wheel tractor, and its type DELQ elevating platform truck. The tractor has been developed during the past year-and-a-half and a few of them are now in operation in industrial service.

The elevating platform truck is similar to those which have been marketed for several years past except that

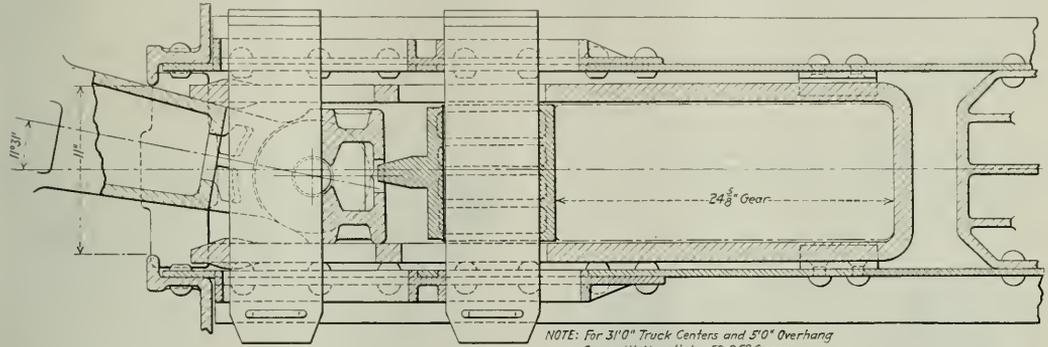
in its present form it embodies several minor improvements and one new feature, namely, the method of mounting the running gear to the frame through compensating adjustable ball connections. This feature is now incorporated in all of the three machines on exhibit.

The Swivel Butt Coupler

THE T. H. SYMINGTON COMPANY, New York, has developed and is exhibiting an articulated or swivel butt freight coupler with standard length of shank. It has been claimed that the present standard rigid shank coupler, because of its necessary angular side movement

of the draft yoke. For freight cars generally and for usual main line curves, this inherent defect of the rigid butt coupler is not so apparent because of the slight angularity possible between adjacent couplers. Nevertheless, angularity between adjacent couplers does result in unequal stresses in the two sides of the yoke loop under pull and in eccentric and concentrated bearing pressure between the coupler butt and draft gear under buff.

The swivel butt coupler corrects these conditions, permitting the coupler shank to swivel freely in a horizontal plane on the pivot pin connecting the shank and butt. Under buff, regardless of coupler shank angularity, the swivel butt of the coupler bears uniformly against the friction draft gear and over an area much greater than that

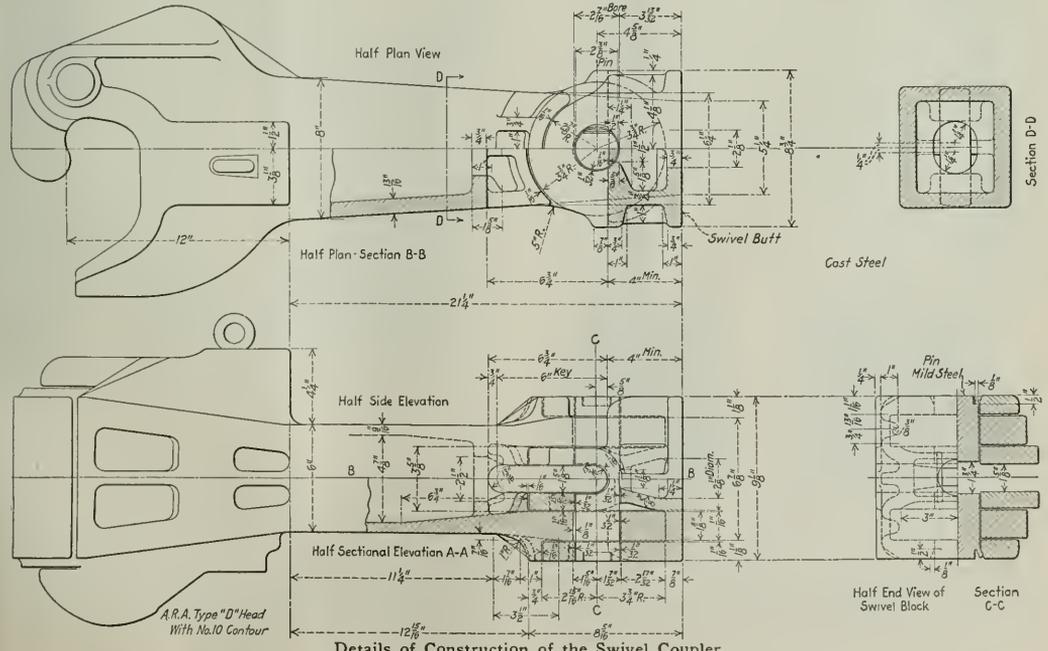


NOTE: For 31'0" Truck Centers and 5'0" Overhang Cars will Negotiate 52.25° Curve

Swivel Butt Coupler in Extreme Angular Position

on short radius curves, bears only on one edge against the front end of the draft gear or follower under buff, while under pull the entire load is concentrated on one loop

provided by the A. R. A. standard shank, while under pull the coupler key maintains its normal position with full bearing and with substantially uniform pressure against



Details of Construction of the Swivel Coupler

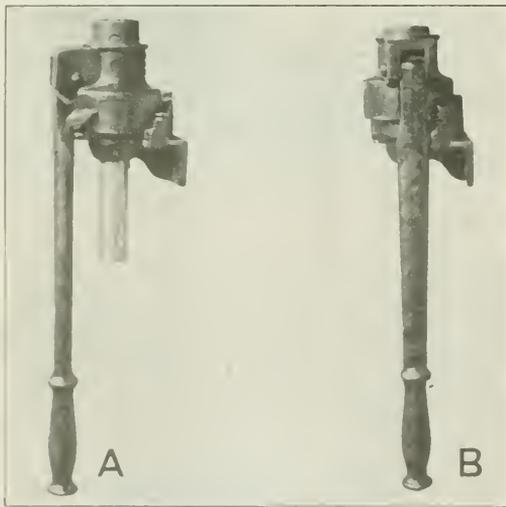
A.R.A. Type "D" Head With No. 10 Contour

both yoke loops regardless of the amount of coupler swing.

It is stated that the swivel butt coupler develops under test a strength of pivot connection 25 per cent greater than the strength of the plain shank coupler and with its use the effective strength of the key and yoke is greatly increased through the equalization of stresses. This coupler should also materially increase the effective life of friction draft gears through the elimination of any angular pressure tending to close the gear irregularly or to subject the friction elements to any transverse forces. This coupler is a self-contained unit which may be applied or removed in the same manner as any ordinary coupler and requires no change in the carry iron or key or any additional guides. A standard 6 in. by 8 in. shank type D coupler can be used for replacement if necessary.

Blackall Ratchet Hand Brake

A NEW RATCHET HAND brake, featured by a positive back-off arrangement, is being exhibited by Robert H. Blackall, Pittsburgh, Pa. The device is made of malleable iron with the exception of the lever, which is a drop forging. The back-off feature is obtained by a set of teeth in the upper part of the revolving ratchet



Ratchet Hand Brake with Positive Back-Off Arrangement

operating in conjunction with the teeth on the lower end of the cup which is attached to the shaft. These teeth, being opposite to the one used for applying the brake, the latter can be revolved in a direction to unwind the chain by simply lifting the revolving ratchet and moving the lever in the release direction of the shaft. In former types the teeth on the revolving ratchet operated on a round pin inserted through the shaft.

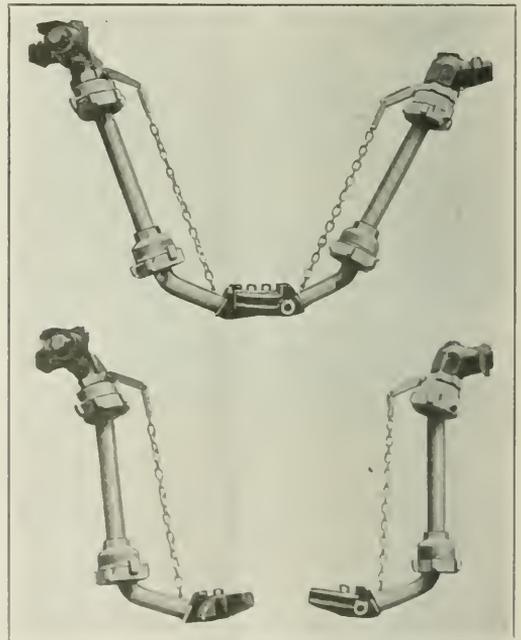
Another advantage of the Blackall brake is that the lever will always remain in the position shown unless held in some other position by the operator, since the dropping of the lever has nothing to do with the release of the ratchet. The release is accomplished by double sets of release lugs, one being on either side of the device to

prevent the possibility of the revolving ratchet cocking on the shaft.

Seven substantial teeth are provided on both the ratchet and attached shaft and a corresponding number on the revolving ratchet, or housing, thus tending to insure strength and long life for the device. The teeth are protected from sleet storms, obviating difficulties from this source. The Blackall ratchet hand brake is shown in application position at *A* in the illustration, the release position being shown at *B*.

Improvements In Passenger Car Steam Heat Connections

FOR A NUMBER of years all-metal steam heat connections for passenger cars made by the Barco Manufacturing Company, Chicago, have been in use on railroads. During this time they have been under observation and test which have demonstrated the advantages of this type of connection. Recently improvements have been



Barco Steam Heat Connections, Showing Method of Supporting Head in Uncoupled Position

made in the design which eliminates some of the troubles to which steam heat connections are subject.

In the latest construction these connections are provided with a combination lock and support. The lock prevents the connections from unscrewing from the end valve and is provided with an arm to which the holding device is attached. The holding device does not in any way interfere with the operation of the connections, or with other hose between cars, but supports the connection when uncoupled and prevents it from dropping down and striking obstructions along the track.

The advantage of this arrangement is readily apparent

as large numbers of hose connections are torn off due to the coupling head being caught in cross-over switches or striking the rails or crossing planks when not hung up in place by the train men.

The Barco steam heat connection can be used wherever pipe locations and end valves conform to A. R. A. standards. They are designed to work in conjunction with any standard steam heat coupling head or end valve. They can be coupled readily with other Barco connections or with the ordinary rubber steam hose on adjacent cars. Coupling is accomplished more readily than with hose and the connections will stand full boiler pressure, making them especially suitable for high-pressure service.

It is stated that the Barco connections will operate throughout the season without attention and with the replacement of gaskets from time to time will last as long as any other part of the heating equipment.

Brill Renitent Car Window Post

UNTIL RECENTLY IN constructing the window system of an electric or gasoline rail car built with steel upper framing, it was customary to attach to the T-posts wooden runways for sashes and curtains and also the wooden pilaster. This construction was early discovered to be not thoroughly efficient due to the fact that the wood has a tendency to swell when subjected to dampness and moisture. This inefficiency of the window system was far from being compatible with the entire practicability of steel car framing, the advantages of which over wooden construction never have been questioned. Thus the was a reasonable one. The result has been the Brill Reni-

without the use of tools is of considerable importance, as ordinarily removing a sash from its casing involves careful handling of tools by a mechanic and consequently a loss of some little time. The Brill Renitent post permits the sash to be taken from its casing by simply pulling it out. This means that the operation is one that can be performed by anyone and does not require the services of a mechanic. However, the sash cannot be removed from its casing as a result of the casual pressure exerted by a passenger in raising or lowering the window. Also, no wind pressure, no matter how great, can disturb the sash.

Another advantage of the Renitent post is that rattling is prevented by the elastic pressure which is exerted upon the sash stiles by the spring brass runways. This feature also guarantees the passenger against accidents to hands or arms that may be resting on the window sill and which might be injured by the sash dropping suddenly; should the catches become unfastened, the sash will drop gradually. Still another advantage due to this check on dropping is that the sashes cannot be racked or the glass broken by careless handling.

The spring brass casing gives a uniformity which does away with fitting sashes individually into their runways as must be done with sashes which are constructed to slide in wooden runways. Consequently the sashes are interchangeable from window to window and from car to car where the window specifications are the same.

Still another advantage, and by no means the least important, is that the post casing may be readily removed from the T-post, thus making the latter easily accessible should it be necessary to make inspections or to make repairs in case of collision. The Renitent post is made in a range of sizes covering every width of post.



Window Sash May Be Removed from the Renitent Post Casings without the Use of Tools

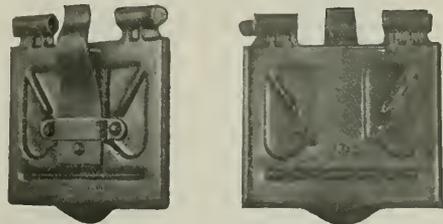
tent post, which has in its favor the advantages of making the sash water-tight, rattle-proof, interchangeable, safe against sudden dropping and of being easily removed from its runways without the use of tools.

The post, which gets its name from its feature of offering elastic resistance to pressure, consists of a casing of spring brass, attached to the T-post by clips fastened to the casing and fitting into stirrups riveted to the post. The feature of the post making the sash readily removable

Hoodless Lid for Journal Boxes

THE PRINCIPAL FEATURES of the Asco hoodless type, A. R. A. standard journal box lid, made by the Allegheny Steel Company, Brackenridge, Pa., are the side and bottom flanges, integral turn-down scrolls and chrome-vanadium alloy steel spring. This lid covers the box face clear across the top as well as at the sides and bottom. The Scroll is a part of the lid itself and locks the pin which holds the lid in place. The pin required for this lid has no head, slot or cotter, being simply a piece of 3/4-in. round bar, 7 1/2 in. long, which is held in place by the turn-down ends of the scroll.

The lid is equipped with a specially designed, extra-heavy chrome-vanadium steel spring which is removed



A Journal Box Lid with Several New Features

from all strain on the rivet hole by the use of a double-riveted strap, which also provides a bearing across the entire 2 1/2-in. width of the spring. The spring exerts sufficient pressure to prevent the lid from "dancing" on the box

face, elongating the pin hole and riding away at the top of the box. The lids are shipped with a strip between the spring and the body of the lid which holds the spring out sufficiently to permit the application of the lid without the use of a spring compressor and with no tool but a hand hammer. To apply the lid it is only necessary to lay it on the box face, insert the pin, turn down the scroll on one end of the lid, and release the piece under the spring, all of which can be done by one man in less than three minutes. The lid complete with spring weighs but 4½ g lb., and the pin 1 lb.

Two-Path Electric Heater

VARIOUS FORGING OPERATIONS demand the heating of material in some cases on the ends, and in other cases at points along the length of the material some distance from the ends, this heating to be accomplished without burning or melting the metal at any point.

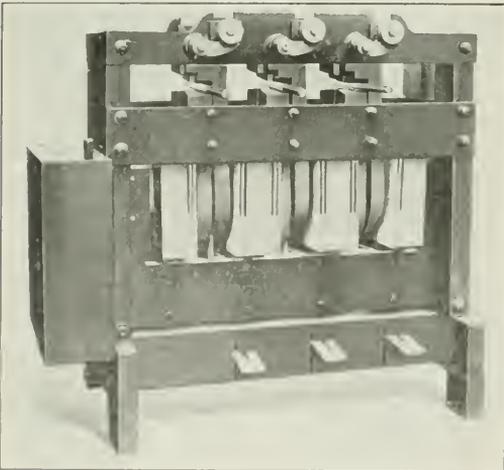
The Berwick two-path electric heater, illustrated, has been developed for the above purpose by the American Car & Foundry Company, New York. Two separate electrodes are provided, each properly insulated from the other. The right-hand electrode has at its two upper ends projecting blocks which overhang but are not allowed to touch the left-hand one. The left-hand electrode is sta-

face of the electrode being set on an incline so that when the top electrode is dropped into position, contact is assured at four points on the material.

This machine may be built in any number of electrodes up to five. To date single, double and triple electrode machines have been built, while machines carrying more electrodes are in the process of manufacture. As the heaters are now designed, stock can be heated from 1 in. to 8 in. long or from 3 in. to 11 in. With a slight change from the standard heater, this length could be increased to 16 in. or 18 in. For high production on the No. 3 type heater, the stock should be from ¾ in. to 7/8 in. in diameter. To get a high hourly production, in heating 7/8-in. and 1½-in. stock, it is advisable to use the No. 4 type heater. The time of heating is greatly reduced by the use of the two-path method and since the current has four points of entrance rather than two, there is no marring of the stock.

Tests on the Berwick No. 3 two-path heater have been made, the data shown in the accompanying tables being submitted as the results of these tests.

It will be noticed that in some instances the heaters were operated on 440 volts and in other cases on 220 volts. In figuring out the capacity of a heater, it is better to obtain the hourly capacity on a single electrode and then provide the heater with a sufficient number of electrodes to give the desired hourly heats. On these test figures the range of work is from 1/8 in. to 7 in. long.



Berwick No. 3 Two-Path Electric Heater

TABLE I—TEST DATA SECURED WITH NO. 3 ONE-ELECTRODE, TWO-PATH HEATER

Size of Material	Taps	Length	Pieces per hour		Pounds per hour		Volts	Peak Amperes	Peak Kilowatts
			heat	hour	hour	per 100 lb.			
3/8 in. rod.....	180	4½ in.	216	30.5	13.4	445	17	7.5	
1/2 in. rod.....	180	4½ in.	144	36.0	18.0	450	28	12.5	
5/8 in. rod.....	180	4½ in.	120	46.4	18.1	440	34	15.	
3/4 in. rod.....	180	4½ in.	96	54.0	19.5	440	34	15.	
7/8 in. rod.....	180	4½ in.	75	63.0	20.0	440	35	15.25	
1 in. rod.....	180	4½ in.	60	60.0	23.6	440	35	15.	
1 in. square.....	180	4½ in.	54	69.0	22.2	440	35	15.	
2 in. by 1/2 in.....	210	4½ in.	30	38.2	27.6	440	27	12.	
3 in. by 3/8 in.....	240	4½ in.	16	23.0	36.8	435	21	9.	
1/2 in. rod.....	90	6½ in.	68	24.5	19.8	226	45	10.5	
5/8 in. rod.....	90	6½ in.	56	31.5	20.8	236	57	13.	
3/4 in. rod.....	90	6½ in.	50	40.6	21.0	224	60	14.	
7/8 in. rod.....	90	6½ in.	48	53.0	21.6	224	60	13.	
1 in. rod.....	90	6½ in.	34	49.3	22.2	222	61	13.5	
1 in. square.....	90	6½ in.	30	55.2	20.8	222	65	14.5	
2 in. by 1/2 in.....	90	6½ in.	19	36.0	26.6	222	63	14.	
2 in. by 1/2 in.....	90	7 in.	30	55.2	24.7	230	67	16.	
3 in. by 3/8 in.....	90	7 in.	27	60.2	22.7	228	70	16.	
1 in. pipe standard.....	210	4½ in.	84	49.9	21.1	445	28	12.5	
1 in. pipe standard.....	180	7 in.	60	55.5	16.0	440	33	14.5	
1½ in. pipe standard.....	210	4½ in.	60	42.2	22.7	440	28	12.5	
1½ in. pipe standard.....	180	7 in.	42	45.9	25.6	440	33	14.5	

TABLE II—TEST DATA SECURED WITH NO. 3 THREE-ELECTRODE, TWO-PATH HEATER

Tap	Size	Heats per hour		Volts	Amperes	Average Kilowatts	Peak Kilowatts
		Kw. per hour	Hrs. per 100 lb.				
120	1/2 in. by 2 1/2 in.....	516	20.0	224	58	13	18
120	3/8 in. by 2 in.....	648	23.5	224	45	10	16
135	1/2 in. by 2 1/4 in.....	372	24.7	226	44	10	13
135	3/8 in. by 1 1/8 in.....	564	23.9	224	33	7.5	11

Bracket for Automatic Connector

THE AMERICAN AUTOMATIC CONNECTOR COMPANY, Cleveland, Ohio, has improved the method of suspending the American connector and is now using a U-type bracket with a two-point suspension instead of the former method of connecting to the drawbar by a one-point suspension. This makes a stronger installation and permits of a central location for the safety chain which supports the connecting head.

In order to apply this type of bracket two lugs with cord holes are cast on the standard A. R. A. coupler shank. It is stated that this change is made by the coupler manufacturers without additional cost to the purchaser. The lugs do not interfere with the operation of the coupler whether automatic connectors are used or not.

tionary, so far as vertical motion is concerned, but may be adjusted horizontally by means of two stud bolts on the rear of the heater.

The top, or right-hand electrode, is arranged so that it may be adjusted horizontally and at the same time be moved in a vertical direction. Horizontal motion is provided by sliding the electrode clamping device along the slot provided for the purpose, while vertical motion is imparted to the electrode by downward pressure of the pedal, thus causing rotation of the shaft, which in turn, through gears, raises the shaft carrying the electrode. The material to be heated is inserted between the top and bottom electrodes, and due to the double-path the time of heating is reduced and the possibility of marring is not so great.

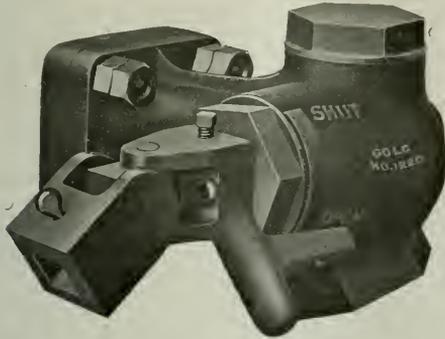
Flexibility of the rear portion of the bottom electrode is provided by a spring on the rear of the heater, the top

New Gold Car Heating Devices

AMONG THE NEW devices shown this year by the Gold Car Heating & Lighting Company, Brooklyn, N. Y., are a packless end valve, No. 1220, and an improved electric hermostatic control.

The No. 1220 packless end valve was designed for use in connection with a drawbar arrangement whereby all steam and air connections swing with the drawbar. The object of having the valves swing with the drawbar is to maintain the same hose connection centers on curves and cross-overs as are obtained when coupled on a straight track. This arrangement will also maintain the same height of steam heat hose couplers and clearances between the various couplers and hose at all times in train service.

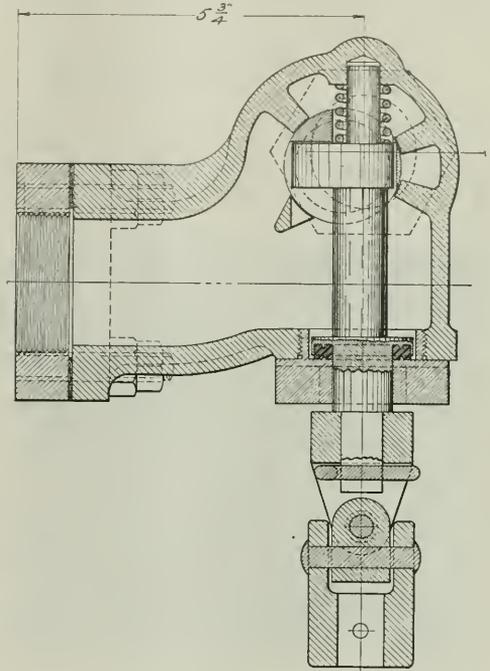
This valve is made with a flange connection to facilitate its application and removal, four 1/2-in. studs being used to secure the valve to the train line pipe flange. The oper-



Outside View of End Valve

and those now in service are said to have proven entirely satisfactory.

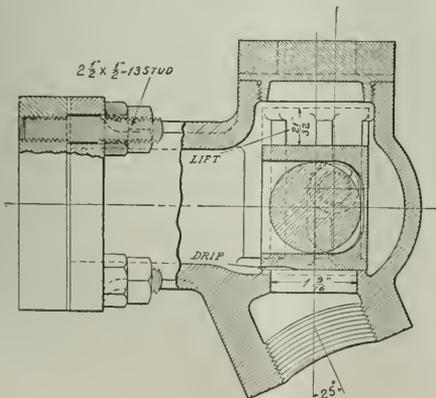
Several new types of thermostats have been added to the line manufactured by the Gold Car Heating & Lighting Company. In the new types for railway cars the electric



Horizontal Section Through End Valve

ation is similar to that of the Gold No. 1126 end valve and employs the well-known cam and piston principle which has been used for years. The packless feature, which eliminates all leaks around the stem, is one of its main features. An automatic drip for the relief of condensa-

parts are entirely enclosed leaving only the temperature sensitive element outside, protected by a substantial perforated metal case. Several railway types are on exhibition to care for all classes of service and the preferences of the railway engineers. These consist of the following: "standarding setting" 68 to 70 deg., no adjustment; "night and day" giving a 70 deg. setting at one position



Vertical Section Showing Cam and Piston

tion at the rear end of the last car is provided as shown in the vertical cross-section. A universal joint with handle is furnished with each valve, so arranged that the vibration of the train will not open or close the valve in service. The valve was constructed with a view to low maintenance cost



Thermostat



Electro-Magnetic Valve

and 60 deg. at the other point; "service and layover" giving 70 deg. at service point and 52 deg. at layover point. These new types have been thoroughly tested and have demonstrated their practicability. The manufacturers state that they have found from tests and experience that

a standard setting thermostat with a range of 68 to 70 deg. will save approximately 35 per cent of the steam in service and from 50 to 75 per cent of the steam in the yards during the layover period. The complete equipment for a passenger coach consists of one thermostat and two magnetically operated valves as shown in the illustrations.

Mercury Tractor and Trailer

AMONG THE EXHIBITS of the Mercury Manufacturing Company, Chicago, is the type L tractor, embodying an improvement in industrial tractor construction by means of what is known as the Twin-3 steering arrangement, illustrated in Fig. 1. Instead of a single wheel carried in a fork with no provision for spring



Fig. 1—Mercury Type L Tractor with Twin-3 Steering Arrangement

suspension, this tractor has two front wheels connected by a short axle. The axle in turn is connected to a bracket by two semi-elliptic springs, the bracket supporting the front end of the tractor and being directly attached to the steering lever.



Fig. 2—Type A-132 Freight House Trailer

This trailer is good to possess the same simplicity in working and the same short turning radius as the single front wheel machine formerly made by the Mercury Com-

pany. In addition, the important advantage of full spring suspension both front and rear is provided.

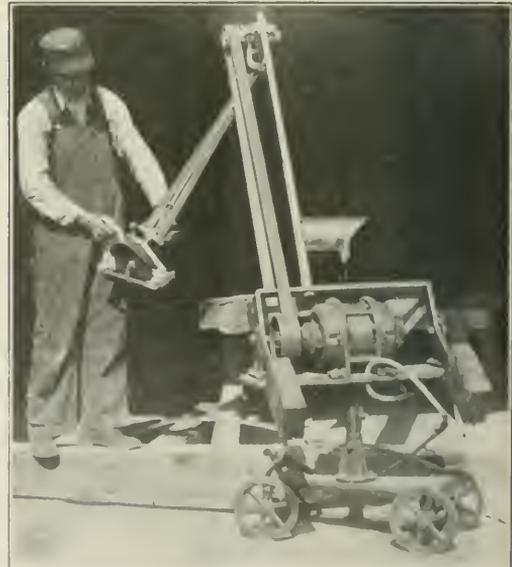
The Mercury freight house trailer, type A-132, is by no means new but has been improved in many points since being first put on the market. For example, a plate type caster is now used, permitting a 10 in. caster wheel to run under a platform only 14 in. high. The face of the caster revolves on a ball race filled with $\frac{5}{8}$ in. ball bearings.

The trailer is equipped with a patented spring draft rigging which takes the strain of starting and stopping the load from the framework of the trailer. This draft spring rigging has been designed along the lines of the best automotive trailer construction. The coupling device is a flat stock forging, the arrangement being such that when not in use a single motion lifts it in an upright position and locks it there.

The end and side stake pockets are forgings of exceptional depth, imbedded and bolted in the sills in such a way as to give a firm foundation for the pipe racks and not loosen under heavy strain. This trailer is usually provided with Hyatt roller bearings and fitted for the Alente system of lubrication.

Flexway Woodworking Machine

AN INTERESTING MOTOR-DRIVEN portable machine, designed to perform many different woodworking operations, may be seen at the booth of the P. L. Billingsley Company, Cincinnati, Ohio. This machine is made in two sizes, No. 1 and No. 2, for relatively light and for heavy work. In general, the driving motor and oper-



Flexway Machine Equipped for Ripping with Rip Gage

ating parts are mounted on a small but sturdy four-wheel truck, which runs on a track the full length of the carpenter's bench. Work such as planing, dadoing, beveling, ripping and mortising can all be done with the same machine by simply attaching the required tool.

The mechanical connection between the tool and the motor is by means of a universal joint with the power transmitted by two belts. The weight of the parts is carefully counterbalanced by means of two adjustable weights clearly shown in the illustration. It is stated that the machine is both accurate and powerful, enabling it to machine fibrous and knotty lumber with ease. All tool changes are made easily and in an average length of time not exceeding a few seconds.

While the Flexway woodworking machine is ordinarily mounted on tracks it has been found convenient for certain types of work to place it on a wood table mounted on wheels which can be moved rapidly about the shop, at the same time keeping the machine at a convenient height from the floor. The Flexway machine is not limited to the use of tracks but can be worked directly on a lumber pile thereby saving the handling of heavy timbers.

A Sturdy Platform Trailer

A NEW PLATFORM TRAILER with a load-carrying capacity of 6,000 lb. and weighing 600 lb. (making it extremely light for its capacity) is being shown at the booth of the Elwell-Parker Electric Company, Cleveland, Ohio. This wheeled platform trailer, as it is called, is designed especially for interchangeable use with Elwell



Elwell-Parker Wheeled Platform Trailer

Parker electric elevating platform trucks and tractors. The construction, as indicated in the illustration, is extremely sturdy, the main top platform consisting of a pressed corrugated open hearth steel plate. Deep aprons on either side make a substantial support for the load and the heavy 4 in. longitudinal channels all tied into malleable corner castings provide a construction which is both light and strong.

Two long steel caster fork pillars carry graphite bushed bearings at the upper end. The ball swivel bearings and roller caster wheel bearings are retained in deep recesses in the malleable corner castings. Fixed wheels on roller bearings are carried in forged steel yokes, riveted to the top and side. All bearings are provided with pressure lubrication, the casters being 10 in. in diameter and the fixed wheels 15 in. in diameter. End or side standards with the coupler are provided.

When used as trailers the unit is furnished with hook or eye couplers, or with "y" or "x" chain couplers. When

desired, this trailer is equipped with four casters instead of two wheels and two casters. Wheels may be provided with 10 and 15-in. solid rubber tires of the pressed iron type if preferred.

When the wheeler platform is used with electric lift trucks, clearance is provided between the wheels in order that the lift truck platform may be driven beneath. When the truck lifts the load, the weight is supported on the truck platform by two longitudinal channels underneath the wheeled platform.

Master Pressure and Master Pilot Gages

A MONG THE NEW devices exhibited by the Ashton Valve Company, Boston, Mass., are master pressure and master pilot gages which are especially adapted for use in large power plants. The master pilot gage is intended to be connected direct to the main steam header and located where it can be readily seen at any part of the boiler room. To increase the size of the graduations, they are usually limited to from 15 lb. below to 15 lb. above the highest working pressure, so that the slightest variation can be readily observed. This is an important advantage in power plants equipped with batteries of boilers, as the standard size boiler pressure gages with smaller diameter dials and finer graduations are not easily read, do not show sensitive pressure fluctuations, and only indicate boiler pressure and not the more important pressure in the main header.

The master pilot gages are made either with dials on one or both sides. The illuminated dial style with semi-transparent opal glass dial and fittings for electric lamps in the case is more generally used, although plain silvered brass dials can be furnished if desired.

The master pressure gage is similar to the master pilot gage in style and diameter of dials, but has all graduations from zero to maximum pressure. This gage is for use in large power houses where it is desired to have dials with prominent graduation figures by which the boiler pressure may be readily read from a distance.

Improvements in Little Giant Motors

THE EXHIBIT of the Chicago Pneumatic Tool Company, New York, includes among other pneumatic tools a Little Giant drill motor with an improved toggle connecting the piston rod to the crank-pins. This toggle is designed for the minimum weight consistent with strength so as to prevent crystallization in the companion parts and enable it to stand up under the severe and continuous service required of these small high-speed motors. Constant lubrication direct to the crank-pin is also afforded by means of this new toggle. There are no rights or lefts, inside or outside, as heretofore, but each one is the same, designed for easy assembling or disassembling and reduced drill maintenance expense. The stock of these parts which must be carried for spares is also greatly lessened.

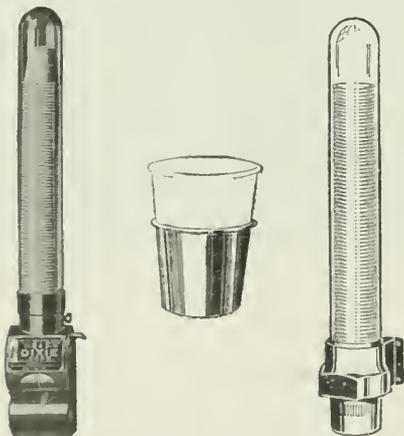
A patented breather tube has also been developed for these drill motors, said to cut the annual cost of lubrication to the extent of \$90.70 per drill. Heretofore these drills and all other similar tools have required lubrication twice daily, but with the breather tube the period is lengthened to one week. Several tests have been conducted in which drills were operated for 30 days with one lubrication, but lubrication once a week is recommended.

The Little Giant motors are of the four-cylinder, single-acting type, and a small amount of air escapes by the pis-

tons into the crank case where splash lubrication is provided. There must be a breather to receive this air and heretofore, with the use of a ball valve, the escaping air through the breather valve carried a small amount of lubricating oil with it. The new breather pipe throttles the lubricant and permits the air only to escape. These two improvements have also been incorporated in Little Giant grinders. The same style of toggle is used but the device that separates the lubricant from the air is operated by means of centrifugal force through a tunnel arrangement surrounding the vent tube which is driven at spindle speed.

Dixie Cup Vending Machine

THE EXHIBIT THIS year has a new model Dixie cup vending machine. The Individual Drinking Cup Company, Inc., the original makers of the paper cup, having in mind the usage to which these machines are put, have designed a vendor economically suitable for railroad work. This machine is the result of careful study of railroad needs, built to withstand the exacting use and at the same time attractively designed to harmonize with the finest interiors in either cars or stations. All parts are die



Dixie Cup Container and Vending Machine

cast. The machine is fitted with Yale locks, the cups being protected in a heavy flint glass tube. Over 150 railroads have been using Dixie cup vendors.

This company has also on exhibition this year cups for parlor and sleeping car use and also an attractive service for club and dining cars, both of which are distinct innovations.

Improved Metal Band Saw

SEVERAL CHANGES have recently been made in the Adams No. 3 metal band saw, made by L. C. Atkins & Co., Indianapolis, Ind., to produce a machine for fast, smooth, accurate and economical cutting. To increase the accuracy of the machine a new adjustable saw guide has been added. This insures an accurate cut in all sizes and quantities of metal up to the full capacity of the machine, when properly adjusted. Hyatt roller bearings are now used in the hubs of the two band wheels, thus doing away with wear in these parts and lengthening

the life of the machine. Other important features of the machine are the quick-acting vise, the gravity feed, the automatic stop, the hinged table and the automatic tension guide. The machine is intended for general shop use for all sizes and classes of metal up to 12 in. by 14 in. sections.

Silumite Paint

WHEN THE NUMBER of paint manufacturers is considered and when the large amount of literature and reports on protective coatings for iron and steel are recalled, it would seem as though the subject must have been nearly exhausted by this time. However, it would appear that the Silumite Products Corporation, Philadelphia, Pa., which is exhibiting at this convention for the first time, has something distinctly new to offer in its silumite paint. This is a non-corrosive and plastic compound which is particularly suited for painting steel freight cars, bridges and other structural work.

The possible value of the pigment used in this paint was suggested by the digging up of a bolt in a cut on an abandoned railroad. Although it had been buried for many years, there was no corrosion even on the threads. The deposit, found to consist of almost equal parts of silicon and aluminum oxides, has been named Silumite.

The pigments which form the base of all paints may be divided into two general groups. The first includes those chemically active in that they are attacked more or less by heat, acids, alkalis, water, various chemicals and the weather. In this group are included white and red leads, zinc oxides and ordinary dry colors. The second group includes those chemically inert. Among them are silica, barytes, asbestine and china clay, all of which have the disadvantage of being more or less transparent when ground in oil, and nothing fully equal to linseed oil has ever been found as vehicle or binder for paint.

Silumite belongs in the group of inerts and possesses the advantage of opaqueness and high-covering capacity. In the dry form it is a light grey, but when ground in oil becomes a dark grey, almost black. The paint dries with a hard surface but retains its elasticity indefinitely. As it is not affected by changes in temperature and as its expansion qualities are greater than the expansion of steel, it will adhere to steel cars without cracking and will not be loosened by jar or vibration. It also possesses the advantage of withstanding sulphuric acid, alkali and salt water conditions. It is ready mixed, spreads and covers well, and is equally suitable for application by brush or spraying machine.

Galena Air Brake Compound

THE GALENA-SIGNAL OIL COMPANY, New York, announces the marketing of a new product for the lubrication of air brake cylinders with which extensive laboratory and service tests have been made during the past year.

"Galena air brake compound" is of a rich reddish-brown color, of such consistency that it may be freely applied with a brush and is claimed to possess the highest melting point yet reached in this class of lubricant. It is free of acid and has no detrimental effect upon leathers. It will not separate and shows exceptional adhesive qualities in clinging to cylinder walls. Before placing the new product on the market the Galena Company first submitted it for trial and test to the leading manufacturers of air brake equipment, who found it equally efficient in the highest and lowest cylinder temperatures met in train operation.

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One of the railroad delegations attending at the Mechanical Division meetings has adopted the practice of discussing the reports to come up at each session in an informal meeting of its own some time before the session convenes. This offers a splendid opportunity for each representative of the road in attendance to take part in the discussion with a well-defined idea of the relation of the report to the interests of his own road. It also insures that each representative of the group will get the greatest possible benefit from the report itself and from the discussion of other members on the floor of the convention. The general adoption of this practice by other groups would give point to the formal discussion and lead to a more rapid crystallization of ideas on the floor with a saving of time of the sessions. Have you tried it?

**Have
You Tried
This?**

Have you tried it?

The corrosion of steel cars has been an important matter ever since this type of equipment was introduced. At one

**Corrosion of
Steel
Cars**

time the Master Car Builders' Association had a committee on this subject. Numerous compounds for coating the interior of the car to prevent rusting were tried but were found to be worthless. Since attempts to protect the surface have failed the only recourse seems to be in the development of non-corrosive plates. The trials conducted by the American Society for Testing Materials show that there is a considerable difference in the rate of corrosion of various kinds of iron and steel. Some railroads are specifying the materials which showed up best in these tests for use on freight cars. Other roads feel that the only satisfactory tests are those made on cars in actual service. The reduction of corrosion in freight cars means so much to the railroads that the question should be settled conclusively and as promptly as possible. Is not this a subject which the Mechanical Division might well consider?

The essential difference between a schedule shop and a shop operating without a schedule is the difference between order and disorder. No one can compare the two shops to the disadvantage of the latter and yet shop schedules have not been installed as generally as seems desirable. It is difficult to understand why so many railroad men fail to appreciate and benefit by the advantages of this system. One general foreman said recently: "I don't need a shop schedule with a schedule supervisor telling me how to run things. I am on the job at six o'clock in the morning, two hours before the men arrive, and I know how everything is going by personal observation." Obviously, attention to details is not the function of the general foreman and besides it is absolutely impossible for one man to know all the details of the work as carried on in a large railroad shop. Production can never be brought to the desired point until some system is installed for co-ordinating the work of the different departments, making sure that material is received and repair work completed as needed. Men often, and in fact usually do, work harder in non-schedule shops than in those provided with a schedule system; also with less to show for their work. The trouble is that they are not all working for the same thing at the same time. In general, the object of the shop schedule is to co-ordinate the work of the different departments and eliminate lost time, thereby increasing shop production. Delays for material are largely prevented and the supervising officers are relieved of a mass of details, enabling them to give their attention to more important problems of personnel.

**Why
Have A
Shop Schedule?**

We suggested yesterday that the foreman or the subordinate officer who comes in direct contact with the men is the most vital link in a railroad organization. In other words, these men are key men. Is this fact always recognized when they are selected for these positions? How do you select them? What kind of men do you promote to these positions? To deal properly with the men the foremen should be thoroughly imbued with the spirit of the organization and fully informed as to its purposes, and as to why certain practices or methods are used or are to be used. Do you coach them along these lines? Are

**How Do You
Select
Foremen?**

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they fitted intelligently and patiently to represent the organization in dealing with the men under them? Do you promote them because they are master workmen and that possibly in addition to this they are respected by their fellows, or do you look first for qualities of leadership—qualities which include self-control, a practical understanding of human nature, and a spirit of fairness. No matter how thoroughly a man understands the detail operations of his department, he is sure to fail in greater or less degree unless he is fully qualified to lead his men as well as direct them. You may say that such arguments are purely academic and that you know how to pick a boss, but do you? How many failures have you made in picking men and could not some of these failures have been overcome if you had not relied too much upon superficial observation or a hunch, but had taken steps to study and analyze each man critically before you decided to promote him?

The officers and committees of the Railway Supply Manufacturers' Association, and especially President J. F. Schureh and Chairman Charles W. Beaver, of the Exhibit Committee, deserve praise and congratulations for having got the exhibits so completely in place before the opening of the conventions. In addition, the attractiveness of the decorations merits mention. When the procession, headed by Chairman Tollerton, of the Mechanical Section, and Mr. Schureh, marched through to the meeting hall yesterday morning, almost everything on the pier was in its proper place and ready for inspection. The ballroom looked especially attractive. The A. R. A. is composed of Canadian as well as United States railways, and the Exhibit Committee had very appropriately had the Canadian flag draped with the Stars and Stripes around the ballroom. Those who have read the entertainment program have noticed that a new departure has also been made by arranging for Friday night to be "Canadian Night." The work done by the officers and committees of the Railway Supply Manufacturers' Association in making the arrangements for the convention, and the splendid exhibit made by the railway equipment and supply manufacturers immediately following a prolonged period of almost the worst business in their lines ever known, illustrate the ability, enterprise and courage with which the railway equipment and supply industry always is managed. No industry suffers more ups and downs; it is usually feast or famine with it. At the same time, no industry is managed with more uniform steadiness and progressiveness. Those in it have learned by long experience that the normal condition of the industry is either what seems abnormal depression or abnormal prosperity, and go along year by year pretty much as if they are always ready for either.

Chairman Tollerton's address yesterday morning brought out some interesting facts concerning railroad electrification. He showed that some of the European railroads have been paying at least five times as much for coal as have the roads in the United States. There is an abundance of potential and developed water power in Europe, and this, coupled with the high price of fuel, in a number of cases

has made electrification imperative. In this country the fuel saving possible by electrification is well worth consideration, but it is not as important a factor as that of dealing with conditions of heavy traffic and congestion. Mr. Tollerton also spoke of criticism which has appeared in publications of wide circulation to the effect that our railroads are not progressing as rapidly in the use of electricity for traction as are European railroads. In spite of indications to the contrary, American electric locomotive design is ahead of all countries in many respects because of difficulties encountered and overcome in designing locomotives which will transmit large power from the motors to the driving wheels. The design of machines utilizing small amounts of power is one thing, but when that amount of power is increased to unprecedented proportions, the problem takes on a very different aspect. No European equipment as now developed would be adequate to handle trains on the Norfolk & Western or on the Chicago, Milwaukee & St. Paul. Added to this, it should be said that both the split-phase alternating current and the 3,000-volt direct-current systems, together with the machinery that has made them possible, were developed in the United States. These two systems are probably the only ones which can meet all the electrification requirements of American railroads. The requirements of this country demand a different development, but we are in no sense behind.

In commenting on American railroad equipment a British engineer recently paid a tribute to the railroads of this country for the careful and thorough research which he stated had been an important factor in establishing American equipment as representing the highest development of engineering skill applied to rolling stock. The value of work such as has been done at Perdue and at Altoona is recognized the world over and it has unquestionably been instrumental in raising the standard of efficiency to the point which it has now reached. In the past research has usually been conducted by individual roads and because of the large expenditure involved the work has lagged when business conditions were unfavorable. In recent years comparatively little of this work has been done and at present there are many important innovations waiting to be tested. Some of these are radically different from prevailing types, but seem very promising. In the interest of economy they should be tried out as promptly as possible to determine whether they possess any merits. Probably no road is at present in position to test such radical innovations as, for example, turbine driven or Diesel engine locomotives, although to the railroads collectively such equipment might mean a saving of tens of millions of dollars. The logical method for handling such investigations would seem to be a co-operative research bureau as mentioned by Chairman Tollerton in his opening address. By this arrangement the expense could be fairly distributed among the roads, so that the cost to each road would be comparatively small and duplication of work could be avoided. As suggested by Mr. Tollerton, any central research bureau should not be carried to the point where it would destroy initiative on individual roads. Perhaps the method should be confined to more extended investigations, but this is a question that should be easily settled. The important thing is to develop an organization that can carry on much of the constructive research

Different Progress, Not Less

potential and developed water power in Europe, and this, coupled with the high price of fuel, in a number of cases

which the individual roads are not in a position at the present time to undertake.

In carrying on a manufacturing enterprise, no matter how good the product may be and no matter how well it may meet the needs of the purchasing public for which it is designed, successful operations for any extended time will be impossible unless all the activities of both the manufacturing

**Do You
Know the
Cost?**

and the sales departments are based on an accurate knowledge of all items of expense from the purchase of the raw materials to the shipment of the finished product. The absolute necessity of an accurate, detailed knowledge of costs has brought out in recent years highly developed cost accounting systems suitable for all kinds of manufacturing enterprises. In a period which is now only a memory, it was possible for many concerns to get along without such a detailed knowledge of costs and yet make substantial profits. Such examples are now few and far between. Many of those who neglected to install a proper cost accounting system, or who afterwards failed to govern their activities by the knowledge thereby obtained either went through the hands of a receiver or were driven out of business. These cases served as effective warnings and caused others to see the handwriting on the wall. In the operation of railroad locomotive and car shops, mechanical officers have not been forced to compete with other shops and they have not had the same incentive as manufacturing concerns to investigate their operating costs. Moreover, the reports which are called for by the government do not disclose the necessary factors. As a consequence, the mechanical officer usually knows very little about the complete detailed costs of doing work in his shops and commonly overlooks a number of elements which enter into overhead. In other words, his training has not caused him to think continuously in terms of cost. There is, fortunately, a growing interest in the subject—small as yet, but still a start. In this matter railroad men might often learn a valuable lesson from supply and other manufacturing concerns which would enable them to inaugurate many changes which would make it possible to decide intelligently whether it was to their advantage to make or to purchase certain articles and how to operate their plans with considerably greater efficiency than is now being done.

Observing the satisfactory operating results obtained from the use of light gasoline rail motor cars, a number of railroad men have publicly expressed the opinion that a car which would seat from 50 to 70 people should be built to meet the requirements of certain sections of their lines. This opinion is unquestionably well founded and there is no doubt of the fact that such a car would have a wide field of usefulness provided it could be operated at a decidedly lower cost than a small steam operated train. Unfortunately the problem involved in the design of such a car is radically different from that of the smaller car and a number of new factors are introduced. Low operating costs of the small car have been predicated upon extremely light weight and the utilization of engines perfected for use in road vehicles. An increase in the length of the car body beyond that of the small car adds much more in weight than in seating capacity. The same dead-weight

**The Call for
Large Motor
Passenger Cars**

of car per passenger cannot be obtained in a car seating some 60 persons that is now possible in one seating only 35 persons. Then, to drive a larger and heavier car at the necessary speeds would require a larger engine than has yet been used by any truck builder. To be sure gasoline engines of sufficient power have been built for aeroplanes but these are of high first cost and although of light weight, are short lived. These characteristics were of secondary importance for aeroplane service but are prohibitive when applied to passenger car propulsion. A satisfactory gasoline engine of larger size could probably be developed by the engine builders but this would take time and they are apparently loath to tackle the problem until assured that there will be an extended sale for such engines if designed. The fact remains that at present no suitable engine is available. For such larger cars a gasoline-electric drive may be better adapted than a gasoline-mechanical one. In studying the problem of the larger unit motor car, or one capable of hauling a small trailer, other types of motive power, such as Diesel engines, must be considered and even the high-pressure steam engine should not be overlooked. The problem might well be taken under consideration by a special committee of the Mechanical Division of the American Railway Association.

operating expenses become necessary. To a certain extent it is inevitable that the maintenance departments bear more than their proportion of such retrenchments, because maintenance work can be deferred without immediately destroying the effectiveness of the transportation machine. But the very defenselessness of the department against the principle has led to its too extensive application, with results clearly set forth by Mr. Tollerton in his address yesterday morning, when he said that "invariably operating expenses of a railroad are effected in inverse ratio of the ratio of maintenance of equipment expenditures. * * * Injudicious savings in maintenance result in actual loss through the increase in transportation costs and heavier later costs for deferred maintenance." There is a most intimate and inextricable relationship between the expenses controlled by the mechanical and the operating departments. The relation between these accounts in the aggregate is well known, but few railroads have developed satisfactory systems of analysis to determine their relative effect on unit costs of train service. Unrelated studies of this kind have been made in a number of cases, the best example of which is probably the statistical work of the fuel departments, where these departments are well organized. Operating officers also give close attention to analyzing crew wage costs. In neither case, however, has much attention been given to the maintenance accounts beyond a check on their aggregate amount. They are as worthy of analysis on a unit cost basis as are any of the other operating expenses, and any system of control of the cost of train operation which does not take into account this important element is likely to be misleading. If the analysis of individual accounts has proved to be of value, is it not reasonable to expect an equally good return by expanding such work to cover all expenses in a co-ordinated statistical department? Its work would make a quantitative knowledge of the relationship between all factors of train operating cost available to the officers of all departments.

**A Neglected
Element of
Train Cost**

There is a pronounced tendency to make the mechanical department the goat whenever heavy retrenchments in operating expenses become necessary. To a certain extent it is inevitable that the maintenance departments bear more than their proportion of such retrenchments, because maintenance work can be deferred without immediately destroying the effectiveness of the transportation machine. But the very defenselessness of the department against the principle has led to its too extensive application, with results clearly set forth by Mr. Tollerton in his address yesterday morning, when he said that "invariably operating expenses of a railroad are effected in inverse ratio of the ratio of maintenance of equipment expenditures. * * * Injudicious savings in maintenance result in actual loss through the increase in transportation costs and heavier later costs for deferred maintenance." There is a most intimate and inextricable relationship between the expenses controlled by the mechanical and the operating departments. The relation between these accounts in the aggregate is well known, but few railroads have developed satisfactory systems of analysis to determine their relative effect on unit costs of train service. Unrelated studies of this kind have been made in a number of cases, the best example of which is probably the statistical work of the fuel departments, where these departments are well organized. Operating officers also give close attention to analyzing crew wage costs. In neither case, however, has much attention been given to the maintenance accounts beyond a check on their aggregate amount. They are as worthy of analysis on a unit cost basis as are any of the other operating expenses, and any system of control of the cost of train operation which does not take into account this important element is likely to be misleading. If the analysis of individual accounts has proved to be of value, is it not reasonable to expect an equally good return by expanding such work to cover all expenses in a co-ordinated statistical department? Its work would make a quantitative knowledge of the relationship between all factors of train operating cost available to the officers of all departments.

Program For Today

DIVISION V.—MECHANICAL, American Railway Association, is holding its meetings in the Greek Temple on the Million Dollar Pier. The program for today follows:

Thursday, June 15, 1922
9.30 a. m. to 12.30 p. m.

Discussion of Reports on:

Prices for Labor and Material.
Arbitration.
Tank Cars.
Loading Rules.
Train Lighting and Equipment.

ENTERTAINMENT

10.30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 p. m.—Tea will be served in Entrance Hall.
9.30 p. m.—Grand Ball, Ball Room, Million Dollar Pier.

The Entertainment Yesterday

YESTERDAY'S ENTERTAINMENT features consisted of a morning concert on the pier by the Albert Taylor orchestra of New York, an afternoon concert including informal dancing and the serving of tea at 4:30 o'clock, followed in the evening by dancing in the ball-room and a pleasing program of musical selections.

The program of the evening was in charge of Subcommittee Charles L. Brown, of the Entertainment Committee, and his fellow workers, J. Cizek, C. W. Floyd Coffin, W. G. Cook, D. L. Eubank, J. W. Fogg, Oscar C. Hayward, Webb G. Krauser, W. A. McWhorter, N. C. Naylor and S. Worcester Sargent.

Fifteen-Cell Batteries for Car Lighting

PHILADELPHIA, Pa.

To the Editor:

The editorial entitled "The Wrong Man Again" which appears in the June issue of the *Railway Electrical Engineer*, while expressing well founded criticism of the lack of co-operation or even actual antagonism which occasionally exists between the mechanical and electrical departments of some railroads, presents the particular case used as a text in such an incomplete form as to be very misleading in regard to the results obtained with 15-cell car lighting batteries.

In the illustration used in this editorial, reference is made to the unsatisfactory results obtained by omitting one cell from the usual 16-cell car lighting battery. It might be inferred that this was the only change that was made and that in all other respects the equipment was identical and included lamp regulators in both cases; but this fact is not specifically brought out, and the casual reader might with the impression that a 15-cell car lighting battery calls for special low voltage lamps. This, of course, is absolutely contrary to the facts, as there are many axle lighting equipments in service on some of the Great trunk line railroads using 15 cells of battery where the same standard lamps are used as with all other equipments on the system, and the illumination obtained has elicited especially favorable comments from the traveling public. These results have been due to the use of the constant voltage system and the omission of the lamp regulator

To quote the words of the editorial above referred to, "Any electrical man knows" that the minimum drop of voltage in an ordinary lamp regulator in average operating condition will more than offset the voltage of one cell of battery, so that with an equipment which eliminates the lamp regulator, 15 cells of battery will give at least as good, and in most cases, better illumination than that obtained from an equipment requiring a lamp regulator with 16 cells of battery. The usual form of lamp regulator, consisting of a pile of carbon disks under more or less compression, is permanently connected between the battery and the lamps and introduces a loss of voltage which is always deducted from the battery voltage applied to the lamps. Equipments which do not require a lamp regulator eliminate this loss and permit the omission of one cell of battery.

J. LESTER WOODBRIDGE,
CHIEF ENGINEER, THE ELECTRIC STORAGE BATTERY COMPANY.

[The writer of the editorial in an effort to show the need of good electrical men in railroad service, chose an example with which he was familiar to illustrate the point in question. The railroad which made the effort to operate with 15 cells of lead battery was using an equipment with a lamp regulator in which there was a minimum drop of about two volts. This fact was not mentioned and it was assumed that the electrical reader would understand that the effort was made to use 15 cells with equipment designed for 16 cells. It is true that some manufacturers of car lighting apparatus maintain that 16 cells are desirable under all circumstances and it is also true that others build equipment designed to operate with 15 cells and get results which to the users, the maintainers and the traveling public are highly satisfactory.—Editor].

C. I. C. I. & C. F. Association Meeting

WM. P. ELLIOTT, secretary of the Chief Interchange Car Inspectors & Car Foremen's Association, announces that a meeting of the executive committee will be held at the Park Street Hall, which is on the ground floor of the Marlborough-Blenheim Hotel, on Thursday afternoon at 3 P. M. All members of the association are invited to attend.

Please Wear Your Badge, Always

WE HAVE all been cautioned about wearing our badges at all times, particularly when on the pier. Please be careful about this, for you will greatly aid the executive committee in its labors to protect the welfare of the members. And when you visit the pier, chiefly on the nights when important functions are scheduled, wear badges where they can easily be seen.

Exhibit Notes

THE TORCHWELD EQUIPMENT COMPANY, Chicago, has transferred its exhibit from Space E on the porch to Space No. 11 in the main exhibition hall.

The Laughlin-Barney Machinery Company of Pittsburgh was listed in Wednesday's *Daily* as being located in Space 705. This company has moved to Space 131.

A typographical error was made in the *Daily* for Wednesday with regard to the Fibreboard Company, Boston, Mass. This company is located in Space 42.

The Production Machine Company's address was incorrectly stated in Wednesday's *Daily* under the list of exhibitors. The general office of this company is located in Greenfield, Mass.



Vice-Chairman J. Coleman



Chairman W. J. Tollerton



Secretary V. R. Hawthorne

American Railway Association—Division V—Mechanical

Chairman Tollerton's Address and Report on Scheduling Feature Opening Session

AFTER AN ABSENCE of two years the members of the American Railway Association—Division V—Mechanical met again Wednesday, June 14, 1922, in their Third Annual Convention in the Greek Temple at Young's Pier, Atlantic City, N. J. The meeting was called to order at 9:45 by W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific, and chairman of the division. Chairman Tollerton invited members of the United States Railroad Labor Board, who were present, to come forward during the opening exercises. Doctor Newton W. Cadwell, pastor of the Olivet Presbyterian Church, then opened the convention by invoking the Devine blessing. The address of welcome was delivered by Edwin F. Bader, mayor of Atlantic City.

Mayor Bader's Address

Mayor Bader said in part: This is a proud moment for me today. I made my maiden welcoming speech in this hall two years ago. While I have not improved in speechmaking, I have always a feeling of good fellowship for all the boys here, the majority of whom I know. I want to say, that of all the conventions coming to Atlantic City, this is the biggest and best. As mayor of

this town, representing its citizens, I would like to sit in the conference that you hold when planning for another convention. Before deciding on any other city, I would like to know it. Give me a chance. I can't talk before a large public gathering, but I can say a few things around the round table. Our idea is to give you a good time while here, and I know you have it.

So there will be no trouble around, I have assigned to your organizations—it was a pleasure for me—at least ten special detectives, not to watch over you, but to look after you.

I am going to give the chairman the key. He can go wherever he likes. So can everyone else, but I will hold the ten detectives responsible for your actions while here. Of course you can have all the privileges. Everything is free—if you can find it. If any of our people do not do the right thing by the members of your association I hope you will let me know. With an organization of this kind we don't want any of you to go away and say you were not treated right.

On behalf of the members of the American Railway Association, chairman Tollerton expressed thanks and appreciation for the consideration and welcome always accorded the Association, when coming to Atlantic City.



J. J. Tatum



C. F. Giles



H. L. Ingersoll



W. H. Winterrowd

Members General Committee, Division V—Mechanical—A. R. A.



J. T. Wallis



John Purcell



T. H. Goodnow



C. E. Fuller

Members General Committee, Division V—Mechanical—A. R. A.

Chairman W. J. Tollerton's Address

The present day and the near future should go down in history as a period of especial progress in the development of devices and design of equipment to bring about the greatest efficiency in railroad transportation service combined with the utmost economy in maintenance and operation.

Passing without comment the generally bad business conditions of the past year or two, the railroads are confronted with a field of competition in the form of automobiles and auto trucks, which is having a serious effect on local traffic, both passenger and freight. In so far as auto trucks are concerned they are in position to operate at a very low cost, practically on a government subsidy, having no other expense than a small tax for investment in or maintenance of roadway, terminal and other station requirements, so they can establish rates and short time deliveries which make the most keen competition. The railroads, in fact, are frequently placed in the peculiar position of paying a heavy portion of both the investment and maintenance of these highways. Concrete roads are constructed by districts or counties, sometimes under state legislation, whereby the territories lying adjacent thereto are designated as "benefit districts," upon which special improvement taxes are levied. When these roads parallel the railroad tracks, as they commonly do, the railroad is expected to pay this improvement tax and its share of the taxes to keep up the highway, notwithstanding the fact that instead of being benefited it is seriously injured by the competition which takes away local passenger and freight business.

The traffic through the Panama Canal in possible competition with the railroads of the United States has been increasing greatly, and in a nine months' period of 1921 compared with the same period of the previous year increased about thirty per cent, representing a probable loss in tonnage to the transcontinental railroads running well into the billions of net ton miles. With these conditions confronting us, the need for the greatest economy combined with increased efficiency in the handling of traffic will be readily realized.

Railway Prospects Brighter

Here I wish to touch on what I consider one of the most important problems before us, that of harmony and co-operation. Closer association between the executives, local or subordinate supervisory officers and the employes is steadily becoming more freely established, and its fulfillment will undoubtedly have far-reaching effects. This is being accomplished, first, by right general interest, to wit, deeper interest in the welfare of the employes and, second, the most rational technical education of supervisory officers to carry out an efficient shop program. I have abounding faith in the capability of the officers of the American railroad organizations, and also in the rank and file of employes, to solve these problems to the entire satisfaction of themselves and our real employer, the American public.

We have had many serious obstacles to overcome in the past and there is gratification in the knowledge that some of the troubles, which were felt at the time to be practically insurmount-

able, have been overcome and in a general way have started a healthful reaction for the ultimate benefit of the railroads.

We have been through the war period, the reconstruction period, and at the present time a governmental regulation period, which appeals to me as one which is based on an earnest endeavor of our statesmen to rise above the persecutions that characterized some of the earlier policies of regulation, particularly in individual states. With the increased facilities for education through the school systems of this country and the ever extending publication of newspapers and magazines, public opinion is becoming more powerful and effective every year. There is no question but that the general public has been brought to a sharp realization of the fact that in the interference with efficient operation of the transportation systems the public itself is the real sufferer.

The record which has been made within the last two years in reducing the operating expenses of the railways in spite of the many unfavorable conditions should cause pride and gratification to railway officers. In the first three months of the year 1917 the average operating expenses of the railways of the United States were about \$7,250,000 per day. There was a great increase during the next three years, and in the first three months of 1920, during two months of which the railways were under government control, the average expenses were \$13,772,000 a day. There was a further increase later in the year 1920, owing to large advances in wages and other causes, and in the first three months of 1921 the average expenses per day were \$13,633,000. Throughout last year most drastic economies were made, and it is interesting to find that in the first three months of 1922 the average operating expenses per day had been reduced to \$11,366,000, which was \$2,267,000 a day less than in the same period of 1921, and about \$2,406,000 a day less than in the first three months of 1920. When it is considered that the freight traffic handled in the early part of 1922 was somewhat larger than in 1921, the significance of these figures becomes apparent. They show the extent to which the pre-war efficiency of operation is being restored.

In our particular field, the maintenance of equipment, there has been a constant endeavor to effect economies by the adoption and application of admitted improvements to the limit of available funds. The present abnormal conditions should not be permitted to interfere with this policy.

Co-operative Research Suggested

The suggestion has been offered, and is worthy of very earnest consideration of the proper committees, that some arrangement be promulgated by the American Railway Association for co-operative tests of railway appliances. This would involve the advisability of establishing some central system for joint investigation, so that tests which would require heavy expenditures could be carried on at the expense of the association and would make available to all railroads, at a minimum expense, information and data as to devices which promise economy in maintenance and operation. Procedure of this kind would be of great benefit, but care should be exercised to see that it would not have the effect of destroying initiative on the part of individual roads who are

in position to originate or advance the development of economical designs and appliances.

Reduction of Expenses Not Always Economy

When we speak of economies we should be very careful not to apply or think of this term as merely a reduction in expenses, if they are of such a nature that the ultimate expenditures may suffer an increase in consequence thereof. My observation has been that, invariably, operating expenses of a railroad are affected adversely by the ratio of maintenance of equipment expenditures. Sufficient expenditures for proper maintenance of equipment make economical transportation costs. Injudicious savings in maintenance result in actual loss through the increase in transportation costs and the heavier later costs for deferred maintenance.

It is readily to be understood that, unless equipment is properly maintained, locomotives kept in condition to give maximum hauling capacity with minimum fuel consumption, and freight cars in condition to give a maximum period of service with the lowest consistent time held on repair tracks, we cannot hope for economical operation on the part of the transportation department.

Study and Develop Fuel Saving Devices

Locomotive fuel, representing nearly 35 per cent of the cost of train operation, is in itself a question of major importance in the entire transportation problem and, due to its volume in proportion to the total expense, is naturally an item of greatest

an accumulation of defective conditions to be repaired at a needlessly heavy expense when returned to the owners.

Owing to the great number of freight cars on foreign lines during the past few years, under-maintenance of cars, heavy trains and the considerable number of old types of cars without reinforcements still in service, the Arbitration Committee has had to consider and decide a large number of important cases during the past year. This committee is asking relief from the numerous trivial questions and is recommending that in the future all questions submitted to the committee be jointly submitted, as arbitration cases in accordance with the provisions of Interchange Rule 123. This committee is also recommending restoring to the Rules of Interchange rules governing the responsibility for damage to foreign cars based on combination of defects denoting unfair usage, in addition to the present rules governing unfair usage based on cause.

The Committee on Locomotive Headlights and Classification Lamps is recommending important additions to the standardization of these devices.

The Committee on Specifications and Tests for Materials is recommending for your approval as recommended practice, an entire revision of the present specifications covering paints and paint material.

The Committee on Loading Rules is recommending some detail revision of these rules, which is the result of conferences held throughout the year with shippers of the various materials represented.



J. S. Lentz

Willard Kells

A. Kearney

C. E. Chambers

Members General Committee, Division V—Mechanical—A. R. A.

opportunity for effecting economies. Having this in mind, I would commend for your special consideration that fuel saving devices should have most careful study and development.

What the Committees Are Doing

We will have a report from the Committee on Car Construction, which will no doubt accentuate interest in car repair work and design. Observation and study of the bad order cars on repair tracks will indicate those parts which are most frequently failing and in need of repairs. In many instances these failures can be overcome by application of improved designs; in others, metal instead of wooden construction will eliminate failures which result in keeping freight car equipment on repair tracks, to say nothing of the excessive delay to trains en route, which is very expensive in transportation costs.

This committee offers for your approval this year a design of special rolled section center sill. As in a great measure the final presentation of acceptable plans for standard cars depends on settling the matter of underframe design, an affirmative letter ballot vote on this proposition is recommended.

Another very important consideration is that of giving more attention on each railroad to the proper maintenance of freight cars of other railroads. Neglect of minor repairs required on foreign cars invariably leads to more extensive damage, and this is probably one of the greatest causes of deteriorated freight car equipment. Your Committee on Prices for Labor and Material has given consideration to this in endeavoring to arrive at just and fair rates of compensation for repairs to freight cars to induce an interest in repairing foreign cars. It is certain that means must be determined upon so that freight cars will receive necessary attention when off the home lines, thereby preventing

The Committee on Scheduling of Equipment Through Repair Shops in its report is presenting recommendations and information which should be given careful thought and consideration by the members, in view of the economies which might be effected.

The railroads should individually supplement the work of our Committee on Shop and Terminal facilities, Structures and Machinery, with earnest thought to inaugurating and extending the best shop practices and availing themselves of labor saving equipment to obtain the greatest returns for maintenance of equipment expenditures.

With proper regard for local conditions, consistent improvements should be vigorously advocated. Installation of power plant machinery and boilers of proved merit, electrification of shops, using individual motor drives on large machines and group drives on smaller ones, portable motor driven machines to avoid unnecessary loss of time of mechanics traveling back and forth between erecting floors and machine shop, and use of power driven truck transportation for handling material around shops and between storehouses and shops, are all productive of economical and efficient results far more than offsetting the original costs and should not be overlooked in your deliberations.

The Standard and Recommended Practices of the division have not been published in complete form since 1918. The several committees of the division under the general supervision of the Committee on Manual have codified and published the complete Standard and Recommended Practice of the former Master Car Builders' and American Railway Master Mechanics' Associations as harmonized and brought up-to-date, including practices since adopted by the Mechanical Division, American Railway Association. These standards and recommended practices are contained in one loose leaf binder in very convenient form and are

now available to the members for reference. The committees participating in this work deserve commendation for the splendid way in which this Manual is arranged.

I have just returned from Rome, after having the honor of serving as a representative of the American Railway Association at the International Railway Congress. The trip was very interesting. Many papers were discussed and conclusions reached which have been published very fully in the *Railway Age*. Fourteen languages were spoken at the Congress, although officially all discussions were in English, French and Italian. The attendance was very large and the Italian railway officials were very courteous and obliging, doing everything they could to make our stay in Rome as pleasant as possible.

From a railway standpoint little may be said, but I would like to suggest to anyone desiring to criticize the American railroads, their equipment and methods of handling the public, that they first journey on some of the railroads of continental Europe. Intended criticisms of American railroads would, I am sure, be changed to words of highest commendation.

Why European Railroads Are Electrifying

In this connection a word might be said on the subject of electrification. The Swiss and Italian railroads, and to a lesser extent the French railroads, are engaged in making and carrying out plans for the electrification of certain of their lines. Some criticism has appeared in publications of wide circulation to the effect that our railroads are not progressing as rapidly in the use of electricity for traction as these European railroads. The visitor to Europe is especially impressed by the difference between some important conditions in some of the countries of Europe and in the United States. The Italian railroads have been paying upward of \$25.00 a ton, measured in American money, for coal. The average price paid by the Paris-Lyons-Mediterranean of France in 1920 was 266 francs, or at the present rate of exchange, about \$26.00. Even in 1921 its coal cost it, at the present rate of exchange, about \$18.00 a ton. The cost of coal to the Swiss railroads is also extremely high. The average cost of coal to the railroads of the United States in February, 1922, including freight charges for its transportation, was only \$3.56 a ton. You will see, therefore, that, at the minimum estimate, coal costs the railroads of Southern Europe on the average five times as much as it does those of the United States. On the other hand, these countries, especially Switzerland and Italy, have large supplies of natural water power, while in many parts of the United States such power is not available. It follows that the savings in fuel cost to be made by electrification in some of these countries of continental Europe is much larger than in this country, and we should not allow this important fact to be overlooked in discussions of the subject.

This is the last meeting at which I am to have the honor of

presiding as Chairman of the Mechanical Division, and I wish to express my deep appreciation of the splendid support you have given me at all times. I must particularly express my appreciation of the assistance of the General Committee. I know that this organization has before it a very bright and productive future and that you will extend to my successor the same hearty cooperation you have given me.

Association Business

The minutes of the 1920 annual meeting were approved and Chairman Tollerton announced the selection of committees as follows: Committee on Subjects, John Purcell, chairman; R. L. Kleine, Willard Kells, C. E. Fuller, and C. F. Giles. Committee on Resolutions, C. E. Chambers, chairman; F. W. Brazier and H. T. Bentley.

Tribute to A. W. Gibbs

C. E. CHAMBERS: Owing to the recent loss of A. W. Gibbs, chief mechanical engineer of the Pennsylvania System, one of our very important members, a man who gave this Association a great deal of valuable service for a long period of years, and who was also chairman of the Tank Car Committee for a great number of years, I wish to offer this resolution: (A memorial resolution giving a brief sketch of Mr. Gibbs' life was here presented.)

J. SNOWDEN BELL: It would be, it seems to me, unnecessary to say a word with regard to the mechanical ability or the personal character of Mr. Gibbs, and I only want to pay one word of personal tribute to his character. I never had the pleasure of meeting a more amiable gentleman and a kindlier gentleman to others than Mr. Gibbs. Once I heard this remark made about him, which I think is as fine a remark as could be made about anyone. A man said, after meeting Mr. Gibbs, "He is the kind of a man who is always going out of his way to help somebody."

THE CHAIRMAN: Are there any further remarks in regard to this resolution on the death of our esteemed member, Mr. Gibbs? If not, I would like to suggest to the members that the resolution be adopted, standing, and that the members remain with bowed heads for one minute, as a testimonial of respect to Mr. Gibbs.

(The members then stood for one minute and the resolution was thereby adopted.)

Report of General Committee

SINCE THE LAST annual meeting, the General Committee has held meetings on the following dates: July 21, 1920; October 20, 1921; March 30, 31, 1921; October 26, 27, 1921; March 14, 1922 and June 13, 1922.

The membership of the Division at the present time includes 206 railroads, representing 379 memberships in the American Railway Association, and in addition thereto, 100 railroads, associate members of the American Railway Association. These railroads have appointed 788 representatives in the Mechanical Division. In addition there are 1,529 affiliated members and 126 life members in the Division.

The last session of the Division was held June 9-16, 1920. Since that time the General Committee has taken action on several important subjects. This action is outlined in the following report and your approval is respectfully requested.

ANNUAL MEETINGS, 1921

A SUMMARY of annual conditions prevailing, meeting of the Division was not held in 1921. The report of the committees for 1921 upon which action was taken by your committee will be included in the printed proceedings for this year.

LETTER BALLOTS 1920

Recommendations from Committees received at the 1920 annual meeting and ordered submitted to letter ballot of the members were sent to the members in separate circulars containing the recommendations from each Committee and result announced by circulars to the members.

LETTER BALLOTS 1921

Recommendations from the following Committees were received in 1921 and submitted to letter ballot of the members: Specifications and Tests for Materials; Car Construction; Brake Shoe and Brake Beam Equipment; Tram Brake and Signal Equipment; Tank Cars and Loading Rules.

The letter ballot circular containing the recommendations from these committees was sent to the members under date of August 20, 1921, as Circular No. DV-215. The result of this letter ballot was announced to the members in Circular No. DV-225, issued January 25, 1922.

MANUAL

The Standard and Recommended Practice of the Division has been brought up to date and compiled under the direction of the

Committee on Manual. The Manual contains the standards and recommended practices adopted by the former Master Car Builders' and American Railway Master Mechanics' Association, harmonized and brought up to date, and the standards and recommended practices since adopted by the Mechanical Division, American Railway Association.

INTERCHANGE RULES

The recommendations of the Arbitration Committee and the Committees on Prices for Labor and Materials and Depreciation for Freight Cars, approved at the 1920 annual meeting, were incorporated in a revision of the Rules of Interchange for 1920. The recommendations from the Arbitration Committee and the Committee on Prices for Labor and Materials contained in the reports of these committees for 1921 were considered by your committee and approved, with the exception of recommendations for changes in Rules 32, 43 and 70, which involved changes in well established principles, and incorporated in a revision of the Rules of Interchange for 1921. In addition, as necessity arose, your committee has approved revisions of detail rules which have been issued as supplements to the Rules of Interchange.

LOADING RULES

The recommendations from the Committee on Loading Rules considered at the annual meeting for 1920 and approved by letter ballot of the members, were incorporated in a revision of the Loading Rules for 1920. The recommendations from the Committee on Loading Rules for 1921 were considered by your committee and submitted to letter ballot of the members. Those changes which were approved by letter ballot were issued to the members as a supplement to the Loading Rules for 1920.

MAXIMUM LOAD MARKINGS ON FREIGHT CARS

The letter ballot ordered taken on this subject in 1919, as result of report from the Committee on Car Trucks, resulted in this proposition being approved by more than the required two-thirds majority. Conferences have been held with representatives of the Traffic and Transportation Divisions to arrange for the necessary adjustment in tariffs. This subject has been considered also by your committee at practically every meeting, but due to difficulties that have been encountered the committee is not prepared at this time to make any definite recommendations as to further action. This decision was covered in Circular S, III-191, issued February 15, 1921.

CHANGE IN NAME OF SECTION III—MECHANICAL

As a result of revised Articles of Organization and By-Laws of the American Railway Association adopted in 1920, and the following resolution adopted at your 1920 annual meeting, the name of your organization has been changed from Section III—Mechanical to Division V—Mechanical, Master Car Builders and Master Mechanics.

MECHANICAL INSPECTION DEPARTMENT

Your committee has approved recommendation for the establishment of a department to investigate repairs to foreign cars and billing therefor. This department at the present time consists of a chief inspector and five inspectors acting under the direction of the General Committee.

FUEL CONSERVATION

At the request of the Board of Directors for the formation of an organization within the American Railway Association, to consider and make recommendations on Fuel Conservation, the General Committee, in co-operation with the General Committees of the Operating and Purchases and Stores Divisions, appointed members to represent the Mechanical Division on the Joint Committee on Fuel Conservation, which reports direct to the Board of Directors. The Committee on Fuel Economy and Smoke Prevention of the Mechanical Division has been discontinued.

JOINT INSPECTION OF STANDARD MATERIAL

A joint committee to study the subject of joint inspection of standard materials has been appointed by your General Committee

in co-operation with the General Committee of the Purchases and Stores Division. Final report from this committee has not yet been received.

JOINT INSPECTION OF EQUIPMENT

The General Committee, in co-operation with the General Committee of the Transportation Division and the Car Service Division, appointed a special committee on the subject of joint inspection of Equipment. Recommendations from this committee have been approved by letter ballot of the railroads as recommended practice, covered in Circular No. 2247, issued April 13, 1922, by the General Secretary.

LOCOMOTIVE AND CAR BUILDERS' CYCLOPEDIAS

The General Committee has appointed special committees to collaborate with the publishers of the Car Builders' and Locomotive Cyclopedias.

SAFETY APPLIANCE HAND BOOKS

Your committee has arranged with the publishers of the small handbook of U. S. Safety Appliances for Cars and Locomotives for an A. R. A. edition. This action is in response to the demand for these safety appliances in handy pocket form, and the books will be supplied to railroads on requisition at cost.

JOINT COMMITTEE ON AUTOMATIC TRAIN CONTROL

Your committee has appointed representatives of the Mechanical Division to serve on the Joint committee on Automatic Train Control with representatives from the Operating and Engineering Divisions and Signal Section.

INVESTIGATION OF POWER BRAKES AND POWER BRAKE SYSTEMS

Your committee also arranged through Mr. R. H. Aiston, President, for the Committee on Safety Appliances to handle matters for the Association in connection with the Investigation of Power Brakes and Power Brake Systems before the Interstate Commerce Commission, and further arranged for the Committee on Train Brake and Signal Equipment to assist the Committee on Safety Appliances in this matter.

EXTENSION OF EFFECTIVE DATES OF RULES AND REGULATIONS

As occasion has arisen during the past two years, your Committee has, upon recommendation of the proper committees of the division, extended the effective dates of certain provisions of the Rules of Interchange and Loading Rules. These extensions have been covered by circular issued to the members.

COMMITTEE ON NOMINATIONS

The committee recommends that no ballot be taken this year for members of the Committee on Nominations, and that the present committee be continued with the exception of Wm. Schlafke, who has left railroad service, and that W. J. Tollerton, (Chicago, Rock Island & Pacific), be appointed to fill this vacancy. The Committee on Nominations will then be as follows: F. W. Brazier (Chairman), New York Central; H. T. Bentley, Chicago & North Western; J. J. Hennessey, Chicago, Milwaukee & St. Paul; C. E. Chambers, Central Railroad of New Jersey; and W. J. Tollerton, Chicago, Rock Island & Pacific.

[The lists of new life members and of members who have died during the year, contained in the report, will be found elsewhere in this issue.]

Discussion

C. E. Chambers: By reason of the action taken by the General Committee as to the omission of the letter ballot, not being in conformity with the constitution, I move that the Association approve their action in that respect. *(The motion was duly seconded, put to vote and carried. The committee report as a whole was also ordered approved.)*

Report of Committee on Nominations

IN ORDER to avoid the necessity of electing an entire new set of officers and General Committee, your Committee on Nominations recommends that the terms of these officers and members of the General Committee expiring June, 1922, be extended to June, 1923; and that officers and members of the Committee only be elected at this time to fill the vacancies created by those whose term of office expired in 1921 but who were continued in office until June of this year, and of those who have left railroad service and are no longer eligible for office in the Division.

Your committee recommends that the term of office of the Vice-Chairman and the following members of the General Committee be extended to June, 1923:

J. S. Lentz, Lehigh Valley; C. E. Fuller, Union Pacific System; H. L. Ingersoll, New York Central; J. J. Tatum, Baltimore & Ohio, and Willard Kells, Atlantic Coast Line.

Your committee also nominates W. J. Tollerton, Chicago, Rock Island & Pacific, for member of the General Committee, to serve for the unexpired term of John Purcell which ends June, 1923; and H. C. Oviatt, general mechanical superintendent, New York, New Haven & Hartford, to serve for the unexpired term of Wm. Schlaefge which ends June, 1923, as Mr. Schlaefge has left railroad service.

Your committee nominates the following to serve until June, 1924:

For chairman, J. Coleman, assistant to general superintendent motive power and car department, Grand Trunk System.

For members of General Committee, C. F. Giles, Louisville & Nashville; T. H. Goodnow, Chicago & North Western; A. Kearney, Norfolk & Western; J. T. Wallis, Pennsylvania System; W. H. Winterrowd, Canadian Pacific; C. E. Chambers, Central Railroad of New Jersey, and L. K. Silcox, Chicago, Milwaukee & St. Paul.

For Vice-Chairman (to serve unexpired term of Mr Coleman which ends June, 1923); J. Purcell, Atchison, Topeka & Santa Fe.

The report is signed by F. W. Brazier (Chairman), N. Y. C.; H. T. Bentley, C. & N. W.; J. J. Hennessey, C. M. St. P., and C. E. Chambers, C. R. of N. J.

Discussion

F. W. Brazier: The Committee offers the following resolution: Resolved that the report of the Nominating Committee be accepted and that the recommendation of the Committee to extend the terms of office of those officers and members of the General Committee expiring June 1922 to June 1923 be approved, and that a formal ballot be taken covering the recommendation of the Committee for officers and members of the General Committee with terms expiring June 1924 and to fill the vacancies of unexpired terms of those members of the General Committee who have left railroad service and whose terms have been extended to June, 1923. (F. W. Brazier moved the foregoing resolution which was seconded, put to vote and carried).

Scheduling Equipment Through Repair Shops

This committee was originally appointed to report on methods for scheduling and routing work in locomotive repair shops. In 1920 the committee submitted a report which outlined the advantages of scheduling systems and described the detail procedure for applying such a method to locomotive repairs. In the discussion following the presentation of the report considerable interest was manifested in the question of scheduling and routing as applied to car repair shops and the committee was continued to make a study of

car department methods and recommend blanks or forms to take care of that branch of the work.

As pointed out in the report, scheduling is not considered applicable to all classes of car repairs, but it is believed that where this method of handling work is suitable, it will show the same beneficial results that are obtained by scheduling locomotive repairs. The report is particularly timely because of the large number of cars now in need of heavy repairs, which can well be handled by a scheduling system.

THE LAST REPORT from this committee was made in June, 1920, and covered the scheduling and routing of locomotives through repair shops. This report considers the scheduling and routing of passenger and freight equipment under repairs. Very little has been done to promote systematic scheduling methods when repairing equipment. One road in Canada has this work highly perfected and claims are made for a considerable increase in output with decreased costs due to its adoption. At least one road in the United States has recently introduced scheduling and routing practices in their passenger car repair shops and indicates point to an increase in understanding and appreciation of method widely used in contract shops and which are equally applicable to railroad shops.

In general the plans outlined for scheduling and routing locomotives (report of the committee for June, 1920) are employed for cars, passenger and freight. These classes of equipment will be considered separately and scheduling systems recommended in more detail. Passenger cars, like locomotives, are repaired in units. But freight cars, by reason of the large number of repairs and kinds of delivery, do not conform to passenger car methods. Groups of cars are scheduled as a unit and "days" of time are further subdivided into "hours," morning and afternoon. Gang work is recommended for passenger car repairs, but not to the extent suggested for freight repairs. In other re-

spects freight car operations and material are scheduled, routed and checked in practically the same manner as other equipment.

Although a discussion of personnel does not properly come under the subject of this report, yet it is important to indicate the close relation existing between labor gangs and correct scheduling and routing plans. The same may be said of shop layout and design. Systematic repair methods may be applied to any existing plant, large or small, with good results, but the greatest benefit obtains when shops and tracks are laid out to suit an orderly and well planned scheduling system. Proper switching may be somewhat beyond the scope of this report, but no system can operate successfully unless instructions governing the selection and spotting of incoming cars are closely followed.

Details covering the following items incident to installing shop systems were fully covered in the report of this committee for 1920 and apply essentially to passenger and freight equipment: Schedule supervisor and assistant, experience and duties; location of schedule office; description of schedule and planning boards; shop blackboards and slide rules. This information will not be repeated here.

PASSENGER EQUIPMENT

The committee recommends considering only those classes which include all repairs having a labor cost of \$50.00 and over.

PASSENGER CAR SCHEDULE CONSTANTS

(WORKING DAY ON WHICH OPERATIONS ARE DUE)

No. of Oays in Shop	8		10		12		14		15		17		19		22		24		17		19		22		24					
	Paint Work		Burn		Burn		Burn		SB																					
Operation	Schedule		A		C		D		E		F		G		H		I		J		K		L		M		N		O	
	PAINTERS																													
Wash Outside	*1	*1	*1	*2	*2	*2	*2	*2	*3	*3																				
Wash Inside	*1	*1	*1	*2	*2	*2	*2	*2	*4	*4	*2																			
Sandblast Start																														
Sandblast Finish (By Noon)																														
Burn Start																														
Burn Finish																														
Lead Color																														
Sand Start																														
Sand Finish																														
Prime No. 1																														
Putty Start																														
Putty Finish																														
Sand Putty																														
Prime No. 2																														
Prepare Start	*3	*4	*5	*5	*5	*6	*6	*6	*8	*9																				
Prepare Finish	3	4	6	7	7	8	9	12	13																					
Color No. 1																														
Color No. 2																														
Color Varnish	4	6	8	8	9	10	11	14	15	11	13	14	15	11	13	14	15	15	15	15	15	15	15	15	15	15	15	15		
Ornament	5	7	9	10	10	11	12	15	16	12	14	15	16	12	14	15	16	16	16	16	16	16	16	16	16	16	16	16		
Varnish No. 1	6	8	10	11	11	12	13	16	17	13	15	16	17	13	15	16	17	17	17	17	17	17	17	17	17	17	17	17		
Varnish No. 2	*7A	*9A	*11A	*12	*13	*14	*15	*18	*19	*15	*17	*18	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19	*19		
Paint Bottom																														
Paint Roof																														
Inside Start																														
Inside Finish																														
Touch Up	*3	*4	*5	*13A	*14A	*16A	*18A	*21A	*23A																					
Clean (By Noon)	8	10	12	14	15	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	
CARPENTERS																														
Strip																														
Start Body	*2	*2	*2	*3	*3	*3	*3	*5	*5	*3	*3	*4	*4	*3	*3	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7		
Start Platform	*2	*2	*2	*3	*3	*3	*3	*5	*5	*3	*3	*4	*4	*3	*3	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7		
Finish Body	*2	*3	*4	*5	*5	*5	*6	*8	*8	*5	*6	*7	*8	*10	*10	*7	*8	*9	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10		
Finish Platform	*3	*4	*5	*7	*7	*7	*8	*10	*10	*7	*8	*9	*10	*10	*7	*8	*9	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12		
CABINET MAKERS																														
Strip Start																														
Strip Finish																														
Work Start	*2	*2	*2	*3	*3	*3	*3	*5	*5	*3	*3	*4	*4	*3	*3	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7		
Work Finish	*2	*3	*4	*4	*4	*5	*5	*6	*8	*8	*5	*6	*7	*10	*10	*7	*8	*9	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10		
Trim Start																														
Trim Finish (By Noon)																														
TINSMITHS																														
Roof Start	*2	*2	*2	*3	*3	*3	*3	*5	*5	*3	*3	*4	*4	*3	*3	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7		
Roof Finish	*5	*7	*9	*10	*10	*10	*10	*12	*12	*10	*10	*11	*11	*10	*11	*11	*14	*14	*14	*14	*14	*14	*14	*14	*14	*14	*14	*14		
Trim Finish (By Noon)	7	9	11	13	14	16	18	21	23	16	18	21	23	16	18	21	23	16	18	21	23	16	18	21	23	16	18	21	23	
STEAMFITTERS																														
Pipes Finish, Cover and Test	*5	*7	*9	*10	*10	*13	*16	*19	*21	*13	*15	*19	*18	*21	*13	*15	*19	*18	*21	*13	*15	*19	*18	*21	*13	*15	*19	*18	*21	
TRUCKS																														
Off	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*5A												
On and Level	*7N	*9N	*11N	*13N	*13W	*15W	*17W	*20W	*22W	*14W	*16W	*20W																		
AIR BRAKES																														
Finish and Test	*7	*9	*11	*13	*13	*16	*18	*21	*23	*15	*17	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21	*21		
ELECTRICIANS																														
Work Finish																														
Dyn. Set Up end Elect. Board																														
Batteries O. K., Dyn. Finish Test																														
Tested (By Noon)																														
UPHOLSTERERS																														
Stock Received																														
Roof Finish	*4	*5	*6	*7	*7	*7	*7	*9	*9	*7	*7	*9	*9	*7	*7	*9	*9	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11	*11		
Trim Finish (By Noon)	8	10	12	14	15	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	17	19	22	24	
SILVERPLATERS																														
Stock Received																														
Stock Finish																														
MACHINISTS																														
Dynamo Set Up																														
Dyn. Finish Test																														

KEY TO SYMBOLS USED IN CHART

*—Guide days; these days will be marked on shop blackboard.
 A—Operation to be performed during afternoon period.
 N—Operation to be completed by noon.
 T—On dynamo cars trucks are to be under by noon of 10th day. Steamfitters and Bottom Painters' finishing day will be on 9th and Air Brake on 10th day.
 W—On dynamo cars trucks are to be under car by noon.

NOTE

This chart is a summary of the passenger car schedules of January 11, 1921, and is put in this form for the convenience of the supervisors.

Approved:

L. B. JENSEN,
 Shop Supt. Car Dept.

C. M. & St. P. Ry. Co.
 Milwaukee Shops

Separate master schedules should be prepared for coaches, mail, baggage, express, combination, dining, parlor and sleeping cars. These schedules should be further subdivided for wood or steel construction. All master schedules should show exterior, interior and paint work separately, also work in all other participating departments, such as the tin and pipe shop, electrical department, air brake shop, etc. (See exhibit 1.) Any convenient combination of figures and letters may be used to designate particular schedules. For example, a "1-A-2" repair schedule would indicate a class 1 heavy exterior repair, class A heavy paint repair and a class 2 medium interior repair.

CAR SCHEDULE	
DAY OF WEEK	
STRIP	1
WASH	2
CARPETS	3
PLAT	3
CABINETMAKER	3
TINSMITH	3
PAINTER	6
SINKER	6
ELECTRICIAN	6
TRUCKS	7
AIR BRAKE	7
UPHOLSTERER	7
MACHINIST	7
PLATER	7
REMARKS	

Exhibit No. 2

Schedule and planning boards or loose sheets may be used to advantage in the schedule supervisor's or foreman's office. Shop sheets, blackboards or bulletins conveying dates transferred from master schedules to department foremen will be found useful and are recommended. A calendar slide rule will greatly shorten the work of assigning actual dates on shop sheets. Exhibit 2 illustrates a shop bulletin sheet which is displayed on or near one end of the car under repair. Daily delay sheets should preferably be made from colored paper to distinguish them from other forms. (See exhibit 3.) Departments recommended for separate shop and delay sheets are as follows: Erecting and paint shop, tin and pipe shop, cabinet shop, smith shop, truck shop, upholstery and plating shops and electrical department.

The committee is of the opinion that passenger car repair delays are to a large extent governed by schedules for painting and recommend examination of report by the American Railway Association, Section III, Equipment Painting Division, Committee 8 for 1920. "Classification of painting repairs and comparison of equipment." The intent is to eventually coordinate and standardize painting and repair schedules in so far as this may be possible. The operation of a passenger car repair shop scheduling system confirms generally to procedure already described in the report of this committee for 1920. The schedule superintendent issues shop sheets to departments and checks all work daily, recording delays which are posted or sent to firemen and other Supervisor also directs the initial rating work. Delay per car per day, or per month, or departmental delays may be tabulated weekly or monthly in any convenient form and forwarded to the supervisor to better shop sheets for information or action.

FREIGHT EQUIPMENT

The committee suggests that only heavy repairs should be considered in any discussion of freight car scheduling. Such

repairs require 20 man-hours and over. Separate master schedules should be prepared for flat, coal, box and refrigerator cars, these to be subdivided for wood or steel construction. The above separation may be varied to some extent when cars are repaired under a group system with specialized shifting gangs.

It is not possible at this stage of development to define arbitrary rules for scheduling freight equipment. Shop tracks and buildings are lacking in uniformity and a majority of shops and tracks are not at present so arranged that practices giving excellent results in one shop will work equally well in another. In general it may be definitely stated that some easily understood and workable system can be adapted to any shop, large or small, which turns out heavy repairs. It is generally conceded that individual cars should not be scheduled, the cost would be prohibitive even if thought advisable, but groups of cars of the same type and class of repairs may be scheduled successfully. Close attention should be paid to segregation of incoming cars if best results are to obtain. The stripping operation is important and should be given careful study.

DAILY DELAY SHEET

Feb. 24-1922

Work to Start Saturday Feb. 25th

2-25	M. & E.	1528	Med.	Sch. E	3-13	NS
2-25	Strp.	Spekane	Hy.	Sch. I	3-28	OS
2-25	Coach	4150	Hy.	Sch. H	3-18	NS

Operations Lost Friday Feb. 24th

OLD SHOP

1638-Plat Carp. Compl. XX-No. 2 1/2" Draw Bar Bolts.
5001-Color Varnish-X-Held up by Carp.
3738-Trucks Compl. XXX-No Oil Boxes-Truck & Level XX-Air Brake Compl.-X
3604-Plat. Carp. Compl. X-Rotted End Timber.
Yakima-Inside Wash-X-Held by Strippers

Gains

1010-Varnish #2-0

NEW SHOP

5720-Varnish #2-XXX-Varnish #1-XX-Ornament-X-Held by Carpenters
346-Body Carp.-X-Entire New Sheathing on One Side
3814-Trucks off-X-10 Cars to Raise
Zenda. Cabl. Mkrs. Strip-X-Excess Stripping-4 Cars.

Gains

3123-Body Carp. Compl.-0

Exhibit No. 3

Constructive information pertaining to freight car scheduling is very meagre, but one large shop has perfected the following plan: Incoming cars are switched to three or four parallel tracks, having regard for the type of car and nature of repairs required. Highly specialized gangs are started on track No. 1 (see exhibit 4) and as fast as each gang completes the work assigned they pass to track No. 2, proceeding in turn to track No. 3, etc. The exhibit shows sixteen gangs and the time in hours each gang is expected to start and finish their special class of work. The stripping operation is shown shaded in order to make the gang movements more easily understood.

By the above method it is possible to schedule 10 or 15 cars in a group on one track as a unit. The time for each gang may be predetermined and stated on a master schedule exactly as outlined for passenger car units. This schedule, with hours, dates and duties inserted, should hang in a conspicuous position near the head of each working track where foremen and inspectors may check the progress of the work and quickly locate each gang, or each man, at any hour of the day. (See exhibit 5.) Under this shifting gang plan, when one gang loses time and another gang gains, those ahead may be used temporarily to help those behind their schedule.

The usual arrangement, where one foreman supervises all men on two or more parallel tracks and cars are switched in or out as fast as needed or finished, should be studied carefully, and it will be apparent that a good system for expediting repairs may

if they are present. Mr. Juneau of the Chicago, Milwaukee & St. Paul, supplied the first matter showing the schedule as in operation on his road. That is Exhibit No. 1, and also Exhibit No. 2.

C. Juneau (C. M. & St. P.): With regard to Exhibit No. 1, the cars, when they come into the shop, are inspected, and the work necessary to be done on these cars is laid out as shown in Exhibit 2. You will notice from Exhibit 2, that we have a board at the head end of each track in the shop, indicating the number of days that it is estimated the car will be in the shop undergoing repairs.

The first crew that gets to work on the car to be repaired is the strippers and the washers, and these are followed by the carpenters, then the cabinet makers, then the tinsmiths, and then the painters. These in turn are followed by the steamfitters and electricians. It is our aim to keep the different crafts working on the passenger equipment separately avoiding their getting in each other's way. By pursuing that method, we accomplish the work satisfactorily and no one craft bothers the other while the car is undergoing repairs.

The shop schedule, as shown in exhibit 1, which indicates what is to be done and how the work is to be followed out, gives very satisfactory results. We also schedule the material for the work on the particular car. Each supervisor who has charge of the work—forgings, or any particular class of work on the car—has a schedule which he is expected to follow, and if there is an operation lost the supervisor in charge of the lost operation receives a pink slip. Each morning these lost operations are caught up.

The supervisor, who has lost a certain number of operations which may delay the work and make it necessary to set the car back, is reprimanded, usually by the shop superintendent, and we have found in carrying out this plan that there are few of the supervisors who care to receive the pink slip, showing that they have lost an operation. The schedule is simple, and we have reduced the costs of repairs and expedited the movement of the car through the repair shop. In my opinion there is not much more explanation necessary than what is shown in Sheet 1. The work to be followed through is shown on "Repair Schedule of Car in Shop," Exhibit 2.

Mr. Fuller: I may not be very bright this morning, but I notice in the repair schedule for work in the shop that start is indicated by "1" and finish by "1" in the case of strip. What does that "1" mean there?

Mr. Juneau: I will call on Mr. Jensen to explain that No. 1.

Mr. Fuller: Mr. Jensen, will you kindly advise for the benefit of those of us who do not understand this just what is meant. On your blackboard you have two columns "Start" and "Finish." The first is "Strip: Start 1" and then "Finish 1." Then under "Note" you have "O.K. 1." What does that mean?

L. B. Jensen (C. M. & St. P.): We strip the car the first day. (start and finish stripping) That is the first day in the shop. We wash the car on the second day. (start and finish washing)

The carpenters start on the 3rd day and finish on the 6th. Platform work is started on the 3rd day and finished on the 8th. The cabinet makers start on the third day on the inside of the car and finish on the 5th. The tinsmith starts on the third day and finishes on the 10th. We give him all the latitude possible so he can work in between. That is the meaning of those numbers.

Mr. Fuller: Then you have painter. You have "Out 6-16" and "In -615."

Mr. Jensen: That means the outside.

Mr. Fuller: Outside and inside?

Mr. Jensen: Yes, sir. We paint and finish the car in nine days. That is probably just a repainted job. I don't know what kind of a car this is on the board, although I think it is an open platform car.

The Chairman: 4161.

Mr. Jensen: A coach.

Mr. Fuller: At the top of the sheet you have a row of numbers, which I understand signify the days of the month.

Mr. Jensen: No, sir, the days the car is in the shop. The three X's under 1, 2 and 3, indicate the three days the car was in the shop (this car on this board). That is the third day that particular car was in the shop.

Mr. Fuller: Then you mark it up each day?

Mr. Jensen: Yes, each day is checked off.

Mr. Fuller: You have down at the bottom airbrake, uphol-

sterers, machinists, platers, without any date for the start, but you have 18, 19 and 15.

Mr. Jensen: That is the day they are supposed to be done with the car.

Mr. Fuller: They are to have their work done on the 18th?

Mr. Jensen: Yes, they work in between.

Mr. Fuller: It is the 18th day the car is in the shop?

Mr. Jensen: Yes, sir.

Mr. Fuller: Not calendar days?

Mr. Jensen: No, sir.

Mr. Fuller: All right, sir, I do not want to ask too many questions but I would like to know about this.

Mr. Jensen: We feel we have a very complete and simple system.

Mr. Fuller: Can you explain this Schedule 1, a little clearer, passenger car schedule constants? Exhibit 1. Working day on which operations are due? I do not quite get these figures clear. Will you explain it alphabetically and then numerically?

Mr. Jensen: We have different schedules shown by the letter. That schedule allows for the number of days that car is in the shop. We have different classes of schedules, of course, for different classes of cars.

Mr. Fuller: Can't you explain that a little bit, just what you mean by different schedules?

Mr. Jensen: On each schedule we have allowed a certain number of days for the car in the shop.

Mr. Fuller: Just carry us through one schedule.

Mr. Jensen: There is what we call the repainted car. It would be under a certain letter, and would be allowed possibly 12 days, depending upon the class of car that is undergoing repairs under that schedule.

Mr. Fuller: To get that clear, take color No. 2, under schedule E. Under Column E, color No. 2, at the top is the figure 14. Does that mean it is 14 days in the shop?

Mr. Jensen: The 14-day schedule, yes sir. A is an eight-day schedule, C is a ten-day schedule.

Mr. Fuller: You are not looking at the same column. Take color No. 2 on your operation under E. At the head is 14, E-2, 5, 7, and down to 8. What is 8?

Mr. Jensen: That is the 8th day that that car must be colored; the 8th day that it is in the shop the color must be applied.

Mr. Fuller: As I understand this blank, under that same inquiry, it is up to someone to see that the work has progressed so that on the 8th day color No. 2 has been applied to the car?

Mr. Jensen: Yes, sir. We have a schedule man who follows that up through the shop daily, checks up each board and each car in the shop.

Mr. Fuller: How is this schedule put out in the shop? You schedule this car out, and you make up this schedule. How is that schedule posted or handled?

Mr. Jensen: Each supervisor has a set of schedules. When he sees a 14-day car, he looks up his schedule on that which is Schedule E, and he knows just what procedure to follow under that schedule for that date.

Mr. Fuller: Who makes up the schedule for the cars to come into the shop.

Mr. Jensen: The schedule man.

Mr. Fuller: Is there a man specially for that?

Mr. Jensen: The schedule man goes through with the general foreman and decides what schedule is to be applied to that car.

Mr. Fuller: If the schedule is not up to date, the foreman in charge of that department furnishes a blue slip himself?

Mr. Jensen: No, sir, the schedule man furnishes it. He is the man who puts the black mark against us, and he turns that slip into my office, with an explanation as to why he is behind. It may be a question of material, or anything else, of course. If the excuse is legitimate it is all right, but if it is not it is all wrong.

Mr. Fuller: You will pardon me for asking so many questions, but I wanted to get at the bottom of this. He knows beforehand, to a certain extent, especially if it is material, that he is going to be behind on his schedule?

Mr. Jensen: Yes, sir.

Mr. Fuller: What does he do then?

Mr. Jensen: He reports to me.

Mr. Fuller: On any particular form?

Mr. Jensen: No, sir. If he knows that he is to run short of

material, he comes and reports to me, and I, of course, endeavor in turn to get the material from the stores department.

Mr. Fuller: Suppose they do not furnish it?

Mr. Jensen: Then the car is set behind and it is charged to the stores department.

Mr. Fuller: Do they ever resent it?

Mr. Jensen: Yes.

Mr. Fuller: They do not like it?

Mr. Jensen: No, sir.

Mr. Fuller: I want to thank you very much for what you have given me.

G. P. Kempf (P. & W. Va.): I understand this blackboard schedule and Schedule H are one and the same. H is the 19-day schedule. That compares with the photographs shown on Schedule 2. It will be noticed that the washout side shows two days; also on the blackboard it shows two days. I believe you can follow all the way through just how that is worked out.

Mr. Jensen: In other words, this car was under Schedule H?

Mr. Kempf: You will notice on touch-up, down at the bottom of painter, next to the last item. Under the 19-day schedule it says 18-A, and there is a notation for A. It says: "Operation to be performed during afternoon period," which is probably the latter part of the day and will go out the following day. All the way through I think these dots show explanations in the key.

I think the schedule is very simple. While it may seem complicated, I believe that with a little study, its workings will be readily understood. I know previous to my leaving the Milwaukee road I had something to do with the schedule system up there, and it facilitated the work all the way through. You will find that the foremen in general will oppose this schedule system; they won't like it. They think that you are going to make more work for them, but you will find, after the system has been put in operation and you get it working, they will be right back of it, every one of them. It helps them in the work and the schedule supervisor can do more for those foremen than you have any idea. I know I found it to be effective, and that the foremen all over the plant were in hearty co-operation with the system in every way.

T. H. Goodnow (C. & N. W.): To get off the schedules for a minute and get down to the practical work of putting in a schedule system, we have been attempting to inaugurate a schedule system for passenger equipment for about 16 months now; the scheduling of passenger equipment through shops will, of course, be dependent upon the number of shops involved and the extent of your passenger equipment. Those having larger numbers of cars will necessarily have to be governed by somewhat different conditions in their work of scheduling. Where they have more shops the conditions will be different, and for that reason I think that the committee has put the finishing touches on first. They say that the scheduling of the passenger equipment is dependent upon the paint shop. It has been our experience that it is just the opposite; the paint shop simply takes the cars as they come to it from the other shops and finishes them up. It depends to a great extent upon the drying of the paint and varnish.

We started out first with a system something like this and other systems. We asked the various railroads for and got their blanks, and in applying them it soon developed that it was simply a matter of timing. In other words, it did not bring out the real efficiency of the work. This scheduling does not indicate the efficiency of the shopmen, but of the foremen, and it puts it up to the foremen to get the efficiency from their shops. As the result of our experience at the start in attempting to schedule, we had to change and in making that change we had to develop a schedule of work. In other words, have different classes of cars coming into your shop; you have wood and steel cars mixed on which the work is different, and a foreman in one shop may be getting wooden cars and foreman in another shop steel cars. To make any judgment of the work to be performed, we had to develop very nearly a piece-work system. In other words, it was a time study of work, the renewal of parts, tearing down and putting back, and on that we had to base the scheduling of our passenger equipment. In doing so, knowing the class of cars that is going through a certain shop and what the foreman is handling, you have some idea of the work he has to do on those cars; he marks up the schedules of those cars through the shop according to what time he thinks he can get them out. Your man who is checking has the schedule of time for the various major operations at

least, and he knows whether or not that foreman is marking his car up as he should.

With more than one shop handling the passenger cars, and knowing the kind of cars in each shop, you know whether each foreman is marking the car up for the best results. We found it necessary to develop a scheme of that kind, and at the present time the scheduling of equipment in our shop is marked up on that basis. It has cut down the man-hours on passenger equipment remarkably, but I do not believe a schedule of passenger equipment, based on a passenger car shop, will produce what you are really after.

So far as the scheduling of freight equipment is concerned, I have not much sympathy for that except when the roads are shopping their freight equipment by series and have the repairing done under a certain classified system of work. I believe that the majority of roads are not doing that and it is really time lost to have a classification such as we are considering here; that is, to have the work done according to these classified schedules. Where you are simply passing your freight equipment through the main shops, and making such repairs as are necessary I do not believe that the scheduling of equipment is advisable; that is, in the case of freight equipment. It takes up time without accomplishing much. I will admit, however, that where you are making freight car repairs by classified series there are many advantages in the system and there are advantages along the same lines when you make track repairs on the outside. From actual experience, however, I can say that the proper scheduling of passenger equipment will accomplish results both with respect to the time of the cars in the shop and in securing greater efficiency in making the repairs. With respect to that efficiency on the part of your men, you simply get that from putting one foreman's record against another.

J. J. Tatum (B. & O.): I note that there are 14 letters in Exhibit 1, following the word schedules. I was wondering if that means that you have 14 different classifications of repairs on passenger cars?

Mr. Jensen: Yes, 14 schedules.

Mr. Tatum: I take it that for Class A repairs, you have eight days allotted for the car to remain in the shop, and so on for the balance of the schedule.

Mr. Jensen: Yes.

Mr. Tatum: Who designates the class of repairs in any particular shop?

Mr. Jensen: The schedule man and the gang foreman make an inspection of the car, designating the class of repairs the car is to receive.

Mr. Tatum: The schedule man and the general foreman go out into the yard before the car goes into the shop, and decide what class of repairs the car is to receive?

Mr. Jensen: Yes.

Mr. Tatum: The schedule man turns it over to the gang foreman and assistant foreman to determine whether that car receives A schedule repairs, or B schedule repairs?

Mr. Jensen: The schedule man follows the work through the shop daily, checking up and seeing that each craft is meeting the dates on the cars.

Mr. Tatum: If you select a car for A class of repairs, your Exhibit No. 2 is marked accordingly, and if they select J class of repairs, your Exhibit No. 2 is also marked accordingly, and each class of workmen is required to meet the dates set.

Mr. Jensen: Yes.

Mr. Fuller: On what basis did you select your schedule man; from what class of employees? Are they car men, or clerks, or what are they?

Mr. Jensen: The schedule man that we have was simply a bright young man, formerly a clerk, and we brought him into that class of work, and we feel that in that regard we have done much better than if we selected a craftsman.

Mr. Fuller: My reason for asking the question is this: A car comes in and the inspector and general foreman inspect the car. Does the general foreman say what work must be done on the car and he and his schedule man then mark up the schedule on which the car will go through? The general foreman has the last word?

Mr. Jensen: Yes.

H. C. Oviatt (N. Y. N. H. & H.): Do we understand that the scheduling engineer assigns the particular schedule to the car, or does the general manager do that? Is the number of days that

the car will be included, for instance, under General Classification A, a matter for the foreman to decide?

Mr. Jensen: He makes out the schedule in conjunction with the inspector and the scheduling engineer.

A. C. Kells (A. C. L.): How do they decide whether a car will be in eight days or ten days or twelve days? What is the basis for making such a decision?

Mr. Jensen: That is determined according to the class of equipment. In the case of an open platform car it would be 8 to 10 days, and in the case of a steel car, 19, 20, 21 or 22 days. It is the class of equipment that governs to a certain extent.

Mr. Kells: Then you use your past experience as a basis for figuring?

Mr. Fuller: The class of equipment, plus the class of work to be performed?

Mr. Jensen: That is correct.

Mr. Tatum: The general foreman decides what kind of work you are going to give to certain equipment? If it is a wooden frame, with open platform car, it received a certain work, and you have a schedule representing the work that car is to receive?

Mr. Jensen: The general foreman assigns one of these 14 letters to each class of equipment when it is brought into the shop for repairs. After that is done, he assigns the different craftsmen to perform their work. They must get through with it by the time set. These dates mean that in the case of cars going through the shop, if the repairs call for machine shop work, the work must be ready on the date set so that the car may be finished in time to go out at the end of the period allotted for the repairs.

Mr. Oviatt: There should be a key covering each one of the schedules; that should be included in the report.

The Chairman: That key is printed at the bottom of the sheet on which Exhibit I appears for the various work on each classification.

Mr. Fuller: Mr. Oviatt has referred to a subject I have been thinking about for some time. You compare the cars that go out on the different schedules continued along with each other. You have a schedule in ordinary operation that will take 24 days, we will say, and then for example you have to remove the sheathing and you find the sill has rotted, and it is necessary to remove the sill. That necessity was not discovered until after the car went into the shop. For this reason, the time of that car in the shop will exceed your schedule. What note do you make, or how do you deal with that matter in order to determine that Gang 2 consumed six or eight days more turning the car out.

Mr. Jensen: We often find cars coming into the shop as you say. We do not find that condition to exist until we have stripped them and then we discover the rotten sill and it is necessary to change the schedule. Of course, we allow for much more time for putting in a new end sill, and we have to increase the schedule accordingly.

Mr. Fuller: That is what I wanted to get clear. You have to start with a given schedule, and then you encounter an obstacle which was unforeseen and find that you must make up another schedule.

Mr. Tatum: I think that the committee could have made this report more helpful if they had printed these schedules so that the various railroads could apply them in making comparisons between the repairs to one set of cars, and the repairs to another set of cars. I think if this character of information could be given by the committee in its next report it would be very helpful. These remarks are not intended in any way as a criticism but simply as a suggestion to show how the report could be improved, in my opinion.

Mr. Juneau: What Mr. Goodnow said with regard to scheduling freight equipment through the shop, calls to mind that the committee as a whole was of one voice as far as the scheduling of freight cars through the shop is concerned at the present time. It is almost an impossibility unless you are having schedule repairs to a certain class of equipment done. Of course, you could lay out a classification, as has been done in the case of the passenger equipment. We will say that the repair card would indicate heavy repairs, and you are applying betterments to that car, which will require at least four days; if you put 14 or 15 cars on the repair track, the heavy repairs would require from four to five days, depending on the length of the schedule.

The committee when it met and talked over the schedule of freight equipment felt that it would be almost an impossibility to

schedule freight cars properly unless the repairs were exceptionally heavy or in a case of rebuilding the cars.

Frank McManamy (Manager, Department of Equipment, United States Railroad Administration): The committee in this excellent report has no doubt covered all the ground that was intended to cover, but it occurs to me that there is one thing of primary importance in any scheduling system. We have here in one of the conclusions of the committee a brief statement of what an adequate scheduling and routing plan aims at: "To plan the work and proportion the forces for maximum production with minimum cost."

If we are to have the maximum of production and the minimum of cost, we must have a means of making comparisons, not only comparisons between the shops on your own lines, but between the shops on your line and some other line. Before we can do that, it is essential that we shall have a uniform classification of repairs, a classification that will apply to both freight cars, passenger cars and locomotives.

This is probably a little bit aside from the report of the committee, although it seems to me there is another reason—a very good one—why we should have a uniform classification of repairs. We find that the American Railway Association, of which this body is a Division, is now keeping and furnishing to the Interstate Commerce Commission and other governmental agencies records of the number of bad order cars, divided between heavy and light, etc. Without a standard classification of repairs, these reports do not mean much, for the reason that a light repair to a freight car requires less than 20 man-hours, whereas in the case of heavy repairs it may cost \$100 or \$1,000.

These reports cover not only the number of units of equipment repaired, the different classes of equipment repaired, but also the number of man-hours required to make the repairs.

These records are now being kept and an attempt is being made to include a record of the relative efficiency of different shops in the performance of labor in making these classes of repairs. As that matter stands today, the records are not sufficiently comprehensive in detail, and it seems to me, in view of the fact that these matters are being considered and eventually there will be an application of a uniform classification of repairs, that it behooves this organization to give very careful attention to this subject.

This division is the body which should lend its efforts in securing a proper classification of repairs for general application, so that when we make comparisons with some other roads we will be speaking the same language. As it is now, we are talking in different tongues, and unless we standardize the classifications of the repairs on different roads, the reports will not mean what they should.

Mr. Goodnow: There is one question I would like to ask the committee. Suppose you have a schedule and then you have a number of cars due for different kinds of repairs and want to get out 15 or 30 cars, in a month. Your schedule man must watch his schedule of the different operations or some of these operations will be bunched. For example, if the carpenters' work has to be done in 15 days instead of 30 days, the carpenters have to go double speed for a part of the time and the rest of the time they have not so much to do. It seems to me that will be something hard to adjust. To spread the work out so it would cover the month, and yet have nothing delayed.

Mr. Tatum: I move that the report of the committee be accepted and the committee continued in its work.

C. T. Ripley (Santa Fe): Anyone adopting a schedule system will find within a short time that there are certain difficulties with regard to the application of the plan. First, after the practice is started, a difficulty which will be encountered is the balancing of the gangs. It will be found that certain gangs will have more men than they should have and other gangs will be short of men. The foreman will have to redistribute the men. The second result will be found to be an insistent demand from the foreman for labor-saving devices.

A third point is the matter of having material delivered on time. Very often there is considerable trouble in that direction and it is a matter which requires constant attention to see that the material is on the job when required.

A fourth difficulty will be found in that blame is often placed on the mechanical engineering department for not furnishing drawings of the repairs to be made to the cars in accordance with the schedule.

All of these elements tend to decrease the output of the shop. Mr. Goodnow: I move that the committee be continued and inclusion in its next report optional classifications of schedule, so far as passenger car equipment is concerned.

C. E. Chambers (C. of N. J.): Is there any reason why this committee should not be constituted that it could take into its work not only passenger and freight car equipment, but locomotive equipment? There is a great opportunity for the improvement of classification of locomotive equipment. For instance, Class 3 repairs on the same type of engine may vary from \$3,000 to \$5,000, by reason of additional material and work. I think that the classification of locomotives should be carried into a subdivision, so that certain repairs would be known as 3-a, 3-b, 3-c, so as to show why it costs more for repairs in one Class 3 engine than on some other Class 3 engine. The same thing applies to Class 2 engines. Class 2 may be a locomotive having a firebox rebuilt or one having one or more boiler sheets applied. While classifications 1 to 5, inclusive, are satisfactory, they should be subdivided so as to show an explanation for the difference in cost of repairs in the different classes of engines.

J. Hall (So. Pac.): On our road, in the case of a car needing repairs, the general foreman proceeds to inspect the car on arrival. The class of repairs are discussed at that time with the car inspector and then the general foreman goes to his office and writes out the schedule. Each foreman and gang foreman in charge of the necessary work to the car, under the respective headings, receives a copy of a notice of the repairs necessary to the car. This notice is placed on the end of the car, and each foreman, as the work proceeds, keeps in mind the date when the car is to be repaired and ready to get out. The general foreman passes through the shop, looks over the car and he has also a schedule of dates showing when the car is to be put in service again. He immediately proceeds, by consulting the order issued for the repair of the car, to see how it is getting along. That is done every morning and when that practice is followed, we have no trouble in following a pre-arranged schedule which we have adopted, because each foreman is trying to get out of the other foreman's way. If one department is behind, for instance the finishers, we can draw from the cabinet shop and assist the department that is behind and in this way we avoid the congestion of certain workmen on certain lines of work and it works out admirably.

I think those who have visited the Southern Pacific shops can bear me out as to the fact that it is a relatively simple operation to carry out a system of scheduling if the details are properly worked out and there is adequate supervision of the work being done. You can see just how the situation is each morning when you pass through the shop. The superintendent of motive power or the superintendent of repairs in the car department goes through the car, observes the date when the operations began and when that car should go out. The cars must be in readiness three days ahead of the finishing date so as to give the air brake men a chance to do their work. The plan is very effective.

Mr. Tatum: Do I understand that Mr. Chambers wants to add to the motion I made that the classification of repairs to locomotives be considered along with the car work?

Mr. Chambers: That is my thought. In my opinion there is no use in having a schedule for passenger equipment when it could take in all classes of equipment.

Mr. Tatum: I am willing that the classification of locomotives should be considered along with the classification of cars.

Mr. Hall: I would like to add one thought further, and that is with regard to the furnishing of materials for the repairs. Each foreman in the respective shops has received a schedule notice with regard to the car which is undergoing repair in the shop, and they are sure that their part of the work is to be done at a certain date. If they are to supply certain material and it is too early we do not need a motion in getting the department to furnish the material, and it is unnecessary.

I S. Reynolds (C. C. & St. L.): It seems to me the schedule list of passenger cars is a good one. There are some practical difficulties connected with it, of course, in our case we get a certain amount of work done and we may have 12 men in the shop at any one time, but I cannot remember a car we only have six men on the shop. I think we have the experience of all consider man here in passing each car through the shop schedule and classification.

Mr. Goodnow made a very good point and that is that you must consider the amount of labor to be put on that car in eight days and he raised the same point that one car may require eight days, another six and another four and the speed with which these cars are repaired varies. The man hours consumed is what talks.

The only reliable way I know of to compare this work is to take the old piece-work schedule. There is no especial work for a man to do. It does not say he must put a flowing coat of varnish on in one hour or one day but you can take your piece-work system and find just where you are and what he is doing. Mr. Goodnow is absolutely correct, the amount of time required in the paint shop to put on a coat of varnish is nothing compared to the time the car must remain on the track.

Mr. Tatum's motion, as amended by Mr. Chambers, was then put to vote and carried.

Report of Safety Appliance Committee

The next business was the report of the Committee on Safety Appliances, presented by Chairman C. E. Chambers, superintendent of motive power and equipment, (C. R. R. of N. J.) as follows:

"No advance report was made or printed by the Committee on Safety Appliances, the condition in general being the same as it was in June 1920. At that time the latest figures obtainable showed 60170 cars to be equipped. No later figures have been obtained, and it is presumed that all of these cars in service have been equipped by this time. No condition has arisen in the last two years which has made necessary any special work for the Committee on Safety Appliances and therefore no action has been taken."

A motion that the report be received was duly seconded, put and carried.

On motion, the meeting adjourned.

The New Life Members

FIFTEEN NEW life members have been added to the list of the Mechanical Division since the last annual meeting was held in 1920. These men automatically become life members under the rules of order of the section, because of a membership in the Mechanical Division or one of its predecessors of 20 years or over. The list is as follows:

Date	Name	Title and Railroad
1902	Carson, G. E.	D. M. C. R., New York Central.
1901	Emerson, Gen. H.	Chief of M. P. & E., Baltimore & Ohio.
1892	Fitzmorris, J.	Supt. Motive Power, Chicago Junction.
1902	Hammett, P. M.	Supt. Motive Power, Maine Central.
1901	Hogan, C. H.	Manager, Dept. of Shop Labor, N. Y. C.
1909	Kudrly, W. F.	General Supt., Southern.
1902	Manchester, H. C.	Supt. M. P. & E. D. L. & W.
1902	Nichols, L. T.	Supt. Carolina & No. West.
1902	Ramsdell, T. M.	Master Car Builder, Oregon-Wash. R. R. & Nav. Co.
1901	Rehling, D. J.	Assistant Supt. Motive Power, P. & L. E.
1911	Sullivan, J. L.	Supt. Machine v. Nash, Chatt. & St. Louis.
1902	Thompson, W. D.	Gen. Supt. Rolling Stock, New York Central.
1902	Watson, S.	Dist. Supt. Motive Power, New York Central.
1902	Young, C. B.	General Mech. Excr. C. B. & Q. R. R.

Registration Figures

THE FOLLOWING FIGURES show the registrations for 1920 and 1922. The figures for 1920 show the registrations up to midnight the first day for book Number 1 and those for 1922 show the registrations up to four o'clock yesterday, the closing time for book Number 1:

	1922	1920
Members Mechanical, A. R. A.	360	355
Purchases and stores	13	9
Special Guests	107	102
Railroad Ladies	148	251
Supply Ladies	281	354
Supply Men	1,140	1,517
Totals	2,049	2,588

Registration, American Railway Association, Div. V, Mechanical

Adams, E. A., M. C. B., Cent. of Georgia, Arlington.
 Allison Wm. L., Senior V. P., Amer. Arch. Co., Marlborough.
 Anderson, C. H., Ch. Clk. Pur. Dept., B. & A., St. Charles.
 B. M., E., D. & H., Marlborough.
 Ashley, S. F., Leading Draftsman, N. Y. C., Pine Hall.
 Baird, G. O., M. C. B. Acct., St. L. & S. F., Chalifonte.
 Baker, C. N., G. M., Tenn., St. Charles.
 Baker, W. G., Supt. Mach., Tenn. Cent., St. Charles.
 Barr, L. S., M. Supt., Live Poultry Transit Co., Traymore.
 Barry, Frank J., M. M., N. Y. O. & W., Haddon Hall.
 Bastford, G. M., Cons. Engr., Lima Loco. Wks., Marlborough.
 Bawden, Wm., S. M. P., T. R. R. Assn., Princess.
 Beaghen, Thomas Jr., Mexican Petroleum Corp., Strand.
 Becherer, Frank H., Asst. Engr., B. & M., Chelsea.
 Becker, E. J., P. A., New Orleans Public Belt, Traymore.
 Becker, N. G., Shop Supt., D. & H., Haddon Hall.
 Bender, W. A., Dis. M. C. B., B. & O., Ritz Carlton.
 Benter, H. T., G. S. M. P. & Mch., C. & M. St. L., Marl.
 Beyer, F. A., S. S., St. L. & S. F., Princess.
 Biancardi, Jos. F., Leading Draftsman, N. Y. C., Pine Hall.
 Bilty, C. H., M. E., C. M. & S. P., Strand.
 Bixler, C. C., Port of New York Authority, Marlborough.
 Black, S. B., Car For., Interstate Tank Car Corp., Breakers.
 Blake, F. H., Insp. M. P., Penna., Craig Hall.
 Booth, W. A., Eng. Loco. Const., G. T., Traymore.
 Bose, T. J., Gen. For., Penn. Craig Hall.
 Borland, W. P., Chief Bureau of G. T. Safety, I. C. C., New England.
 Bowen, H. B., Works M. G. R. C., P., Seaside.
 Boyd, C. B., M. M., Tol. & Ohio Cent., Chalifonte.
 Boyd, W. R., Jr., Asst. Gen. Secy., American Petroleum Inst., Traymore.
 Boyer, Chas. E., Gen'l Car Insp., Penna., Runnymede.
 Boyer, L. K., G. F. B. & A., Pennhurst.
 Bradley, C. H., Supt., Southern.
 Bradshaw, J. H., Supt. C. D., American Cotton Oil Co., Ambassador.
 Broad, Jas. P., Asst. M. C. B., D. L. & W., Haddon Hall.
 Brown, B. H., M. M., S. P. R. (T. & L.), Ambassador.
 Bruckert, R. H., Storekeeper, Ken. & Ind. Term., Shelburne.
 Buchler, John A., M. M., D. B. & O., 130 St. James Place.
 Buist, C. N., O. N. O., Public Belt R. R., Traymore.
 Burel, W. J., M. M., West. Allegheny, Somerset.
 Cade, W. E., Jr., Sec. New England R. R. Club, Princess.
 Calder, W. W., M. C. B. B. & O., Haddon Hall.
 Caldwell, Samuel, Engine House For., Penna., Elwood.
 Cairns, A. E., Dist. M. C. N. Y. C., Ambassador.
 Callison, W. A., S. M. P., Monon, Strand.
 Cann, Arthur T., P. A., Live Poultry Transit Co.
 Carrall, J. T., Gen. S. M. P., B. & O., Traymore.
 Carrey, Keith, Asst. to Eng. of Tests, N. Y. N. H. & H., Traymore.
 Case, Truman G., Asst. Gen. For., N. Y. C., Pennhurst.
 Carrey, Thos., C. C. Yard Master, D. L. & W., Shelburne.
 Clark, James H., Supt., B. & O., Marlborough.
 Coe, T. W., M. M., N. Y. C. & S. L., Alhanna.
 Coffman, B. J., Asst. M. E., R. F. & P., Dennis.
 Coleman, L. C., Asst. Genl. Mgr., B. & M., Chelsea.
 Cook, Bernard, Asst. Engr., N. & W., Chalifonte.
 Cooper, F. R., Salesman, Gold Car Heating Co., Dennis.
 Corcoran, C., Station Master, U. P., Craig Hall.
 Coulter, A. E., Genl. Car For., Union, St. Charles.
 Coulter, I. W., M. M., A. & S., Grand Atlantic.
 Cox, Millard F., Mech. Eng., L. & N., Chalifonte.
 Craig, S., Gen'l Shop Insp., B. & M., Chelsea.
 Cratzer, C. A., Passenger Repr., Penn., 1301 Pacific.
 Crone, S. A., Past. President, Dennis.
 Cunningham, W. P., S. M. P., Monongahela, Llewellyn Apts.
 Daley, W. W., M. M., N. Y. O. & W., Craig Hall.
 Damman, Charles P., Supt. of Fuel Cars, P. & R. 11 N. St. Catherine Pl.
 Daniels, O. V., Asst. Gen. Strkpr., Penn., Atlantic Ave., 4101.
 Daniels, Geo. F.
 Davis, D. W., Asst. M. M., Lehigh Valley, Princess.
 Davis, J. H., E. E., B. & O., Shelburne.
 Davis, I. J., G. F. Penna., Loraine.
 Davis, W. H., M. E., N. Y. O. & W., Haddon Hall.
 De Hoyos, F. P., Genl. Agt., Natl. Reg. of Mexico, Ambassador.
 Demarest, T. W., M. C. B., G. T., Princess.
 Dickinson, F. W., M. C. B., B. & L. E., Shelburne.
 Ditmore, G. W., M. C. B., D. & H., Marlborough.
 Douglass, I. H., M. C. B., W. & L. E., Chalifonte.
 Downing, L. S., G. M. C. B. C. & M. P., Shelburne.
 Downs, T., Supt., R. S. M. C., Haddon Hall.
 Drake, W. A., Rep., Penna. Tank Line, Traymore.
 Drew, Geo. W., Asst. For., L. I., Pine Hall.
 Driscoll, F. E., P. A., Erie, Traymore.
 Edd, Frank H., Supt. Shop, B. & M., Chelsea.
 Eisenhauer, Gen. Elec. Engr., Erie, Haddon Hall.
 Elkind, C. E., Chf. Drafts., A. T. & S. F., Ambassador.
 Elliott, W. P., Gen. For., Term. R. R. of St. L., Princess.
 Englevy, L. E., Prof. Ry. Mech. Engr., University of Pittsburgh, Haddon Hall.
 Entwisle, T. J., Supt. Car Dept., Southern Cotton Oil Co., Strand.
 Etzinger, B. L., Cons. Mech. Engr., Southern, Dennis.
 Everett, Irs., Chf. Car Insp., Lehigh Valley, Dennis.
 Ferry, F. C., M. M., L. H. & St. L., Shelburne.
 Fisher, Geo., M. C. B., G. T., Princess.
 Foster, R. W., M. M., Marianna & Blountstown, Deville.
 Fowler, Geo., L. C. Engr., Dennis.
 Freeman, L. B., Asst. S. M. P., Seaboard Air Line, Ambassador.
 Frey, Wm., Supt. Mech. Engr., C. N. Bridge, St. P., Traymore.
 Frye, D., Supt. Ntl. Power, Piedmont & Northern, Strand.
 Galloway, G. R., Dist. M. M., B. & O., Shelburne.
 Gardner, Henry, Spec. Engr., B. & O., Chalifonte.
 Garstang, Wm., Con. Genl. M. C. B. C. C. S. T. L., Breakers.
 Geisinger, Geo., Jr., Asst. Mgr. Dept. of Equip., U. S. R. A., Marlborough.
 Gies, Wm., Supt. M. P. & R. S. M. P. & L., Traymore.
 Gilliam J. B., G. F. C. Dpt., St. L. S. F.
 Gimpel, J. H., S. C. Dept., Wash. Strand.
 Gormish, Geo., Adm. Council.
 Gorton, Chas. E., Adm. Council & S. M. E., Haddon Hall.
 Green, J. Paul, Sol. Apprent., C. R. I. & P., Traymore.

Goss, W. F. M., Pres. Ry. Car. Mfgs. Assn., Marlborough.
 Gullage, Joseph, G. F., B. & M., Dennis.
 Gregory, C. F., M. M., Mts. St. L. & O., Fallows, Ritz-Carlton.
 Gregory, Wallace K., Ritz-Carlton.
 Hadley, C. J., Asst. Supr. Tools, D. L. & W., Shelburne.
 Halbert, M. W., Ch. Inter. Inssps. Term. St. L. & E. St. L., Princess.
 Hall, Frederic D., E., B. & M., Traymore.
 Hall, James, M. C. Repairer, So. Pac., Chalifonte.
 Hall, W. H., Ch. C. Insp., C. R. R. of N. J., Arlington.
 Hanger, G. W. W., Member Railroad Labor Board, Dennis.
 Hammet, P. M., S. M. P., M. C., Chelsea.
 Hanson, D. M., M. C. M. P., Ambassador.
 Harris, C. M., V. P., Hagerstown & Frederick, Traymore.
 Hartley, Geo. B., Solvay Process Co., Ritz Carlton.
 Harvey, H. H., Gen. Car For., C. B. & O., Chelsea.
 Haslam, J. P., M. M., N. Y. C. & S. L., Princess.
 Hellman, Chas., Gen. Car For., Pitts. & Shawmut, Terminal.
 Henry, J. M., G. F. C. M. P., Penna., Chelsea.
 Herring, W. M., Chf. Clk. Asst. to V. P. Mec., Southern, Shelburne.
 Hickok, Wallace H., Chf. Insp. C. D., D. & H. Co., Marlborough.
 Hitch, C. M., Dist. M. C. B., B. & O. Bouvier.
 Hobson, W. P., M. M., C. & O., Chalifonte.
 Holdan, H. C., For., L. I.
 Hollan, W. D., M. M., National R. R. of Italy.
 Hoochian, D. T., Gen. For., D. L. & W., Shelburne.
 Horzican, J. S. M. P., E. I. & E., Traymore.
 Howell, F. P., Shop Supt., A. C. L., Pennhurst.
 Hunt, R. B., M. E., E. F., C., Sterling.
 Hunsicker, A. T., Asst. C. S. N. Y. N. H. & H., Traymore.
 Hughen, J. N., B. P., Penna Tank Line, Traymore.
 Ingram, M. D., Supt. of M., K. O. & C., Alamac.
 Jensen, E. W., E. E., I. C. Dennis.
 Jennings, Thomas, Supt. Shops, B. & M., Chelsea.
 Jensen, L. B., S. S., C. M. & St. P., Strand.
 Johnson, J. O., Gen. For. Car Repairs, Southern, Fredonia.
 Jones, W. L., Asst. Eng. Power Plants, N. Y. N. H. & H., Traymore.
 Jones, F. N., Asst. to Eng. of Tests, N. Y. N. H. & H., Traymore.
 Jones W. M., Jr., Engine House For., F. E. C., Sterling.
 Joneau, G. G., M. C. B., C. M. & St. P., Strand.
 Justus, I. J., Spec. Insp., N. Y. C., Pennhurst.
 Kadel, B. W., Cons. Engr., Brighton.
 Keenow, R. V., V. P. & Gen. Supt., Donora Southern, Strand.
 Kellogg, C. D., Chf., U. S. Chas., U. S. Dept. of Com., Princess.
 Kelly, I. P., M. M., Frisco, Traymore.
 Kelly, S. R., M. M., Southern, Princess.
 Kent, F. S., Gen. Car Insp., Penna., Marlborough.
 Kilborn, James E., P. A., Rutland, Dennis.
 Kinnaird, L. S., S. M. P. C. & E. I., Chalifonte.
 Kinney, M. A., S. M. P., H. V., Traymore.
 Kinter, D. H., G. F. C. Dept., Monongahela, Watkins.
 Kisp, A. G., C. Insp., N. Y. O. & W., Craig Hall.
 Kleine, Herbert J., Dennis.
 Kleine, R. L., Asst. Chf. Motive Power, Penna., Dennis.
 Kleinhans, T. J., Secy., Interstate Tank Car Corp., Breakers.
 Knicker, W. B., J. Mech. Engr., B. & P., Breakers.
 Koenecke, T. B., Supt. Equip., Ind. R. Co., Strand.
 Kraft, E. A., Pure Oil Co., Lexington.
 Krueger, A. J., M. C. B., N. Y. C. & St. L., Haddon Hall.
 Kuhlke, Oliver H., S. M. P., B. & O., Alamac.
 Kuhn, W. T., S. M. P., T. H. & B., Traymore.
 Kunkle, W. F., S. M. P., Charleston & West Carolina, Alamac.
 Lentz, John S., M. C. B., Lehigh Valley, Dennis.
 Lewis, John P., Asst. For., D. L. & W., Shelburne.
 Lindner, W. C., Ch. C. Insp., Penn., St. Charles.
 Littell, Cero N., Supt., St. Louis Rely. Car Co., Ritz Carlton.
 Long, John H., M. M., B. & O., Princess.
 Lovell, Alfred, C. Eng., 141 S. Illinois Ave.
 Lower, M. J., Asst. Gen. Mgr., Oswego River, Traymore.
 Lynn, S. M., C. B., P. & L. E., Pennhurst.
 Lyons, A. N., Supt. Franks, K. & M., Traymore.
 McConnell, C. H., E. E., P. & L. E., Haddon Hall.
 McDevitt, W. P., M. M., K. & I. Term., Monticello.
 McFeatters, F. R., Gen. Supt., Union, Haddon Hall.
 McGutty, T. M., Gen. For., Penna., Princess.
 McManamy, Carl, U. S. R. A., Marlborough.
 McManamy, Frank, Mgr. Dept. of Equip., U. S. R. A., Marlborough.
 McMunn, Wm. H., G. C. Insp., N. Y. C., Traymore.
 McNicholls, C., Gen. Frt. Agt., McKeesport Connt., Traymore.
 Maddox, P. W., Ch. C. Insp., B. & O., Chalifonte.
 Mallory, C. E., Supt., Kingan, Traymore.
 Malthauer, Wm. S. M. P., B. & O., Shelburne.
 Mancher, C. A., For. Upholster, L. I., Pine Hall.
 Martin, K. H., M. C. B., Insp., Southern, Shelburne.
 Mattitney, F. M., Joint Gen. For., B. & O. C. T., Alamac.
 Maxfield, Colonel H. H., G. S. M. P., Penna., Brighton.
 Meister, C. L., M. E., A. C. L., Pennhurst.
 Merrill, F. A., Tra. Car Remar., B. & O., Bouvier.
 Michael, I. P., M. M., Southern, Princess.
 Miller, A. T., Chf. Clk. S. M. P., Atlanta & West Point, Princess.
 Miller, E. Gen. Car Insp., B. & M., Chelsea.
 Miller, E. B., Dist. M. C. B., B. & O., Lexington.
 Miller, G. A., Supt. M. C. Mach. F. E. C., Sterling.
 Miller, W. J. S. M. P., Pine Bluff & Ark., Traymore.
 Miliken, J., Member of M. V. B., Brighton.
 Minette, H., Asst. G. F. N. C., Breakers.
 Moir, W. B., Genl. Car Insp., Penna., Runnymede.
 Moncure, A. H., R. F. & P., Gen. For. Car Dept., Dennis.
 Montagnet, J. M., M. C. B. Acct., New Orleans Public Belt, Traymore.
 Montgomery, Hugh, S. M. P., Rutland, Dennis.
 Moore, Geo. W., S. M. P., Car Dept., St. L. & S. F., Strand.
 Morris, J. E., Engine House For., F. E. C., Sterling.
 Morris, I. M., Asst. Traf. Mgr., Lake Term., Traymore.
 Mudd, Frank X., Pres., Live Poultry Transit Co., Traymore.
 Mullins, C. W., Spec. Approv. C. R. I. & P., Traymore.
 Mullinix, Sam W., S. S., C. R. I. & P., Traymore.
 Murray, E. A., S. S., C. & O., Marlborough.
 Naylor, F. M., M. M., C. Strand.
 Neiser, N. F., Accountant, South Buffalo, Blackstone.
 Netherwood, J. S., S. P., Traymore.
 Nevins, B. E., M. M., Virginian, Traymore.
 Newberry, C. M. C. B., N. O. Public Belt, Traymore.
 Newman C. M., S. S., B. & O., Princess.
 Norris, C. W., C. R. I. & P., Princess.
 Nowell, H. T., Mech. Supt., Central of Vermont, Haddon Hall.

Railway Club Secretaries Meet Today

THE SOCIETY OF RAILWAY CLUB SECRETARIES will hold its annual meeting in Room 449 at the Marlborough this morning, at 10 o'clock.

Reduction of Car Surplus

THE *Daily's* Washington correspondent wired yesterday that in the week ended May 30 the freight car surplus showed a reduction of over 24,000 cars, being 305,198. This included 195,439 surplus coal cars, a reduction of over 13,000 and 69,714 surplus box cars, a reduction of over 9,000.

Breaks in the Ranks

DEATH has claimed an unusually large number of members of the Mechanical Division since the last meeting was held in 1920. Among them are several widely known men who have been leaders in its affairs and those of its predecessors, the Master Car Builders' and American Railway Master Mechanics' Associations.

John W. Marden, who died on May 27, 1922, had been a member of the Master Car Builders' Association since 1877. Mr. Marden was one of the group of car men who took an active part in the pioneer development of the standards which have since become such an essential factor in the interchange of traffic between the railroads, and he served as president of the association in 1903.

F. F. Gaines, who died on August 26, 1921, has long been an active worker in the associations and served as president of the American Railway Master Mechanics' Association for the year 1914-15.

A. W. Gibbs has been chairman of the Tank Car Committee since its organization following the 1911 meeting of the Master Car Builders' Association. Under his administration the present standards of tank car construction were formulated, and adopted, and, this year's report of the committee was prepared under his direction.

The following is the list of obituaries read in report of the General Committee yesterday morning:

NAME	Died
Acker, S. B., Gen. Car Foreman, P. S. & N. Ry.	
Harstow, Wm. A., Pres., Union Tank Car Co.	Feb. 10, 1922
Beattie, A. L., Napier, New Zealand	
Best, W. N., New York City	April 11, 1922
Hoss, E., Supt. Motive Power, C. I. & W. R. Ry.	Dec. 11, 1921
Branton, J. W., Master Mechanic, Illinois Central R. R.	
Brooke, I. D., Minneapolis, Minn.	April 10, 1922
Brown, T. A., Supt. Motive Power, La. & Ark. Ry.	Oct. 11, 1921
Gaines, F. F., U. S. Railroad Administration.	Aug. 26, 1921
Gibbs, A. W., Chief Mech. Engr., Pennsylvania System.	May 19, 1922
Hartigan, Bert, General Foreman, Rutland R. R.	Oct. 14, 1921
Herman, A. O., Gen. Fore. Car Dept., Panama Canal	
Hodgins, G. S., New York City	
Leyonmark, J. H., Mech. Engr., Chicago & Alton R. Ry.	Aug. 1, 1921
Marden, John W., Waltham, Mass.	May 27, 1922
Montgomery, Wm., Master Mech. Cent. R. R. of New Jersey	May 21, 1921
Needham, E. F., Boston, Mass.	May 12, 1922
Oakes, Chas. E., Shop Supt., Kansas City Southern Ry.	Oct. 13, 1921
Robinson, W. A., Hamilton, Ontario	Sept. 11, 1921
Robinson, M., Master Mechanic, A. T. & S. F. Ry.	
Ryan, T. T., Master Mechanic, A. T. & S. F. Ry.	Oct. 24, 1921
Sheehan, R. J., C. C. D., Commonwealth Railways	
Sellers, Morris, Chicago, Ill.	May 11, 1921
Yost, A. S., Mech. Engr., Pennsylvania System	Nov. 11, 1921
Watkins, G. H., A. E. M. P., Pennsylvania System	
Wilson, David H. Jr., Consulting Engineer, Erie Railroad	Sept. 15, 1921
Williams, Edw. A., Glen Ridge, N. J.	April 29, 1922

Half-Rate Pullman Transportation

LAST YEAR A NUMBER of the members of the Mechanical Division were disappointed in securing half-rate Pullman transportation because they failed to obtain receipts when they purchased the Pullman accommodations. The conductor's check and receipt must be presented to obtain these reduced rates.

- O'Brien, Charles W., Car Fore., Lehigh Valley, Edgewater.
- O'Brien, Jas. J., Supt. Car Dept., Term. R. R. Assn., Princess
- O'Brien, John, Pres. M. P. C. & O., Chelsea
- O'Brien, W. J., M. M., K. & M., Haddon Hall.
- O'Donnell, T. J., Chf. Interchange Inspnr., Niagara Frontier Inspnr. Assn.
- Pennhurst
- O'Shaughnessy P. J., Major U. S. A., Chelsea.
- Oliver, Thomas, Gen. For., Detroit & Macineca, New Belmont.
- Osman, H. L., G. P. A., Morris & Co., Traymore.
- Overton, R. J., Mech. Repr., Southern, Princess.
- Oviatt, H. C., G. M. S., N. Y., N. H. & H., Haddon Hall.
- Owens, W. H., G. M. M., Southern, Osborn.
- Owley, C. W., Supt., Texas Co., Traymore.
- Pace, R. T., P. A., Atlanta & West Point, Strand.
- Pack, A. G., Ch. Insp. Bureau Local, Inspn., Interstate Commerce Commission, Breakers.
- Paul, Jas., M. M., A. C. L., Princess.
- Peiffer, Chas. E., M. C. B. R. & P., Pennhurst.
- Perrine, W. M., M. M., C. R. R. of N. J., Alamac.
- Perry, M. B., Chf. Car Repair Acct., B. & O., Bouvier.
- Porter, C. A., Supt. T. Indian, Rehring Co., Ambassador.
- Power, J. A., S. M. P., So. Pac., Traymore.
- Queenan, Wm., Asst. Supt. of Shops, C. B. & O., Chelsea.
- Quercrau, C. H., Supt. Elec. Equip., N. Y. C., Chalfonte.
- Quinn, C. H., Chf. Elec. Eng., N. W., Dennis.
- Rae, J. C., M. M., A. H., Princess.
- Raefer, C. D., M. M., A. C. M. H. B., St. Charles.
- Ralston, J. A., M. E., Union, Traymore.
- Ramsdell, T. M., M. C. B. O. W. R. & N., Chalfonte.
- Rasbridge, R. B., S. C. D., P. & R., Dennis.
- Rausch, Wm., P. & R., N. Y., Marine.
- Ream, A. H., S. M. F. & Eq., F. & S.
- Renter, Sebastian, For., L. L., Dennis.
- Richards, C. F., Chf. C. Insp., L. & H. R., Critcheroff.
- Riley, S. B., S. M. P., W. M., Dennis.
- Rink, Geo. W., Asst. S. M. P., C. R. R. of N. J., Traymore.
- Ross, B. B., G. F. C. Dept., L. L., Dennis.
- Runkel, William H., Engr., Union Tank Car Co., Traymore.
- Russer, F. W., Foreman, L. L., Pine Hall.
- Salinas, Leon, Pres., National Rys. of Mexico., Ambassador.
- Sandman, A. G., M. E., B. & O., Marlborough.
- Savage, T. E., Asst. to Pur. Agt., Erie, Traymore.
- Schneider, Louis, Ch. C. S. M. P., G. N., Grand Atlantic.
- Scott, W. J., Rep., Penna. Tank Co., Traymore.
- Schmoll, Geo. A., Dis. M. M., B. & O., Marl.
- Schuyler, A. J., Gen. Car Insp., Virginia, Strand.
- Sears, E., Dist. & Elec. M. M., C. M. & St. P., Chalfonte.
- Sellers, J. A., M. P. & Rolling Equip., F. & R., Dennis.
- Seifert, S. P., Supt. C. Dept., N. & W., Brighton.
- Shand, A. C., Chief Eng. Penna., Penna., Strand.
- Shaughnessy, T. J., Shop Acc., Kentucky Ind. Term., Monticello.
- Shave, B. S., M. M., D. S., Princess.
- Sheehan, J. S., Supt. M. P., A. & H., Haddon Hall.
- Sheehan, J. E., G. C. Insp., N. Y. N. H. & H., Pennhurst.
- Sheehy, F. D., Marlborough.
- Sheehy, J. Fred, Pres., Chicago Short Line, Marlborough.
- Shirwood, M. H., Asst. For. Eng. House, Penn., Kentucky.
- Sitterly, W. H., Gen. C. Insp., Penn., Chalfonte.
- Skinner, Archie, Air Brake & Valve For., Santa Fe, Princess.
- Smith, Abram F., V. P., Union Tank Car Co., Traymore.
- Smith, C. B., M. E., B. & O., Chelsea.
- Smith, L. N., Div. M. M., Wash. Princeton.
- Stauch, F. B., Supt. Car Equip., Roxana Petroleum Corp., Strand.
- Storey, J. W., Ch. Draughtsman, Cent. Georgia, Arlington.
- Street, Clement F., Marlborough.
- Streeter, L. P., Air Brake Eng., I. C., Haddon Hall.
- Stumpf, Carl, Foreman L. & R., Pines.
- Sturrock, A., Asst. Supt. M. P., C. F., Seaside.
- Sullivan, I. L., Supt. Mech., N. Y. N. H. & H., Shelbourne.
- Summer, Elliott, S. M. P., Penn., Brighton.
- Sutherland, H. F., Supt. K. & I. Term., Alamac.
- Symons, W. E., Cons. Eng., Lake Erie Franklin & Clarion, Strand.
- Taylor, E. C., Gen. Car Insp., Penn., Princess.
- Taylor, C. H., Asst. S. M. P., C. O., Haddon Hall.
- Thistle, C. F., Chf. Car Insp., Cent. Reg. Penn., Dennis.
- Tiley, Geo. F., Supt. Tank Car En., Gen'l Chemical Co., Traymore.
- Timpon, J. E., Asst. For. L. L., Pine Hall.
- Tiner, F. S., Material Insp., Virginia., Dennis.
- Trappell F., Ch. Interchange Insp., B. & A. C. Lines, New England.
- Treman, F. W., M. C. B. Clerk, A. C. L., Shelburne.
- Trottnow, E. H., Spec. Insp., N. Y. C., Traymore.
- Tryer, C. V., G. F. C. S. N. Y. O. & W., Haddon Hall.
- Votum, J. E., Chief Joint Insp., Hocking Valley, Arlington.
- Vought, Harry D., Secy., New York R. R. Club, Central Ry. Club, Marlborough.
- Waestaff, Gen. Past M. M., N. Y. C., Chalfonte.
- Wallace, O. A., Gen. Supt. C. R. A. C. L., Shelburne.
- Walls, W. H., Examiner, U. S. R. A., Marlborough.
- Walsh, F. O., S. M. P., Atlantic & West. Joint, Strand.
- Warman, H. L., S. M. P., Frisco, Traymore.
- Warner, W. W., Works Mgr., Erie, Princess.
- Walter, P. S., Gen. Car Insp., Penn., Princess.
- Weaver, F. F., G. F., Penn., Loraine.
- Wehster, H. D., Eng. M. P. B. L. E., Ritz Carlton.
- Weigman, F. H., Supvr. A. R. A. Interchange, I. & N., Shelburne.
- Weigman, F. H., Supt. Interchange, I. & N., Shelburne.
- Wells, L. S., E. L., L., Marlborough.
- Welther, A. G., Asst. Supt. of B. & O., Chalfonte.
- Wescoe, F. B., Ch. Car Insp., Penn., Craig Hall.
- Whaley, T. H., Boiler Insp., Penn., Osborn.
- White, Nelson B., M. M., C. & O., I. I. J. I. J. I. J. Chatham.
- Wiles, C. F., Dist. Motive Power Insp., B. & O., Princess.
- Williams, E. V., S. M. P. B. R. & P., Traymore.
- Washington, Sidney, For. Engr., N. Y. N. H. & H., Marlborough.
- Wolfe, R. C., Gen. For. Engr., D. & H. I., Fenwick.
- Woodbridge, H., Past M. M., B. R. & P., Traymore.
- Woods, L. R., P. A., M. C. & St. L., Marlborough.
- Woods, F. I., M. M., C. & O., Alamac.
- Wooly, Bendigler, C. & O., Alamac.
- Wright, Wm., Storekeeper, D. I. & W., Shelburne.
- Yanawina, F. S., Chf. Clk. Mech. Dept., Term. R. R. Assn. of St. Louis, Princess.
- Yarborough, W. C., Asst. Treas., A. C. L., Marlborough.
- Yerex, H. J., Ch. C. Insp., Penn., 229 S. Conn. Ave.
- Yorg, Henry, S. M. P., G. M., Traymore.

From Europe to the Conventions

F. A. POOR, president of the P. & M. Company, Chicago, accompanied by Mrs. Poor, arrived in New York from Europe on the Majestic Tuesday, and came down yesterday to attend the conventions.

Mr. Poor comes with a new interest in railway mechanical matters, since he and Burton Mudge recently bought control of the Joliet Railway Supply Company, Mr. Mudge having been elected president of this company.

Mr. Poor went to Europe about two months ago. He attended the convention of the International Railway Association at Rome, and was subsequently met by Mrs. Poor in Paris. They later returned to Italy.

"My own observations of railway conditions in Europe are similar to those which have been already published in the *Railway Age*," said Mr. Poor. "It is difficult to get sleeping car accommodations and trains generally are crowded. The railway service is much better in France than in Italy, and as was the case before the war, is best of all in England. In fact, in England some excellent new passenger equipment has been provided, there is very little crowding of trains, and the trains are being operated generally at pre-war speeds.

Mr. Poor took the aeroplane route from Paris to London, and later flew back from London to Paris. He enjoyed these experiences immensely and is very enthusiastic about the air as a means of transportation. He says, however, he is very glad to get back to the U. S. A., and is quite willing to use American trains for traveling for some time to come.

W. B. Storey Comments on the Convention

T HIS IS THE FIRST visit that W. B. Storey, president of the Santa Fe, has made to the mechanical convention. He is now A. R. A. executive committee member for the Mechanical Section, but he came up in railway service through the engineering department. He was long active as a worker in the American Railway Engineering Association, and is a past president of that organization.

"I have taken much interest in observing the mechanical convention and the exhibit," said Mr. Storey yesterday. "There is no doubt that the reports and discussions in the convention, and the inspection of the exhibits by railway men do much good.

"Some of the executives of the railways have questioned whether an exhibit is necessary in connection with the convention, and whether Atlantic City is the best place to hold it. The expense involved is substantial and some have thought it may be too large.

"I have not had time to make observations enough to reach definite conclusions regarding these matters.

"I could see this morning that the convention is conducted much like others I have attended; and there is no doubt that the interchange of information and ideas that takes place in the sessions broadens those attending and makes them better able to do their work. The exhibit is excellent and railway mechanical men who carefully go through it cannot fail to learn many things about the development of equipment and appliances which it will be advantageous for them to know.

"The purpose, of course, is contribute toward increasing the efficiency and economy of railway operation. Everything done should be done to accomplish that object, and it should be done in the way that will accomplish it most effectually. The railways in the eastern

part of the country can without difficulty send a good many of their officers to Atlantic City. It is not so easy for railways west of Chicago, for example, to do so because of both the greater expense and the greater time required. To get the greatest benefit at reasonable cost they must select carefully the men they send."

Mr. Storey's entire attitude was that of a much interested observer who had not reached any definite conclusions regarding the matter under observation and did not intend to until he was sure he knew the entire situation thoroughly. The Santa Fe always has been well represented at the conventions.

Being himself very familiar with and a believer in the convention work of the American Railway Engineering Association, it may safely be anticipated that any recommendations Mr. Storey may make will be intended and will tend to, increase the value and effectiveness of the work of the Mechanical Section.

Mr. Storey leaves for New York this morning to attend a meeting of the executive committee of the American Railway Association. He expects to start for Europe the latter part of June for a two months' trip.

Enrollment

T HE ENROLLMENT BOOTH at the main entrance to the Million Dollar Pier will open today from 9:00 a. m. to 1:00 p. m., 2:00 p. m. to 6:00 p. m., and 7:00 p. m. to 8:00 p. m.

I. C. C. Power Brake Hearing

T HE POWER BRAKE hearing before the Interstate Commerce Commission at Washington, which was adjourned on May 29, subject to call at a date to be announced in the future, will be convened again on July 17, at which time examination of witnesses for the air brake manufacturers will be resumed.

New York Railroad Club Nominates Officers

T HE NOMINATING COMMITTEE of the New York Railroad Club has decided upon the following nominations for the next fiscal year, beginning November 1, 1922:

President, two year, F. T. Dickerson, secretary-treasurer, Central Railroad of New Jersey.

First vice-president, W. F. Jones, general storekeeper, New York Central, West Albany, N. Y.

Second vice-president, John J. Mantell, regional manager, Erie Railroad, New York.

Third vice-president, W. G. Gove, superintendent equipment, Brooklyn Rapid Transit System, Brooklyn, N. Y.

Treasurer, D. W. Pye, president, Tuco Products Corporation, New York.

Member of executive committee, three years, Elliott Sumner, superintendent motive power, Pennsylvania Railroad, New York.

Member of finance committee, three years, Charles C. Castle, vice-president, National Railway Appliance Company, New York.

Conventionalities

Among the convention visitors this year from far-away lands is W. D. Hollan, master mechanic of the National Railroad of Haiti.

F. S. Wilcoxon, fuel supervisor of the Chicago Great Western, has recently left that position to go with the Edna Brass Manufacturing Company, and is attending the convention this year in that capacity.

R. L. McIntosh is attending the convention in a new capacity this year. He has recently joined the staff of the Locomotive Finished Materials Company of Atchison, Kansas.

Harry C. Buhoup, for 40 years connected with McConway & Torley Company and a regular convention attendant, finds it impossible to attend the meeting this year.

W. H. Winterrowd, chief mechanical engineer of the Canadian Pacific and member of the General Committee of Division V, made but a flying trip to the convention. He arrived Tuesday and left Wednesday evening for Montreal. He will not be able to return.

Mr. and Mrs. Frank McManamy motored over from Washington on Tuesday. They have with them this year a nephew, Carl McManamy, who is just about to be graduated from Georgetown University.

Orris Bilger, mechanical engineer of the Kansas City, Mexico & Orient is here from Wichita, Kans., with his wife and seven-year old son. This is Mr. Bilger's first visit to the Atlantic City conventions.

Charley Gayetty is looking for a job. For two years chairman of the enrollment committee and for a number of years a most active committeeman, he feels lost with nothing to do but "roam the Pier." He received a rousing reception from his previous enrollment associates as he entered on his "new" duties Wednesday morning.

R. S. Cooper, general sales manager of the Independent Pneumatic Tool Company, has just returned from a trip to England and the Continent to attend the conventions. He reports poor but improving business conditions on the other side. England is in about the same position as regards trade as the United States was last fall.

The printer got his wires crossed yesterday and made *The Daily* say that Samuel Higgins, of the Railroad Labor Board, was formerly "deputy president of the Brotherhood of Railroad Hartford." Mr. Higgins is one of the railroad members of the board, and what *The Daily* meant to say was that he was formerly general manager of the New York, New Haven & Hartford.

Mr. and Mrs. Burton Mudge were joined at the convention yesterday by their son, Burton, Jr., who has just completed his freshman year at Princeton University. Burton, Jr., is now western junior golf champion of the United States, and has been captain of the freshman golf team at Princeton.

John M. Lammedee is attending the convention as a full fledged supplyman this year. Drawn from ranks of the railway profession he is now sales engineer in the locomotive fuelwater heater department of the Worthington Pump & Machinery Corporation for the middle west. Mr.

Lammedee is a graduate of Purdue University and before his editorial work was with the Pennsylvania Railroad.

At any gathering of this sort the "old guard" is always in evidence. They spend a lot of time swapping yarns and proving seniority in years of attendance. Among those present here this year are C. E. Postlethwaite and his side-partner, W. H. Wilkinson, both of the Pressed Steel Car Company. While neither flew over the battle lines in France, nevertheless they are known as "aces," being a pair that's hard to beat.

Charles A. Schroyer, one of the oldest members of the railway mechanical association and for many years superintendent of the car department of the Chicago & North-western, came early in order to enjoy meeting and visiting with his many friends. Mr. Schroyer is taking things rather easy these days, and in this connection it may be stated that he probably brought with him to Atlantic City his golf clubs.

"Doc" W. H. S. Bateman of the R. S. M. A. executive committee, returned to Philadelphia on Wednesday to attend the commencement exercises of the University of Pennsylvania. His son, Stanley L. Bateman, graduated from the Wharton School of the University. Stanley, who with his older brother, Husten, has attended the conventions in former years, has just received his commission as second lieutenant, U. S. A. Reserve Corps.

Mr. and Mrs. J. W. Bettendorf and Mr. and Mrs. J. H. Bendixen arrived early from Davenport, Iowa. Mr. and Mrs. Bettendorf motored to Atlantic City from their home and enjoyed the trip greatly. At Lafayette, Ind., they were joined by their son, William, who is taking a course in mechanical engineering at Perdue. Mr. and Mrs. Bendixen have as their guest, Mrs. Harry Kleeberg, of Davenport. The entire party is stopping at the Traymore.

The many friends of C. E. Chambers will be glad to learn that his son, James, is rapidly regaining his strength after an operation for appendicitis. Young Mr. Chambers received his degree from Stevens Institute of Technology this year and after graduation went to Schenectady, where he was suddenly taken with a severe attack of appendicitis. Friends took him to a hospital at once, where the operation was performed. His father went to Schenectady, returning a few days ago, after all danger was over.

Harry T. Bentley comes to the convention this year, accompanied by Mrs. Bentley, in his new official capacity as general superintendent of motive power and machinery of the Chicago & North Western. During the past year Mr. Bentley made a flying visit to England, renewing his long-standing friendship with his English railway brothers. He visited the Crewe shops of the London & North Western, the largest railway shops in England, where he first entered railway work. He was accompanied by his daughter, Miss Emily Bentley, who unfortunately was ill with appendicitis during her entire visit on the other side.

Jose Urgelles, general master mechanic, and Jose C. Perez, superintendent of shops of the Cuba Railroad at Camaguey, Cuba, registered as special guests yesterday afternoon. They are representing J. W. Small, superintendent of motive power of the road, who is unable to attend this year. Mr. Small was formerly superintendent of motive power of the Seaboard Air Line and served as mechanical staff officer for the Southern Region of the United States Railroad Administration. Neither Mr. Urgelles nor Mr. Perez has attended the convention before.

R. L. Kline, assistant chief of motive power, Pennsylvania Railroad, arrived early Wednesday morning at the Dennis with his son, H. J. Kline, who was graduated Tuesday as mechanical engineer from Lehigh University. Mr. Kline, Jr., is to make railroading his career. At the university he was president of the Railroad Society and is now serving as special apprentice on the Pennsylvania Railroad at Altoona. He has served part of his time in this course during previous summer vacations and has but two more years to complete the course. He has had a fine start in railroad life and with the lessons to be learned from the successful career of his father, we anticipate a great future for him.

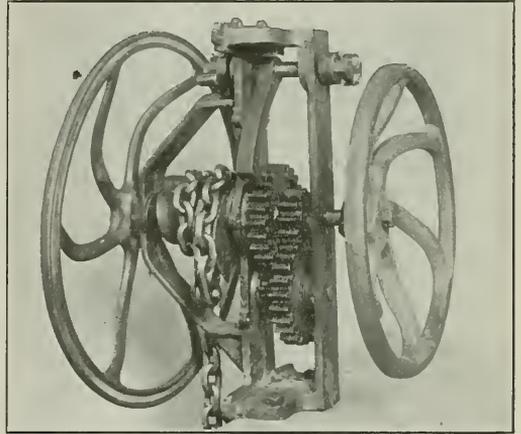
Friends of B. B. Milner, formerly chief mechanical engineer of the New York Central and a very active member of the mechanical associations, will be interested in learning that the Imperial Hotel at Tokyo, Japan, where he was making his headquarters, was partly destroyed by fire on April 17. It was at first reported that Mr. Milner had lost all of his belongings, but a notation from him on a copy of a special edition of a paper describing the fire indicates "nearly every thing saved". The hotel ordinarily can accommodate about 150 guests comfortably, but at the time of the fire there were 165 guests, fifty of them being members of the suite of the Prince of Wales and officers of the H. M. S. *Renown*. Mr. Milner after leaving the New York Central, spent one year in the Orient for Sale & Frazar, Ltd. He returned to this country last fall, but went back to Japan early this year and is now making his headquarters at Tokyo.

J. A. Miller, Superintendent motive power, Florida East Coast, a member of the association since 1890, is here from St. Augustine, Fla., to maintain an almost continuous attendance at these conventions. Mr. Miller is in the unique position of being with a road presenting ideal operating conditions. The Florida East Coast is a water level route of something over 500 miles in length. Oil is used exclusively for fuel on all locomotives. The line is primarily single track, which requires high speed service by both freight and passenger trains. These features have permitted Mr. Miller to establish one class of locomotive for both passenger and freight service and have given him an opportunity for standardization which in his 30 year's experience with that road has not been neglected. All road locomotives have 68-in. driving wheels. They are of the Pacific type, weighing about 200,000 lb., with 22-in. by 26-in. cylinders. This high degree of standardization in power is visibly reflected in cost of maintenance, which is substantially lower than that of other roads in this country.

Peacock Brake for Blind End Cars

A NEW DESIGN of Peacock geared hand brake for baggage, express, mail, and all kinds of so-called blind end cars, is one of the features of the exhibit of the National Brake Company, Inc., Buffalo, N. Y. This design was first used on Canadian Pacific baggage cars but is suitable for general use.

It is the enclosed type and is built of steel throughout. The frame is a one-piece steel casting and is designed for installation in the wall of the car so that all the gears are enclosed by the car wall and protected from dirt and weather. The brake is equipped with a second wheel so that it may be operated from the inside of the car as well as by the larger wheel outside the car. The brake wheel and the chain-winding drum, with a small portion of the frame, is all that is visible from the outside of



Peacock Geared Hand Brake for Blind End Cars

the car so that the brake is not only neat in appearance, but meets the requirements which the severe weather in Northern Canada imposes. The tripping device is so designed that the pawl may be operated from either outside or inside the car. The gears of the brake give a double reduction and are so proportioned that a 100-lb. pull on the outside wheel will yield approximately 3,500 lb. on the brake chain.



Southern Pacific 2-10-2 Type Locomotives Ready for Shipment at the Eddystone Plant of the Baldwin Locomotive Works

New Devices Among the Exhibits

Wrought Steel Truck Side Frame

ONE OF THE remarkable exhibits of this year's convention is a wrought steel truck side frame formed in one piece from open-hearth steel plate. The construction of this frame, developed by the T. H. Symington Company, New York, is entirely different from

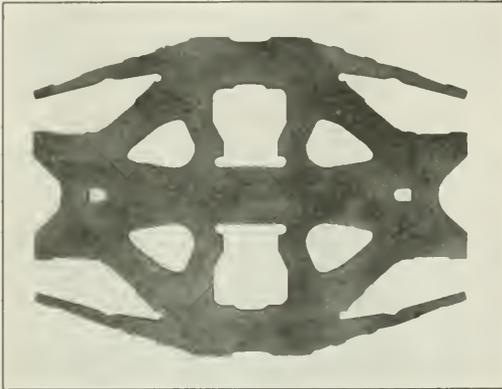


Fig. 1—The Sheared Blank from which the Side Frame Is Made

any other pressed steel truck side frame previously manufactured.

The blank for the entire frame is produced from a steel plate in one piece and at one operation by shearing between dies under a hydraulic press of high capacity. The blank after the shearing operation is shown in Fig. 1.

After flanging, the blank is folded along two lines parallel with, and on either side of the longitudinal center line, following which operation the flanges around the bolster opening and the journal box seat are in contact as shown in Fig. 3. The flanges are then welded together at all points of contact. Bolster wear plates and journal box reinforcing pads are welded in position, brake hanger brackets riveted on and the journal box holes drilled. Cross sections of the frame at various points are shown in Fig. 4.

The journal boxes used with this side frame are the A. R. A. standard arch bar type. The journal box tie bars are integral with the frame and formed in a channel section, which adds materially to the stiffness of the frame. The A. R. A. recommended truck bolster can also be used.

The Symington wrought steel side frame is designed for use with either a rigid or a flexible truck, depending

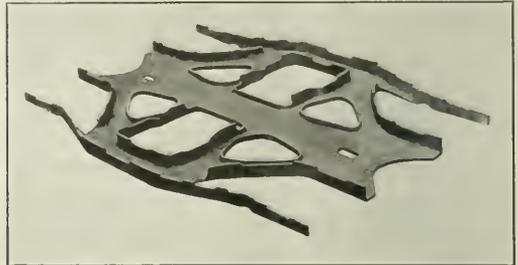
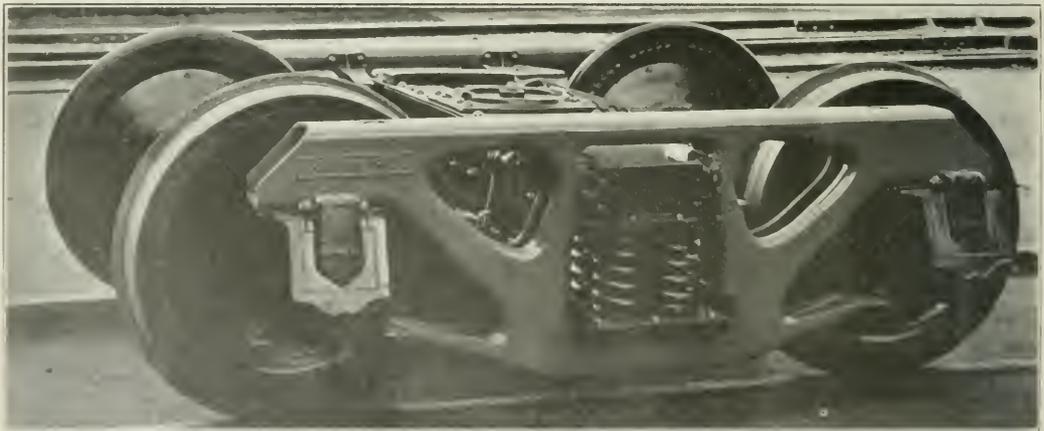


Fig. 2—Flanges Pressed Around Edge of Blank

upon the arrangement of the spring plank. The spring plank seat is not riveted to the side frame but is dropped into place at the bottom of the bolster opening. The



A Freight Car Truck with Symington Pressed Steel side Frames

The sheared blank is then formed in flanging dies to the shape shown in Fig. 2, flanges being formed along the edge and around all of the principal openings.

standard seat has a boss at the center to permit the spring plank to swivel if desired. To make the truck rigid it is only necessary to rivet the spring plank to the seat as

shown on the completed truck. This arrangement makes a rigid truck which can be readily assembled or taken apart.

Renewable wear plates are welded to the faces of the columns, thus preventing any wear of the column proper by the bolster. The brake hanger brackets are of malleable iron, riveted in the standard locations and arranged to take the regular hanger and pin.

The strength of rolled plates is very uniform and the method of manufacture of this side frame insures freedom from imperfections of material. The completed structure is well adapted to withstand repeated impact

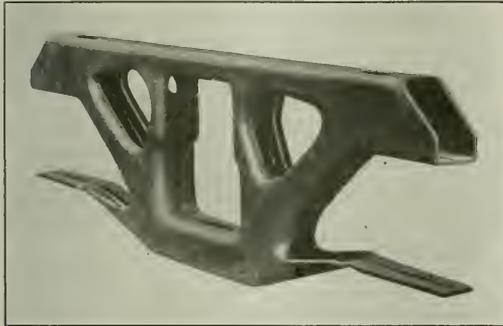


Fig. 3—Frame Folded Ready for Welding

and reversals of stress. It is stated that tests show the frame will carry a static loading equal to any frame now in general use, while the resistance to dynamic stress is greater.

The 55-ton side frame weighs about 300 lb. per car less than the 55-ton cast steel frame of the U. S. R. A. type

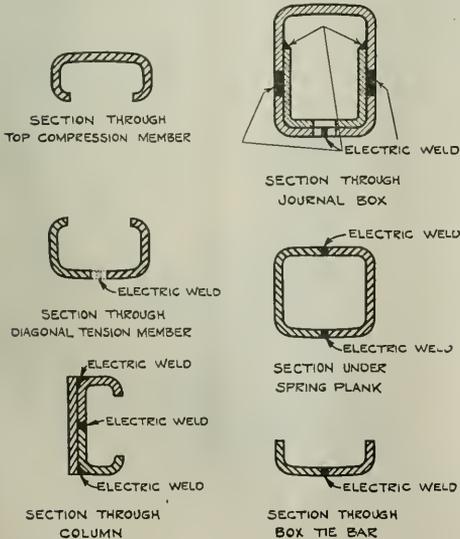


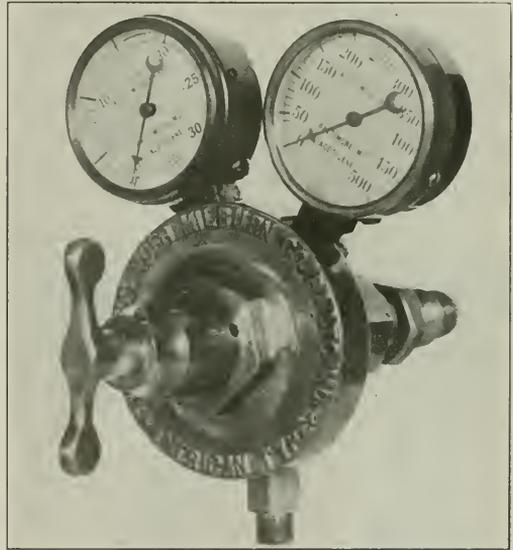
Fig. 4—Typical Sections Through the Frame

and 450 lb. per car less than the A. R. A. design of arch bar side frame of the same nominal capacity. The 55-ton frame is now in production at the works of the Cambria Steel Company and the 40-ton and 70-ton frames will be available shortly.

High Pressure Gas Regulator

FOR THE CONTROL and delivery of acetylene, oxygen, hydrogen and other high pressure gases, the Alexander Milburn Company, Baltimore, Md., has developed the gas regulator shown. Features of this device are said to be simplicity, ease of assembly, direct action and accurate regulation.

The regulator comprises a front cap containing an adjusting key, top spring button and tension spring. The body contains a flexible metal diaphragm in front, soldered in place. Over the diaphragm is screwed a bronze diaphragm plate or spring button to hold the tension spring. Inside the body is a fixed nozzle, containing a loose operating pin. Over the nozzle is loosely assembled the valve sleeve which has a row of gas ports



Milburn High Pressure Gas Regulator

drilled around its circumference and carries the valve seat. The seat closes against the nozzle by initial gas pressure on the valve sleeve and the pressure of a compensating spring resting in the recessed back cap.

The loose operating pin inside the nozzle is actuated at one end by a depression of the diaphragm and at the other end by pressure of the valve seat.

The seat of the regulator closes *with* instead of *against* the pressure, enabling the seating to be effected by a sealing pressure of several pounds instead of hundreds of pounds with attendant risk of damaging or splitting the seat, as in the case of regulators where the seat is yoked to the diaphragm. The closing of Milburn seat is independent of the diaphragm.

The valve is closed by the rear pressure of the compensating spring, assisted by initial gas pressure. When the adjusting key is turned to the right, the tension spring depresses the diaphragm, moving the loose pin, which forces the sleeve back, unseating the valve and permitting gas to enter through ports in the sleeve. The gas then passes through the nozzle to the diaphragm chamber and thence to the low pressure gage and through the outlet port. When multiplied gas pressure exceeds the tension of the

adjusting key spring, the diaphragm is released, permitting the loose pin to advance and letting the valve sleeve close the valve by pressure of the rear compensating spring.

The main operating part of this regulator, comprising only the pin and nozzle and a seat-carrying sleeve, is almost immediately accessible for examination, cleaning or renewal. The seat is subject to slight wear, as the spring closing the seat exerts only a pressure of several pounds in order to effect the regulation of the gas. If it becomes necessary to renew the seat, the sleeve carrying it is easily removed so that a spare sleeve can be immediately inserted, or the seat can be reversed. Every effort has been made in the design of this regulator to secure reduced size and weight with the least number of parts consistent with the function to be performed.

Bradford Boltless Truck Column

A NEW TYPE of boltless truck column has been designed by the Bradford Draft Gear Company, New York, to interchange with bolted columns now used in Diamond arch bar trucks. This column is made of cast steel and has double the cross sectional area of the standard column bolts now used. It is constructed with an opening at the top to admit the upper arch bar at an angle of 45 deg., with a boss cast in this opening that fits into the drilled hole of the arch bar and which locks the column to the arch bar when the column is placed in a normal, vertical position. This column is then locked to the lower arch and tie bars with a cast steel lock which is riveted to the spring plank in the usual way with two $\frac{7}{8}$ -in. rivets.

A double-holed nut, both holes being threaded, made in one piece of cast steel or drop forged, is used for the journal box bolts; the box bolts are then screwed into this double nut from the square head of the bolts. This prevents loss of nuts or loosening of box bolts.

Clark Air Brake Retaining Valve and Bracket

THE CLARK COMPANY, West Pittston, Pa., is showing an air brake pressure retaining valve of novel design. It is not a complete device but consists of a weighted valve which can be substituted for the ordinary weighted valve which was universally used for many years before the introduction of the spring type of retainers. The Clark valve is made of a specially prepared rubber composition which the maker claims will remain elastic, will not cut or corrode the seat, and will not stick to the seat when cars are standing idle. The object of the device is to avoid the expense of discarding the old weighted type retainers and substituting those of the spring type. Old retainers can be converted by substituting a Clark valve and it is claimed that such retainers then become reliable under all conditions.

Two means are provided for adjusting the retained pressure to the desired amount. One provision consists of a screw in the top of the valve stem which can be screwed up or down to secure the desired lift and retained pressure, this adjustment being made on a test rack before the valve is placed in service. The objection to this is that the cap will probably have to be taken off and replaced several times before the exact adjustment is secured. To avoid this objection an adjusting and a lock screw can be put in the cap or weight cap and adjustment then obtained without the necessity of renewing the

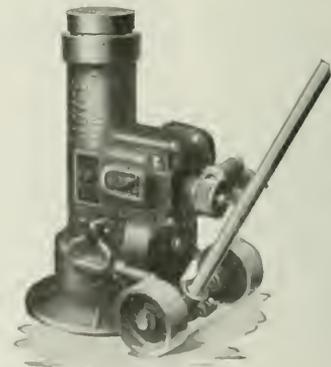
Another device shown is a retaining valve bracket which is permanently bolted to the car. It consists of a steel plate with two lugs and studs holding cars. To apply a retaining valve it is simply set in place, the stud nuts loosened, the cars allowed to drop down over the brackets on the retaining valve body and the nuts then tightened. By using this bracket and placing a union in the pipe below the retainer, it can be more easily applied or removed than by the method of attachment ordinarily followed.

Self-Lowering Ball-Bearing Jack

THE NEW JOYCE jack, illustrated, is made by the Joyce-Cridland Company, Dayton, Ohio, and is designed with its own bracket and wheels attached. The wheels are 5½ in. in diameter and sturdily built and attached, so that they cannot be easily knocked off. The operating lever is inserted in a socket and is used for a handle in wheeling the jack about. This also enables the operator to spot the jack directly under the jacking point and eliminates much exertion in pulling and tugging at the jack to get it directly under the load.

The jack is built in either the inverted or upright style, depending upon whether a large head or a small head is required. All shafts run in bronze bushings and the entire lowering mechanism runs in an oil bath which insures constant lubrication to all parts. It is only necessary to oil the jack about every six months, when the oil should be changed as in the crank case of an automobile. The jack is made in 50 and 75-ton capacities and over 50 per cent of the parts of different capacities are interchangeable; all parts, with the exception of the base, sleeve and cap of the inverted type, are interchangeable with the upright type. This is advantageous where various tonnage jacks of both inverted and upright types are used on the same road.

The Joyce jack is designed to stand an overload of 20 per cent. No exertion is required in lowering the load



Joyce Self-Lowering Ball-Bearing Jack

which is controlled by a small lever at the side of the jack through a system of worm and wormgears. Lowering is said to be under the absolute control of the operator who can at all times stop the load within the fractional part of an inch.

Coupling Devices

TWO DEVICES of especial interest have been brought out recently by the McConway & Torley Company, Pittsburgh, Pa.; these are a quadruple shear coupling connection for passenger cars and locomotive tenders and an uncoupling device for type D passenger couplers.

The former of these devices, as will be observed by an inspection of the booth where it is exhibited, is a coupler and yoke connection providing greater strength and bearing surface than is ordinarily afforded in the common type of tail pin connection. The end of the coupler passes through three lugs on the yoke and is connected by a tail pin, inserted from below. This tail pin is held in place by a retaining plate and a split cotter, both of which are readily accessible. This arrangement enables the draft gear followers and yoke to be assembled in a unit, an important advantage. Obviously the tail pin is in quadruple shear.

The uncoupling device for passenger cars can be used with type D couplers fitted with underneath release. It has several important advantages, including simplicity in design, a section of ample proportions, easy application and removal and rigidity. The coupling may be disconnected from either one or both sides of the car if desired. The uncoupling rods clear all train pipes and platform attachments. They rotate for uncoupling in accordance with the usual practice on freight cars, eliminating the possibility of train partings due to short or bent pull rods. The uncoupling rods work independently of each other, the one in use at the time of uncoupling not operating the one on the other side.

Tank Car Valves

WITHIN THE LAST few years a number of complaints have been made of the failure of the present A. R. A. standard type outlet valve to prevent leakage, particularly of volatile products. Investigation has disclosed in the majority of cases that the trouble was due, aside from the "breathing" of the tank, to grit, straws, patches of gummy residue, etc., lodging on the valve seat and preventing the valve from going solidly into place. Investigation further disclosed the fact that when the valve seat was properly wiped off or cleaned the trouble with leakage generally disappeared. With a knowledge of the above conditions the American Car & Foundry Company, New York, designed the two valves described below.

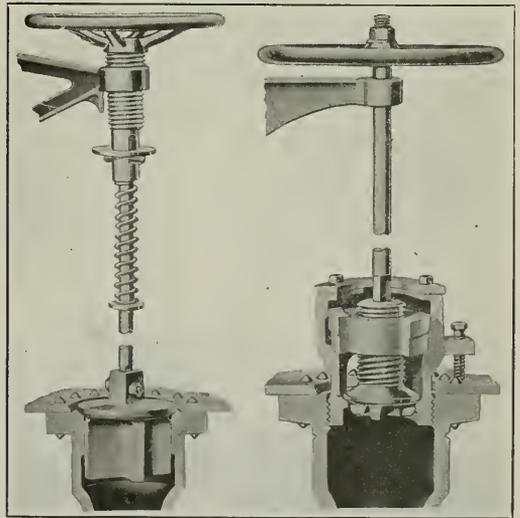
In applying the self-grinding valve, shown at the left of the illustration, the A. R. A. outlet chamber and valve are not changed nor is it necessary to throw away the valve rod and the valve rod spring. It is necessary, however, to cut off the upper part of the valve rod, cut the old valve rod bracket off the dome, apply a new threaded bracket, and substitute for the cam and handle the new type handwheel, all of which may be done at a small expense.

The principal feature of this valve is the property it possesses of wiping or cleaning the valve seat every time the valve is opened or closed, so that any foreign matter is dislodged and swept into the outlet chamber. Assuming the valve to be closed tightly on its seat, to open it the handwheel is turned to the left. This revolves the valve on its seat and the resultant wiping or cleaning effect continues until the lower end of the slot in the shank of the handwheel comes into contact with the 3/8-in. pipe thimbles riveted to the valve rod. Any further revolution of the handwheel to the left results in raising the valve from its seat.

To close the valve the handwheel is revolved to the right until the valve touches its seat. By revolving the handwheel further the spring is compressed and this compression serves to hold the valve tightly in place. During these latter revolutions the wiping or cleaning effort is again obtained. The function of the spring is to take care of variations in height from the valve to the handwheel bracket, these variations being due to the "breathing" of the loaded tank while in transit.

In addition to the wiping or cleaning effect which is a characteristic of the self-grinding valve, the positive self-locking valve, shown at the right, has the advantage of a positive lock. By this is meant that when this valve is finally seated it is absolutely impossible to force it off its seat by the upward pressure of a bar or any other instrument inserted in the outlet chamber. Furthermore, the locking and wiping mechanism is at the bottom of the tank and, as the valve rod slides freely in the valve dome bracket which, in the case of this valve acts as a guide only, the "breathing" of the loaded tank in transit cannot lift the valve from its seat and permit valve leakage. The positive self-locking valve also embodies practically all the desirable features for a bottom outlet valve as outlined on page 52 of the A. R. A. tank car specifications of 1920.

The substitution of this valve to existing tank car equipment fitted with the standard A. R. A. type of outlet valve necessitates replacement of the outlet chamber with one of a new type. The rivet spacing in the flange of



Self-Grinding and Self-Locking Tank Car Valves

the new outlet chamber agrees, however, with that on existing standard American Car & Foundry Company outlets, so that the old outlet may be removed and the new one applied without punching or drilling any new holes in the tank shell. New valve rods and handwheels are also required, as the old style cam and handle is not suitable for this type valve. It is not necessary, however, to replace the valve rod dome bracket, as almost any type bracket can be used.

To open the valve the handwheel at the top of the valve rod is turned to the left. This inpart a vertical downward movement to the wing nut, but the valve does not yet rise from its seat; it simply turns in the same direction

and at the same speed as the handwheel until about three complete revolutions have been made. By this time the wing nut is bottomed on the lower shelf inside the valve cage, and any further revolutions of the handwheel result in raising the valve off its seat.

To close the valve the handwheel is turned to the right, this movement resulting in a downward vertical travel of the valve until the bearing surface comes into contact with the valve seat in the cage. When this occurs the wing nut begins to move upward and the valve itself completes the three wiping or cleaning revolutions on its seat until the wing nut comes into contact with the upper shelf in the valve cage. Any further revolution of the handwheel simply increase the tightness with which the valve is forced to its seat.

Both valves can be readily adapted to the discharge of tank cars without removing the dome covers, by extending the valve rod through a stuffing box located on top of dome and when so operated these valves should always be used with the newly designed A. C. & F. Co. vacuum valve, the use of which automatically prevents the formation of a vacuum inside the tank.

Bucyrus Caterpillar Shovel

THE BUCYRUS COMPANY, South Milwaukee, Wis., has recently announced that it is prepared to equip all sizes of railroad-type shovels with caterpillar traction. The principal advantages of mounting a shovel of this type on caterpillars may be summarized as follows: no time lost in moving up, an ordinary move requiring about 10 sec. only; no rails to lay, no jacks to release and set and no stops during operation to reset jacks; may be quickly and easily moved back out of the way, or turned around; can always dig at most effective distance from bank; lighter work for pitmen and fewer men required.

This mounting consists in general of two forward caterpillars, replacing the jack arm, and two rear caterpillars mounted under the rear end of the shovel. Both front caterpillars are drivers and are so designed that they can swivel and adjust themselves to unevenness of the ground. The rear caterpillars consist of two units

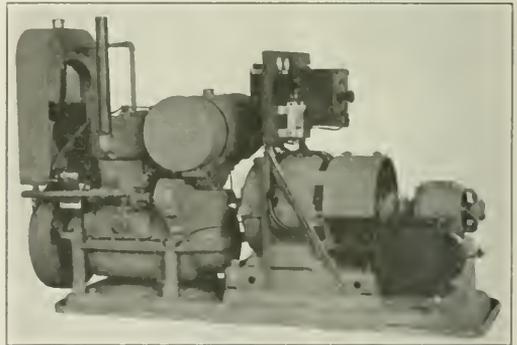
engages a pinion on a vertical shaft and is driven by an independent center-valve, reverse-type engine, suspended underneath the frame. This engine may be operated either from the operator's stand or from the ground alongside the rear caterpillars. Steering in curves of large diameter may be done by the swinging of the boom without the steering mechanism.

Propelling is accomplished through the front caterpillars. Both may be driven together or each one independently, forward or backward. The propelling speed is about half a mile an hour. The tractive effort is sufficient to enable the shovel to climb 15 per cent. to 20 per cent. grades with ease. For transportation by rail, railroad trucks may easily be substituted.

Electric Welder With Gas Engine Drive

A COMPACT OUTFIT for electric arc welding, consisting of a gas engine, a welding generator, and control panel, has been developed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This outfit should be adaptable for use on maintenance of way trains or for use in any place where it is desirable to employ arc welding or cutting, and where electric power is not available.

The gasoline engine is a 2-cylinder, slow-speed, marine type, and the outfit is completely self-contained, the engine



A Self-Contained Gas Engine-Driven Electric Welding Outfit

and generator equipment being mounted on a substantial baseplate, together with the oil and gasoline tanks and a radiator for cooling the engine. Forced feed lubrication is used, making it unnecessary to level the machine before placing it in operation.

Plush Renovator

A LIQUID CLEANSER, known as Chase plush renovator, has been developed by L. C. Chase & Co., Boston, Mass., makers of Mohair car plush. This compound is in concentrated form—a small quantity to a plentiful supply of water makes an ideal solution for ordinary soiled surfaces. Where dirt is more stubborn, a stronger solution can be made; even though used full strength, it is guaranteed harmless. It is said that it will not start the dyes nor impair the surface beauty, is non-inflammable, contains no harmful ingredients such as gasoline, and has practically no odor.



Railroad Type Shovel With Caterpillar Traction

mounted on the same frame and are designed with sufficient strength to permit the crossing of holes and ditches without the delay incidental to filling in.

Steering is accomplished through the rear caterpillars, the steering arm being integral with the pinion of the rear trucks. It carries a heavy gear segment which

Railway Age

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JAMES CURRIE

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WE GUARANTEE that of this issue, 12,000 copies were printed; that of these 12,000 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; 1,100 copies for distribution at Atlantic City.

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The steadily increasing use of Diesel engines is one of the noticeable changes now taking place in engineering practice. American engineers have been followers in this field rather than leaders. For marine work it was left for European builders to make extensive applications of Diesel engines for propelling ships before American builders finally woke up to the fact that in many instances such motor ships were being operated at noticeably lower costs than similar modern ships using steam propulsion. Diesel engines are now being installed in American ships and the number so equipped would doubtless be much greater if the shipbuilding industry were not at present in a dormant condition. The Diesel engine has reached a high level of development and can be operated at a remarkably low cost for fuel and lubricating oils. Moreover, at present a number of European rail motor cars are being driven by such engines and they are reported to be highly satisfactory as regards reliability and operating costs. The most extensive applications have been in Sweden where transmission has been of the electric type. In view of the increasing demand in this country for larger rail motor cars than can be propelled by gasoline engines thus far developed for highway trucks, the ad-

vantages of the Diesel engine should be thoroughly investigated. Such engines would appear to be well suited for this particular service.

It is to be hoped that Chairman Tollerton's invitation to the younger men to take an active part in the meeting will encourage some of the members who are not so well known to present their views on the floor. Nothing contributes more to the value of the meetings than free discussion and often men out on the line can give valuable suggestions from their intimate knowledge of the problems met in everyday operation. Apparently the younger members are diffident about talking on the floor, for a list of those who discuss the papers would usually read like a directory of superintendents of motive power and master car builders. Possibly this is partly due to the fact that committee work is delegated almost entirely to the higher officers. Would it not be a good thing to cut out some of the duplication in committees and give the younger men a chance?

Now is the time to prepare for the demand for coal cars that is sure to come with the settlement of the coal strike and the increase in business that regularly comes in the late summer and early fall. Why not line this strike cloud with silver and use the enforced idleness of the cars to put them in real serviceable condition? Such a small amount of coal is being carried now that there has been no opportunity for the usual storage for winter use, and when the strike is settled there is sure to be a great demand for cars. Making the repairs now when there is plenty of time and opportunity for doing the work will permit of making economical repairs, will mean a large saving in revenue when the rush comes and will greatly relieve congestion caused by defective equipment. Business is on the up-grade. Be sure you are ready to handle the peak load when it comes.

Watch the Car Situation

It would at times almost appear as though the railroads must have recruited many of their mechanical officers from the state of Missouri, and in addition must have limited applications for positions to those whose ideas had become fixed. This, at least, seems to be the impression frequently gained by the man who is trying to introduce some new mechanical device to the railroad field. If this attitude stopped with the demand for a statement as to what advantages might accrue from the use of the device and an investigation as to how the results arrived at were to be obtained, all would be well. Frequently, however, the attitude of mind goes further and no one appears to be willing to buy or even try something that has not yet become a demonstrated success on some other road—a fear of making a possible mistake that someone will find out about. No matter how well conceived any device may be, the records of the past show that very few ever amounted to anything until after they had passed through a long stage of development, and success was finally built up on the foundation of failure. Conservatism has a

place, but a fear to try anything because it might possibly not turn out well never accomplished anything except to act as an impediment to progress. Much greater advancement might be accomplished by a greater willingness to aid in necessary development work from which all would benefit.

The report on train lighting equipment and practice presented yesterday morning was a carefully prepared report

Why Present Electrical Reports?

that contained a fund of valuable information, but as is usual with an electrical report presented to the Mechanical Division, it provoked no apparent interest. It was ably presented by E. W. Jansen, electrical engineer, Illinois Central, but he was the only one who discussed it. The report included data on car lighting, generator belts, specifications for lamps and lamp regulators, and outlined the present status of direct drive for car lighting generators. The report stated that at the present time there is no type of direct drive which does not include features that are objectionable to the extent of practically prohibiting its general use. At the same time it stated that there was a place for such equipment and it is entirely probable that apparatus will be developed which will meet all requirements. In his discussion Mr. Jansen showed how it was possible to save real money by improving the present method of belt drive, but this statement apparently fell on deaf ears. The same report will be presented before the Association of Railway Electrical Engineers, where, as usual, it will undoubtedly provoke lively discussion. What is the answer? The electrical department or departments on every railroad are growing rapidly and reports on electrical matters are becoming of ever-increasing importance, but apparently a meeting of the Mechanical Division is not the place to present them.

There is a wide difference of opinion among the railroads as to what constitutes the most economical type of open

Composite or All-Steel Car Construction?

top car construction. For a period of about 20 years, ending with our entrance into the European war, the all-steel type of construction gained steadily in prestige. A shortage of steel for other than war purposes then forced the extensive building of cars of the composite type. Since the end of the war there has been evidence of a growing disposition to question the supremacy of the all-steel coal car, because maintenance costs have proved to be much higher than was expected when the type first received serious consideration. The maintenance characteristics of steel and wood cars differ widely. Cars with wood superstructures require frequent light repairs and, if well designed, can be given a general overhauling at a comparatively moderate cost. The all-steel car, on the other hand, requires comparatively little attention beyond running repairs until wear and corrosion necessitate extensive renewal of the side and hopper or floor sheets, when the mill are also frequently found to be badly corroded. This frequently entails completely rebuilding the car body, at a cost under current prices often greater than the original cost of the car. Both types require paint protection. The maintenance of a proper protective coat is much more difficult on the steel car and very much more important than on the car of composite construction, and consequently it is much more generally neglected. Furthermore, rail-

road repair points are much better fitted to take care of the composite cars. Where the life of the steel car does not exceed eight or ten years before rebuilding becomes necessary—and this is not exceptional—it becomes a serious question whether the composite type would not prove to be the more economical. Under conditions such that the steel car will operate for 15 years, the comparison may be much more favorable to the all-steel type of construction. The dissimilarity in the characteristics of the two cars makes a true comparison of the ultimate maintenance costs somewhat difficult, and in this connection it should be pointed out that the small but frequent repair jobs required on a car of wood or composite construction tend toward wastefulness which is less readily checked than in the case of the more extensive repairs usually required when the steel car comes into the shop. This question is one which cannot be answered except on the basis of a careful study in which differences in the local conditions are taken into consideration. Opinions formed without such a study are as likely to be wrong as to be right.

There appears to be considerable interest in several European countries in the subject of roller bearings as applied

Roller Bearings for Car Trucks

to use on passenger and freight car journals. Several designs of such bearings are in service at the present time, and although it can not yet be said that any of them has passed the experimental stage, the results thus far obtained with some of them are quite encouraging. There has been a slight interest in the matter in this country also, although by no means as much as its importance would seem to warrant. There is no doubt that a successful adaptation of roller bearings here would effect noticeable economies in the costs of train operation. The ability to run for relatively long periods of time without additional lubrication and without danger of hot boxes or need of frequent inspection would be a step forward that would be welcomed by all. Despite the attractiveness of the proposition, and the fact that roller bearings have been successfully applied in many other fields, railroad men have fought shy of the innovation. Possibly this is because of a knowledge that several designs have been offered to them which looked well and did work well for a time, but eventually gave considerable trouble after sufficient time had elapsed to allow the results of fatigue to become manifest. The perfecting of a design of roller bearings for car trucks is bound to take some time, but little will be accomplished until the railroads attack the problem seriously and are willing to carry on a considerable number of tests for developmental purposes.

It may be true that, owing to the extremely rapid spread of autogenous welding, much of the work formerly sent to the railroad blacksmith shop now

Forging Machines Demonstrate Value

never leaves the erecting shop. Granting that this loss of work has a tendency to lessen the importance of the blacksmith shop, this department has more than held its own on a production basis because of the machine and drop forging work. Many locomotive and car parts are made at a minimum cost by the use of production forging machines, an interesting example of these operations being described in the December, 1921, *Railway Mechanical Engineer*. This article told of the machine forging work at the Elizabethport

shops of the Central Railroad of New Jersey, but the work is typical of that carried on at many other points. Bolts are made in great numbers and all sizes on forging machines. Truck cross-ties, draft sills, reinforcement channels, drawbar yokes, air brake levers and hundreds of small parts for use on locomotives and cars are produced in quantity by efficient forging machines. The quality of the work is excellent and its cost compares favorably with that of other methods of manufacture. The field for drop forging work also is very large and one which has not been developed as fully as it should in railroad shops. It is essential in all this work that dies be properly designed and carefully heat treated. Railroad men responsible for the design of these dies are to be congratulated on the mechanical ingenuity and knowledge of the flow metal under pressure which is often displayed. The reduced labor cost due to manufacturing more or less complicated parts at a single stroke of the hammer is self-evident and this work should be extended.

There is probably no lack of agreement on the proposition that all freight cars should be maintained as defects develop. In fact, this is the purpose of

**Penalty Prices
in
the Rules**

Rule 1 of the interchange code. Likewise, it is unquestionably a fact that foreign cars are quite generally neglected until it becomes necessary to return them home in bad order for heavy repairs. No incentive seems to have been found, however, to make the provisions of Rule 1 more than a pleasing fiction. The RAILWAY AGE has advocated the adoption of a schedule of billing prices for labor and material deliberately fixed to include a fair commercial profit from all operations performed under the price rules. This, it is believed, is sound in principle. There is no more reason to expect the railroads, which are essentially private corporations organized for profit, to perform at cost a service involving large expenditures for labor and material and requiring an extensive investment in facilities, than it would be to expect them to perform transportation service on the same basis. One of the objections which has been raised to this suggestion is that it would not prove effective, since the responsibility for financial results and the performance of maintenance operations is so widely separated. In this connection it is interesting to note in the report of the Committee on Prices for Labor and Material the application of this very principle in the establishment of prices for journal box lids with a differential intended to make the application of the A. R. A. standard lid profitable, and the application of other lids unprofitable. No doubt these are difficulties which would have to be overcome in establishing a set of prices in which a profit is included. But these do not include a lack of effectiveness as an incentive to improve the general standard of car maintenance.

In selecting a foreman or an officer of any railroad it is important to keep in mind not only his qualifications as

**The Foreman
and the
Public**

a leader of the men under him, but also his potential possibilities for making friends for the railroad. Remember that these men, because of their official connection, are looked upon by the public as integral parts of the railroad management. Then, too, the influence that they may have

upon the men under them will be reflected as the men themselves deal with the public, of which they form a large part in many communities. It is true that the type of man that will make a good leader will in most cases be one who can make a favorable impression upon the public. He cannot, however, make good in a large way unless he is fully informed as to the spirit of the management and of the facts about the road's operation, financing, etc., which may be misunderstood or misinterpreted by the public. If every railroad foreman and subordinate officer were fully informed as to facts about the railroad and its relations with the public, they could render invaluable service in these troublesome days. It is the force of public opinion, after all, that makes our Congressmen and public servants "toe the mark." Fortunately, or unfortunately, whichever way you may view the matter, public opinion forms and crystallizes slowly; it requires a long, slow and sometimes tedious program of education to change it. It is vital if the railroads are to prosper—and the prosperity of the entire country depends upon them—that railroad foremen, dealing as they do with the men in the ranks and holding responsible positions in the eyes of the public, should be selected and trained to interpret the spirit of the railroad and present the facts concerning it to the workmen and the public.

In any consideration of plans for conserving fuel it should not be forgotten that railway power plants, numbering over 1200 in the United States, are large fuel consumers. Do power

**Spotting
Power Plant
Fuel Wastes**

plant engineers and higher mechanical officers give these plants the continuous attention without which economy in fuel consumption will never be secured? It has been estimated that the average power plant wastes 25 per cent of its fuel in preventable heat losses while burning and these losses will never stop by themselves. They will never stop until some one in authority develops a definite plan for locating the losses, stopping them and keeping them stopped. A method of accomplishing these three objectives is outlined by Joseph W. Hays in an intensely practical little book entitled, "How to Build Up Furnace Efficiency," which passed through its tenth edition in 1916. Mr. Hays states that the only equipment necessary for "spotting" fuel wastes consists of some tallow candles, a flue gas analyzer, a sensitive differential draft gage and high temperature thermometer or pyrometer. With the idea of checking up fuel wastes the following questions are put directly up to each power plant engineer.

"What is the efficiency of your boiler furnaces? What draft in your boiler furnaces will carry your load and burn the least coal? Have you calibrated your boiler dampers and the main breeching damper? Have you equalized the draft among the boilers? How much air is leaking through your boiler settings? When is an air leak an aid to efficiency? Where are the air leaks that are injuring efficiency? How much too much air are your firemen permitting to flow through the fuel bed? Do your firemen admit more air than is necessary at the furnace either above or below the fire? How much excess air from all sources are you heating and sending up the chimney? How thick should the particular coal you are burning be carried on the particular grates you are using? Are you using the coal best adapted to your conditions? Are you using the grates best adapted to your conditions? Should the coal you are using be fired dry or wet for greatest economy? Is the grate surface just right for the highest economy? How much and what kind of combustible is passing up your chimney? What are the specific causes of the smoke you are making? Is the low evaporation of which you complain due to the boiler, the furnace, the coal or the fireman? If you don't know why the evaporation is low, how will you proceed to increase the evaporation? How much coal is your poor fireman wasting and how much more can your best fireman save? Will you state under oath that the boiler headers are always properly packed and the setting and baffling always in proper condition before your boilers are put into service?"

A satisfactory answer to these questions will be impossible unless most of the fuel wastes have been "spotted," and if any plant engineer does not know how to answer the questions, he should either resign or take a course in combustion engineering.

Yesterday's Entertainment

THE ENTERTAINMENT activities of yesterday ended at an early hour this morning. An orchestral concert was given in the ballroom on the pier in the morning, followed by an informal dance in the afternoon and tea at 4:30 o'clock.

At 9:30 in the evening the formal hall of the week was opened. To the music of an enlarged orchestra the grand march, so dear to the hearts of the "old guard" of M. C. B. and M. M. times, commenced. The large floor of the ballroom was completely occupied by the marchers. On all sides in the exhibit booths and in the balconies there were throngs of ladies and gentlemen who did not take part in the march, but who were interested spectators. Dancing followed the grand march and was prolonged to a late, or rather an early hour.

Great credit belongs to the Entertainment Committee Chairman R. J. Himmelright and his co-workers and to the following sub-committee which was in charge last night: C. W. Floyd Coffin, chairman; Lewis O. Cameron, W. G. Cook, J. W. Fogg, G. A. Nicel, Jr., F. W. Venton, W. R. Walsh and W. M. Wilson.

Chief Interchange Inspectors to Hold Annual Meeting in Chicago

THE CHIEF INTERCHANGE Car Inspectors' & Car Foremen's Association has decided to hold its annual convention in Chicago August 22-24. The hotel in which the meetings will take place has not yet been selected. The subjects to be discussed, in addition to the usual consideration of the rules of interchange and loading rules, include the following: Car department apprenticeship, freight claim prevention, train yard repair conditions and preparing cars for flour loading.

Enrollment

THE ENROLLMENT booth at the main entrance to the Million Dollar Pier will be open today from 9.00 a. m. to 1.00 p. m.; 2.00 p. m. to 6.00 p. m.; and 7.00 p. m. to 8.00 p. m.

New President for Standard Coupler Company

COL. DOUGLAS I. MCKAY is attending the convention this year as president of the Standard Coupler Company, having been elected recently to that position. Colonel McKay was born in New York in 1883. After completing a course in the public schools he attended the College of the City of New York for three years and then entered West Point Academy, from which he was graduated with highest honors in 1905. He was commissioned a second lieutenant in the Coast Artillery and was promoted to first lieutenant in 1907. In 1908 he resigned to enter civil life and was appointed deputy chief of state constabulary. After a few months' service in this capacity he was promoted to chief in which position he served for three years.

In 1911 he was appointed first deputy police commissioner of the City of New York, having charge of the business administration of the department and direct command of the uniformed force. In 1913 he was appointed police commissioner. Colonel McKay resigned from the police department in 1914 to become assistant to the

president of J. G. White & Co., of which organization he became vice-president in 1915 and a director in 1916.

Shortly after this country entered the war Colonel McKay resigned to enter the army and was commissioned a major in the Ordnance Department. In December, 1917, he was promoted to lieutenant colonel and assigned to the general staff. In March, 1918, he was made a colonel and continued on general staff duty until August, when he was assigned to the position of emergency director of artillery ammunition production. He received his discharge at the end of 1918 and was elected president of the International Pulverized Fuel Corporation and Pulverized Fuel Equipment Corporation. Colonel McKay is a director of the Botany Worsted Mills, the International Agricultural Corporation and the Atlantic Trust Company of Baltimore.

John Woodrow Marden

JOHAN WOODROW MARDEN, for many years superintendent of the car department of the Boston & Maine, died on May 22 at his home in Waltham, Mass., at the age of 82. Mr. Marden entered the employ of the Concord Railroad as a repair man and later went to the Norwich & Worcester as general foreman. He left this position to become master car builder of the Fitchburg Railroad. He later acted for that road in the capacity of superintendent of rolling stock, superintendent of motive power, and superintendent of bridges and buildings. When the Fitchburg Railroad became a part of the Boston & Maine, he was made general foreman of the Fitchburg division and was later promoted to superintendent of the car department, which position he held up to the time of his retirement. Mr. Marden was a past president of the Master Car Builders' Association and also of the New England Railroad Club.

Train Control Order Reissued

THE INTERSTATE COMMERCE COMMISSION today made public its order to 49 railroads to install automatic train stops or train control devices upon designated portions of their roads comprising at least one full passenger division substantially in the form of the tentative order of January 10, except that the date for filing report and completing the installation is extended six months, so that the installation is required to be completed by January 1, 1925.

The specifications and requirements appear to be substantially as in the tentative order. Each road is required to file with the Commission on or before January 1, 1923, complete plans of its signal systems and the number and types of locomotives on the designated portion of the line, and to proceed without unnecessary delay to select and install the device; also to file by January 1, 1923, and each month thereafter reports of progress made, with reference to preparation for and installation of the device. However, the Pennsylvania, Panhandle, West Jersey & Seaboard, Long Island and Norfolk & Western will not be required to file the plans and reports until July 1, 1923, for the installation between Lewistown and Sunbury, Pa. The Commission's report says it has eliminated the provision in the specifications of the joint committee under which engineman would be permitted, if alert, to forestall the automatic brake application and proceed.

It has decided not to limit the order to roads or portions of roads already equipped with automatic block signals because it has no desire to discourage efforts to control trains automatically without the use of fixed wayside signals.



American Railway Association—Division V—Mechanical

Presentation of Five Committee Reports With Discussion Following Each Occupy Busy Session

Chairman Tollerton called the meeting to order at 10 a.m.

Report on Prices for Labor and Materials

Aside from reductions in the wheel prices, few revisions in the prices for materials have been made by the committee this year. The labor rates have been reduced 10 cents an hour from the present \$1.20 an hour in Rule 101 and \$1.45 an hour for tank car repairs in Rule 107.

The principal work of the committee has been in revising the time allowance in Rule 107 to compensate for increases in labor efficiency since 1920. These revisions are based on a 20 per cent improvement in output under day-work conditions. The allowances for more than 50 items

have been increased, principal among which are 38 items dealing with sill renewals. The committee recommends that no change be made in the time allowances for air brake repairs.

Additional allowances of \$100 for cast steel wheels and \$125 for rolled steel wheels are recommended in the settlement prices for destroyed cars under Rule 112. The committee expects to include further revisions in material prices in the 1922 code, if further price declines take place before the new code becomes effective.

THE COMMITTEE SUBMITS the following report under Freight Car Rules 101, 107, 111 and 112, and Passenger Car Rules 21 and 22:

The material prices recommended are the same as those reported under Supplement No. 1 of May 1, 1922, with the exception of certain items which have been adjusted due to market conditions. They are based on the average purchase price as reported by seven large roads during January and February, 1922, as well as current quotations of several large railway supply companies. The material prices include transportation charges, direct and indirect storeroom expenses, manufacturing cost wherever involved, and interest on stock investments, which is based on the average monthly inventory balance, multiplied by interest rate and result divided by total annual material disbursements. Scrap credits were based on the average current scrap material prices.

These material prices are recommended with the understanding that if there is any further decline before 1923, same would be

adjusted to existing conditions prior to the 1922 rules going into effect.

The present labor allowances were based on time studies conducted during 1915 and 1916, with proper adjustment for decreased productivity of labor on day work basis as compared with piece work basis which existed when the present allowances were established. A recent study conducted on three large roads developed that the time at present required to perform freight car repairs made necessary, due to improved efficiency of labor on day work, the removal of part of the adjustment referred to, in order that the labor allowances might reflect present day work productivity, and the labor allowances that were adjusted in 1920 have been reduced approximately 20 per cent. In recommending these allowances due consideration was given to the fact that the majority of repairs to foreign cars is being done on a day work basis.

The labor rate per hour (Item 175, Rule 101) is recommended at \$1.10 per hour, which is based on a study of 20,006 men, being

the weighted average hourly rate paid repairs on wooden, steel and composite freight train cars by eight large roads, plus the average direct and indirect overhead of 62 per cent as reported by six representative roads.

Preserving the present differential, the labor rates per hour (Items 19 and 20 of Rule 21) are recommended at 85 cents per hour for labor on lubrication and \$1.20 per hour for labor repairs to passenger train equipment.

Any reduction in the basic hourly rate before 1923 is to be adjusted before the rules go into effect.

The committee also recommends under Items 458, 459 and 460, Rule 107, a charge for dismantling all-steel constructed cars, which at present is being charged at actual cost. The recommendations are the average results based on the study of 123 cars submitted by three large roads, and covers all necessary cost of cutting, handling, sorting and weighing the scrap.

The present charges under Rule 111 are to remain, as the reductions are very slight and the committee felt that no reduction ought to be made at the present time.

The pound prices for cars in Rule 112 is based upon statistics furnished by the President's Conference Committee. With the rapidly declining market, your committee, in the absence of complete figures from the President's Conference Committee on new car costs for the full year of 1921, made an arbitrary reduction of 30 per cent, effective from May 1, 1922, which was covered by Supplement No. 1, dated May 1, 1922. Any further reductions before the 1922 rules go into effect, obtained either from the market conditions or through the obtaining of complete data from the President's Conference Committee on the 1921 cost of new equipment, will be adjusted and included in the 1922 rules, which go into effect as of January 1, 1923.

An additional allowance of \$100.00 for cars equipped with cast steel wheels, and \$125.00 for cars equipped with rolled steel wheels, is recommended under Rule 112, which represents the difference in value over the cast iron wheels, due consideration being given the lower scrap credits for these kind of wheels.

The committee also proposed changes in the scrap and service metal charges for new wrought steel wheels, Rule 98, as follows: Scrap value for metal inside the condemning limit reduced from \$5.55 to \$1.90; service metal value reduced from \$2.21 for each 1-16 inch to \$1.52. The labor charge of 1.8 hours allowed for restoring the standard contour is also reduced to 1.4 hours in question No. 3 under the interpretation of this rule. The revisions in material prices in Rules 101 and 22 were almost entirely confined to wheels. Items 190, 190-A and 190-B, Rule 101, covering charges for stenciling, have been transposed to Rule 107, Items 376, 376-A and 376-B.—EDITOR.]

The report is signed by A. E. Calkins (chairman), N. Y. C.; Ira Everett, Lehigh Valley; J. H. Milton, C. R. I. & P.; C. N. Swanson, A. T. & S. F.; T. J. Boring, Penn. System; E. H. Weigman, L. & N.; I. N. Clark, Grand Trunk; H. G. Griffin, Morris & Co., and A. E. Smith, Union Tank Car Co.

Discussion

A. E. Calkins (N. Y. C.): Under Rule 98 you will see it is practically a repetition of last year's rule except that we have adjusted the prices so as to hit the present cost price of wrought steel wheels on account of the lowering of those wheels. Rule 107, as you see, sets forth the labor charge as \$1.10 per hour for freight cars, and \$1.35 per hour for tank cars, (Item 443). The notes on Rule 21 I have already mentioned in the summary of the report.

C. E. Fuller (U. P.): I do not think there is any subject before this convention that is as important as the Price Committee Report. It is dollars and cents for all of us. There is more or less criticism during the year relative to prices. The question of repairing foreign cars and being able to get out even is discussed, and I hate to see this convention close this report without having some of the men who are repairing cars tell us something about it. We cannot hope to get 100 per cent, but we can get nearer 100 per cent if we get the expression of the men who are doing this work.

It is my feeling that car men themselves are the ones who should give us the information, men who are right on the ground floor and doing the work, and while I do not see

anything about this report that I can criticize, I am sure there are gentlemen here who will criticize it and have criticized it, and now is the time to do it. Let us all get some light on the subject.

Mr. Calkins: I think with all the inquiries we will undoubtedly get during the year there ought to be some questions today. I know that our dockets every meeting are pretty well loaded with inquiries as to how to apply these prices. It would be of help to the committee to hear some expressions today.

T. H. Goodnow (C. & N. W.): I would like to ask the chairman of the committee why there is a special allowance for steel wheels. Is not that covered in the committee's costs, the same as other specialties on cars? That is referred to on the last page where you make a special allowance for settlement price for cars equipped with steel wheels. Do not you set these figures up the same as the other materials used on the cars?

Mr. Calkins: The reproduction costs for new cars is taken from the President's Conference Committee on the basis of cast iron wheels. The prices are based all the way through on a plain car with certain allowances for the specialties, but the only specialty which was recommended by the President's Conference Committee was the wrought steel and cast steel wheel.

Mr. Goodnow: Why do you recognize that and no other special features?

Mr. Calkins: Because it was referred to us by the President's Conference Committee.

Mr. Goodnow: The car with steel wheels is being specially favored apparently. There are lots of items on cars that cost about the same that should have been brought to the attention of the committee, if it was known that we were going to set up individual prices.

Mr. Calkins: Take the item of roofs. You have the base price on the ordinary car roof and the other types of roof are rated accordingly.

Mr. Goodnow: These arbitrary figures in the settlement of cars, with reference to special items on the car, are going to draw in other things on the car. I think if you are going to establish that principle, you must go further and make it apply to everything of a special character on the car.

Secretary Hawthorne: When the Depreciation Committee's report was presented they included wrought steel wheels as a special addition to the destroyed car settlement. When that report was presented on the floor, Mr. Giles offered a resolution that the cast steel wheels should be given consideration. That resolution was approved by this body at that convention and acted on by the Price Committee, but the rules have not been printed containing that feature.

F. W. Brazier (N. Y. C.): This committee, if you notice, is made up of representatives of railroads located in the north, south, east and western sections of the United States and Canada. They have gone into this work very carefully and the work which they undertook to do is very trying and difficult. I want to compliment the committee for the hard work done. It is easy for men to come to the conventions who are not on the committee and read the report and get some of the benefits of the information contained. They do not necessarily have any appreciation of what is involved in the preparation of the report, however.

J. E. Mehan (C. M. & St. P.): I have been looking through the report to see if there is anything inserted in the report covering the reproduction cost. For instance, in the case of a tank car made by the tank car builders, there is included in the reproduction cost the freight charges for getting the tank to the owners. We have had cases where the car owner in setting up his cost has

Report of the Arbitration Committee

It is doubtful if any committee of the Mechanical Division has as many and as exacting duties to perform as the Arbitration Committee. The burden of answering questions or interpreting the rules informally has been heavy and the committee will no longer render decisions except on those questions or controversies which are submitted formally according to the procedure outlined in Rule 123.

Another duty of the committee involving a large amount of work is the passing on the mass of suggestions for changes in the rules, originating with railroad clubs, foremen's associations and others, all of which must be carefully weighed

by the committee before its recommendations to the Mechanical Division can be formulated. The interests of the railroads are so universally affected by the application of these rules that ill-advised changes would soon lead to chaos in their interchange relations, and a heavy responsibility rests on this committee which, in effect if not technically, determines what modifications shall be made from year to year. One of the significant changes this year is the reintroduction of combination defects under delivering company responsibility in Rule 32. The last of the combinations formerly appearing in Rules 37 to 42 inclusive, disappeared from the Rules in 1918.

DURING THE YEAR Cases 1184 to 1232 inclusive, have been decided and copies sent to the members. A copy of these decisions is made part of this report. A vote of concurrence in the decisions is respectfully requested by the Committee.

With the approval of the General Committee, your committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the Rules of Interchange. The more important of these interpretations have been issued to the members in Supplement No. 1 to the 1921 Rules of Interchange.

Under date of September 8, 1919, the Arbitration Committee issued Circular No. 60 outlining certain requirements to be followed in presenting questions for interpretation in connection with the Rules of Interchange, as well as regular arbitration cases for decision. In many cases there has been more or less disregard of the instructions referred to. The situation has become so burdensome that the committee considers it necessary to discontinue the practice of furnishing direct interpretations. Therefore, in the future, questions or controversies arising under the Interchange Rules on which a decision is desired should be regularly submitted in the form prescribed in Rule 123.

All recommendations for changes in the Rules of Interchange submitted by members, railroad clubs, private car owners, etc., have been carefully considered by the committee and, where approved, changes have been recommended.

Recommended Changes in the Rules of Interchange

As far as possible the changes and additions in the text of the rules are shown in italics.

RULE 2

In order to eliminate conflict between Car Service Rules and Interchange Rule 2 it is recommended that the second paragraph and sections (c) and (d) of this rule be modified in accordance with proposed form shown below:

Second Paragraph—Empty cars offered in interchange must be accepted in any condition and *be available for some combination that can be loaded in the car, the receiving road to be the judge.*

Owners must receive their own cars, when offered home for repairs, at one point on their line, subject to the provisions of Interchange.

Loaded cars furnished in order for storage loading must be in accordance with condition for such loading, the receiving road to be the judge.

Section (c)—I had better furnish car delivered under load, if load is considered or indicated within company district, may be removed or delivered, free, provided, substituted on both sides with a load order transfer, or return when empty yard, showing my district for which the car was transferred or returned, in which case it must be accepted unless the receiving line has a

direct physical connection with the car owner at that point or where delivery can be made to the car owner at that point through an intermediate switching line, car ferry or float."

Section (j)—Eliminated.

RULE 3

The use of coupler yokes with pull depending entirely on the rivets should be prohibited and the committee recommends that a new paragraph be added to Section (b) as follows:

"After January 1, 1924, cars equipped with couplers having riveted yoke without lugs will not be accepted in interchange."

The committee recommends that Section (c), second paragraph, be modified to read in accordance with proposed form shown below; to permit the use of No. 2 or No. 2 plus beam as recommended by the Committees on Brake Shoe and Brake Beam Equipment, Train Brake and Signal Equipment and Car Construction; also in connection with changes recommended in Rule 17, Section (c).

"Section (c) second paragraph—Cars built after January 1, 1917, or cars receiving general repairs after October 1, 1918, must be equipped with metal brake beams of not less than the capacity of the No. 2 A.R.A. brake beam."

The committee recommends that the effective date of Section (d) second paragraph, be extended to January 1, 1924. The present situation justifies this extension.

The committee recommends that Section (f) be modified to read in accordance with proposed form shown below, the effective date being extended to January 1, 1923:

"Section (f)—After January 1, 1923, no refrigerator car equipped with brine tanks will be accepted in interchange unless provided with suitable device for retaining the brine between icing stations."

The committee recommends that the effective date of Section (g) be extended to January 1, 1923 and the section modified in accordance with proposed form shown below:

"(g) After January 1, 1923, cars will not be accepted from owners unless stenciled showing month and year built, or bearing a load plate giving this information. Cars built prior to 1895 may be stenciled "Built prior to 1895" or bear a badge plate giving this information." (Reference to tank cars eliminated.)

The committee recommends that the effective date of Section (h) be extended to January 1, 1923, and the section modified in accordance with proposed form shown below:

"(h) After January 1, 1923, cars will not be accepted from owners unless the body is stenciled light weight and capacity in pounds as provided for in Rule 86. Tank cars shall be weighed and stenciled by the tank car companies only, or by authorized representatives of the tank companies."

The committee recommends that Section (j) be modified to read in accordance with proposed form shown below.

"Section (j) Refrigerator cars not equipped with door hooks and fasteners or *other efficient device* to secure the doors in an open position will not be accepted in interchange."

It is felt that the use of any efficient device for this purpose should be permitted.

The committee recommends that the time limit in the second sentence of Section (1) be extended to January 1, 1924. It is considered advisable to allow additional time in which to comply with this requirement.

The committee recommends that the answer in interpretation of No. 4 be modified in accordance with proposed form shown below:

"A.—If a tank car is equipped with safety valves, the valves must be tested and the record of the test stenciled on the tank, as required by the Tank Car Specifications, regardless of the commodity carried. *Test of safety valves is required at intervals as follows:*

	lb. per sq. in.	Time limit for test
Class I	12 and 25	2 years
Class II	12 and 25	2 years
Class III	25	2 years
Class IV	25	6 months
Class V	200	2 years

RULE 4

The committee recommends that the second paragraph of this rule be modified in accordance with proposed form shown below. It is felt that the rewording of this rule will bring about the desired improvement in avoiding the issuance of unnecessary defect cards.

"Defect cards shall not be required for any *slight damage (new or old), that of itself does not require repairs before reloading of car. Defect card shall not be required for raked or cornered sheathing, roof boards, fascia, bent or cornered end sills, if defects are old.*"

RULE 9

The committee recommends that the item showing information required on billing repair card under the heading "Air Brakes Cleaned" be modified in accordance with proposed form shown below:

- "R&R K-1 or K-2, convertible or non-convertible.
- "Name of road and date of last previous cleaning.
- "Work performed, per Rule 60."

The committee recommends that a new item be added under the heading of "General Information," to be shown on billing repair card as follows:

"Size of Bolts and Nuts"

This will make it possible to check the weight of such material. The committee recommends the following interpretation of this rule:

"Q.—Is it necessary to specify dimensions of forgings and springs on billing repair card in addition to weight?"

"A.—No."

This interpretation seems necessary on account of certain railroads insisting that this information be furnished although not specified in the Rules.

RULE 12

The committee recommends that the following be added as the second paragraph of Rule 12:

"At points where it is impracticable for a railroad company to obtain joint evidence, the evidence of car owner shall be sufficient provided it is furnished by a competent representative of the railroad company after actual inspection has been made by him."

The car owner should be afforded the means of establishing the existence of wrong repairs in the many instances when it is impracticable to secure joint evidence.

RULE 17

To permit the use of No. 2 or No. 2 plus brake beams as recommended by the Committees on Brake Shoe & Brake Beam Equipment, Train Brake & Signal Equipment and Car Construction, the committee recommends that Section (e) of this Rule be modified in accordance with proposed form shown below:

"(e) A. R. A. No. 2 or A. R. A. No. 2 plus brake beams may be used in repairs to all freight equipment cars equipped with non-A. R. A. A. R. A. No. 1, A. R. A. No. 2 or A. R. A. No. 2 plus brake beams, charges and credits to be on basis of beams applied and removed. A. R. A. No. 3 brake beam must be replaced in kind."

The committee recommends that Interpretation No. 11 of Rule 17 be modified to read in accordance with the proposed form shown below:

"Q.—Owing to the great demand for equipment, it has become necessary in a number of cases to repair truck bolsters and pressed steel side frames by riveting patches, which makes a reasonably substantial job. Is it proper to bill car owner for this work?"

"A.—The patching of bolsters and truck side frames generally is not considered good practice. However, in the case of pressed or structural steel bolsters and pressed or structural steel side frames, patching of flat surfaces or tension side by riveting on plates, in a substantial manner, is permissible, and may be considered permanent repairs, provided this patching restores original strength of bolster or side frame."

In order to clarify the matter of exchanges of various types of triple valves the committee recommends the following interpretations to be added to this rule:

"Q.—What types of triple valves are standard? What types convertible and what types non-convertible?"

"A.—The only A. R. A. standard triple valves are the K-1 and K-2.

"The only triple valves that are convertible to the "K" type are those having removable check valve case.

"Triple valves having check valve case cast integral with triple valve body and not removable are non-convertible to the "K" type.

"Q.—Is it considered wrong repairs, to substitute one type of non-convertible triple valve for another non-convertible type?"

"A.—No. Provided car was built prior to January 1, 1919, and is stenciled showing a non-convertible type valve as standard or where car is not stenciled showing what type of valve is standard. Cars built after January 1, 1919, must have "K" type of triple valve applied."

RULE 32

The suggestion to include in Item 1, discharge valve caps missing from tank cars, as delivering line responsibility, was not approved. These caps may and do work out of position and lose from cars in fair service.

The committee recommends that the following combination of defects denoting unfair usage be added to this rule immediately following the present first paragraph:

"Delivering company will be responsible for damage to ear when the following combinations of sill damage exist, regardless of cause or physical condition of sills.

"Wooden Underframe.—Six or more longitudinal sills broken.

"Composite Underframe.—Two continuous metal center sills, broken or bent, together with three or more other longitudinal sills, broken or bent, when necessary to straighten, splice or renew.

"All-Steel Underframe.—Four metal longitudinal sills, broken or bent, when necessary to straighten, splice or renew.

"Tank Cars with Two Metal Longitudinal Sills only.—Two continuous metal longitudinal sills, broken or bent, when necessary to straighten, splice or renew; provided such damage is accompanied by the shearing of all tank anchor rivets or bolts.

"Note—A sill is regarded as "broken" when necessary to splice or renew, even though breakage was due to decay, elongated bolt holes, or other old defects.

"Note—A sill is only regarded as "bent" when necessary to remove from car to straighten.

"Note—Shearing of all tank anchor rivets or bolts means the "shearing" of either those securing the anchorage to the underframe or tank to the anchorage or both."

The committee recommends that present Section (d) of this rule be eliminated in view of above recommendation for combinations of defects denoting unfair usage.

The committee recommends that a new item, to be designated as item (c), be added to the causes of damage denoting unfair usage as follows:

"(c) Telescoping superstructure above the sills due to mounting of adjacent car"

The committee recommends that the last paragraph of Rule 32 be revised to read in accordance with proposed form shown below:

"Defect cards shall not be required for any slight damage (new or old) that of itself does not require repairs before reloading of car. In no case shall defect card be required for raked or

cornered sheathing roof boards, fascia, bent or cornered end sills, if defects are old."

The committee recommends the elimination of present Interpretation No. 7 and the modification of present Interpretation No. 4 to read as follows:

"Q.—Does the damage to a car under any of the conditions enumerated in this rule carry with it the same responsibility for damage occurring to other cars in the same train or draft?

"A.—Derailment is the only cause for which the same responsibility applies to any damage sustained to other cars at same time in same train or draft, except as otherwise provided in Rule 33."

RULE 33

The committee recommends the addition of the following paragraph to this rule:

"Where running boards on tank cars are spliced, the joint must be located over the running board support and a steel plate of not less than 3/8 in. by 8 in. by 10 in. must be either riveted or bolted to the running board support, and the running board secured by not less than four bolts."

RULE 43

The committee recommends the elimination of the present notes under this rule account of the recommendation for combinations denoting unfair usage under Rule 32.

RULE 58

The committee recommends that the words "Cars offered in interchange with" in the first line of this rule be eliminated from the rule. As these parts are frequently reclaimed for further use, they should be replaced at the expense of the handling line.

RULE 59

The committee recommends that the words "Cars offered in interchange with" in the first line of this rule be eliminated from this rule. As these items are frequently reclaimed for further use, they should be replaced at the expense of the handling line.

The committee recommends the addition of a new paragraph to this rule, under the bracket "Delivering company responsible," as follows:

"Missing steam heat hose or air signal hose, complete, where cars are stenciled that they are so equipped."

It was felt that the car owner should be protected for such missing hose when car is so stenciled.

RULE 60

To insure a higher maintenance standard for retaining valves, dirt collectors and pipe strainers, the committee recommends the addition of the following new paragraphs to this rule, to follow the present first paragraph and read as follows:

"Charge is not permissible for cleaning triple valve or cylinder unless the triple valve, cylinder, retaining valve, dirt collector (or pipe strainer) are all cleaned at same time."

"If either the retaining valve or dirt collector (or pipe strainer) are cleaned, charge may be made therefor even though cylinder and triple valve are not cleaned at same time. The cleaning of these items must be shown separately and bill rendered in accordance with Rule 111."

RULE 70

The committee recommends that the following note be added to this rule:

"Note.—Defect cards should be attached to car at time and place wrong wheels are applied. Failure to do this obligates the road delivering car in interchange to issue its defect card. Before rendering bill on authority of such defect card, however, the car owners must investigate their records to ascertain if possible the road on which wrong wheels were applied. If by such investigation the owner fails to locate application, a statement to that effect must accompany bill, on the defect card. In the event the application is located by car owner, settlement must be made by the road responsible, in which case the defect card issued under Rule 70 must be canceled. Subsequent receipt of repair card by owner after bill has been rendered on authority of defect card carries the same obligation."

Car owners should be protected as far as possible against the substitution of cast iron wheels for wrought steel or cast steel wheels, and the penalty should be assessed wherever possible against the line making wrong repairs instead of against delivering line.

RULE 86

The committee recommends that the effective dates of the third and fourth paragraphs of Section (b) of Rule 86 be extended to January 1, 1924. Account of the large number of these axles

in service, it is felt that more time should be allowed to effect their retirement.

The committee recommends that the third paragraph of Section (b), Rule 86, be modified in accordance with proposed form shown below:

"Non-American Railway Association Standard axles may be used to replace non-American Railway Association Standard axles in kind until January 1, 1924, subject to condemning limits of such axles, except that non-American Railway Association Standard axles must not be applied to tank cars of private ownership."

As tank cars are built to comply with the Specifications of the A. R. A., which provide for the use of standard axles, it was felt that such cars should be protected against the substitution of non-A. R. A. axles.

RULE 88

The committee recommends the following addition to the first paragraph of this rule:

"Except that when the following substitutions are made, defect cards must be issued for material and labor of correcting, regardless of responsibility for the repairs: Wrong truck side; arch bars in place of truck sides; wooden draft timbers in place of metal draft arms extending beyond bolster; wooden roof in place of metal roof; wooden end in place of all-steel end on house cars."

The owners should have full protection against improper repairs of the items specified.

RULE 91

The committee recommends that (b) and (c) under the note in Rule 91 be modified in accordance with the proposed form shown below:

"(b) No bills should be returned for correction on account of incorrect car numbers, but shall be passed for payment at once and the alleged errors in car numbers brought to the attention of the company rendering same within 60 days from date bill is passed for payment, but in no case exceeding six months after first receipt of bill.

"The billing company shall furnish correct car reference, or shall issue within 30 days countercharge authority as per form shown on page 176. If it is alleged car was not on repairing road on date claimed, the car owner must show location of car on such date.

"(c) No bills shall be returned for collection on account of other error or questionable charges unless the net amount involved exceeds 10 per cent of the total amount of the bill, but shall be passed for payment at once and the alleged error brought to the attention of the billing company within 60 days from date bill is passed for payment, but in no case exceeding six months after first receipt of bill. The billing road must furnish proper explanation or shall issue within 30 days countercharge authority on form shown on page 176. If objections to bill does not amount to 25 cents in aggregate, no exception shall be taken, but bill shall be passed for payment as rendered."

There should be a time limit on exceptions on car repair bills where there has been an unusual delay in payment of same.

RULE 101

It is recommended that the words "Special Section" be inserted in the identification table for solid brake beams in connection with the 17 lb. per ft. channel, in order to clear up apparent inconsistency in the table.

It is recommended that the table shown be substituted for the present identification table for trussed brake beams. It is felt by the Committee on Brake Shoe and Brake Beam Equipment that showing the depth of truss will make the table in question less confusing to inspectors.

(See Illustration of table on page 1137.)

RULE 112

The committee recommends the following interpretation of this rule:

"Q.—From what date shall depreciation be figured in the case of a tank car where the underframe and tanks were built new on different dates?"

"A.—In cases of tank cars with underframes and tanks constructed on different dates, the oldest date built on the car, whether tank or underframe, shall be the basis of settlement for figuring the depreciation."

The committee considered carefully recommendations to restore separate settlement for rebuilt cars under this rule, but decided that no change should be made at this time. The persons

making these suggestions are referred to the reasons shown in report for 1921.

PASSENGER CAR RULE 18

The committee recommends the elimination of reference to Freight Car Rule 32, Section 4, because of the modifications recommended in Freight Car Rule 32.

The committee recommends that Rule 18 be modified in accordance with proposed form shown below:

"Settlement for passenger equipment cars destroyed shall be based on cost of reproduction in kind at date of destruction. Depreciation shall be figured at 3 per cent per annum from the date originally built (straight depreciation basis), not to exceed 30 per cent of reproduction cost."

This change is recommended because the present rules do not fully reimburse car owner for car destroyed and in order to bring method of settlement in line with the freight car rules.

The report is signed by T. H. Goodnow (chairman), C. & N.; J. J. Hennessy, C. M. & St. P.; J. Coleman, Grand Trunk; F. W. Brazier, N. Y. C.; T. W. Demarest, Penna. System, and G. F. Laughlin, Armour Car Lines.

Discussion

Mr. Goodnow: There is shown an analysis of the various changes in the rules that have been recommended for adoption on your part and the issuance of the rules for the ensuing year. The Arbitration Committee held a meeting yesterday afternoon to give all an opportunity to express themselves on these changes and it is to be assumed that any questions that might arise in connection with them were fully presented at that time. As a result of the evident divided opinion regarding responsibility for damage to cars, as covered by Rule 32, the Arbitra-

tion Committee in executive session following the open meeting, considered it best to recognize that, and to withdraw its recommendation under Rule 32—that portion of which refers to the setting up of the combinations. So that in acting on the Arbitration Committee's report, it will be understood that the Arbitration Committee has withdrawn that portion of its report, at least for the ensuing year, and will continue present Rule 32 so far as that portion of the rule is covered. It can be understood that the further recommendations in connection with Rule 32 are still a part of the Committee's recommendation to be acted upon at this time.

Similar action, of course, will follow on the passenger car rule. That portion of the rule which refers to action on this rule, the same as the change in Rule 32, will be withdrawn on account of withdrawing the recommendation for the freight car rule. The other rules that were questioned, or as to which suggestions were made at yesterday's meeting, were fully considered by the committee and the committee continues the recommendation as made in the report. The only change that they make is the one that I have referred to in Rule 32.

Mr. Calkins: Do I understand with the change in Rule 32 the committee withdraws its recommendation to eliminate the notes in Rule 43?

Mr. Goodnow: Any change that is effected by the change in Rule 32 will continue the same as at present. I did not refer to all the rules.

J. J. Tatum (B. & O.): I move that the report of the Arbitration Committee be accepted as amended.

(The motion was seconded, put to a vote and carried.)

Report of Committee on Tank Cars

This is one of the most important committees of the association. The rapid increase in the quantity of the highly volatile and dangerous casinghead products, and the disasters which have resulted from their shipment in defective or unsuitable equipment, have created for the committee numerous problems which have been and are not only physically exceedingly difficult to solve but, because of the conflict of interests involved, require the exercise of the utmost patience and tact in their handling.

The work of the committee has not been en-

tirely free from controversy, but it is safe to say that every interest affected will agree without reservation that a never failing spirit of fairness has characterized this work during the chairmanship of the late A. W. Gibbs. This year's report, which was prepared under Mr. Gibb's direction shortly before his death, indicates that steady progress is being made toward the solution of two of the most difficult tasks before the committee, i. e., the development of a satisfactory safety valve and a satisfactory bottom outlet valve.

THE TANK CAR Committee during the past year has continued its efforts to secure improvement of those tank car features which reports from the Bureau of Explosives and others indicate are the principal sources of trouble, viz., safety valves, dome closing arrangements, heater coils, and the bottom outlet.

Safety Valves

A safety valve was developed at Altoona in which the contour of the seat, valve and huddling chamber followed very closely the design of a valve submitted by one of the manufacturers of locomotive safety valves which had been previously tested. Some modifications were also made in the form of the wings of the valve disk to reduce the restriction of the discharge area, and the spring was made with six coils instead of five as in the standard design. The test of this valve indicates that the question of discharge capacity at the popping pressure has been satisfactorily solved, as practically

full discharge is obtained at the initial pop. This is important in that while the tanks are required to be designed for a bursting strength of 300 lb. per sq. in., this strength does not hold good when the tanks are heated to high temperatures by external fire.

Following this test the valve manufacturing concern has prepared three experimental valves along the same lines and they are now at Altoona for test. It is hoped that these valves will show also a great improvement in the matter of tightness up to the popping pressure. Until the results of these tests are available the Committee is not prepared to make its recommendations as to changes in standard design.

Advices from users of tank cars indicate that great improvement in the performance of the present standard design of valve as to leakage, etc., may be obtained by proper care and maintenance.

The committee recommends that the dimension of the spring follower of the 5 in. standard safety valve, (Fig. 9-A, Tank Car

Several designs for the rim and ribs may be reduced from 5 1/2 to 5 in. to permit fitting between the spring and the follower.

Experiments have shown that the present six months' test period for safety valves on Class IV tank cars may be safely lengthened, the Committee recommends that the first paragraph of Section 24, Tests of Safety Valves, Class IV Specifications, be amended to read:

Safety valves shall be tested and, if necessary, adjusted at intervals of not less than one month.

The Committee has been called to the fact that reports of leakage conditions some concerns still have on hand a model of safety valve castings of the 1920 design. Committee recommends that provision be given to place in service any valves cast or machined that may be required that the patterns be changed at once so that future castings will comply with the requirements of Specification No. 1 to the specifications for tank cars (effective January 1, 1922).

Bottom Outlet Valves

The report of the sub-committee which is handling this feature states in part as follows:

Up to March 1, 1922, 28 different designs have been considered, of which 17 are modifications of the present plunger type, nine of the plug type, one a sliding disk and one a rotating disk.

Four designs in present state were recommended for further trial, 13 were authorized for further trial only with the understanding that the designs must first be changed; 9 were eliminated from further consideration. One was authorized for trial November 19, 1921, but has not yet been tried out. One was authorized for trial September 13, 1921, but trial has been suspended pending reports on tests of the lubricating device, which is a feature.

None of the designs we have studied can be considered to have solved the problem of leakage. The four designs in first group, however, show considerable improvement over the present type.

We believe that a valve will not be satisfactory or practical which requires two seats, the aid of gaskets, or a complication of levers and springs. The operating mechanism should be simple, strong and positive in action. Troubles due to sticking appear to be characteristic of valves of the plug and piston type.

The work of this sub-committee will be continued during the coming year.

Extension of Bottom Outlet Below Sills

The committee in its 1921 report recommended that "the bottom outlet pipe when applied to tank cars having center sills shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap." The committee obtained the views of various associations representing tank car users, and after discussion of the subject with representatives of the car builders recommends that Section 7 (c), Specification for Classes I and II cars, be amended to read as follows:

7 (c) The bottom outlet pipe, in the case of replacements on existing cars, shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (d) With cap and plug or combination cap and valve on 4 in. outlet—

1. With cap and plug—Cap, rubber cap and plug or combination cap and plug.

2. With cap and plug—Cap, rubber cap and plug and combination cap and plug.

3. With cap and plug—Cap, rubber cap and plug and combination cap and plug. The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than 1/2 in. (being a model).

The above recommendations that Section 7 (d), Specifications for Classes III and IV cars, be amended to read:

7 (d) The bottom outlet pipe, in the case of replacements on existing cars, shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (e) With cap and plug or combination cap and valve on 4 in. outlet—

1. With cap and plug—Cap, rubber cap and plug or combination cap and plug.

2. With cap and plug—Cap, rubber cap and plug and combination cap and plug.

3. With cap and plug—Cap, rubber cap and plug and combination cap and plug. The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than 1/2 in. (being a model).

7 (f) The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (g) The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (h) The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (i) The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

7 (j) The protrusion of the bottom outlet pipe shall not project below the bottom line of sills more than the threaded length necessary to permit the application and removal of the bottom outlet cap. The protrusion of the bottom outlet pipe shall not be more than 1/2 in. (Fig. 2).

Dome Closing Arrangements

Several designs have been submitted and approved for trial to meet the requirement adopted last year that after July 1, 1922, the dome cover for Class IV cars, if external, shall be secured by bolts; or if internal, by yoke and screw.

The committee recommends that the drawing of Fig. 1, (Approved method of automatically venting pressure on starting removal of dome cover) be made to show the lead gasket projecting not less than 1/8 in. beyond the face of dome cover flange in order to insure the gasket bearing on the dome ring. (The present drawing shows the gasket flush with the cover surface.)

Heater Pipes—After careful consideration and consultation with the American Petroleum Institute the committee recommends that the following requirements be made part of the Tank Car Specifications:

Heating systems in new tank cars and new installations in existing tank cars shall comply with the following general principles:

1. Where heater pipes are installed not less than 2 in. extra heavy pipe and fittings shall be used. All piping shall be properly secured to permit the necessary expansion and contraction and so installed as to provide for self drainage.

2. Cast iron, malleable iron or cast steel return bends shall not be used. Return bends may be forged or made by bending the pipe and using threaded sleeve coupling, forged unions or welded joints. A minimum number of connections shall be used.

3. Single or multiple heater systems may be installed, but the latter is preferable.

4. The steam inlet preferably should be through the top of tank or through dome; the outlet may be either in the end or through the bottom of tank; but both shall be safeguarded by an approved form of cock, cap or plug. Where the discharge is through the bottom of tank, no part of pipe shall extend below bottom of underframe.

Where inlet or outlet pipes pass through the shell of tank, the opening shall be reinforced by suitable pads riveted on inside or outside. The pipe connection preferably shall be expanded or welded, or both, into pad. The outside connection shall not be an integral part of the heater, but it shall be secured to the pad by an approved design.

5. On new installations the heater pipes shall be tight at a hydraulic pressure of 200 lb. The same test shall be applied when the tank is retested.

6. Each compartment of a compartment-tank shall be treated as a separate tank and comply with the foregoing requirements.

7. Designs of heater systems shall be submitted to the American Railway Association for approval before application.

Compliance With Specifications in Case of Rebuilding Cars or Making Extensive Alterations—In view of instances of non-compliance with the specifications and of the very bad workmanship where tank cars have been rebuilt or extensive alterations have been made, the committee recommends that the following requirements be added to Section 25, Inspection, of the specifications for all classes of tank cars.

In case of extensive alterations or rebuilding of tank cars a Certificate of Compliance with the specifications, similar in form to that for new cars, page 17, shall be furnished to the car owner and to the Chief Inspector of the Bureau of Engraving.

Tests of Jackets of Class IV Cars—The committee recommends that the fourth paragraph of Section 23, Tests of Tanks, Class IV Specification, be amended to read as follows:

All tests shall be made by completely filling the tank with water of a temperature which shall not exceed 70 deg. F. during the test, care being taken not to spill any water on the tank and that all fittings are tight. The pressure may be applied in any suitable manner. The tank shall hold the prescribed pressure for not less than 20 minutes without leak or evidence of distress, with the source of pressure disconnected. While the tank is under pressure it shall be carefully inspected for evidence of leakage. If the jacket is to be removed, a drop in pressure shall be evidence of leakage, and a reduction of the jacket and insulation shall be removed as may be necessary to locate the leak and make repairs. After the repairs have been made the tank shall again be subjected to the prescribed test.

In this connection attention is called to the desirability of using some form of alkali wash or graphite paint on the outside of the tank and inside of the sheet iron jacket in order to prevent the insulating material from sticking fast and being damaged so that it can not be removed when it is necessary to remove it for any purpose.

Protection of Pipes Near Dome Head—The Bureau of Engraving has called attention to the hazards involved by loading or unloading pipes projecting through the dome head. While the committee is not prepared at this time to recommend a limit to the height of such pipes, it calls attention to the desirability that the projection shall be restricted to a minimum.

Method of Securing Casks—During the past year there was submitted to the committee a design for the transportation of liquid chlorine in 15 one ten caskers secured in cradles on a flat car.

While the Tank Car Committee has in the past restricted itself to the consideration of cars coming under the definition of "Tank Car" given in the Tank Car Specifications, it was felt in view of the dangerous characteristics of this product that the arrangement should be passed upon from the railroad standpoint, and the Committee, therefore, considered and approved the method of securing the containers to the car.

In this connection, if it is desired that the committee shall consider designs for cars of this type, or cars with wooden tanks for handling muriatic acid, etc., and possibly special cars for other products where the conventional design of tank car is not applicable, it should be definitely advised to that effect.

The report is signed by A. W. Gibbs (Chairman), Penn. System; C. E. Chambers, Central Railroad of New Jersey; Samuel Lynn, P. & L. E.; John Purcell, T. & S. F.; Geo. McCormick, Southern Pacific; F. K. Tutt, M. K. & T.; Col. B. W. Dunn, Bureau of Explosives; A. E. Smith, Union Tank Car Company; Geo Hartley, Semet-Solvay Company, and C. W. Owsley, The Texas Company.

Discussion

Geo. E. Tiley (General Chemical Company): I believe the Tank Car Committee should be given authority to include all types of tank cars within the scope of their investigations. The time has come when there are special types of tank cars being considered which are not now covered in the tank car specification. About two years ago a number of the acid manufacturers were in consultation with the Bureau of Explosives on the design of a special car for the transportation of hydrochloric or muriatic acid, which cannot be transported in either wooden or steel cars. The General Chemical Company ships this particular acid in very large quantities and we are at present using a wood lined car with the interior of the wooden tank prepared with a special tar and pitch mixture as a coating and an intermediate filler of about two inches of the same material to prevent the acid getting through the steel shell if it works its way through the wooden lining.

The average life of the tanks of those cars is about three years at the most and at times they create a very nasty situation for the railroads when they spring a leak en route, because it means in every case either sacrificing the acid or moving the car by a special movement to the nearest plant where it could be unloaded, regardless of the customer to whom it was consigned. Colonel Dunn and myself discussed the proposition and finally a special committee was appointed which is now at work upon it.

One acid concern, for illustration, has in service at the present time as an experiment a steel tank with a hard rubber lining; also a semi-hard rubber lining. We have two experimental cars with transverse wooden tanks, the insides of which are first fitted with canvas backing and then with a soft rubber lining. There are a number of other types of muriatic acid cars under experiment at the present time, and that is what the Tank Car Committee has in view in bringing this matter to your attention.

I believe in view of the special conditions which are being encountered in the acid business, as well as some of the other businesses, the time has come for the Tank Car Committee to consider tank cars of all descriptions and that the definition of the tank car should be modified accordingly.

Mr. Tatum: I would like to ask the Tank Car Committee if it has given any consideration to the fact that when tank cars are built and prepared for the heater pipe system, and the heater pipe system is not applied, plugs are applied to the outlets of the pipes. There is a method by which those plugs may be held in place to keep them from working out when cars are under load with such materials as act as lubricants upon the thread of the plug. We find from experience that these plugs become lubricated by certain materials and by the vibration of the tank they work loose and discharge their contents. We

find also that cars sometimes are bought with heater pipes in them for certain commodities and then are sold to other persons who do not have use for the heater pipes. These pipes are then removed and plugs applied to the holes through which the pipes pass. The same plugs become lubricated by the materials hauled in the tank cars and work out and discharge the load.

We had an experience a short time ago where a car was loaded with cotton seed oil. The car was received at interchange apparently with all plugs tight and in good condition. The vibration of the tank and the lubricant acting on the plug resulted in a leak taking place at the plug. The car inspector seeing the leak attempted to tighten the plug, but it was so near out of the cistern that it discharged the entire contents and had to be paid for. But worse than that, the inspector was almost drowned in the oil; he could hardly get out in time to save himself. It seems to me there should be some method by which these plugs could be secured so they would not work out, just as we double-nut bolts or have a lock nut to prevent them from working off. I would like to ask the Tank Car Committee if that has been given consideration.

Mr. Chambers: There was some action on that at the 1920 convention. Perhaps you do not have it in mind so I will read it. On page 690 of the 1920 proceedings, through a question raised by you, this answer was made: "Where heater pipes are used it is frequently the practice to make an opening in the one head of the tank for handling the pipes in and out. This opening, as a rule, is closed by a plug, screwed through the sheet or through a flanged fitting. There have been a number of failures of these plugs involving, in addition to loss of contents of the tank, injury and loss of life. In all cases it developed that the failure was due to the use of a cast plug cored on the inside for lightness.

"The committee recommends that the specifications require that where plugs are used in the heads of tanks of new tank cars, or as replacements in the case of existing cars, they shall be solid, of a good grade of grey cast iron, standard pipe thread and taper, and of a length which will screw at least six threads inside the face of fitting on the tank."

Mr. Tatum: Is it the opinion of the Tank Car Committee that the plug will not work out?

Mr. Chambers: I do not see how it will work out more than any plug you have in other places, and will not take lubrication if you tighten it.

Mr. Tatum: We tighten bolts, but even then we have them fall off. The matter, as it appears to me, is a very important one, and there should be some positive lock for the plugs, so that they cannot work out even though the inspector or repair man fails to screw it in tightly.

Mr. Chambers: I ask how many instances Mr. Tatum knows of where this failure occurred?

Mr. Tatum: I know of one instance where it cost \$10,000, and other instances where it did not cost so much, but I do not believe that the Baltimore & Ohio, from my observations of other railroads, is the only road that has had such experiences.

Mr. Chambers: That is the first time I have heard of such accidents to tank cars in handling. You will find in Section B that this was referred to letter ballot, but I can say for Mr. Tatum's benefit that we will very thoroughly consider this subject at our next meeting, and if we can find enough justification to make any change, we will do so.

Chairman Tollerton: Now is the opportunity to air your views and get important information from the Committee on Tank Cars and from others using tank cars. Considerable improvements are being made in tank cars for the shipment of explosives and it is important that you should get all the information you can. Full discussion of

this question is very desirable. We have with us today some representatives from the private tank car lines, and I would like to hear from Mr. Hartley.

G. Hartley (Semet-Solvay Company): I am also a member of the Tank Car Committee. I do not believe it is necessary to say anything more than what we have covered by our reports. I certainly would suggest, however, that in the case of any tanks offered for transportation after the test date has expired, that railroads should not transport such cars. When this is done disastrous results sometimes follow. In one case that I have in mind a car loaded with what is called pure ammonia (30 per cent) was put on the road and a few days afterward the inspector found that the test date had expired and he attempted to test the safety valve. In doing this he used a gage which showed 90 deg., and lifted the valve at 25 lb. pressure. The commodity inside the tank had generated a pressure and was also expanded up above the outlet for the safety valve. When the safety valve did lift, the ammonia rushed out and caused a loss of life. There is certainly no good reason for testing a safety valve which generates pressure under a load, after the test date has expired, as you have that indeterminate pressure on the other side of the valve. The tank car should not be accepted unless the safety valve is well within the test date shown on the car, which test date will not expire for a reasonable time.

Chairman Tollerton: Is Mr. Smith, of the Union Tank Car Company present?

A. E. Smith (Union Tank Car Company): I am a member of the committee and I would like to say that we are trying to provide the safest transportation we can supply and have constantly studied the tank car situation. In the case of any improvements which have been developed in the service of the car, we are glad to submit them to the Tank Car Committee.

Mr. Goodnow: I ask the Tank Car Committee, now that they have included in the specifications the heater piping, whether or not any consideration was given to the number of feet of radiation which should be provided, taking into consideration the number of commodities carried in the tank cars. That question is up with us. The number of feet of tank car heater piping affects the car capacity. It seems to me that there cannot be any difference in the heating pipes provided in a car. They should be included as a part of these specifications, so as to hold it to a minimum and maintain the carrying capacity of the car to as great a degree as possible.

Mr. Chambers: The heater pipe question has been considered by the committee for two or three years from every angle from which it could be approached. We do not feel it is within our province to tell a builder or a user how much piping must be used. We can only make specifications on the pipe and fittings. The man who loads the material will know what the radiation must be in order to unload it. And if it does not conform to those requirements, the users would make a protest. I do not feel that is a subject within our province. We have at the present time a sub-committee composed of members of the American Petroleum Institute which co-operates with us in all this work very fully.

(A motion that the report be received and submitted to letter ballot was duly seconded, put to a vote and carried.)

Chairman Tollerton: Your attention is called to the fact that this motion just adopted does not dispose of the question covered in the recommendation of the Committee on Safety Valves. Therefore, an additional motion will be necessary to cover that question. I will read it: "The committee recommends that permission be given to place in service any valves now on hand, but that it be required that the patterns be changed at once, so the

future castings will comply with the requirements of Supplement No. 1.

Mr. Fuller: How many castings are there on hand, and to what extent would it hurt the car owners if that recommendation was not carried out? Have you any information at hand to know the number of castings in stock of the old design?

Mr. Chambers: It is only a limited number. The secretary says, as he recalls it, it would take about two years at the present rate to use them up.

Mr. Fuller: Would it be a hardship to scrap them? My thought is this: We have been told to extend the time and we have done so in the case of a great many things, but if this particular proposition as to the amount of old valves on hand is not of any great magnitude, the question is, would it not be better to go into the use of the steel valve as early as possible?

Mr. Chambers: Our thought and action in regard to material which may happen to be on hand has always been to not show a wasteful tendency. I do not know that it would be an extreme hardship if we set the date from which time on the new pattern will have to be used. This would mean the scrapping of a number of the old valves, but I do not think that it would amount to a great deal.

Mr. Fuller: I believe it has been your observation, as it has been mine, that we have had many requests for extensions of time with regard to the application of materials to tank car work when the materials could have been used for something else. Take the thickness of the plate used in the construction of the tank itself. This association continued to make extensions when the new application should have been put in force. A few years ago we were confronted with the fact that the manufacturers were building tanks that would not comply with the specifications. We have to consider, of course, the question of the waste of material, but at the same time we feel that if certain recommendations are designed for the improvement of the equipment we should benefit by that improvement as soon as possible.

Mr. Chambers: I am sure the committee would gladly accept any time limit the association wishes to place on this, and we will act accordingly.

Mr. Hartley: I believe that all the tank car builders about two or three years ago bought as much material required in the construction of tank cars as they could get, because they felt that there might be a scarcity in the future. I know that considerable material has been purchased and included in the stocks held at the present time, in the way of accessories. These materials and accessories were very high in price. I think that fact should be borne in mind and that time should be given for the tank car builders to use up that material.

I think the Tank Car Committee has in mind, while they are trying to better these accessories and conditions, to allow these people to use up some of this material which they bought at a high price. This question was considered by the committee last summer, in fact, during the past year of depression, and it was not thought that hardship would be imposed on any concern in the matter of saving money. That is, there would not be any unnecessary burdens added to the manufacturers in the way that has been referred to, if it was felt that the committee in permitting the use of the older material, was not endangering tank car service.

Mr. Fuller: I think it is important there should be a time limit set. I think it is too wide open to let it stand until all the castings are used up. It has been my observation, and the observation of others, that the patterns are not changed. We find that even after the time limit has expired they are still using castings of the old pattern to

a greater or less degree, and I think a time limit should be stated and adhered to.

I will make a motion, embodying an amendment to the report of the committee, and I would like the benefit of the information from the committee as to what they know of the amount of castings now on hand of the old pattern. Of course we have had certain information on that point but I now move as an amendment, that the time limit be set as either January, 1923, June, 1923, or January, 1924, whichever date may meet the ideas of the committee. My idea is to make the time limit as early as possible and if necessary it can be extended, but I do not think it should be left wide open. I will make my motion more definite and move that June, 1923, be set as the time.

Mr. Chambers: The Tank Car Committee will make recommendations to the General Committee, very shortly, as to what the rate should be.

Chairman Tollerton: With that understanding, we will pass without formal motion.

The chairman of the Tank Car Committee also calls attention to the last paragraph of the report, and desires that the convention give some instructions from the floor as to the policy of the committee with regard to an investigation of the various types of tank car construction.

Mr. Goodnow: I move that the duties of the Tank Car Committee be extended to cover such other classes of tank cars as have been referred to and that any others may be added from time to time in connection with their work.

Chairman Tollerton: Do you think that motion covers the field you have in mind, Mr. Chambers?

Mr. Chambers: I think it does, Mr. Chairman.

(The motion was duly seconded, put to a vote, and carried.)

Mr. Chambers: Mr. Grant, of Colonel Dunn's department, was not in the room when you called for him, but came in immediately after we closed the subject, and he has given me permission to use some correspondence which passed between Colonel Dunn's bureau and the Commission at Washington on the particular case that Mr. Hartley mentioned, about the testing of a car of ammonia while loaded, resulting in a man's death.

When Colonel Dunn learned of this accident which resulted in a fatality he wrote Mr. Doyle, explosives agent of the Interstate Commerce Commission at Washington, as follows:

June 7, 1922.

Mr. L. I. DOYLE, Explosives Agent,
Interstate Commerce Commission.

Answering your letter of June 3, file 3666 relative to proposed amendment of paragraph 402 of the revised regulations, I agree with you on the suggested wording as follows:

"Safety valves on tank cars must not be tested while these cars are loaded with dangerous articles. Whenever this test is due on a loaded car while in transit, the car must be allowed to continue to destination bearing a defect card with the following notice:

Safety valves overdue for test. Moving under I. C. C. 402.

Prompt report of such movements must be made by carriers issuing the defect cards to the chief inspector, Bureau of Explosives, 30 Vesey Street, New York City."

Having made some inquiries of representatives of car owners and railroad inspection forces I find such a ruling will be favor-

ably received by them. I am also advised that if we can be reasonably sure that this amendment will be adopted, steps will be taken by the Arbitration Committee of the American Railway Association to provide suitable changes in their mechanical rules to harmonize with the use of defect cards as outlined in this amendment.

The A. R. A. Mechanical Section holds its annual meeting next week at Atlantic City and it seems desirable, if possible, that we inform them before that time if this amendment will be adopted, so that their action may be taken then.

Kindly advise at your earliest convenience.

COL. B. W. DUNN,
Chief Inspector.

Mr. Chambers: I will read the answer from Mr. Doyle, as follows:

COL. B. W. DUNN,
Chief Inspector.

Referring to your letter of June 7, concerning the amendment of proposed paragraph 402 of the revised regulations:

It cannot be stated at this time what action the Commission will take as an assurance to the A. R. A., Mechanical Section, but the inquiries which you have made and your recommendation indicate the value and propriety of the regulation and it will be recommended for the Commission's adoption. No reason is now seen for refusal of the Commission to give necessary approval, and though more definite advice on the subject cannot now be given it is suggested that changes might be prepared in A. R. A. rules to be effective upon receipt of the Commission's approval of the regulations. Presumably this approval, if given, may be expected by the first of July, or soon thereafter.

L. I. DOYLE, Explosives Agent.

Proposed Addition to Rules of Interchange on Tank Cars

Mr. Chambers: In view of that the Tank Car Committee would like to recommend to the section—to be placed before the Arbitration Committee—that this be added to the rules of interchange on tank cars:

"Safety valves on tank cars must not be tested while under load. Whenever this test is due on a loaded car while in transit, the car must be allowed to continue to destination bearing a defect card with the following notice: 'Safety valve overdue for test. Moving under I. C. C. 402.'

"Prompt report of such movements must be made by the carriers issuing the defect cards to the Chief Inspector, Bureau of Explosives, 30 Vesey Street, New York City."

It may be that a number of people have not been confronted with a request to move a car already loaded on which the test date has expired, but in districts where competition is keen and business is sought after, many times a little pressure on a road has caused it to move a car when it knew it was in violation of some rule, with the threat made in this manner: "Well, all right, if you don't take it, so and so will"—and many times so and so does.

So I think this is a proper safeguard to cause a car to be moved.

C. F. GILES (L. & N.): I move, Mr. Chairman, that resolution be approved.

(The motion was seconded, put to a vote and carried.)

Mr. Calkins: Would the issuing of a defect card under those conditions penalize the delivering line with the cost of making the test?

Mr. Chambers: That is something the Arbitration Committee should work out. I would say that would not enter into this materially because whoever makes the test bills the owner for the cost of it, so nobody will lose and nobody will gain.

Report of Committee on Loading Rules

The preparation of rules governing the loading of freight cars has been an important part of the work carried on by the Master Car Builders' Association and its successor, the Mechanical Division of the American Railway Association. The committee has been in existence many years but changing conditions require additions and modifications in the rules and the members still find a broad field for their activities as the numerous revisions submitted in this year's report demonstrate.

The preparation of the loading rules may seem

an easy matter to anyone making a casual examination of the code. However, the necessity for considering clearances, stability and stresses introduces problems which often require considerable ingenuity for solution. The need for adhering to methods of securing loads that are simple and inexpensive and employ only material that can be easily obtained makes the work still more difficult. The committee since its inception has performed an important service in improving operation which has often not received due recognition.

THE COMMITTEE HAS considered all suggestions for modifications of and additions to the Loading Rules presented by the members of the association as well as shippers and has held joint conferences with the latter to the end that the Loading Rules may be kept up to date and take care of any new methods of loading that may be presented. As a result of this procedure, the committee submits the following recommendations for approval and

100 lb. as total weight for car and lading (100,000 lb. capacity car) to conform with Interchange Rule 86.

PROPOSED REVISION OF RULE 9-E, FIRST PARAGRAPH PROPOSED FORM

RULE 9-E. For twin or triple loads of long flexible material such as plates or similar lading requiring more than two sliding-pieces in addition to the bearing-pieces (See Figs. 67 and 68) the

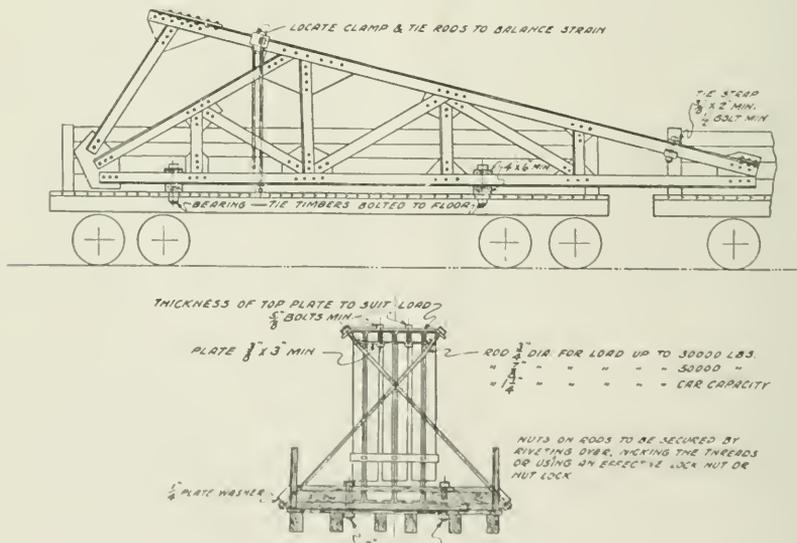


Fig. 50—A

submitted to Letter File for adoption as standard of the association.

RULE 5

PROPOSED REVISION OF TABLE OF LOAD WEIGHTS PROPOSED FORM

Material	Total Weight of Car and Lading	Load Weight
Maximum Capacity of Car	100,000	100,000 less weight of car.

Explanation—Table revised to show 100,000 lb. in place of 161,

weight of lading must not exceed two-thirds the capacity of car and the total weight of lading must not exceed 150,000 lb. For materials of less flexibility such as heavy channels and I-beams requiring two sliding-pieces in addition to the bearing-pieces as per Figs. 65 and 66 or for rigid materials, as per Figs. 62 and 64, requiring two bearing-pieces and no sliding-pieces, the weight of lading shall be determined by the location of bearing-pieces as per Rules 6, 9 A, 9-B and 9 C.

Explanation.—Rule revised to more clearly define loads of flexible material and to increase allowance load of flexible and semi-flexible material.

RULE 13

PROPOSED CHANGE IN TABLE RULE 13

In the table, it is proposed to increase the allowable width of load for loads having overhang of 19 ft., 6 in. and above. The

vided, but a group of cars must have at least one accessible and operate hand brake for each multiple of three cars or fraction thereof. There must be a clearness of at least six in. between the brake wheel and lading, this clearance to extend the width of the car.

Explanation.—Reference to hand brakes as shown on the various cuts has been added to the rule to clarify same.

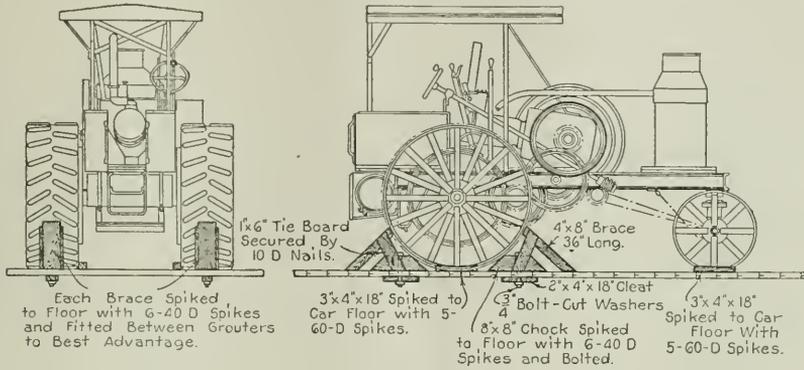


Fig. 104—Manner of Loading Gasoline Tractor Engines on Flat Cars

clause "but shipments may contain pieces overhanging as much as 24 ft. provided the average length of overhang of the total load does not exceed 18 ft." preceding the table to be indicated in heavy type to direct attention to same in connection with increased width allowance.

PROPOSED FORM			
Length of Overhang C	Width of Load W	Length of Overhang C	Width of Load W
9 ft. 0 in.	9 ft. 5 in.	18 ft. 0 in.	8 ft. 1 in.
10 ft. 6 in.	9 ft. 2½ in.	19 ft. 6 in.	7 ft. 9 in.
12 ft. 0 in.	9 ft. 0 in.	21 ft. 0 in.	7 ft. 5 in.
13 ft. 6 in.	8 ft. 9½ in.	22 ft. 6 in.	7 ft. 1 in.
15 ft. 0 in.	8 ft. 7 in.	24 ft. 0 in.	6 ft. 9 in.
16 ft. 0 in.	8 ft. 4 in.		

Explanation.—Increased width for loads having long overhang can safely be permitted if the average length of overhang of the total load does not exceed 18 ft.

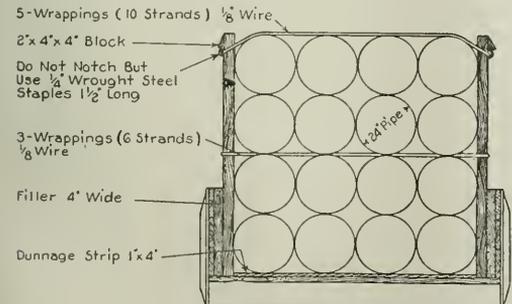


Fig. 81-A—Loading Wrought Pipe on Gondola Cars. Pipe 24 in. in Diameter

ADDITIONS TO TABLE UNDER RULE 23
MAXIMUM WEIGHT OF LOAD—FOR LOADS AS PER Figs. 7, 8, 9, 23, 24, 52, 54 AND 55

Length of Car Over End Sills	Average Length of Material	Capacity of Cars 60,000 lb.	Capacity of Cars 80,000 lb.	Capacity of Cars 100,000 lb.	Capacity of Cars 140,000 lb.
42 ft.	42 ft.	75,000 lb.	80,000 lb.	100,000 lb.	140,000 lb.
	44 ft.	71,000 lb.	77,000 lb.	97,000 lb.	137,000 lb.
	46 ft.	67,000 lb.	73,000 lb.	93,000 lb.	133,000 lb.
	48 ft.	64,000 lb.	70,000 lb.	90,000 lb.	130,000 lb.
	50 ft.	61,000 lb.	67,000 lb.	87,000 lb.	127,000 lb.
48 ft.	52 ft.	58,000 lb.	64,000 lb.	84,000 lb.	124,000 lb.
	54 ft.	55,000 lb.	61,000 lb.	81,000 lb.	121,000 lb.
	56 ft.	52,000 lb.	58,000 lb.	78,000 lb.	118,000 lb.
	58 ft.	49,000 lb.	55,000 lb.	75,000 lb.	115,000 lb.
	60 ft.	46,000 lb.	52,000 lb.	72,000 lb.	112,000 lb.

Explanation.—Limits for 42 ft. cars of 80,000 lb. capacity and

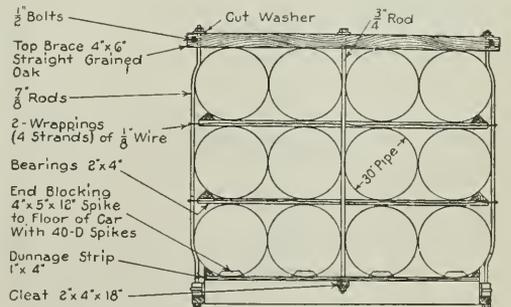


Fig. 81-B—Loading Wrought Pipe on Flat Cars. Pipe 30 in. in Diameter

48 ft. cars of 100,000 lb. capacity added to table to take care of existing equipment not covered by the table.

PROPOSED REVISION OF RULE 18
PROPOSED FORM

RULE 18. The location and number of hand brakes shown in the various cuts is not necessarily the hand brakes that are to be pro-

PROPOSED REVISION OF RULE 27
PROPOSED FORM

RULE 27. Where the dimensions of bearing-pieces or sliding-pieces are not otherwise specified, they must be of sufficient thickness to keep the lading four in. from the floor or end gates of

carrying car and idler, and must extend the full width of car. Bearing-pieces more than five inches high may be built up of lumber of ample strength or take the shape of cribbing or rolled or built-up steel construction. Bearing-pieces, sliding-pieces, chocks, head-blocks, etc., must have a width at least equal to their height. For structural and similar material, the bearing-pieces must be securely fastened to the floor of the car as shown in Figs. 48 or 53. For number, logs, telegraph poles, piling and props and similar material on open cars loaded as per Figs. 8,

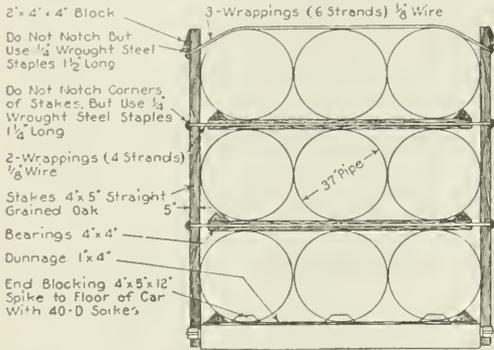


Fig. 81-C—Loading Wrought Pipe on Flat Cars. Pipe 37 in. in Diameter

11, 12 and 13, the bearing-pieces must be securely held in place by cleats, as per Fig. 2.

Explanation.—Reference for manner of securing bearing-pieces changed from rule 207 to Figs. 48 or 53 to cover both methods of securing bearing-pieces.

RULE 102—PROPOSED PARAGRAPH TO BE ADDED

RULE 102. *Proposed Additional Paragraph:* Where timbers of different sizes are loaded, they should, when possible, be

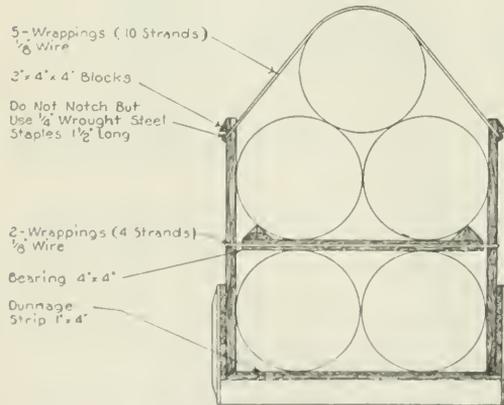


Fig. 81-D—Loading Wrought Pipe on Gondola Cars. Pipe 43 in. to 49 in. in Diameter

arranged in layers of uniform thickness across the car and having strips used as prescribed in the first paragraph of this rule. Where the sizes will not permit of uniform layers across the car the height of load must be restricted to four feet above floor of flat cars and three feet above top of sides of gondola cars.

Explanation.—Loads of this description have given trouble by becoming disarranged enroute and falling from cars, therefore, a new paragraph has been added to specifically cover the method of loading such timbers

PROPOSED CHANGE IN RULE 200

RULE 200. In the ninth line of this rule it is proposed to change the wording "sixteen-penny nails" to "ten-penny nails."

Explanation.—Changed to conform with the requirements of General Rule 15.

PROPOSED CHANGE IN FIG. 43-A

FIG. 43-A. It is proposed to specify 1 in. by 5 in. tie boards and diagonal braces in place of 1 in. by 6 in. as shown.

Explanation.—Size of tie boards and braces changed to conform with Fig. 42.

PROPOSED REVISION OF RULE 202—THIRD PARAGRAPH PROPOSED FORM

Supplementary Report

RULE 202. Third Paragraph: Determine number of posts required by dividing total weight of lading by load allowed per post. There must be a minimum of two posts per pile. *Two by six inch hardwood timbers extending from top of car side to top of lading must be used to prevent creeping of the plates. These timbers shall be spiked to the post and in addition shall be secured at the top by the diagonal tie rod.* Total weight of

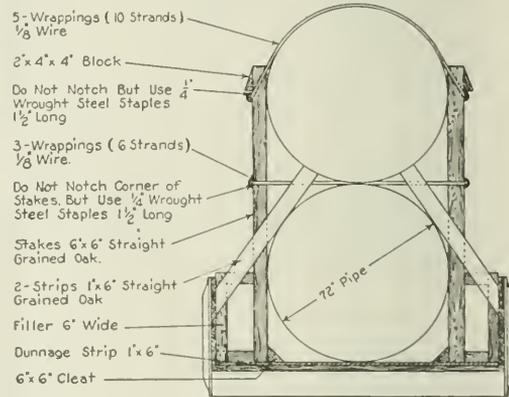


Fig. 81-E—Loading Wrought Pipe on Gondola Cars. Pipe 72 in. in Diameter

plates loaded diagonally must not exceed 75 per cent of the load weight as per General Rule 5. Short material may be loaded on car floor, if equally distributed over entire floor; total weight of entire lading must not exceed the load weight as per General Rule 5. Upright posts may all be staggered as shown in Fig. 44. Bearing-pieces spiked to the floor and sides of the car, may be used at the lower edge of plates as may be required by loading and unloading facilities. When used, the size of bearing pieces is optional but they must be located opposite each post and longitudinal shifting of the plates prevented either by stop blocks spiked to side and floor of car, stop blocks bolted to side of car or horizontal tie rods across the car.

Explanation.—Paragraph has been revised to provide 2 in. by 6 in. timbers secured to outside face of supporting posts to prevent creeping of the plates, and to provide an alternate method for securing stop blocks by bolting them to side of car.

PROPOSED REVISION OF RULE 202—LAST PARAGRAPH PROPOSED FORM

RULE 202. Last Paragraph: Round plates flat or flanged, may be loaded as per Figs. 44-B, 44-C or 44-D. This manner of loading is the same as for ordinary plates, except that when loading according to Figs. 44-B and 44-C a 4 in. by 8 in. horizontal bearing-piece is bolted at top of posts to form a rest for the plates. Longitudinal shifting of the plates to be prevented either by stop blocks spiked to side and floor of car, stop blocks bolted to side of car or horizontal tie rods across the car.

Explanation.—Paragraph revised to provide an alternate method for securing stop blocks by bolting them to side of car.

(See Fig. 50-A on page 1446.)

RULE 208. PROPOSED PARAGRAPH TO BE ADDED

RULE 208. *Proposed Additional Paragraph:* An alternate method of loading open girders, half roof trusses and similar material by using rod and plate material is covered by Fig. 50-A.

Explanation.—Alternate method of loading is provided at the suggestion of steel shippers in order to permit use of rod and plate material available at the mills.

PROPOSED REVISION OF RULE 221
PROPOSED FORM

RULE 221. The idlers used with loads as shown in Fig. 52 must be flat cars unless the width of the overhanging load is less than the width given for each length of overhang in the table of General Rule 13, by an amount equal to the difference between 11 ft. 0 in. and the inside width of gondola car used.

Explanation.—Rule has been revised to govern width of overhanging load by inside width of the gondola car used as an idler. This arrangement makes the rule more flexible and will permit wider loads when wide gondola cars are used.

PROPOSED REVISION OF RULE 227-D
PROPOSED FORM

RULE 227-D. Binders consisting of two vertical hardwood pieces of timber, 6 in. by 8 in. in section with 1/2 in. bolts and suitable washer under head and nut in each end to prevent splitting, drawn together by means of two 1 1/4 in. rods, one on top and one below load, shall be applied to all loads as follows:

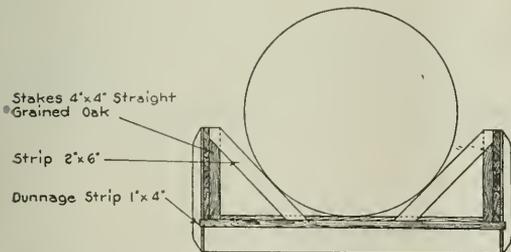
Loads up to four feet in height, one binder located midway between bearing-pieces.

Loads four feet and not over six feet in height, two binders, located between bearing-pieces, each binder to be located three feet from bearing piece.

Explanation.—Rule has been revised to permit two binders in place of three binders on loads five feet and not over six feet in height and location of binders has been specified to be between bearing pieces and three feet from the same instead of either side of bearing-piece and six in. from same. Test loads were followed to destination which established the safety of the proposed change in number and location of binders on these loads.

PROPOSED CHANGE IN RULE 230

RULE 230. Proposed Change: Substitute "General Rule 27" for "Detail Rule 227" in the next to last line of this rule making the last sentence of the rule read as follows: "The bearing-pieces must be secured to the car in the manner described in



NOTE.—Not less than three pair of braces to each length of pipe.

Fig. 81-F—Loading Wrought Pipe on Gondola Cars. Pipe 84 in. to 96 in. in Diameter

General Rules Nos. 26 and 27 and the material must be clamped together in the manner described in Rule 231 to prevent it from shifting."

Explanation.—Reference to Detail Rule 227 is an incorrect reference.

PROPOSED CHANGE IN FIG. 61

FIG. 61. It is proposed to change the size of lateral braces shown on this cut from 3 in. by 8 in. to 2 in. by 8 in.

It is proposed to change the top clamp from 4 in. by 6 in. to 6 in. by 8 in. and show 1/2 in. bolts in ends to prevent splitting.

Explanation.—Size of braces changed to conform with braces shown on Figs. 56 and 57. Top clamp changed to conform with top clamp shown on Fig. 53.

PROPOSED CHANGE IN FIGS. 62, 63 AND 67

FIGS. 62, 63 AND 67. It is proposed to eliminate the dimensions of bearing-pieces from these figures and substitute a notation reading "Bearing-Pieces as per Rule 227."

FIGS. 63 AND 67. It is proposed to eliminate the dimensions of metal sliding plates from these figures and substitute a notation reading "Dimensions of Sliding Plates Must Conform with Rule 230."

Explanation.—Reference is made to Rule 227 for size of bearing-pieces in order to cover both sizes that are permissible. Reference is made to Rule 230 for dimensions of metal sliding plates in order to cover both sizes that are permissible.

PROPOSED CHANGES IN FIGS. 64, 65, 66 AND 68

FIGS. 64, 65, 66 AND 68. It is proposed to eliminate the dimensions of bearing-pieces from these figures and substitute a notation reading "Bearing Pieces as per Fig. 61."

It is proposed to eliminate the dimensions of metal sliding plates from these figures and substitute a notation reading "Dimensions of Sliding Plates Must Conform with Rule 230."

Explanation.—Reference is made to Fig. 61 for size of bearing-pieces in order to cover both sizes that are permissible. Reference is made to Rule 230 for dimensions of metal sliding plates in order to cover both sizes that are permissible.

(See Fig. 104 on page 1447.)

PROPOSED CHANGE IN FIG. 104

FIG. 104. It is proposed to eliminate the longitudinal blocking at front wheel and apply more substantial blocking at rear wheels to prevent any longitudinal motion.

Explanation.—The longitudinal blocking at front wheel has been removed to prevent bending of the king pins.

PROPOSED REVISION OF RULE 309

PROPOSED FORM

RULE 309. If box cars are used for loading heavy machinery such as lathes, planers, boring machines, etc., each machine should be blocked by securely nailing or bolting to floor of car 2-in. by 4-in. hardwood strips fore and aft. Machinery resting on legs should be securely braced and propped at ends, but in no case should the legs be blocked or in any way secured to the car floor. Where there is danger of the legs becoming broken they should be removed and the machine crated when practical. The legs to be secured in same crate with the machine.

Explanation.—Rule revised to provide more definite instructions for loading machinery to overcome breakage of legs.

The committee has been advised recently by pipe manufacturers that wrought pipe or tubing ranging from 24 in. to 96 in. in diameter is being offered for shipment to the railroads. The present pipe loading rules do not cover these larger sizes of pipe and after conference with the shippers revised rules and cuts have been worked out to cover this loading.

The following revision of the pipe loading rules, with new cuts to cover these shipments, are submitted for your approval at this time.

REVISION OF RULE 249

RULE 249. First sentence of first paragraph. There should be not less than three pairs of stakes to each pile, when the material is 23 ft. or less in length, the top of each pair of stakes to be held together by not less than six strands equal to three wrappings of good 3/8 in. diameter wire resting on the pipe, in addition to any intermediate wiring or dunnage strips for character of shipments, as provided for in succeeding paragraphs.

Explanation.—Rule revised to cover additional wiring at top of stakes as used in loading large sizes of wrought pipe.

REVISION OF RULE 255, PROPOSED FORM

RULE 255. First Sentence. Gondola or Flat Cars. All cast iron pipe 24 in. or more in diameter must be loaded in pyramidal form, with the bell ends interlocking each other.

Explanation.—Rule changed to omit reference to wrought iron pipe account of same being covered in new Rule 251-A.

RULE 251-A—PROPOSED NEW RULE

RULE 251-A. Flat and Gondola Cars: Wrought iron pipe 24 in. or more in diameter when loaded on flat or gondola cars should be loaded in accordance with Figs. 81-A, 81-B, 81-C, 81-D, 81-E or 81-F.

Explanation.—New paragraph and cuts added to cover the loading of large size wrought iron pipe.

The report is signed by R. L. Kleine (Chairman), Pennsylvania Railroad; J. J. Burch, Norfolk & Western; E. J. Robertson, Soo Line; J. E. Mehan, Chicago, Milwaukee & St. Paul; Samuel Lynn, Pittsburgh & Lake Erie; Ira Everett, Lehigh

Valley, T. O. Sechrist, Louisville & Nashville; E. N. Harding, Illinois Central and G. R. Lovejoy, Detroit Terminal.

Discussion

R. L. Kleine (Penn. R. R.): It has been found that the bottom plates creep up over the posts and extend into the clearance limits, and the committee formerly had in the rule a vertical 2 in. by 8 in. bolted to the post to prevent this creeping. The rule was afterwards modified as that was considered unnecessary, but since we have taken it off we have found that these plates creep and therefore a provision of that kind has been re-inserted in the rule. Some of the shippers, since we made this suggestion, have tried out that method and on account of their loading facilities find that they cannot swing the plates into place

on the cars because of this projecting piece, and I suggest that the convention allow an alternate provision to be inserted in the rules to read as follows: Add the following after the word "rod" in twelfth line: "As an alternate method to prevent creeping, plates 24 in. long, 6 in. wide and not less than $1\frac{1}{2}$ in. thick, secured to the outside of post by the diagonal tie rod and by one $\frac{5}{8}$ -in. bolt to prevent turning, may be used."

These various shipments have been tried out, followed to destination and found to carry alright.

Mr. Brazier: I move that the report be accepted and submitted to letter ballot, and the recommendations outlined in the report be adopted.

(The motion was seconded and carried.)

Committee on Train Lighting and Equipment

The committee has accomplished two things in its report on train lighting and equipment. First, the status of direct drive for car lighting generators is set forth by brief historical notes and by an outline of what the functions of direct drive equipment should and should not be. Second, standards are recommended for train lighting lamps which reduce the number of lamps required for the greater part of car lighting service to four. Regulation limits for lamp regulators are also included.

Belts are good and efficient form of drive, for car lighting generators but due to wear and break-

age an average of five or six belts must be applied on a car each year. The report includes an interesting and informative table on belts from which belt costs are derived.

Many forms of direct drive are described briefly in the report, which were more or less successful but which developed weaknesses before reaching the point at which they could compete with belts. It describes others in the development stage. Only those which are now under test on the road or in the shop are included in the following abstract.

SO FAR as the committee is aware, the solution of the problem has been attempted by the following, approximately in the order given, although information on this point is not definite

1. W. L. Bliss.
2. E. L. Deutsch.
3. E. M. Fitz.
4. The Gould Compler Co.—Chain Drive.
5. The Safety Car Heating and Lighting Co.
6. The Gould Compler Co.—Shaft Drive.
7. W. A. Pitt.
8. A. H. Matthews.
9. United States Light and Heat Corporation.

"Safety Car Heating and Lighting Company's" Drive

The "Safety Co.'s" second drive consists of two axle bushings, they being mounted on the axle a little inside the wheel fits. Each bushing carries a collar to which eye bolts are secured.

The eye bolts are connected by means of a helical spring, normally under tension, to a lug on a hollow shaft, the springs being arranged parallel with the longitudinal axis of the axle.

The hollow shaft has a smooth internal diameter to permit the axle to move freely without rubbing the shaft.

This shaft is split and is supported at each end by the outer raceways of four ball bearings, the inner raceways of which are secured on one end only, carried by the gear housing.

The gear housing is split and is carried by seats turned on each end of the hollow shaft, and is prevented from turning by lugs formed by cross bars fastened to the axle generator suspension track.

Mounted on the hollow shaft is a split gear meshing with a pinion which is mounted on a short shaft carried on ball bearings, parallel to the axle.

Mounted on the short shaft is a bevel gear meshing with a pinion carried on a second shaft, also carried on ball bearings, perpendicular to the axle.

This second shaft is connected to the armature shaft by means of a split coupling, no universal joints being provided, as the generator is carried on suspension irons attached to the truck frame.

It should be noted that this drive does not require a special axle, and also that no provision has been made for maintaining the pitch circles of the bevel gear and pinion in contact.

So far as is known this drive has never been used in actual service.

The "Gould" Drive

The "Gould" Shaft Drive, shown in cuts, Figs. 1 and 2, requires the use of a special axle. A circular key $\frac{1}{2}$ inch wide and $\frac{1}{4}$ inch high is machined on the axle midway between two bearings fits $4\frac{1}{2}$ inches long. A second key $\frac{1}{2}$ inch by $\frac{1}{2}$ inch and $5\frac{1}{2}$ inches long is fitted in a keyway cut in the axle parallel with the axis of same.

The first key acts to center the split gear on the axle and the second serves to drive the gear. The bearing fits on the axle serve as a seat for the gear box.

The 52 tooth spur gear mounted on the axle meshes with a 36-tooth spur pinion mounted on a shaft, parallel to the axle in the gear box, this shaft being carried on ball bearings.

On this shaft is a 28-tooth bevel gear, meshing with a 20-tooth bevel pinion on a second shaft perpendicular to the axle. This second serves to drive the gear. The bearing fits on the axle serve and at the outboard end carries one part of a universal coupling.

The gear box is split on the horizontal diameter of the axle and is prevented from turning by a member which connects the end of the gear box to the end frame of the truck.

A telescoping shaft carrying on one end the balance of the first universal joint and on the other end a portion of a second universal joint serves to transmit the power to the armature shaft.

Mounted on the armature shaft is a safety device consisting of a coupling carrying a shear pin so that if the generator becomes overloaded in any way that will throw an excessive load on the drive, the pin will shear, permitting the drive to run free. This

safety device also forms the balance of the second universal coupling.

Disconnecting this safety device permits the generator to be operated as a motor for testing purposes.

The generator is mounted rigidly on the under frame of the car body with the armature shaft parallel with the longitudinal axis of the car.

Provision is made whereby the position of the bevel pinion can be adjusted so as to maintain the pitch lines of the bevel gears and pinion in contact.

The record of this drive as applied to a car on the D. L. & W. Railroad is as follows:

January 17, 1918. Car No. 582 came out of shop and went in service on local runs.

January 19, 1918. Car journal ran hot, causing car to be cut out for repairs. The opportunity was taken for inspection of internal mechanism and it was found that locking device for jack shaft adjustment had failed, and the locking pin had fallen out

show point at which teeth were coming into mesh to be properly adjusted. No adjustment necessary on jack shaft.

Main Bearings.—Wear slight, not enough to permit passing of 1/64 inch shim 3/8 inch wide. Thrust surface clearance about 1/8 inch, slightly more than on previous inspection.

Dust Guards. In good shape, allowing no dirt to enter.

Universals. No wear apparent.

Telescope Joint. No wear apparent.

Suspension on Linkage. No wear apparent and free to swing.

Since the above inspection nothing has been done on this equipment. No expense or repairs other than lubrication and inspection has been necessary to date. At all times the drive has functioned properly, maintaining a steady voltage and amperage output according to the setting of the regulator. No noise is made by the device when operating and the performance up to date has been very satisfactory. A mileage of approximately 100,000 has been attained and the shock and strain due to hard suburban service have been withstood without faults developing. Some improve-

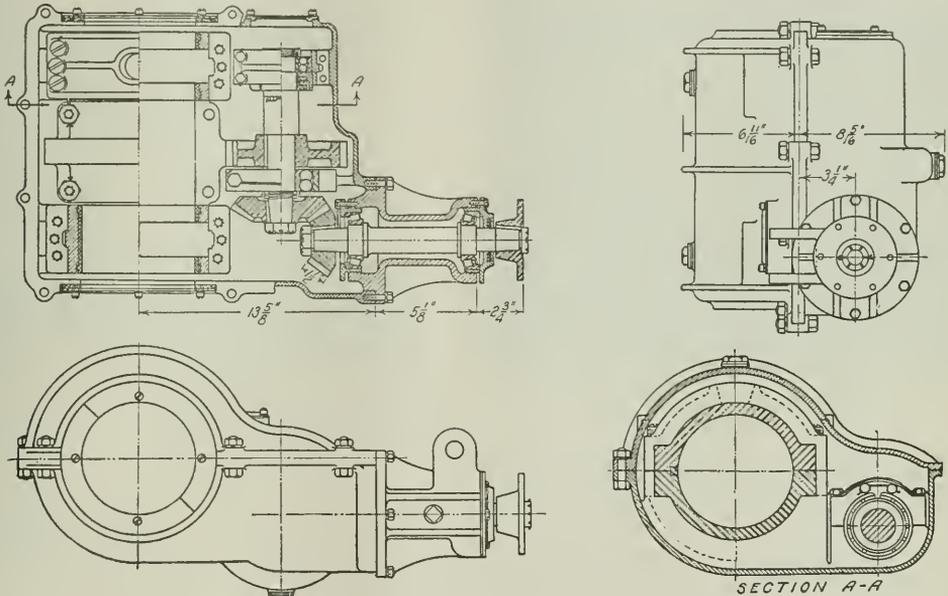


Fig. 1—Assembly Drawing of Main Part of Gould Drive

and into the grease. From here it traveled with the grease and got into the gears, cutting them badly before it was finally cut to pieces, but damage to gears did not necessitate removal or repair, and after cleaning out all grease and installing an improved locking device, the car went back in service on February 13, 1918, no further trouble with the locking device being experienced.

April 24, 1918. Universal on the generator was greased.

September 16, 1918. Both universals greased, and five pounds of grease put in gear box.

July 19, 1919. For purpose of investigation and inspection, the device was opened up, grease cleaned out and all parts checked up for wear. No wear was noticeable on gears, axle bearings, universals, shock absorber or hangers. No dirt or residue of any kind noted in gear case. Back lash on gears normal and all parts functioning properly. All screws and bolts tight and no apparent strain in any part. Refilled with fresh grease and put back in service.

February 20, 1920. Greased universals and put five pounds of grease in gear box.

July 14, 1920. Car came out of shop and the device was opened up for general inspection. After cleaning out the grease, conditions were found as follows:

Gears. Back lash normal, wear insignificant, just enough to

ment as to reducing weight may be possible as well as reduction in size, the present outfit being claimed large enough to drive 15 H. P.

The following is a record of the performance of a similar drive on C. & N. W. diner 2868, applied April, 1920.

Equipment operated satisfactorily until the latter part of July 1920, when the brass collar for adjusting the rear shaft bearing became loose. Repairs were made and the drive worked satisfactorily until the latter part of September, 1920, when the adjusting collar again worked loose. Repairs were made and operation was satisfactory until February 15, 1921, when car was taken in shop, at which time it was found that the adjusting nut had again worked loose.

The equipment was transferred to diner 2888, which is still in shop.

From the time of application to diner 2868 until its renewal, there was no failure of lights.

“United States Light & Heat Corporation” Drive

The “U. S. L.” Drive, as shown in Figs. 3, 4 and 5, consists of a 17-inch split steel pulley secured to a standard axle by means of through bolts.

These pulleys drive by contact two 10-inch pulleys or friction

wheels which are made of rubber tires molded on steel rims, the rims being pressed on the center hub of the pulley.

These tires are the standard tire as used on industrial automobile trucks. These pulleys are mounted on the ends of a short shaft, parallel to the axle, this shaft being supported by two sets of ball bearings which are carried from housing pivoting about a horizontal cylindrical bar in a position approximately vertically above the pulley shaft.

This bar in turn is supported by a steel casting mounted on a member which is supported by the truck frame.

This casting is arranged so that it will pivot in the horizontal plane about a bolt, equalizing the pressure of the friction wheels on the pulleys.

At the center of the shaft carrying the friction wheels a worm wheel is mounted which meshes with a worm mounted on a second shaft perpendicular to the axle. The second shaft is also carried on the ball bearings which are mounted in a casting which

Pressure between the pulleys and friction wheels is assured by a bar attached to the housing midway between the pulley, curved so as to pass over the axle and extending beyond the end sill of the truck and having a thread cut on the end.

Beyond the truck frame this rod passes through a helical spring

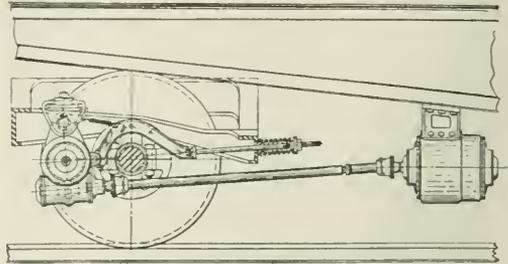


Fig. 3—Side Elevation of U. S. L. Drive

and the pressure between the pulley and friction wheel is adjusted by the amount that this spring is compressed.

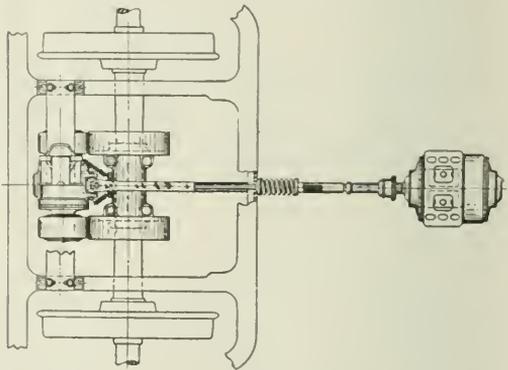


Fig. 4—Plan of U. S. L. Drive

This drive has been operating for some time in experimental service in the shop, but has never been used in service on the road.

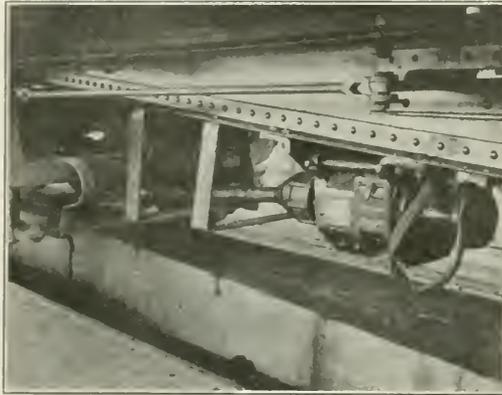


Fig. 2—Gould Direct Drive Equipment Mounted on D. L. & W. Car

is bolted to the casting forming the housing for the worm wheel.

This second shaft is connected by means of a universal joint to an extension shaft provided with a sliding joint, and this in turn is connected to the armature shaft by a second universal joint.

The worm shaft is connected to the shaft of the axle generator, which is mounted longitudinally under the car body by means of two universal couplings and an extension shaft with a sliding joint

DATA ON BELTS—BODY HUNG GENERATORS

Railroad	1 K. W.		2 K. W.		3 K. W.		4 K. W.		5 K. W.		6 K. W.		7 K. W.		8 K. W.		9 K. W.		10 K. W.	
	NYC	N&W	ACL	NYC	NYC	NYC	NYC	NYC	B&O	B&O	B&O	D. I. R.	IC	IC	ACL	ACL	ACL	ACL	ACL	ACL
Type of Suspension	NYC	N&W	NYC	NYC	NYC	NYC	NYC	NYC	und. frame	Stone	U. S. L.	Gould	und. frame	Gould	Gould	Safety	U. S. L.	U. S. L.	U. S. L.	U. S. L.
No. of Generators in Service	21	7	6	2	77	33	84	60	92	50	129	126	84	237	11	10	7	7	7	7
Width of Belt in in.	4	4	4	4	5	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4
Press. of Belt in lbs.	4	4	5	4	4	4	4	4	5	4	5	5	4	4	4	4	4	4	4	4
Ave. Length of Belt, ft. in.	17	15	11	15	14.7	14.7	14.7	14	14	14.9	11.6	13.6	14	14.6	13	13	13	13	13	13
Type of Fastener	W	W	C	C	C	C	C	W	W	C	C	W	W	C	C	C	C	C	C	C
Dist. of Axle Plates in In.	19	17	17	19	19	19	19	17	17	17	18	17	17	20	17	17	17	17	17	17
Dist. of Armature Plates in In.	6.5	5.5	9	13	8	8	8	5.5	5.5	8	5.5	5.5	8	11	5.5	8	8	8	8	8
Remarks in % of cars																				
Old 1919	8				26	39	30													
New 1919					47	44	8													
Old 1919	4				10	85	64	120	69	58	15	6	11							
Old 1919	7	5	53	50	208	218	140	113	69	42	40	5	74	57	64	80	29			
Feb. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Mar. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Apr. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
May 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
June 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
July 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Aug. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Sept. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Oct. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Nov. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Dec. 1922	17	8	66	60	109	106	75	77	67	70	10	65	61	24	64	240	41			
Total Belts installed	49	16	13	4	531	204	301	617	694	214	307	834	520	655	105	85	15			
Av. Remarks for Mo.	4	5	8	41.7	16.7	64.2	66.6	45.9	85.6	67	40.7	19.8	50.1	51.5	21	79.5	70.8	41.6		
Av. (incl. und. belt)	12.73	84.73		5.11	4.39	7.43	7.57					17.00	20.99	44.99						

Advantages and Requirements of Direct Drive Equipment

It will be conceded by all who are familiar with present-day operation of axle generators that, at the present time, failure of the drive is the cause of a larger number of failures of light than any other one item.

The records of the company operating the largest number of axle generators show that 18.4 per cent of the lighting failures and 25.2 per cent of the equipment failures are due to the drive.

The causes of the trouble experienced with belt drive are many and various, but they are not germane to the subject assigned.

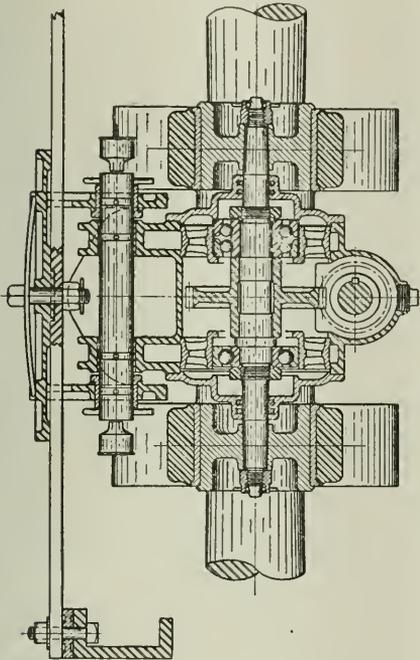


Fig. 5—Section Showing Details of Construction of U. S. L. Drive

Their effect on car lighting, however, is and has been so detrimental that, as has shown, repeated efforts have been made to design a satisfactory positive drive which eliminate the belt.

The advantage of such a form of drive are:

1. Decreased liability of failure of drive, resulting in.
2. Decreased liability of failure of light.
3. Decreased liability of deterioration of battery, due to undercharging of battery on account of the belt slipping and sulphating on account of battery becoming discharged and standing in that condition.
4. Decreased liability of having train detentions.
5. Decreased liability of annoyance to passengers, due to flickering of lights caused by belt slipping and to failure of lights due to loss of belt.
6. Positive drive under all conditions of weather.
7. Elimination of belt tension device, simplification of suspension, with consequent reduction in first cost and cost of maintenance of these parts of the equipment.

The disadvantages of such a form of drive are:

1. Increase in first cost of drive.
 2. Increase in cost of application.
 3. Increase in length of time of train detention when drive does fail.
 4. Increased difficulty in testing generator by motoring.
- To be really successful, the direct drive should, of course, in

addition to its advantages over the belt drive, be capable of being operated at a total cost comparable with the total cost of operating the belt drive.

In order to determine what the cost of operating a belt drive might be, your Committee presents the accompanying data as fur-

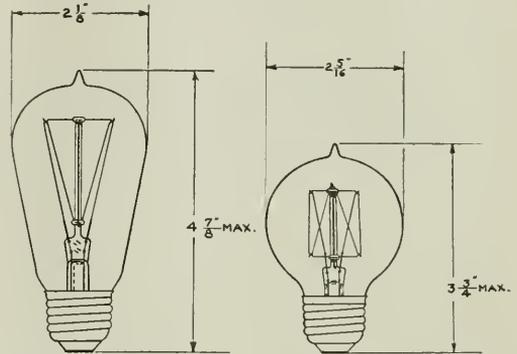


Fig. 6—15-Watt, 30-34-Volt, S-17 Mazda B Lamp
Fig. 7—15 and 25-Watt, 30-34-Volt, G-18 1/2 Mazda B Lamp

nished by various railroads, from which it will be noted that the mileage per belt varies from 5,132 to 84,775, and that the average percentage renewals per belt per month vary from 5.8 to 85.6.

As the data on belts given in the large table varies so widely on the several railroads, each railroad should, when making such a comparison, make use of its own data.

However, as a guide to arrive at a figure which might represent the cost of operating, we submit the following:

ASSUMPTIONS

Miles service per belt	10,000
Miles service per month per car	5,000
Length, width and ply of belt .14 ft. 0 in. by 4 in. by 5-ply	
Cost per foot of belt.....	\$0.4725
Type of belt fastener.....	Crescent
Cost of fasteners per belt.....	\$0.155
Axle pulley bushing life, cost.....	.20 yrs. \$ 4.95
Axle pulley life, cost.....	10 yrs. 18.00
Armature pulley life, cost.....	3 yrs. 12.00
Armature pulley times turned, cost per turning	
3 yrs.....	.90
Labor to cut and apply belt, time, cost.....	.20 min. .28
Difference in cost of suspension, including belt tension device	75.00
Cost per year based on above Assumptions.	

OPERATION

6 14 ft. 0 in. by 4 in. by 5-ply belt, at \$0.4725	
per ft.	\$39.69
6 sets of fasteners, at \$0.155 per belt.....	.93
6 by 20 minutes for application belt, at \$0.85	
per hour	1.70
Cost of one turning of armature pulley.....	.90
	<hr/>
	\$43.22

DEPRECIATION

Axle pulley bushing, \$0.05 by \$4.95.....	\$0.25
Axle pulley, \$0.10 by \$18.00.....	1.80
Armature pulley, \$0.33 by \$12.00.....	4.00
	<hr/>
	\$6.05

INTEREST

Axle pulley bushing at.....	\$ 4.95
Axle pulley at.....	18.00
Armature pulley at.....	12.00
Belt at.....	2.84
Fasteners at.....	.06
Difference in cost of suspension.....	75.00
	<hr/>
Interest at \$0.06 on \$112.85.....	6.77
Total	\$56.04

Therefore, as an economical proposition, considering the drive of the direct drive, on the basis of the figures used in making this comparison, should be capable of being operated at a total cost, counting in operation, maintenance, depreciation and interest, at not more than \$56.00 per year.

There are, however, other items of expense due to the use of the belt drive which must be considered in making a true comparison.

These items are:

1. Cost of charging current at terminals necessitated by car arriving with batteries discharged due to belt slipping or being lost.
2. Depreciation of battery due to sulphation on account of battery being discharged and remaining for a greater or less time in that condition, due to belt slipping or being lost.
3. Depreciation of battery due to "reserve" material being formed into "active" material before needed, due to sloughing off

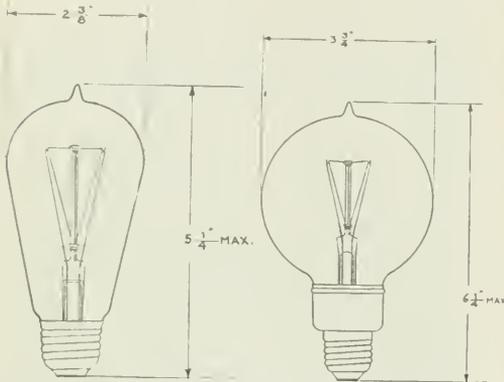


Fig. 8—50 Watt, 30-34-Volt, S-19 Mazda B Lamp Fig. 9—50-Watt, 30-34-Volt, G-30 Mazda B Lamp

5. That the generators should be so mounted as to provide a maximum of accessibility.

6. That means should be provided by which the generator may be readily "motored."

The committee feels that at the present time there is no type of direct or positive drive which does not include features that are objectionable to the extent of practically prohibiting its gen-

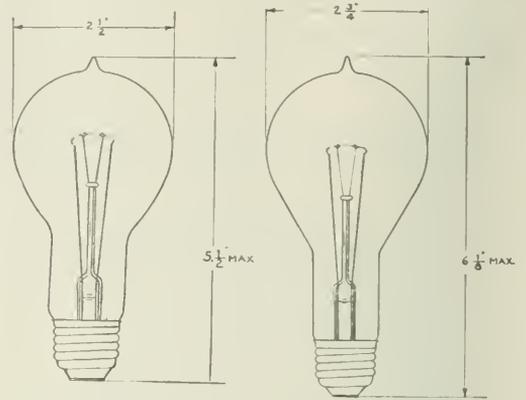


Fig. 10—50-Watt, 30-34-Volt, PS-20 Mazda C Lamp Fig. 11—75-Watt, 30-34-Volt, PS-22 Mazda C Lamp

eral use, nor does any drive possess all of the points that we consider necessary.

The committee is, however, of the opinion that the advantages of the direct drive are of such importance as to justify its further development, and further that its use would be justifiable even at a cost in excess of the belt drive.

The committee believes that there is a demand for a direct or positive drive, and that its development should be encouraged by all concerned.

Specifications for Axle Generators—1920 Report

Recommended Practice

There has been more or less criticism of regulation limits as given for the lamp regulator in these specifications under the heading "6. Lamp Regulator (i), 1 and 2."

As I now reads, the greater the load on the regulator the greater the permissible drop in voltage.

Due to the characteristics of the battery, the terminal voltage of the battery also decreases as the load increases.

Therefore, we have incurred a double drop in lamp voltage, while what is actually desired is a constant lamp voltage.

As this condition is impossible of attainment under the conditions given, i. e., a battery voltage of 31 volts or less, the obvious thing to do is to set a limit for the maximum conditions which will give the greatest drop permissible and for any conditions less than the maximum the drop in voltage will then be less.

The committee have therefore agreed that paragraph 6 i. 1 should read as follows, the words in parentheses being those of the present text that we eliminate:

"6 i. 1 With the battery discharging and with the battery voltage 31 volts or less, the drop in voltage across the terminal of the lamp regulator resistance shall not exceed 1 volt (per 25 amperes flowing) for the connected lamp load."

Paragraph 6 i. 2 gives certain voltage limits for a current value to be specified by the railroad company and the note recommends that this current value be 125 per cent of the connected lamp load. There is no necessity for specifying a load greater than will be connected in service.

The committee has therefore agreed that paragraph 6 i. 2 should read as follows, the words in parentheses being those of the present text that we eliminate:

"6 i. 2 With armature r. p. m. increasing at an approximately uniform rate from minimum full load speed

of sulphated active material and "forming" charge resulting from full current to battery caused by slipping or being lost.

4. Loss of patronage due to annoyance to passengers caused by the "lickering" or failure of the lights due to defects of the belt drive.

Objections 1, 2 and 3 do not necessarily apply to generators designed to operate with slipping belt.

The points that, in the judgment of your committee, should be avoided in designing a positive drive for axle generators are:

1. Construction which necessitates the use of a "special" axle.
2. Construction which in any way changes a "standard" axle.
3. Construction which necessitates the removal of the wheel from the axle in order that the equipment may be applied.
4. Construction which uses a helical spring in a plane other than that perpendicular to its axis.
5. Construction which, on account of wear, necessitates scraping of material other than the material worn.
6. Construction which does not provide for maintaining pitch correct of bevel gears in contact.
7. Construction which does not readily permit the turning of wheels in order drive wheel lathes.
8. Construction which does not provide for the full movement of the axle in all planes.
9. Construction that does not provide efficient lubrication and protection to all working surfaces from dirt and grit.

The general character of the judgment of the committee, should be provided for the positive drive for axle generators are:

1. Construction to allow that can readily be removed.
2. Location of the axle generator on the truck or under-truck structure in the simplest possible manner.
3. That the increased force, if used, should be in a true angle measured in the direction of travel of the axle between a center line of travel and not only be found on the curve of least resistance but also be capable of being reversed in direction.
4. That a safety device should preferably be provided which will enable to break the connection between the drive and pin frame, in the event of the drive tending to become overloaded.

to maximum speed in not more than five minutes and again decreasing to its original value, the voltage shall be maintained at . . . volts plus or minus one volt (at any current value not exceeding . . . amperes) at any current value equal to or less than the connected lamp load."

Train Lighting Lamps

The present recommended practice shows only the limiting dimensions of two sizes each of two types of bulbs, i.e., the "G" bulb in the 18½ and 30 size and the "S" bulb in the 17 and 19 size.

This information does not fully describe the lamps, and furthermore the type "C" lamp has now been developed and with it a new style of bulb has been introduced.

The committee therefore deems it advisable to present a full schedule of train lighting lamps divided into two portions, a standard or regular schedule and a special or intermediate schedule.

From the point of view of cost of manufacture, as well as stocks to be carried by the railroads and the lamp manufacturers, it is desirable to reduce the number of kinds of lamps used for train lighting purposes to a minimum consistent with meeting the requirements for illumination of the various classes of passenger train cars. Table I covers the standard or regular schedule of tungsten train lighting lamps as listed by the lamp manufacturers. Table II covers the special or intermediate schedule of tungsten train lighting lamps which represent lamps that are available but that are not regularly listed by the lamp manufacturers.

TABLE I.
STANDARD OR REGULAR SCHEDULE

Size in Watts.	Voltages.	Type and Size of Bulb.	Vacuum (B) or Gas Filled (C).
10	30-34	S-17, G-18½	B
15	30-34	S-17, G-18½	B
25	30-34	S-17, G-18½	B
50	30-34	S-19, G-30	B
50	30-34	PS-20	C
75	30-34	PS-22	C

TABLE II.
SPECIAL OR INTERMEDIATE SCHEDULE

Size in Watts.	Voltages.	Type and Size of Bulb.	Vacuum (B) or Gas Filled (C).
15	30-34	PS-16	C (Diffusing Bulb)
20	30-34	S-17, G-18½	B
25	30-34	PS-16	C (Diffusing Bulb)
50	30-34	PS-20	C (White Bulb)
100	30-34	PS-25	C
15	60-65	S-17, G-18½	B
25	60-65	S-17, G-18½	B
50	60-65	S-19, G-30	B
75	60-65	PS-22	C
100	60-65	PS-25	C

The committee believes that the following sizes will meet the general requirements of train lighting service, and that the railroads should confine their demands to these as far as possible.

Size in Watts.	Voltages.	Type and Size of Bulb.	Vacuum (B) or Gas Filled (C).
15	30-34	S-17	B
25	30-34	S-17	B
50	30-34	PS-20	C
75	30-34	PS-22	C

The straight side or "S" type bulb is recommended in place of the round or "G" bulb on account of its much lower cost. The 50-watt, PS-20 tungsten gas filled or "C" lamp is a comparatively new development, but is recommended in place of the vacuum lamp in that it provides 50 per cent more illumination without increase in current consumption.

The accompanying figures, 6 to 11, inclusive, show the dimensions and shapes of the different styles of bulbs.

The committee recommends:

1. That that portion of their report pertaining to the direct or positive drive on which a report was ordered be accepted.
2. That the proposed change in paragraphs 6 i. 1 and 2 of the specification for axle generators be referred to letter ballot as Recommended Practice.
3. That the schedule of Train Lighting Lamps, together with the limiting dimensions as given, be referred to letter ballot as Recommended Practice.

The report was signed by J. R. Sloan (chairman), Pennsylvania; C. H. Quinn, Norfolk & Western; E. W. Jansen, Illinois Central; L. S. Billau, Baltimore & Ohio; A. J. Farrelly, Chicago & Northwestern; H. A. Currie, New York Central, and E. Wana-maker, Chicago, Rock Island & Pacific.

Discussion

Mr. Jansen: Your committee in writing this report has described all the various drives of which it had knowledge at the time and included, as will be seen from the report, a drawing showing each drive. The drawings submitted

were unfortunately of such a character that they did not lend themselves to reproduction by photographic process and it was, therefore, considered advisable to omit all except those drives which were in commercial use. We have since learned of two other drives, one by D. C. Wilson and one by G. G. Milne, but neither of these has been developed, so far as we know, beyond the patent stage. We have also given a list of what we consider to be the essential features that such a drive must possess, and also a list of the features we consider should be avoided.

With regard to the Gould shaft drives in service, as mentioned in the report, we are advised that the one on the C. & N. W., "has not been opened or touched since March 15, 1921, and has been performing in an entirely satisfactory manner."

The record of the one on the D. L. & W. since July 14, 1920, is,

Jan. 25, 1921: Regreased gear box and universal shaft drive joints.

July 25, 1921: Regreased gear box and universal shaft drive joints.

Feb. 23, 1922: Regreased gear box and universal shaft drive joints.

Two hours labor and eight pounds of grease were used each time.

The equipment has been inspected subsequent to May 24, and considerable wear was found between the main axle and the intermediate gear teeth. The bevel gear showed practically no wear and was in good condition. The wear on the main gear was evidently due to its not being hardened as was the bevel gear.

In the 1918 report your committee recommended that the axle pulley bushing, if one is used, be 7.5 in. in diameter, and not less than 8.5 in. long. Apparently these dimensions were not sufficient, as we learned there is a considerable number of various types and sizes of the bushings called for, the variation between them being slight. This condition tends to increase the cost, and prevents the manufacturer from manufacturing for stock.

Considerable interest is now being manifested in the so-called wide face pulley, the advocates of the same claiming that its use conduces, especially with body-hung generators, to increase the mileage obtained from the belt.

It has been suggested that the committee investigate these two subjects as part of their next year's work and the committee would so recommend.

I want to call your attention especially to the fact that all roads, where they can, should make use of straight-side lamps; they cost considerably less than round lamps. At present the tendency is to get the generators off the truck and on the car body. Members of this committee developed first a heavy cast pulley that occupied the entire axle length. They have changed that and are getting out a pressed steel pulley 18 in. in diameter and are mounting the generators so that the generator pulley is on the center line of the car. I think all railroads should come to that, because it will result in reducing belt loss practically one-half. A test was made on a 23-deg. curve, 224-ft. radius, and on the sharpest point of the curve the belt had still two inches to go before it struck the pulley. The belt at all points rested on the axle pulley, and if it had been a straight-faced axle pulley the outer edge would be against the flange and it would have tended to go over.

The truss rod was offset so as to get the pulley on the center line of the car. A sort of S-form that was at least 1½ in. in diameter and about 6 in. wide was used to take up the strain, and as it was believed that it would not in any way interfere with the brakes, the brake beam was also offset.

The present cost of car lighting can be cut down by taking care of body-hung generators and getting a proper

axle pulley. We are now using 17-in. and 20-in. pulleys, but I believe all roads could go to 18½-in. pulleys, and if they get their clearance for the brake rigging and can get the pulley on the center line of the car and it will greatly reduce the cost. The manufacturers now want you to pay three or four hundred dollars for the necessary dies.

Chairman Tollerton: Any further remarks? If not, the motion that the report be accepted and the changes recommended submitted to letter ballot is now in order.

Mr. Tatum: I move that the report be accepted and submitted to a letter ballot. *(The motion was seconded, put to a vote and carried.)*

(On motion of Mr. Tatum the meeting adjourned.)

A Brave Attempt to Rescue Drowning Man

AT 6:30 o'clock last evening a thrilling scene occurred off Young's Million Dollar Pier in full view of hundreds of convention people. A man who later gave his name as F. A. Basford, of New York City, attempted to commit suicide by drowning. He was unobserved at the moment by hundreds of people. He mounted the railing and jumped headlong into the ocean. A life boat did not appear; it remained for a railroad man to prove himself every inch a hero. He was E. S. Smith, master car builder of the Florida East Coast. Mr. Smith hastily stripped off his outer clothing and shoes and, seizing a life preserver, dived headlong from the pier, swimming splendidly 200 ft. towards the drowning man. He had nearly reached him when a life guard boat appeared from the shore and rescued the would-be suicide and took also aboard his courageous rescuer. Mr. Smith deserves untold praise for his splendid efforts, which would have been successful in almost another moment. At the Atlantic City Hospital last night the man Basford was in a precarious condition.

Basford late last night denied that he had attempted suicide. He said he was ill, became dizzy and fell off the pier.

Railway Club Secretaries Meeting

MEMBERS OF THE Society of Railway Club Secretaries, which has done so much good practical work for the organizations it represents, were in annual session for several hours yesterday morning at the Marlborough. W. E. Cade, Jr., of the New England Club, who has been chairman for the past two years, presided. All the railroad clubs of the country were represented either by their secretaries or by proxy. Daniel M. Brady, founder of the society, was also in attendance.

Problems with which the secretaries have to deal from time to time and endeavor to solve for the advantage of the clubs were as usual a subject of much general discussion. Conclusions were reached which must be recommended to the executive committees of the clubs. If approved and made effective corresponding benefits are expected to follow. The biggest question that came up was the broadening of the work in hand. It had been suggested that a larger society of greater usefulness might be developed for co-operation and mutual helpfulness. The idea met with cordial endorsement and later on a plan of organization will be considered. This will probably be in the latter part of July at a meeting to be held in New York City.

The following officers were elected for the ensuing year:

Chairman, W. A. Booth, Canadian Railway Club, Montreal; vice-chairman, Bruce V. Crandall, Western Railway Club, Chicago; secretary-treasurer, Harry D. Vought, New York and Central Railroad Clubs, New York.

After adjournment the secretaries and a number of their superior officers had a delightful round-table luncheon at the Blenheim.

Registration Figures

THE FOLLOWING figures show the registrations for 1922 and 1920. They show complete registrations up to four o'clock of the second day of the respective conventions:

Members, Mechanical, A. R. A.	1922 478	1920 490
Purchases and stores	16	24
Special Guests	180	190
Supply Men	1,771	1,955
Railroad Ladies	337	344
Supply Ladies	384	490
Totals	3,166	3,493

Program for Today

DIVISION V—Mechanical, American Railway Association, is holding its meetings in the Greek Temple on the Million Dollar Pier.

Friday, June 16, 1922

9:30 a. m. to 12:30 p. m.

Discussion of Reports on:

- Car Construction.
- Couplers and Draft Gears.
- Brake Shoe and Brake Beam Equipment.
- Train Brake and Signal Equipment.
- Car Wheels.

ENTERTAINMENT

10:30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3:30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4:30 p. m.—Tea will be served in Entrance Hall.

9:00 p. m.—Informal Dance, Canadian Night with Special Features, Ball Room, Million Dollar Pier.

Exhibit Notes

THE NAME OF Charles F. Pierce is to be added to the list of representatives of the Railway Storage Battery Car Company.

The Midvale Steel & Ordnance Company has added to its list of representatives the name of George E. Thackray. The name of Mr. Aertsen was incorrectly spelled in Wednesday's issue. It is Guiliam Aertsen.

The Van Dorn Coupler Company is exhibiting a car-air-electric coupler at Space 38 instead of an automatic coupler as noted in Wednesday's issue.

Rodger Made Vice- President of the Safety

J. H. RODGER, western manager of the Safety Car Heating & Lighting Company, is receiving congratulations from his friends on his election on Wednesday of this week as a vice-president of the Safety Car Heating & Lighting Company. He will continue to have charge of the western business of his company, maintaining his headquarters in Chicago. He has been with the Safety Company for 11 years.

President Salinas of Mexican Railways at the Convention

LEOON SALINAS, of Mexico City, executive president of the National Railways of Mexico, and F. P. de Hoyos, general agent of these lines at New York, have been attending the convention and looking over the exhibits.

"I have been very much interested in the exhibit," said Mr. Salinas yesterday. "Of course, our railways buy practically all their equipment and supplies in the United States, and the multiplicity of things we are interested in that can be seen on the pier is remarkable.

"The railways of Mexico have largely recovered from the effects of the destruction done during the revolutionary period," Mr. Salinas continued. "We now have about 50 per cent more locomotives than we had before that time and practically an adequate supply of freight cars. There is, however, much of our equipment which is still in need of repair, and we are particularly interested in getting the machinery necessary to be used in making repairs. We have ordered a good deal of it, and will order more as we are able. During the revolutionary period there naturally was not much new machinery bought and the old machinery deteriorated, which of course accounts for our present needs in this respect. Many of our shops also still require reconstruction or repairs.

"Those of our tracks which were destroyed have been entirely rebuilt, and the tracks generally are in satisfactory condition. We have had to get the money for reconstruction and improvements entirely from earnings, and of course this has made our progress in restoring normal conditions slower than it otherwise would have been."

Registration, American Railway Association, Div. V, Mechanical

- Allen, L. L., M. M., Gulf Coast Line, Arlington.
- Baker, G. T., G. C. Insp., Penn., Washington.
- Bassett, H. M., Genl. O. E., N. Y. C., Marlborough.
- Bawden, Wm., S. M. P. Term. R. Assn., Princess.
- Beaghen, Thomas Jr., Mexican Petroleum Corp., Strand.
- Bennett, R. C., S. M. P., Penn., St. Charles.
- Bentley, W. F., Sp. Insp. Cars, B. & O., Bouvier.
- Bibb, Arthur, Chf. Car Drafts., D. & H., Dennis.
- Bishop, G. C., S. M. P., L. L., Chelsea.
- Boyd, H. H., Asst. Insp. Mch., G. P., Dennis.
- Brandt, C. A., Chf. Eng., Superheater Co., Marlborough.
- Breaker, E. R., Supt. M. P. M. of Way, S. A. U. & G. 1925 Pacific Ave.
- Brenaman, H. A., Asst. Wks. Mgr., Penn., Loraine.
- Brenholtz, Thos., S. M. P., A. C. R. R. Co.
- Brittain, W. M., Chief Acct., Penn., Grammercy Apt.
- Bronz, J. E., S. S., L. V., Monticello.
- Broughton, M. C., Div. Prt. Agt., Penn.
- Buch, G. S., Gen. Car Wks., Penn., Breakers.
- Buechler, John A., M. M., D. B. C. & W., 130 St. James Place.
- Buist, C. P., M. M., N. O., Public Belt, Traymore.
- Burton, T. L., A. B. Engr., N. Y. C., Marlborough.
- Butterworth, J. A., Chf. Clk., Southern, Penn., Chalfonte.
- Buzard, E. V., Trav. Insp., P. & R., Dennis.
- Canon, J. M., Retired Mgr., Pullman Co., Kendrickton.
- Carlton, E. T., C. Insp., L. I., Strand.
- Chadron, G. J., Gen. Car Insp., N. & W., Pennhurst.
- Clancy, T. P., Genl. Mgr., C. N. Y. S., St. Charles.
- Clark, F. H., Marlborough.
- Coffey, J. E., For. Pass. Equip., C. R. R. of N. J., Lyric.
- Craig, Jas. Gen. Insp., B. & O., Chelsea.
- Crewe, H. M., M. M., A. C. & Y., Sterling.
- Cromwell, O. C., Asst. Chf. M. P. & Equip., B. & O., Chalfonte.
- Darden, C. M., M. E., N. C. & St. L., Dennis.
- Davidson, Guy H., Solicitor Legal Dep't., Penn., Traymore.
- Davis, M. J., Asst. Engr. of M. P., Penn., Chalfonte.
- Deeter, Harry E., Asst. For., P. & R., Russel House.
- Detley, J., Asst. Boiler For. Insp. Cent. R. of N. J., Edison.
- Delaney, John, S. M. P. Cum., Penn.
- Dequire, Geo. N., Asst. Mgr., Dept. of Equip., U. S. R. A., Marlborough.
- Dickert, C. L., M. M., C. of G., Haddon Hall.
- District, I. C. F., Dept., Penn., Elwood.
- Dyer, R. H., Gen. Car Insp., N. & W., Chelsea.
- Ebensperger, C. T., Frt. Agt., Penn., 3910 Winchester Ave.
- Eklind, C. E., Chf. Drafts., A. T. & S. F., Ambassador.
- Ely, E. W., C. B. C., P., Ambassador.
- Faris, C. H., Craig Hall.
- Faris, J. M., Supt. M. P. & Eng. Dept., Youngstown Steel & Tube Co., Marlborough.
- Faulkner, B. J., M. P. & C. D., G. T., Marlborough.
- Faulkner, J. N., P. & C. D., Penn., Traymore.
- Feehan, B., Asst. For., C. R. R. of N. J., Brady.
- Ferry, F. C., M. M., L. H. & St. L., Shelburne.
- Fetner, W. H., G. S. M. P., C. of G., Haddon Hall.
- Fisher, D. Wallace, Asst. M. E., P. & R., Dennis.
- Fisher, Geo., M. C. B., G. T., Traymore.
- Fisher, S. W., Supr. Car Service, Nat. Rys. of Mexico, Ambassador.
- Flynn, J. J., Asst. G. F., N. & Southern, Traymore.
- Flynn, W. H., S. M. P., M. C., Marlborough.
- Frank, C. W., Genl. For., M. P., Dept., Penn., Mt Carmel.
- Fritchey, F. W., M. M., B. & O., Elberon.
- Fritts, J. C., M. C. B., D. L. & W., Traymore.
- Galloway, W. S., P. A. B. & O., Traymore.
- Garcelon, M. L., Asst. Eng. Test. B. & O., Arlington.
- Gardner, Henry, Spec. Eng. B. & O., Chalfonte.
- Gaston, Jas. H., Formerly M. M., Atlanta & West Point, Traymore.
- Geesey, W. R., Towman, Penn., Shelburne.
- George, W. A., M. M., Jacksonville, Penn., Traymore.
- Goldsmith, A. C., Gen. For., Penn., Arcadia.
- Goodwin, E. L., Oper. Off., Pullman Co., Arlington.
- Grant, J. E., Spec. Agt., Bur. of Expt., Traymore.
- Griffin, P. A., Genl. Insp., M. P., Erie, Albermarle.
- Guyer, Jas. T., Ticket Gateman, L. & N.
- Hall, James, M. C. R., S. P., Chalfonte.
- Hamilton, A. D., Ins., Inter. Comm. Comm., Elberon.
- Hammer, C. A., M. M., Oles Brad. & Sala., Arlington.
- Hamm, W. C., M. E., C. V., Craig Hall.
- Hardin, F. H., Chf. Engr., N. Y. C., Traymore.
- Hardy, W., Genl. For., Cent. R. of N. J., Edison.
- Harris, C. M., V. P., Hagerstown & Frederick, Traymore.
- Harrold, W. V., Freight Dept., Penn.
- Hatch, M. C., M. E., M. K. & T., Strand.
- Haverstick, P. W., Supr. Track, Penn., South Carolina Ave. Sta.
- Hawman, Allen M., Asst. Ch. Clk., S. P. & R., Sterling.
- Heuley, R. W., M. M., N. & W., Brighton.
- Henry, W. C. A., G. S. M. P., Penn., Chelsea.
- Hill, Frank J., Ch. Elec. Train Light, M. C., Breakers.
- Holmes, Harry, Freight Agt., Atlantic City R. R.
- Hooper, J. M., Supt., A. C. Y., York.
- Houston, H. A., Ry Mech Engr., Westinghouse Elec. Co., Traymore.
- Hunt, R. B., M. E., P. E. C., Sterling.
- Hunter, H. B., M. M., P. & R., Bothwell.
- Huston, F. T., M. M., Penn.
- Irwin, J. E., M. M., Sand Springs, Princess.
- Jaynes, R. T., M. M., L. & H. R., Chalfonte.
- Jennings, Thomas, S. S., B. & M., Chelsea.
- Johnson, W. D., Genl. M. M., B. & O., Shelburne.
- Jones, H. W., M. M., Penn., Loraine.
- Jones, W. F., Genl. Store., N. Y. C., Chalfonte.
- Katte, Elwin B., Ch. Eng. Elec. Tract., N. Y. C., Marlborough.
- Keiser, C. B., S. M. P., Brighton.
- Kerns, A. U., Shop Insp., Penn.
- Kiefer, P. W., Asst. Eng. Car Dept., N. Y. C., Penhurst.
- Kiesel, W. F., Jr., M. E., Penn., Chelsea.
- Kimmitt, M. A., G. F., C. R. R. of N. J., Strand.
- Kinney, Wm. A., For. Boiler Maker M. P. & R. E. Dept., P. & R.
- Kinkead, J. M., Div. Eng., Penn.
- Kittle, W. M., G. F. Car Dept., Penn., Princess.
- Kneebuck, F. W., For. Pipe Shop, B. & O., Alamac.
- Laporte, V., Ch. Loco Insp., C. & N. W., New England.
- Lea, C. C., Asst. For. C. R. R. of N. J., Edison.
- Leard, H. S., Supv. Pass. Oper., S. A. L., Dudley.
- Lewis, Thomas, Gen. Boiler Insp., L. V., Princess.
- Link, A., M. M., M. C., Traymore.
- Linton, Harvey, Asst. M. M., Penn.
- Lovejoy, Geo. R., M. M., D. T., Haddon Hall.
- Martin, W. L., Ch. A. R. A. Bureau, B. & O., Alamac.
- McAlpine, J. D., Trav. Act., N. Y. C., Cheltenham Revere.
- McClellan, W. J., Mgr. Rolling Stock R. Dept., A. Hecker Co., Haddon Hall.
- McCaughy, D. J., S. M. P., G. T., Traymore.
- McCue, Thomas B., Asst. For., P. & R., Stanley.
- McMullen, John, S. C. Dept., Erie, Traymore.
- McMullen, John Jr., Insp., Erie, Traymore.
- McVehich, A. S., Maintainer, Tel. & Sig., Penn., 3 S. New Hampshire.
- Meelching, J. S., M. P., Penn., Craig Hall.
- Midghead, W. H., Div. Car For., Erie, Penhurst.
- Miller, John B., Asst. For., Atlantic City Ry.
- Mitchell, John, G. F., C. R. R. of N. J., Pennhurst.
- Monfies, A. J., S. M. P., Birmingham, Penn.
- Morse, W. L., Spec. Asst. Eng., N. Y. C., Marlborough.
- Moses, E. P., Gen. Insp., N. Y. C., Penhurst.
- Murray, G. P., E. & M. Eng., G. T., Marlborough.
- Myers, Harry, E. M. M., L. V., Traymore.
- Needman, P. J., M. E. & E., G. T., Ambassador.
- Nolan, T. E., Asst. Ch. Insp., C. R. R. of N. J., Y. M. C. A.
- Norham, B. L., Dennis.
- Nosler, Geo., For. Supt., Am. Ry Exp. Co., Marlborough.
- O'Brien, Peter, Chelsea.
- Owen, W. J., Chf. Int. Insp., Peoria & Pekin Union, DeVille.
- Owens, A. G., Ch. Eng., C. R. R. of N. J.
- Plicht, I. T., Gen. Overhd Insp., N. H. & H. & H. & H.
- Paine, Donald E., Clk. Trans. Dept., P. & R.
- Pardue, W. J., M. C. R., Seaboard Air Line, Traymore.
- Parker, G. E., M. E., M. C., Brighton.
- Perez, José Cent. Shop Supt., Penn., Haddon Hall.
- Perkinson, T. F., M. M., B. & O., Chalfonte.
- Perrine, W. M., M. C. R. R. of N. J., Alamac.
- Picheur, John A., M. E., N. & W., Chalfonte.
- Poole, P. L., Dist. M. P., Insp., B. & O., Chalfonte.
- Porcher, Samuel, Gen. P. A., Penn.
- Pratt, L. S., M. M., S. P., Shelburne.
- Prendergast, A. D., G. M. Insp., C. of G., Traymore.
- Price, C. P., E. S., Canadian, N. Y. C., Penhurst.
- Quinn, M. H., G. S. C. R., Erie, Penhurst.
- Rice, W. L., S. S. P. & R., Dennis.
- Riggs, David, Breakers.
- Riggs, J. R., M. M., Penn., Breakers.
- Rinberg, E. C., Asst. to M. E. B. & A., Shelburne.
- Ritz, A. L., Asst. C. F., A. C. & Y.
- Roberts, John, Supt. M. P., G. T., Traymore.
- Romig, T. S., Asst. M. M., Penn.
- Scheifele, Leonard H., Mach. P. & R., Sterling.
- Schum, H. J., G. F., Penn., Loraine.
- Schuyler, A. J., G. C. Insp., Virginian, Strand.
- Scott, W. L., M. M., Penn., Princess.
- Sealy, Garrett T. L., Asst. Elect. Engr., P. & R., Clarendon.
- Shackford, Jas. M., Chf. Drafts., D. L. & W., Marlborough.
- Shelby, C. K., M. M., Penn., Chelsea.
- Sevard, E. C., Pres. Union Trunk Car Co., Traymore.
- Sindall, G. E., M. M., Asst. Gen. For. Cleaning House, Penn.
- Sisco, G. E., M. M., Penn., Breakers.

Conventionalities

Among the visitors at the convention and exhibit yesterday was George C. Taylor, president of the American Railway Express Company.

John Kruttschnitt, assistant mechanical engineer of the Southern Pacific, who is attending the conventions, is one of the three sons of Julius Kruttschnitt, chairman of the Southern Pacific Company.

T. D. Kingsley, sales manager of S. F. Bowser & Co., Ft. Wayne, Ind., will spend the entire week attending the conventions. Mr. Kingsley has succeeded E. M. Savercool, who is now manager of the San Francisco district.

J. B. Michael, master mechanic, Southern Railway, a member of the Master Mechanics' Association since 1887 is here from Selmer, Ala., maintaining his perfect record of attendance in all these years. He has been with the Southern Railway for 37 years.

Mr. and Mrs. W. E. Sharp's sudden departure from the convention on Thursday afternoon caused real regret on the part of their many friends here. They left for Chicago where they were called by the serious illness of an official of Mr. Sharp's Company.

Col. E. M. Hadley, vice-president of the Chicago-Cleveland Car Roofing Company, is attending the convention this year for the first time and pronounces it a grand success. Col. Hadley is actively interested in the Chicago Association of Commerce, being a member of the Illinois Relations Committee.

J. E. Fairbanks, general secretary of the American Railway Association, and Mrs. Fairbanks, expected to attend the conventions, but V. R. Hawthorne, secretary of the Mechanical Division has received a telegram from Mr. Fairbanks saying that he fears because of pressure of other business they will not be able to come.

Ellsworth Haring, like Mr. Gayetty, is having a real vacation this year. It is the first time for many conventions that he has not to do some tall hustling as a committee man. Nevertheless he seems to be doing more than his full part in helping to make things move. Mrs. Haring, as usual, is backing him up in good work.

Two old timers associated with S. F. Bowser & Co., Alvin A. Bowser and W. T. ("Bill") Simpson, have not missed a convention for the last 25 years. Mr. Bowser has been connected with the mechanical and engineering departments at Ft. Wayne for 35 years. Mr. Simpson has served in the railroad sales department for 17 years.

The General Vermont is represented this year by a new mechanical superintendent, H. T. Nowell, who is here with his wife, and a new mechanical engineer, W. C. Harris. Mr. Nowell was formerly with the Boston & Maine and Mr. Harris came from the Delaware & Hudson. Harris previously served with the American Locomotive Company.

Mr. and Mrs. W. I. Tyler are here for the convention. Mr. Tyler who was director in operation of the Personnel Administration in 1919 and Tyler vice president of the Northern Pacific, is now vice-president and general manager of the National Safety Appliances Company, with three in Chicago. Mr. Tyler was in ill health for some time, but now believes he is fully recovered.

F. A. Schaff, vice-president of the Superheater Company, is one of the convention visitors who recently have returned from Europe. He went over to attend the International Railway Congress at Rome; and after the Congress travelled in various countries. He had a good trip in many ways, but like most recent American visitors to Europe is quite satisfied to be back home.

One of the convention visitors for many years who will be missed this year is C. Haynes Williams. Mr. Williams who was vice-president of the Chicago Railway Equipment Company, died some months ago, after having bravely done his work in spite of serious ill health for a long time. His most intimate friend for years was A. Clark Moore, and Mr. Moore, is also his successor as vice-president of the Chicago Railway Equipment Company.

Superintendent of motive power and equipment J. A. Power, of the Southern Pacific lines, Houston, Texas, and mechanical engineer J. S. Netherwood, of the same road, are attending the conventions. Mr. Power, coming from the country where real honest-to-goodness watermelons grow, refuses to order the luscious fruit at his hotel. He says he is putting in readiness for the watermelon crop 3,000 stock cars and that every car will soon be loaded and sent on its way to the northern markets.

The editor of the *Railway Age*, Samuel O. Dunn, likes nothing better than a good joke himself. His friends are "kidding" him on the loss of an overcoat and perfectly good straw hat somewhere between Chicago and North Philadelphia. The overcoat followed him to Atlantic City, but up to last night the straw hat had not returned. If any one is wearing a hat that doesn't belong to him and the size therein is seven, he will confer a favor on S. O. D. by leaving it at *The Daily* on the Million Dollar Pier. No questions will be asked.

The perfect air ventilation in the ballroom on the pier has been commented on by many this year. Just before the opening of the convention the B. F. Sturtevant Company, Boston, made a generous offer to install ventilating fans above the balconies on both sides of the ballroom. The offer said the company would be pleased to furnish the material and do the work entirely without cost to the R. S. M. A. or the pier people. Ten large fans, five on each side, were promptly installed and are now doing the work. The fine work of the Sturtevant company is greatly appreciated.

W. L. Day thinkathat! H. A. Houston, railway mechanical engineer of the Westinghouse Electric & Manufacturing Company, arrived in the city yesterday with a blushing bride leaning on his arm. Yes! Married Wednesday. After graduating from Purdue, where he held the master mechanics' scholarship from 1907 to 1911, Mr. Houston took his M. S. degree from the University of Illinois and then spent five years with the Frisco and five and a-half years with the Rock Island before he joined the Westinghouse Company in charge of heavy traction locomotive design. Sure thing, have a cigar.

Sir Arthur Conan Doyle, the English novelist, with Lady Doyle and their three children—looking extremely fit—honored the convention Thursday noon by examining the exhibits. Sir Arthur expressed great surprise at the rapidity with which the exhibits were put in operating condition, having witnessed the chaos on the pier but a few days before. His one lament on Atlantic City in general was its "drabness"—and he was not speaking of the weather. May we suggest and urge that he put in a hurried call for Sherlock Holmes!

New Devices Among the Exhibits

Bullseye Dust Guards

HAIR FIBRE dust guards which are said to be superior to and more durable than the old type of wood guards in car and locomotive truck journal boxes, and yet which can be furnished at approximately the same cost, have been brought out by the Fibreboard Company, Boston, Mass. These dust guards, to which the name "Bullseye" has been applied, are furnished in three styles; plain composition felt, the same guard waterproofed, and one with the hair fibre reinforced on both sides by a jute fibreboard. The last type is recommended for railroads which desire a rigid and long-wearing dust guard.

These guards have been and are now being tested out by a number of railroads. They are said to be giving satisfactory service and are being shown at Atlantic City by Midgley & Borrowdale, Chicago, the Western representatives of the manufacturers.

Top Vestibule Buffing Mechanism

THE MORTON MANUFACTURING COMPANY, Chicago, is exhibiting an outside buffing mechanism for the top of vestibule diaphragm face plates. The face plate is extended the proper distance from the carline and a bracket is bolted to it as its center. Two connecting rods extend from this bracket diagonally back to two plungers or pistons which work against $\frac{1}{2}$ -in. by $2\frac{1}{2}$ -in. springs,

revolvably mounted and the side-sway action is taken care of through the angularity of the connecting rod and plunger, while the inward and outward movement is controlled by coil springs. It eliminates annoying noises within cars caused by the pounding and hammering of face plates and buffing mechanism in the hoods, or grinding and scraping of springs on the carline. This is possible because the blows or strains on the device are received angularly at six points. There is no grinding because each piston receives less than one-sixth of the blow from the face plate. The travel of the piston in its bushing at the carline does not exceed 1 in. to $1\frac{1}{2}$ in. when the face plate is fully driven back.

This device has been tested in service for practically one year, and is said to have stood up satisfactorily under six months of winter service and six months in which the cars were switched and the train made up twice a day, without any of the parts showing appreciable wear.

Hand Brake Safety Attachment

A SIMPLE SAFETY attachment for hand brakes on freight cars is being shown by the Inter-State Safety Appliance Company, Inc., Norristown, Pa. It consists of a ratchet wheel and pawl on the underside of the stepboard, the teeth of the ratchet wheel facing in the opposite direction from those on the regular ratchet



Outside Connected Top Diaphragm Buffing Mechanism

$7\frac{1}{2}$ in. long, which are held in brackets bolted to the carline. This device is simple and is applicable to all cars, new or old, used in passenger train service. It can be readily and economically installed, as all parts are in plain view and accessible. This also simplifies inspection and replacements.

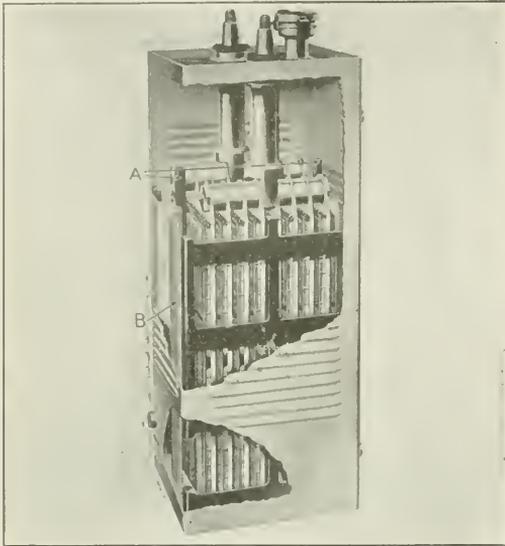
The mechanism is so constructed that it compensates for the action of the face plates due to the swinging, swaying and bouncing of the cars when rounding curves, passing over rail joints, switches, crossings, etc. For the up-and-down motion of the car, the buffing mechanism is

wheel above the step-board. A large foot pedal on the step board serves to hold the safety pawl out of contact with the wheel and compresses a spring.

If, while setting up the hand brakes, a brake chain or other connected part should break, the handwheel would start to turn freely. However, the instant the exertion of power on the pedal is released, the spring forces the safety pawl into the teeth of the wheel and prevents further rotation of the hand wheel. As the brakeman would naturally cling to the handwheel, the operation of this safety device would save him from falling.

Improved Edison Car Lighting Battery

THE EDISON STORAGE BATTERY COMPANY, Orange, N. J., is exhibiting its high-wide cell for car lighting batteries, which is now being introduced to the railroad field. The "HW" type of cell was developed as the result of recommendations made by railroad car lighting



Edison "HW" Cell for Car Lighting Service

authorities and a study of conditions of practical operation which a battery must meet.

The cell is designed with increased space for electrolyte. The design also permits better circulation. These provisions lessen the possibility of high concentration of the solution, and the evils resulting from operation with insufficient electrolyte.

A Forged Steel Coupler Yoke

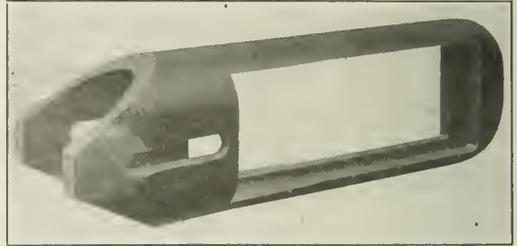
A FORGED STEEL DRAFT yoke of the vertical type is one of the innovations at the convention and is being exhibited by the Forged Steel Yoke Corporation, Chicago. This yoke is made by piercing a solid billet under high pressure in a powerful hydraulic press and without any welding or hammering operations. This method of manufacture produces a very dense, close-grained steel. After the yoke has been brought to finished form, it is heat-treated in oil to neutralize any internal strains resulting from the forging operation.

The forging and heat treatment insure yokes of uniform quality, the average physical characteristics of test specimen being as follows: Ultimate tensile strength, 90,000 lb. per square inch; elastic limit, 60,000 lb. per square inch, reduction of area, 34 per cent, and elongation, 22 per cent. With material of the above characteristics, the forged steel yoke has an ultimate breaking strength approximately twice as great as yokes now in use. After heat treatment the ultimate tensile strength is approximately 1,000,000 lb., and the elastic limit about 600,000 lb.

The forged steel yoke meets all A. R. A. requirements

as to minimum area and limiting dimensions, being strictly interchangeable with standard cast steel yokes. The straps, which are the points of minimum sectional area, contain 11 sq. in. of metal. The weight is approximately the same as that of cast steel yokes. The standard yoke has a gear opening $24\frac{5}{8}$ in. long. Lut can be made in shorter lengths or special sections for repair work.

The Forged Steel Yoke Corporation is also manufacturing drop forged steel draft lugs. These are lighter than those of cast steel but have more rivet bearing area

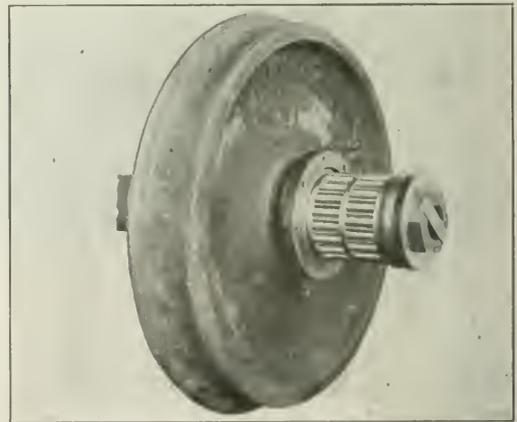


Coupler Yoke Formed from a Solid Steel Billet

and are designed to insure properly driven rivets. This is accomplished by a conical ring around each rivet hole which is forced into intimate contact with the web of the center sill when the lug is bolted up and eliminates the possibility of rivet collaring between the draft lug and sill while being driven.

Roller Bearing Truck

THERE ARE a number of obvious advantages which would be obtained from the use of a satisfactory roller bearing for freight and passenger car journals, provided there was full assurance of high durability. A new design of a roller bearing is being shown this year by the Stafford Roller Bearing Car Truck Corporation,



Roller Bearing and Thrust Plates Mounted on Axle

Lawton, Mich., and will naturally attract attention. The rollers for the radial load are mounted in a double-squirrel cage. For a 5-in. by 9-in. journal there are 36 rollers, two sets of 18 each, $3\frac{1}{2}$ in. diameter and $2\frac{1}{2}$ in. long.

These rollers are of chrome steel, oil-treated. Beyond the roller cage toward the end of the axle is a roller thrust bearing which is held between two bearing plates. The entire assembly is secured by a nut on the end of the axle, this nut being secured by a bar lock held by two screws. These parts are shown clearly in one of the photographs. Next to the wheel will be noticed the back cover, oil ring and dustproof plate. The appearance of



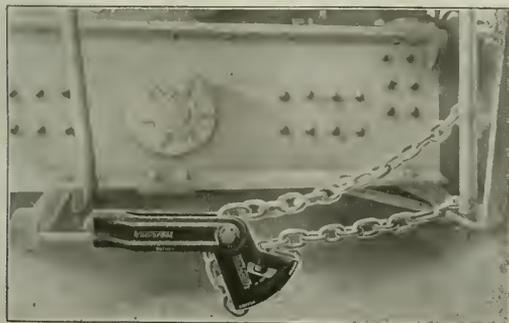
Appearance of Arch Bar Truck with Stafford Roller Bearing Boxes

the sealed enclosing box and cover will be noted from the photograph of the complete truck.

A Michigan Central flat car was fitted with Stafford roller-bearing trucks in December, 1920. After making 3,731 miles in transfer yard and logging service, the trucks were transferred in June, 1921, to a gondola car, which made 990 miles in sand and gravel service that season. In January, 1922, the trucks were again transferred to a box car—the one being shown at Atlantic City—and up to April 1 this car had made 3,654 miles in mixed train service. The total distance run has consequently been 8,375 miles. During the period these bearings have been in service they have given no trouble whatever; no hot boxes have developed and no repairs have been found necessary either on the bearings or the journal boxes.

Universal Hand Brake Attachment

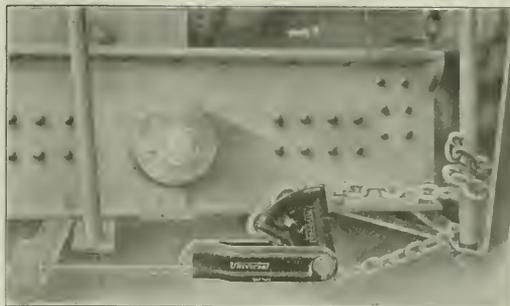
THE ORDINARY HAND BRAKE is commonly an ineffective piece of mechanism, in that it fails to bring the brake shoes into contact with the wheel with the same degree of force as does the air brakes. The hand



Position in Full Release

brake attachment furnished by the Universal Draft Gear Attachment Company, Chicago, was designed to

obtain an effective hand brake for tank and high capacity cars. This is secured by inserting a properly proportioned cam lever between the ordinary brake staff and the hand brake rod. With this device the slack is quickly

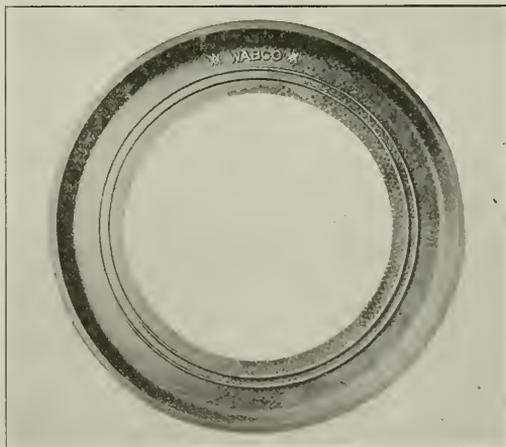


Position When Brakes Are Applied

taken up and rapidly released and there is at the same time a considerable increase in the pull delivered to the brake rod. The Universal hand brake attachment is arranged for attachment on the end of the hand brake rod, as shown in the illustration. It is simple, easily attached and effective.

Brake Cylinder Packing Cup

UNTIL QUITE RECENTLY, leather has been used extensively for packings in air brake cylinders. It has however, been found difficult to keep cylinders absolutely air-tight over extended periods with packings made of even the best grades of leather and treated by



WABCO Brake Cylinder Packing Cup

the best possible methods, due to the presence of disintegrating elements such as oil, water, rust, heat, and dirt. Efforts to evolve a substitute material possessing the good qualities of leather with none of its disadvantages have culminated in the development of the WABCO packing

cup by the Westinghouse Air Brake Company, Pittsburgh, Pa.

This packing consists of a special oil-proof composition in combination with a strong open-mesh cord fabric. The fabric is uniformly distributed throughout the section of the cup, each thread being thoroughly imbedded in the composition and the whole accurately molded. The composition offers remarkable resistance to elements which have proven more or less destructive to other forms of packings. Its structure is compact and uniform; air cannot penetrate it either when the packing is first installed or after long hard usage. It is impervious to the action of the usual lubricants and cleaning agents, will not break down under conditions where unusual heat prevails; is tough and durable, and able to resist wear for long periods.

The fabric, around and through which the composition is molded, serves as a skeleton framework to give body to the packing, prevents cracking of the composition under service conditions, adds resiliency and increases the tensile strength. The finished cup is homogenous, tough, sturdy and resilient. It does not become flabby, but is so formed and constituted as to maintain an airtight contact with the cylinder wall by its own body.

WABCO packing cups are not strictly new but have not been shown at a previous convention; wherever they have been applied, and a number of railroads are already using them exclusively, it is stated that substantial savings in brake cylinder maintenance and improved air brake operation have been noted.

Record of a Carnegie Rolled Steel Wheel

THE CARNEGIE STEEL COMPANY, Pittsburgh, Pa., in addition to its display of new rolled steel wheels is showing a pair of wheels which were installed in September, 1912, under an all-steel passenger coach weighing 149,200 lbs. They remained in service until finally removed in May, 1921, during which period the wheels were turned four times. The total mileage secured was 581,139 miles. The complete record of service follows:

Period	Cause of removal	Average Loss of Tread		
		Wear	Turning	Mileage
1	Shod flat	.02 in.	.39 in.	2,339
2	Worn flange	.18 in.	.22 in.	102,225
3	Worn flange	.20 in.	.11 in.	90,984
4	High flange	.28 in.	.08 in.	126,880
5	High flange	.54 in.	—	258,711
Total		1.22 in.	.71 in.	581,139

Side Bearing Testing Machine

THE ILLUSTRATION shows an interesting and novel machine which has been designed and built by the A. Stueck Company, Pittsburgh, Pa., to show the resistance to the swivelling of the truck due to the friction on the side bearings.

It consists of body and truck bolsters, loading arrangement and measuring apparatus. The truck bolster is placed on a frame at a convenient height for observation, while the body bolster swivels on top of it, pivoted by the usual center plates. Instead of placing the load on top of the bolster, provisions have been made to pull the bolster downward by calibrated springs, which can be tightened or released at will so as to get any desired load at the side bearings. Arrangements have also been made so that different side bearings of the frictionless type, as well as the old-fashioned friction blocks, may be inserted between the two bolsters and the force necessary to swivel the

body bolster is registered on a gage by means of an interposed oil cylinder and piston.

The results obtained have, of course, developed nothing radically new, as the great amount of friction at the side



Machine for Determining The Frictional Resistance of Truck Side Bearings

bearings is known to the railroad world; the machine simply confirms the judgment of railroad officials in using a frictionless side bearing, thereby saving the rails, wheels, power, and avoiding costly derailments.

Sliding Door Controller

ONE OF THE NEW devices shown by the O. M. Edwards Company, Inc., Syracuse, N. Y., is a sliding car door controller. This not only locks the door in a closed position but automatically holds the door in various open positions. It prevents the door from sliding shut during emergency brake applications or for any other of the various causes for door sliding either open or closed which frequently causes injury to baggagemen and express messengers. The door can be kept partially open for ventilation by use of this device and still be held in a stationary position. It is operated by a handle, and a pull in either direction allows it to be easily moved.

EDITORIAL

Railway Age

EDITORIAL

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Certain maintenance of way operations have been conducted by using the main track since the earliest days. To adopt other methods would add so greatly to the cost as to be prohibitive.

The Economy of Modern Work Equipment

With the growth of traffic the interference of work equipment with revenue trains has increased proportionately with the result that it has become increasingly important to select equipment which will cause the least interference and result in the minimum delay to regular revenue trains. This has stimulated the development of the ditcher, the pile driver, the dump car, the spreader, and other forms of construction equipment until today much of it differs widely from that of a few years ago. This not only increases the value and the range of applicability of this equipment for railway service, but it is hastening the retirement of the older types. It is told of Andrew Carnegie that an employee in charge of the design and construction of a steel mill remarked to him on the completion of the mill that if he had the work to do over again he could design the mill in a way that would save a large part of its cost annually. "If you can do that," Mr. Carnegie replied, "we will begin work on a new plant at once and dismantle the one just completed." Many roads can apply the principle implied in this incident to much of their work equipment and discard the obsolete and inefficient types that they now have for more modern equipment the savings from which over the old will yield a good return on the investment. If this theory is good business for a steel company it is equally good for a railroad.

Three collisions described in the Interstate Commerce Commission's report, abstracted in this issue (Warner Junction, Montrose and Welch), with three reported in the issue of June 10, page 1343, and a fourth on page 1332, make a strong dose of a kind of medicine which is very unpalatable, but which

The Lesson of Seven Collisions

evidently is still needed. And why should not these seven cases be studied as carefully as though they were like Porter or South Byron or Mount Union? We have grouped these seven together for the purpose of emphasizing the lesson that for all of them the complete block system is the rational remedy; and the only satisfactory remedy. The government reports have set forth in each case the rules that have been violated and the mistakes that have been made, and the railroad superintendent in each case has, no doubt, imposed suitable punishments (except where the men at fault have themselves been killed by the collision). But this is the same treatment that has been in vogue for many years, with only partial success; while all the time the other lesson—what might be called the master lesson—seems in many cases to be neglected, or is acted on only after years of delay. "Complete block system" is a term which ought to receive much more consideration than it does. Any operating officer who will re-read these seven reports will be reminded—what he ought already to know pretty well—that, taking the country as a whole, there is a good deal of satisfaction felt in a false reputation for using the block system when in

reality it is not used. Some railroad officers seem to concentrate their attention (in this matter) exclusively on two points: (1) the *automatic* block signals that they have and (2) the automatics that they *intend* to have. But a collision on a line for which automatics cannot be provided for five years yet, shows this attitude to be extremely short-sighted. This side-stepping of the question, with the widespread employment of a mixture of old-style time-table rules and the space interval, and falsely calling the arrangement the block system, indicate two very weak spots in our mental roadbed.

The Railroad Labor Board in its recent opinion awarding reductions in the wages of shop employees, did not authorize reduction of the compensation of supervisory officers. This was in accordance with justice and sound policy. As the *Railway Age* repeatedly has pointed out, most supervisory officers were not

The Pay of Supervisory Officers

paid enough, absolutely or in comparison with what the employees working under their direction were paid, before government control was adopted, and have not since then been given advances in pay which put their compensation relatively where it should be. The course of the board in leaving their compensation untouched, while reducing that of the employees, largely remedies an unfair and unhealthy situation. The supervisory officer cannot command needed respect from employees who know they are receiving as much or more pay as he is. Furthermore, when supervisory officers are paid relatively low, it is often difficult to get the best available men to accept and retain these positions. These things militate against securing the greatest economy and efficiency. The higher railway officers should, in future as in the past, be chiefly men promoted from the ranks of the supervisory officers, and in compensation and all other respects supervisory positions should be made such as to attract capable men, and especially able, energetic and ambitious young men, to them.

For the last 20 years or more American railway bridges have been designed for live load stresses imposed by the so-called Cooper loadings, a series of hypothetical trains consisting of two consolidation locomotives followed by a uniform load. The particular advantage of this series lies in the fact that the loading effect produced by any particular train of this series is exact in proportion to its index number, that is, an "E 50" is five-sixths as heavy as an "E 60." The system has proved very convenient and has come into almost universal use for design, and also for the classification of old structures, and with its continued use, operating officers also are beginning to have some conception of the Cooper classification as applied to the old bridges. As the weights of actual locomotives and train loads have increased, bridge designers have gradually pushed up the Cooper classification used in designs so that, whereas, "E 40" was the one most commonly used in earlier days, the "E 60" and "E 70"

Is the Cooper Loading Obsolescent?

classes are now the usual live load loading called for by the design specification, but in spite of the increase in proportionate loading thus effected it is found that the heavier load no longer constitutes an accurate equivalent of the actual locomotives of today. A chief difficulty is that the modern locomotive is much longer than the consolidation of the early nineties and that the weights of the locomotives of today are heavier in proportion to the train load than is the case with the Cooper loadings. In other words actual loadings of today that are equivalent to one Cooper loading for one span length may approximate an entirely different Cooper loading for some other span length. This situation has led to rather frequent proposals for new standard bridge design loadings to supersede the Cooper series but these suggestions have met with scant favor because of a reluctance to give up what has become a thoroughly established standard. However, the subject is now given renewed interest because of the appearance in the Proceedings of the American Society of Civil Engineers for May of a paper by D. B. Steinman in which he proposes a new design loading based on a painstaking study of seven of the heaviest locomotives now used in this country. The proposed loading has much to recommend it, particularly as applied to design. It more nearly represents the future developments in train loading to be expected in this country and, therefore, insures a more uniform design of bridges. In view of the present universal use of the Cooper loading it may well be continued for the classification of old structures in spite of some of the shortcomings pointed out by Mr. Steinman, but there is clearly a need for the application of something other than the short consolidation locomotives of the Cooper series when it comes to the proportioning of the parts of a new bridge.

Assurance that the revenue provisions of the transportation act, which have been under continuous attack in and out of Congress ever since the law was passed early in 1920, will not be repealed or amended at this session of Congress is given in the decision of the House committee on interstate and foreign commerce on Tuesday to postpone further hearings on the Hoch and Sweet bills until the December session. The Senate committee on interstate commerce, which held protracted hearings on the similar Capper and Nicholson bills, has taken no action upon them and it is understood to have agreed informally that it will not, although Senator La Follette has threatened to move to discharge the committee from further consideration of the bills in order to take them up on the floor of the Senate. In the present state of legislation there is little to fear from such a threat, even if La Follette were not more potent as an obstructionist than as an active force. Therefore it appears certain that the experience of the year 1922, which promises to be more nearly normal than its two predecessors, will be added to that of the year of depression, 1921, and the boom year, 1920, in affording a thorough test of the law which has received so much of both praise and criticism and which has been so generally misunderstood. Less of the extreme criticism of the provision in the law which attempts to give the railroads a stated percentage of return has been in evidence since it has been shown that rates may be reduced in spite of it and that business could improve even before a general rate reduction. The kind of criticism that now remains is mainly that of the professional railroad critics. On the other hand those who have looked for the way of beneficial results from this part of the law have yet to see their hopes realized. The principal organized advocates of the bills which have failed to emerge from the two committees has been that of the state railroad commissioners who object to the curtailment of their power

to make rates without a too careful regard for their effect on interstate commerce, and they have thus far failed to convince the committees that the difficulties of which they complain cannot be remedied by co-operation between the states and the federal commission.

The Careful Crossing Campaign is the most prominent item of railroad news in the daily press at the present time; prominent by reason of the great number of articles, long and short, poetic, prosaic and otherwise, appearing all over the country. These are literally too numerous to mention. From the railroad standpoint the principal thing to be said is that the A. R. A. Committee evidently has thus far been very successful in its activities looking to uniformity of action on the part of all railroads. These various newspaper articles help one to appreciate the magnitude of the problem. The Northern Pacific, for instance, has 10,000 crossings to look after. The Pennsylvania has distributed 140,000 posters, and will use a million stickers on letters. By getting all classes of employees interested it is possible to introduce some variety. On the Charleston division of the Baltimore & Ohio the employees fixed up an automobile truck as a make believe passenger locomotive, and made a hit in the Memorial Day parade on May 30, at Weston, W. Va. The safety motto of that division is "THINK ABOUT IT." Superintendent W. Trapnell opened the campaign at Weston by an address in the Methodist Church on Sunday evening. Committeemen will be cheered by the fact, emphasized in the circular issued by the Pennsylvania, that warnings given to automobile drivers at crossings and sent to them in writing by mail have already had "a marked effect" in limiting the list of fatalities at crossings. On the other hand, the Monday morning newspapers continue to feature crossing horrors on the front page in a way to have a marked effect on readers—if the readers can be made to fix their minds on the lesson which the facts convey.

A station agent recently undertook to examine the crates of glass brought to him for forwarding during one month.

In one shipment of 70 boxes of window glass he found 15 panes broken and in another of 17 boxes he found seven panes broken; in fact, of all the glass offered for shipment during that month only five contained no broken panes. By this additional labor he saved his company a considerable amount of money, for if the shipments had gone through as usual without investigation the carrier in question would have been called upon to pay for a large amount of damage which it did not cause. This is a problem which is especially serious on lines remote from glass manufacturers, where such products are forwarded from distributing points for the most part without examination. For the year ending December 31, 1921, the sum of \$2,153,291 was expended by the railroads of the United States for claim payments on glass, glassware and crockery. Perhaps, as this case indicates, a number of carriers contributed to this amount who were guiltless of any damage done, and likewise it is more than likely there were roads which escaped paying for damage which they actually caused. There is a still further supposition that at least part of the blame is due to defective products or careless packing or handling on the part of glass companies' employees. Nevertheless, we know that glass is an easily breakable article and that large panes of glass are expensive. It would, therefore, seem advisable for re-

Rate Law Amendments Postponed

Avoid Damage Claims

ceiving agents to examine shipments of glass and similar commodities in order to insure that the responsible party should bear the expense of this damage. If such methods are adopted it is fair to presume that a number of roads will find their claim payments materially reduced as in the case of the carrier mentioned above which, through the efforts of its vigilant station agent, has now decided to investigate all glass shipments received at its distributing points.

Great Reduction of Railway Expenses

PERHAPS THE MOST significant thing which has occurred since the railways were returned to private operation has been the reduction in the number of employees. The labor policy which has been followed has, of course, been widely different from that under government control. There was a very large increase in the number of employees under government control. This was the chief, although, of course, by no means the only, cause of the large increase in operating expenses which took place.

The Railroad Administration's labor policy has been vigorously attacked and stoutly defended. We have not heard the last of the question of government ownership. Smith W. Brookhart, a very radical advocate of government ownership, has just been nominated for the United States Senate by the Republicans of Iowa. This is a portent which shows that facts illustrating the difference between the efficiency of government and private operation cannot be too often presented. No other facts illustrate it more forcibly than the great increase in the number of employees which occurred under government operation and the remarkable decrease which has occurred since private operation was resumed.

When the government seized the railways in December, 1917, they had 1,703,748 men on their payrolls. It operated them until the end of February, 1920, and the average number of men employed in the first three months of 1920 was 1,993,524 and the total payroll was \$795,616,330. One year later, in the first quarter of 1921, the number of employees had been reduced to 1,691,471. Although meantime an average increase of nearly 22 per cent in wages had been granted, the total payroll for this smaller number of employees was only \$757,325,356.

Still another year has now gone by. The statistics of the Interstate Commerce Commission regarding the number of employees and wages paid in the first quarter of 1922 are now available. They show that in this period the average number of employees was 1,555,737, and the total payroll \$616,406,474. The reduction in the number of employees since the first quarter of 1920 is 437,787, and the reduction in the payroll over \$179,000,000, or at the rate of about \$60,000,000 a month. This reduction in total wages paid was secured in spite of the fact that the hourly rates of pay per hour and per day of the employees were higher than in 1920. It was due principally to reduction of the number of employees, but also largely to the adoption of various measures for the elimination of overtime which had to be paid for at punitive rates. It was also due to some extent to changes made by the Railroad Labor Board in the rules in the national agreements which two years ago were operating to prevent the railways from getting efficient work and to force them to pay for work not done at all.

The heavy decline of traffic in 1921 rendered it possible as well as necessary for the railways to make a large part of the retrenchments in the payroll and in other expenses which have been effected. Experience makes practically certain, however, that no reductions in payroll approaching these would have been made under government control. In the early part of 1919, under government control, the traffic

declined but the number of employees continued to increase.

The heavy reduction in the number of employees has inflicted severe hardships on those who have been laid off, but the labor policy which their own leaders got adopted under government control caused the payroll to be inflated, and it was inevitable when efficiency was restored that many men would be discharged. Furthermore, the insistence of the labor leaders upon the payment in a period of profound depression of the highest wages ever known forced the railways drastically to curtail maintenance and improvements, and thus threw many men out of employment. Being forced to pay excessive wages to those they had to keep on the payroll, they were obliged to reduce the number kept on the payroll as much as was physically possible. Many of the men who have been thrown out of work may thank for their unemployment labor leaders who succeeded in compelling the railways to pay wages so high that they could not pay them to a normal number of men without bankrupting the railway industry.

The reduction which has been made in the payroll is reflected in a striking way by the operating expenses. In the first three months of 1920 total operating expenses were \$1,253,200,000, or about \$13,772,000 a day. In the first three months of 1921 they were \$1,227,000,000, or about \$13,633,000 a day. In the first three months of 1922 they were \$1,023,000,000, or about \$11,366,000 a day, a reduction compared with the first three months of 1920 of over \$2,400,000 a day.

These statistics demonstrate that there has been a great increase in the efficiency of operation under private management. The advocate of government ownership is likely to say, however, that this increase in efficiency has merely benefited the railways at the expense of their employees and to denounce the results gained under the Transportation Act as of no benefit to the public. Let us see. The total amount paid by the public for railway transportation in the first three months of 1920, *including the deficit incurred as a result of government operation*, was \$1,497,600,000, or \$16,440,000 a day.

In the first three months of 1922 the total amount paid by the public for railway transportation was \$1,271,500,000, or at the rate of only \$14,100,000 a day. In other words, the reduction in *operating expenses* effected between the first quarter of 1920 and the first quarter of 1922 was about \$2,400,000 a day, and the reduction in *what the public paid* for railway transportation was about \$2,340,000 a day. Meantime there was an increase of over \$86,000 a day in the taxes the public collected from the railways. Thus it appears that the public, in reductions in the amount it pays for transportation and in increases in the taxes it collects from the railways, has actually got benefits exceeding all the reductions in wages and other operating expenses which the railways have made. And now reductions of rates have been ordered on July 1 which will be absolutely out of the question except for the economies which have been effected.

In view of such facts as the foregoing it is extremely difficult to understand how any intelligent man can argue that government operation is more efficient than private operation, or that the public does not benefit by the superior efficiency of private operation. But, then, men do not have to be intelligent to advocate government operation. Mr. Brookhart, who has recently been nominated for senator from Iowa, estimated in testimony before a Senate Committee in Washington in December, 1917, that railway operating expenses would be reduced over \$400,000,000 a year under government control. The policy he advocated was adopted and operating expenses increased over \$1,000,000,000 the first year. Mr. Brookhart apparently knows just as much about railway matters now as he did before government control was adopted.

A Proposed Revision of the Operating Expenses Classifications

THE INTERSTATE COMMERCE COMMISSION has requested the co-operation of the Railway Accounting Officers' Association in the matter of a proposed revision of the various railway accounting classifications. It is proposed to begin the work with the classification of operating expenses and the association has prepared a plan around which the discussion will commence. The subject is being given prompt attention. A meeting with representatives of the I. C. C. Bureau of Accounts was scheduled to begin this week. Because of the importance of the matter, the plan, as presented to the R. A. O. A. by its committee on disbursement accounts, is given in full on another page, as well as a brief analysis of the ideas by which the work will be guided.

It will be noted from the plan that the basic element in the proposed changes is simplification. There is first of all a reduction in the number of primary accounts from 197 to 69. One will notice in particular the treatment given depreciation. Under maintenance of equipment, for instance, the one primary account, "260, Depreciation" appears where in the present classifications there are 19 primary accounts. Whereas the 19 showed depreciation and retirements separately for different classes of equipment, in the new single account these are all lumped together in a single figure.

In the transportation accounts the outstanding factor is the simplification or the segregation into station, yard and road service; fuel, it is noted, is given special consideration. Another interesting development in the proposed classification is the creation of a new general account, "Casualties," including damage to property, freight loss and damage, personal injuries, etc., or, in general terms, loss or damage to property of others than the carrier.

It is rather evident that the proposed classification is likely to be the subject of much argument on the part of the commission because the plan can hardly be said to follow out the ideas expressed by Alexander Wylie, director of the I. C. C. Bureau of Accounts, in his letter opening the matter, and Mr. Wylie on the floor of the convention said that the commission had hardly expected such a drastic reduction in the number of accounts.

The *Railway Age* does not believe that the desired result in this work is a further refinement and sub-division. As a matter of fact, it is only too evident that the present classifications are too refined as they are and that there is such a mass of details that it is very difficult to use the figures to greatest advantage. This has been evidenced in the rate cases and in cases before the Railroad Labor Board, where it was found that in spite of all the present details the basic facts that were desired were not easily to be ascertained. On the other hand, the *Railway Age* is not unduly impressed by what the R. A. O. A. disbursement committee has offered. It is, in truth, unable to agree with those who believe that the proposed changes represent progress, nor does it believe, under the circumstances, that with its present plan the R. A. O. A. will "get to first base" insofar as the Interstate Commerce Commission is concerned.

Of course, everybody will agree that simplification and economy are highly desirable. We have already spoken of the present degree of refinement and the inability to put this refinement to practical use. We do not believe, however, that simplification alone is a necessary remedy in the present case.

Insofar as concerns particular matters of detail, attention is drawn to the steps taken with the depreciation accounts particularly in the case of equipment. Depreciation in railroad accounting is distinguished, somewhat falsely, it is true, from retirements, primarily for the reason that in the past the charges for depreciation were not sufficient to take up all

but the salvage value of the equipment. However, admitting that fact, it must also be admitted that the retirement accounts at present have a special value because of the contemporary bad-order car and unserviceable locomotive percentages. Many of these locomotives and cars are awaiting retirements instead of repairs. They will be retired as soon as the situation can permit of charges to retirement account. It might further appear that the primary accounts will have a value in this connection that will be largely lost if the charge is made to an all inclusive depreciation account.

The proposed general "Casualties" account, we venture to suggest, will be a much disputed affair. First of all, the name of the account is a poor one. It seems to have a reference to personal injuries alone; the war is not well far enough behind us to keep it from having that connotation. Further, the contention is made that casualties are an element which must be expected and received like the weather, or, in other words, that such items "do not have a direct bearing on transportation expenses." This is a question. We believe that they do and, in fact, it is for that reason that this paper has noted so favorably the attention which has been given to freight loss and damage campaigns. The argument, as a matter of fact, works both ways. It might be a question as to whether the freight loss and damage people will not be highly honored by the special attention given their work because freight loss and damage will make up much the larger proportion of the total casualties account. In fact, at first we thought that this recognition was what was intended. The accounting officers, however, have advised us otherwise.

A great deal is made of the argument that any changes in the classification should reflect the new position which is given the Interstate Commerce Commission by the Transportation Act. The classification should be such that it is of greatest value to the carrier, to the I. C. C. and to the public. As the resolution passed by the R. A. O. A. meeting itself said, "The accounts should afford a prompt and accurate method of controlling expenditures for labor, fuel and material." It is difficult to see how the reduction in the number of accounts and the questionable innovation of a new casualties journal account will succeed in securing the desired result.

The proposed new classification further adds nothing new to railway accounting procedure. It gets nowhere at all in that important matter of enabling a student to determine, for instance, whether the road is properly maintained or not. We are not prepared to assume that it might be possible to put it in the operating expense classifications but, nevertheless, the fact remains that we have no contribution whatever as to the argument about contract work, contract shops, etc., and other similar matters of leading importance under present conditions.

These criticisms, we feel, are possibly a bit destructive rather than constructive. They prove, at any rate, that the R. A. O. A. and the Bureau of Accounts have no simple task before them. We hope, however, that the issue will be argued out on some other basis than that of simplification or expansion. The problem is not to be solved in as easy a manner as that.

THE NEW JERSEY BOARD OF TAXES and Assessments has refused to make material reductions in the railroad assessments for 1922. Hearings on the appeals have continued through many weeks and the railroads submitted voluminous testimony regarding the value of railroad property in New Jersey. Aggregate valuation of these properties for taxes for 1922 was \$415,135,518. The tax involved is \$14,740,628, of which \$5,684,789 will go to municipalities and \$9,055,839 to the State. The board sustains the assessment with the exception of minor adjustments, which resulted in a total reduction of \$1,535,020.



Classification Yard, West from Cemetery Street Viaduct

New Haven Builds Freight Yards at Providence

New Terminal Forms Important Unit in Broad Improvement Program to Effect Operating Economies

THE NEW YORK, New Haven & Hartford, in completing its new Northrup Avenue freight terminal at Providence, R. I., to meet present operating requirements, has taken another step in the development of the broad yard and terminal improvement plans which it has had under way for several years. This terminal is of the hump type with the same general characteristics of design, except as herein-

of convergence of a large number of branch lines. This section is served almost exclusively by the New Haven, and it is estimated that it contains approximately one million population. Previous to the construction of this yard, traffic conditions had reached a point where it was imperative that the delivery of cars at freight houses and bulk yards be expedited, train delays reduced and terminal restrictions avoided. The congested situation then existing was aggravated further by the increased per diem rates—there being an average of about 50,000 foreign cars on the New Haven's line daily—by high wages, the eight-hour day, time and one-half for overtime, and a possible shortage of labor.

The New Haven has often been called a terminal railroad. The outstanding reason for this expression is that this road delivers to destination on its rails, about 92 per cent of all the tonnage received at its gateways; while its mileage is only about one per cent of the mileage of the country, it serves almost entirely without competition, about 3¾ per cent of the population.



Permanent Location of Main Line Tracks at Cemetery Street Viaduct

after outlined, as the Cedar Hill project at New Haven, Conn., which was described in the *Railway Age* of July 30, 1920.

The Northrup Avenue yard will have a capacity, when entirely completed, for receiving, classifying and forwarding 2,500 cars per day, and will have ample facilities for the prompt dispatching of carload and less-than-carload freight as well as for the efficient handling of inbound and outbound power. It is one of three projects started by the New Haven previous to government control, to improve operating and traffic conditions and thus secure heavier train loading, increased train miles with a decrease in switching and other terminal expenses.

New Yard Serves a Congested Territory

The new yard is located partly in Providence and partly in Pawtucket in the center of freight train, transfer and switching movements in and out of the terminal from the numerous directions served. Providence is the center of a dense manufacturing section of New England, and the point

Interchange at Harlem River and Maybrook

The greater part of this interchange freight is received at the Harlem River yards at New York City via car-float and the Hell Gate bridge connection with the Pennsylvania, the Hell Gate bridge with the Long Island, and car float with the Lehigh Valley and the Central of New Jersey. Other freight in quantity is received at Maybrook, N. Y., moving east across the Hudson River over the Poughkeepsie bridge. Interchange at this point is with the Erie, the Lehigh & New England, the New York, Ontario & Western and through the connecting link of the Lehigh & Hudson River with the Delaware, Lackawanna & Western, the Central of New Jersey, the Philadelphia & Reading and the Baltimore & Ohio. Large numbers of cars are also interchanged at various junction points on the system with the Boston & Albany, which includes that from the New York Central, and with the Boston & Maine.

Formerly this freight was classified almost entirely at Harlem River and at Maybrook for points east, the classification being limited, however, on account of lack of facilities, to groups destined for intermediate yards located at numerous points on the system where it was re-classified for further destination or yards. There was little opportunity under

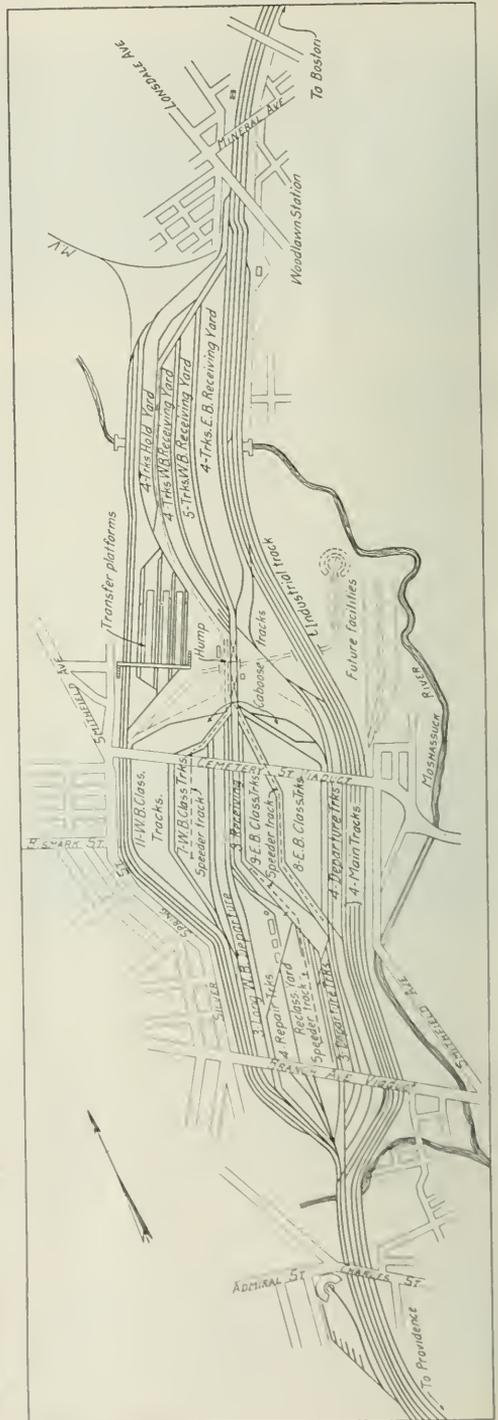
this method for consolidation of freight movement into solid trains of heavy tonnage. Classifications at Harlem River for instance, were made for Boston, Providence, Worcester, Midway, Springfield, Hartford, New Haven, Waterbury, Bridgeport and other points. Similar classifications were made at Maybrook. These were far from sufficient for the straight train service necessary for transportation economy and quick dispatch of traffic. With the construction of the Cedar Hill and Providence yards, these classifications at Harlem River and Maybrook were largely reduced, and traffic was forwarded more rapidly. Excluding the perishables and New York City proper freight for Boston which moves in solid through trains, all freight destined for points east or north of Cedar Hill is now grouped into one classification and forwarded to that terminal. Freight at Maybrook is handled in like manner. As a result switching movements at Harlem River and Maybrook have been reduced 45 or 55 per cent. Likewise, switching movements at the many other points named have been greatly reduced, and in some instances, notably Midway, a former transit classification yard, they have been practically eliminated.

Thus the New Haven has, in a way, consolidated itself into one main and one sub-group; Cedar Hill serving with direct classification, the greater part of western New England as well as the system as a whole, and Providence, serving in like manner, although on a lesser scale, eastern New England. The inauguration of these terminal improvements has brought about many operating as well as other economies. Hitherto contemplated extensions to existing yards are no longer necessary, while considerable benefit has been derived from the greatly decreased switching movement, the heavier train loadings, the increased train miles and the lessened interference to passenger movement, the latter being a factor of marked importance on the New Haven. Some figures appearing in the last annual report reviewed recently in the *Railway Age* are indicative of the progress made along this line. In comparing 1915 with 1921, the report showed that although the ton-miles had increased 10.2 per cent, the increased traffic had been handled with a reduction under 1915, of 21.15 per cent in freight train miles, and 22.9 per cent in freight switching miles.

The Northrup Avenue Terminal

The new terminal at Providence, as constructed, is substantially two miles long and about one-sixth of a mile wide, extending from Woodlawn, a station in Pawtucket, to a point west of Branch avenue in Providence. The project occupies about 180 acres, and, differing from Cedar Hill, involves an arrangement of receiving tracks for both east and west-bound trains in the upper, or Woodlawn end, with a single hump, as nearly every train contains cars for all directions and routes; a large classification cluster and eastbound departure tracks. Westbound trains are dispatched from the classification tracks. The hump, located approximately midway of the yard, is provided with summer and winter gradients for the classification of both eastbound and westbound freight by gravity. The receiving yards are interconnected at the summer and winter humps through the medium of a diamond crossover. There is a similar crossover installation in the leads from the hump to the classification yard, thus securing a maximum flexibility in operation.

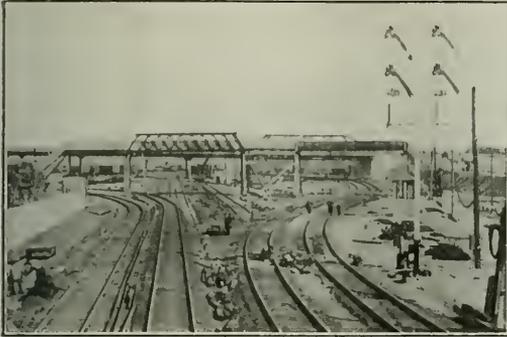
The descending grade approaching the hump reverses to one per cent for 690 ft. to the hump, from the apex of the hump to the scales it is 4.43 per cent for 70 ft., descending from this point on a 4.4 per cent grade for 38 ft., thence on a 2.45 per cent grade for 122 ft., and then on a one per cent grade for 600 ft., through the classification yard switches beyond which the grade continues to descend at the rate of 0.35 per cent through the yard. This involves a total drop from the hump to the end of the yard of 30 ft., or an average grade of about 0.65 per cent. The grades are



A Sketch Plan of the Track Layout

established with the view of running cars to the lower end of the yard at speeds slow enough so that they can be controlled readily at all points.

Adjoining the hump is a small group of buildings designated for certain definite purposes. The first is the car riders' building, containing a rest room, locker room and toilet facilities, with a speeder car garage in the lower story. This building is so located as to be readily accessible to a point where the car rider should climb the car and test the brakes



East and Westbound Main Tracks on Temporary Locations to Permit Yard Construction

before it has reached the hump. The next is the hump conductor's office, where a man is located who controls the car cutter and signals for the movement of the hump engine. The third building in sequence is that of the hump master, located directly opposite the scales. It contains the weighing beam, a control heating plant, and also serves as general headquarters. The fourth building is the hump tower, where one man controls the electro-pneumatic interlocking for all the switches at the head end of the classification yard.

Two speeder tracks have been installed, one for each unit of the main classification yard. These tracks are standard gage and extend from the car riders' building down to the

free running engines are used for this purpose, and an average round trip is made in from three to four minutes.

Traffic Conditions Necessitate Provision for Additional Facilities

Conditions of traffic in this section necessitate much reclassification, but as additional space was not available in the main layout because of topographical conditions, for the large number of classification tracks that would have been desirable (50 to 60), this will be met by the construction later of an auxiliary hump and classification yard located near the south end of the main layout. This unit will have the same facilities as the larger units, such as speeder tracks, offices, interlocking tower, controls, etc., and can be operated independently or by temporary transfer of the forces from the main unit, as may be desired.

Other general features of the terminal include the provision for caboose tracks, the arranging for tracks in the classification yard to take cars requiring light or minor repairs, where such cars may be placed adjacent to the mill buildings fully equipped to handle this class of work. The plan involves the provision for future construction of three 30-ft. platforms, 1,000 ft. long for handling and transferring l.c.l. freight, certain tracks being set off in the classification yard for receipt of cars of this nature. Provision also has been made for an engine terminal adjacent to the hump, served by engine tracks passing under the hump, other tracks, and the main line by means of subways, thus insuring a free movement of power without interference to or suffering a restriction from the yard movements. A further development contemplates the construction of a coach yard with a capacity for about 250 passenger cars.

In constructing this terminal it was necessary to take care of two streets which crossed the site. Previous to this work these streets had been carried over the existing tracks, and this procedure was followed in the final plan. The Cemetery Street viaduct which passes over the widest portion of the yard was re-located and is an entirely new crossing. It is interesting chiefly through the fact that it was built out of an old bridge and consists of a series of spans on concrete piers.

The original location of the main line tracks was some-



Hump Tower, Hump Master's Building, Hump Conductor's Building, and Car Riders Building

throat of the yard where they are carried under the tracks in concrete tunnels and thence down through the yard between the leads of each unit. This construction and arrangement is similar to that employed at Cedar Hill. Thus the maximum number of tracks which a car rider must walk across in order to secure conveyance back to the hump is not more than nine or ten, depending upon the number of tracks in each half of the unit. Gasoline motor cars with

what diagonally through the center of the tract of land. Thus in construction it was necessary to confine the grading operations to the side of the main line, to cut over the east-bound tracks to the southeasterly side of the yard in the location of the permanent tracks, and to place the westbound tracks on temporary locations at the northwest side of the yard before any appreciable area was available for the laying of 30 odd classification tracks. Partial re-arrangement



Hungarian Locomotive, Built at the State Railroad Shops

Hope for Normal Railroading in Central Europe

Free Movement of Traffic Over International Boundaries Seen as Result of Portorose Conference

By Brice Clagett

Formerly Assistant to the Director General, U.S.R.A.

OUTSIDE OF THE EXCHANGE situation probably the greatest obstacle to the restoration of "normalcy" in Europe since the war has been the disorganized state of the railroads. This has been particularly true in Central Europe. There the disorganization which has come to railroads throughout the world, as a result of high war costs and inefficiency, has been intensified by the breaking up of the formerly thoroughly synchronized railroad systems of the old Austro-Hungarian empire. Parts of that old empire were given by the treaties of peace to seven so-called "succession" states and with the ceded territories have gone parts of the railroad systems. The results have been disastrous to the orderly conduct of the railroad business. Until within the last few months no definite beginning had been made towards the adoption of remedial measures.

The greatest step forward and one which gives the richest promise for the future, has come as the result of the initiative of an American, Colonel C. B. Smith, of the American army, who for many months served as the American unofficial delegate, or "observer," on the Austrian section of the Reparations Commission. Colonel Smith realized early in his work the need for bringing harmony out of the chaos in Central Europe and proposed that the states which had become the heirs of the Austro-Hungarian empire should sit down in conference and settle their differences. The result was the Portorose Conference, held recently in Italy, the results of which may now be assessed.

New States Afraid to Let Cars Leave Their Borders

This conference dealt with a variety of questions bearing upon the commercial and economic relationship between the succession states, but probably the greatest question facing

it was the railroad situation. The railway mess resulting from the division of the old Austro-Hungarian empire is almost inconceivable to Americans, where the exchange of cars between lines has been long regulated and where the only international problems have to do with the minor questions affecting Canada and Mexico. This was true likewise in Central Europe before the war but had altogether changed after the peace.

Since the earliest days of development of railway communications the idea that the run of freight cars should not be limited by the boundaries of the various railway administrations of different nations has been one of the most important foundations of business management. Before the war there existed in Europe agreements for the interchange of railway cars. After the war there was an irresistible need for modernizing these agreements and, as a result, the association of German railway administrations and of the administrations of the other countries made a new agreement known as the "Government of Stresa," which took effect on January 1, 1922. Under this agreement a modern basis was reached for the circulation of freight cars between the lines of the railway companies to which they belonged, and their free movement and the uses to which they might be put was considerably extended.

Within the territory of the succession states of Austria and Hungary, however, there was a serious difficulty. The "Government of Stresa" could only apply to those freight cars which belonged to a state and were its unquestionable property. There was no recognized ownership to most of the rolling stock formerly belonging to the Austro-Hungarian empire. The division of this rolling stock was provided for in the treaties of St. Germain and Trianon and had been

entrusted to a commission which has been at work ever since. It was clear that the division of 200,000 freight cars, 32,000 passenger, baggage, service and mail cars, and 12,000 locomotives would require a long time. Up to the present the ownership of approximately 40,000 freight cars and 3,000 locomotives only has been settled.

Ownership of Cars in Doubt—Car Hoarding the Result

The difficulty in Central Europe has been caused by the remaining equipment. Each nation has held the equipment actually in its possession for fear it might be kept if permitted to go into another country. This fear gave rise to car hoarding which ended in an almost complete stoppage of circulation between national boundaries. In many cases when a loaded freight train arrived at one boundary the originating country would not permit it to go in a neighboring state until an equivalent amount of equipment had been delivered at the boundary. The resulting chaos need not be described.

It is also unnecessary to recite the very earnest efforts made to remedy this situation prior to the Portoroze Conference. It is sufficient to indicate that none of them were completely successful.

It is greatly to the credit of the American, Colonel C. B. Smith, that the Portoroze Conference settled many of these outstanding questions and placed others on the route to settlement. At this conference a series of special agreements were drawn up which are to affect all the seven countries concerned.

The New Agreement

Without going into irksome details it may be indicated that the most important agreement reached had as its object to facilitate national passenger travel and transportation of baggage and freight. The principal provisions of this first agreement are as follows:

1. The setting up of a general obligation to do away with difficulties in the way of passenger and freight transportation in Central Europe, particularly to open the most important border states for international communications.
2. The provisions that in case of limitations of communications in one country, the railway administrations are to give to each other mutual assistance in the way of maintaining import and export and transit. The transportation of persons and goods of foreign nationality is not to be hampered or restricted more than that of the country itself.
3. The restoration of through international trains for passenger traffic and of through cars.
4. The obligation of the contracting states to make agreements for long haul freight and in regard to hastening the transport of special shipments, especially of necessities such as food, cattle, fuel, etc.
5. The obligation to restore through rates as soon as is practicable, and, in the meantime, to take measures to make possible a reliable estimate of the cost of international passenger traffic and of the transportation of at least the most important commodities.
6. The obligation that the rates of exchange fixed by the collecting railway administrations shall as hitherto regulate payment, but that they shall not be so used as to favor or prejudice any particular route.
7. The highly important provision that customs inspection at the boundaries shall be conducted so that goods may be cleared in any hour of the day or night and also on Sundays and holidays. (That goods in transit shall not be subject to customs formalities, and the mutual recognition of customs seals. Perishable goods sent by express are to enjoy the same privileges as traveler's baggage.

The arrangements above-mentioned are to go into effect between any two states as soon as both have ratified it and there is every indication that such ratifications will follow shortly.

Special Agreements

In addition to this general agreement there were five special agreements adopted by the conference, the broad provi-

sions of the three most important of which are shown in the following:

(a) Jointly owned cars, now in the actual possession of each individual state, shall be provisionally marked as the property of that state without regard to their ultimate definite allotment by the commission established for that purpose. These cars, as well as all others previously marked with the sign of a nation on the basis of any presumptive or actual ownership, shall from January 1, 1922, be treated internationally as if they were the rightful property of the state in question. This agreement also contained provisions for the settlement of car debts between the succession states and also for rentals. A provision was made that the cars taken by the ex-enemy powers from foreign countries as war booty shall, until their final ownership is decided, remain in the domestic trade of the country now possessing them. Finally, a committee of technical experts was set up for carrying out these agreements and the same committee is to consider necessary corrections in the accounts of war rentals.

(b) The governments shall restore to their former owners the private cars in their possession.

(c) Cars belonging to car renting companies, not claimed as war booty and with regard to which there is no new rental contract, shall be restored to their owners and not marked with any new sign of ownership.

115,000 Cars

As has been pointed out by railroad experts in the succession states, the chief importance of these agreements lies in the fact that they make international agreements in regard to the reciprocal use of cars applicable to some 115,000 cars of the combined stock. While these cars hitherto could only be used within the territory where they happened to be, in the future they will be subject to exactly the same regulations as the rightful property of each individual railway administration. Here again there are strong indications that these agreements will be carried out practically and in a spirit of mutual confidence different from the antagonism hitherto existing since the war.

In addition to these definite agreements, other miscellaneous railroad problems were considered at the Portoroze Conference, but probably the outstanding achievement was that the officials running the railroads in the succession states were enabled to sit down together, talk over their problems and agree on common methods for beginning at least the restoration of normal railroad conditions in Central Europe.

Board Hears New York Central Piece Work Dispute

Hearings on the charge made by Mr. Jewell that the New York Central had illegally established piece-work in several of its shops were held before the Labor Board on June 9 and 10. J. F. McGrath, vice-president of the Railway Employees department of the American Federation of Labor, charged that the shop employees involved on the New York Central were coerced into accepting piece-work in violation of the rules of the Labor Board, and the intent of the Transportation Act.

Jacob Aaronson, attorney for the New York Central, contended that 98 per cent of the men in the shops involved in the controversy had voted in favor of piece work. A similar contention was made by representatives of the employees on June 10, and the case is now in the hands of the Board.

The shop crafts' strike ballot will be counted in Chicago, beginning on June 25, Mr. Jewell announced recently. The executive committees of the six shop crafts organizations will convene in Chicago on June 24, preparatory to canvassing the vote which has been made returnable June 25, instead of June 30, in order to make the results known to the men involved before July 1, when the lower rates of pay go into effect.

Revision of Operating Expense Classification

Now Under Consideration by I. C. C. Which Is Receiving
Co-operation of Accounting Officers' Association

A PROPOSED REVISION of the operating expenses-classifications was one of the leading matters offered for consideration before the thirty-fourth annual meeting of the Railway Accounting Officers' Association at Cleveland, Ohio, June 6 to 9. The matter was taken up by the Accounting Officers' Association in response to a communication from the I. C. C. Bureau of Accounts, advising that that bureau was considering proposed revisions of the various railway accounting classifications and asking the co-operation of the Railway Accounting Officers. The plan, which is offered for consideration, was prepared by the R. A. O. A. committee on disbursement accounts. The association has appointed a special committee headed by John Hurst, assistant comptroller of the Pennsylvania Railroad at Pittsburgh, and is also in the hands of the committee on general accounts. The matter was scheduled to be taken up with the Interstate Commerce Commission representatives this week.

In the communication mentioned above from the Bureau of Accounts, Alexander Wylie, the director, said in part:

"The co-operation of the Accounting Officers' Association has been an invaluable aid to the commission in the original compilation of the steam road accounting classifications and in the revisions which have heretofore been made. In the revision which is now being undertaken, the same helpful co-operation of the association is confidently counted upon.

"Much of the necessary preliminary detail work has already been accomplished by this bureau. It is desirable, however, in advance of the completion of this phase of the work, to determine the extent of the steam roads sub-accounts in some of the primary operating expense accounts, by which a separation may be uniformly provided between the cost of labor, material and other items, and perhaps a further subdivision of these items of expense may be between freight, passenger and commot.

"I would greatly appreciate the views of the association in this connection, and would be glad to be favored with its recommendations as to other changes which it feels should be incorporated in the revised classifications.

Mr. Wylie's letter was dated March 31, 1922. In reply to it, under date of April 4, President J. J. Ekin of the association, answered in part as follows:

Your letter of March 31st has just come to hand. The kind expressions in regard to the co-operation and aid to the Commission on the part of the Accounting Officers' Association in the original compilation of the steam roads accounting classification and in the revisions which have been made, are indeed very pleasing to me, and I know will be appreciated by the members of our association. In the revision which you now state is being undertaken, it is the earnest wish and desire of our association to co-operate with you to the fullest extent.

You will recollect at our conference of February 4, 1922, we discussed this subject in considerable detail, and I then expressed the opinion that it was not a refinement and further extension of the classification that was desired. At that time, and in our subsequent discussions, I mentioned the fact that the nearer we can have the disbursements accounts reflect the current expenditures for labor—payrolls—fuel, and material and supplies, the more useful the accounts will become as a check and record of these items of cost, and I strongly urged that the revised classification should show separately, with as few accounts as possible, the direct items of expense for labor, fuel, and material and supplies, the aggregate of which constitutes the cost of maintaining and operating the railroad properties. The fact was very forcibly impressed on me through the requirements of the Interstate Commerce Commission in the recent rate hearings, the Senate investigation, and the preparation of data before the United States Railroad Labor Board.

The revision of the disbursement classification should be approached in the light of present conditions prevailing under the Transportation Act. The accounts should afford a prompt and accurate method of controlling expenses represented by disbursements for labor, fuel and material, and the classification should directly reflect these elements. There should be decided reduction, instead of an expansion, in the number of accounts. The Standing Committee on Disbursements Accounts of this association has been giving the subject of revision and simplification of the disbursements classification earnest study during this year, and your representative has participated in these discussions.

As you are aware, consideration has and is now being given to the subject of statistical requirements of the Interstate Commerce Commission and other Federal and State Boards or Commissions. The statistics should logically flow from the accounts, and for that reason I believe we should commence with the disbursement classification so that the physical and other statistics will naturally coordinate with the accounts, reflecting in a simple and direct manner the facts developed relating to maintenance and operation of the property.

Mr. Ekin's letter, besides serving to give the Interstate Commerce Commission the benefit of the ideas of the association, was also used as a guide by the disbursements committee in preparing its plan. Probably the most striking feature of the plan as presented was the reduction in the number of primary accounts from 197 to 69. The plan received considerable discussion on the floor of the conven-

tion. Mr. Hurst, chairman of the sub-committee, pointed out that it was thought that the proposed revision would permit access to the figures most demanded and that it would allow such access without the necessity of special study. He also mentioned the fact that it would permit of greater economy in railway accounting work and that there would be less of the hair splitting now required in allocating the expenses to the particular accounts.

Mr. Wylie, director of the I. C. C. Bureau of Accounts, who was present at the convention, was requested to state the views of his bureau. He said that one of the principal reasons for a revision of the accounts was that the Transportation Act, by putting new responsibilities upon the Interstate Commerce Commission, created requirements which made changes necessary to suit new conditions. He expressed the idea that his bureau was prepared to take up the work at an early date and explained that he wanted an expression of the views of the association as a whole concerning the proposed revision. He added, however, that the Interstate Commerce Commission had hardly expected such a radical cut in the number of the primary accounts as the committee had proposed. The action of the association was to refer the matter to its committee on general accounts and in response to Mr. Wylie's request for an expression of opinion, the association put the latter in a resolution.

Reduction in Number of Primary Accounts

As above noted, the proposed revision as made by the R. A. O. A. disbursements committee, reduces the number of primary accounts from 197 to 69. In particular, it cuts down the number of depreciation accounts and shows under maintenance of way one depreciation account in place of the present 34, and under maintenance of equipment, a single depreciation account in place of the present 19 retirement and depreciation accounts. Another feature is the creation of a new general account headed "Casualties" and throughout the entire classification one will notice an attempt to segregate labor and material and in the case of transportation expenses, station, yard and road service. Because of the importance which this matter bears to all departments of railway service, the plan of the disbursements committee is reproduced in full.

Your committee has undertaken to prepare some suggestions in connection with the contemplated revision, by the Interstate Commerce Commission, of the Classification of Operating Expenses, prescribed by the commission for steam roads—with a view of reducing the number of primary accounts and preparing a classification of accounts more comprehensive in scope than that now in use.

The present classification, which became effective July 1, 1914, was built up from the classifications in use by individual carriers before the Interstate Commerce Commission undertook the regulation of the accounting systems for steam carriers, in accordance with Section 20 of the Interstate Commerce Act. The revision of 1914 constituted an enlargement of the classification prescribed by the commission in 1907 and did not change the general viewpoint of the system of primary accounts. The principal change in 1914 was in the matter of providing accounts for depreciation applicable to each material account which covered the maintenance of fixed improvements.

In the revision proposed by your committee, fifty depreciation accounts are eliminated.

The general make-up of your committee's suggested classification follows the lines heretofore in use; that is to say, departmental general accounts have been provided, which are fundamentally a part of the American system of railway accounting.

In the use of the proposed classification, it is intended that a separation shall be made, for the primary accounts, of the elements of labor, material, and miscellaneous items, this information hav-

ing been found necessary in a great many instances, and your committee believes it to be of paramount importance looking to the economical and efficient operation of the railroads.

The commission requires a separation of the primary accounts of expenses as between passenger and freight services, and a similar requirement may be made in connection with the revised classification of operating expenses.

The present requirements of the commission are that the maintenance of way and structures expenses be divided between road and yard. It is the opinion of your committee that this division cannot be measured with even approximate correctness, in view of the joint use made of the tracks in yards by both road and switching services, and recommends that this division be not required.

A few of the important changes under the general account headings are as follows:

1. MAINTENANCE OF WAY AND STRUCTURES

It will be noted that the four principal material accounts are not changed, it being the intention to carry, in one account, all the labor applying and renewing these materials. The opinion of your committee is that an accurate separation of the labor costs of applying ties, rails, ballast, and other track materials, is a practical impossibility.

A general grouping has been provided for the maintenance of buildings and other structures instead of the separation of this account into seventeen different items. There seems to be no particular reason or advantage in a separation of the different classes of structures.

The item of insurance has been continued for the reason that it is intended the premiums for insurance upon the company's own property shall be included in the general accounts to which that property applies.

2. MAINTENANCE OF EQUIPMENT

No particular changes are proposed in the accounts under this general head except the merging of the depreciation and retirement accounts and the consolidation of the steam and other locomotives and miscellaneous equipment.

3. TRANSPORTATION—RAIL LINE

In the treatment of the transportation accounts consideration has been given to the thought that they embrace three kinds of service—station, yard, and road—and the proposed classification has been prepared so as to concisely group the expenses incident to these three classes of service.

It was deemed advisable, however, to have separate accounts for locomotive fuel, as this constitutes a very important element of the cost of operation.

4. CASUALTIES

In the present classification, the principal items covering casualties are grouped following the expenses of transportation, and it seemed to your committee that it would be much better to deal with them in a separate general account for the reason that such items as damage to property do not have a direct bearing on transportation expenses.

It is intended that this general account shall contain only expenditures made in connection with loss or damage to property of others than the carrier.

One account has been provided herein to include injuries to all persons instead of separating this item among the other general accounts.

It is intended that all payments for insurance or accruals to an insurance fund to cover losses of the above character shall be included in the appropriate primary accounts under this general account.

5. TRANSPORTATION—WATER LINE

No changes have been proposed in this general account.

6. MISCELLANEOUS OPERATIONS

The expenses incident to operation of sleeping cars have been transferred from transportation expenses, and a number of minor items have been consolidated in "Other Miscellaneous Operations."

7. TRAFFIC

The position of this general account has been changed for the purpose of bringing it nearer to the general expenses, as it constitutes a part of the "overhead expenses" of operating the railroad.

8. GENERAL

Your committee does not consider it necessary to continue the separation of the salaries and expenses of general officers, clerks, and attendants, the account as now proposed being analogous to the supervision accounts provided under the other general accounts.

9. TRANSPORTATION FOR INVESTMENT

No change is proposed by your committee except the assignment of a primary account.

The following is a list of the primary accounts recommended by your committee, together with self-explanatory notes with respect to certain eliminations:

CLASSIFICATION OF OPERATING EXPENSES

Proposed Primary Accounts

Present Primary Accounts

I. MAINTENANCE OF WAY AND STRUCTURES

- 201 Superintendence.
- 202 Ties.
- 203 Rails.
- 204 Ballast.
- 205 Other track material.
- 206 Roadway and track labor.
- 207 Other roadway and track maintenance.
- 208 Bridges and elevated structures.
- 209 Signals and interlockers.
- 210 Telegraph and telephone lines.
- 211 Electric power systems.
- 212 Buildings and other structures.
- 213 Insurance.
- 214 Depreciation.

- 201 Superintendence; 276, Stationery and printing.
- 212 Ties.
- 214 Rails.
- 218 Ballast.
- 216 Other track material.
- 202, Roadway maintenance, 220, Track laying and surfacing.
- 267, Paving; 269, Roadway machines, 271, Small tools and supplies; 272, Removing Snow, Ice and Sand, 273, Assessments for public improvements.
- 208, Bridges, trestles and culverts; 210, Elevated structures.
- 249, Signals and interlockers.
- 247, Telegraph and telephone lines.
- 251, Power plant dams, canals, and pipe lines; 253, Power plant buildings; 255, Power substation buildings; 257, Power transmission systems; 259, Power distribution systems; 261, Lower line poles and fixtures, 263, Underground conduits.
- 204, Underground power tubes; 206, Tunnels and subways; 221, Right of way fences; 224, Snow and sand fences and snow sheds; 225, Crossings and signs; 227, Station and office buildings; 270, Roadway buildings, 241, Water stations; 233, Fuel stations; 235, Shops and engine houses; 237, Grain elevators; 239, Storage warehouses; 241, Wharves and docks; 243, Coal and ore wharves; 245, Gas producing plants; 265, Miscellaneous structures.
- 275, Insurance.
- 203, Roadway depreciation; 205, Underground power tubes, depreciation; 207, Tunnels and subways, depreciation; 209, Bridges, trestles and culverts, depreciation; 211, Elevated structures, depreciation; 213, Fences, depreciation; 215, Rails, depreciation; 217, Other track material, depreciation; 219, Ballast, depreciation; 223, Right of way fences, depreciation; 224, Snow and sand fences and snow sheds, depreciation; 226, Crossings and signs, depreciation; 228, Station and office buildings, depreciation; 230, Roadway buildings, depreciation; 232, Water stations, depreciation; 234, Fuel stations, depreciation; 236, Shops and engine houses, depreciation; 238, Grain elevators, depreciation; 240, Storage warehouses, depreciation; 242, Wharves and docks, depreciation; 244, Coal and ore wharves, depreciation; 246, Gas-producing plants, depreciation; 248, Telegraph and telephone lines, depreciation; 250, Signals and interlockers, depreciation; 252, Power plant dams, canals, and pipe lines, depreciation; 254, Power plant buildings, depreciation; 256, Power substation buildings, depreciation; 258, Power transmission systems, depreciation; 260, Power distribution systems, depreciation; 262, Lower line poles and fixtures, depreciation; 264, Underground conduits, depreciation; 266, Miscellaneous structures; 268, Paving depreciation; 270, Roadway machines, depreciation.
- 280, Transportation—Way and Structures.
- 278, Maintaining joint tracks, yards and other facilities—Dr.
- 279, Maintaining joint tracks, yards and other facilities—Cr.

*—Present account 274, "Depreciation of Buildings" to be eliminated, and distributed to the appropriate primary accounts.

account 277, "Other Expenses" to be eliminated, and distributed to the appropriate primary accounts.

Proposed Primary Accounts

- 251. Supervision.
- 252. Shop and power plant machinery.
- 253. Locomotives.
- 254. Freight train cars.
- 255. Passenger train cars.
- 256. Work equipment.
- 257. Marine equipment.
- 258. Miscellaneous equipment.
- 259. Insurance.
- 260. Depreciation.

- 261. Equalization
- 262. Joint equipment—Dr.
- 263. Joint equipment—Cr.

NOTE—Present account 332, "Injuries to Persons," assigned to general account IV, "Casualties," primary account 354. Present account 335, "Other

11. MAINTENANCE OF EQUIPMENT

Present Primary Accounts

- 301. Superintendence; 334. Stationery and printing.
- 302. Shop machinery; 304. Power plant machinery; 306. Power substation apparatus.
- 308. Steam locomotives; 311. Other locomotives—repairs.
- 314. Freight train cars—repairs.
- 317. Passenger train cars—repairs.
- 326. Work equipment—repairs.
- 323. Floating equipment—repairs.
- 320. Motor equipment of cars—repairs; 329. Miscellaneous equipment—repairs.
- 333. Insurance.
- 303. Shop machinery, depreciation; 305. Power plant machinery, depreciation; 307. Power substation apparatus, depreciation; 309. Steam locomotives, depreciation; 310. Steam locomotives, retirements; 312. Other locomotives, depreciation; 313. Other locomotives, retirements; 315. Freight train cars, depreciation; 316. Freight train cars, retirements; 318. Passenger train cars, depreciation; 319. Passenger train cars, retirements; 321. Motor equipment of cars, depreciation; 322. Motor equipment of cars, retirement; 324. Floating equipment, depreciation; 325. Floating equipment, retirements; 327. Work equipment, depreciation; 328. Work equipment, retirements; 330. Miscellaneous equipment, depreciation; 331. Miscellaneous equipment, retirements.
- 338. Equalization equipment.
- 336. Maintaining joint equipment at terminals—Dr.
- 337. Maintaining joint equipment at terminals—Cr.

Expenses" to be eliminated and distributed to the appropriate primary accounts.

III. TRANSPORTATION—RAIL LINE

- 301. Supervision.
- 302. Station service.
- 303. Fuel for yard locomotives.
- 304. Electric power for yard locomotives.
- 305. Other yard service.
- 306. Joint yards and terminals—Dr.
- 307. Joint yards and terminals—Cr.
- 308. Fuel for road locomotives.
- 309. Electric power for road locomotives.
- 310. Other road service.

- 311. Signal and interlocker operation.
- 312. Telegraph and telephone operation.
- 313. Marine equipment operation.
- 314. Joint tracks and facilities—Dr.
- 315. Joint tracks and facilities—Cr.

Present account 403, "Operating Sleeping Cars," to be eliminated, and assigned to general account VI, "Miscellaneous Operations," primary account 373.

Present account 409, "Express Service," to be eliminated, and distributed to the appropriate primary accounts.

Present account 410, "Stationery and Printing," to be eliminated, and distributed to the appropriate primary accounts.

Present account 411, "Other Expenses," to be eliminated, and distributed to the appropriate primary accounts.

Present account 414, "Insurance," to be eliminated, and assigned to appropriate primary accounts under general account IV, "Casualties," with the

- 351. Supervision.
- 352. Damage to property.
- 353. Loss and damage—freight and baggage.
- 354. Injuries to persons.

NOTE.—This account is to include pay, office rent, traveling, office and other expenses of general, chief and freight claim agent assistants, and subordinates, including traveling claims adjusters, claim clerks, loss and

- 361. Operation of vessels.
- 362. Operation of terminals.
- 363. Incidental.

- 371. Dining and buffet service.
- 372. Hotels and restaurants.
- 373. Operating sleeping cars.
- 374. Other miscellaneous operations.

- 381. Supervision.
- 382. Solicitation.
- 383. Advertising.
- 384. Tariffs.

Present account 358, "Stationery and Printing," to be eliminated and distributed to accounts 381 and 384. Present account 359, "Other Expenses," to be eliminated and distributed to the appropriate primary accounts.

- 401. General Administration.
- 402. Law Expenses.
- 403. Relief department expenses.
- 404. Pensions.
- 405. Valuation expenses.
- 406. Other expenses.
- 407. Joint facilities—Dr.
- 408. Joint facilities—Cr.

Present account 455, "Insurance," to be eliminated, and distributed to the appropriate primary accounts under "General." Present account 458, "Stationery and Printing," to be eliminated, and distributed to the appropriate primary accounts under "General."

IX. TRANSPORTATION FOR INVESTMENT

- 421. Transportation for investment—Cr.

- 371. Superintendence; 372. Dispatching trains.
- 373. Station employees; 374. Weighing, inspection and demurrage bureaus; 375. Coal and ore wharves; 376. Station supplies and expenses; 414. Insurance (see note below).
- 382. Fuel for yard locomotives.
- 383. Yard switching power produced; 384. Yard switching power purchased.
- 377. Yard masters and yard clerks; 378. Yard conductors and brakemen; 379. Yard switching and signal tenders; 380. Yard enginemen; 381. Yard motormen; 385. Water for yard locomotives; 386. Lubricants for yard locomotives; 387. Other supplies for yard locomotives; 388. Enginehouse expenses—Yard supplies and expenses.
- 390. Operating joint yards and terminals—Dr.
- 391. Operating joint yards and terminals—Cr.
- 394. Fuel for train locomotives.
- 395. Train power produced. 396. Train power purchased.
- 392. Train enginemen; 393. Train motormen; 397. Water for train locomotives; 398. Lubricants for train locomotives; 399. Other supplies for train locomotives; 400. Enginehouse expenses—train; 401. Trainmen; 402. Train supplies and expenses; 405. Crossing protection; 406. Drawbridge operation.
- 404. Signal and interlocker operation.
- 407. Telegraph and telephone operation.
- 408. Operating floating equipment.
- 412. Operating joint tracks and facilities—Dr.
- 413. Operating joint tracks and facilities—Cr.

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exception of the part "Premiums on Fidelity Bonds of Employees," which is to be assigned to 302, "Station Service," or other accounts affected.

Present account 415, "Clearing Wrecks," to be eliminated, and distributed to the appropriate primary accounts.

The following present accounts:
 416. Damage to Property.
 417. Damage to Live Stock on Right of Way.
 418. Loss and Damage—Freight.
 419. Loss and Damage—Baggage.
 420. Injuries to Persons.
 are to be eliminated and transferred to general account IV, "Casualties."

IV. CASUALTIES

(See note below.)

- 416. Damage to property; 417. Damage to live stock on right of way.
- 418. Loss and damage—freight; 419. Loss and damage—baggage.
- 274. Injuries to persons; 332. Injuries to persons; 420. Injuries to persons.

V. TRANSPORTATION—WATER LINE

- 431. Operation of vessels.
- 432. Operation of terminals.
- 433. Incidental.

VI. MISCELLANEOUS OPERATIONS

- 441. Dining and buffet service.
- 442. Hotels and restaurants.
- 443. Operating sleeping cars.
- 444. Grain elevators; 444. Stock yards; 445. Producing power sold; 446. Other miscellaneous operations.

VII. TRAFFIC

- 351. Superintendence; 354. Traffic associations; 357. Insurance; 358. Stationery and printing (see note below).
- 352. Outside agencies; 355. Fast freight lines.
- 353. Advertising; 356. Industrial and immigration bureaus.
- 358. Stationery and printing (see note below).

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VIII. GENERAL

- 451. Superintendence; 452. Salaries and expenses of clerks and attendants; 453. General office supplies and expenses.
- 454. Law expenses.
- 456. Relief department expenses.
- 457. Pensions.
- 459. Valuation expenses.
- 460. Other expenses.
- 461. General joint facilities—Dr.
- 462. General joint facilities—Cr.

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Labor Leaders Again Plan Appeal to President

WITH STRIKE BALLOTS in the hands of maintenance of way and shop employees, returnable before July 1, and with a delay in the announcement of the Labor Board's decision as to the reductions to be made in the pay of various other classes of employees on July 1, there has been a lull in the railroad labor situation during the past week.

From Cincinnati, where the leaders of the railroad labor organizations other than the train service brotherhoods, met recently to formulate a plan of concerted action against further reductions in their wages, comes the report that the whole wage controversy will again be laid before the President, as have practically all of the major controversies of the last five years. Leaders of 11 railway employees' organizations agreed to outline a letter to President Harding, presenting their arguments for higher wages or at least no further reductions. A committee of union officers was appointed by B. M. Jewell, president of the Railway Employees department of the American Federation of Labor, to draft the letter.

The employees' protest, it is reported, will contend that the new wage scales fixed by the Labor Board, are inadequate to maintain an "American standard of living." It is the intention of the union leaders in the letter to President Harding, to demand whether he thinks these wages are sufficient to "maintain an American standard of living and properly sustain a family."

In a later executive session, it was decided that the committee appointed to draft the letter should call in statistical and economic "experts" to outline the wage situation and its relation to the minimum wage scale before the letter is forwarded to the White House. This additional data will require at least a week for preparation, they pointed out.

The threat of a nation-wide strike of railway employees is apparently causing little alarm either on the part of the public or railroad executives. Both have become accustomed to the threats of a general tie-up of transportation, to appeals to the President and to promises of dire happenings and consequently the predictions of a walk-out within three weeks is meeting a cool reception from the public and in the press.

Railway Executives Outline Attitude Toward Threatened Strike

The attitude of railway executives toward the present strike threats was outlined recently in a statement signed by H. E. Byram, president of the Chicago, Milwaukee & St. Paul, Hale Holden, president of the Chicago, Burlington & Quincy, W. H. Finley, president of the Chicago & North Western, J. E. Gorman, president of the Chicago, Rock Island & Pacific, C. H. Markham, president of the Illinois Central, and S. M. Felton, president of the Chicago Great Western. This statement said in part:

Threats of a strike made by leaders of the railroad labor unions, are appearing with such frequency in the newspapers that the time seems opportune for questioning the soundness of their talk. There is a very good reason for doubting whether the men themselves, that is the railroad employees, really are in sympathy with resistance to the decisions of the United States Railway Labor Board. The truth is that the men have been expecting a reduction in their wages and, as would be the case among any other body of intelligent men, they have made or are making preparations to meet the new scale. There is no talk of strike among the men. The disturbing statement read by the public are prepared by leaders of the unions, whose viewpoint has been distorted by months of effort before the board to resist the inevitable downward trend of wages. The employees, on the other hand, are in the main sincerely interested in taking care of their jobs and their homes, and few employees in any industry have more good reasons for doing so

B. M. Jewell, spokesman for these railroad labor unions, has severely criticised the decision of the railroad labor board awarding the reduction in wages of shop employees. Jewell says the decision will cause employees to believe the board is "not an impartial court created to dispense justice, but a body created to help the railroads carry out their labor policy." He attacks the wage award also on the ground that the proposed scales are lower than the minimum required to support the average family according to American standards. The constant allusion to "average families" is misleading. The average family is no different now than it was before the war, and comparisons are being made on that basis. It should not be forgotten that the men in railroad service work under much more favorable conditions than in outside shops and industries. Indeed, no class of men doing such work in any industry has better homes and surroundings.

The existence, and the policy of the labor board have benefited railroad employees because the board has prevented these reductions in wages until long after the wages of men doing similar work in other industries had been cut.

The public should not overlook the fact that in deciding the proposed wages of these employees, maintenance of way and shop, the labor board, which is a government body, said "After the reductions made under this decision * * * these employees on the railroads will still be receiving as a rule a wage in excess of that paid to similar employees in other industries." The board held in its opinion that measured by the present cost of living, the average hourly wages of machinists, for instance, after July 1, will still have 19 per cent more purchasing power than in December, 1917; those of car men 46 per cent more purchasing power, and those of common labor 45½ per cent more. That is to say, measured by the cost of living their wages will still be these percentages higher than at the end of 1917.

The records show that the proposed scale of wages for the classes of employees involved in the two wage reduction orders already issued would practically restore the scale in effect at the end of federal control in 1920, which carried an increase for these employees of 119 per cent over the wages paid in 1916. The cost of living as shown by the Department of Labor in Washington for March, 1922, was 42 per cent above 1916. The railroads proposed no hardships for their men in these reductions in pay. When wages were raised in July, 1920, more than \$720,000,000 at one time, an amount unheard of in wage scales up to that time, not a word was uttered by the leaders of the railroad labor unions. But now, when the roads and the railroad labor board propose adjustments to bring their wage scale more nearly to the level paid for the same kind of work in other industries, strike threats are heard.

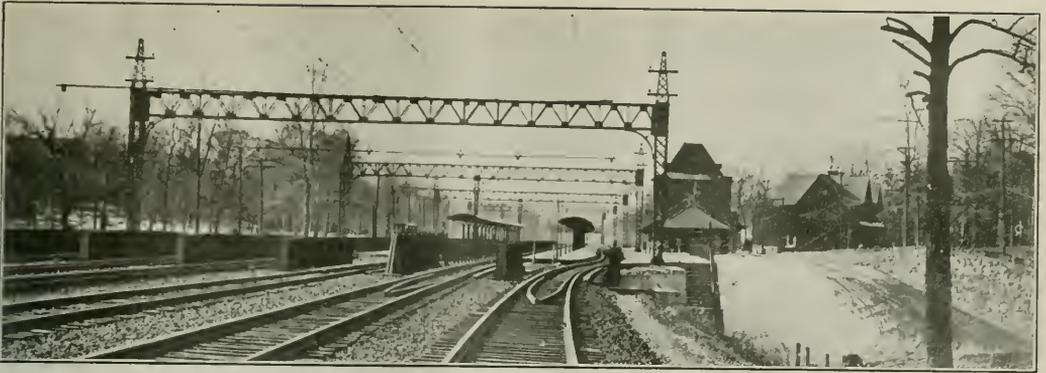
The important fact which should not be overlooked by the public because it may have a very important bearing upon its business and comfort, is that whereas rate reductions amounting to more than \$250,000,000 have been ordered by the Interstate Commerce Commission, the cut in wages, according to the decisions thus far rendered, amounts to only \$110,000,000.

These reductions in wages of railway employees simply mean that they must bear some part in the readjustments made necessary by changed business conditions. Farmers and business men have been compelled to accept lower prices. The railways having not yet emerged from a serious financial crisis have been ordered to make reductions in rates which they cannot stand without reductions of their wages and other expenses.

To leave railway wages on their present high basis would be to make railway employees a favored class at the expense of shippers and all other classes of people, including other working men.

The decision of the Supreme Court of the United States in the Coronado case, coming simultaneously as it did with the threat of the nation-wide strike of railway employees, will probably result in a revision of the plans of the labor leaders, and will undoubtedly lend an entirely different atmosphere to a strike crisis if it does materialize. Rumors are being freely circulated that the labor organizations now threatening a strike will hurriedly incorporate or transfer their headquarters and funds to Canada in an effort to evade the responsibility which would be theirs under the application of the provisions of the Supreme Court's ruling. This decision is also a contributing factor to the apparent lull in the controversy over reduced rates of pay.

THE BUFFALO EXPRESS train (No. 975) of the Pennsylvania Railroad was derailed on the evening of June 7, at Brillharts, Pa., three miles south of York, and the fireman was killed. Several passengers were injured, but, according to the report none of the injuries were serious.



Six Track Trunk Line of N. Y. N. H. & H. Electrification

New Single Phase Equipment for the New Haven

Two Master Controllers Installed in Trail Cars Permit
Operation From Any Car in Train

By Walter H. Smith

Railway Equipment Engineer, Westinghouse Electric & Mfg. Co.

THE NEW YORK, New Haven and Hartford electrification has been in operation since July, 1907, and at present comprises 83 miles of route with 570 miles of electrified track. In February, 1910, the first regular multiple-unit train service was put into operation between Port Chester and New York. The equipment at that time consisted of four motor cars and six trail cars, each motor car being designed to handle two trail cars.

This electrification has expanded until it now represents one of the largest single-phase electrifications of a steam railroad and is one of the most extensive examples of multiple-unit and locomotive service in operation today. In this electrified zone there are at present 106 locomotives, 27 motor cars and 50 trail cars. This railroad recently placed an order for 8 new motor cars and 14 trail cars which makes a total of 35 motor cars and 65 trail cars in service. This new equipment is now in operation. The table following gives some of the principal dimensions of the new motor cars:

Length over buffer face plates	71 ft. 11 in.
Length over buffer channels	70 ft. 7 in.
Length over end sills	61 ft. 4½ in.
Distance between truck centers	47 ft. 7½ in.
Wheel base of motor truck	8 ft. 1 in.
Wheel diameter	42 in.
Height from top of rail to top of car	13 ft. 3¼ in.
Weight fully equipped	177,000 lb.
Seating capacity	84

The trail cars have the same dimensions except as follows:

Wheel base of truck	8 ft.
Wheel diameter	36 in.
Weight fully equipped	103,000 lb.

Like most of the other New Haven multiple-unit cars, the new equipment has series motors for operation on both alternating and direct current. When operating over the New York Central tracks the direct-current system is used and power is taken directly from the third rail through collecting shoes, while on the New Haven and New York Connecting Railroads, the alternating-current system is used and power is taken from an overhead trolley wire at 11,000 volts. It is then reduced by means of a transformer to the voltage required for the main motors and other auxiliary apparatus on

the car. The main motors are permanently connected two in series and the groups may be connected in series or in parallel for d. c. operation.

The new motor car equipments (excepting two) will employ four 175 hp. (hour rating) Westinghouse type 409-D single-phase, 25-cycle, series motors. The frame is a one piece steel casting of box construction. At the ends are large machined openings for receiving the bearing housings



N. Y. N. H. & H. Multiple-Unit Car Fully Equipped

and to permit the removal of the armature. The armature is of the drum type, lap wound, coils cross connected and with resistance leads between the commutator bars and coil leads. The spur gears are of the flexible type, the ratio being 27:73. The rims of these gears are made from high grade steel forgings, accurately machined with a 5¼-in. face. The gear is pressed on and without key.

The new equipment was designed for multiple operation with the cars already in service. All of the trail cars are

equipped with two master controllers duplicates of those on the motor cars, a control train line and the necessary details for operation of the train from a trail car as well as from a motor car. This permits the operation of a trail car at the head of the train when desirable.

The Westinghouse type "HB" (hand operated battery) electro-pneumatic multiple-unit control system is employed. The energy for operating the magnet valves of the control and auxiliary apparatus is taken from a motor-generator set and storage battery at 30 volts. The storage battery consists of 25 Edison type B-4-II cells connected in series.

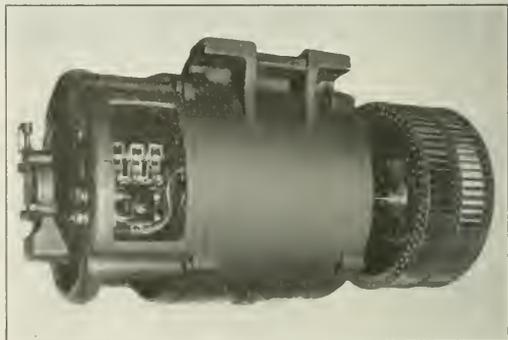
The motor cars are provided with two sliding shoe pantagraph trolleys, having automatic, self adjusting action to conform to various trolley wire heights such as are encountered under bridges and along the open line. The pantagraph is raised and held in position by spring pressure and is lowered by compressed air from the control reservoir. These cars are also provided with four pneumatically operated third rail shoes. These shoes are located on each side of the trucks on wooden beams and are used when operating in the direct-current zone over the New York Central tracks. The operation of both pantagraphs and third rail shoes is controlled from a push button set located in the motorman's compartment and two magnet valve sets located under the car body.

The main motors are protected from overload and short-circuit when operating in both the alternating and direct-current zones. When operating in the direct-current zone the usual standard series type of overload relay actuating

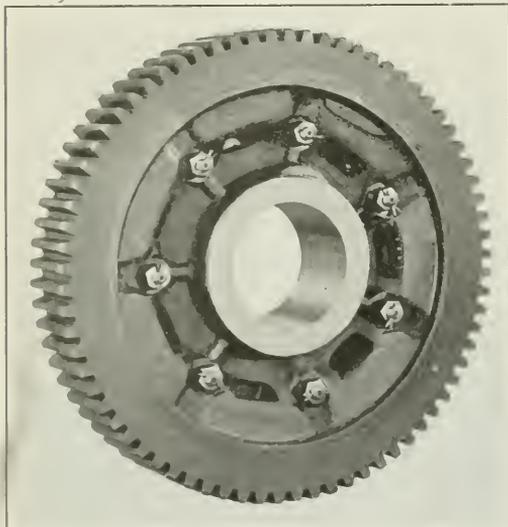
assembled coils with inter-leaved joints and clamped tightly between cast steel end frames. The transformer is provided with ventilating ducts and is cooled by the flow of air from the blower system. The ventilating air enters the low tension end of the transformer and is discharged at the high tension end. The ventilating system will be described later.

The control system employs 15 electro-pneumatically operated switches assembled in two groups of seven and eight switches respectively. Most of these switches are used for both alternating and direct-current operation. There are seven accelerating points for a. c. operation and thirteen accelerating points for d. c. operation. The switches are of the standard railway construction and are provided with blow-out coils.

The main circuit arrangement requires only one set of



Type XB-45-N Blower Motor and Fan (Mounted Position)



Flexible Gear Assembled Complete

the line switch is employed for this protection, while in the alternating current zone an oil circuit-breaker is employed. This oil breaker is provided with a time element relay to delay its opening on an overload, ground or short-circuit until the line has been cleared by the power house breaker. The high tension side of the main transformer is then disconnected from the trolley. This time element relay is controlled from a series transformer inserted in the high tension lead of the main transformer between the oil circuit breaker and pantagraph.

The main transformer is of the standard railway air blast type. The laminations are built up closely around the as-

sembled grids for acceleration on both alternating and direct current. These grids are assembled into five frames and suspended from the underframing of the car body. By the use of the a.c.-d.c. control changeover switch the sequence of switches is arranged so that the grids are correctly and efficiently employed for both kinds of power.

There are two reversers of the drum type, one for each group of two motors in series. These devices govern the direction of flow of current through the main motor fields with respect to the armatures and accordingly determine the direction of armature rotation and consequent forward or reverse movement of the car or train. The drums are rotated from one position to the other by means of two opposed air cylinders which are provided with magnet valves. The control circuits governing these drums are interlocked with the switches so that power cannot be applied to the two motors controlled by a drum, unless the latter is in the correct position for movement of the car or train in the direction indicated by the reverse handle of the master controller.

The wires comprising the control train lines are run throughout the entire length of both motor and trail cars and are connected between cars by means of jumpers. Each car is provided with a switchboard panel located in a cabinet in one of the vestibules. This panel board has mounted on it all of the control switches for the lighting and auxiliary apparatus required by the system.

Both motor and trail cars are provided with independent main and auxiliary lighting systems. These lighting systems are protected by fuses in the panel board cabinet and comprise 36 lights, the auxiliary row down the center of the car and a main row down each side of the car. Each side row consists of two circuits, each containing six 25-watt, 110-volt lamps connected in series, and the center row is a single circuit of twelve 25-watt, 32-volt lamps connected in parallel. The main lighting circuits receive power direct

from the line on d.c. and from the main transformer on a.c. The auxiliary or center circuit is supplied with current from a 500-watt lighting transformer at 32 volts, when the car is operating in the a.c. zone and from the storage battery when operating in the d.c. zone. The changeover is automatically made when passing from the d.c. to the a.c. zone and vice versa. The battery charging system is provided with an ampere-hour meter and disconnecting switch, so that when the battery has been fully charged it is automatically

Annual Meeting of Signal Section, A. R. A.

THE SIGNAL SECTION of the American Railway Association held its annual meeting at the Monmouth Hotel, Spring Lake, N. J., on Wednesday, Thursday and Friday of this week with an attendance of about 340. This was the fourth annual meeting of the Signal section and the 27th annual convention of what was formerly the Railway Signal Association. Chairman F. B. Weigand (N. Y. C.) presided. The principal business of the first day, after the chairman president's opening address, consisted of the reports of the committee of direction and the secretary and the celebration of the fiftieth anniversary of the closed track circuit.

Chairman Weigand, in his opening address, complimented the membership on the active part taken by them in the work of the association and told of the interest of this Section in the subject of automatic train control. Mr. Weigand pointed out how this Section was co-operating with the American Engineering Standards Committee which was organized as a national clearing house for industrial standardization. Attention was called to the means provided by the American Railway Association whereby the various divisions and sections are co-operating to eliminate duplication of effort. Regarding standardization, Mr. Weigand called attention to two important subjects which have apparently been neglected: (1) Approach and route locking circuits and (2) circuits for power signals at mechanical interlocking plants. He recommended that the committee of direction assign these subjects to a committee for careful study, with a view to recommending typical circuits, from the simplest to the most complex.

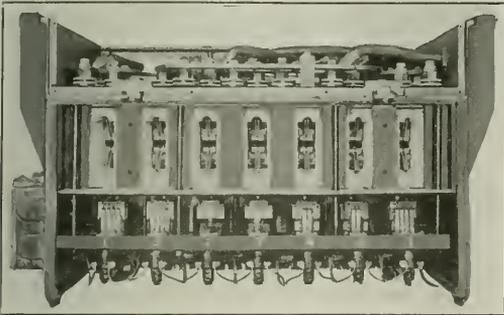
Following Mr. Weigand's address the committee of direction submitted its report. H. S. Balliet, (N. Y. C.), secretary, in his report stated that a total of 276 members were enrolled during the year and 14 were reinstated, while there was a loss, from various causes, of 234. In reporting on committee work he said that 59 subjects had been reported on by standing committees during the past year.

Highway Crossing Protection

Committee No. 20, reported on this subject. It believes that its recommendations, if adopted, will form a basis for the universal standardization of highway crossing protection, which at present is anything but uniform throughout the country. It is realized that some of the recommendations may conflict with existing state laws or orders of state commissions. The cross-board crossing sign, which is recommended, will comply with the laws of many states. It is believed, however, that if these recommendations are presented to public authorities with the explanation that they represent an effort on the part of the American Railway Association to recommend uniform practice throughout the country there will be little difficulty in getting existing state rules modified. The use of the automobile for long journeys has made highway traffic interstate almost as completely as railroad traffic and the great desideratum is to make the aspects of all good signs of possible or existing danger uniform throughout the country.

Memorial of Dr. William Robinson

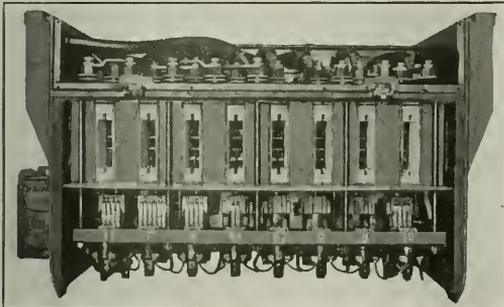
In commemoration of the fiftieth anniversary of the invention of the closed track circuit by Dr. William Robinson, a special committee presented a report on the invention of the track circuit which was also a memoir of Dr. Robinson. This report was in three parts. Part 1 was Robinson's own story of his invention. Part 2 was devoted to W. A. Baldwin, a former general superintendent of the Pennsylvania Railroad, who was responsible for the first installation. Part 3 was devoted to a description of the track circuit.



Front View of Type 269-A-3 Switch Group, Covers Removed

cut off from the motor-generator and the motor-generator disconnected from the line.

The ventilating system for cooling the main transformer and motors is supplied from a blower. The ventilating air is taken into the system through louvres at the sides of the car and is delivered by the fan to a longitudinal air duct (formed by the center channels of the car body and top and



Front View of Type 268-A-2 Switch Group, Covers Removed

bottom plates) through which it is distributed to the intakes of the transformer and main motors.

The blast wheel of this blower unit is a double inlet wheel 20 inches in diameter mounted on the shaft of its driving motor. The blower unit is mounted near the center of the car body and is suspended from the under framing. The motor is of the series type and is supplied with current at 380 volts from taps on the main transformer and runs at a speed of 1,400 r.p.m. The blower unit is not used when the car is operating over the New York Central tracks in the d.c. zone.

THE ILLINOIS CENTRAL has designated June as "no exception month"; all hands must endeavor to prevent the causes of freight claims by giving careful attention to every shipment. Freight claims paid by the Illinois Central in 1921 amounted to \$2,449,275.

Better Terminal Market Facilities Urged

WASHINGTON, D. C.

WHY THE HOUSEWIFE pays so much and the farmer gets so little for fruits and vegetables is one of the questions that will be answered by the Joint Commission of Agricultural Inquiry in a report soon to be tendered to Congress, and the report finds many other causes aside from the cost of transportation.

One reason for the wide spread between consumers' and producers' prices for fruits and vegetables has been found by the Joint Commission in lack of proper terminal market facilities. "The movement of fruits and vegetables has increased about four-fold in the last 20 years," said Chairman Anderson, "and most of the terminal markets have long since outgrown their facilities. Chicago furnishes a conspicuous example of how things ought not to be done. Some 27 trunk line railroads and several boat lines pour in the fruit and vegetable supplies for nearly 3,000,000 people. These are chiefly sold in a section of five or six city blocks on a narrow thoroughfare.

"This market is wholly inadequate in size, but the worst feature of the situation is its location at a distance of from two to four blocks from principal rail and water terminals. Most of the fruits and vegetables must be handled by wagon or motor trucks over rough streets through the most congested portion of the city. None of this carting or rehandling adds in any way to the value of the product, but it does add materially to the cost of distribution.

"At this market fruits and vegetables must be unloaded and then reloaded and are frequently backhauled over the same routes by the dealer purchasers. No inconsiderable portion is actually carted back to the same railroad yard or depot from which it was taken to the wholesale market. Obviously mere relocation of Chicago's wholesale district will not materially help its unfortunate situation. The city's great need is a wholesale railroad terminal for fruits and vegetables to which all carriers would have access and about which a sufficiently commodious wholesale district could be established.

"In New York, the greatest need is for a unification of docks. These should be as closely contiguous as possible in order to centralize and unify the wholesale district, and there might be an advantage in setting aside special docks for the handling of given lines of produce.

"Pittsburgh is more fortunate with respect to terminal facilities for fruits and vegetables than most American cities. It shows the advantage of centralizing the wholesale market about a single terminal, with consequent elimination of cartage and rehandling.

"Adequate, organized and correlated terminal markets, together with a reduction of unnecessary movement of commodities from terminal to terminal or from terminal to central market should materially reduce the expense involved in unnecessary equipment and the employment of an unnecessarily large number of men."

Out of the fluctuating wholesale price there are certain fixed charges in distribution, such as freight, storage, cartage, interest, insurance, and the semi-fixed charge of labor, all of which must be paid before the producer gets anything or before the wholesale distributor can be paid for his services, or gets his money back on goods purchased. "Changes in cost of distribution," said Chairman Anderson, "up to the time goods are sold at wholesale, are largely reflected in the producer's net return. For example, increased transportation charges, in the first instance, at least, are largely borne by producers, since production of fruits and vegetables, particularly tree fruits, cannot be quickly regulated to meet new conditions. Once produced, the crop will probably be sent to market even if the returns will yield only a little more than the costs of distribution, including transportation, etc., and irrespective of cost of production."

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ended June 3 shows a drop of 70,000 due to the holiday on May 30. The total was 750,645 as compared with 693,903 in the corresponding week of 1921 and 828,907 in 1920. As compared with the corresponding week of last year there were increases in the loading of all classes of commodities except grain and grain products and coal. The coal loading showed a slight decrease as compared with the week before on account of the holiday, but the loading of coke and ore was greater than that of the week before. The average daily loading excluding the holiday was also greater than that for the week before. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, JUNE 3, 1922.

Districts	Year	Grain and grain products	Live stock	C. al.	Coke	Forest products	Ore	Misc.	Miscellaneous	Total revenue freight loaded		
										This year,	Corresponding year, 1921	Corresponding year, 1920
Eastern	1922	8,455	2,646	1,475	1,549	5,248	61,359	28,938	162,530	.....	.....	.....
	1921	6,619	2,277	36,096	1,053	5,341	2,595	51,359	59,560	.....	164,900	190,022
	1920	2,163	2,867	13,710	4,655	2,865	5,185	46,186	63,592	141,163	142,872	176,140
Allegheny	1922	2,426	3,029	41,325	2,112	2,668	6,244	40,970	44,098	.....	.....	.....
	1921	207	175	29,378	194	1,435	17	5,436	4,018	40,880	.....	.....
	1920	154	151	22,354	131	1,201	23	4,679	3,115	.....	31,708	30,855
Picahntas	1922	3,399	2,458	23,387	718	19,191	1,175	34,302	41,399	126,020	.....	.....
	1921	3,645	2,099	17,703	435	14,519	574	34,210	33,808	.....	107,219	117,949
	1920	10,960	7,549	7,692	1,448	16,081	18,991	26,246	33,560	122,447	.....	.....
Southern	1922	10,399	5,381	4,563	628	12,897	17,350	23,225	26,849	.....	101,292	144,903
	1921	9,120	9,811	3,815	223	6,075	26,325	29,242	35,676	96,597	.....	.....
	1920	12,231	8,096	10,986	157	5,084	646	26,333	29,422	.....	92,865	112,503
Northwestern	1922	3,636	2,416	2,169	140	8,088	649	14,483	24,417	55,998	.....	.....
	1921	4,603	2,397	1,240	104	5,915	710	14,411	21,761	.....	53,047	56,735
	1920	23,716	19,776	13,676	1,811	30,244	22,975	69,971	93,593	275,066	.....	.....
Central Western	1922	27,231	15,784	18,789	889	23,896	18,796	63,269	78,038	.....	247,904	313,941
	1921	37,911	27,292	86,626	8,927	58,973	31,552	217,254	181,610	750,645	.....	.....
	1920	40,077	23,440	136,367	4,620	47,645	48,142	195,096	218,616	.....	694,903	.....
Southwestern	1922	29,166	25,689	168,019	11,993	58,260	71,430	145,179	319,171	.....	.....	828,907
	1921	.....	4,402	.....	4,307	11,278	3,410	22,158	63,024	56,742	.....	.....
Total Western District	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase (decrease)	1922	3,146	.....	49,741	.....	663	.....	72,075	.....	.....	.....	.....
Increase (decrease)	1920	8,765	2,103	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease (increase)	1921	.....	.....	81,193	3,066	.....	39,878	.....	37,531	78,262	.....	.....
Decrease (increase)	1922	37,911	27,292	86,626	8,927	58,973	31,552	217,254	211,640	750,645	693,903	828,907
	1921	.....	.....	91,720	.....	.....	.....	.....	.....	.....	821,121	795,135
	1920	.....	.....	91,113	.....	.....	.....	.....	.....	.....	770,991	862,074
May 2	1922	4,772	.....	81,967	9,315	61,930	16,917	244,971	306,434	727,459	770,991	862,074
May 13	1922	4,770	.....	79,170	8,813	60,664	14,403	241,418	300,684	772,359	751,186	843,145
May 13	1922	4,125	.....	75,410	8,124	57,132	11,766	242,945	289,751	755,749	721,722	843,184



One of the Oil Developments on the Southern Pacific System—A View at Mexia, Tex. (Houston & Texas Central)

Southern Pacific Issues Interesting Report

System Not Yet Back on Pre-War Earning Basis—Net Railway Operating Income in 1921 \$35,946,791

THE SOUTHERN PACIFIC annual report which was issued last week is another one of the comparatively small number of stockholders' reports which succeeds in giving to the readers a really adequate idea of the operations for the period with which the report deals. The report contains many things of leading interest, notably such matters as the improvement in the operating conditions of the carrier in 1921, some rather interesting material concerning the matter of taxes, a brief analysis of the effect of the decision of the Supreme Court with reference to the Central Pacific, etc. There can be little question, however, that the most interesting feature of all is the form in which the report is rendered.

The report is a document of 96 pages. It contains the usual tabulations of figures which will be found in annual reports with the exception that it has to give also a great mass of data relative to the many proprietary lines. The body of the report itself, however, deals with the Southern Pacific Company as a whole and the analyses which are given relate to the operations of the system as a combined property. The value of the figures and the analyses thereof is further enhanced by a series of graphic charts, two of which are reproduced in the present article. But the real element of interest and of value is the form of the remarks of Julius Kruttschnitt, chairman of the executive committee. The report shows on its first page a table giving the net railway operating income for 1921 with comparative figures for 1920—in other words, the report gives a proper recognition to the new importance which this figure has been given by the Transportation Act. On the second page there is a brief summary of the transportation operations for the five years 1917 to 1921 showing the operating revenues, operating expenses, net revenue from railway operations and the traffic units in their actual figures and in a percentage relation to the 1917 figures as 100.

The third page of the report contains details of monthly wages for 1921, 1920 and 1916 for several representative classes of employees. The fourth page continues the idea by giving a table showing in some detail the material used in repairs and renewals in way and structures for the years 1918 to 1921. This is followed by a similar table showing for maintenance of equipment: all freight cars on line; cars in shop or awaiting repairs, and per cent of cars in shop or awaiting repairs for specific dates, namely: December 31, 1917; March 1, 1920; September 1, 1921; December 31,

1921, and for May 1, 1922. Similarly, the report contains brief statements relative to business conditions generally and in Southern Pacific territory, to wage and rate matters, Panama Canal competition, maintenance during federal control, and as above noted, taxes and the Central Pacific case. Of course, the corporate income account is given in the usual form with a detailed analysis of the changes which appear therein in comparison with 1920. All the factors described herein may be noticed in the excerpts from the annual report which appeared in last week's issue of the *Railway Age*. They are pointed out here because they seem to be in line with what the *Railway Age* has said editorially about this important subject of railway annual reports (*Railway Age* of April 15, 1922, page 901.)

Net, After Rentals in 1921, \$35,946,791

The report of the Southern Pacific System shows for 1921 a net railway operating income of \$35,946,791 as compared with a net in 1920 of \$21,312,344. The 1921 figure as thus given, however, includes estimates of unaudited items such as loss and damage claims and reparation claims appertaining to operations during the guaranty period which were included in the 1920 accounts on the basis of the ruling of the Interstate Commerce Commission last December. The report states that if these guaranty period items were eliminated from the accounts the 1921 net railway operating income would have been \$39,827,756. This figure has more of a value by comparison with the years previous to 1920 rather than with that year alone. A comparison with the preceding years will show that while the road had a much increased net in 1921 over what it had in 1920, it has not yet succeeded in restoring its operations to its federal control standard of earnings or to the earnings of the test period ending June 30, 1917, on which the standard return was based. The system had a standard return slightly in excess of \$48,000,000. In 1918 it earned for the government a net of \$55,925,278, or \$7,757,935 in excess of its rental. In 1919 it earned for the government \$43,910,305, or \$4,334,355 in excess of its rental for that year. This will give something of an index as to the 1921 operations of the property.

Corporate Net 8.93 Per Cent on Stock

Insofar as concerns the corporate income account the figures show a net after fixed charges in 1921 of \$29,515,218

which figures out to 8.93 per cent on the outstanding capital stock. In 1920 the net after fixed charges was \$31,016,329, or 10.57 per cent on the capital stock. There was, however, an increase in the capital stock itself, this having been increased during the year in the amount of \$17,939,500, representing stock issued in exchange for 5 per cent 20-year convertible bonds. The dividends in both years totaled 5 per cent, the total for 1921 in dollars being \$20,639,196. With further reference to this matter of the increase in capital stock it might be mentioned that the reports show that there has been a total increase in the amount of capital stock outstanding since December 31, 1916, of \$71,537,600, or 26.21 per cent, whereas in the same period there was a decrease of \$99,033,312, or 17.67 per cent in funded debt. The increase in capital stock was the result of its being issued against the surrender and cancellation of 4 and 5 per cent convertible bonds and this explains in part the reduction in the amount of funded debt. The remainder represented bonds retired through the redemption out of the general funds of the system and by sinking funds, etc. This matter is of more than ordinary interest at this time and in this case is marked because on December 31, 1916, the ratio of capital stock to total capital was 32.75, whereas on December 31, 1921, it was 42.75. On the latter date the stock outstanding totaled \$344,443,106, the funded debt, \$461,865,051 and the total, \$805,808,157.

Transportation Operations

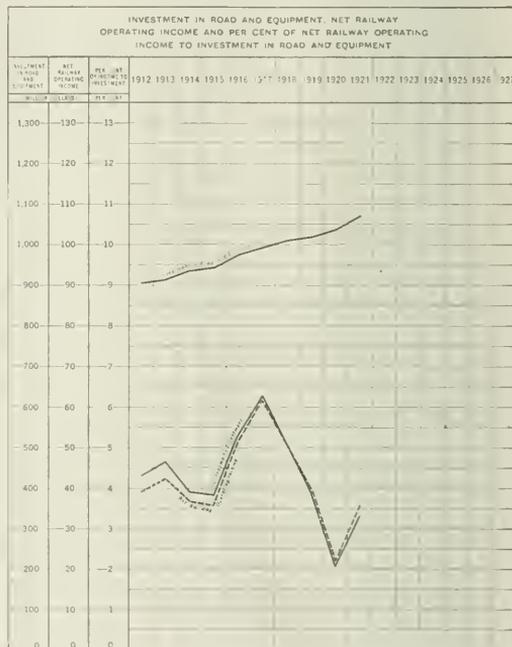
The actual transportation operations of the system show for 1921 a 1.09 per cent reduction in freight revenues as compared with 1920, a 11.52 per cent reduction in passenger revenues, and a 4.53 per cent decrease in total railway operating revenues. The operating expenses for the year decreased 12.2 per cent. This reduction in operating revenues and the comparatively greater reduction in operating expenses is fairly typical of what was done on almost every railroad in the United States in 1921. The distinguishing feature insofar as the Southern Pacific is concerned is the fact that the reductions were not as great as those made by most other carriers. In the report the officers of the road explain that the reduction in operating revenues was due to the nation-wide business depreciation, "aggravated on your company's lines by diversion of transcontinental business, by much lower rates offered by the Panama Canal route, and by the competition on the highways of motor trucks substantially free from taxation and regulation." The report further points out that the freight revenue was adversely affected by the smallest cotton crop in Texas and Louisiana that has been produced in 20 years; by a large reduction in the acreage of rice planted in the same states; and by reductions of rates on such important commodities as beans, canned goods, dried fruit, live stock, lumber, apples, cantaloupes and vegetables. The report gives some rather pertinent information concerning Panama Canal competition, one of the most cogent facts being that in 1921 the number of steamship voyages through the Panama Canal between Atlantic and Pacific ports of the United States increased 80 per cent and the volume of freight increased 83 per cent over the preceding year.

Reduction of 15.87 Per Cent in Tonnage

The figures in the report show that the actual tonnage of revenue freight carried in 1920 totaled 38,206,878 as compared with 45,416,021 in 1920, a reduction of 15.87 per cent. The reductions were fairly general in all classes of traffic except that there was an increase amounting to 3.72 per cent in products of agriculture due to the increased traffic of grain and citrus fruits. The Southern Pacific tonnage is very diversified and the percentages for 1921 were as follows: Products of agriculture, 21.41; of animals, 2.41; of mines, 29.71; forests, 20.16; and manufactures and

miscellaneous including l. c. l., 26.31. The road's coal traffic in 1921 made up only 2.33 per cent of its total tonnage. Crude petroleum, however, made up 5.05 per cent and refined petroleum and its products, 4.90. The tonnage of both of these represented reductions from 1920 of slightly over 20 per cent. The Southern Pacific gets a long haul on its traffic, the average distance in 1921 being 264 miles. This was less than in 1920, because in that year the figure was 285.

The actual freight revenues in 1921 were \$171,788,880 as compared with \$176,714,390 in 1920. The passenger revenues in 1921 were \$63,442,251, a decrease as compared with 1920, as has above been noted, of 11.52 per cent. It is explained in the report that "the amount of passenger business was diminished by a dearth of large conventions such as were held on the Pacific Coast in 1920 and by a substantial increase in travel by automobiles." "Much money is being appropriated," the report says, "by the feder-



Investment in Road and Equipment, Net Railway Operating Income, and the Per Cent of Income to Investment, 1912 to 1921

al and state government for the construction of highways that usually parallel the very railroads which are heavily taxed to provide and maintain them."

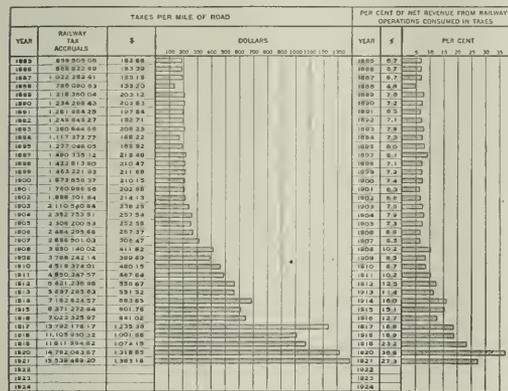
The report contains some very interesting figures, giving comparisons by years. Taking 1917 as a base of 100, the report points out that the operating revenues in 1921 figured out at 139 per cent, the expenses at 176, and the net revenue from railway operations at 78. It also shows that the traffic units (compiled on a basis of ton miles plus three times the passenger miles) would show for 1921, 84 and for 1920, 105.

The total operating expenses for the year were \$212,572,263. This compared with a total of \$242,113,790 in 1920 and the reduction figures out at \$29,541,527, or, as above noted, 12.2 per cent. The report explains that the system had to contend with slightly higher average wages in 1921

than in 1920, the various increases of 1920 and the decreases of 1921 averaging out to that result. It also says that prices of fuel and other material in 1921 averaged more than in 1920. The combined effect of higher wages and higher material costs increased the 1921 operating expenses by \$5,292,000 which, of course, was compensated for by the decreases due to less traffic and, as the report says, "This net result reflects the improvement forecast in last year's report as progress is made in substituting the incentive of self-interest of private management, and the increased efficiency and more cheerful service of the entire operating staff, for the apathy and blight of government management." Before speaking further of this matter of operating expenses it is advisable to point out that in 1921 the system operated at a ratio of 78.88. This compared with 85.77 in 1920, but in 1919 the figure was 78.61, in 1918, 73.43, and in 1917, 62.18.

Maintenance Details

The reduction in operating expenses in 1921 included decreases of 12.93 per cent in maintenance of way, 12.93 per cent in maintenance of equipment, or an average of 15.39 per cent in total maintenance. The reduction of transpor-



Southern Pacific Taxes 1885 to 1921, One of the Charts Shown in the Company's Annual Report

tation expenses was 10.65. With reference to maintenance of way the report gives some unusually adequate figures. It shows that in 1921 there was an actual decrease of material used for maintenance purposes, but apparently not of sufficient amount but that the properties were satisfactorily maintained during the year. Actually there were laid in 1921 427 miles of new steel rail as compared with 528 miles in 1920. In the case of ties 4,721,542 were put in track as against 4,587,913. With reference to equipment the report shows a rather satisfactory condition. It gives these figures of the per cent of freight cars in shops or awaiting repairs: On December 31, 1917, 3.55 per cent; on March 1, 1920, 4.32 per cent; on September 1, 1921, 9.13 per cent, and on May 1, 1922, 8.10 per cent. In addition figures are given explaining the difficulties which were met during 1920; at the end of federal control, 87.75 per cent of the company's box cars were on other railways with the result that "the deplorable condition of this equipment, owing to the neglect of current repairs when away from home during federal control, was not realized until we regained possession of our cars in the fall of 1921."

Taxes

With reference to taxes the report reads as follows:

The increase in taxes for 1921 over 1920 is \$747,406. This increase is the result of an increase of \$1,893,052 in state and county taxes, due, principally, to an increase in the rate of taxation on gross earnings in California from 5 1/2 per cent to 7 per cent under the King Tax Law which became effective July 1, 1921; to an increase of \$170,607 in capital stock tax, and to a decrease of \$1,316,253 in federal income and excess profit taxes, due, principally, to an assessment in 1920 of excess profits tax for the year 1917. As this report goes to press the large increase in taxes of \$747,406, or 5.05 per cent, over 1920, seems trivial in comparison with the taxes for the first four months of 1922, which amount to \$6,393,726, an increase of 38.26 per cent over 1921. At this rate taxes for the year 1922 will aggregate \$19,181,179, or 93 per cent of the dividends distributed to stockholders for 1921. Taxes amounted to \$8.60 for every hundred dollars of freight revenue during the year 1921, and to \$12.42 for every hundred dollars of freight revenue during the first four months of 1922.

The total railway tax accruals for the year consumed \$15,539,469, or 27.3 per cent of the \$56,922,031 of net revenue from railway operations. With an increase of 138.76 per cent in the miles of road operated over the miles operated in 1885, the first year of operation, taxes have increased \$14,679,964, or 1,707.96 per cent.

Presumably one of the most important features in connection with the Southern Pacific at the present time is the matter of the recent decision of the Supreme Court, calling upon the Southern Pacific to rid itself of its control over the Central Pacific. For the moment, however, this seems to be of somewhat academic interest only because the whole question is involved in the matter of consolidations. Professor Ripley, in his plan, put the Central Pacific with the Union Pacific, but the Interstate Commerce Commission amended the professor's idea and left the Central Pacific with the Southern Pacific. The whole thing seems to be something of conflict between ideas about railroading that were extant in the nineties with those which have received acceptance today. It is too early as yet to figure out what the final decision may happen to be, but there does not seem to be any particular reason for worrying about what will happen to the Southern Pacific if it loses the Central Pacific until something more concrete has been developed with reference to the situation. In this connection reference is made to an item which appears on another page of the present issue quoting some remarks of President Sproule on the matter.

Accident Investigations—

January, February and March

THE ELEVENTH quarterly issue of the Summary of Train Accident Investigations, prepared by the Bureau of Safety of the Interstate Commerce Commission, which is for the months of January, February and March, 1922, was issued on May 31. This report covers four collisions and two derailments, as follows:

- Collision—Mo., Kan. & Tex. Warner Junction, Tex. Jan. 13
- Collision—Baltimore & Ohio. Noble, Ill. Jan. 31
- Collision—Great Northern. Montrose, Minn. Feb. 22
- Collision—Northern Pacific. Welch, Mont. Mar. 17
- Derailement—Kansas City Southern. Fuller, Kans. Mar. 27
- Derailement—Atlanta, B. & Atlantic. Woodbury, Ga. Mar. 28

Following are abstracts of these reports:

The trains in collision on the Missouri, Kansas & Texas near Warner Junction, Tex., on January 13, were south-bound passenger No. 5 and a work train which was at a standstill. One employee was killed and 11 passengers and three employees injured. The collision occurred a short distance south of the Red river, and 2,000 ft. north of Warner Junction. From signal No. 20, about two miles north of Warner Junction, all trains are run by signal indications regardless of time-table rights, there being two junctions in the territory, one north of the Red river and one south of the river. Signal No. 20, an interlocking signal at North Frisco Junction, was clear and the engineman of No. 5 appears to have assumed that this assured him of a clear indication at signal No. 6561, about a mile south of there; and he ran at high speed until he collided with the work train. The engine and cars of the work train were pushed back so far that the inspector was convinced of excessive speed, notwithstanding the claims of the enginemen and testimony to the contrary. The engineman had no reason for assuming that signal No. 20 gave any indication concerning

signal 6561 except that it had been customary for the signalman at North Frisco Junction to hold signal 20 against a train when he knew that 6561 was in the stop position; this to avoid delays on the bridge and at the junctions. Moreover, No. 5 had a train order from the dispatcher requiring speed to be reduced to 15 miles an hour over the Red river bridge, and to Warner Junction, because of the pressure of the work train. A flagman had been sent out by the work train, but he had not gone far; he is censured for not properly protecting his train, having had 22 minutes in which to do so. If he had gone further, to the end of a curve, he no doubt would have been able to attract the attention of the engineman of No. 5 in season to enable him to stop. After sighting signal 6561, the engineman made an emergency application of the brakes; but it is probable that this was nullified by a prior service application which had been made. The train dispatcher said that he would have ordered the passenger train held at North Frisco Junction, as was the usual practice, had not the signalman at that point told him that the track was clear. The signalman, however, said that he told the dispatcher (in response to inquiries) that the work train was still on the main track; and the signalman's version is confirmed by three men who heard his conversation with the dispatcher; one, a signalman (off duty) in the cabin, one the operator at another station and the third a brakeman of the work train who was at Warner Junction, listening at the telephone.

The trains in collision on the Baltimore & Ohio at Noble, Ill., on January 31, were westbound freight extra No. 2500 and eastbound passenger No. 62. They met at about 10 p. m. on the main track near the middle of the long passing siding, and the engineman and fireman of the passenger train were killed. Nine other persons were injured. Engineman Smalley, of the passenger train, had a meeting order which required him to enter the side track at Noble, but he continued on the main track at about 40 miles an hour and met the freight, making a bad wreck. Smalley had received the order at Flora, 14 miles west of Noble, and had commented on the fact that he would have to take the siding for the freight; and he also had been warned by the air-whistle, sounded by the conductor, on approaching Noble. The switch light and the light of the approaching freight train were also plainly visible; the night was clear and there was a good view for a mile. Two trainmen said that Smalley was in the habit of approaching stations at high speed; but the conductor said that during the 20 days that he had been on that run, "he had been doing very well in learning the landmarks."

The collision on the Great Northern near Montrose, Minn., on February 23, was between eastbound passenger No. 28, first section, and a westbound extra, pushing a snow plow. Five employees were killed and four passengers and five employees injured. The engineman of the extra was killed. At Delano, about seven miles east of Montrose, the snow plow had been engaged for some time in clearing the side track and remarks made by the conductor and the engineman show that both of them noted the fact that train No. 28, which was about six hours late, was still due; and they had no orders against it. At about 4.40 p. m. they received an order making a meeting point with the second section of No. 28, but giving no right against the first section. But after receiving a number of orders, the conductor forgot about No. 28 and gave the order for his train to proceed. After going into the caboose and showing his orders to two brakemen and after the orders were read by them and inquiries made, the conductor realized that he had overlooked No. 28, and he immediately applied the brakes. He brought the train to a stop, but not soon enough to prevent the collision. How the engineman came to forget No. 28 can only be conjectured. Both men were experienced.

The collision on the Northern Pacific at Welch, Mont.,

on March 17, occurred during a snowstorm, about 7.51 a. m., and it was between the switches at the station where the trains had been ordered to meet and pass. Westbound passenger No. 1, having right to the road, was run into by eastbound passenger No. 220, at about 15 miles an hour. The fireman of train No. 220 was killed and one trespasser also was killed; 40 passengers and six employees were injured. Train No. 220 had the order to meet No. 1 at Welch and to take the siding. Later, when ten miles short of Welch, another order, order No. 210, form 19, was received, making a meet with train 651 at Spire Rock, about five miles east of Welch. The fireman, who also was a qualified engineman, received these other orders by hoop and read them; and, answering an inquiry from the engineman, said that their meeting with No. 1 had been changed to Spire Rock. The fireman immediately handed this and the other orders to engineman Nielsen; but Nielsen did not read them; he accepted the erroneous information given him by the fireman, folded the orders and placed them in his pocket, with the intention of reading them later. He had received notice to be on the lookout, on this part of the road, for fallen rocks; and, having his mind on this, he neglected to read the orders.

On this part of the road the grade is steep, descending, and Nielsen's applications of the brakes deceived the conductor so that he thought the engineman was intending to enter the side track. Nielsen thought that the whistle communication from the conductor—three blasts—meant stop at Welch station, the impression being still on his mind that the meeting point with No. 1 had been changed. Because of sharp curves, with rocks at the side of the line, together with the falling snow, neither engineman had more than a very brief view of the opposing train before the collision occurred.

The conclusion of the inspector is that Nielsen is "primarily" responsible; there being no excuse for not reading the orders. No statement could be obtained from the fireman prior to his death.

The train derailed on the Kansas City Southern near Fuller, Kans., on March 27, was northbound freight No. 56, consisting of locomotive 557, with 51 cars and a caboose. Moving at about 25 miles an hour, the train ran over a misplaced switch and entered a coal mine spur; and the locomotive was overturned and the engineman and one brakeman were killed. The time was about 10 p. m. The inspector finds that the switch had been opened, apparently, with malicious intent; but the engineman had disregarded the rules; for, both on account of the switch being within yard limits and the light having been extinguished, the speed should have been kept under control. A work train had run through the switch southbound, without noticing that it was mis-set.

The work train had passed about 9.30; and all of the members of its crew admitted that they had not noticed the position of the switch target, or whether or not the lamp was burning.

The derailment on the Atlanta, Birmingham & Atlantic near Woodbury, Ga., on March 28, resulted in the death of two employees and the injury of one. The train was eastbound fast freight No. 92 and the derailment occurred at 11.28 p. m. A rail had been loosened; and, after a careful examination of the locomotive, the cars and the track, the inspector reports the cause as malicious tampering with the track.

J. H. WINFREY, yard switchman on the Southern Railway at Hayne, S. C., detected a bent axle recently under an empty refrigerator car in a freight train, and in connection with the report of the incident Superintendent William Maxwell remarks that Switchman Winfrey probably holds the record for having discovered more bent axles than any man connected with the Southern Railway; nineteen since September, 1915.



Opening Session of the Accounting Officers Meeting

Railway Accounting Officers Meet at Cleveland

Simplification and Economy in Accounting Procedure Theme of
Interesting Convention

“THE POINT I wish to emphasize is that it is not the higher accounting end on which we need to lay stress, but we should look to our primary accounting, the detail work, and bend our efforts towards having it performed in a simple, direct and positive manner.” If the thirty-fourth annual meeting of the Railway Accounting Officers Association, held at Cleveland, Ohio, June 6 to 9, could be said to have a theme, it was the emphasis placed upon the desirability of bringing about simplification and increased economy in railway accounting procedure as is brought out in the foregoing excerpt from the address of J. J. Ekin, comptroller of the Baltimore & Ohio and president of the association. The meeting took action on approximately 300 subjects, which amount of work it succeeded in accomplishing in a three-day convention characterized by its continuing interest. In line with the theme which has been mentioned above, the meeting gave a great deal of attention to such matters as simplified divisions, the standardization of station accounts and forms, etc. Two subjects of leading importance were: (a) a proposed change in the present classification of railway operating expenses, and (b) the matter of statistics, particularly as relates to the requirements of the Interstate Commerce Commission concerning statistical reports.

The Railway Accounting Officers Association conducts its annual meetings in a manner somewhat different from that with which most other railway conventions are conducted. It is the practice of the association to have a small

number of important committees. These meet at different times during the year and their findings are presented in the form of a book, having the title of Agenda, copies of which are sent to all the members of the association prior to the meeting. Further, on the day preceding the actual opening of the convention, these committees hold meetings open to all members of the association who desire to attend them and if any of the decisions as reported in the Agenda are changed or modified, the result is given to the convention in the form of mimeographed supplementary Agenda. This explanation is given to explain how it is that the convention can cover such a large amount of ground and still carry on an interesting meeting. The result is that there is no subject needing discussion that does not receive adequate and satisfactory attention while, on the other hand, time is not taken up with unnecessary discussion of subjects concerning which the committee report in the Agenda is approved without further argument.

The address of J. J. Ekin was characterized by the manner in which it pointed out the problems concerning the railway accounting field and suggested remedies for their solution. The meeting was also addressed by Samuel O. Dunn, editor of the *Railway Age*, by S. Ennes, vice-president and general manager of the Wheeling & Lake Erie, by W. A. Colston, formerly director of the I. C. C. Bureau of Finance and now vice-president of the Nickel Plate and also by representatives of government departments. These addresses will be published in a later issue of the *Railway Age*.

President's Address

THE SHARP DECLINE in railroad traffic which commenced in the closing months of 1920, continued throughout 1921, and only recently has there been indications of a revival. This, and the fact that the accounting department had to carry on the work of stating the federal, guaranty period and corporate accounts, as well as the new statistics required in enforcing the act and furnishing the data for the special investigations and rate hearings, has made the life of the accounting officers anything but easy and pleasant.

The large increase in clerical forces and the expense thereof has been the subject of a great deal of discussion

and criticism, and there has been apparently a tendency to attribute it all to accounting and statistical requirements, which is misleading for the reason that a large proportion of the forces now classified as clerical in the reports to the Interstate Commerce Commission are not engaged in accounting and statistical work. This applies to forces in the general offices as well as on the line of road.

The great war and federal control of railroads brought about many changes in accounting methods and practices. In 1917 the railroads had one set of accounts and books. Most of them now have three: federal control, guaranty pe-

riod and corporate, and this condition adds vastly to the expense of accounting by requiring separations between different interests, for both receipts and disbursements.

Hearings Required Special Statistical Data

Since March 1, 1920, there have been almost constant rate hearings, both state and interstate; there have been numerous investigations, for example, hearings before the Committee on Interstate Commerce, United States Senate, and the Agricultural Inquiry; there have been continual wage hearings and the negotiations with employees; all of which have required the preparation of a large amount of detail data at a great expense on the part of the accounting and statistical forces.

Among the causes contributing to the cost of accounting today are changes in rates, complicated divisions, adjustments in wages of employees, and settlement of accounts with the government covering federal control and guaranty periods. The stabilization of transportation rates and employees' wages, the use of simple divisions for apportioning revenues, and the settlement of federal and guaranty accounts will result in a marked reduction in the cost of accounting.

There is no mystery in railroad accounting. It is simply auditing into the treasury the receipts from the sale of transportation through the medium of tickets and freight bills and auditing out of the treasury, through the medium of time cards, material orders and service bills, the cost of producing this transportation as represented by labor, fuel and material and supplies.

The trouble and complications we have are largely of our own origin; to illustrate, expensive methods of timekeeping and distribution, antiquated methods for handling material accounts, and a too refined and extended classification for stating these simple elements of cost.

Again on the income or revenue side we lack definite classification of commodities. We do not have clear and concise tariffs. We do not have, in many instances, simple and agreed upon divisions for apportioning revenues, as a result of which many of the carriers have long standing items of adjustment in their interline accounts, and claim channels are choked with overcharge and other claims.

Should Be Performed in a Simple,

Direct and Positive Manner

The point I wish to emphasize is that it is not the higher accounting on which we need to lay stress, but we should look to our primary accounting, the detail work, and bend our efforts towards having it performed in a simple, direct and positive manner. It is the duty of this association to see that this is done. It must be done in order that we, as accounting officers, in charge of one of the single largest groups of railroad employees, may do our part in having the railroads operated in an efficient and economical manner. There is a crying need today in many instances for proper instruction of the forces now engaged in the detail work.

We must not forget that accounting regulations and requirements enter into the minutest details of railroad operation; into the timekeeper's work, the material clerk's work, the agent's work—both ticket and freight. There must be the closest co-operation between the traffic, operating and accounting officers, if the desired results in operating these vast properties are to be obtained.

This is the great work of the accounting officer, his great opportunity, the embracing of which has rendered his position so important and added so much to his prestige—the simple telling of the truth, not in a critical but in a helpful manner.

The first thing we must realize is that there has been a radical change in social and economic conditions in this country and throughout the world. This has had a tremen-

dous influence on railroad operation and costs. There has been an increase in the volume of traffic as measured by passengers one mile and tons one mile, but the real increase is in the expense measured by the expenditures to meet the demand for more ease and comfort, better dining car and other features in passenger service, the highly specialized service in handling perishable freight, and the great increase per capita in small shipments of merchandise, all of which has added so much to the station, operating and accounting costs of the railroads.

The increased demand for transportation in a refined instead of what may be termed a raw state, has been one of the principal factors in producing the increase in overhead expense, made up largely in wages paid clerical forces. It should be remembered it requires the same outlay, probably more, to bill, collect and account for a shipment of 50 lb. of merchandise, as it does to bill, collect and account for 50 tons of coal handled as a carload.

It is for this reason that I urge we get back to first principles, start at the beginning in this transportation game and see how we can best account for these millions of transactions which produce our revenues, and the equally numerous transactions which constitute our expenses.

The real problem, from an accounting standpoint, is not one of handling the income account, the profit and loss account, and the balance sheet, but a simple, uniform, direct and efficient method of verifying and stating the millions of items that compose the receipts from, and the cost of, transportation.

Some Suggested Aids to Uniformity and Economy

As an aid to uniformity and in producing economy I would suggest:

1. A plan of arbitration be put into effect for settling disputes relating to divisions of joint rates similar to that now in effect for settling disputes between carriers relating to apportionment of loss and damage and overcharge claims.
2. The carriers should develop and put into effect standard methods for accounting for passenger and freight receipts, both local and interline. This should embrace practice in making and handling way bills, station forms and methods, reporting by agents, and settlements as between carriers.
3. Carriers should develop and put into effect standard methods of timekeeping, material accounting and stating of disbursements.
4. The Interstate Commerce Commission, working jointly with this association, should revise the classifications. The work is already under way with respect to operating expenses, and it is highly important that this classification be completed and put into effect January 1, 1923. I consider this the foundation of all of our constructive work.

The revision of the disbursement classification should be approached in the light of present conditions prevailing under the Transportation Act. The accounts should afford a prompt and accurate method of controlling expenses represented by disbursements for labor, fuel and material, and the classification should directly reflect those elements.

The nearer we can have the disbursement accounts show the current expenditures for labor payrolls, fuel, and material and supplies, the more useful the accounts will become as a check and record of these items of cost, and I strongly urge that the revised classification should show separately, with as few accounts as possible, the direct items of expense for labor, fuel, material and miscellaneous, the aggregate of which constitutes the cost of maintaining and operating the railroad properties. This fact was very forcibly impressed on me through the requirements of the Interstate Commerce Commission in the recent rate hearings, the Senate investi-

gation, and in the preparation of data for submission to the Labor Board.

There should be a decided reduction, instead of an expansion, in the number of accounts. It is not a refinement and further extension of the classification that is desired. The accounts, as few in number as possible, should be constructed so that a distribution can be made from the details of timekeeping, material disbursements, etc., with the least amount of additional expense. The thought is that with the proper timekeeping records and material and fuel disbursements a direct classification can be made in relatively few accounts, showing separately, the expenditures for labor, fuel, material and miscellaneous, under the general headings of

Management
Maintenance, and
Operation.

The revised classification for disbursements should apply to each and every common carrier railroad without respect to its class or size.

5. The Interstate Commerce Commission and all other federal and state commissions should revise their reports and statistical requirements so as to conform with the summaries regularly prepared from detail records, in conformity with the revised classification, and should be confined to the annual report, monthly income account and the standard statistical units of comparison developed for each road. The annual reports to the commission, to the states, and to the stockholders, should be harmonized so that one form will answer the requirements of all.

The situation with respect to statistics has reached that point where it seems to me desirable that this Association of Accounting Officers co-operating with representatives of the Interstate Commerce Commission, formulate a system of

statistics that may be generally used by the individual carriers—the summaries to be furnished the commission for its information and as a guide in determining whether the properties are being operated efficiently and economically.

The statistics required by the Interstate Commerce Commission and the state and federal bodies should be on a basis of maximum of essential operating data, with a minimum of detail.

The object of statistics is to establish facts. Let us not waste our energies to the preparation of a lot of useless, meaningless statistics, compiled at great expense, which cannot be utilized in producing results that will add one penny to the net revenue or be the means of improving the service. I have conferred with Commissioner Potter and know how much in earnest he is in regard to this subject.

A working basis has been established with the Interstate Commerce Commission for the purpose of solving this problem. It remains for the railroads to get together and adopt the best methods in handling the details of accounting, discontinuing anything of questionable value now prepared, and eliminating the numerous disputes and sources of expense, caused by lack of proper through rates and properly constructed divisions for apportioning revenue.

Let us finish as quickly as possible the work of settling the accounts for federal control and guaranty period operation, and then declare perpetual holiday in the production of useless statistics and reports.

I have the greatest respect for what has been accomplished by this association in the past, and I am thoroughly in accord with the thought so ably expressed, that we should hasten slowly in making changes. But I firmly believe we now have in our grasp the greatest opportunity ever offered to do constructive work in revising our detail practices at home and in working out with representatives of the Interstate Commerce Commission a revision of the existing classifications and statistical requirements.

Report of Committee on General Accounts

THIS COMMITTEE, headed by A. J. County, vice-president of the Pennsylvania System, reported that during the year it had held three meetings not including the one held on the day preceding the convention. The total number of subjects upon which it reported action was 21. These included a number of special importance, notably: A proposed change in the requirements of the Interstate Commerce Commission as to the compilation of freight commodity statistics; a proposed modification of the monthly report of revenues and expenses; the matter of reports furnished the Interstate Commerce Commission and the state commissions, etc. It also discussed a proposed revision of the Interstate Commerce Commission's accounting classifications, notably with reference to the classification of operating expenses. This subject was also covered by the committee on disbursements accounts and the suggestions of the latter are given in detail in a separate article on another page of this issue.

An analysis of the action taken on some of the matters of leading interest before the committee follows:

Settlement of Inter-Road Bills and Accounts

Where desirable or practicable, the committee recommended that individual agreements or arrangements should be made with specific carriers to facilitate or simplify inter-road settlements. The committee suggested a plan for consideration by those carriers that desire to enter into such an arrangement with other roads. In conclusion it said that, "In view of this action being purely recommendatory, there can be no objection to any road agreeing with another road that one net settlement be made monthly of all bills of every character that the company may find expedient.

Value of a Unit of Equipment as Rebuilt

Approval was reported of an interpretation given in a letter dated July 5, 1921, from Alexander Wylie, director of the I. C. C. Bureau of Accounts for the secretary of the association. The letter said in part:

The instructions at the top of page 33 of the Classification of Investment in Road and Equipment, relating to the rebuilding of equipment, have been the subject of considerable correspondence between carriers and this Bureau, especially with respect to the determination of when work in connection with the rehabilitation of equipment shall be considered in the nature of repairs and be charged to operating expenses, or in the nature of rebuilding requiring the retirement of the old unit and the reinstatement of the new.

The rule referred to is an adaptation from somewhat similar instructions appearing in the Classification of Expenditures for Additions and Betterments first revised issue, effective on July 1, 1910. The second paragraph on page 39 of that classification reads in part as follows:

"When any equipment is in such physical condition that it must be practically rebuilt in order to fit it for service, or when any equipment requires repairs which, if made, would constitute the major portion of its value, it should, when taken out of service, be considered as retired and be written out of the accounts."

The purpose of the classification will be served and the accounting for equipment repairs perpetuated on a correct basis if the word "value" as it appears in the second line of the instructions referred to be interpreted as pertaining to the current or so-called market value of a unit for the reason that this interpretation would continue the objective of having the measure of repairs determine whether the unit shall be retired, rather than to have the money value of the repairs determine that question. It should be understood that this process of determining whether a unit should be retired has no bearing on the value at which the unit shall be written out of the investment account, the retirement value being the lesser value or cost, estimated if not known. The procedure outlined will not conflict with the later provisions of the instructions which require that the appraised cost of the new unit shall be included in the investment account. In other words, for the purpose of determining whether the unit shall be written out of the accounts, the current or market value of the unit shall be considered, but in determining the figure at which the reconstructed unit shall be entered in the property accounts the fundamental principle of the classification shall be adhered to, that entries shall be on basis of actual cost.

Compilation of Freight Commodity Statistics for 1922

Discussion of this subject has been going on since last July and originated in a letter dated July 13, 1921, from Dr. M. O. Lorenz, director of the I. C. C. Bureau of Statis-

ties, in which he offered for consideration by the association a proposal for a special compilation of freight commodity statistics for the year 1922. Mr. Lorenz's letter said in part:

The Interstate Commerce Commission is now publishing quarterly a statement of the number of carloads and the number of tons for each of 73 classes of commodities. Nothing is known about the revenue derived from each of these classes.

The problem of how far it is advisable to go in the periodical freight commodity statistics is an old one. The carriers themselves differ widely in their own statistical practice. The Commission has frequently been asked why it does not require carriers to make reports that will reflect the monthly movement of the principal commodities and why it does not show the average earnings from the various classes of commodities. The answer has been that the expense of compilation is very large.

It must be recognized that the Transportation Act imposes new duties on the Commission in observing the adequacy of railroad revenues. In any comprehensive survey of freight rate adjustments that would seem undeniable that it is illuminating and helpful to know the amount of freight revenue from various sources.

The following proposal for additional statistics is made after much deliberation of what will be most useful to the Interstate Commerce Commission in its work and at the same time not prohibitive in cost to the carriers:

Outline of Proposed Additional Commodity Statistics

There should be reported for the separate months of January, April, July, and October, 1922, the number of carloads, tonnage, freight revenue and ton miles of each of the sixty-nine carload classes of commodities now in use, local and interline business being separated:

Commodity Class	Number of carloads		Number of tons		Ton miles		Respondent's freight revenue
	Originating on line	Received from connections	Originating on line	Received from connections	Local	Interline	
Wheat							
Etc. for each of 69 carload classes							

This subject was also considered by the committee on freight accounts, which committee reported as follows:

Your committee has given consideration to the proposal submitted by the Director, Bureau of Statistics, Interstate Commerce Commission, for a special compilation of freight commodity statistics for the calendar year 1922, and is of the opinion that these statistics should not be required for the following reasons:

(1) Based on the best available information, your committee estimates that the cost of compiling these statistics, by Class I carriers, for four so-called representative months in any one year, will be at least one million dollars. Such an added expense would be incompatible with the policy of cutting down operating expenses and reducing forces, in connection with the retrenchment in the cost of industry.

(2) These statistics would be of little, if any, practical value to the carriers generally, and, in the judgment of your committee, any use that could be made of the statistics by the carriers generally would not justify their compilation.

(3) In the judgment of your committee, such statistics would be subject to misuse in a manner that would be detrimental to the railway industry and unfair to the public; also, the statistics would be susceptible of such inaccuracies and erroneous conclusions as to discredit the statistics.

The movement of freight traffic in the United States embraces a very large area and is diversified in its nature. The methods of waybillng necessarily vary, in that some traffic is waybilled from point of origin to destination, while other traffic is rewaybilled one or more times; still other traffic of large volume moving under transit arrangements of various kinds, by which the nature and the name of the commodity may change. Rates for certain parts of the haul are low, and others high. It is, therefore, believed that any revenue ton mile figures produced in totals, and without regard to geographical movement, would be very unreliable unless accompanied by voluminous explanations of such detail as to make the practical use of such statistics very doubtful.

The statistics could not equitably or practically be used in rate cases or rate studies, until and unless supplemented by such detail as to constitute virtually a special study for that particular purpose.

The compilation of the suggested statistics would necessitate increased clerical forces, added stationery costs, enlargement of office space, additional machinery, etc. Even in the case of those carriers that now compile, for their own purposes, information similar to that suggested, there would be usually an additional expense, generally of a material amount, in order to meet the suggested requirements.

By requiring the data for only four so-called representative months, the statistics could be obtained at the minimum estimated cost of one million dollars by spreading the period of compilation to that extent which would make the figures available far distant from the period that they cover; that would detract from any usefulness the compilation might possess. Even four months selected under any conditions would not always be representative and, in many cases, would certainly be misrepresentative.

Modification of Monthly Report of Revenues and Expenses

The following is letter of September 15, 1921, from Dr. M. O. Lorenz, Director, Bureau of Statistics, I. C. C.:

It is proposed to modify items 10 and 11 in the monthly report of revenues and expenses as follows, beginning with January, 1922:

- 10. Maintenance of Way and Structures:
 - Accounts 201-279
 - Account 280 —Equalization adjustment
 - Total Maintenance of Way
- 11. Maintenance of Equipment:
 - Accounts 308-313—Locomotives
 - Accounts 314-316—Freight train cars
 - Accounts 317-319—Passenger-train cars
 - Accounts 301-337—Excluding preceding
 - Account 338 —Equalization adjustment
 - Total Maintenance of Equipment*

* Includes \$.....for contract repairs.

I would ask that this matter be brought to the attention of the appropriate committee.

Your committee is of the opinion that if the information mentioned is to be required, it should be as a separate special report, and should not be included in the monthly report of revenues and expenses.

Minimum for Addition and Betterment Charges

This subject came up because of a conflict in the requirements of the Bureau of Accounts of the I. C. C. and the Bureau of Valuation. The former allows a \$100 minimum for additions and betterments but the latter does not, with the result that the economy which the rule of the former allows is not permitted in the case of the latter and with the result, also, that two sets of books must be kept. The secretary of the association was directed to communicate with the I. C. C. for an interpretation eliminating the conflict and to request the I. C. C. to relieve the carriers of the reports of items of less than \$100 to the Bureau of Valuation.

Reports for the I. C. C. and the State Commissions

This subject is one of the most important subjects which is now before the railway accounting officers. It was brought to the attention of the R. A. O. A. by the Association of Railway Executives and is being studied by the general accounts committee through a sub-committee headed by E. M. Thomas, comptroller of the Chesapeake & Ohio. One of the most interesting features of the discussion was a letter sent to Mark W. Potter, member of the Interstate Commerce Commission, by Slason Thompson, director of the Bureau of Railway News and Statistics. Mr. Thompson, in his letter, pointed out that from 1895 to 1920 there had been an increase of 441 per cent in the number of clerks, whereas

in the same period there was an increase of but 147 per cent in the number of passengers carried, 231 per cent in the number of tons of freight carried, 103 per cent in the net capitalization, etc., or that there had been an increase of 1148 per cent in this period in the compensation of railway clerks, as compared with an increase of 481 per cent in operating revenues and 720 per cent in operating expenses. He followed out this idea by showing that this increase in number and compensation of clerks was due to the increasing volume of statistical reports required primarily by regulating bodies, all of which he points out in great detail. The latter part of his letter is a suggestion for what he terms "reformed accounting" or a "new arrangement for statistical requirements." In these suggestions he gives in great detail a proposed classification of accounts of various kinds and the major element in his suggestions is primarily a reduction in the number of classifications.

The accounting officers have not yet arrived at any definite conclusions in connection with Mr. Thompson's letter or in connection with submissal of that letter to the association by Mr. Potter. The matter is still being considered by the sub-committee working in co-operation with the commission.

Forms Relating to Income Tax Returns

A sub-committee was appointed to confer with Internal Revenue Department on the subject of simplifying

the forms for income tax returns. The sub-committee reported that it was preparing a form for use by railroads for the year 1922 returns. It requested suggestions and said that it had already received a large number. With reference to the general matter of taxation, it added:

It is the view of your sub-committee that the great and continued increase in railroad taxation, both federal and state, should be kept before the attention of the railroad executives by the accounting officers. It is evident to your sub-committee that because of high taxation and the limited return that railroads have been permitted to earn for many years past, combined with the construction of new highways and the use of the motor truck, and to some extent the waterways, the carriers are continuing to operate many miles of railroads and facilities that are not self-sustaining, and unless there is some relief in the matter of taxation, as well as in other expenses, continued operation of such lines might not be justified. To your sub-committee it seems equitable that so long as railroad earnings and returns are limited by law and the railroads are required to divide profits, if earned, with the government, a corresponding limitation of taxation should be urged for the railroads.

Tax Accruals

The committee reported its opinion that taxes should be charged to Account 532 each month on basis of 1/12 of the estimated taxes for the year, except that in the case of railroads whose traffic is largely or wholly seasonal and who deem it necessary to account for taxes on some other basis, such cases should be permitted by the Interstate Commerce Commission rather than to impose a method not adapted to the earning or financial experience of such railroad companies.

Report of Committee on Freight Accounts

THIS committee, the chairman of which was W. B. Kraft, auditor of revenues of the Pennsylvania Railroad at Philadelphia, reported that the committee had met on four occasions for a total of 14 days, not including the meeting preceding the convention nor the meetings of the several sub-committees chosen to cover specific subjects. The committee's report in the Agenda for the annual meeting covered 103 subjects and required 126 pages. In supplementary agenda three more subjects were added, bringing the total to 106. The 1921 freight committee covered 77 subjects which was the record up to that time. In view of these facts any analysis of the committee's work must be severely abstracted. Among the important subjects considered were the following:

Revenue Accounting, Forwarded

Basis vs. Received Basis

The report discussed the general features of each plan and in its conclusion said that to reverse the plan in general use—that is, the received basis—would add to the expense of accounting. Therefore, the committee recommended the use of the so-called received basis for accounting of freight revenues as the standard plan of the Railway Accounting Officers Association.

Station Freight Accounting by Automatic Machines

This subject was carried over from 1921. The committee expressed the opinion that the plan of station accounting with the use of punched cards and tabulating machines is impracticable for general use. However, the plan is practicable where the volume of traffic warrants its installation, and the committee is of the opinion that no economy can be effected where the number of items handled at a station is less than 25,000 per month. A plan was proposed as to the method of doing the work.

Standardization of Station Accounts and Forms

The association at its 1921 annual meeting left this subject with the committee on freight accounts for further consideration and report. The committee recommended for adoption a suggested plan of station freight accounts. The

plan pointed out that station accounting represents an important fundamental of revenue freight accounting. "Obviously, all railroads must have station accounting. The variations on different roads are variations largely in detail. There are some broad, general principles of station accounting, both as to forms and methods, that are applicable to all conditions alike. The Railway Accounting Officers Association has endeavored to embody those principles in the forms and method hereinafter contained for the benefit of all who are now or may hereafter be concerned with station accounting." The plan also states: "The association recommends a daily system of station freight accounting; and in recognition of the trend to this system by all carriers, the forms constituting the R. A. O. A. plan of station freight accounts have been primarily predicated on the daily system. Sufficient elasticity, however, has been allowed in the forms to permit the advantageous use of them in connection with a monthly system of accounting."

Method of Adjusting Items on Loss and

Damage on Bills Against U. S. Government

The committee recommended for adoption by the association the following:

Resolved, That all claims presented by the United States government against a carrier, in connection with a bill rendered by that carrier against the United States Government, be sent by the government to the officer of the carrier in charge of the rendition of bills, instead of to freight claim agent in charge of overcharge or loss and damage claims. After the necessary notation has been made against the records of the office to whom sent the claim papers are to be forwarded to the appropriate freight claim agent or investigated and adjusted in accordance with the practices of the carrier against whom filed.

Shipper's Order Notify Bills of Lading

The committee expressed the opinion that paragraph 129 of the R. A. O. A. 1921 Synopsis should be changed to read:

129. Bills of lading should be signed only by an agent or bonded employee, the signature to be written in ink or indelible pencil. Carriers should exercise care in policing the endorsement on bills of lading.

Two-Figure Per Cents—Interline Waybills

The most important development in this very important matter during the year was a reference of this question to the attention of the association of railway executives. The

committee's report submitted as information the following letter dated March, 1922, from J. J. Ekin, president of the R. A. O. A.; to the chairman of the executives' association:

The universal use of joint through freight rates, and simplified divisions for apportioning freight revenue among the interested carriers, would save the carriers of the country more than five million dollars (\$5,000,000) annually in clerical expense. This saving is arrived at from figures furnished by the individual carrier.

Joint through rates and simplified divisions are indispensable in efficiently and economically adjusting interline or through waybilling if freight from point of origin to destination, which method materially improves the service rendered by railroads to the public, lessens the time required for transporting freight; is helpful in the operation of junction agencies, reduces the number of overcharge claims; and facilitates the investigation of loss and damage, as well as overcharge claims. These advantages are separate and apart from, and are in addition to, the economy heretofore mentioned.

The traffic department makes the rates and divisions, but it is an accounting function to apply those divisions in the settlements with other carriers. The divisions are stated in such a complicated manner, as to bring about unnecessary clerical expense in the accounting application of those divisions.

The accounting officers advocate divisions of that degree of simplicity which will afford adequate protection to the revenues of the interested carriers, and which will readily apply to the clerical labor necessary in making the voluminous and complicated calculations month after month, year after year. Regardless of how the division may be stated, and how many calculations may be necessary, it will be obvious that each carrier, after all, receives a certain percentage of the revenue involved.

The term "Simplified Divisions" means stating the divisions as straight percentages. To illustrate: The rate would represent 100 per cent of the revenue, and each carrier's proportion would be expressed as a percentage of the joint through rate.

The benefits to be derived from the use of simplified divisions have passed the experimental stage and are an established fact. Simplified divisions are, to some extent, in use, but the carriers are deprived of the full efficiency and economy to be obtained, until and unless simplified divisions are completely and universally put into effect.

This question, during recent months, has been given special study by a committee appointed for that purpose, and the subject is of such pressing importance and concern that we commend it to you for consideration as being worthy of submission to the Railway Executives.

The Railway Accounting Officers Association, and the accounting officers individually, stand ready to cooperate with the traffic officers and traffic association in every possible way in connection with this matter.

This letter is written by direction of, and is, therefore, an expression on behalf of this Association.

Various members of the association reported that considerable progress had been made in the matter of simplified divisions during recent months. One member said that the Southern Railway had adopted two-figure per cents on all system business and had shown large savings. A memorandum was read saying that the western executives had recently appointed a committee of six traffic officers headed by C. E. Spens, vice-president in charge of traffic of the Burlington, to consider the question and that accounting officers had been asked to co-operate.

Legible Interline Waybills

The committee submitted as information a copy of a circular sent to members of the association under date of October 4, 1921, in accordance with a recommendation of the committee.

Preventing of Overcharges and Undercharges

The committee submitted the following suggestions as means for preventing overcharges and undercharges, with the recommendation that they be embodied in the Synopsis:

1. Simplification of tariffs and division bases.
2. Some general plan of a structuring divisions under which it would be possible to place division bases in the hands of junction agents and others interested before the tariffs become effective.
3. Extension of joint through rates.
4. Extension of interline billing.
5. Proper instructions and advice to new or inexperienced agents billing and revising clerks, station and revolving bill collectors and at destination, by means of junior station employees, or by traffic or accounting representatives, to see that all information in work of this nature.
6. Full payment of audit office revision charges at important inter-junction points, or at system points advantageously located, thus insuring proper revision by competent rate men prior to delivery of freight and bill to the carriers at the latter stations of this duty as far as practicable.
7. Inspection of all tariff files and recheck of station revision by competent inspectors or rate clerks, generally assigned to and qualified for work of this nature.
8. Printing and distribution of a number of weights, particularly on less-carrier bills, with a series of toll-card weights and reports to be made by the carrier at each station, if necessary, and preferably by the carrier, to the audit office, to be done in work of this nature.
9. Extension of the revision work to a complete system of advice to carriers, by means of a revision office, to be located at junction points, to be organized and operated in a similar manner to the present revision office.
10. Extension of the revision office to include the Overcharge Office and Waybill Office, and Division Office, with an appropriate station of advice under which the carrier would be advised of all revision features developed in the handling of his bills, and of the reasons therefor.
11. A revision office of inter and intra-carrier carriers accepted

and of overcharge claims paid, showing as to each the number and amount chargeable to faulty work at each station, separated as to causes, such as—

- Errors in rates,
- " classification,
- " description of freight,
- " weight,
- " routing,
- " extension, etc., etc.,

Shipments not rated through, such analysis to be tabulated in statement form, showing comparison by stations, for distribution to station agents and others. With the causes for overcharge set up in this manner, corrective measures can be concentrated on the principal causes.

Refunding Freight Overcharges Discovered by Verification of Waybills in Freight Auditor's Office

The committee found that carriers generally are refunding overcharges detected in the audit office, but there is lack of uniformity in the method of notifying parties to whom overcharge is to be refunded.

The committee recommended that all agents be required to carefully revise the waybills as to description of articles, weight, classification, rate and extension before taking into account, and that a careful revision be made of the waybills in the audit office.

Overcharges detected in the audit office should be covered by waybill correction, or by special form if used for that purpose, and re-checked before being forwarded to the agent who collected the transportation charges. If the agent is unable to effect refund on account of freight bill having been remitted to the shipper, or for other reasons, the agent should obtain full address of the shipper or party to whom the refund is due, and submit the information to the audit office without delay. Upon receipt of this advice the audit office should notify the party to whom refund is due to submit claim supported by the original paid freight bill or original paid bill of lading.

It should be impressed on all concerned that it is as important to refund overcharges as to collect undercharges.

Unit Passing Report

This subject was brought before the attention of the committee by a communication explaining the methods followed by the Central of Georgia with reference to passing reports. The committee expressed the opinion that, in addition to the present R. A. O. A. Standard Form No. 119, Junction Passing Report of Interline Waybills, a Unit Passing Report be also adopted. The use of either form is optional.

Junction point at which unit passing report is made should be left to the individual carrier for reason that facilities to obtain such information may be available at one point and not at another.

However, it would seem preferable to obtain the record at the going off junction for reason that, when tracing for settlement, next connection delivering record can be positively furnished.

Accounting requirements of the individual carriers would determine whether the unit passing report should be printed in one or more parts.

Division Sheet Reference to be Shown on Tariffs

The committee recommended that division sheet reference be shown on tariffs when published and requested the secretary to advise the traffic associations of this action.

Standard Form of Waybill Envelope

The committee met with the sub-committee on railroad business mail of the A. R. A. transportation division and agreed to recommend a standard form of envelope for mailing merchandise waybills. The envelope is to be 12½ in. by 9½ in. and to have a half-inch border on both sides in red ink in order that it can always be identified as an envelope containing waybills.

Miscellaneous Charges on Waybills

The committee reported that it had given thorough consideration to the necessity of properly describing in detail,

miscellaneous services in transit, so that the destination agent can fully describe this information on the freight bill to obviate complaints of consignees and refusal of payment for the charges and, therefore, it recommended changes in the present rules to cover the situation.

Empty Cars Short-Routed

Empty cars, when short-routed in accordance with car service rules, should be moved on empty car waybill, the road arranging for the service to pay the charges through bill and voucher plan.

The committee was also of the opinion that, under no circumstances, should revenue waybill be issued with charges.

Waybilling to Stop in Transit to Finish Loading, Etc.

This matter was brought up because it was felt that there was a lack of uniformity with reference to the manner in which various carriers waybill carload shipments that are stopped in transit to finish loading, partly unload, or in conformance to other privileges authorized by tariffs. The committee submitted the following conclusion:

On the R. A. O. A. standard waybill forms now used for car-load freight, a space is provided at the top, immediately above the car initials and number in which to enter for the benefit of conductors, instructions covering cars to be stopped in transit. Your committee feels that if instructions are shown in this space by the waybilling agent, the troubles due to carrying such shipments beyond the "stop" point will be practically eliminated. Furthermore waybilling to the "stop" point would involve possibility of agent neglecting to show the final destination and would make necessary a change of waybill heading for every stop.

Report of Committee on Passenger Accounts

THE COMMITTEE ON passenger accounts, the chairman of which was W. A. Meglery, auditor of passenger accounts of the Louisville & Nashville, reported that it had held three meetings for a total of eight days. It covered 51 subjects and its report on these subjects required 60 pages of the Agenda. Two of the important subjects which it discussed were related to the accounting procedure for surcharge on pullman fares and the standardization of station accounting forms and practices. It also reported on some further details in connection with the uniform and simplified basis for the division of the interline passenger fares. A brief analysis of the work of the committee follows:

Uniform and Simplified Basis for the

Division of Interline Passenger Fares

A plan covering this situation was presented to the 1920 meeting. The committee said that it had hoped to be able to include in its report some figures in the form of a comparison of the revenue that would accrue under the simplified basis and under the present basis. The matter is being studied further and the committee recommended that all carriers of the association whose interline ticket sales average \$25,000 per month or more, should be asked to make a comparison covering the month of February, 1922, including also a statement of the possible saving under the new plan.

Accounting Procedure for Surcharge on Pullman Fares

This matter caused considerable discussion on the floor of the convention. The matter was considered also in 1920 and had been left with the committee for further report. The committee recommended the following resolution and proposed also a detailed plan for securing better results in connection with the matter.

The committee recommended that shipments consigned to be stopped in transit to partly unload, to finish loading, etc., be waybilled in accordance with current waybilling instructions to the destination to which consigned (or to junction point if through billing unauthorized). Instructions to conductors showing where cars are to be stopped to be entered on waybill in space provided.

Simplification of Accounts

The importance of this subject is pointed out by the fact that 21 pages were devoted to it in the Agenda. The committee took up the consideration of the subject in conformance with a letter addressed to it by the president of the association last January. The committee resolved itself into three sub-committees and the work which it submitted in the form of plans, methods, recommendations and comments in the interest of the simplification of accounting, may be summarized in the following topical analysis:

1. STANDARD FORMS AND PLANS FOR STATION ACCOUNTS.
 - Zone Plan of Accounting.
 - Machine Station Accounting Plan.
 - General.
2. (a) USE OF BLANKET WAYBILLS.
 - (b) THE ACCOMPANYING OF WAYBILL WITH FREIGHT.
 - (c) MULTILATION OF WAYBILLS.
3. AUDITING THE DOLLAR OF LOCAL REVENUE INTO THE TREASURY.
 - Audit Office Settlement of Interline Waybills.
4. SETTLING INTERLINE ACCOUNTS.
 1. Separate Abstracts for Each Commodity.
 - (a) Settlement of L. C. L. Traffic on Gateway or Zone Per Cents.
 2. Minimum Amount for Which Correction Shall Be Issued by Agents of Audit Office.
 3. Rendering Interline Accounts Later than the 18th of the Following Month.
5. SIMPLIFIED DIVISIONS.
6. LIMITATION OF THROUGH WAYBILLING.
7. BEST METHOD OF EXISTING CO-OPERATION OF TRAFFIC OFFICERS IN SIMPLIFICATION OF RATES, DIVISIONS AND CLASSIFICATIONS.
8. RESTRICTING CLASSIFICATION TO THREE CLASSES FOR L. C. L. SHIPMENTS.
9. DIVISION SHEET REFERENCE TO BE SHOWN ON TARIFFS WHEN PUBLISHED.

Final Date for Reports from Agents

to Accounting Department

This matter was brought to the attention of the association by the American Association of Railroad Ticket Agents who pointed out that the requirements as to the dates the monthly reports should reach the accounting departments frequently result in considerable overtime work in order to get them out on time. The committee recommended no change from the existing practice, which provides that ticket reports from all agencies be forwarded as promptly as possible after the close of the month, and points out that the varying conditions would not make it practicable to prescribe a fixed date that could be observed at all stations. The matter should accordingly be left with the individual carriers.

Attention is directed to the fact that some relief can be afforded by permitting agents at the larger offices to render semi-monthly reports of interline ticket sales.

Standardization of Station Accounting

Forms and Practices

The importance of this matter is indicated by the fact that in the Agenda 25 pages were devoted to it. The committee offered for adoption several standard forms with which it submitted a description of their proper use.

Publication of Transfer Charges at Junction Points

The committee submitted the following for adoption by the association:

Whereas, The Act to Regulate Commerce as amended provides that all charges to be collected for transportation must be shown in tariffs filed with the Interstate Commerce Commission, and

Whereas, It has been found that when transfer charges are so published it would prove a convenience to agencies who are not provided with a complete set of tariffs if they were shown in the Official Guide as a matter of information, and

Whereas, This information can be published in the Guide without charge, be it

Resolved, That this association recommends that all transfer charges which are to be collected from passengers be shown in tariffs regularly published and filed with the Interstate Commerce Commission, and be it further

Resolved, That when such charges are published in tariffs compilers solely publishers of the Guide in order that the charges may be shown in that publication as a matter of information, and be it further

Resolved, That a copy of this resolution be sent to the Secretary of the American Association of Passenger Traffic Officers and the chairmen of the several Territorial Passenger Traffic Associations.

Dating Tickets Sold in Advance

The committee expressed the opinion that the most satisfactory manner of handling interline tickets sold in advance is to require the agents to stamp these with their regular dating stamps showing the actual date of sale, endorsing or stamping across the face of the contract of ticket and each coupon, "Not good for passage until., 19." indicating the date on which such tickets are good for passage.

Double dating stamps at large offices, indicating the same information on each coupon and contract of tickets, are used to advantage in this respect.

Report of Committee on

Disbursement Accounts

The most important subject before this committee was the proposed change in the classification of operating expenses which has been covered in a separate article in this issue. The committee was headed by F. C. Uhlman, general auditor of the Western Maryland. The work of the committee is largely a matter of determining to what accounts various expenses should be charged, but in recent years the committee has gone beyond this and has accomplished work of a more general character as is evidenced, for instance, in what it has done in connection with the operating expense classification.

The committee reported on a total of 52 subjects. Some of the important subjects discussed by the committee included the following.

Percentage Covering Supervision, etc.,

to be Added to Bills

The committee expressed the opinion that when not in violation of contract provisions and when not in violation of A. R. A. (M. C. B.) rules, 10 per cent for labor and 15 per cent for material are reasonable and equitable percentages to be added to bills rendered by one carrier against another carrier to cover supervision, use of tools, etc.

The committee recommended that the individual accounting officers bring the foregoing to the attention of their respective managements, with a view of having the 10 and 15 per cents made generally effective and operative.

Settlement of Car Repair Charges

The association adopted the following as an addition to its disbursement recommendatory rules.

The subject was brought to the attention of the committee by R. L. Harris, auditor of disbursements of the Atchison, Topeka & Santa Fe.

The committee recommended the addition of the following to the disbursement recommendatory rules:

Car repair bills rendered under A. R. A. (M. C. B.) code of rules shall be paid in one monthly summary if R. A. A. standard form is used. This monthly summary, together with all bills included therein, shall be rendered not later than the last day of the succeeding month.

For the purpose of draft settlement summaries may be accepted as correct until they are called to verification and adjustment through the A. R. A. code of car repair rules. Settlements made under the A. R. A. code of car repair rules may be subject to draft settlement of the second succeeding month.

The committee recommended that the new rules should be made mandatory, but after considerable discussion, the association voted to make them recommendatory only. Mr Harris who explained his ideas, said that some roads have car

repair bills running from \$100,000 to \$500,000 monthly. He showed further that billing of car repairs usually was averaged about 45 days after the work was completed although some roads take a longer time, but he said that in his experience the average time in which it took to get payment on the bills—that is for the checking and payment of bills—required 78 days and that some carriers do not pay until the expiration of six months. He pointed out that there was too much diversity of practice and too much correspondence requesting payment, etc., and that the whole thing was largely a matter of proper equity. Those who objected to the proposal said that the difficulty was that on the whole the bills were not properly rendered and it was stated in no uncertain terms that there was apparently considerable padding and erroneous charging, although strenuous objection was made to such allegation. The final result, however, was that the association refused to make the rule mandatory and suggested that carriers, if they desired, could make individual arrangements with other roads.

The committee also submitted a detailed plan concerning interroad car repair billing and bookkeeping methods and forms.

Report of Committee on Overcharge Rules

The subjects discussed by this committee headed by J. F. Schutte, auditor of freight claims of the Baltimore & Ohio, were largely of a technical character. One of the subjects of more general interest, however, was that relating to the cause and prevention of overcharge claims, which has already been referred to above.

The committee expressed the opinion that the large number of overcharge claims discovered as a result of the revision of freight bills by the traffic men of large shippers, and by the numerous auditing bureaus and claim collecting agencies for the smaller shippers clearly indicate necessity for more complete revision by carriers before the charges are collected, not only for the purpose of preventing such overcharges, but in order that an almost equal number of undercharges which are not now called to its attention may be collected. The cost of increased revision would be largely taken care of by the additional undercharges collected, and by decrease in expense in claim offices, and much of the irritation resulting from overcharges and from demand for payment of undercharges months after the freight has been delivered would be removed.

The committee, therefore, recommended the employment of expert rate clerks under the jurisdiction of the accounting department at the large terminals and at the larger rate breaking or interchange points, whose duty it shall be to carefully revise the billing and correct the charges to the proper basis before delivery of the freight.

The committee further recommended that the fullest cooperation be established between the office adjusting claims and the revision clerks, so that errors which may have escaped detection may not be repeated.

Report of Committee on

Terminal Companies' Accounts

The chairman of this committee was George E. Campbell, auditor of the Union Railroad. The most interesting feature of its work consisted of its recommending plans and uniform blanks for handling lost and found articles, and it also made some interesting recommendations relative to parcel room checks.

Election of Officers

The association elected as its president for the coming year, L. G. Scott, vice president of the Wabash; as its first vice president, A. J. County, vice president of the Pennsylvania Railroad, and as second vice president, E. M. Thomas, comptroller of the Chesapeake & Ohio.

Michigan Central Reflects Increasing Prosperity

Net After Fixed Charges in 1921, \$7,725,337, Despite
16.95 Per Cent Decrease in Revenues

THE MICHIGAN CENTRAL in recent years has had somewhat the same sort of a change for the better in its fortunes as has characterized the recent history of the Pere Marquette. This statement, of course, is made with due regard to the fact that the Michigan Central has had somewhat of a different financial history from that of its neighbor carrier. Both roads, nevertheless, have been able to realize rather handily on the increased prosperity of the state of Michigan which has resulted primarily from the centering of the automobile industry in that section.

In the year ended December 31, 1921, the Michigan Central reported a net after fixed charges of \$7,725,337 as compared with \$3,805,785 the preceding year. In 1920 its dividends totaled 4 per cent, or \$749,456. In 1921 the total was 6 per cent or \$1,124,184. This meant that in 1920 the road carried a surplus to profit and loss of \$3,056,329, and that in 1921 it increased this surplus to \$6,601,153. It might be suggested that because of the various adjustments made as between the two years, that these figures should possibly be averaged in order to secure a proper basis for comparison. In whatever way they may be regarded, they indicate a very favorable financial condition for the Michigan Central. The adjustments referred to as between the two years are principally those relating to the reserves for maintenance which were set up in 1920 but which were eliminated or credited in 1921. There was, for example, a charge to equalization of maintenance of way in 1920 of \$1,212,936 and to equalization of maintenance of equipment, \$2,696,790. The inclusion of these reserves in the 1920 accounts increased the maintenance charges to the extent named and their being credited in 1921 reduced the 1921 accounts accordingly. This matter was pointed out in rather complete detail in the recent editorial review which appeared in these columns of the New York Central operations, so it is not necessary to enlarge upon the matter here except insofar as it is necessary to point out the effect on the 1921 income statement. Another factor of interest in the 1921 income account is the inclusion of a figure of \$621,874 representing additional compensation and adjustment of standard return under the contract with the director general for the operation of the property during federal control.

The Michigan Central did extremely well for the government during the period of federal control and this is the factor which emphasizes more than almost any other one thing the change in the fortunes of the road which was pointed out above. The road had a standard return of \$8,052,127 excluding the adjustments which were made later. In 1918 it earned for the government a net railway operating income of \$13,692,236. In 1919, when nearly every other road was doing the opposite, it increased this net to \$16,969,157. The figures for 1920 and 1921 were complicated by the debit in one year and the credit in the other of the charges for equalization of maintenance. In the December statement to the Interstate Commerce Commission, the figure for 1920 was \$4,395,633, and for 1921, \$15,403,271. Bearing in mind the amount of the equalization credits for the latter year, it appears, nevertheless, that the Michigan Central is on a very much different earning basis from that on which its standard return was based, which again goes to prove the point which was made above concerning this factor.

32.22 Per Cent Cut in Tonnage

The favorable result secured in 1921 was due primarily to the severe economies which were instituted in that period.

The road suffered during the year a reduction of 32.22 per cent in its revenue freight tonnage and an even greater reduction in its revenue ton mileage. Increased rates, however, compensated for this in a measure, but, nevertheless, the reduction in freight revenues was 17.18 per cent, and of total revenues, 16.95 per cent. Such improvement as was made during the year was the result of a decrease of 29.79 per cent in operating expenses, this figure being worked out with the elimination of the adjustments of the expenses for equalization of maintenance.

The tons of revenue freight carried during the year totaled 20,471,263 as compared with 30,203,776 in 1920, the reduction being 9,732,513, or, as above noted, 32.22 per cent. The reduction in tonnage was general. The most important elements in the road's traffic are products of mines and manufactures. Of the total tonnage in 1921, 9,476,640 was products of mines and 5,418,397, manufactures and miscellaneous. The bituminous coal tonnage makes up about one-half the total products of mines and in 1921, the figure of bituminous coal tonnage was 4,710,600, as compared with 8,174,625 in 1920. In other words, there was a falling off in bituminous coal tonnage of 3,464,025. The figure given above for manufactures and miscellaneous, 5,418,397, compared with 10,285,407 in 1920, and represented a reduction of 4,867,010. It is interesting at this point to indicate that the Michigan Central also has a large traffic in anthracite coal. In 1921 it carried 1,409,000 tons, received from connections at the Niagara Frontier.

Car Loadings Increase

This tonnage was slightly larger than the 1920 figure. These figures have an interest at present because it happens that the Michigan Central car loadings are running considerably better than they ran in the corresponding period of 1920. The increase has been shown in l.c.l. traffic and in manufactures. In other words, it reflects the reviving prosperity which has recently been characterizing the automobile business. It might be pointed out that the road originates only about one-half its total traffic and further, that its traffic received from connections has also been showing an encouraging betterment.

The freight revenues in 1921 totaled \$45,728,135 as compared with \$55,215,123 in 1920, a decrease of \$9,486,988. The total revenues for 1921 were \$72,911,852 as compared with \$87,790,799 in 1920, a decrease of \$14,878,947. This decrease compared with a reduction of \$16,809,927 in operating expenses.

Any analysis of operating expenses for the year 1921 is complicated by the maintenance equalization charges which have been mentioned several times previously. If the equalization charges are included, the figures show a reduction in operating expenses of \$24,588,614. They also show an operating ratio for 1920 of 87.87 and for 1921 of but 72.08. Excluding the equalization charges, however, we have the figure previously given and an operating ratio for 1921 of 77.38. This ratio is high, which makes one believe that the 1922 report of the Michigan Central should be able to show a marked improvement over 1921.

With further reference to the decrease in operating expenses it should be noted that there was a decrease of \$2,452,508 in maintenance of way and structures, but that there were sizeable increases in the primary accounts of ties, rails and other track material, which rather plainly indicates that such savings as were made were due to lower wages and

increased economy on the part of labor generally. The reduction in maintenance of equipment was \$5,797,600 and the 1921 figure was \$14,385,253. It appears that in this case the road made its principal savings largely because of locomotive and car repairs. There was, in fact, a reduction from \$6,367,461 in 1920 to \$4,502,434, or, \$1,865,027 in the primary accounts of repairs to locomotives. The charges of freight car repairs were decreased \$3,245,982, or, from \$9,061,387 in 1920 to \$5,815,405 in 1921. The final result is shown in a rather marked increase in the percentage of bad-order cars. The Michigan Central reported on May 15 a bad-order car percentage of 19.8 as against the country's average at that time of 14.7. This seems to indicate that operating expense accounts will probably have to reflect some rather heavy expenses in coming months for freight car repairs. The un-serviceable locomotive percentage on May 15

was 16.8 which is high but not as high as many other roads had reported.

The general thought with reference to Michigan Central would be that this property has become a prosperous part of the New York Central system. The thought would also be that if the road was able to meet such a large reduction in its operating revenues as it succeeded in meeting without particular difficulty in 1921, it should show a very interesting effect in 1922 in the form of a realization on the rapidly improving prosperity of the territory which it serves. This idea is further emphasized by the April report of earnings. For the month the road shows a net after rental of \$1,206,327 as compared with \$952,401 in April, 1921. For the four months, the net after rentals was \$3,784,616 as against \$2,318,211 in the first four months of 1921. For April this year the road operated at 74.1. for the four months, at 77.4.

Burlington Has Large Net After Extra Dividends

Dividend Payments Totaled \$44,925,917 of Which \$19,300,382
Were Paid from Year's Income

ONE OF THE MOST interesting features of American railway finance in 1921 was the attention given, in connection with the refunding of the Burlington joint 4½'s, to the unusual earning power of the Chicago, Burlington & Quincy. The recently issued annual report of the property puts this factor again in the foreground. In 1921 the Burlington carried 25.3 per cent fewer revenue ton-miles than it carried in 1920, in spite of which it was able to operate at a ratio of 76 per cent and to show an income balance, even after the large payments which were made in dividends, of \$6,014,948. It was the Burlington's extra dividend declarations in 1921 which enabled the Great Northern and Northern Pacific to maintain their dividends during that year. The Burlington was very much of an exception to its two proprietor lines. It also had a sharp falling off in traffic but was able to come through the year without this condition being reflected in its net. In fact, the opposite was the case because, by means of drastic reductions in operating expenses, the Burlington was able to show a much greater net from railway operations than it showed in 1920.

All of the large amount declared by the Burlington in dividends during the year was not charged to income account. A considerable portion was paid from surplus. The actual declarations were 2 per cent on the original capitalization of \$110,839,100. This capitalization was increased by a stock dividend of 54.13 per cent, or \$60,000,000, making the total stock outstanding \$170,839,100. On this new capitalization two dividends of 5 per cent were declared from income account and 15 per cent from surplus. This meant that the total dividends for the year were \$44,925,917, of which \$19,300,382 were paid from the income for the year, and \$25,625,535 from accumulated surplus.

The dividends declared in 1920 totaled \$8,867,128, and in 1920 the property had a surplus after dividends of \$13,826,158. In 1921 the dividends paid from income were, as already noted, \$19,300,382, and the road had a surplus for the year after dividends of \$6,014,948. This evidence of the Burlington's unusual strong financial and earning position adds little to what we already know about the property, except that in a measure it brings up to date some of the facts which were given prominence at the time the refunding of the Burlington bonds took place.

The Burlington's earning power is also shown in connection with the figure of net after rentals and the evidence is

that in spite of the sharp falling off in traffic in 1921, the Burlington was able to approach its pre-war level of net earnings. The Burlington had a standard return of \$33,360,683. During the period of federal control it earned for the government a net after rentals of about \$22,000,000 annually. In 1920 the adverse conditions permitted the road to earn a net after rentals of but \$8,100,104, inclusive of reserves. This figure in 1921 was changed to \$29,145,007. This means that the Burlington is again an exception from most of the roads in its territory. It is true that it did not suffer as severe a decrease in its traffic as some of its neighbor lines, but there was none of them which was able to make quite this exceptional and favorable showing.

Revenue Ton-Miles Decreased 25.3 Per Cent

The Burlington in 1921 carried 36,116,089 tons of freight, as compared with 47,233,256 tons in 1920. In other words, there was a reduction of 11,117,167 tons or 23.54 per cent. The 1921 revenue ton-miles totaled 10,554,788,351, a reduction from 1920 of 25.30 per cent. The decrease in freight revenues was, however, 15.66 per cent, the reason being an increase in the rate per ton-mile from 0.92 cents to 1.163 cents. It may be added that of the total tonnage of 36,116,089, the Burlington originated 26,416,793 tons. In 1921, as compared with 1920, the road carried considerably more grain and products of agriculture as a whole. The total grain tonnage in 1921, nearly all of which was originated on the Burlington's own lines, was 3,049,202 tons, or 73,951 cars. This grain constituted 8.44 per cent of the total 1921 tonnage and exceeded the 1920 traffic by 24.10 per cent. There was an increase also of 28.63 per cent in corn. The total products of agriculture made up 8,847,124, constituting 24.5 per cent of the total tonnage and being 3.64 per cent in excess of 1920. Another important Burlington traffic is live stock. The total traffic in products of animals in 1921 was 227,802 carloads of which 202,267 originated on the C. B. & Q. lines. The tonnage of 2,537,321 made up 7.03 per cent of the total tonnage and was 15.53 per cent less than in 1920. It is interesting to note that the larger part of the tonnage under the classification of products of animals was in live stock, there having been handled in 1921, 84,183 cars of cattle and calves, 13,759 of sheep and goats, and 82,532 of hogs. The Burlington is one of the largest carriers of live stock in the country.

Coal also constitutes a considerable share of the Burling-

ton's total tonnage. The 1921 figure was 251,933 cars—11,991,724 tons—or 33.2 per cent of the total tonnage. This was a reduction of 4,342,987 tons, or 26.59 per cent from 1920, which is of interest because the Burlington has been rather severely hit by the present coal strike. For the past several weeks it has been loading approximately 300 carloads of coal a week, whereas in the corresponding period of 1921 it was averaging from 3,500 to 4,000 cars weekly. The Burlington car loadings are showing the effect of the elimination of the coal traffic. Since the beginning of the strike the total loadings have been slightly below those of the corresponding weeks of last year. There has been a slight increase in grain traffic, a slight decrease in live stock, and a rather sizeable increase in merchandise and miscellaneous, which increase, however, has been more than balanced by the decrease in the coal tonnage. Presumably the road will be called upon later in the year to handle the coal tonnage which it is not now receiving. Should the coal finally begin to move about the same time as the harvested products, it will complicate matters somewhat.

The Burlington's freight revenues in 1921 totaled \$122,716,630 as compared with \$130,076,370 in 1920, there being a reduction of \$7,359,739, or 5.66 per cent. The total revenues for 1921 were \$168,712,268 as compared with \$185,270,768 in 1920, a reduction of \$16,558,500, or 8.94 per cent. The reduction in operating expenses was \$35,801,098, or 21.83 per cent. The annual operating expenses in 1921 were \$128,216,290 as compared with \$164,017,388 in 1920. The operating ratio in 1921 was 76.10. In 1920 the road operated at 88.52.

Coal Traffic Cut by Strike

It is hardly necessary to analyze the reasons for the reduction in operating expenses. It will be the usual story of rigid economy, decreased costs of fuel and other materials; it will reflect the decreases in wage rates which were made, as well as the reduction in overtime payments which was a typical feature on all roads in 1921. It may be noted, however, with reference to maintenance of way, that the road did not lay as much rail in 1921 as it did in 1920. The figure for 1921 was 281 miles of new 90-lb. and 100-lb. rail as against the 1920 figure of 340 miles. As concerns maintenance of equipment, it should be pointed out that the Burlington's percentage of bad order cars on May 1 was 9.1 and its percentage of unserviceable locomotives was 18.6. The bad order car percentage is not what the Burlington officers presumably would like it to be, but it is much below the country's average. The percentage of unserviceable locomotives was slightly below the country's average and the road had, on the date mentioned, 159 locomotives stored. The final result is that the 1922 operating expenses will presumably have to reflect increased charges for either repairs or retirements, but that there will probably be no difference so far as service is concerned.

To carry the figures of operating revenues and expenses further, it should be noted that net operating revenues in 1921 totaled \$40,495,978 as compared with \$21,253,380 in 1920, an increase of \$19,242,598. The figures of net after rentals have already been quoted. The point should be made in this connection that the Burlington in 1920 had a debit equipment rent balance of \$2,070,140, which had decreased in 1921 to a debit of \$598,330, a reduction of \$1,471,810. Similarly joint facility rents which in 1921 had a debit balance of \$1,009,017 were \$1,176,458 less. There was an increase of \$912,811 in taxes.

Operating Statistics

With the falling off in traffic it is natural that the road should have suffered a decrease in its revenue train load, revenue car load, etc. Its revenue train load in 1921 was 591 tons as against 661 tons in 1920. The revenue tons per

loaded car totaled 23.54 tons as against the 1920 figure of 24.86. This decrease was a familiar story on most roads in 1921, so the Burlington was able to continue its position as having one of the highest train loads in the western district. With the decrease in tonnage per train, there was an increase in average train speed from 10.8 miles in 1920 to 12.3 miles in 1921. The net ton-miles per train hour for the year averaged 8,861 as against 8,260 in 1920. There were very few roads in western territory that exceeded this figure. The miles per car per day in 1921 were 29.2 as compared with 32.1 in 1920, which reduction again was to have been expected because of the large proportion of idle cars.

The Burlington is another of those roads which has adopted the praiseworthy idea of showing in its annual report what it may be doing in the matter of purchasing new equipment, etc. The Burlington was allocated by the Railroad Administration 500 box and 1,000 gondola cars, and 15 heavy Mikado, 10 heavy Santa Fe, 10 six-wheel switching and 10 eight-wheel switching locomotives. In 1920 it supplemented these acquisitions by the purchase of 31 freight locomotives, 5 switching locomotives and 500 stock cars, a portion of which equipment was received during 1921. In 1921 there were orders placed for 40 freight locomotives, 95 passenger train cars and for 1,500 box, 500 automobile, 1,000 refrigerator, 500 stock and 2,000 coal cars. The Burlington also reported in 1921 various other improvements of which the most notable was with reference to the Chicago Union Station, in which the Burlington has one-quarter interest. There was a new locomotive terminal at Centralia, Ill.; work was carried on in connection with track elevation at Aurora, Ill., 66 miles of automatic block signals were installed, etc.

The Burlington earnings in 1922 will depend largely upon what finally develops in connection with the coal strike, for the reason that coal represents a rather important part of the Burlington business. In the first four months of 1922—which brings us up to the end of the first month since the beginning of the present coal strike—the road had a net after rentals of \$7,651,058 as against a 1921 figure for the same period of \$6,578,051. In April the road had an operating ratio of 79.90 and for the four months of 76.10.

Southern Pacific Protests Against Separation of C. P.

THE attitude of the Southern Pacific Company toward the dismemberment of its System by the recent order of the Supreme Court was made public this week in a long statement issued to the press by President William Sproule, the main portion of which is given below, supplemented by a statement from the Union Pacific.

Equities of the Southern Pacific's Position

The tentative grouping of the country's railroads by the Interstate Commerce Commission under authority granted by the Transportation Act provides the basis under which the Southern Pacific-Central system may be continued despite the decision of the Supreme Court. Although the Supreme Court's ruling carries the full weight of judicial authority on the issue before the court new constructive aspects of the subject have to be considered. The Supreme Court in passing upon the legal question involved presumably has not concerned itself with the possible consequences to follow from that decision under a law which is superseded by the Transportation Act, 1920, as to the railroads, whenever the Interstate Commerce Commission takes jurisdiction. The public have nothing to gain by breaking up these properties. It is not a question of unmerging two roads separately devel-

oped but afterward put together. The roads have developed into a single unit of growth and service throughout half a century. The great public interest is best served by recognizing that even a technical violation of the Sherman Act is of small detriment to the public when compared with the large and extended and convenient service given to that public by the present railroad system of the Southern Pacific Company under existing regulative control of the commissions, state and federal.

Continuing, Mr. Sproule says: "There seems, therefore, to be proper motive for direct appeal to these commissions to the end that power lodged in the Interstate Commerce Commission under the Transportation Act of 1920 be exercised to maintain the operations of this transportation system as a unit justified by the general experience of the people served; and if necessary for this purpose a new power might well be created by appropriate legislation.

"The Central Pacific has been leased to the Southern Pacific for 37 years, by unanimous vote of all the stockholders present or represented, who constituted more than five-sixths of the entire capital stock. The Southern Pacific has been the actual owner of the entire capital stock of the reorganized Central Pacific for 22 years. The Central Pacific and Southern Pacific were held in common ownership as early as October, 1870. The growth has been of one system and not two. It is and has been responsive to the needs of coast communities and producers. Whichever company could get the money most readily was the company in whose name the railroad lines were extended. The Central Pacific carried a heavy burden of debt to the government and the Southern Pacific had to come to its aid. Thus the two companies did what one company could not do under the circumstances of the time. * * * The only question of present interest to the public is whether or not the public is hurt by having this development done by a single control under two corporate names, instead of having it done by single control with a single corporate name. * * *

"The Transportation Act of 1920 is now the governing federal law for the railroads of the United States. It expressly provides that with consent of the commission it shall be lawful for two or more carriers by railroad to consolidate their properties into one corporation.

"The tentative grouping by the Interstate Commerce Commission tends to remedy the unfortunate legal situation presented by the Sherman Act standing alone. The grouping indicated by the commission provides the remedy by which one of the principal transportation systems of the nation need not be torn asunder. The government control of railroads has so increased and the policies of the government so changed since the suit in question was begun in 1914 that the situation needs to be dealt with in the light of present conditions and not the conditions that prevailed from 1895 to 1899. Every essential factor in the railroad business is supervised by commissions created to protect the general public interest. * * * We recognize that whatever is to the public interest in light of experience up to the present time is likely to prevail. * * *

Union Pacific Pleads for Its Pioneer Line

President C. R. Gray of the Union Pacific this week issued a statement calling attention to the fact that the Union Pacific and the Central Pacific, constituting the first trans continental line, were constructed under the Pacific Railroad Acts of Congress which provided for a continuous line of railroad from the Missouri River to the Pacific Ocean to be operated and used for all purposes of communication, travel and transportation, as far as the Public and Government are concerned, as one connected, continuous line. "They were operated under common control from 1901, when Mr. Harriman, for the Union Pacific, bought

control of the Southern Pacific, to 1913, when the Supreme Court decided that the control by the Union Pacific of the Southern Pacific was in violation of the anti-trust law, and required its release. The Union Pacific in that case sought to justify its control upon the ground that it had to buy the Southern Pacific in order to get control of the Central Pacific, and prevent discrimination against it by the Southern Pacific in favor of the latter's southerly line via New Orleans and Galveston. But the Supreme Court held this defense insufficient, and pointed out that under the Pacific Railroad Acts, discrimination against the Union Pacific, the owner of the line from Ogden to the Missouri River, by the westerly end of the line from Ogden to San Francisco, would be a violation of the acts under which the entire line was built, and observed that—"the obligation to keep faith with the Government continued, as did the legislative power of Congress concerning these roads, notwithstanding changed forms of ownership and organization." And the government proceeded, by the suit decided last week, to complete the job of making the first trans-continental line formed by these two links entirely independent, and free from rival control, which had only been partially accomplished by the decision in the Union Pacific case.

Continuing, Mr. Gray said:

"Although there was a clear recognition by the Supreme Court of the special interest of the Union Pacific in the Central Pacific, as the owner of one-half of the line built under the Pacific Railroad Acts, with the aid of government bonds and land grants, the Union Pacific, notwithstanding the policy of the Southern Pacific to favor the Southern Route, as stated by the supreme court decision, has refrained thus far from taking any part in the litigation between the government and the Southern Pacific. But we have been apprehensive that in case the Supreme Court should decide in favor of the Southern Pacific, it would yield to the temptation to route even more traffic in favor of its longer route through El Paso. This apprehension has been very greatly increased by the tentative consolidation plan promulgated by the Interstate Commerce Commission, leaving the Central Pacific with the Southern Pacific and providing for the merging of the Rock Island with the Southern Pacific.

"The interest and right of the Union Pacific is to see that the westerly half of the Federal railroad system from the Missouri River to the Pacific Ocean shall perform its share of the duties imposed by the Pacific Railroad Acts, which provide for the operation of said System as—'one connected continuous line'—without discrimination of one against the other by whomsoever operated * * * The Union Pacific is willing to buy the Central Pacific from the Southern Pacific, if fair and reasonable terms can be agreed upon. But it is not seeking to buy the Central Pacific, and it is not necessary for a compliance with the decree of the Supreme Court that it should. If the Central Pacific is to be merged into any System, by the Interstate Commerce Commission, it should be merged with the Union Pacific. * * * There is very active propaganda in California for the purpose of working up public sentiment, with the idea, presumably, of influencing the Interstate Commerce Commission to exercise some very doubtful power in the premises. * * * According to reports it has gone beyond the bounds of possibility in representing the alleged detrimental effect that would result from carrying out the Supreme Court decree. The rates would not be more, or the service less, if the Central Pacific were made an independent and competing line as ordered by the Supreme Court, and, as for the possibility of the Central Pacific being merged with the Union Pacific, no line has ever come under the control of the Union Pacific which has not been improved in service and facilities to the public, and there is no reason why the present instance should constitute an exception in this respect."

General News Department

President Harding signed the valuation bill, S. 539, on June 7.

The Twentieth Century Limited express train of the New York Central has now been running between New York and Chicago 20 years, and on the anniversary, June 15, the platform at the Grand Central Terminal, New York, leading from the concourse to the train, was covered with a red carpet and the passage decorated with trees and flowers.

The Central of New Jersey has been denied permission by the New Jersey State Board of Commerce and Navigation to construct a four-track, steel bridge across Newark Bay according to the plans submitted. It was the commission's opinion that the construction of such a bridge would interfere materially with the comprehensive port plan for the New York harbor that it is trying to put into execution. The City of Newark, N. J., is vitally interested in the development of a harbor and desires to see the bridge eliminated.

At a Grade Crossing near Atlantic City, N. J., on Saturday afternoon, June 10, a whole family—John H. Stratton, wife and four children—was killed when their automobile was struck by a train of the Pennsylvania Railroad. On Monday, the Board of Freeholders of the county, issued a "finding" to the effect that the responsibility for the deaths was chargeable to the railroad company and the Public Utilities Commission of the state. The finding stated that the Board, last November, adopted and sent to the authorities a resolution calling for the installation of a gate at this crossing.

Floods at Syracuse and other points in central New York on Sunday morning, June 11, were reported as doing damage amounting to \$1,000,000; and the tracks of the New York Central, about one mile east of the Syracuse station, where the line passes beneath the Erie Canal, was covered with six feet of water. Westbound passenger train No. 59 of the New York Central, the Western New York Express, leaving New York at 11:10 p. m., ten cars was stopped in this flood (before it had reached its height) and the passengers, said to have numbered 200, had to be taken out in boats and across improvised bridges, some of those from the sleeping cars dressing themselves after they had reached high land. They were taken in automobiles to hotels in the city.

Firemen's Brotherhood Condemns Harding

A resolution condemning President Harding and declaring that all members of the organization should work to prevent his re-election, was passed recently at the convention of the Brotherhood of Locomotive Firemen and Enginemen in Houston, Tex. The resolution says that Mr. Harding has in many ways shown himself to be a consistent and unrelenting enemy of organized labor in particular and of the working classes in general; and that when the train service employees had determined to exercise their economic power in resisting an entirely unjustifiable reduction in wages, he declared he would crush their organizations if they went on strike.

President Harding denies that he has ever made any suggestions as to a course of action to the Railroad Labor Board or any of its members. This was given out officially at the White House this week in reply to a question by a newspaper man as to whether the President intended to suggest further wage reductions to the board. It was stated that the President would like to have it known that the only message he has ever given to the board or to any of its members was last fall, when a strike was threatened, when the board was told that under the law it was expected to deal with the railroad labor situation; and that the government would support it with all the power at its command.

Wage Statistics for March

The Interstate Commerce Commission's summary of wage statistics for the month of March, 1922, shows an increase of 25,118, or 1.6 per cent, in the number of employees as compared with the number reported for February, 1922. Total compensation increased \$22,180,581, or 11.4 per cent, owing principally to the fact that there were 27 working days in March and only 23 in February.

Compared with those for February, 1922, the returns for March, 1922, indicate the following increases or decreases (D) by employee groups:

Executives, officials, and staff assistants.....	D96
Professional, clerical, and general.....	D673
Maintenance of way and structures.....	13,138
Maintenance of equipment and stores.....	7,933
Transportation (other than train, engine, and yard).....	1,056
Transportation (yardmasters, switch tenders, and hostlers).....	85
Transportation (train and engine service).....	3,605
Net increase.....	25,118

A comparison of the number of employees and their compensation, by months, for the period covered by the new classification follows:

Month	Number of employees	Total compensation
July, 1921.....	1,634,872	\$214,359,385
August, 1921*.....	1,679,927	227,745,895
September, 1921*.....	1,718,330	223,972,822
October, 1921*.....	1,754,136	237,602,959
November, 1921*.....	1,732,353	235,304,006
December, 1921*.....	1,637,151	214,921,396
January, 1922*.....	1,532,014	205,178,639
February, 1922*.....	1,545,400	194,523,427
March, 1922*.....	1,570,158	216,704,408

*Excludes Detroit, Toledo & Ironton Railroad.

Railway Earnings for April

The Interstate Commerce Commission's summary of revenues and expenses for Class I roads for April is as follows:

Item	April		Four months	
	1922	1921	1922	1921
Average number of miles operated.....	235,167.22	234,713.97	235,154.67	234,720.98
Revenues:				
Freight.....	\$288,848,724	\$304,773,803	\$1,214,184,485	\$1,235,067,976
Passenger.....	183,461,307	190,649,150	321,307,625	381,686,749
Mail.....	7,512,568	7,762,455	29,614,593	33,600,757
Express.....	13,053,662	9,217,858	35,233,667	27,101,568
All other transportation.....	14,364,463	12,263,243	52,679,002	50,337,227
Incidental.....	8,802,505	9,200,280	32,809,456	40,085,191
Joint facility—Cr.....	989,326	655,932	3,206,610	2,628,716
Joint facility—Dr.....	163,935	184,648	688,595	778,059
Railway operating revenues.....	416,868,620	433,398,073	1,688,406,843	1,769,730,125
Expenses:				
Maintenance of way and structures.....	59,122,465	59,998,686	207,602,342	236,128,651
Maintenance of equipment.....	96,038,448	101,420,846	387,726,060	441,068,964
Traffic.....	6,988,010	7,121,916	28,130,402	28,861,017
Transportation.....	157,672,060	188,828,167	669,923,654	822,738,452
Miscellaneous operations.....	3,734,699	4,078,972	14,699,746	16,821,523
General.....	13,060,140	14,889,968	52,767,920	59,155,619
Transportation for investment—Cr.....	437,400	641,843	1,750,079	2,088,845
Railway operating expenses.....	336,178,422	375,696,312	1,359,100,045	1,602,685,378
Net revenue from railway operations.....	80,690,198	57,701,761	329,306,798	167,044,747
Railway tax accruals.....	24,604,143	21,946,290	94,290,482	87,446,915
Uncollectible railway revenues.....	112,910	90,115	418,237	317,355
Railway operating income.....	55,973,145	35,664,956	234,598,079	79,280,477
Equipment rents—Dr. balance.....	4,344,331	4,283,592	17,746,546	15,165,059
Joint facility rent—Dr. balance.....	1,356,949	1,524,724	5,558,140	6,706,486
Net railway operating income.....	50,271,865	29,856,640	211,293,393	57,408,932
Ratio of expenses to revenues (per cent).....	80.44	86.69	80.50	90.56

†Includes \$2,533,597, sleeping and parlor car surcharge.

‡Includes \$2,748,698, sleeping and parlor car surcharge.

§Includes \$9,483,200, sleeping and parlor car surcharge.

¶Includes \$10,383,612, sleeping and parlor car surcharge.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.	Average mileage operated per period.	Operating revenues—			Operating expenses—			Operating ratio.	Net from railway operations.	Operating (or loss).	Net after rental.	Net after rental.
		Freight.	Passenger.	Total.	Way and equip- ment.	Mainten- ance of tracks.	Trans- portation.						General.	Total.
Chicago, Indianapolis & Louisville, Apr. 657	3,284,596	\$1,290,586	\$1,290,586	2,581,172	1,148,181	1,436,367	1,362,367	51.98	1,218,805	\$245,151	\$140,454	\$140,454
Chicago, Indianapolis & Louisville, Apr. 4 mos.	6,567,193	2,581,172	2,581,172	5,162,344	2,296,362	2,862,724	2,718,724	52.50	2,443,620	515,001	265,371	265,371
Chicago Junction & Louisville, Apr. 12	3,046,336	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	100.00	1,290,586	364,001	364,001	364,001
Chicago Junction & Louisville, Apr. 4 mos.	12,084,672	5,162,344	5,162,344	5,162,344	5,162,344	5,162,344	5,162,344	100.00	5,162,344	1,456,002	664,812	664,812
Chic. Milwaukee & St. Paul, Apr. 11,100	7,571,896	10,753,572	10,753,572	10,753,572	4,254,413	17,008,000	17,008,000	87.40	1,556,815	554,984	214,582	214,582
Chic. Milwaukee & St. Paul, Apr. 4 mos.	11,400	1,556,815	1,556,815	1,556,815	425,413	1,982,228	1,982,228	88.90	46,812	141,587	70,568	70,568
Chic. Peoria & St. Louis, Apr. 346	12,532,52	20,338	20,338	20,338	15,334	35,672	35,672	123.10	35,337	44,882	70,550	70,550
Chic. Peoria & St. Louis, Apr. 4 mos.	2,463,613	86,616	86,616	86,616	105,184	1,917,801	1,917,801	105.20	16,516	54,549	146,223	146,223
Chicago, Rock Island & Pacific, Apr. 7,661	5,910,498	2,056,348	2,056,348	2,056,348	8,778,927	11,237,949	11,237,949	165.16	3,001,918	246,233	7,822,873	7,822,873
Chicago, Rock Island & Pacific, Apr. 4 mos.	7,900	790,000	790,000	790,000	2,056,348	2,746,348	2,746,348	108.20	288,412	363,072	551,681	551,681
Chic. Rock Isl. & Gulf, Apr. 4 mos.	461	1,232,512	1,232,512	1,232,512	294,109	1,777,159	1,777,159	141.20	1,483,050	1,483,050	661,616	661,616
Chicago, St. Paul, Minn. & Omaha, Apr. 1,749	1,374,517	515,000	515,000	515,000	241,007	407,479	407,479	131.55	1,172,994	285,407	7,279,915	7,279,915
Chicago, St. Paul, Minn. & Omaha, Apr. 4 mos.	3,211	1,374,517	1,374,517	1,374,517	407,479	1,781,996	1,781,996	130.42	1,374,517	1,374,517	3,045,975	3,045,975
Cin. Indianapolis & Western, Apr. 321	2,910,789	483,028	483,028	483,028	43,981	70,887	70,887	104.86	134,373	19,428	282,514	282,514
Cin. Indianapolis & Western, Apr. 4 mos.	1,099	1,910,789	1,910,789	1,910,789	164,312	298,484	298,484	144.20	103,137	81,038	1,210,615	1,210,615
Colorado & Southern, Apr. 1,099	3,961,927	547,899	547,899	547,899	37,132	196,119	196,119	11.02	342,353	42,823	695,712	695,712
Colorado & Southern, Apr. 4 mos.	4,056	4,884,542	4,884,542	4,884,542	155,446	273,824	273,824	9.885	216,899	32,620	4,561,922	4,561,922
Ft. Worth & Denver City, Apr. 253	1,951,927	368,126	368,126	368,126	377,014	620,058	620,058	42.977	775,470	81,684	1,935,707	1,935,707
Ft. Worth & Denver City, Apr. 4 mos.	4	2,023,624	2,023,624	2,023,624	269,711	556,759	556,759	28.235	39,500	1,453,519	2,011,240	2,011,240
Wichita Valley, Apr. 256	64,918	20,389	20,389	20,389	18,038	5,321	5,321	25	39,500	1,453,519	2,011,240	2,011,240
Wichita Valley, Apr. 4 mos.	256	383,336	383,336	383,336	81,714	362,333	362,333	290	171,567	6,066	292,803	292,803
Columbus & Greenville, Apr. 226	325,338	111,202	111,202	111,202	112,766	135,235	135,235	108.80	22,469	77,940	100,546	100,546
Columbus & Greenville, Apr. 4 mos.	226	325,338	325,338	325,338	112,766	135,235	135,235	108.80	22,469	77,940	100,546	100,546
Delaware & Hudson, Apr. 887	1,164,185	273,614	273,614	273,614	475,196	766,515	766,515	43.925	291,319	5,709	140,168	140,168
Delaware & Hudson, Apr. 4 mos.	887	1,164,185	1,164,185	1,164,185	475,196	766,515	766,515	43.925	291,319	5,709	140,168	140,168
Delaware, Laek. & Western, Apr. 594	3,670,813	1,088,543	1,088,543	1,088,543	5,314,320	6,088,336	6,088,336	101.106	2,299,955	133,966	4,432,158	4,432,158
Delaware, Laek. & Western, Apr. 4 mos.	594	1,088,543	1,088,543	1,088,543	5,314,320	6,088,336	6,088,336	101.106	2,299,955	133,966	4,432,158	4,432,158
Denver & Rio Grande Western, Apr. 2,923	1,951,927	368,126	368,126	368,126	377,014	620,058	620,058	42.977	775,470	81,684	1,935,707	1,935,707
Denver & Rio Grande Western, Apr. 4 mos.	2,923	1,951,927	1,951,927	1,951,927	377,014	620,058	620,058	42.977	775,470	81,684	1,935,707	1,935,707
Denver & Salt Lake, Apr. 225	74,131,5	1,494	1,494	1,494	5,435,137	12,477,460	12,477,460	174.694	3,281,977	32,500	6,900,322	6,900,322
Denver & Salt Lake, Apr. 4 mos.	225	387,013	387,013	387,013	57,974	477,112	477,112	112.766	135,235	25,145	488,019	488,019
Detroit & Mackinac, Apr. 385	397,052	28,999	28,999	28,999	136,797	27,105	27,105	48.144	168,880	180,584	25,145	25,145
Detroit & Mackinac, Apr. 4 mos.	385	397,052	397,052	397,052	136,797	27,105	27,105	48.144	168,880	180,584	25,145	25,145
Detroit & Toledo Shore Line, Apr. 61	2,300,609	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	100.00	1,290,586	1,290,586	1,290,586	1,290,586
Detroit & Toledo Shore Line, Apr. 4 mos.	61	2,300,609	2,300,609	2,300,609	1,290,586	1,290,586	1,290,586	100.00	1,290,586	1,290,586	1,290,586	1,290,586
Detroit, Toledo & Ironton, Apr. 454	841,018	9,431	9,431	9,431	651,467	101,124	101,124	2,048	65,384	6,652	138,200	138,200
Detroit, Toledo & Ironton, Apr. 4 mos.	454	841,018	841,018	841,018	651,467	101,124	101,124	2,048	65,384	6,652	138,200	138,200
Duluth & Iron Range, Apr. 294	2,966,513	38,295	38,295	38,295	2,683,788	33,913	33,913	5,310	268,628	76,637	607,111	607,111
Duluth & Iron Range, Apr. 4 mos.	294	2,966,513	2,966,513	2,966,513	2,683,788	33,913	33,913	5,310	268,628	76,637	607,111	607,111
Duluth, Missabe & Northern, Apr. 309	1,233,246	45,538	45,538	45,538	187,350	138,544	138,544	3,664	166,024	17,080	493,971	493,971
Duluth, Missabe & Northern, Apr. 4 mos.	309	1,233,246	1,233,246	1,233,246	187,350	138,544	138,544	3,664	166,024	17,080	493,971	493,971
Duluth, South Shore & Atlantic, Apr. 591	2,441,258	199,403	199,403	199,403	384,127	533,018	533,018	12.872	615,648	78,931	1,631,517	1,631,517
Duluth, South Shore & Atlantic, Apr. 4 mos.	591	2,441,258	2,441,258	2,441,258	384,127	533,018	533,018	12.872	615,648	78,931	1,631,517	1,631,517
Duluth, Winnipeg & Pacific, Apr. 178	119,943	19,241	19,241	19,241	144,069	22,698	22,698	3,291	15,932	11,992	2,533,544	2,533,544
Duluth, Winnipeg & Pacific, Apr. 4 mos.	178	119,943	119,943	119,943	144,069	22,698	22,698	3,291	15,932	11,992	2,533,544	2,533,544
Elgin, Joliet & Eastern, Apr. 459	1,444,114	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	1,290,586	100.00	1,290,586	1,290,586	1,290,586	1,290,586
Elgin, Joliet & Eastern, Apr. 4 mos.	459	1,444,114	1,444,114	1,444,114	1,290,586	1,290,586	1,290,586	100.00	1,290,586	1,290,586	1,290,586	1,290,586
El Paso & Southwestern, Apr. 1,139	9,687,931	1,848,681	1,848,681	1,848,681	3,488,681	6,200,000	6,200,000	65.107	2,157,350	3,042,650	3,042,650	3,042,650
El Paso & Southwestern, Apr. 4 mos.	1,139	9,687,931	9,687,931	9,687,931	3,488,681	6,200,000	6,200,000	65.107	2,157,350	3,042,650	3,042,650	3,042,650
Erie, Apr. 2,039	4,886,235	1,070,636	1,070,636	1,070,636	6,507,059	7,181,561	7,181,561	540.442	13,294,243	1,155,272	26,262,495	26,262,495
Erie, Apr. 4 mos.	2,039	4,886,235	4,886,235	4,886,235	6,507,059	7,181,561	7,181,561	540.442	13,294,243	1,155,272	26,262,495	26,262,495
Chicago & Erie, Apr. 269	810,914	51,401	51,401	51,401	937,188	88,086	88,086	17,839	30,964	31,422	659,018	659,018
Chicago & Erie, Apr. 4 mos.	269	810,914	810,914	810,914	937,188	88,086	88,086	17,839	30,964	31,422	659,018	659,018
New Jersey & New York, Apr. 45	85,115	374,878	374,878	374,878	478,898	103,020	103,020	5,034	209,145	1,054	412,023	412,023
New Jersey & New York, Apr. 4 mos.	45	85,115	85,115	85,115	374,878	103,020	103,020	5,034	209,145	1,054	412,023	412,023
N. Y. Susquehanna & Western, Apr. 135	100,185	50,683	50,683	50,683	30,670	71,353	71,353	70.976	1,000	1,000	1,000	1,000
N. Y. Susquehanna & Western, Apr. 4 mos.	135	100,185	100,185	100,185	30,670	71,353	71,353	70.976	1,000	1,000	1,000	1,000
Florida East Coast, Apr. 764	8,042,962	327,364	327,364	327,364	1,543,838	151,087	151,087	10,300	390,433	26,903	8,066,288	8,066,288
Florida East Coast, Apr. 4 mos.	764	8,042,962	8,042,962	8,042,962	327,364	1,543,838	1,543,838	151,087	10,300	26,903	8,066,288	8,066,288
Pt. Smith & Western, Apr. 249	385,411	11,250	11,250	11,250	116,004	25,730	25,730	32,968	4,791	46,021	108,059	108,059
Pt. Smith & Western, Apr. 4 mos.	249	385,411	385,411	385,411	116,004	25,730	25,730	32,968	4,791	46,021	108,059	108,059
Galveston Wharf, Apr. 13	346,766	78,307	78,307	78,307	101,415	9,222	9,222	10,145	19,375	183,295	27,494	44,924
Galveston Wharf, Apr. 4 mos.	13	346,766	346,766	346,766	78,307	9,222	9,222	10,145	19,375	183,295	27,494	44,924
Georgia, Apr. 338	303,859	90,010	90,010	90,010	432,108	40,886	40,886	18,484	19,069	330,775	30,933	30,933
Georgia, Apr. 4 mos.	338	303,859	303,859									

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1922—(CONTINUED)

Name of road.	Average mileage operated during period.		Freighting.		Operating revenues.		Total income.		Maintenance of way and equipment.		Operating expenses.		General.	Total.	Operating ratio.	Net income railway operations.	Operating surplus (or loss).	Net after alterations, 1921.	Net after alterations, 1921.
	Apr.	4 mos.	Apr.	4 mos.	Apr.	4 mos.	Apr.	4 mos.	Apr.	4 mos.	Apr.	4 mos.							
Grand Trunk & Western	347	1,354,888	\$143,637	\$1,046,745	\$97,036	\$745,897	\$359,673	\$1,406,638	\$259,783	\$857,849	\$20,631	\$857,849	\$18,959	\$848,990	88.30	\$124,008	\$61,605	\$125,507	\$48,321
At. & St. Lawrence	166	94,318	33,160	142,729	44,774	45,372	1,027,741	1,027,741	1,027,741	1,115,543	2,145,457	2,145,457	1,439,9	2,299,691	156.00	79,877	-96,777	184,822	131,382
C. P. Det. & Canada (r. Tr. Jet)	50	179,170	6,686	194,403	12,889	1,248,9	12,889	1,248,9	1,248,9	3,584	34,874	3,584	34,874	86,095	44,720	107,408	100,161	74,388	8,869
Det. & St. Lawrence	59	232,378	34,138	180,473	45,266	55,362	143,572	263,922	15,506	143,572	15,506	143,572	15,506	304,073	84.20	84,550	77,617	16,455	231,347
Det. & St. Lawrence & Mich.	189	1,191,519	154,674	1,449,395	139,285	1,797,118	1,797,118	1,797,118	1,797,118	35,638	7,029,177	35,638	7,029,177	1,231,583	217,841	1,899,555	97,976	39,112	68,459
Green Bay & Western	26	78,175	17,176	99,785	23,805	20,194	513,310	1,190,201	85,312	2,272,887	88.10	3,074,805	799,186	4,106,447	96.10	9,875	1,745	1,416	2,078,488
Green Bay & Western	362	6,047,038	76,092	451,097	76,838	72,734	72,734	72,734	72,734	1,755,366	1,755,366	1,755,366	1,755,366	3,013,3	105,013	2,908,353	1,416	54,548	2,853,805
Gulf Coast Lines	90	347,038	148,754	848,130	149,915	125,627	27,892	27,892	27,892	27,892	27,892	27,892	27,892	336,000	67,892	343,892	315,932	91,730	97,730
Gulf & Ship Island	307	1,813,760	508,884	2,066,117	174,100	1,506,884	1,506,884	1,506,884	1,506,884	71,188	21,240	71,188	21,240	42,834	1,171,018	1,034,311	90,918	43,741	970,730
Gulf, Mobile & Northern	436	3,572,204	34,932	410,941	57,506	64,492	132,520	1,325,200	132,520	1,325,200	132,520	1,325,200	132,520	15,644	271,859	66.90	135,892	99,312	19,597
Hocking Valley	138	240,276	90,184	426,211	98,426	222,195	222,195	222,195	222,195	13,462	119,927	13,462	119,927	1,019,494	378,18	309,306	260,998	171,481	439,819
Hocking Valley	375	1,927,763	35,775	1,927,763	35,775	1,927,763	1,927,763	1,927,763	1,927,763	1,927,763	1,927,763	1,927,763	1,927,763	2,813,557	68.5	1,109,236	946,618	667,674	635,235
Illinois Central	474	54,542,556	4,755,099	53,786,128	9,731,247	758,000	16,750,923	1,238,927	34,100,982	75.20	11,281,714	1,309,521	13,091,521	7,044,015	41,432,440	7,044,015	24,344	1,766,895	2,809
Yates & Miss. Valley	181	116,938	292,901	1,526,099	371,294	298,380	26,970	62,274	185,869	145,944	27,332	185,869	27,332	185,869	90.40	145,944	27,332	185,869	2,809
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902	47,004	929,416	50.50	239,366	97,193	329,559	50.50	239,366	97,193	329,559	312,236
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International & Great Northern	1,150	878,874	196,977	1,229,382	169,024	225,740	26,370	518,902											

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1922—Continued

Table with columns: Name of road, Average mileage operated during period, Freight, Operating revenues, Total revenues, Maintenance of way and structures, Equipment, Operating expenses, Traffic, Trans-traffic, General, Total, Operating ratio, Net from way operation, Operating income (for loss), Net after rentals 1921, Net after rentals 1922.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.	Average mileage carried during period.		Operating revenues		Maintenance of way and equip-ment		Operating expenses		Total.	Operating ratio.	Net from railway operations.	Operating income (or loss).	Net after rentals 1921.	Net after rentals 1922.
	Apr.	4 mos.	Freight.	Passenger.	Total.	Structures.	Equip-ment.	Traffic.							Trans-shipment.	General.
Long Island	Apr. 398	1,570,374	\$790,374	\$1,345,300	\$2,135,674	\$284,381	\$401,024	\$15,063	\$1,027,522	\$52,791	\$1,800,970	\$340,130	\$132,981	\$330,254
4 mos.	3,98	6,285,003	3,877,583	4,737,437	8,615,020	1,003,630	1,619,351	56,789	4,130,270	2,271,211	7,106,478	84,840	1,054,522	760,469
Md. Delaware & Va.	Apr. 8	63,417	30,439	87,547	103,661	17,361	24,468	1,174	52,553	2,246	90,722	10,720	4,426	7,296
4 mos.	31	268,844	129,229	280,329	309,664	36,196	102,206	3,477	203,340	19,159	349,157	40,228	6,913	33,245
New York, Phila. & Norfolk	Apr. 12	478,578	75,042	597,914	61,196	171,256	7,995	293,138	15,420	354,622	92,940	45,239	28,812	16,428
4 mos.	112	1,895,003	374,851	2,127,520	212,250	621,853	2,077	1,080,212	43,997	1,468,212	187,940	84,500	50,950	33,550
Pitts. Cin. Chic. & St. Louis	Apr. 2,115	2,709,134	1,589,937	2,908,631	4,498,568	2,669,387	8,241,402	436,250	2,140,310	8,202,520	29,850	1,165,266	888,936	6,067,776
4 mos.	19	59,852	17,822	77,674	13,129	38,053	77,136	474	259,138	36,616	411,431	190,719	152,679	30,759
West Jersey & Seashore	Apr. 359	1,404,583	1,847,316	3,555,660	602,223	793,983	57,828	1,816,100	105,080	1,018,464	94,300	136,196	10,043	48,057
4 mos.	1,19	5,985,221	7,829,239	16,584,889	2,350,000	3,010,000	213,129	5,644,348	83,410	6,478,458	81,800	23,552	3,012	21,750
Peoria & Pekin Union	Apr. 19	59,852	17,822	77,674	13,129	38,053	77,136	474	259,138	36,616	411,431	190,719	152,679	30,759
Pere Marquette	Apr. 2,222	2,300,432	3,717,260	3,018,248	3,388,195	687,768	1,026,768	59,919	1,182,413	101,124	2,586,973	78,530	847,352	399,646
4 mos.	2,22	9,101,893	14,715,566	11,502,681	14,026,189	21,600,189	32,160,189	212,696	4,820,448	413,124	10,413,248	54,400	2,083,832	1,222,200
Philadelphia & Reading	Apr. 1,127	3,109,639	3,130,317	2,731,610	2,912,650	6,850,361	21,834	21,834	5,899,193	4,859,702	92,491	897,158	2,083,832	92,491
4 mos.	1,127	12,439,639	12,521,639	10,925,610	11,650,650	47,337,361	87,516	87,516	218,776	187,702	4,062,876	161,300	4,906,176	161,300
Pittsburgh & West Virginia	Apr. 85	132,615	11,184	175,559	26,343	38,567	27,743	45,945	14,747	136,160	13,730	39,399	13,730	60,052
4 mos.	315	797,425	37,942	960,244	97,805	309,171	13,326	234,101	66,420	755,464	78,700	204,680	10,421	268,355
Pittsburgh, Shawmut & Northern	Apr. 210	52,648	7,812	60,460	6,170	10,932	1,312	169,000	30,292	430,753	116,360	61,901	70,831	10,812
4 mos.	101	38,437	5,636	44,073	3,759	5,719	783	10,932	2,107	88,352	44,289	9,913	6,311	16,049
Quincy, Omaha & Kansas City	Apr. 237	209,839	64,740	336,073	119,934	167,916	6,588	169,593	5,095	367,517	109,400	31,444	47,166	63,119
4 mos.	1,127	805,609	243,200	1,048,809	150,150	220,000	26,426	646,658	89,306	517,747	51,885	43,480	36,584	115,558
Richmond, Frederickburg & Potomac	Apr. 417	505,244	333,220	996,260	95,150	147,926	1,214	20,813	6,465	89,306	237,800	51,747	51,885	43,480
4 mos.	1,127	1,991,722	1,278,276	3,436,497	328,858	484,144	29,415	1,238,590	106,391	2,388,720	66,600	1,147,727	961,866	273,074
Rutland	Apr. 415	262,492	117,787	477,340	86,587	86,587	7,228	210,141	12,439	404,358	84,000	73,282	52,950	94,233
4 mos.	1,127	1,026,156	457,492	1,810,186	90,719	90,719	30,059	83,317	2,814,555	851,631	4,814,457	1,594,334	1,946,720	801,958
St. Louis-Sao Francisco	Apr. 4,760	17,450,014	5,439,252	24,625,288	3,172,608	4,816,822	330,013	9,403,826	760,665	18,989,155	74,720	6,227,133	4,926,612	5,095,629
4 mos.	4,760	69,808	27,108	96,972	44,311	21,989	26,229	48,980	5,753	122,956	26,740	29,296	36,485	29,716
Ft. Worth & Rio Grande	Apr. 235	250,870	103,609	394,372	164,660	88,630	10,747	20,480	22,783	489,354	133,200	95,582	111,464	168,007
4 mos.	1,127	1,026,156	457,492	1,810,186	90,719	90,719	30,059	83,317	2,814,555	851,631	4,814,457	1,594,334	1,946,720	801,958
St. Louis, San Fran. & Tex.	Apr. 134	424,330	14,950	124,775	35,697	24,031	14,622	55,645	6,788	126,043	101,700	78,080	48,867	30,329
4 mos.	1,127	1,700,150	58,067	507,550	155,741	98,321	36,279	220,777	26,850	469,600	96,360	117,168	91,402	103,825
St. Louis Southwestern	Apr. 368	1,183,385	121,715	1,325,872	182,900	237,149	46,750	237,149	106,750	420,000	100,000	100,000	100,000	100,000
4 mos.	1,127	4,739,385	486,847	5,226,232	728,861	973,149	186,750	728,861	303,543	1,303,543	165,600	165,600	165,600	165,600
St. Louis Southwestern of Tex.	Apr. 807	385,609	84,847	517,130	238,861	163,139	20,145	287,906	30,399	739,107	142,900	222,071	246,110	128,198
4 mos.	3,107	1,561,636	329,659	1,891,295	268,861	363,139	80,565	1,117,906	136,200	1,254,106	136,200	136,200	136,200	136,200
San Antonio & Aransas Pass	Apr. 739	345,663	59,810	435,121	94,305	117,229	9,786	215,571	27,065	462,815	106,300	27,694	4,200	68,722
4 mos.	2,817	1,388,562	235,580	1,606,347	369,305	473,493	37,779	821,845	101,045	1,800,799	112,100	194,142	53,867	27,418
San Antonio, Uvalde & Gulf	Apr. 319	297,895	16,437	314,332	10,516	10,516	1,692	136,640	29,551	275,311	80,500	54,996	30,293	7,951
4 mos.	1,127	1,190,150	64,337	1,254,487	42,000	42,000	6,720	259,138	6,720	315,858	101,000	66,776	30,329	37,418
Seaboard Air Line	Apr. 1,563	2,550,691	672,988	3,814,244	375,610	565,686	198,743	1,608,992	152,076	2,870,925	75,200	941,920	763,241	541,508
4 mos.	3,563	10,206,113	3,224,111	14,936,710	1,506,955	2,598,624	408,600	6,527,992	601,673	11,373,556	80,800	2,841,832	2,281,832	1,430,604
Southern	Apr. 6,971	7,396,346	2,999,659	10,491,106	1,575,555	1,912,385	204,030	4,614,637	332,426	8,108,237	77,300	2,382,885	1,898,317	1,570,770
4 mos.	6,971	29,808,563	9,269,659	39,076,977	5,723,395	7,381,657	820,423	16,316,851	1,312,299	33,198,981	80,200	7,884,996	6,072,246	4,830,335
Alabama Great Southern	Apr. 318	629,000	124,367	808,026	83,764	174,972	11,864	299,017	25,586	599,066	74,200	200,160	158,462	148,483
4 mos.	1,127	2,496,000	496,916	3,000,000	330,000	430,000	45,720	1,176,055	117,136	2,358,919	275,904	195,057	215,731	233,538
Cin. New Orleans & Tex. Pac.	Apr. 308	2,422,584	1,042,556	3,465,140	595,994	1,441,310	106,689	1,930,430	167,381	4,292,955	77,600	72,801	58,160	65,149
4 mos.	1,127	9,700,000	4,170,000	13,870,000	2,390,000	5,830,000	420,000	7,360,000	670,000	15,730,000	300,000	280,000	220,000	250,000
Georgia Southern & Florida	Apr. 402	2,714,044	409,096	67,042	70,840	8,539	170,381	119,948	331,295	1,119,948	81,000	77,801	58,160	65,149
4 mos.	2,072	10,870,000	1,620,000	1,559,641	260,590	722,910	35,538	683,292	49,915	1,114,057	84,200	24,584	182,474	97,490
New Orleans & Northeastern	Apr. 207	3,762,880	82,263	5,133,727	70,863	122,230	10,939	219,860	17,358	1,141,000	101,000	135,000	131,000	131,000
4 mos.	2,072	15,355,995	297,415	20,323,928	273,671	406,138	44,981	923,260	67,310	1,735,931	85,000	201,500	131,167	92,653
Northern Alabama	Apr. 110	99,626	10,223	109,849	4,508	2,415	5,160	143,080	11,552	244,408	68,700	133,220	117,000	15,024
4 mos.	440	399,626	40,223	439,849	18,032	24,150	20,640	81,380	46,520	290,928	274,000	343,000	353,000	484
Southern Pacific	Apr. 7,117	8,794,480	3,516,885	13,819,472	1,298,590	2,478,602	239,046	4,713,994	416,051	10,025,100	77,400	13,633,501	6,208,637	2,249,900
4 mos.	7,117	34,329,472	13,447,085	51,525,231	7,691,218	12,525,231	934,572	18,745,870	1,680,329	39,917,300	77,400	11,500,000	6,167,782	8,145,720
Arizona Eastern	Apr. 382	226,701	27,321	268,000	30,567	24,423	2,275	60,236	18,015	145,415	54,300	122,586	99,700	86,162
4 mos.	3,822	731,037	113,296	844,891	109,609	105,794	11,738	264,697	78,076	572,848	54,300	135,536	120,500	100,723
Atlantic S. Lites.	Apr. 382	226,701	27,321	268,000	30,567	24,423	2,275	60,236	18,015	145,415	54,300	122,586	99,700	86,162
4 mos.	3,822	902,667	113,554	1,016,221	120,500	100,723	11,738	264,697	78,076	572,848	54,300	135,536	120,500	100,723
Atlantic S. Lites.	Apr. 382	226,701	27,321	268,000	30,567	24,423	2,275							

Further Cuts in Wages

The Railroad Labor Board this week announced reductions effective July 1, 1922, in the wages of clerical and station forces; signal department employees, stationary engine and boiler room employees, etc. The decreases announced were as follows in cents per hour: Switchboard operators are guaranteed \$85 per month; those receiving lower rates are not to be reduced.

ARTICLE II—CLERICAL AND STATION FORCES

- Sec. 1. Storekeepers, assistant storekeepers, chief clerks, foremen, subforemen, and other clerical supervisory forces.....3 cents
- Sec. 2. (a) Clerks with an experience of two or more years in railroad clerical work, or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than two years.....3 cents.
- (b) Clerks with an experience of one year and less than two years in railroad clerical work, or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than one year.....4 cents.
- Sec. 3. (a) Clerks whose experience as above defined is less than one year.....4 cents.
- (b) Clerks without previous experience heretofore entering the service will be paid a monthly salary at the rate of \$60 per month for the first six months, and \$70 per month for the second six months.
- Sec. 4. Train and engine crew callers, assistant station masters, train announcers, gatemen and baggage and parcel room employees (other than clerks).....3 cents.
- Sec. 5. Janitors and elevator operators, office, station and warehouse watchmen and employees engaged in assorting way bills and tickets, operating appliances or machines for perforating, addressing envelopes, numbering claims and other papers, gathering and distributing mail, adjusting telephone cylinders and other similar work.....4 cents.
- Sec. 6. Office boys, messengers, chore boys and other employees under eighteen years of age, filling similar positions and station attendants.....4 cents.
- Sec. 7. Station, platform, warehouse, transfer, dock, pier, store room, stock room and team track freight handlers or truckers and others similarly employed.....4 cents.
- Sec. 8. The following differentials shall be maintained between truckers and the classes named below:
 - (a) Scalers, scalers and fruit and perishable inspectors, one cent per hour above truckers' rates as established under Section 7.
 - (b) Stowages or shovers, callers or loaders, locators and coopers, two cents per hour above truckers' rates as established under Section 7. The above shall not operate to decrease any existing higher differentials.
- Sec. 9. All common laborers in and around stations, storehouses and warehouses, not otherwise provided for.....4 cents

ARTICLE VIII—STATIONARY ENGINE (STEAM) AND BOILER ROOM EMPLOYEES

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

- Sec. 1. Stationary engineers (steam).....2 cents.
- Sec. 2. Stationary firemen and engine room boilers.....2 cents.
- Sec. 3. Boiler room water tenders and coal passers.....2 cents.

ARTICLE IX—SIGNAL DEPARTMENT EMPLOYEES

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

- Sec. 1. Signal foremen, assistant signal foremen, and signal inspectors, No reduction.
- Sec. 2. Leading maintainers, gang foremen, and leading signalmen, 5 cents.
- Sec. 3. Signalmen, assistant signalmen, signal maintainers, and assistant signal maintainers.....5 cents.
- Sec. 4. Helpers.....6 cents.

ARTICLE X—FLOATING EQUIPMENT EMPLOYEES

All disputes remanded to interested parties.

ARTICLE XI—OTHER SUPERVISORY FORCES

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

- Sec. 1. Train dispatchers.....No reduction.

ARTICLE XII—MISCELLANEOUS EMPLOYEES

The same ruling is to apply as in Decision 147, namely:

- Sec. 1. For miscellaneous classes of supervisors and employees in the heretofore named departments properly before the Labor Board and named in connection with a carrier affected by this decision, deduct an amount equal to the decrease provided for the respective classes to which the miscellaneous classes herein referred to are analogous.
- Sec. 2. The intent of this article is to extend this decision to certain miscellaneous classes of supervisors and employees submitted by the carrier not specifically listed under any section in the classified schedules of increases and decreases for such employees in the same amount as provided in the schedule of decreases for analogous service.

DAMAGE to the amount of \$1,925 will be asked by the Southern Pacific in a suit which it has entered in the Superior Court at Los Angeles, Cal., against Coe & Whitaker, proprietors of a motor truck, for crashing into a locomotive and derailing its tender, on April 9, last.

Traffic News

The Canadian Government has advised the United States Government that it does not regard the present as an opportune time to negotiate a treaty looking to the improvement of the Great Lakes-St. Lawrence waterway.

The Railroad Commission of Georgia has ordered a general reduction of ten per cent in freight rates, to go into effect on July 1, the date when interstate rates are to be reduced by the similar order of the federal commission.

The Southern Pacific reports the shipment recently from Nogales, Arizona, of 92 cars of garbanzos (Mexican beans) with an average load of 75,296 lbs. per car. The cars were loaded to 102.62 per cent of their rated capacity.

Charles L. Cable, superintendent of Public Works of the State of New York, reports that the traffic on the main line of the Barge Canal, Buffalo to Albany, has thus far been more than three times the volume of traffic in the same month last year.

Live stock shipped from Montreal to Liverpool in the past season totaled about 5,000 head. It is said that most of these animals came from points in the United States, and that Chicago shippers are preferring this route for freight formerly sent via New York.

Five cars of machinery—a turbo-generator, including one piece, on one car, weighing 54 tons—shipped by D. P. Robinson & Co. from Schenectady, N. Y., on April 27 were moved to New Orleans, La., in seven days; and, deducting a delay due to a crippled car, made the journey of 1,643 miles in 5 days, 6 hours, equal to 313 miles a day or 13 miles an hour. The route was the New York Central and the Big Four to Indianapolis, 716 miles and thence by the Illinois Central and the Y. & M. V. to destination, 927 miles.

The "National Travelers' Protective Association" held its annual convention at Atlantic City, N. J., last week and elected the following officers: President, H. L. Ramey, Champaign, Ill.; vice-presidents, G. Armour, E. L. Kerley, J. Adcock, H. L. Scarborough, and G. E. Brown. The secretary and treasurer is T. S. Logan, St. Louis, Mo. The next convention is to be held at St. Paul, Minn. Resolutions adopted by this body refer to the Interstate Commerce Commission as an "oligarchy that is repugnant to a free people." The convention asked Congress to reinvest state railroad commissions with "full power" to deal with transportation, and to order the discontinuance of the 50 per cent surcharge on passengers riding in sleeping and parlor cars.

Scott Describes Effect of Hoch Bill

Enactment of the Hoch bill would bring about chaos in the rate structure of the nation that would require 10 years to remedy. This was the gist of a statement of Bruce Scott, general solicitor of the Chicago, Burlington & Quincy, before the House Interstate and Foreign Commerce Committee, which is conducting hearings on the bill. The bill would amend the Transportation Act so as to limit the jurisdiction of the Interstate Commerce Commission over intrastate rates where they discriminate against interstate commerce. One proviso in the bill would reopen all cases that have already been decided by the Interstate Commerce Commission involving the question of discrimination by intrastate rates, and would necessitate the commission making new orders in all of those cases. The proper procedure is through the courts. Under this bill, in order to show that rates fixed by state commissions discriminate against interstate commerce, it would be necessary for either the railroads or the shipper to prove them confiscatory; but it is a difficult job for the carrier to prove that a rate is confiscatory and it is absolutely impossible for a shipper to do so.

In response to an inquiry by Representative Newton of

Minnesota, Mr. Scott said the Hoch bill, as it stands now, would nullify the so-called Shreveport case in which the Supreme Court in effect held that the Interstate Commerce Commission has jurisdiction over intrastate rates where they discriminate against interstate commerce.

Replying to statements made by the governor of Iowa and other witnesses who appeared recently before the committee in support of this bill, and who said that they came to Washington to get relief from existing freight rates, Mr. Scott said that Iowa at all times has had full control over rates within that state, and only recently reduced rates on coal and certain other commodities.

Coal Production

Recovering from the holiday depression, the production of soft coal in the tenth week of the strike is expected to pass 5,000,000 tons. Production of anthracite, however, remains practically zero, according to the weekly bulletin of the Geological Survey. In the ninth week of the strike (May 29-June 3) the combined effect of the Memorial Day holiday and of a pay day reduced production of bituminous coal to 4,623,000 tons. The quantity of all coal raised was 4,631,000 tons. A year ago production, including anthracite, was 8,400,000 tons; in the year before that, 11,100,000 tons, yet in neither of the years preceding was the output at this season normal, for in 1921 the business depression was at its acute stage, and in 1920 the market demanded more coal than could be delivered.

On Monday of last week (June 5) loadings were only 14,576 cars, but on Wednesday loadings passed the 16,000-car mark, for the first time since the strike began.

The largest elements in the increase appear to be heavier shipments from the Connellsville region, from eastern Kentucky and Tennessee, and from the New River district. The accumulation of unbilled coal at the mines has fallen rapidly during the last week.

Ship Subsidy Bill Revised

The administration's ship subsidy bill, which has been the subject of extensive hearings before a joint committee of the House and Senate has been redrafted by a sub-committee and the modified form of the bill was reported to the House on June 14, where strenuous efforts will be made by the administration to have it passed at once. President Harding has indicated that if the bill is not passed at this session he will immediately call Congress into extra session to consider the bill. A statement by Representative Edmonds, chairman of the sub-committee which revised the bill, explains the provisions relating to relations with the railroads as follows:

It is endeavored in the bill to bring about an understanding between the Interstate Commerce Commission and the United States Shipping Board by arranging for a joint committee to clarify the situation in regard to through freight, so that something approaching the correlation between rail and water carriers in foreign countries can be covered in this country by our connecting rail and water lines.

The bill also clarifies the Interstate Commerce Act by describing under what conditions a railroad can become interested in vessels.

It also arranges to enlarge the powers given the board by the shipping act of 1916 in Section 15 so that a thorough record of agreements between shipping companies, or between shipping companies and other carriers, shall be subject to the approval of the board; this covers all common carriers by water and includes the Coastwise business. This section is subject to a heavy penalty for violation.

In order to make Section 28 of the merchant marine act, 1920, operative the bill has clarified the section, and it is believed that all delay in placing this section in operation should now be eliminated. As this gives preferential railroad rates to American vessels it will go a long way in assisting in securing cargo both of imports and exports for American ships.

It is provided in the amendment to Section 28 that the Shipping Board and the Interstate Commerce Commission have the power jointly to suspend the application of the provisions of this section when in their judgment it would operate to the prejudice of any particular port.

Commission and Court News

Interstate Commerce Commission

The commission has ordered oral argument before the full commission at Washington on July 6 in the investigation of the cost of locomotive repairs on the Central of New Jersey.

The commission has suspended until October 8, the operation of schedules which propose to reduce the charges of the Missouri Pacific on lumber held for reconignment at Dupon Ill., from \$7 a car to \$3.

The commission has suspended until October 8, the operation of certain schedules which propose to increase and reduce the rates on petroleum from Texas points to Colorado points on the Denver & Rio Grande Western.

The commission has issued a report finding justified reductions in the rates on grain and products from Illinois Central stations in northern Illinois to New Orleans for export to Europe. The order of suspension has been vacated.

The commission on petition filed by the Western railroads for a modification of its order, has reopened the western freight rate case involving grain, grain products and hay on the question of the relation of rates on wheat and other grains and their products between points in the western and the western and mountain-Pacific districts.

The commission has made public a tentative report by Examiner Bartel as a result of its investigation concerning the propriety of rates on bunker coal which are lower than rates on similar kinds of coal for local delivery. It recommends a finding that the railroads have justified the propriety of the application of the rates on coal for trans-shipment to vessels on bunker coal and that such rates do not contravene the fourth section of the commerce act.

Reduced Rates to Be Effective on Three Days' Notice

The commission has issued orders giving special permission to make the 10 per cent reduction in freight rates, to go into effect on July 1, on three days' notice. The original report had prescribed ten days' notice. These orders also waive various provisions of the tariff regulations to permit making the rates effective on short notice and in as inexpensive a manner as possible by the use of tariffs of reduced rates and special connecting link supplements referring to the tariff of reduced rates to be filed in the form shown in the exhibits attached to the orders.

Delivery of Perishable Freight at New York City

The commission has investigated the situation at the terminals of the Pennsylvania in New York City, in connection with the embargo on potatoes, which last week was suspended, at the request of the commission, and decides that no embargo is justified. The director of the Bureau of Service reports to the commission that the congestion of perishable freight has not been of sufficient extent or duration to warrant an embargo; that there is no congestion whatever at present; that the Pennsylvania pier facilities at New York where perishable freight is handled are inadequate to handle the arrivals during a 48-hour period in one day, but are adequate to care for each day's arrivals correctly, and that the receivers of perishable freight can overcome much of the congestion and delay by removing all of their freight from the piers during the first 24 hours after arrival.

The railroad company denies the claim of the merchants that to have the potatoes unloaded at Kearney, N. J., and truck them to New York would increase the ultimate cost of transportation; and claims that for some parts of Manhattan the cost would probably be reduced. The embargo was placed on potatoes as being the least perishable of the various fruits and vegetables which come to piers 28 and 29.

Equipment and Supplies

Locomotives

THE CHICAGO & EASTERN ILLINOIS, reported in the *Railway Age* of May 27 as inquiring for six Pacific and ten Mikado type locomotives, is expected to order same in about a week.

E. ATKINS & COMPANY (Cuba) have ordered 2 Mogul type locomotives from the American Locomotive Company. These locomotives will have 16 in. by 24 in. cylinders and a total weight in working order of 85,000 lb.

THE OSCEOLA CYPRESS COMPANY, Osceola, Fla., has ordered 1 Mogul type locomotive from the American Locomotive Company. This locomotive will have 18 in. by 24 in. cylinders and a total weight in working order of 111,000 lb.

THE SOUTH SAN FRANCISCO BELT LINE has ordered 1 six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 20 in. by 26 in. cylinders and a total weight in working order of 141,000 lb.

THE HAMMERMILL PAPER COMPANY, Erie, Pa., has ordered 1 four wheel switching locomotive from the American Locomotive Company. This locomotive will have 16 in. by 24 in. cylinders and a total weight in working order of 99,000 lb.

NORTON GRIFFITH & Co. (Inspectoria Federal Brazil) have ordered 3 four-wheel switching locomotives from the American Locomotive Company. These locomotives will have 9 in. by 14 in. cylinders and a total weight in working order of 29,000 lb.

THE MANSFIELD SHEET & TIN PLATE COMPANY, Mansfield, Ohio, has ordered 1 four-wheel switching locomotive from the American Locomotive Company. This locomotive will have 14 in. by 22 in. cylinders and a total weight in working order of 79,000 lb.

Freight Cars

THE CHICAGO GREAT WESTERN is inquiring for repairs to 200 stock cars.

THE PHILADELPHIA & READING is inquiring for 1,000 gondola cars of 70-ton capacity.

THE NORFOLK & WESTERN is inquiring for 1,000 single-sheathed box cars of 50-ton capacity.

THE NEW YORK CENTRAL has ordered about 975, 55-ton all steel hopper car bodies from the American Car & Foundry Company.

THE BUFFALO & SUSQUEHANNA, reported in the *Railway Age* of June 1 as inquiring for 100 gondola car bodies is now inquiring for 200, 55-ton hopper car bodies.

THE CHICAGO & EASTERN ILLINOIS contemplates the purchase of a number of baggage cars. It has not been decided if or when bids will be sent out for this equipment.

THE NORTHERN PACIFIC, reported in the *Railway Age* of May 6 and 13 as inquiring for 1,750 cars of various types, is expected to order new equipment by the end of this week.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of May 13 as inquiring for repairs to 4,000 cars, has contracted with the Pullman Company for repairs to 800 box cars and is expected to order repairs to the remainder late this week.

THE WESTERN PACIFIC, reported in the *Railway Age* of June 10, as contemplating the purchase of a large number of refrigerator cars is now figuring on 2,000 such cars, 150 of which are to be equipped for passenger train service.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of May 6 as inquiring for 700 box cars of 40 tons' capacity has ordered this equipment from the Standard Tank Car Company, Sharon, Pa. The company will also have repairs made to about 750 cars.

Supply Trade News

R. A. Dennis has been appointed manager of the railroad department of the **Pierce Oil Corporation**, New York. Mr. Dennis' office is at 420 Olive street, St. Louis, Mo.

N. R. Seidle has resigned as assistant general manager of the Charles G. Heggie Company, Joliet, Ill., to become works manager of the **General Boilers Company**, Waukegan, Ill.

M. A. Evans has opened an office at 1416 Lytton bldg., Chicago, to act as a manufacturers agent in the handling of various railway supplies. Mr. Evans has been in the railway supply business for 12 years, the last six of which were spent in the service of the Buda Company.

The **Fibre Conduit Company**, Orangeburg, N. Y., has acquired the plant of the American Fibre Conduit Corporation, at Fulton, N. Y., and the conduit manufacturing business of the Johns-Mansville, Incorporated, at Lockport, N. Y., and has appointed **Johns-Mansville, Incorporated**, New York, as sales agent for its products.

The **E. H. Welker Company, Inc.**, 222 W. Larned street, Detroit, Mich., will in the future represent the **George Oldham & Son Company**, Baltimore, Md., in the state of Michigan and the city of Toledo, Ohio, and **J. A. Meredith** will represent this company in the Pittsburgh district with office at 2138 Oliver building. Both the Detroit and Pittsburgh offices will be factory branches and will carry in stock a complete line of the company's pneumatic equipment.

Elliott E. Nash, vice-president and general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has resigned, effective June 15, to become western representative of the American Locomotive Company, with headquarters at Chicago. Mr. Nash was born on March 28, 1870, at Hudson, Wisconsin, and entered railway service in June, 1886, with the Chicago, St. Paul, Minneapolis & Omaha, where he served in various clerical capacities until November, 1888, when he became traveling auditor, with headquarters at St. Paul. He was appointed agent in March, 1892, and continued in this capacity at Ashland, Wis., at St. Paul, Minn., and at Minneapolis,



E. E. Nash

until January, 1905, when he was promoted to assistant superintendent at Itasca, Wis., being transferred later to Eau Claire. In May, 1910, he entered the service of the Chicago & North Western at Chicago with a special assignment in the president's office, where he remained until May, 1911, when he was promoted to superintendent at Winona, Minn., where he remained until April, 1912, when he was transferred to Raraboo, Wis. In November, 1913, he was promoted to assistant general superintendent of all lines east of the Missouri river except the Iowa, Minnesota and Dakota divisions, and in October, 1917, he was transferred to the Iowa territory, with headquarters at Boone, Ia., where he remained until July, 1918, when he was promoted to assistant to the federal manager, which position he held until March, 1920, when he became general manager of the Minneapolis & St. Louis with headquarters at Minneapolis, Minn. He was promoted to vice-president and general manager of this company on May 31, 1921.

Harry M. Wey has been appointed manager of the Chicago district for the **Pittsburgh Testing Laboratory**, Pittsburgh, Pa. Mr. Wey's office is at 1500 Monadnock block. He entered the service of the Pennsylvania Railroad in 1900 in the office of the superintendent of motive power at Columbus, Ohio. Later he served in the motive power departments of the Illinois Central and the Atchison, Topeka & Santa Fe. He was again employed in the mechanical department of the Pennsylvania, Lines west of Pittsburgh, from 1905 until 1909 when he entered the sales department of the U. S. Metallic Packing Company.

General Electric Elects Two New Vice-Presidents

J. G. Barry, sales manager of the General Electric Company since 1917, and manager of its railway department for many years, and **A. H. Jackson** of the law department, were recently elected vice-presidents of the company at a meeting of the board of directors.



J. G. Barry

Mr. Barry has been connected with the General Electric and **Thomson-Houston** Companies for 32 years and is 52 years old. He was first employed in the production department of the **Thomson-Houston** Company in Lynn, in 1890. A year later he was transferred to the construction department of the Boston office and in 1894 entered the railway department at Schenectady, following the organization of the

General Electric Company. Mr. Barry worked up to the position of assistant manager of this department in three years, and in 1907 was appointed manager in which position he exerted a marked influence on many aspects of the company's sales problems and policies. His success as manager of the railway department, one of the most important divisions of the G-E organization, led to his appointment in 1917 as general sales manager and his present promotion to vice-president.



A. H. Jackson

Mr. Jackson has been head of the law department of the General Electric Company for several years. He was born in Schenectady in 1864 and was educated in the public schools there. In 1886 he was graduated from Union College and two years later received the degree of LL.D. from

the Albany Law School. He first practiced law with his father, Judge Samuel W. Jackson, and remained with him until 1902, except for three years with the firm of Chanler, Maxwell and Philip in New York. Mr. Jackson was first employed at the General Electric Company in the law department in December, 1902.

THE GOVERNOR OF CONNECTICUT has appointed a commission of six to appear before the Interstate Commerce Commission to recommend the consolidation of the railroads of New England into a single system.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was reported in the *Railway Age* of March 25, as having obtained authority to construct a 43-mile cut-off, extending from Eldorado, Kan., to Ellinor, and to include a 4-mile belt line east of Eldorado, is now receiving bids for this work. This company has also authorized the construction of the first unit of enlarged freight terminal facilities at Dallas, Tex., the work in immediate contemplation to involve an expenditure of approximately \$200,000.

CHICAGO & NORTH WESTERN.—This company which was reported in the *Railway Age* of May 20, as receiving bids for a 100-ton coaling station at Manitowoc, Wis., has awarded the contract for this work to the Roberts & Schaefer Company, Chicago.

CHICAGO UNION STATION.—This company has closed bids for the construction of a concrete and steel viaduct over its tracks at Madison street.

CENTRAL VERMONT.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 150-ton coaling plant of frame construction at New London, Conn., and for "N & W" type electric cinder handling plants at Burlington, Vt., and White River Junction.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a cut-off from a point on the Cincinnati division in Brown Township, Delaware County, Ohio, 3½ miles, to a connection with its present main line track.

ELGIN, JOLIET & EASTERN.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the installation of automatic electric hoisting equipment in its East Joliet, Ill., and Waukegan coaling plants.

ILLINOIS CENTRAL.—This company receiving bids for the laying of water supply pipe lines at Kankakee, Ill., to cost approximately \$20,000.

MICHIGAN CENTRAL.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for a 500-ton reinforced concrete coaling station and sanding plant at Michigan City, Ind., the structure to supply four tracks, and to cost approximately \$48,000.

MISSOURI, KANSAS & TEXAS.—This company, reported in the *Railway Age* of Jan. 14, as preparing plans for new terminal facilities at Denison, Texas, is now accepting bids for this work. It will include a 22 stall brick roundhouse, a shop, storhouse, power house, car repair shop and incidental buildings, including yard office, oil and tool houses a track scale and transfer platform.

SANTA FE & LOS ANGELES HARBOR.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line from a connection with the Atchison, Topeka & Santa Fe near El Segundo, Calif., to Torrance and Wilmington, all in Los Angeles County, Calif., 12.54 miles. The road is to be operated by the Santa Fe, which has also filed an application for authority to acquire the stock of the road and to operate it under a lease.

C. F. LOWETH, chief engineer of the Chicago, Milwaukee & St. Paul, has addressed a letter to the public service and the highway commissions of a number of the states in the middle-west, calling to their attention the division of responsibility between the railways and the highway authorities for the installation of adequate warning signs at grade crossings, and suggesting that the public authorities take the necessary steps to cause the removal of all unauthorized signs from public highways and prevent the placing of new signs of this character; so that the grade crossing warning signs will stand out as a real warning, thereby making them more effective.

Railway Financial News

CANADIAN PACIFIC—*New Director*.—W. N. Tilley, of Toronto, K. C., has been named a director to succeed Sir John Eaton, deceased.

CHICAGO & ALTON—*Annual Report*.—The annual report issued this week shows the following income account for the year ended December 31, 1921:

	1921	1920
Operating revenues.....	\$31,057,069	*\$25,785,052
Operating expenses.....	26,123,948	24,403,890
Revenues over expenses.....	4,933,121	1,381,162
Rental from U. S. R. A. ....	.....	529,719
U. S. Government guaranty.....	.....	3,105,524
U. S. Railway operating income.....	4,933,121	5,016,405
Taxes.....	1,031,435	657,144
Railway operating income over expenses and taxes.....	3,901,686	4,349,688
Total income from railroad properties.....	3,926,608	4,412,748
Net income from railroad properties.....	2,080,802	3,355,860
Total income from all sources.....	2,217,668	3,475,116
Interest on funded debt.....	3,333,256	3,287,564
Total deductions.....	4,277,200	4,109,763
Net deficit.....	2,059,532	634,647

*Covers period March 1 to December 31.

CHICAGO & ALTON—*Claim Katy-Alton Merger Certain*.—See Missouri, Kansas & Texas.

CHICAGO & NORTH WESTERN—*Authorized to Sell Bonds*.—This company has been authorized by the Interstate Commerce Commission to sell \$2,233,000 of general mortgage gold bonds of 1927 at an average price of not less than par.

CHICAGO, BURLINGTON & QUINCY—*Annual Report*.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Burlington Has Large Net After Extra Dividends." See also excerpts from annual report on adjacent pages.

CHICAGO, ROCK ISLAND & PACIFIC—*Inspects Kansas Line*.—This company recently conducted an inspection tour over the Wichita North-Western, a line extending from Pratt, Kan., to Vaughn, a distance of about 100 miles. This Kansas railroad has been incurring an annual deficit averaging approximately \$50,000 and is reported to be considering the cessation of operations. The Kansas Public Utilities Commission has asked the Rock Island to take over the smaller road because of its necessity to the farmers of that region.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA—*Authorized to Issue Bonds*.—The Interstate Commerce Commission has authorized an issue of \$2,700,000 of debenture gold bonds of 1930 to be sold at not less than 93% and the proceeds used for corporate purposes.

CLEVELAND UNION TERMINALS—*Authorize to Issue Securities*.—The Interstate Commerce Commission has authorized this company to issue \$10,000 of common stock to be delivered at par for cash to the proprietary companies, and \$12,000,000 of 5½ per cent first mortgage sinking fund gold bonds, to be sold at not less than 92½ and the proceeds to be applied to the acquisition of property for and the construction of the terminal station and facilities at Cleveland and the discharge of indebtedness on account of advances made by proprietary companies.

J. P. Morgan & Co., the First National Bank of New York, National City Company, New York, and the Union Trust Company of Cleveland are offering the \$12,000,000 first mortgage 5½ per cent sinking fund gold bonds, series A, at 60 and accrued interest. The bonds will yield 5.55 per cent and are unconditionally guaranteed both as to principal and interest by the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis and the New York, Chicago & St. Louis Railroads. They are dated April 1, 1922 and are due April 1, 1927, with interest, payable April 1 and October 1. They are redeemable at 105 and accrued interest on 90 days' notice at the option of the company, in whole but not in part, on April 1, 1942, or any earlier date thereafter, and for sinking fund semi-annually, beginning October 1, 1927.

EL PASO & SOUTHWESTERN—*Annual Report*.—The income account for the year ended December 31, 1921, follows:

	1921	1920†
Railway operating income.....	\$10,868,799*	\$11,865,369
Railway operating expenses.....	8,439,019*	8,826,313
Net from railway operations.....	2,429,779*	3,039,057
Railway tax accruals.....	1,084,251	1,109,872
Total operating income.....	1,343,084	1,928,900
Total non-operating income.....	1,316,898	1,924,599
Net non-operating income.....	1,638,397	2,602,695
Gross income.....	2,981,481	4,531,595
Rent for leased roads.....	1,210,011	1,948,598
Total deductions from gross income.....	1,628,059	2,427,50
Net income.....	1,327,236	2,099,79
Dividend appropriation of income.....	1,327,236	2,000,000
Balance to profit and loss.....	.....	99,793

*Do not include federal lap-overs.
†For comparative purposes figures for the year 1920 are corporate only.

ESCANABA & LAKE SUPERIOR—*Authorized to Abandon Branch*.—The Interstate Commerce Commission has issued a certificate authorizing the abandonment as to interstate and foreign commerce of the operation of the northwestern 6.1 miles of its Northland in Marquette and Dickinson Counties, Mich.

GREAT NORTHERN—*Annual Report*.—The income account for the year ended December 31, 1921, follows:

	1921	*1920
Operating revenues.....	\$101,317,204	\$106,801,583
Operating expenses.....	80,496,913	94,911,125
Net from railway operations.....	20,820,291	11,890,458
Railway tax accruals.....	8,291,224	8,673,402
Railway operating income.....	12,480,988	3,217,056
Net railway operating income.....	12,866,411	.....
Total non-operating income.....	31,731,122	24,528,663
Gross income.....	44,597,533	27,801,719
Interest on funded debt.....	13,747,509	7,375,984
Total deductions from gross income.....	16,127,607	8,497,622
Net income.....	28,469,926	19,304,097
Dividends (7 per cent).....	17,462,916	17,462,916
Income applied to sinking funds.....	24,284	25,685
Balance to profit and loss.....	10,982,668	1,815,497

*Corporate operation, March 1 to Dec. 31.

GULF & NORTHERN—*Authorized to Issue Bonds*.—This company has been authorized by the Interstate Commerce Commission to issue \$326,000 of first mortgage 5 per cent gold bonds to be delivered to the Atchison, Topeka & Santa Fe in satisfaction of indebtedness of the applicant to that company.

KANSAS CITY & OKLAHOMA—*Authorized to Issue Stock*.—This company has been authorized by the Interstate Commerce Commission to issue \$1,400,000 of common stock for the purpose of continuing the construction of its line between Liberal and Richfield, Kans. It is proposed to complete approximately 93 miles of line.

KANSAS CITY SOUTHERN—*Annual Report*.—The income account for the year ended December 31, 1921, follows:

	1921	1920
Railway operating revenues.....	\$21,840,439	\$18,668,288
Railway operating expenses.....	16,003,485	15,051,665
Net revenue from railway operations.....	5,836,954	3,616,624
Railway tax accruals.....	1,072,693	833,850
Operating income.....	4,764,041	2,780,448
Non-operating income.....	405,596	2,025,266
Gross income.....	5,169,637	4,805,717
Interest on funded debt.....	1,878,795	1,884,277
Total deductions from gross income.....	2,728,633	2,881,663
Net income.....	2,433,005	1,924,054
Dividends on preferred stock.....	840,000	840,000
Income balance.....	1,593,005	1,084,054

LOUISIANA & ARKANSAS—*Asks Authority to Issue Bonds*.—This company has applied to the Interstate Commerce Commission for authority to issue \$470,000 of first mortgage 5 per cent gold bonds due September 1, 1927, to reimburse the treasury for construction expenditures and to be sold through the Guaranty Trust Company of New York or pledged at not less than 87.14 Charles L. Pack, of Lakewood, N. J., under an agreement of several years ago has an option to purchase the bonds at that figure.

MICHIGAN CENTRAL—*Annual Report*.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Michigan Central Reflects Increasing Prosperity." See also excerpts from annual report on adjacent pages.

MISSOURI, KANSAS & TEXAS—*Merger with Chicago & Alton Rumored*.—Newspapers throughout the country continue to report on the possibilities of the Missouri, Kansas & Texas and the Chicago & Alton soon merging, although officers of both roads concerned deny and refuse to confirm these very active and current rumors. The Chicago Daily Journal of Commerce printed

(Continued on page 1512)

Annual Reports

Chicago, Burlington & Quincy R. Co.—Sixty-Eighth Annual Report

Chicago, January 2, 1922.

To the Stockholders of the Chicago, Burlington & Quincy Railroad Company:
The following is the report of your Board of Directors for the year ended December 31, 1921:

COMPARATIVE STATEMENT OF CORPORATE INCOME, YEARS ENDED DECEMBER 31

1921	1920
Standard return.....	\$5,560,113.85†
RAILWAY OPERATING REVENUES	
\$122,716,630.31..... Freight	\$110,385,624.32*
31,396,048.30..... Passenger	31,445,171.57*
4,332,770.88..... Mail	3,220,489.33*
3,630,851.56..... Express	3,997,628.95*
3,725,991.29..... All other transportation.....	2,989,078.26*
2,746,665.01..... Incidental	3,490,458.49*
163,310.60..... Joint facility.....	157,354.50*
\$168,712,268.15..... Total railway operating revenues.....	\$155,483,805.42*
RAILWAY OPERATING EXPENSES	
\$22,917,767.47..... Maintenance of way and structures.....	\$28,367,933.14*
34,290,506.03..... Maintenance of equipment.....	36,355,037.27*
2,102,819.22..... Traffic	1,580,802.84*
63,564,016.74..... Transportation	69,529,774.77*
1,734,740.90..... Miscellaneous operations.....	1,976,605.75*
4,637,991.86..... General	4,557,894.10*
1,031,352.24 Cr..... Transportation for investment—Cr.....	Cr. 348,107.72*
\$128,216,289.68..... Total railway operating expenses.....	\$142,017,420.15*
\$40,495,978.47..... Net	\$13,026,429.12*
\$9,718,567.61..... Railway tax accruals.....	\$7,707,712.65‡
25,057.02..... Uncollected railway revenue.....	87,835.11*
Railway operating income (includes two months of standard return of 1920).....	\$11,230,951.36*
NON-OPERATING INCOME	
\$598,329.71 Dr..... Equipment rents (net)..... Dr.....	\$1,803,974.48*
1,009,017.09..... Joint facility rents (net)..... Dr.....	1,808,522.59*
9,214,857.50..... Miscellaneous rents.....	110,779.83*
2,124,948.48..... Dividends and miscellaneous interest.....	977,616.56*
94,365.07..... Miscellaneous income.....	8,175.14*
..... Estimated amount due under guaranty—Transportation Act, 1920.....	21,991,964.87
\$1,533,024.28..... Total non-operating income.....	\$19,476,039.38
\$32,285,378.09..... Gross income.....	\$30,706,990.74
DEDUCTIONS FROM GROSS INCOME	
\$77,864.43..... Miscellaneous rents.....	\$55,888.64
6,807,134.36..... Interest on funded debt.....	6,816,006.44
5,991.66..... Interest on unfunded debt.....	8,277.44
57,771.00..... Amortization of discount on funded debt.....	57,771.00
273,356.73 Cr..... Miscellaneous income charges.....	852,083.47‡
\$6,675,404.72..... Total deductions from gross income.....	\$7,782,626.99
\$25,609,973.37..... Net income.....	\$22,924,363.75
DISPOSITION OF NET INCOME	
\$294,643.26..... Sinking funds.....	\$231,077.96
19,300,382.00..... Dividends.....	8,867,128.00
\$19,595,025.26..... Total appropriations of income.....	\$9,098,205.96
\$6,014,948.11..... Income balance transferred to profit and loss.....	\$13,826,157.79
†January and February, 1920.	
*Ten months. †Ten months credit war taxes which are included for twelve months.	
‡Includes "Lap over" items credited and charged by Federal Administration.	
CAPITALIZATION	
CAPITAL STOCK:	
On December 31, 1920, the Capital Stock of the Company was.....	\$110,839,100
To which was added by a stock dividend of 54,1325 per cent declared out of Surplus accumulated prior to July 1, 1909, payable to Stockholders of record at the close of business on March 31, 1921.....	60,000,000
Making the total outstanding December 31, 1921.....	\$170,839,100
of which \$2,200.00 was represented by fractional stock scrip convertible in multiples of \$100. into full shares. This scrip is not entitled to vote or to receive dividends until so converted.	
Dividends paid during the year and charged to Income for the year were:	
March 25, 1921, 2% on \$110,839,100.....	\$2,216,782
June 25, 1921, 5% on \$170,835,100.....	8,541,755
December 27, 1921, 5% on \$170,836,900.....	8,541,845
Total charged to Income for the year.....	\$19,300,382
In addition there was paid and charged to Surplus accumulated prior to 1921:	
December 27, 1921, 15% on \$170,836,900.....	\$25,625,535
Total dividends paid during year.....	\$44,925,917
FUNDED DEBT:	
On December 31, 1920, the Funded Debt outstanding in the hands of the Public was.....	\$124,038,100
and on December 31, 1921.....	123,619,300
a reduction of.....	\$419,000
caused by the purchase of the \$15,000,000 Nebraska Extension Mortgage Sinking Fund Bonds and the retirement of \$404,000,000 Equipment Gold Notes which fell due on January 15, 1921.	
During the year the operation of the sinking funds, provided for retirement of the Sinking Fund Bonds of 1921 and the Denver Extension Bonds	

of 1922, were completed and the bonds were retired with the exception of \$10,300.00 of the Union Bonds to cover which funds have been placed in the hands of the Trustee under the Mortgage. The only sinking fund remaining in operation is under the Nebraska Extension Mortgage of 1927.

GENERAL OPERATIONS

REVENUES:	
Total Operating Revenues for 1921.....	\$168,712,268.15
Total Operating Revenues for 1920 (excluding Federal laps overs after March 1, 1920).....	185,270,768.39*

Decrease.....	\$16,558,500.24 or 8.94%
This decrease was distributed as follows:	
Freight Revenues.....	\$7,359,739.26—5.66%
Passenger Revenues.....	5,127,633.48—15.04%
Mail Revenues.....	2,200,796.28—33.68%
Miscellaneous Transportation Revenues.....	1,521,694.64—6.62%
Incidental Operating Revenues.....	1,408,635.58—31.67%
	\$16,558,500.24—8.94%

*Includes January and February Federal operations.

Generally speaking, these decreases were due to the business depression which prevailed during most of the year.

The decrease in revenues was due primarily to the fact that the 1920 mail revenues included \$3,000,000 back mail pay representing allowance for the years 1918 and 1919 under decision of the Interstate Commerce Commission handed down December 23rd, 1919, as mentioned in last year's report. The decrease in miscellaneous transportation revenues was largely in express revenue which decreased \$873,323.38 or 19.39 per cent.

All items under the caption Incidental Operating Revenues show decreases, the greatest being in Dining and Buffet Revenue, \$296,095.49 or 22.88 per cent. Hotel and Restaurant Revenue \$203,467.98 or 35.73 per cent. Murage \$418,253.11 or 47.17 per cent; Telegraph and Telephone Revenue \$168,156.93 or 42.79 per cent, and Miscellaneous Revenue \$120,173.86 or 36.47 per cent.

Tonnage of Commodities compared with 1920 shows:	
Farm Products.....	Increased 310,675 tons—3.64%
Animals and Products.....	Decreased 466,518 tons—15.53%
Mine Products.....	Decreased 5,720,641 tons—27.78%
Forest Products.....	Decreased 1,329,277 tons—28.37%
Manufactured Products.....	Decreased 3,431,101 tons—35.76%
Less than Carload Tonnage.....	Decreased 450,305 tons—18.24%
Grand Total Tonnage.....	Decreased 11,117,167 tons—23.54%

There were the following increases in tonnage of Farm Products:
Wheat.....Increased 592,149 tons—24.10%
Corn.....Increased 431,169 tons—28.63%
Cotton.....Increased 16,840 tons—44.13%
Fruit.....Increased 12,875 tons—51.28%
Potatoes.....Increased 17,703 tons—5.92%
and these more than offset the decrease in all other classes of Farm Products.

All classes of Animals and Products tonnage decreased with the exception of:
Poultry which increased.....5,982 tons—15.30%
Butter and cheese which increased.....3,874 tons—10.53%
Wool which increased.....17,875 tons—51.28%
With the exception of increases in Base Bullion and Matte (4,249 tons or 8.78 per cent) and Crude Petroleum (136,216 tons or 44.37 per cent), all sub-classes of Products of Mines show decreases, principally Bituminous Coal (4,422,597 tons or 26.59 per cent), and Clay, Gravel, Sand and Stone (1,053,459 tons or 35.66 per cent).

Products of Forests show decreases in all sub-classes under this caption, the principal decrease being in Lumber, Timber, etc. (1,163,302 tons or 44.91 per cent).

EXPENDITURES (OPERATING):	
Total Operating Expenses, 1921.....	\$128,216,289.68
Total Operating Expenses, 1920 (excluding Federal laps overs after March 1, 1920).....	164,017,388.32

Decrease.....\$35,801,098.64—21.83%
The reduction in Operating Expenses as compared with previous year was possible because of the following:
Rigid economy in all departments.

More plentiful supply of labor, resulting in better quality with less turn-over and greater efficiency.
Reduction in cost of materials.
Reduction in rates of pay and changes in rules governing working conditions.

Reduction in percentage of overtime and rearrangement of forces to effect economical operation.
Reduction of approximately \$2,000,000.00 in freight claims due to reduction in volume of business, lower prices of commodities, and intensive campaign to reduce claims by more careful handling of freight. Special campaign was made for improvement in handling of refrigerator freight and also to effect on-time delivery of stock.

Reduction of approximately \$1,500,000 in injuries to persons account reduced in volume of business handled, less labor turn-over with greater proportion of experienced employees, and also to special "No Accident" campaign conducted throughout the year.

EXPENDITURES (CAPITAL):	
There was expended during the year, chargeable to Capital Accounts:	
For Repairs.....	\$6,543,248.88
For Equipment.....	1,753,238.44
For General.....	7,886.12
Total.....	\$8,306,373.44

Work on the Chicago Union Station project and related facilities at Chicago by the Station Company was continued during the year and substantial progress made. The plans of the new station provide for construction of a modern office building above the station, thereby adding a substantial source of revenue and increasing the utility of the valuable ground space.

Development of new freight house at Harrison Street, Chicago, was carried forward, together with the necessary viaduct construction, track changes, etc. It is noted that the new inbound freight house will be placed in service this year, or early in 1923.

There was an in main track during the year 281 miles of new 90-pound iron rail, and 190 miles of second-hand rail in replacement. A large portion of this rail replaced lighter rail.

The usual program of rehabilitating existing tracks where required was carried out.

There was completed and placed in operation during the year on important lines of heavy traffic, with a view to promoting safety and efficiency in operation, 66 miles of automatic block signals.

INDUSTRIAL:

There were constructed and extended during the year, industrial tracks as follows:

	New Tracks	Extensions
In Lines East of the Missouri River	51	18
In Lines West of the Missouri River	13	5
Total	64	23

The number of new industrial leases made during the year reflects a gradual expansion in business throughout all our territory. Seventy-six new industrial plants were located upon the railroad during the year and seventeen existing industries made material additions to their plants.

The tonnage of crude oil and its products received by the company was about the same as during the preceding year, although some new developments are under way in the producing and refining region in Wyoming.

AGRICULTURAL:

During the year 1921, twenty-one hundred inquiries regarding lands were received. There were 595 carloads of settlers' effects received on the Alliance, Casper, McCook, Sheridan and Sterling Divisions, and it is estimated that 3,781 families were located. In the Douglas, Newcastle and Buffalo land districts in Wyoming, 1,800 persons filed on 915,000 acres of non-irrigated government homestead land, as compared with entries on 1,604,000 acres in the same districts during the year 1920. Two hundred and seventy-three irrigated homestead units, comprising about 19,000 acres on the North Platte and Shoshone Government projects were taken.

Two special exhibit cars were operated during the year on Lines West of the Missouri River, one in Wyoming during July to develop the dairy industry, and one during October and November in the potato growing sections of Colorado, Wyoming and Nebraska, to prevent losses in potatoes during storage and transit, improve market grades, and to secure better cooperation from shippers in ordering cars, handling, loading and storing potatoes. Approximately four thousand farmers and shippers attended these demonstrations. Five hundred and twenty head of high grade dairy cows were shipped from Wisconsin to points West of the Missouri River, and three hundred thousand pounds of miscellaneous farm seeds and forty-two carloads of feed stuffs were handled, through our marketing service. Improved varieties of winter wheat and rye were introduced in the semi-arid sections.

Seventy farmers' meetings were attended by a company representative. Four thousand copies of circular letters and ten thousand copies of bulletins giving information on land opportunities, dairying, silos, feeding, livestock, potato production and marketing, were distributed.

GENERAL:

Under the Federal Valuation Act of March 1st, 1913, subsequent orders of the Commission, the Company has been engaged in taking an inventory of its property and making the several returns to the Commission under

the requirements of the Act and orders above referred to. The date of Valuation, established by the Commission, is June 30th, 1917, and the Valuation to be found will be of that date. On December 31st, 1921, the work of taking and returning the physical inventory was substantially completed and the Government forces which had been on the property had practically completed the field work, in relation to examination of physical property and accounting records. The Company forces also have been continuously engaged in the development of unit costs and other necessary data to fully support its claim for proper valuation when the findings of the Commission is made. It is anticipated that within the coming year this work will have reached the point where further reduction will be made in forces, some of which already have been reduced.

The total expenditures on this work to December 31st, 1921, were \$2,772,227, a very large proportion of this expenditure has been for the purpose of complying with the requirements of the Commission as embodied in the various orders, and much of the information collected will constitute a valuable and permanent record of the company's property.

The annual compensation for use of the company's transportation system during the period of Federal control, under the contract dated October 8, 1918, between the Director General of Railroads and the Chicago, Burlington & Quincy, and the Quincy, Omaha & Kansas City Railroad Companies, was increased by negotiation with the Interstate Commerce Commission from \$33,390,079.61 to \$33,879,100.59.

Final adjustment of accounts between the United States Railroad Administration and the Chicago, Burlington & Quincy and the Quincy, Omaha & Kansas City Railroad Companies of matters of account for 1921 was made on September 10, 1921. Under this adjustment the company received \$8,000,000.00 in cash. The net credit remaining on the books of the Company was \$11,420,589.56, after disposition in full of all amounts due to the Railroad Administration for Addition and Betterments made to the property during Federal control, expenses and liabilities paid chargeable to the companies under the contract, working fund advances to proprietary lines and for all amounts due from the Director General for balance due on compensation, cash and other assets taken over or collected, by him, accrued depreciation, property retired and not replaced, deficiency in material and supplies, under-maintenance, etc.

Instructions from the Interstate Commerce Commission as to method of carrying the proceeds of this settlement into the accounts of the Company were issued on January 25, 1922, and in accordance therewith the amount will be transferred to Profit and Loss Account.

The Interstate Commerce Commission has definitely set December 31, 1921, as the date on which accounts for the Guaranty Period (six months ended August 31, 1920) must be closed and has prescribed form in which claim for that period must be presented, but settlement has not yet been reached. During the year your Board of Directors decided to create a Pension System and adopted Rules and Regulations governing the administration of the Pension Department, to become effective January 1, 1922.

This action was taken with the realization that the company during succeeding years will have numerous employees, including officers, who will have given many years of service before they reach an age when they are unequal to the further performance of their duties, and with the desire to give tangible recognition to long continued and faithful service. Following herewith is the report of the Comptroller.

By order of the Board of Directors.

HIALE HOLDEN, President.

GENERAL BALANCE SHEET

December 31, 1921

ASSETS		LIABILITIES	
Investments:		Capital stock:	
Investment in road and equipment:		Common Stock	\$170,839,100.00
Road	\$413,050,371.27	Long term debt:	
Equipment	101,562,975.41	Bonds held by the public	\$173,619,300.00
General expenditures	1,147,121.21	Bonds owned by the Company, unpledged	11,857,000.00
	\$515,760,467.89	Total	\$185,476,300.00
Sinking funds:		Less bonds held by or for the Company, included in above	11,857,000.00
Book assets	\$17,338.27	Total long term debt	173,619,300.00
Company's own issues included, par value	17,338.27	Total capital liabilities	\$344,458,400.00
Deposits in lieu of mortgaged property sold	40,953.96	Current liabilities:	
Miscellaneous physical property	931,547.76	Traffic and car-service balances payable	\$1,841,712.17
Investments in affiliated companies:		Audited accounts and wages payable	10,342,017.97
Stocks	\$11,382,082.81	Miscellaneous accounts payable	897,993.96
Bonds	1,507,237.32	Interest matured unpaid	1,052,534.50
Notes	6,515,735.47	Funded debt matured unpaid	34,800.00
Advances	3,478,891.25	Unmatured interest accrued	1,147,531.66
	42,883,966.85	Other current liabilities	526,893.70
Other investments:		Total current liabilities	15,843,483.96
Stocks	\$5,510.00	Deferred liabilities:	
Bonds	1,838,382.32	Other deferred liabilities	\$110,379.71
Notes	185,730.02	Total deferred liabilities	110,379.71
Miscellaneous	27,075.00	U. S. Government deferred liabilities	1,202,522.48
	2,029,897.24	Unadjusted credits:	
Total investments (capital assets)	\$561,604,171.97	Tax liability	\$5,845,509.93
Current assets:		Insurance reserves	1,249,771.29
Cash	\$9,307,987.61	Operating reserves	5,944,042.34
Time drafts and deposits	30,000.00	Accrued depreciation Equipment	57,432,968.33
Special assets	17,000.05	Other unadjusted credits	16,122,917.52
Draw and bill receivable	111,530.40	Total unadjusted credits	87,095,287.41
Traffic and car service balances receivable	1,414,527.04	Corporate surplus:	
Net balances receivable from agents and companies	26,055.31	Additions to property through income and surplus	\$105,861.42
Miscellaneous accounts receivable	6,941,812.96	Funded debt retired through income	42,561,426.50
Material and supplies	26,711,984.03	Sinking fund reserves	214,224.67
Other current assets	797,467.54	Profit and loss	134,415,784.47
Total current assets	\$42,602,193.35	Total corporate surplus	177,297,297.01
Deferred assets:			
Warranted but not issued	\$161,384.04		
Unadjusted debits:			
Tax liability	5,845,509.93		
Insurance reserves	1,249,771.29		
Operating reserves	5,944,042.34		
Accrued depreciation Equipment	57,432,968.33		
Other unadjusted credits	16,122,917.52		
Total unadjusted debits	\$87,095,287.41		
Total deferred assets	\$161,384.04		
Total unadjusted debits	\$87,095,287.41		
Total assets	\$626,007,370.57	Grand total	\$626,007,370.57

[ADVERTISEMENT]

Michigan Central Railroad Company—Seventy-sixth Annual Report

To the Stockholders of

THE MICHIGAN CENTRAL RAILROAD COMPANY

The Board of Directors herewith submits its report for the year ended December 31, 1921, with statements showing the income account for the year and the financial condition of the company.

Road operated

	The following is a comparative table of the mileage operated:		Decrease
	1921	1920	
	Miles	Miles	Miles
Main line and branches owned.....	1,184.69	1,186.80	2.11
Line jointly owned.....	.70	.71	.01
Leased lines.....	577.67	578.35	.68
Lines operated under trackage rights.....	98.96	100.03	1.07
Total road operated.....	1,862.02	1,865.89	3.87

The decrease in the mileage of the company's owned, jointly owned and leased lines, as compared with 1920, is the result of corrections in measurements. A change in the operation of passenger trains at South Bend, where they are run on the company's South Bend Branch instead of over the tracks of the New York Central Railroad, accounts for 1.03 miles of the decrease in line operated under trackage rights, the remainder being due to a correction in the measurement of New York Central Railroad tracks between Buffalo and Suspension Bridge.

Traffic conditions

The year 1921 was one of business depression, reflected in the decreased freight and passenger traffic of the company. The tonnage fell off approximately one-third in volume and the passenger traffic approximately one-fourth as compared with 1920. This situation was met by economies in operation.

In co-operation with the federal government in its effort to lower costs of foodstuffs, voluntary decrease in rates on certain agricultural products were put in effect during the year. There was no general reduction in other freight rates, but adjustments were made from time to time to remove inequalities. The company has co-operated with state authorities in a readjustment of rates on road-making material for the purpose of stimulating the building of good roads and to meet the unemployment situation.

There was no general readjustment of passenger rates, but the practice which obtained prior to federal control of putting into effect reduced excursion rates during the summer months was re-established to some extent.

Account with Railroad Administration

The company's account with the Railroad Administration covering the period of federal control will be completed in the early part of 1922.

Claim against the United States upon the guaranty

The company's claim against the United States based upon its guaranty for the period March-August, 1920, is approaching completion. It has been necessary to restate this claim several times in accordance with tentative formulas. It will be ready for presentation in the early part of 1922.

Wages

Effective July 1, 1921, the United States Labor Board issued its Decision No. 147, reducing the rates of pay of employees by an amount which aggregated approximately 11 per cent of the payroll. A revision of rules and working conditions for shop employees so modified the lines of demarcation between the various crafts that it is now possible to use a mechanic in one class to do incidental work of another craft. The Board also discontinued the requirement that time and one-half be paid for necessary Sunday service, thus permitting the use of engine terminal and car repair forces for such necessary Sunday work without the payment of a punitive rate. During the federal control period up to July 1, 1921, all overtime for maintenance of way employees was paid for at the rate of time and one-half, but, under the decision of the Labor Board, the ninth and tenth hours of service may now be paid for at the regular hourly rate. Pending final decision of the Board, certain other classes of employees for whom overtime rates were established by the Director General of Railroads are now receiving the pro rata hourly rate for such overtime. Notwithstanding the reductions in rates of pay and changes in rules above mentioned, the average earnings per employee for the first six months of 1921 as compared with the average earnings per employee in 1920 indicate that wages are still much higher than prior to the federal control period. The company is negotiating with its employees looking to further reductions in pay and further changes in working rules and in some cases these matters have been referred to the Labor Board.

Capital stock

The capital stock of the company remained unchanged during the year.

Changes in funded debt

The changes in the funded debt of the company are shown in the following statement:

The funded debt outstanding on December 31, 1920, was.....	\$72,501,446.05
It has been increased as follows:	
Equipment Trust No. 48 of January 15, 1920, additional notes.....	72,800.00
	\$72,574,246.05

and has been reduced as follows:

Michigan Central, Jackson, Lansing and Saginaw 3½ per cent gold bond of 1921 purchased and cancelled by the Trustees of the Land Grant fund of the Jackson, Lansing and Saginaw Railroad Company.....	\$4,000.00
Serial note of the M. C. R. R. Co. dated December 23, 1920, due December 23, 1921.....	262,000.00
Payments falling due during the year and on January 1, 1922, on the company's liability for principal installments under equipment trust agreements as follows:	
N. Y. C. Lines Trust of 1907, due November 1, 1921.....	260,425.45
N. Y. C. Lines Trust of 1910, due January 1, 1922.....	393,960.44
N. Y. C. Lines Trust of 1912, due January 1, 1922.....	151,710.90
N. Y. C. Lines Trust of 1913, due January 1, 1922.....	300,060.00
M. C. R. R. Trust of 1915, due October 1, 1921.....	341,200.00
M. C. R. R. Trust of 1917, due March 1, 1921.....	600,200.00
Equipment Trust No. 48 of January 15, 1920, due January 15, 1921.....	341,200.00
M. C. R. R. Co. proportion of N. Y. C. R. R. Co. Trust of April 15, 1920, due April 15, 1921.....	467,664.75

3,043,321.08

\$69,536,924.97

The additional notes for \$72,800 issued under Equipment Trust No. 48 were given to the Director General of Railroads in connection with final settlement of the equipment allocated to the company during the period of federal control and described in the annual report for 1920. The total cost of the equipment was \$69,334,865.45, of which \$5,190,800 was financed by equipment notes.

Changes in property investment accounts

The changes in property investment accounts during the year, as shown in detail elsewhere in this report, were as follows:

Investment in road property owned, net increase.....	\$193,112.45
Investment in equipment, net increase.....	5,678,682.94
Improvements on leased railway property, net decrease.....	151,367.67
Miscellaneous physical property, increase.....	811,974.41
Total net increase in property investments.....	\$6,532,402.13

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	Year ended		Increase or Decrease
	Dec. 31, 1921	Dec. 31, 1920	
Operating income	1,862.02	1,865.89	3.87 miles
Railway operations:			
Railway operating revenues.....	\$72,911,852.36		
Railway operating expenses.....	52,551,944.57		
Net revenue from railway operations.....	\$20,359,907.79		
Percentage of expenses to revenues.....	(72.08)		comparable
Railway tax accruals.....	\$4,681,296.47		See Note A
Uncollectible railway revenues.....	52,834.07		
Railway operating income.....	\$15,625,777.25		
Equipment rents, net credit.....	235,302.55		
Joint facility rents, net debit.....	457,809.28		
Net railway operating income.....	\$15,403,270.52	\$10,508,669.75A	\$4,894,600.77
Miscellaneous operations:			
Revenues.....	\$48,187.23	\$139,827.63	—\$91,640.40
Expenses and taxes.....	27,921.29	82,338.15	—\$54,416.86
Miscellaneous operating income.....	\$20,265.94	\$57,489.48	—\$37,223.54
Total operating income.....	\$15,423,536.46	\$10,566,159.23	\$4,857,377.23
Other income:			
Additional compensation and adjustment of standard return under contract with Director General of Railroads for use of this company's railroad property during federal control	\$621,873.80		\$621,873.80
Income from lease of road.....		\$151.25	—151.25
Miscellaneous rent income.....	178,304.44	5,845.61	172,458.83
Miscellaneous non-operating physical property.....	8,314.20	5,095.85	3,218.35
Dividend income.....	440,679.47	498,305.04	—57,625.57
Income from funded securities.....	71,310.86	54,064.68	17,246.18
Income from unfunded securities and accounts.....	472,724.77	563,495.98	—90,771.21
Miscellaneous income.....	1,441,616.95*B	30,277.32C	1,411,894.27
Total other income.....	\$351,590.59	\$1,157,235.73	—\$805,645.14
Gross income.....	\$15,775,127.05	\$11,723,394.96	\$4,051,732.09

Deductions from Gross Income			
Rent for leased roads.....	\$2,793,425.71	\$2,774,791.59	\$18,634.12
Miscellaneous rents.....	4,493.94	4,119.35	374.59
War taxes accrued.....	D	92,000.00	—92,000.00
Miscellaneous tax accruals.....	12,756.68	6,734.49	6,022.19
Separately operated properties—loss.....	896.35	132,438.11	131,541.76
Interest on funded debt.....	3,396,968.64	3,059,383.17	337,585.47
Interest on unfunded debt.....	1,849,322.88	1,668,605.49	180,717.39
Amortization of discount on funded debt.....	68,360.99	59,068.79	9,292.20
Maintenance of investment organization.....	273.51	1,317.50	—1,043.99
Corporate general expenses.....	29,069.27	29,069.27	—
Miscellaneous income charges.....	76,708.27†	90,081.96c	—166,790.23
Total deductions from gross income.....	\$8,049,790.43	\$7,917,609.72	\$132,180.71
Net income.....	\$7,725,336.62	\$3,805,785.24	\$3,919,551.38

Disposition of Net Income			
Dividends declared (6 per cent 1921, 4 per cent 1920).....	\$1,124,184.00	\$749,456.00	\$374,728.00

Surplus for the year carried to profit and loss.....	\$6,601,152.62	\$3,056,329.24	\$3,544,823.38
A—Includes compensation accrued under contract with Director General January and February, Guaranty under Transportation Act, 1920, March to August and net railway operating income—corporate—September to December.			
B—Includes annual account Guaranty under Transportation Act, 1920.			
C—1920 figures revised to include revenues and expenses prior to January 1, 1918.			
D—War taxes for 1921 included in Railway tax accruals.			
*Debit.			
†Credit.			

Profit and Loss Account

Balance to credit of profit and loss on December 31, 1920.....	\$20,831,976.62
Additions:	
Surplus for the year 1921.....	\$6,601,152.62
Profit on road and equipment sold.....	\$4,563.73
Unrefundable overcharges.....	8,058.32
Various adjustments of accounts (net).....	4,429.35
	6,648,204.02
	\$27,480,180.64

Debt discount extinguished through surplus.	\$1,817.20
Depreciation prior to July 1, 1907, on equipment retired during 1921.	243,037.25
Road property abandoned and not replaced.	193,978.96
	369,833.41

Balance to Credit of profit and loss, December 31, 1921..... \$27,110,347.23

Comparison of Revenues, Expenses and Freight and Passenger Statistics
The following comparisons of 1921 revenues, expenses and freight and passenger statistics are with those of 1920, including in the latter year similar items of the United States Railroad Administration for January and February.

Revenues, Tonnage and Passengers

The total operating revenues were \$72,911,852.36, a decrease of \$14,878,546.83. Freight revenue was \$45,728,134.99, a decrease of \$9,486,988.38. There was a decrease of 9,732,513 tons in freight traffic. The tonnage of bituminous coal and coke fell off 3,729,712 tons, the remainder of the decrease being well distributed among the other commodities.

Passenger revenue was \$20,016,897.06, a decrease of \$1,541,466.14. Total number of passengers carried was 5,234,397, a decrease of 1,700,588. The heavy falling off in tonnage and in passenger traffic during the year more than offset the benefit in earnings from increases in rates which went into effect August 26, 1920. The passenger revenues of the company's Canada division were also affected by decreases in rates effective January 1 and July 1, 1921.

The revenue from the transportation of mail was \$868,436.79, a decrease of \$589,569.06. The mail traffic of the company increased in 1921. The decrease in mail revenue is the result of the inclusion in 1920 of large amounts for adjustments covering additional compensation for the entire period of federal control.

The express revenues were \$2,771,111.49, a decrease of \$676,936.42, which was due not only to the business depression, but the operation of the new contract with the American Railway Express Company effective September 1, 1920.

Operating Expenses

In arriving at the net railway operating income for the guaranty period, the Transportation Act required that the maintenance allowance should be fixed with reference to the standards and price levels of the test period. The company worked out a tentative factor which resulted in charging for maintenance in excess of actual expenditures and the carrying forward of a reserve at the end of 1920. This factor, however, has proved to be larger than the government is likely to accept. Therefore, entries were made in December, 1921, closing out the balances in the maintenance reserves which had been accumulated in 1920, and its operating expenses for that year had been over-accrued by the amount of the reserves, it was necessary to adjust operating expenses in 1921 to offset the overcharge and preserve the continuity of the accounts. In making this adjustment the amount tentatively charged against the government for guaranty period operations was reduced and a corresponding charge was made against non-operating income, as a result of which the net corporate income for 1921 was not affected.

The operating expenses for 1921, by groups, as compared with those for 1920, eliminating these adjustments, were as follows:

	Amount	Decrease
Maintenance of way and structures.....	\$9,686,491.02	\$2,452,507.73
Maintenance of equipment.....	14,385,253.42	5,797,599.81

[ADVERTISEMENT]

(Continued from page 1508)

in its issue of June 9: "From sources regarded here as semi-official, it is stated that there is practically no doubt as to the final success of the negotiations between the Missouri, Kansas & Texas and the Chicago & Alton for a merger of the two systems. It is said that the negotiations have reached the point where the equipment for the merger is being prepared. The higher officials of both systems are pushing the details in preparation for an early unification." Incidentally, it was pointed out by this paper that the Missouri, Kansas & Texas had announced its intention sometime ago of withdrawing from the Kansas City Union station. This is now considered significant in connection with the merger talk since the Katy could withdraw from the terminal company and still use the station under the Alton franchise. "If the merger is effected," this paper continued, "there will be a direct line from Chicago, Kansas City and St. Louis to points in Texas. Through business from Chicago to the southwest would probably be handled by way of Higbee, Mo., where the Katy's Sedalia-Hannibal line crosses the Alton's Chicago-Kansas City line. This route would obviate the necessity of hauling trains through the terminals at either in Kansas City or St. Louis, but would send them through Sedalia, Fort Scott and Parsons." Most newspapers predict that the Katy will be the dominating factor in the merger and that C. F. Schaff, now receiver for that system, and president of the new Missouri, Kansas & Texas organization, will probably be at the head of the combined system.

NEW YORK, CHICAGO & ST. LOUIS Asks Authority for Exchange of Materials.—This company and the Lake Erie & Western have filed an application with the Interstate Commerce Commission for authority to enter into an agreement providing for the exchange of materials, supplies and labor and the purchase or acquisition of materials and supplies on joint account and the exchange thereof. The object is to relieve the companies of the necessity of complying with section 10 of the Clayton law in so far as transactions between them are concerned, thereby avoiding inconvenience and delay. The agreement provides for the exchange of materials and supplies on the basis of cost plus 10 per cent and freight charges.

	Amount	Decrease
Traffic.....	1,125,580.92	49,670.19*
Transportation.....	29,535,983.20	8,265,118.47
Miscellaneous.....	96,030.72	326,899.37
General.....	1,778,962.20	16,957.51*
Transportation for investment—Cr.....	54,394.95	34,429.11

*Increase \$56,420,906.53 \$16,809,926.79

The substantial decrease in operating expenses reflect the falling off in traffic, the economies effected by the company during the year, and reduction in wages and in costs of material and fuel.

Railway Tax Accruals—Equipment and Joint Facility Rents
Separate tables setting forth the details of these accounts will be found in another part of this report.

Non-operating Income

Pursuant to the final certificate of the Interstate Commerce Commission, the annual compensation for the possession, use and control of the property of this company and its leased lines, under the contract with the Director (General of Railroads, is \$8,126,349.13. This is an increase of \$74,221.65 over the amount stated in the contract and accrued during federal control. This increase and additional compensation, completed additions and betterments put in service prior to February 29, 1920, account for the item of \$62,187,830 shown in the income account as additional compensation and adjustment of standard, return.

The decrease of \$1,471,894.27 in miscellaneous income is due in part to a rearrangement, for purposes of comparison, of the figures shown in the 1920 report and in part to adjustments in connection with the guaranty period, March-August, 1920.

Deductions from Gross Income

There was a decrease in the account "separately operated properties—loss" of \$131,541.76. This decrease is due to the fact that there was a surplus from the operation of the Indiana Harbor Belt Railroad in 1921 while this company was called upon to contribute its proportion of a deficit from the operation of that road in 1920.

Net Corporate Income

The net corporate income of the company was \$7,725,336.62, from which were declared dividends of 6 per cent, amounting to \$1,124,184.00, leaving a surplus for the year of \$6,601,152.62, an increase over the surplus for 1920 of \$2,544,823.38.

Elimination of Highway Grade Crossings at Detroit, Michigan

The separation of grades at various streets in Detroit under contracts with the city the first of which was made in 1900, was necessarily suspended during the war period. The city has grown very rapidly, especially in the southwesterly portion, and the highway traffic has become so heavy over certain streets as to render the separation of grades essential. During the year, grade separation work has progressed at Livernois, Dix and Waterman avenues. The city has undertaken to open Military Avenue under the company's tracks at its expense.

Changes in Organization

On May 5th, Mr. Edmond D. Bronner was elected a Director to fill the vacancy caused by the death of Mr. William K. Vanderbilt, and on the same date Mr. Henry M. Campbell was elected a Director to fill the vacancy caused by the resignation on February 9th of Mr. Samuel Mather.

Appreciative acknowledgment is made to all officers and employees of their loyal and efficient co-operation and service.

For the Board of Directors, ALFRED H. SMITH, President.

NEW YORK CENTRAL.—Petition to Reopen Chicago Junction Case Denied.—The Interstate Commerce Commission has denied a petition of trunk lines entering Chicago for a modification of the order by which it authorized the New York Central to acquire control of the Chicago River & Indiana and the Chicago Junction.

PHILADELPHIA & READING.—Annual Report.—The incomes for the year ended December 31, 1921, compares with the previous year as follows:

	1921	1920
Railway operating revenues.....	\$84,924,328	.....
Railway operating expenses.....	68,361,308	.....
Net from railway operations.....	16,562,920	.....
Railway tax accruals.....	1,728,270	.....
Railway operating income.....	14,830,302	*\$15,961,211
Non-operating income.....	853,537	465,652
Gross income.....	15,673,840	16,426,863
Deductions from gross income.....	9,177,456	7,416,073
Net income.....	6,496,384	9,010,790
Income appropriated for investment in physical property.....	3,055,961	2,538,571
Income appropriated for sinking and reserve funds.....	51,790	41,394
Total appropriations of income.....	3,107,751	2,579,965
Income balances.....	3,388,633	6,430,825

*Includes two months federal compensation, six months government guarantee and four months corporate operation, excluding hire of equipment and joint facility rents, shown as non-operating items.

PITTSBURGH & LAKE ERIE.—Annual Report.—The income account for the year ended December 31, 1921, follows—

	1921	1920
Miscellaneous.....	228	225
Operating revenues.....	\$23,226,057	.....
Operating expenses.....	20,144,436	.....
Net from railway operations.....	2,888,761	.....
Railway tax accruals.....	1,201,858	.....
Railway operating income.....	1,682,355	.....
Net railway operating income.....	4,066,867	*\$3,727,618
Total other income.....	4,157	1,559,106
Gross income.....	4,034,274	11,286,726
Total deductions from gross income.....	1,638,312	3,044,799
Net income.....	2,395,961	8,241,927
Dividends declared (10 per cent each year) in 1921, 6.6 per cent charged to income, and 3.38 per cent to profit and loss.....	2,184,961	3,598,560
Surplus for the year.....	.....	4,643,367

*Includes compensation for January and February, guaranty, March to August, and net railway operating income corporate—September to December.

Items not shown are not comparable.

READING COMPANY.—Annual Report.—The income for the year ended December 31 1921, compares with the previous year as follows:

	1921	1920
Receipts:		
Interest and dividend receipts.....	\$10,870,103	\$11,942,639
Rent of equipment.....	3,835,612	3,773,830
Rent of Delaware River wharves and other property.....	589,991	349,864
Miscellaneous income.....	732,333	.....
Total income.....	16,028,040	16,066,333
Expense—contingent.....	144,051	125,988
Deduct:		
Interest on funded debt.....	3,731,908	3,756,511
Interest on Reading Co., Jersey Central Co.—lateral bonds.....	920,000	920,000
Rental of leased equipment.....	374,625	442,135
Taxes.....	965,690	779,508
Total deductions from income.....	6,337,354	6,218,602
Surplus.....	9,546,635	9,721,743

RUTLAND.—Annual Report.—The income account for the year ended December 31, 1921, follows:

	1921	1920
Mileage operated.....	415	415
Operating revenues.....	\$5,811,556	.....
Operating expenses.....	5,203,707	.....
Net from railway operations.....	607,848	.....
Railway tax accruals.....	298,829	.....
Railway operating income.....	308,913	.....
Net railway operating income.....	450,911	*\$899,978
Total other income.....	135,217	83,855
Gross income.....	586,128	983,832
Interest on funded debt.....	447,326	450,573
Total deductions from gross income.....	322,401	601,421
Surplus for the year.....	13,326	382,411

*Includes compensation accrued for January and February, guaranty, March to August, and net railway operating income—corporate—September to December.
Items not shown are not comparable.

SANTA FE & LOS ANGELES HARBOR.—Asks Authority to Issue Stock.—This company has applied to the Interstate Commerce Commission for authority to issue \$50,000 of stock for the construction of a line in Los Angeles County, Calif., to be operated as an extension of the Atchison, Topeka & Santa Fe.

SOUTHERN PACIFIC.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Southern Pacific Issues Interesting Report."

Comments Concerning Separation of Central Pacific.—See article on another page. C. P.

TUCKASEEGE & SOUTHEASTERN.—Authorized to Acquire Line.—This company has been authorized by the Interstate Commerce Commission to acquire and operate the railroad from Sylva to Blackwood, N. C., 12.26 miles.

WICHITA NORTH-WESTERN.—Rock Island Inspects Line.—See Chicago, Rock Island & Pacific.

Railway Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts:

Toledo, Peoria & Western.....	\$325,000
Central Union Depot & Railway Company of Cincinnati.....	25,000
York Harbor & Beach.....	50,000
Chicago, Rock Island & Pacific paid Director General..	2,500,000

Dividends Declared

Chicago, Indianapolis & Louisville.—Preferred, 2 per cent, semi-annually; common, 1½ per cent, semi-annually; both payable July 10 to holders of record June 30.
Chicago, St. Paul, Minneapolis & Omaha.—Common, 2½ per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable August 21 to holders of record August 1.
Mahoning Coal Railroad.—Common, \$5, semi-annually, payable August 1 to holders of record July 15; common, extra, \$15, payable July 1 to holders of record June 24; preferred, 2½ per cent, semi-annually, payable July 1 to holders of record June 24.
Philadelphia, Baltimore & Washington.—3 per cent, semi-annually, payable June 30 to holders of record June 15.
Rensselaer, Saratoga.—\$4, semi-annually, payable July 1 to holders of record June 15.

Trend of Railway Stock and Bonds Prices

	June 13	Last Week	Last Year
Average price of 20 representative railway stocks.....	64.18	65.01	53.68
Average price of 20 representative railway bonds.....	85.62	86.06	72.79

Railway Officers

Executive

W. L. Stanley, general attorney of the Seaboard Air Line, has been elected vice-president in charge of public relations and kindred matters.

M. H. Cahill, general manager of the Seaboard Air Line, has been elected vice-president in charge of operation with headquarters at Norfolk, Va.

Robert E. Ryan, superintendent of the western division of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been promoted to vice-president and general manager with the same headquarters effective June 15, to succeed Elliott E. Nash, resigned to become western representative of the American Locomotive Company with headquarters at Chicago.

A. H. Smith, president of the New York Central, has had his jurisdiction extended to include the presidency of the Chicago River & Indiana, pursuant to the recent acquisition of this property by the New York Central interests and the consolidation with it of the leased property of the Chicago Junction; and **George Hannauer**, vice-president and general manager of the Indiana Harbor Belt, with headquarters at Gibson, Ind., has had his jurisdiction extended to include the vice-presidency of this property. Pursuant to the change in the administration of the Chicago Junction, R. Fitzgerald, president of the latter company, and H. E. Poronto, vice-president, both with headquarters at Chicago, have resigned.

Charles S. Lake, whose appointment as assistant to the president of the St. Louis Southwestern, with jurisdiction over all departments, effective June 5, was reported in the



C. S. Lake

Railway Age of June 10 (page 1368), was born on May 27, 1871, at Front Royal, Va., and entered railway service in May, 1885, as a telegraph operator on the Richmond & Allegheny (now a part of the Chesapeake & Ohio). Subsequently he served in yard and train service on the Chesapeake & Ohio and on the Norfolk & Western until September, 1888, when he was promoted to dispatcher on the latter road. A year later he became a dispatcher on the Chesapeake & Ohio, but reentered the service of the Norfolk & Western

in January, 1897, after which he served consecutively as night chief dispatcher, general yardmaster and assistant trainmaster at Norfolk, Va., and Bluefield, W. Va., until 1902, when he became a trainmaster on the Southern. During the next five years, he served as trainmaster and superintendent on the Danville & Western division of this road. He then became superintendent of the New York, New Haven & Hartford. He held this position, first at Hartford, Conn., and later at Waterbury, until 1912, when he was appointed general superintendent of the Minneapolis & St. Louis, which position he relinquished in May, 1914, to become general manager of the Seaboard Air Line. He continued with the latter company until June, 1917, when he left to perform special service for the president of the Erie, a position he held until the period of federal control. Consecutively thereafter he was engaged

as assistant director of the division of operation of the Railroad Administration, and as assistant to the director general of railroads until August, 1920, as general manager of the Norfolk & Southern until June 1, 1921, and as assistant to the president of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., until the date of his recent appointment.

Financial, Legal and Accounting

E. H. Bunnell, general auditor of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been elected comptroller, a newly created office, effective May 17, and the title of general auditor has been abolished.

B. A. Little, assistant freight claim agent of the Chicago & North Western, has been promoted to freight claim agent, with headquarters at Chicago, to succeed H. C. Howe, whose death was reported in the *Railway Age* of June 3, page 1318.

Operating

N. D. Connolly, trainmaster, has been promoted to superintendent with headquarters at Gibson.

Lynne L. White, trainmaster of the Erie at Hammond, Ind., has been promoted to superintendent with the same headquarters, effective June 10.

James P. Carey, superintendent of the Nebraska division of the Union Pacific, with headquarters at Omaha, Neb., has been transferred to the Los Angeles division, with headquarters at Los Angeles, Cal., to succeed T. P. Cullen, retired.

Forrest W. Rosser, division superintendent of the Chicago region of the Erie, with headquarters at Chicago, has been promoted to the newly created office of superintendent of transportation of the Chicago region, with the same headquarters, effective June 10, and the office of superintendent at Chicago, has been abolished.

Mr. Rosser was born at Arcanum, Ohio, on April 19, 1874, and entered railway service on July 1, 1888, as a messenger in the telegraph office of the Cincinnati, Jackson & Mackinaw (now a part of the Cleveland, Cincinnati, Chicago & St. Louis), in which capacity he served until July 1, 1890, when he was promoted to operator, a position which he relinquished

October 1, 1891, to become an operator on the Pennsylvania. Subsequently from that time he served as operator, conductor and extra dispatcher on the Pennsylvania until December 1, 1898, when he became a dispatcher on the Baltimore & Ohio. In June of the following year he entered the employ of the Chicago, Milwaukee & St. Paul in a like capacity, and continued as dispatcher until January 1, 1903, when he became chief dispatcher on the Chicago, Rock Island & Pacific. Thereafter he served as chief dispatcher until February 29, 1904, as trainmaster on the Iowa and Illinois divisions until June 1, 1912, and as superintendent from that time until June 1, 1916, when he became connected with the Missouri, Kansas & Texas as trainmaster. In the service of this company, he was promoted to superintendent on January 15, 1917, and continued in this capacity until February 1, 1918, when he was appointed an assistant superintendent of the Erie. Thereafter he served as assistant superintendent until March 1, 1920, and as superintendent of the Chicago division until his recent promotion to superintendent of transportation.



F. W. Rosser

J. F. Lord, superintendent of safety and fire prevention of the Chicago Great Western, has been appointed to the newly created office of assistant to the general manager and the title of superintendent of safety and fire prevention has been abolished.

J. W. Smith, general superintendent of the Indiana Harbor Belt, with headquarters at Gibson, Indiana, has been promoted to general manager with the same headquarters to relieve George Hannauer, who retains the title of vice-president coincident with his election as vice-president and general manager of the Chicago River & Indiana which now controls the Chicago Junction. The office of general superintendent has been abolished.

Mechanical

M. L. Zyder, roundhouse foreman of the Indiana Harbor Belt, has been promoted to assistant master mechanic at Gibson, to succeed A. B. Fromm, promoted to master mechanic to succeed C. B. Nelson.

Engineering, Maintenance of Way and Signaling

R. A. Feldes, assistant to chief engineer at Gibson has been promoted to chief engineer to succeed O. H. Gersbach, transferred to chief engineer of the Chicago River & Indiana.

F. S. Purdy, roadmaster of the Los Angeles division of the Atchison, Topeka & Santa Fe, Coast Lines, has been promoted to inspector of track and roadway, to succeed J. E. McNeil, deceased.

Purchasing and Stores

A. H. Laret has been appointed assistant to the vice-president and chief purchasing officer of the St. Louis-San Francisco with headquarters at St. Louis, Mo.

Obituary

J. E. McNeil, inspector of track and roadway on the Atchison, Topeka & Santa Fe, Coast Lines, whose death on May 28 was reported in the *Railway Age* of June 3, page 1318, was born on March 16, 1847,

at Hamilton, Ont., and entered railway service in 1868 as a brakeman on the Illinois Central, where he served consecutively as brakeman, conductor and trainmaster until 1884, resigning at that time to become trainmaster of the Texas & Pacific. A year later he returned to the Illinois Central and was employed as trainmaster, first at Waterloo, Iowa, and later at Fort Dodge, until 1887, when ill health induced him to remove to California, where in December, 1887, he entered the service of

the California Southern, now a part of the Santa Fe. During his first year with this road he served as extra gang foreman and work train conductor and continued with the company from September, 1888, until October, as acting superintendent of construction and thereafter as conductor until November, 1888, when he became roadmaster on what is now known as the Los Angeles division of the Santa Fe, a position which he relinquished in December, 1906, to become inspector of track and roadway. While his death occurred suddenly, it is attributed largely to injuries received last November in a motor car accident which resulted in the death of several officers of the road, including W. H. Oliver, engineer of the Grand Division.



J. E. McNeil

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WE GUARANTEE that of this issue, 12,500 copies were printed; that of these 12,500 copies 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,600 copies for distribution at Atlantic City.

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Probably few men who are familiar with the evolution of the Rules of Interchange read the report of the Arbitration Committee without a feeling of surprise that the committee has again proposed a combination of defects constituting unfair usage. The general trend of the rules has been

to place more and more responsibility on the car owner. This naturally has the effect of enforcing a higher standard of construction and maintenance, which is admitted to be desirable. To include in the Interchange Rules any provision making the delivering line responsible for such items as the breakage of wooden sills or bending of steel center sills without cover plates, regardless of physical condition, would be an invitation to perpetuate weak construction and poor maintenance, particularly for non-operating companies or those handling light trains. There is more involved in this ruling than the mere question of responsibility for damage. It involves in addition the policy that is to be followed in the perpetuation of old cars, the design of new equipment and even the size of locomotives. The decision of the committee is in line with the progress of railroad operation and the members are to be commended for the change in their recommendations.

Continuing a Progressive Policy

The discussion of labor questions seems to be tabooed by the Mechanical Division. The American Railway Engineering Association, on the other hand, has a strong and live committee which reports each year on the economics of railway labor. Is it not a serious mistake for the Mechanical Association to ignore these questions? What would it not mean to the mechanical departments if their officers and foremen were thoroughly educated as to the simple economics of the labor problem? Could they not deal to far better advantage with the employees under them, and could they not work far more effectively to build up that *esprit de corps* which is necessary in any organization if it is to make good in a large way? It is fortunate that some railroads realize the force of this argument and that the officers and foremen enjoy the full confidence and support of the men in the ranks. Railroad mechanical officers at large, however, could do much better in this respect if they would discuss questions of this sort at their annual meetings and compare notes. It is vitally necessary for American railroad officers and particularly the foremen, thoroughly to understand the problems of dealing with and supervising men. Why not discuss these matters at the Atlantic City meetings?

Why Not Discuss Labor Questions?

There was a time when a person desiring to obtain the latest information on railroad mechanical subjects instinctively turned to the proceedings of the Master Car Builders' or the Master Mechanics' Association and it was more than probable that he would there find the data desired.

Automatic Train Connectors

Can this be truly said of current reports of the Mechanical Division? For example, suppose information is desired in regard to the present development and extent of application of automatic train connectors. If one turns to the report of the committee on Train Brake and Signal Equipment he finds in a few lines devoted to the subject that "one maker * * * reports having 15 locomotives, 12 passenger trains, 100 ore cars and 34 slag cars equipped" and "another maker claims to have five passenger trains in Canada and one in the United States equipped". One would infer that this was the full extent of the development at the present time. Even a casual investigation, however, would have disclosed the fact that there were more than two manufacturers and a larger number of connectors in service. The report is perfunctory and barely sufficient to be called a report. There is no intimation as to the character of the couplers, their defects or success. Had the subject been of no importance to the railroads the committee could not have shown any less interest. If it was thought that the whole proposition was valueless, why did not the committee come out and say so? This would have at least been action and would have brought the matter up for discussion on the convention floor.

Notable improvements have been made in the average standard of railroad refrigerator cars during recent years.

Developments in the Refrigerator Cars

Many roads now have cars which are up to the standard of refrigerating efficiency that is necessary for carrying meat and similar products. Three desirable features are becoming practically standard in refrigerator car construction, basket bunkers, insulated bulkheads and floor racks. Insulation in the walls of the car is receiving careful attention and

most of the recent designs provide low conductivity, although in some cases there seems to be room for further improvement. The importance of providing rigidity in the body and avoiding air circulation is generally recognized. When the body, because of weaving, is no longer tight and the insulation begins to sag down, the car will not maintain a low temperature and will be extravagant in the use of ice. Realizing these conditions, some roads have been experimenting with steel refrigerator cars, and others with insulation which has sufficient structural strength to stay in place indefinitely and add somewhat to the stiffness of the cars. Another recent innovation is the location of the refrigerating medium along the roof of the car instead of at the ends, to provide more satisfactory circulation of the cold air over the lading. The experimental work now underway holds promises of further increases in the efficiency with which refrigerated products are handled.

Most advocates of the gasoline engine driven motor car acknowledge that at the present time it is advisable to limit their use to such light weight cars as can be driven by gasoline engines which have already been developed for use on highway trucks. This distinctly limits the weight and carrying capacity of these cars and makes the problem at present one of finding the field where such cars will best fit and avoiding attempts to place them in service for which they are not well adapted. There is, however, a persistent demand for larger cars, which can not be ignored if this type of equipment is to be used as extensively as now appears probable. To develop thoroughly a large gasoline engine will take time, and while it may come in the next few years, the fact remains that nothing has yet been offered in which there is full confidence of assured success as regards economy and durability. In the discussion at a recent meeting of the New York Railroad Club, reference was made to a steam driven motor car of fair size which has given good service under severe conditions. As size limitations do not apply in the same manner to steam engines as to gasoline engines, it would seem as though there might be possibilities of development in this direction which should not be overlooked by builders and inventors. Moreover, equipment of this character would probably be well received by present railroad men who are accustomed to handle and maintain steam engines.

One of the most important uses of electric energy in railroad maintenance is that of electric welding. The process may be either spot, butt or arc welding—each has its uses and in the aggregate the possible applications reach an astounding total. The electrical engineer who has not investigated the possibilities of reclaiming worn and broken parts by arc welding has overlooked an opportunity for reducing maintenance costs which can scarcely be equalled in any other manner. Electric welding is not confined to iron and steel parts. It is conceded, of course, that ferrous metals form the great bulk of its applications in railroad work, but it does not follow that this is the limitation of the process. Brass, copper, bronze and aluminum have been successfully welded by the electric current. Welds made between two pieces of the same metal, or between different kinds of metal, have demon-

strated beyond question the practicability of the process. Moreover, with possibly a few exceptions, these non-ferrous metals can be welded to iron or steel with wonderful results. Non-corrosive metals, such as copper, for example, are frequently of greatest importance when they can be coupled with iron or steel to secure the necessary strength, and in such instances the electric welding of the two metals may prove of inestimable worth. It must be remembered that in all of the applications mentioned, the results that have been secured were obtained at the expense of no small amount of experimentation and study, but they indicate clearly what can be accomplished when care and thought are given to the electric welding art. A great opportunity is offered the electrical engineer, for on the great majority of roads there is no one in a better position to study the possibilities of electric welding.

The brake beam is one of the most important parts of the equipment on a freight car, both from considerations of safety and maintenance economy. It is subjected to severe loads in service and failure to withstand these loads is likely to result in disaster. It is an expensive piece of equipment to replace and frequent renewals are undesirable. After long and patient effort on the part of the Master Car Builders' Association, standard specifications for new beams have been established to which the roads are now required to adhere in interchange service. No limitations are placed on the condition of repaired beams, however, and anything which will hold together, provided its original construction indicates that it once passed the proof load requirements of the specifications, may be restored to service. This goes far toward destroying the effectiveness of the specifications and leaves the handling line without protection against weak brake beams. The committee on brake shoe and brake beam equipment has done well to formulate reclamation methods to overcome this situation. There may be differences of opinion with respect to the need for the facilities recommended by the committee in its 1921 report, but this is unessential. Any practice that will best meet local conditions may be followed provided the repaired beams are subjected to proof load tests and are not restored to service unless they meet the requirements of the standard specifications. The essential requirement, then, is that a testing machine be provided and used. If this is done the advantage of concentrating the reclamation work at central shops which can be provided with suitable facilities will soon become evident. Eventually the rules of interchange should prohibit the application of repaired brake beams unless they are known to have passed the specification tests.

A Break in the Brake Beam Defenses

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Electric Welding Opportunities

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The rolled center sill section recommended for adoption as standard for new cars by the Committee on Car Construction is worthy of most favorable consideration by the members of the Mechanical Division. It possesses at least two important advantages over a section built up of plates and angles, as is necessary in the case of the fish-belly type or of a channel and bottom angle flange in the case of sills of uniform section. Probably the most important advantage when comparing the proposed section with the fish-belly type is the greatly decreased opportunity for deterioration of the section through the development of corrosion. Every joint in built-up sills offers an opportunity

Advantages of a Unit Sill Section

Every joint in built-up sills offers an opportunity

for the accumulation of moisture, heavily laden with acid in the case of coal carrying cars, with the result that the effective area of the section is rapidly reduced. Not only does this increase the cost of maintenance during the life of the car, but the maximum period of service which can be obtained before the car is scrapped may be affected by as much as 25 or 30 per cent. In extreme cases cars with this type of sill have completely failed after a service of not more than 15 years. In the case of sills of the channel and angle type the extent to which corrosion affects the life of the sills is, of course, much less. In this case the greatest advantage of the proposed unit center sill section is in the more effective distribution of the metal. With the same sectional area this increases the strength by 10 to 13 per cent. There is also a decrease in the cost of construction because of the elimination of the bottom flange rivets. Such a section, once in general use, will become a tonnage production proposition and will, therefore, probably cost no more per ton than structural sections now in common use.

Even though the shop buildings provided may be adequate, well-lighted and modern in their design and the machine tools well selected, the cost of operation will depend to a considerable extent upon the utilization of the space and the arrangement of the machines.

Is Your Shop Properly Arranged?

Until an investigation is made, the needless expense frequently caused by unnecessary movements of material due to lack of consideration when planning the layout of machinery passes unnoticed. In manufacturing plants which were forced to know their operating costs in detail, there was long ago recognized the necessity of so planning the layout as to avoid every unnecessary move from the start to the finish of the manufacturing process. The ideal method is, of course, to receive the raw material at one end and so arrange that a job will pass through by the most direct route without backward movements, until it reaches the shipping department at the other end. While this is not always possible, the underlying principle is economically correct and has been followed as closely as possible by successful manufacturers. This same idea might well be more thoroughly kept in mind in connection with locomotive and car shops now that railroads are obliged to consider operating costs more carefully than they have had to in times past. Shops must be more economically operated. It is doubtful if a railroad shop exists anywhere in which it would not be possible to effect economies by rearrangements intelligently carried out after careful investigation. Time thus spent will produce results which will show good returns when the demand for output once more comes. The possibilities suggested apply not only to locomotive shops but to the blacksmith, boiler and car shops. It is to be regretted that no report is to be made this year by the committee on Car Repair Shop Layouts. There is some real work that this committee might do, and it is hoped that they will submit a report next year.

The logical thing to do after "spotting" power plant fuel wastes is to stop them and find some means of keeping them stopped. Fuel wastes can be stopped and maximum boiler efficiency obtained only by attention to many small details of apparently minor importance. These details include among others the careful lagging of boiler and steam pipes to prevent radiation loss; elimination of air leakage in furnace and boiler settings; checking up the loss due to in-

complete combustion from whatever cause; preventing the short circuiting of gases in boilers; removing soot and scale; calibrating the dampers; finding the draft which will provide the highest CO₂ without CO and still carry the load; equalizing the draft between the boilers; finding the right kind of coal; and determining whether it should be fired wet or dry. It is one thing to stop fuel wastes and another to keep them stopped. The latter result can be accomplished only by some effective method of checking the work of firemen or stoker attendants and giving them an incentive to fire the boilers as efficiently as possible. Automatic devices for recording variations in draft and the proportion of CO₂ for each boiler are available, and when properly interpreted afford a practical measure of the boiler efficiency attained. Firemen and stoker operators should be impressed, as is not often done, with the fact that coal is only another form of money; if shown how much coal can be saved each day by following correct firing methods, most of the men will try to apply those methods. By playing the different firemen and different shifts against each other and posting records of the individual performances another incentive is afforded. Perhaps the best method of all is to install some sort of bonus system whereby the firemen or boiler room attendants receive extra pay in proportion to the efficiency with which they fire the boilers. Where a bonus system, based on the proportion of CO₂ maintained during the day, has been used and given a fair trial it has almost invariably been successful.

No small part of the development of the modern automobile may be credited to modern machine operations, particularly grinding. These machines are now made of sufficient capacity to finish locomotive and car parts from the rough stock. In the speed of production, accuracy and smoothness of finish, grinding machines are unsurpassed. They are particularly adapted also for the truing of worn parts. These worn parts are usually surface hardened due to a rubbing or wire-drawing action and if a cutting tool were used to true the surface a considerable cut would necessarily be taken to get under this hard shell. With the grinding machine, however, just enough material is taken off to true up the surface and, because little material is removed, there is a considerable saving on the time required for the operation. Railroad shopmen have been a trifle slow in realizing the adaptability of grinding machines to their work. Now, however, plain cylindrical gap grinders for piston rods, valve stems and similar work have been quite generally installed; also surface grinders for guides and other flat surfaces. There are still some shops which do not utilize grinders to the greatest advantage and either get along without them or else use old grinders which, through lack of power and rigidity, are entirely unsatisfactory compared to the modern machines which are available. There is a big field for the more general introduction of grinding machines of various kinds and sizes for railroad work. Internal grinders should not be forgotten and surface grinders equipped with magnetic chucks are adaptable to a wide variety of work now performed on other types of machines. An interesting article on "Getting Results from Modern Grinding Machines in Railroad Shops," is published in the June *Railway Mechanical Engineer*, page 317, and another article showing what is being done along this line in English railway shops appears in the same issue, page 325. The time is coming, if it is not now here, when no railroad shop will be considered equipped for maximum production without a full compliment of modern grinding machines.

Program for Today and Sunday

Saturday, June 17.

Entire Day Set Aside by Mechanical Division V to View the Exhibits.

ENTERTAINMENT

10:30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3:30 p. m.—Orchestral Concert with Impromptu Dancing, Entrance Hall, Million Dollar Pier.

9:00 p. m.—Informal Dance, Carnival Night with Special Features by H. T. McConnell of Chicago, Ball Room, Million Dollar Pier.

Sunday, June 18.

3:30 p. m.—Sacred Concert, Music Rooms of Marlborough-Blenheim. The Albert Taylor Orchestra, New York City, and the following artists: Emily Stokes Hagar, operatic soprano, and the Criterion Male Quartette of Philadelphia; Charles Stahl, first tenor; William H. Carmint, second tenor; Harold Simonds, first bass; John Vanderslott, second bass.

Enrollment Today and Sunday

THE ENROLLMENT BOOTH will be open today—Saturday—from 9 a. m. to 12 noon; 2 to 4 p. m.; and 7 to 9 p. m.

On Sunday it will be open from 11 a. m. to 12 noon and from 7 to 8 p. m.

Will You Get Any of This?

NEWSPAPER DISPATCHES STATE that India recently has floated in London a loan of £75,000,000 and that most of the money is to be spent in the improvement and expansion of the railroads of that country. Some American manufacturers of equipment and supplies have found India a very good market in the past, and doubtless will get busy trying to get their share of the new business coming.

Lost and Found

BADGE No. 15 belonging to Willard Kells, superintendent of motive power of the Atlantic Coast Line, has been lost. Anyone finding it is requested to return it to the headquarters of the enrollment committee.

LOST! The following lost items have been brought to our attention by Secretary Conway of the Railway Supply Manufacturers' Association:

Camera—by Mr. Carrigan of the International Machinery & Supply Company.

Badges Nos. 3695, 5672, 3803 and 8328.

Pair of gloves.

Will the finders please return these lost articles to Secretary Conway?

Movies of the "Prosperity Special"

THE "PROSPERITY SPECIAL" of the Baldwin Locomotive Works has attracted widespread attention throughout the country. Some excellent moving pictures have been obtained of its progress westward. These the Baldwin Locomotive Works have arranged to show in the Rose Room of the Hotel Traymore at 8:30 p. m., Sunday, June 18.

The train consisted of 20 locomotives recently shipped to the Southern Pacific Lines. These pictures are

markable in that they show not only the heaviest locomotive train ever moved, but also the scenic beauty of Pennsylvania between Philadelphia and Pittsburgh.

S. M. Vauclain, who was primarily responsible for the movement of this train and who clearly foresaw the stimulating effect which such a demonstration would have toward inspiring public confidence and aiding business improvement, will deliver an address.

Registration Figures

THE REGISTRATION FIGURES from four o'clock Thursday afternoon to four o'clock yesterday afternoon tell an interesting story and show an increase in the attendance of 758 people within this period of time. This increase was made up as follows: Railway men, 76; purchases and stores 10; special guests 96; supply men 544; railroad ladies 84; supply ladies 48.

The following figures show the registrations for 1922 and 1920. They show complete registrations up to four o'clock of the third day of the respective conventions:

	1922	1920
Members, Mechanical, A. R. A.....	554	666
Purchases and Stores.....	26	37
Special guests	276	285
Supply men	2,215	1,935
Railroad ladies	421	413
Supply ladies	432	649
Totals	3,924	3,985

Cars on Track Exhibit

THE NUMBER OF cars shown this year on the Philadelphia & Reading track at the boardwalk and Mississippi avenue, just below the pier, is not as extensive as usual but will well repay one for a visit.

The only passenger car is one of the new steel coaches which the Philadelphia & Reading has received lately from the Harlan Plant of the Bethlehem Shipbuilding Corporation at Wilmington, Del. This car seats 78 people and weighs 117,600 lb., the length over-all being 72 ft. 5½ in., the length inside is 63 ft. 0 in. The trucks are of the four-wheel type, equipped with clasp brakes and spaced 49 ft. between centers.

Five freight cars are shown. The first one is a Virginian 120-ton coal car weighing 78,700 lb. light, built by the Pressed Steel Car Company. This car has Buckeye six-wheel trucks with clasp brakes operated by the "empty and load" brake. The car has one end jacked up and the truck run out for inspection after making 10,600 miles in regular service.

Two of the new Philadelphia & Reading hopper bottom coal cars are on inspection. Their light-weight is 53,900 lb. The coupled length is 42 ft. 11 in. and the length inside 39 ft. They are equipped with four-wheel trucks, having forged steel wheels and American Steel Foundry Company's steel side frames. One of the cars was built by the Cambria Steel Company and the other by the Middletown Car Works. Both are equipped with the empty and load brake, while a Minich super-safety hand brake is applied to one of them.

Another hopper bottom coal car shown is one belonging to the Westmoreland Coal Company, which has a capacity of 110,000 lb. and weighs 42,200 lb. light. This car has trucks with Synnington wrought steel side frame trucks.

The remaining car is a Michigan Central box car with Stafford roller bearing trucks.

A Visitor From Sweden

BROR VIKTOR PETERSSON, mechanical engineer on the Swedish State Railways, located at Norrköping, Sweden, is visiting the convention as part of a carefully planned survey and study of American railway problems. He has been making a thorough tour throughout the country, having visited Washington, Altoona, Cleveland, Chicago, West Burlington and various points on the Great Northern and Chicago, Milwaukee & St. Paul since his arrival in this country on April 15.

Mr. Petersson is particularly interested in the use of pulverized fuel on locomotives and has expressed disappointment in not finding more locomotives equipped for burning this fuel in this country. In Sweden the question is being actively investigated, for something must be done to

lower locomotive fuel costs. There are 10 locomotives there equipped for burning powdered fuel and all of them are giving excellent results. The greatest handicap in making this process a commercial success in Sweden has been the high cost of pulverizing the coal. From his investigations Mr. Petersson believes that we in this country have been using too high a grade of coal for our powdered fuel installations. He believes that a low gas coal of not too high thermal value will give better results than a high gas coal of high thermal value and reduce the liability of explosion. In Sweden they have had no difficulty with explosions whatever. They use a 50-50 mixture of Swedish coal, having about 9,000 B. t. u. and good English coal of about 14,000 B. t. u., and they seek to keep the volatile below 25 per cent.

In commenting on the use of Diesel locomotives or Diesel-operated cars in Sweden, Mr. Petersson says that this is restricted almost entirely to the privately owned lines in Sweden, of which there are a number, the Swedish government operating only about 50 per cent of the standard-gage mileage of the country. A large number of Diesel locomotives have been built in Sweden for railroads in southern Europe.

As is well known, Sweden has been very much interested in the use of roller bearings for car equipment and several experiments have been conducted. It has been found that friction is very materially reduced by their use and the only reason why this type of bearing has not been more extensively adopted is because of the initial first cost, for, as Mr. Petersson says: "We in Sweden are not rich like you people in America." These roller bearing tests have been extended to locomotives and tenders, the trucks of the locomotives and all tender wheels being equipped with the bearings. The tests have been fully as successful as those made on the car equipment.

Mr. Petersson is to remain in this country until about September 15 and after the convention is to continue his tour of inspection and investigation throughout the country. He will return to Chicago and proceed to the Pacific

coast, thence back to New York through the south. He will visit the principal shops and railways in his travels, giving particular attention to the study of refrigerator car equipment.

He has been very much impressed and delighted with the reception he has received on the railways he has already visited and desires to take this opportunity of making his appreciation known to the railways.

Breaks in the Ranks

IN *The Daily* of June 15, page 1422, we recorded the deaths of 27 members of Division V, Mechanical, American Railway Association, who had passed away since the last convention in June, 1920.

The news of the death of Joseph Maycock at Buffalo on the opening day of this year's convention brings to mind the faces of a dozen other supply men well known as attendants at these gatherings, who have passed to the Great Beyond during that period. They are:

Albert C. Ashton, treasurer of the Ashton Valve Company, who died on January 31, 1922.

Robert A. Bole, vice-president and district manager of sales at Pittsburgh of Manning, Maxwell & Moore, Inc., who died April 2, 1921.

James C. Currie, eastern representative of the Nathan Manufacturing Company, who was killed in an elevator accident December 11, 1920.

Otis Cutler, chairman of the board of directors of the American Brake Shoe & Foundry Company and a director in a number of other concerns, who died March 4, 1922.

Charles A. Lindstrom, assistant to the president of the Pressed Steel Car Company, who died September 2, 1921.

James B. Rider, vice-president and general manager of the Pressed Steel Car Company, who died November 3, 1921.

Joseph S. Ralston, president of the Ralston Steel Car Company, who died September 11, 1920.

Clarence E. Rood, sales manager of the Gould Coupler Company, who died December 11, 1921.

Frank P. Smith, railway representative of Manning, Maxwell & Moore, Inc., who died November 3, 1921.

B. E. D. Stafford, general manager of the Flannery Bolt Company, who died November 30, 1921.

John G. Talmage, president of the Talmage Manufacturing Company, who died August 25, 1920.

Harry R. Warnock, appointed vice-president in charge of mechanical matters of the Standard Steel Car Company in July, 1920, and prior thereto general superintendent of motive power of the Chicago, Milwaukee & St. Paul, who died January 19, 1921.

Joseph Maycock, who died on Wednesday night, last, was the railroad representative of Pratt & Lambert, Inc., for some 25 years, and was a familiar figure at the M. M. and M. C. B. conventions for a considerable part of that time.

Albert C. Ashton not only attended the conventions regularly, but was active in the affairs of the Railway Supply Manufacturers' Association. Also, it seldom if ever happened that Mr. Ashton came to the meetings without his mother—"Mother Ashton," as she was reverently called, not only by her family, but by her many friends. She, too, passed away a month ago in the same delightfully peaceful way in which she had lived.

James C. Currie was a man much like Mr. Ashton in many ways. He, too, had much to do with the activities of the railway supply men at these conventions; but his time of service was longer and the contact much more intimate. For several years he acted as treasurer of the organization.



Bror Viktor Petersson

While a considerable number of the present generation of followers of the conventions will not recall Frank P. Smith well, if at all, it is not so many years ago, in the days of the Hancock Inspirator Company and for some time after that concern was absorbed by Manning, Maxwell & Moore, Inc., when he was well known not only to many railway supply men, but also by a host of railway men.

Then there is B. E. D. Stafford—"Staff" as he was called with not a little touch of affection by a large number of men in the railway field. He was typical of the many splendid men who have brought the Railway Supply Manufacturers' Association to its present high plane; and it was those same simple, honest qualities which carried him to success in the company he served from its infancy. At the time of the last convention Mr. Stafford was confined to his home at Millville, just a few miles from Atlantic City, through a paralytic stroke, the last of a series of which finally caused his death last November.

No two of the other eight men were quite alike. Mr. Cutler was, of course, in a class by himself, judged purely from the heights he had attained in the world's affairs. Yet withal he was the fine, approachable fellow that made the lives of others so worth while; and he always concerned himself with the smallest details which made for cleanliness and progress in the ranks of the railway supply men. Of the remainder, it would be hard to draw close parallels. They differed in dispositions, sometimes widely, much as do men as a whole; but each had achieved something and each contributed in like manner to the progressive success which has culminated in what we see here at Atlantic City this year.

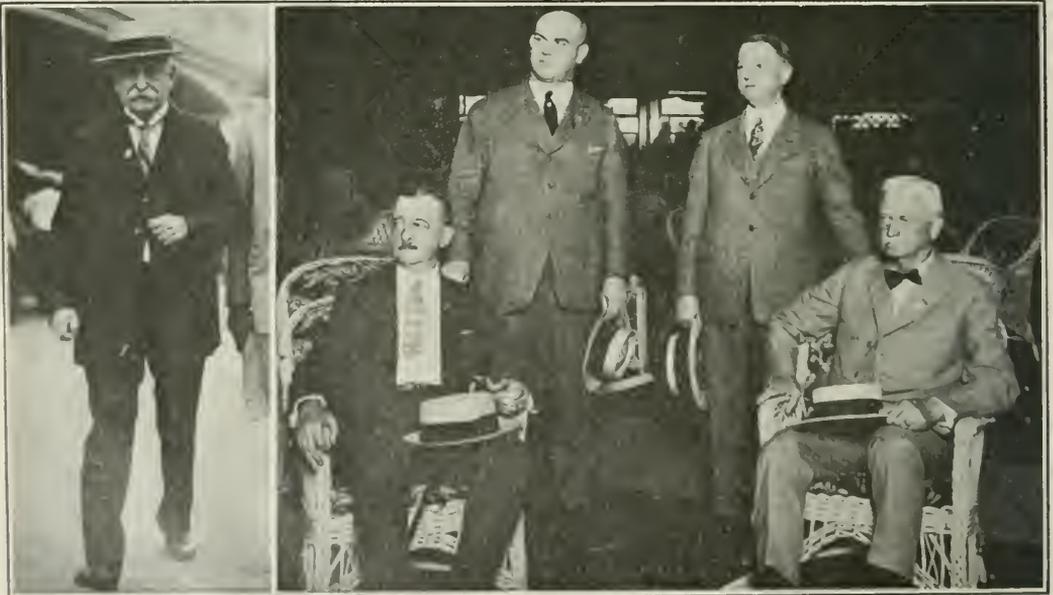
Canadian Night

IN HONOR of our Canadian members and the many Canadians who are attending the convention the Entertainment Committee put on a "Canadian Night" last night. The citizens of our neighboring country were there and they greatly enjoyed the attention given them and the evening's festivities, generally speaking. The ballroom on the pier was gaily decorated with the flags of their country and of ours. The dancing programs were also illuminated with the flags, in colors, of each country.

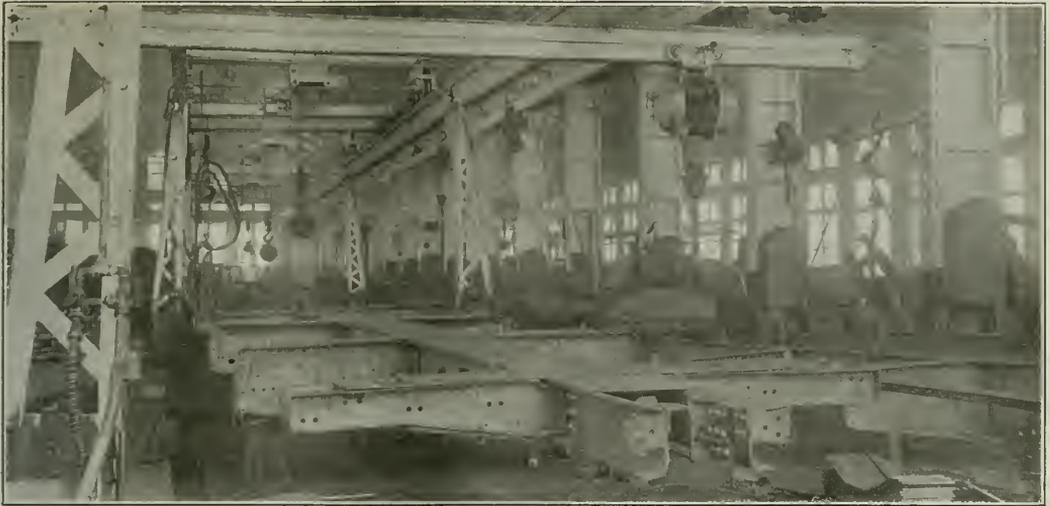
At 9:30 o'clock the dancing program, consisting of 16 numbers, commenced. In the intermissions refreshments were served and bits of vaudeville sketches given by artists from Montreal. They were here with the permission of Sergeant-Major R. J. Hiller, of the Fifth Royal Highlanders. They were Jack Hunter, Canada's Harry Lauder; James Robertson and Jean Thompson, juvenile dancers of considerable fame, and five members of the Royal Highlanders who were entitled "The Canadian Black Watch." Rhys Morgan, of New York, also sang. The night's entertainment was greatly enjoyed.

Those of the Entertainment Committee in charge of the evening were: W. J. Carrigan, chairman; Webb C. Krauser, assistant chairman; Oscar C. Hayward, A. R. Miller and W. A. McWhorter.

Mr. and Mrs. B. A. Clements are accompanied this year by their daughter and son. The son, Robert, has just finished a course at the Staunton Academy in Virginia.



Members of the Railroad Labor Board in attendance at the convention. Left to right: Judge R. M. Barton, Samuel Higgins, Walter L. McMenimen, G. W. W. Hanger and Horace Baker.



American Railway Association—Division V—Mechanical

The Committees Dealing With Construction and Important Details of Cars Reported Yesterday

Chairman Tollerton called the meeting to order at 10 a.m. and called for report of Committee on Car Construction.

Report of Committee on Car Construction

The work of this committee during the past 10 years has had a marked influence in bringing about a more general appreciation of the importance of correct fundamentals in the design of freight cars. This part of the committee's work, however, has been simple in comparison with the task of developing a set of standard car designs which will be generally acceptable to the members of the American Railway Association.

In 1915 the committee presented to the Master Car Builders' Association a design for an outside steel sheathed 40-ft., 6-in. box car. But the fur-

ther development of this or other designs was not pushed, owing to the action of a subcommittee of the old American Railway Association, under the chairmanship of the late E. P. Ripley, in taking up the same task. The war then intervened.

The committee has again actively taken up this work and hopes to present one or more complete designs next year. It now has 15 members who represent practically all sections and railroad interests in North America (except Mexico), and its greatest task is likely to be political rather than technical in its character.

Arrangement of Refrigerator Cars to Prevent Salt Water Dripping on Rails

THE VARIOUS REFRIGERATOR transportation companies have either developed a brine retaining valve of their own or favor some particular type of valve. So many of their cars are equipped with brine retaining valves of the type they favor that it will be difficult for them to agree on any other type of valve, unless it is something which is a great improvement over the one they now use.

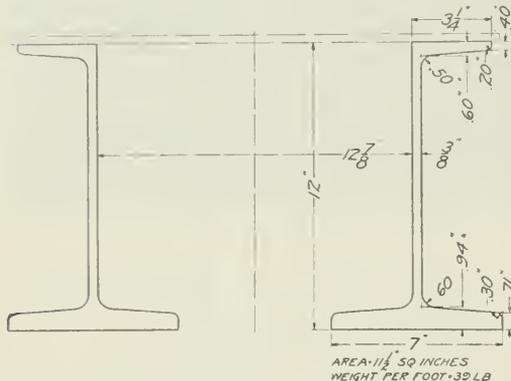
Such a device has not been called to the attention of the committee. It would, therefore, appear advisable to adopt a set of rules covering the design of valves and brine tank equipment, as well as for the inspection of this part of the refrigerator car.

A canvass of brine valve application to refrigerator cars shows that the cars of twelve railroads and car lines are either all equipped or will be, in all but one case, during the current year.

The following rules are suggested for adoption as a standard of the Association:

RULES FOR BRINE VALVE AND OPERATING RIGGING

1. Operating rods shall be solid and not less than $\frac{5}{8}$ -in. in diameter.
2. Operating lever at top shall be of wrought or malleable iron, with cross-section area not less than 1.5 sq. in.
3. Rubber seats shall be made of pure rubber, to resist the action of salt water.
4. Cast parts shall be of malleable iron, not less than $\frac{1}{4}$ -in. thick.
5. All parts of brine valves shall be heavily galvanized or sherardized.
6. All surfaces adjacent to rubber or other seats in the valves shall be machined and free from fins, blow holes or other defects.
7. Valve operating mechanism shall be so constructed that valve must be closed before plug can be put in place.



Proposed Standard Center Sill Section

8. Where possible, valves should be so arranged that weight of brine in tank will hold the valve closed.
9. The diameter of wearing pins and connecting bolts shall be not less than $\frac{1}{2}$ in.
10. All nuts shall be held in place by cotter pins at end or by lock nut.

RULES FOR CLEAN-OUT OR HAND-HOLE CASTINGS

1. Cast parts shall be of malleable iron, not less than $\frac{1}{4}$ -in. thick.
2. All parts of clean-out casting shall be heavily galvanized or sherardized.
3. Clean-out castings shall have a gasket between cover and clean-out frame.
4. The cover locking device should be simple in operation and easy to close.

RULES FOR BRINE TANK

1. The tank shall be made of heavily galvanized iron, not less than $\frac{1}{16}$ in. thick.
2. All joints shall be riveted and soldered.
3. Connection castings shall be made of heavily galvanized or sherardized malleable iron castings.
4. The brine tank shall be securely supported and fastened in end of car.

RULES FOR INSPECTION

1. See that rods, levers and other parts of the brine valves are connected, and that valves function properly.
2. Inspect the following parts for leaks: Clean-out castings, tanks, valves, and connections between tanks. All leaks shall be repaired before a car is loaded.
3. A card, reporting the brine tank equipment in serviceable condition, signed by the foreman in charge of the inspection, shall be filed before a car is loaded.

Standard Fundamentals for Cars

The committee desire to present the center sill section shown, for adoption as standard for all cars except those which, on account of insufficient side sill strength, require fish-belly center sills, such

as flat cars and gondola cars with very low sides. The section proposed presents the least surface for corrosion, with a maximum section modulus. Therefore, the loss in strength per year will be a minimum.

It is applicable to all cars, with few exceptions. It will reduce the number of rivets in center sills by an appreciable amount, and, therefore, will correspondingly reduce the cost of the car. Interchangeability of details will be very materially increased, reducing the amount of repair stock to be carried at the different shops.

We earnestly recommend that this section be adopted as the standard of the Association, for all cars which do not necessarily require fish-belly center sills, and that all railroads use this center sill section for all new construction.

Standardization of Marker Lamp Socket Brackets and Holders

The standard marker lamp socket and marker lamp bracket were brought to the attention of your committee, suggesting a standard marker bracket and socket to promote interchangeability. The committee proposes that a slight modification in the present standard socket be made by adding a bevel, and that a standard marker bracket foot be adopted, as shown in the illustration.

Care should be exercised to make the exterior of the bracket foot and the interior of the socket smooth and close to dimensions so that they will mesh properly.

Standard Box Car Body Designs

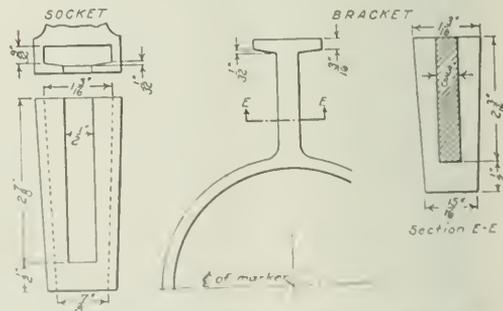
A number of meetings with the Committee on Car Design and Engineering, of the Car Manufacturers' Association of the United States, were held to go further into the question of fundamentals of car construction, which finally resulted in the submission of several preliminary designs by the Manufacturers' Committee, which are now under advisement by your committee, which hopes to submit one or more complete designs next year.

Equipment Classification to Facilitate Mileage Allowance on Private Cars

Under date of October 24, 1921, the Transportation Division issued a circular covering mileage rates, which led to requests for more definite and precise description of privately owned freight cars in the Equipment Register.

Representatives of the committee on car construction conferred with the subcommittee of the Committee on Records of the Transportation Division, who agreed that the value of mileage depends on whether or not the car is suitable for coal or coke. It was also agreed that a car which has sufficient strength and cubic capacity to carry its marked capacity of bituminous coal should be considered suitable for coal or coke. The Mechanical Division was, therefore, requested to provide two classifications instead of the present single classification "GB," with definition for each. The following is submitted for adoption:

"GB"—Gondola Car—A car open on top, with solid bottom, sides and ends, suitable for mill trade but not suitable for coal or coke.



Proposed Modified Standard Marker Socket and New Standard Bracket

"GK"—Gondola Car—A car open on top, with solid bottom, sides and ends, suitable for mill trade and for coal or coke.

Prof. I. E. Endsley (University of Pittsburgh): With regard to the $1\frac{3}{8}$ in. bottom arch bar to replace the $1\frac{1}{4}$ in. arch bar, I do not believe that much gain will be made for the point where the arch bars are breaking is at the bend, and at this point a large proportion of the stress is secondary, induced through the bending. Increasing the arch bar from $1\frac{1}{4}$ in. to $1\frac{3}{8}$ in. increases these secondary stresses 20 per cent, while the primary stresses are reduced only 10 per cent. Adding 20 per cent and taking off 10 per cent does not seem to improve it very much. I think more gain could be made by widening the arch bar instead of increasing its thickness. These statements are not made from calculations, either, but from actual tests.

Mr. Kiesel: From what Prof. Endsley said, it would seem that we are wrong in allowing a 50-ton arch bar truck, because we would have more stress. The arch bar is supposed to be supported in the bend and everybody is trying to do that. If we are wrong in increasing the arch bar for the 80-ton car, we are certainly wrong in having arch bars under the 100,000-lb car. I do not think that the reasoning is correct.

Prof. Endsley: I would like to submit to the Car Construction Committee a full record of something like 21 arch bars which I have tested.

Mr. Kiesel: We will be glad to have anything you can submit, establishing what you have stated and if the figures support your contention I think we will agree with you.

Mr. Downing: In these figures I presume that the figures which have been used for the last fifteen years in the cast steel truck side will be covered.

Chairman Tollerton: It is extremely important that we have a complete discussion before this report is submitted to letter ballot.

George W. Rink (C. R. R. of N. J.): The committee recommends a special stress for center sills. They also report a number of meetings with the Committee on Car Design and Engineering of the Car Manufacturers' Association of the United States, and they expect to have a design of standard box car body ready to report to the next session.

I would like to know whether or not they have passed on this question of the section of the center sill construction, or whether they will come out with another section.

Mr. Kiesel: As we understand it, whatever design the Mechanical Division adopts as standard, that design must be observed by every manufacturer who makes designs for the division. It will be expected that the members will follow it in the construction of new cars.

C. H. Bilty (C. M. & St. P.): Our road is in favor of going to a special shape of center sill construction, but of course we are a little hesitant to use something that we have never used before. We also feel that 24 sq. in. is ample for all of our requirements, which we are using both in repair work and on the new cars, and hence we feel that it would be more or less of a hardship to be compelled to accept the committee's recommendation in this respect.

Mr. Kiesel: As I understand it, Mr. Bilty's idea is that they now have cars with 24 sq. in. center sills, and assumes that the section recommended by the committee would have to be used in the case of all repairs. That cannot be done in all cases. You cannot substitute a 12-in. center sill for a 10-in. sill. But I believe that if the railroad men it they will be glad to adopt it for repairs they will save money.

F. H. Hardin (N. Y. C.): I would like to ask if the

dimensions, shown in Fig. 1, are included as part of the committee's recommendation?

Mr. Kiesel: They are.

Mr. Hardin: May I ask what thickness of the cover plate is recommended?

Mr. Kiesel: That question has not yet been settled by the committee. Tentatively it has been agreed that for box cars in which the superstructure assists the center sills more than on flat cars, we will use $\frac{1}{4}$ -in. cover, and on all other cars, $\frac{3}{8}$ -in. covers; 28 sq. in. on box cars and 30 sq. in. for all other cars.

G. S. Goodwin (C. R. I & P.): With the proposed section of center sill, it will be necessary to cut off the inside lower flange where the draft rigging is applied. I would also like to inquire if it is proposed to recommend or apply any reinforcement behind the draft rigging to get greater area from the front stop back to the bolster.

There is also a question as to the stake pockets on flat cars. It seems to me that it would be desirable, if possible, to say whether those pockets should be inside or outside of the sill.

Mr. Kiesel: We did not intend to be specific in regard to this, but to make a general rule which would cover strength conditions. As long as we do not have a standard flat car design, we cannot give a specific design and say it has got to be used.

Mr. Giles: The arch bar question would be solved to some extent by the committee embodying in their report a recommendation to the railroads that the use of arch bar trucks under new equipment should be discontinued. The use of arch bar trucks should be confined to existing equipment.

Mr. Tatum: Would it be wise to consider the elimination of the arch bar truck? There have been vast changes in the development of the arch bar truck and I think it would be a drastic action at this time to consider its elimination unless you stipulate the design that you care to eliminate.

Mr. Kiesel: Some of the members of the committee are very much in favor of eliminating arch bar trucks from new designs, but others are not. Even if we did make a suggestion it would not pass. I believe that question should be left until the committee has developed and furnished truck designs to be adopted as a standard and those truck designs should be such that all the stresses are properly cared for.

R. D. Bryan (Santa Fe): The proposed center sill is a special section and after you cut out for the draft gear, I do not see where you have anything better than a pair of commercial channels. These special sections are hard to get sometimes.

Chairman Tollerton: If the report of this committee is adopted, manufacturers will make the section which will be a regular section for car construction.

Mr. Kiesel: The sill section must be balanced, and in addition to the channel center sill, an angle is united to the bottom and a cover plate at the top. A section of that nature will have a section modulus corresponding with a section area of 115 or perhaps 120, while the section modulus of this is over 130, and thus for the same area you get greater strength.

Of course, we cut out for the draft gear; we do not run the angles into the draft gear now, but our backstop is behind the draft gear, and the column action is from rear follower plate to rear follower plate. This section, therefore, as a column carrying member is stronger than the same area we have used heretofore.

(A motion that the report be accepted and the vote taken by letter ballot was carried.)

Report on Couplers and Draft Gear

The long task of this committee in developing the Type "D" coupler has now been brought to a conclusion and in the future matters pertaining to couplers will require but little of its time.

This year's report marks the interim between the completion of one task and the active prosecution of another equally as extensive. For its future work the committee is now taking up the testing of draft gears that have been subjected

to a period of actual service, to supplement the Rochester tests of the United States Railroad Administration on new gears. A special drop testing machine is being developed for this work, the purpose of which is to furnish information of the same character as that obtained in the Rochester car impact tests, but with closer control of variable conditions other than those in the gears themselves.

DURING THE PAST year the activities of the committee with respect to draft gear investigation have been limited on account of the depression in business through which the railroads have been passing. It is the purpose to pursue the draft gear work diligently during the coming year.

Following are a number of recommendations concerning the Standard "D" Coupler Specifications and gages, which are submitted for your approval at this time.

Standard "D" Coupler Specifications

It is proposed to revise paragraph 15-B to require 10 per cent of the complete couplers to be weighed, rather than all the couplers. The revised paragraph follows:

"15-B. When couplers are purchased complete and assembled, 10 per cent of the couplers in each lot of 100 or less shall be individually weighed and shall come within the limits as shown on Fig. 6. Upon the failure of a coupler to come within the limits as shown on Fig. 6, the weighing shall be extended to the entire lot. Failure of any coupler to come within the limits shall be sufficient

developed by the manufacturers since adoption of the Standard "D" Coupler Specifications in 1918, and take care of the bottom operating mechanism for the coupler.

Table of Weights for the Standard "D" Coupler

The table of weights shown is recommended for approval to replace the table of weights now appearing in the "D" coupler specifications. The weight table has been revised to conform with the weights obtained on a large number of couplers and a column has been added giving the normal weights.

The report is signed by R. L. Kleine (chairman), Penna. System; J. C. Fritts, D. L. & W.; J. R. Onderdonk, B. & O.; J. A. Pflüger, N. & W.; C. B. Young, C. B. & Q.; L. K. Silcox, C. M. & St. P.; Samuel Lynn, P. & L. E.; L. P. Michael, C. & N. W., and Prof. L. E. Endsley, University of Pittsburgh.

Discussion

Mr. Bilty: The report states that "Failure of any coupler to come within the limits shall be sufficient cause to reject the coupler unless the weight can be adjusted by

LIMITING WEIGHTS—"D" COUPLER

Coupler Shank	Weight	Top Operation				Bottom Operation				
		Without Fittings	Comp. with 9 in. Knuckle	Comp. with 11 in. Knuckle	Without Fittings	Comp. with 9 in. Knuckle	Comp. with 11 in. Knuckle	Without Fittings	Comp. with 9 in. Knuckle	Comp. with 11 in. Knuckle
6 in. by 8 in. shank, 6 in. butt.....	Min.	266	385	389	267	389	395	389	395	405
	Nor.	274	397	401	275	401	423	401	423	423
	Max.	286	415	419	287	419	423	287	419	423
5 in. by 7 in. shank, 6½ in. butt.....	Min.	259	378	382	260	382	386	268	394	398
	Nor.	267	390	394	268	394	398	279	412	416
	Max.	279	408	412	280	412	416	267	390	394
5 in. by 7 in. shank, 9¼ in. butt.....	Min.	267	386	390	268	390	394	276	402	406
	Nor.	275	398	402	276	402	406	287	416	420
	Max.	287	416	420	288	420	424			

WEIGHT OF FITTINGS		Top Operation			Bottom Operation		
Fittings	Minimum	Normal	Maximum	Minimum	Normal	Maximum	
9 in. cored knuckle.....	90	93	97	90	93	97	
11 in. cored knuckle.....	94	97	101	94	97	101	
Lock.....	13.5	14.5	15.5	13.5	14.5	15.5	
Total weight of parts (with 9-in. knuckle).....	119	119	123	122	126	132	
Total weight of parts (with 11-in. knuckle).....	123	127	133	126	130	136	

cause to reject the coupler unless the weight can be adjusted by the manufacturer. Detail parts shall come within the limits as shown on Fig. 6, one coupler being dismantled in each 100 and weighed."

Actual experience in carrying out the "D" coupler specifications developed that weighing 10 per cent of the complete couplers furnished sufficient check on the product.

Gages for Standard "D" Coupler

The following gages for the Standard "D" Coupler are recommended for your approval: 16529-1—Bottom Lock Lift Lever Gage; 16529-2—Bottom Lock Lift Toggle Gage, and 16529-3—Bottom Lock Lift Lever Gage Pin. These gages have been

the manufacturer." Just how would the manufacturer adjust the weight?

Mr. Kleine: If you could get all parts of minimum weight in a complete coupler, it might fall below the minimum requirements. You could then put in a heavier knuckle, bringing the total weight of the coupler within the minimum specification weight.

Mr. Bilty: Then if the bar is perhaps a little under weight, or the locking block and the knuckle a little light, will the coupler be accepted?

Mr. Kleine: The coupler will be accepted.

Mr. Rink: I would like to ask Mr. Kleine whether he

has received any complaints of the Type "D" coupler lock lifter dropping down behind the lock and wedging in such a manner that it is impossible to throw the coupler? We have had several cases of that kind with couplers applied to Railroad Administration coal cars. It may be due to a faulty core, but I am wondering how extensive that trouble is on other roads.

C. G. Juneau (C. M. & St. P.): As far as our line is concerned, we have not had any trouble with the Type "D" coupler.

J. A. Pilcher (N. & W.): On the Norfolk & Western we have some very large cars using these couplers and I mention this because there has been some tendency to go back to the lighter coupler. In examining a group of these cars, where it is necessary to remove the couplers right along, one of the car men asked me a day or two ago: "What shall we do with these couplers?" Out of sixteen examined, three had upset 1 in., two of them $\frac{7}{8}$ in., three $\frac{3}{4}$ in. and four $\frac{1}{2}$ in. The rest of them had upset from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. The question is, what are we going to do next if we keep on hammering the cars? We must put some limit on the speed with which contact is made in switching.

Mr. Kleine: The Coupler Committee is glad to receive any information whatever in regard to defects which may develop in the Type "D" coupler. When it was designed we did not believe it was perfect, but we did take great care to get the coupler as near 100 per cent as possible. Mr. Goodnow called our attention to another case of the lift lever dropping back of the locking block and I think we had two cases of this kind on the Pennsylvania System. We ran those cases down, but could not find how the lifter could get back of the locking block. We cut sections out of the coupler and it was not possible to place the lifter so that it would drop down back of the locking block. We are convinced that somebody had taken the coupler apart

and had not placed the lifter back in the slot. If anybody else has experienced any similar trouble, the committee would be glad to hear from him now or by letter.

O. D. Buzzell (Santa Fe): We have had a number of complaints of the Type "D" coupler not coupling. At excessive speed they did not couple due to the locking device being slow to act. I think this is a good feature. We were always after our switchmen to couple up easy but there has been considerable complaint about rough handling on the part of the transportation department and switching yards.

Another thing I have noticed is the rapid wear of the pin holes in the coupler eyes. How we can increase that area I do not know, but a considerable amount of play appears at that point in a very short time.

Mr. Kleine: Of course, we all remember the trouble with the old standard coupler due to pin holes wearing rapidly in line with the lock pin, but there cannot be any such wear in the Type "D" coupler. Do you refer to that coupler, or to others?

Mr. Buzzell: I refer to the Standard "D" coupler.

J. J. Tatum (B. & O.): Some very enthusiastic things have been said about this type of coupler; however, there have also been some complaints about hard coupling, and I believe it would be a good idea for those who know of any cases of trouble to bring them to the attention of the Coupler Committee.

F. W. Brazier (N. Y. C.): It must be very gratifying to Mr. Kleine and the other members of the committee to know that there are so few complaints with reference to Type "D" couplers. I think that this will be handed down to posterity, as one of the greatest things you have ever done.

(A motion that the report be received and submitted to letter ballot was carried.)

Report on Brake Shoe and Brake Beam Equipment

Last year this committee gave particular attention to brake beam reclamation and recommended in detail a process to be followed in repairing brake beams the purpose of which was to insure that the repaired beams might fully measure up to the capacity required of new beams. The report presented drawings and photographs of a simple but comprehensive set of special devices to facilitate assembling and testing reclaimed beams systematically and cheaply. This equipment can be built largely of second-hand material. An ab-

stract of this report appeared in the *Railway Age* for August 20, 1921, page 369.

A further study of this subject prompts the committee again to emphasize the importance of having the repaired brake beam meet the requirements of the standard specifications, which can only be done effectively in properly organized central repair plants. The committee has under consideration the development of a standard brake beam design, in connection with which it will consider the advisability of adopting some form of brake head strength test.

The detailed work of the committee has been principally the further study and reclamation of subjects carried over from the previous year as follows:

Work of the 1st. Year.—The construction of a careful analysis of the work of the year was made, supplemented by reports from the general committee of the Eastern and Western Railroad Association covering the subject. The first back brake shoe, illustrated, is a standard design, which has been able to develop not covered completely. This design is recommended to letter ballot as Recommended Practice.

Recommendations were made for the use of reversible shoes, including that on the subject and those suggested by different members,

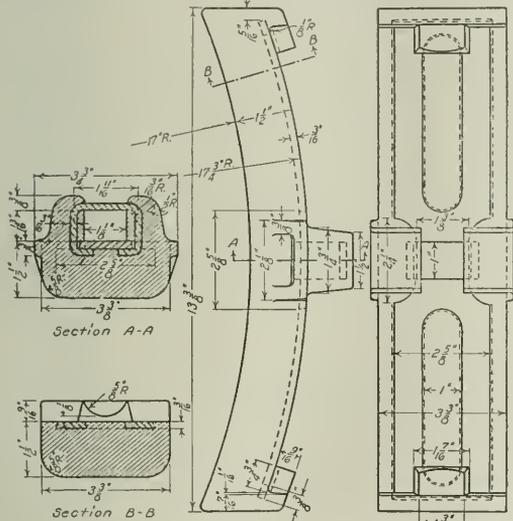
have been considered from the standpoint of demand and practicality. The committee feels that none of the designs have sufficient merit to warrant recommending them as Standard or Recommended Practice. The subject will be continued for further consideration.

Brake Beam Reclamation.—Last year the committee submitted as a progress report a tentative Standard Practice for the consideration of the members and requested their consideration and criticism. No criticism or suggestions were offered. A further study of this subject emphasizes the importance of repaired brake beams meeting the capacity and other requirements of the standard specification. To handle this work most efficiently, properly organized

central repair plants, provided with special equipment for assembling and testing, are recommended. The equipment, while special in character, is inexpensive and can be constructed largely of second-hand material, as suggested and illustrated in detail in last year's report.

Brake Head Strength Test.—In view of the desirability of a standard brake beam design and the progress being made in that direction, and also the demand for improvement in present practice in brake beam maintenance generally, the brake head strength feature has been deferred for action in connection with the standard beam.

Brake Shoe Key Design.—A canvass of the situation developed that brake shoe keys conforming to the standard drawing and properly applied give little trouble. It is believed that an improvement can be made by lengthening the head from $\frac{1}{2}$ in. to 1 in. and bending it over instead of upsetting it. This change is recommended for submission to letter ballot, as it involves a change in the standard drawing. It is further suggested that purchasers of brake shoe keys have such inspection made that will insure keys



Brake Shoe Proposed for Adoption as Recommended Practice

conforming to standard, and that railroads co-operate by having repair points use more care in maintaining better fitting keys, and when manufacturing their own keys to see that they comply with the standard.

Standard Practice Brake Beam Design.—The committee is not prepared at this time to submit a standard design of brake beam, and the subject will be continued.

Capacity Markings, Brake Beam Struts.—On suggestion made by the chairman of the Mechanical Committee, Brake Beam Manufacturers' Institute, the committee recommends for letter ballot changing Section 14 of the Standard Specifications for Brake Beams to read:

The A. R. A. Nos. 1, 2, 2-plus, 3, 4, 5 or 6, as the case may be, shall be cast on the center strut with raised letters and figures not less than 5/8 in. high and 1/8 in. in relief, where they can be readily inspected when beam is in place on car.

The report is signed by W. J. Bohan (chairman), Northern Pacific; C. B. Young, C. B. & Q.; F. M. Waring, Penna. System; M. H. Haig, A. T. & S. F.; W. H. Coddington, N. & W.; G. E. Smart, Canadian National, and T. L. Burton, N. Y. C.

Discussion

Mr. Bohan: In view of the fact that there were no replies received to the circular in regard to brake beam reclamation, the committee earnestly desires that that subject be given as free discussion as possible.

C. E. Fuller (U. P.): I would like to have some of the

car men here talk on the reclamation of brake beams. Brake beams are being reclaimed and put on cars in service, being of about as much use, as far as a practical brake beam is concerned, as if they were left off the car. It may be cheaper for the road applying that beam, but it is running the expense up on the other roads. I have a conviction that the reclamation of brake beams is a serious question. We evidently take the position that if a car has a brake beam on it it is all right and I think the car men who are here that are handling the beams ought to get up and say something. It is a matter of dollars and cents to us, and I for one would like to see some material saving on the brake beam problem. It is a pretty expensive item.

Chairman Tollerton: I think Mr. Fuller has touched on a very important subject. Brake beams are being reclaimed and returned to service which do not comply in any way, shape or form with the Master Car Builder's requirements. They are just there, that is all.

Mr. Fuller: It has been called to my attention and I have observed that brake beams have been applied by some railroads that had absolutely no tension in the brake beam. You could apply the brakes and almost bend the beam backward. Now, if the beam is worth reclaiming, it is worth reclaiming right, and if we cannot do it we should get someone else to do it. It is time that very careful attention was given to this matter of the reclamation of brake beams.

T. L. Burton (N. Y. C.): If the results of my observation, and the test reports we have in New York mean anything, Mr. Fuller is correct in what he says as to the manner in which some of the brake beams are reclaimed. The problem resolves itself into a matter of having adequate facilities for testing the brake beam, as recommended by the committee last year.

The New York Central, until comparatively recently, followed a practice which no doubt was in vogue on many of the other roads of so-called brake beam reclamation. At some of the minor plants each brake beam was taken apart and reassembled. There was some further work, such as pulling up the nuts on tension members and then the beam was restored to service.

In line with the committee's suggestion last year to collect some data as to what results were being had from the methods of reclaiming brake beams, the New York Central recently tested a large number of beams that had been reclaimed at its own shops and almost without exception these beams failed to meet the test requirements. We then removed these beams and loaded several carloads of the displaced, secondhand beams, sending an inspector with them to the manufacturer, who made necessary repairs. The beams were then subjected to the same test as called for in the specifications for the new beams and almost without exception they passed the requirements. The cost of restoring them to service under conditions was materially less than the purchase price of new beams.

In further compliance with the suggestion contained in the last committee's report on this subject, the New York Central is installing some of the facilities for subjecting the beams to proof test after we assemble them. I do not believe there is anything in connection with the brake beam proposition that is more worthy of consideration than the committee's report of last year on that particular item.

G. G. Juneau (C. M. & St. P.): We went very extensively into the question of the reclaiming of brake beams some years ago. Every little shop wanted to do some reclaiming. We started out to find what was being done in regard to the reclamation of the brake beams, and we dis-

covered that many of the shops did not have the necessary facilities for accomplishing the work, which was not being done according to standard practice. We then centralized the work at the main shop and it was discovered that testing machines were needed in order to find out whether the reclaiming was all right before the brake beam was sent out into service. We had apparatus which indicated whether the brake beam had the proper camber before we gave it a test.

We demand a certain capacity beam from the manufacturer, as Mr. Fuller said, and I believe we should all watch that particular feature closely in reclaiming brake beams and see that we are meeting the requirements demanded from the manufacturer.

The specifications for brake beams should be just as rigid for the reclaimed beam as for the new beam, and should give the service that we can expect in the case of a new beam. I was surprised to find the tension members of some beams I recently tested were made of channels and angles that had reduced in thickness of metal 25 per cent and more in some instances. How can we expect that metal so much reduced to give the strength in the beam that we require and how can we expect such beams when reclaimed to meet our specifications?

I believe there are other things in connection with our trucks and brake beams and brake attachments that should be considered. I found a number of brake beams in which the recommendations of the A. R. A. with regard to attaching the beam to the truck had not been followed.

There are other parts that should be given consideration. For example, in the winter time when there is snow and ice between the tracks, we find that the cotter pin is pushed in, resulting in the brake connection dropping down; some method should be adopted to hold the brake

rod in position in case the cotter pin or connecting pin is worked off and lost from its position.

Mr. Bohan: As a matter of general information, I will say that the connections and attachments for brake beams are under consideration by the committee.

T. H. Goodnow (C. & N. W.): While the committee has called attention to the situation with respect to the reclaiming of brake beams, it has made no definite recommendation as to the cure, or rather the enforcement of it. We can hold a love feast here and then go home and continue to do about as we have done in the past. It seems to me that if the members of this Association are sincere in what they are expressing, a remedy can be found in the adoption of some rules similar to the rules with regard to the triple valve work. In other words, regulations could be embodied in the interchange rules providing that on and after a certain date brake beams failing to meet the specifications set up for the reclamation, and not having been tested on recognized testing machines, should not be applied to foreign cars.

If some regulation of that kind is set up, it will at least stop the application of reclaimed beams to other than owners' cars and that matter could be fully controlled because we would have the means of checking it as we now check triple valve work. I believe that if the Brake Beam Committee would take the matter into consideration and recommend something definite of that kind, the Arbitration Committee could take care of the framing of the rules. You can only bring it about by some regulation of that kind. If this is not done, in my opinion many of us will go along as we have done in the past.

(A motion to accept the report and submit it to letter ballot was carried.)

Report on Train Brake and Signal Equipment

Following the 1919 report the committee was requested to investigate and report on the question of standard capacity for retaining valves. A sub-committee was appointed to make tests and in 1920 the committee reported progress and asked for further time on the question of retaining valve capacity. This year's report recommends adopting as standard the present recommended practice which calls for a two-pressure spring type retaining valve without specifying the capacity.

The question of automatic connectors was likewise referred to the committee in 1919; the 1920

report stated that, owing to the magnitude of the subject, the committee had done little more than outline a plan to be followed in investigating it. This year's report indicates little progress has been made in the matter.

In addition the 1920 report recommended that the following subjects be included in the next year's work of this committee: Permissible Use of Brake Cylinder Packing Made of Leather Substitutes, Gages for Signal Hose Coupling, Adjustment of Brake Power on Freight Equipment Cars. No report has been submitted on these subjects.

THE committee on Train Brake and Signal Equipment submitted the following report on subjects which have been considered by the committee during the year.

PART I. AIRBRAKE: HOSE CONNECTIONS FOR FREIGHT AND PASSENGER EQUIPMENT

The subject of permissible hose connectors for freight and passenger equipment has been further considered by a sub-committee and the report now hereby made to substance as follows:

On account of a general committee report having 15 locomotives, 32 passenger (P.M.E. 100) coaches and 41 freight cars equipped with three pressure connectors, and that there are progressing heavily

Another making status to have 3 passenger trains in Canada and one in the United States equipped with this type of connector

and are working with certain railroad officials in the direction of developing a freight connector.

Further than this, the reports are in the general direction of development only.

It will be seen from the above that the trials in general now being made are in passenger service and the progress of development in automatic train connectors is not such as to put the committee in possession of information at this time that will enable it to make any definite recommendations on an acceptable design of connector for both passenger and freight service.

PART II. REVISION OF CODE OF AIR BRAKE AND TRAIN SIGNAL RULES

The present code of Air Brake and Train Signal Rules is in need of revision, and a sub-committee has been appointed from the

Train Brake and Signal Committee to work in conjunction with a committee from the Operating Division on revising the code.

PART III—STENCILING BRAKE CYLINDERS

Attention has been called to the fact that in many cases where the stenciling is above the transverse center line of the auxiliary reservoir it frequently becomes illegible through drippings from the car. Experiments have been made on at least one large railroad by stenciling below the center line, which indicates an improvement.

We believe the practice of applying the stencil approximately one inch below the center line should be followed, which can be done without conflicting with the present requirements from the fact that the location for the stencil is not specifically indicated.

PART IV—RETAINING VALVES FOR FREIGHT EQUIPMENT CARS

The committee recommends submitting to letter ballot for advancement to standard, the present recommended practice, two-pressure spring type retaining valve for freight equipment cars.

PART V—BRAKE BEAMS

At the request of the Car Construction Committee, the Committees on Train Brake and Signal Equipment and Brake Shoe and Brake Beam Equipment have held several joint meetings during the year in connection with the strength requirements of brake beams, and have submitted their recommendations to the Car Construction Committee on the proposed status of number two and two plus beams.

The report is signed by T. L. Burton (Chairman), New York Central; B. P. Flory, New York, Ontario & Western; J. M. Henry, Eastern Region, Pennsylvania System; L. P. Streeter, Illinois Central; R. B. Rasbridge, Philadelphia & Reading; G. H. Wood, Atchison, Topeka & Santa Fe; H. M. Curry, Northern Pacific; W. J. Hatch, Canadian Pacific and G. C. Bishop, Long Island.

Discussion

G. G. Jumeat (C. M. & St. P.): I would ask the chairman of the committee, referring to the automatic connector, whether they have actually seen a test of the connector. Did the committee actually see the train broken up and the cars recoupled by the use of the connector?

Mr. Burton: A sub-committee, composed of Mr. Bishop (Long Island) and Mr. Hatch (Canadian Pacific), have, as individuals but not in the capacity of members of the committee, made the observations referred to in our inquiry.

J. M. Ryan (C. St. P. M. & O.): We have had a little experience with the automatic connector in passenger car equipment. The Canadian Northern has been operating a train at a large terminal for a year satisfactorily, and while I do not know what trouble they have experienced on the other end of the line, as far as we were concerned we experienced no trouble in that year. Just recently, for some unknown reason, the connectors were taken off. I inquired as to why and was unable to get a definite reply, but as far as our experience went the connector was a success.

B. J. Fogg (Grand Trunk): We have three trains equipped with the automatic train connector for test purposes; two of these trains run between Detroit and Grand Haven, a distance of 186 miles, and another train works between Battle Creek and Port Huron, a distance of 159 miles. These trains are equipped at both ends of the road and they are working out splendidly. They have been in service under tests for pretty nearly two years.

Mr. Burton: I might state, in connection with the automatic hose connector, the committee feels that there has been no test made up to date that will have an important bearing on the performance of the connector when applied to freight cars.

Passenger train tests, covering a run in many cases of small mileage and switched at one or both ends of the road, mean little compared to the movement of coupling and uncoupling which would occur on freight train cars in classification yards. There have been several test trains with the connectors run in passenger service, but we get from these movements little information about how the connector would work in freight service.

Mr. Tatum: I agree with our committee that we have got to go very carefully in establishing a decision on the automatic connector. The trains which are made up for testing get very careful attention, careful switching, and as a rule these cars are handled together, but when these cars get into general use, there will be difficulties to contend with. We have three different connectors under test and it is difficult to say what we might expect if they were in general use. (*It was voted that the report of the committee be accepted and the various items recommended by the committee submitted to letter ballot.*)

Report of Committee on Car Wheels

The committee has had under consideration the possibility of mounting wheels having the same physical characteristics on the same axle as a means of increasing their service life. It has reached the conclusion that the only practicable way of mating wheels of equal hardness is in the case of solid wrought carbon steel wheels, to pair those with a carbon content varying by not more than .05 per cent and in the case of cast iron wheels to continue the selection by tape sizes now covered in the recommended practice.

A few roads have been experimenting for the purpose of developing a chemical specification for cast iron wheels. The committee now has this subject under consideration and tentative specification has been prepared for the consideration of the wheel manufacturers. Owing to the number of interests affected, this is a matter requiring a thorough survey before final recommendations can be formulated and presented to the Division.

IN ORDER to clarify the matter of condemning limits of steel and steel-tired wheels on account of wear, the committee recommends the following rule as Interchange Rule 79, under the freight car code and as a paragraph of Rule 7 of the Passenger car code:

"Thin tread: Steel and steel-tired wheels.—If tread is worn to within $\frac{3}{4}$ in. of the measuring line, which is the inside edge of the limit of wear groove."

There is recommended the introduction of an additional drawing in the code of rules to follow Fig. 4, now shown on page 220 of the 1921 revised code; also Fig. 4, M. C. B., sheet 16-A.

In 1920 the contour of the back of flange of steel and steel-tired wheels adopted in 1912 was withdrawn from the standards and the 1909 contour readopted as standard. With the 1912 contour the

as A, B, C, and such roads are following the practice of making the wheels within this range with the thought that the carbon contents being close, the wheels are more nearly of the same hardness and that under those conditions better mileage is obtained.

Mr. Juneau: It would seem to me that the committee in recommending this change or addition to the paragraph should recommend some way of marking the wheels so that they will all work alike.

Mr. Henry: The committee felt, as this is merely a recommended practice, that if this recommendation met with the approval of the Association it might be desirable to go further in the matter. This is merely a recommendation.

Mr. Fuller: The wheel manufacturers at present furnish to each mill a statement showing the carbon content from which this information can be derived. The committee had not gone to the extent of including in the specifications for wrought steel wheels anything covering the subject.

J. E. Mehan (C. M. & St. P.): Supplementing the remarks of Mr. Juneau, I notice that new wrought steel wheels, when mounted, shall not have a carbon content of more than .05 per cent. It strikes me that is a good requirement for new wrought steel wheels and it ought to be equally good for re-turned wheels. The point of having a uniform marking, to my mind, is very essential for the reason that if we return wheels from other roads in order to get uniform wheels on the same axle, we ought to know the other fellow's method of determining the carbon content. For that reason it strikes me there should be some uniform method.

Mr. Fuller: I am inclined to believe that this recommendation is impractical. We are depending entirely on the manufacturers to know the carbon content of these wheels. Everybody understands that the committee could not mount a pair of wheels, both having the same carbon content, without due respect to the tape sizes. The wheels would have to be marked by the manufacturer, or you would get my wheels and not know whether they contained .05 per cent or what the amount of carbon was. I do not believe that you can live up to it, even if the wheels are marked.

Mr. Tatum: The limit groove, shown in Exhibit A, is $\frac{3}{4}$ in. from the bottom and the condemning limit shows $\frac{3}{4}$ in. above that limit groove. Suppose the metal was $\frac{1}{4}$ in. thick at that point and the car was offered for interchange; should it be accepted?

Mr. Henry: Yes, sir.

C. T. Ripley (Santa Fe): It has been found practicable to make wheels in accordance with the carbon content, varying not more than .05 per cent, and merely marking that group by letters. The results which can be secured are somewhat questionable, but we feel there is a chance of better wear. Inasmuch as we can take that chance with practically no extra expenditure either in first cost of the wheel or work in the repair shop, it is worth going after. As regards marking old wheels, the difficulty is that many of the roads (and they have a good argument for so doing) dismount wheels where but one wheel is worn. Therefore, the committee did not care to make any rule regarding worn wheels. When it comes to the scrapping limit of rolled steel wheels, I think this is a bigger subject than appears on the surface. For years we have been throwing away rolled steel wheels by hundreds and thousands with an inch of metal in the tread. The wisdom of this is somewhat questionable. We started with tires and had such a limit. The rolled steel wheel gradually developed and we followed the same practice for two reasons: First, we knew very little about what we could get out of the rolled steel wheel, and second, some of the

roads felt their coupler heights would be involved. Some roads have cars and locomotive tenders which could use wheels worn down $\frac{1}{4}$ in. further. If it is safe to use a rolled steel wheel with $\frac{1}{4}$ in. more wear in service, it would mean the saving of hundreds of thousands of dollars to our railroads. In order to find that out, some experiments have to be made. First, we can go into the laboratory and make drop tests with testing machines to determine the strength of the flanges. Second, we can observe our failures on the line. Indications from both these tests show that we have not gone as slow on rolled steel wheels as we should. The limit of wear on rolled steel wheels is governed by the distance from the throat to the underside of the rim on the back. We run into a sharp corner at this point which would tend to make breakage improbable. With a full radius at this point, we have a $1\frac{3}{8}$ -in. limit. This does not seem fair to the rolled steel wheel. I do not think anyone wishes to take any chances of accident but on the other hand we do not wish to throw away material which is really serviceable. In order to try this out in service, it was thought switch engine service might give us some figures before a further step was made or before recommending its general use. We hope some figures will be obtained in that way which will aid us in this study. The general feeling is that the failure of a flange on a rolled steel wheel is not due to the tread being thin or this dimension being down to $1\frac{3}{8}$ in. but due to a defect in the wheel.

James Hall (So. Pac.): The present method of gaging the service metal on rolled steel wheels is, in my opinion, far from satisfactory.

Our book of rules instructs us to measure the service metal from the base of the measuring line, this line to be not less than $\frac{3}{4}$ in. above the critical line, but it makes no provision for the measuring line being more than $\frac{3}{4}$ in. above, which is very frequently the case. It is my opinion that we are sustaining a loss of thousands of dollars yearly, in wheel service by this practice.

Our standard drawings show the measuring line as $\frac{3}{4}$ in. above the critical line, and the condemning limit or line of wear, $\frac{1}{4}$ in. above that, leaving a thickness of one inch of metal above the critical line, which no doubt, is ample for safety.

Our specifications for new wheels require a measuring line not less than $\frac{3}{4}$ in. above the critical line and not less than $1\frac{3}{4}$ in. of metal above the base of measuring line, thereby assuring us at least $1\frac{1}{2}$ in. of service metal or $2\frac{1}{2}$ in. total thickness of rim.

The manufacturers evidently do not confine themselves strictly to these dimensions, in many cases furnishing a wheel which exceeds $2\frac{1}{2}$ in. in thickness and instead of placing the measuring line $\frac{3}{4}$ in. above the critical line, they place it $1\frac{3}{4}$ in. below the base line at the top of the tread. This practice can not be objected to as it fulfills all requirements, but, when gaging worn wheels as to their scrap limit, or actual thickness of service metal, the extra metal below the measuring line should not be overlooked.

We often find wheels with the measuring line $\frac{7}{8}$ in. or 1 in. above the critical line and if we were to condemn such wheels by taking the measuring line as a basis, as we are instructed to do in the book of rules, we would then be throwing away from $\frac{1}{8}$ to $\frac{1}{4}$ in. of valuable service metal.

As the actual thickness of metal in the rim of the wheel determines its value and as one inch has been decided as the limit of wear, why not keep them in service until they have reached that limit, disregard the measuring line, and measure the actual thickness above the critical line? The measuring line is evidently placed there to aid wheel inspectors in determining the amount of metal in the rim but I can see no particular use for it. It is just as easy to measure the actual thickness if a proper gage is used, and,

with that end in view, I wish to submit for your consideration a service metal gage which we have been using for some time and which I feel, meets all requirements. The gage is simple in construction, easy to apply, and gives a direct reading of the actual amount of service metal above the condemning limit.

There is another point to be considered when gaging worn wheels. There is a condemning limit of 1-3/8 in. of metal through the throat of the flange taken at the back or inner face of the wheel. It has been found that the critical line at the front, or outside face of the wheel, and that at the back or inside face do not in all cases coincide, and while a wheel might have the required amount of metal at the outside, it may have reached the limit of wear of 1-3/8 in. at the back or inside, which might be overlooked.

The gage submitted provides for that, the tail of the gage which extends along the back of the wheel being graduated and a scrap limit mark provided. These graduations are not intended to give the exact amount of metal through the throat of the flange, but merely to act as a precaution against going below the 1-3/8 in. scrap limit. The gage is also provided with an attachment for determining the amount of metal necessary to remove from the tread in order to restore contour, the graduations indicating in sixteenths of an inch the depth of cut to be taken.

I would recommend abolishing the measuring line as now applied, as in my opinion it is misleading and of no practical use, and would recommend also the adoption of the gage submitted, or one similar to it as a substitute for the one shown on plate C. 1, Standards and Recommended Practice.

O. C. Cromwell (B. & O.): Several members of the wheel committee have paid considerable attention to the condition of the worn wheels, when removed for returning. Many times you have one pair of wheels worn to a thin flange, and the other a relatively thick flange or nearly new. When that condition prevails, you get only half the mileage that you should get if you wore the two flanges an equal amount. Uniformity of carbon content assists in giving wheels more nearly of the same hardness, and you get more even wear of the flange. The flanges of the rolled steel wheel before we remove it, we will e-cast iron wheel flanges, and in the cast iron wheel, we have a means for mounting wheels of extreme hardness, which we do not now have in the rolled steel wheels, that is the tape measurement, and this gives you more nearly an equal wear on the flanges of the wheel than you get with the rolled steel wheel. If we can increase the mileage of the rolled steel wheel before we remove it, we will effect considerable economy in operation. As regards reducing the limit of wear, in line with the limit of wear groove, the figure of 1 3/8 in. was established on the line of steel tired wheels, as the only one with which we could measure and in those cases the under side of the rim was cut or turned that gave you about 1/2 in. less metal than you have now with rolled steel wheels which are slightly tapered on the under side of the tread. In order to get some experience in actual service, the committee thought it would be a proper thing to try those wheels on a trade service.

Mr. Furrow: I feel satisfied that the committee is on the right road, in their recommendation so far as the carbon content is concerned, but I want to be satisfied as to how we are going to convey that information properly, to the road managers. We must have some means of doing this.

Mr. Ripley: I think that the carbon content numbers as given should be put on at the manufacturers' plant, preferably painted yellow with the heat number, etc., on the inside of the rim. Instructions could then be issued to the

wheel man as to what the symbol means. It should be understood that the number represents heat analysis and not an individual analysis of any kind, so there will be no variation in the wheels.

Mr. Pileher: I believe the mating of wheels by carbon content is a very desirable thing and if it can be accomplished with the classification under group letters (four or five in the range of carbon content) it would be very desirable. In regard to the question of wearing the wheels thinner than at present, the ruling we now have is a law and we are not allowed to go below the limit of wear. As I understand the proposition, the ruling was set upon the basis of recommended practice by the Master Car Builders' Association, based upon their experience. They were playing very safe. In the Norfolk & Western, we were conducting a series of experiments in regard to running wheels thinner so that we could operate the wheels with as much economy as possible. We had run the wheels safely 1/4 in. thinner than they had been set, and we feel that it would be safe if we could get a ruling at least locally in switching service, until we develop the experiments further. As pointed out very clearly by Mr. Ripley, the analogy for the thickness of the rims on rolled steel wheels was made by comparison with the steel tired wheels. But there is a very large fillet between the rim and the plate on the rolled steel wheels, which adds materially to the strength, the whole structure being tied together as one.

I do not know how we could get this thought impressed in such a way that we could get action from the Interstate Commerce Commission, permitting these experiments that we have in mind. We certainly hope their rulings may not be changed in the future, regarding experiments. There have been some laboratory tests, conducted particularly under the auspices of Prof. Hennessey. The test is so much in favor of the cast steel and wrought steel wheel, as compared with the cast iron wheel, that we could easily draw the analogy that these two wheels could be run safely with a very thin rim.

(A motion to accept the report was put to a vote and carried.)

(The meeting then adjourned.)



Sir Arthur Conan Doyle with wife and family after looking over the Exhibits—a Friend at the left.

R. S. M. A. Meeting and District Elections Today

THE DISTRICT MEETINGS for the election of members of the executive committee will be held in the executive committee room, next to Secretary Conway's office, from 10:00 to 11:30 o'clock this morning. Two new members must be elected to succeed Charles W. Beaver and H. G. Thompson in the second district, whose terms of office expire. One member must be elected in the fourth district to succeed George A. Cooper, whose term expires, and one must be elected for the same district to succeed Edward M. Savercool, who has moved out of the district.

The annual meeting of the Railway Supply Manufacturers' Association will be held in the Greek Temple of the pier at noon today.

Sunday Sacred Concert

A SACRED CONCERT will be given on Sunday at the Marlborough-Blenheim at 3.30 p. m. under the direction of a committee made up of Aden R. Miller, chairman, W. J. Carrigan, Oscar C. Hayward and W. R. Walsh. The following program has been arranged:

1. Indian Love Lyrics.....Woodford-Finden
Orchestra
2. "Soldiers Chorus"—Faust.....Gounod
Criterion Male Quartette
3. "The Pipes of Gordon's Men".....Hammond
Mr. Simonds
4. "Billa Nello".....Dell Acqua
Mrs. Emily Stokes Hagar
5. "Swing Along".....Cook
Criterion Male Quartette
6. Cello Solo
a—Elegie.....Massenet
b—Le Cygne.....Saint-Saens
Mr. Lucian Schmit
7. a—"The Star".....Rogers
b—"Song of the Open".....Laforge
Mrs. Emily Stokes Hagar
8. a—"Blue are Her Eyes".....Watts
b—"Until".....Sanderson
Mr. Carmint
9. "Italian Street Song"—"Naughty Marietta".....Herbert
Mrs. Hagar and Quartette
10. a—Prelude du DeLuge.....Saint-Saens
b—Hymn to the Sun.....Rimsky-Korsakoff
Orchestra

Registration, American Railway Association, Div. V, Mechanical

- Alexander, I. R., Rtd. Gen'l. Rd. Fore. Eng., Penn.
 Anderson, F. W., Gen. For., Penna.
 Ayers, A. R., S. M. P., Nickel Plate, Marlborough.
 Baldinger, F. A., M. M., B. & O., Clarendon.
 Barton, T. E., M. M., B. & O., Fraymore.
 Beacon, T. H., V. P. & G. M., C. & R. I. P., Ritz Carlton.
 Bennett, W. H., Insp. Ch. of M. P., Penn., Martinique.
 Bingham, P. R., G. F., Penn., Martinique.
 Bowden, J. F., M. M., B. & O., Clarendon.
 Burnham, W. D., G. F., B. & O., Castro.
 Burns, John, W. Mgr., C. P. R., Ambassador.
 Butt, F. W., Asst. Eng., N. Y. C., Rumyniece.
 Cahill, M. H., V. P., Sealboard Air Line, Marlborough.
 Chapman, E. E., Engr. Tests, Sauta Fe, Chalfonte.
 Cole, W. C., F. Steel Shop, Penn., Carnix.
 Conniff, P., Asst. S. M. P. & Mich., F. E. C., Elwood.
 Coulter, A. S., Comm. Agt., Penn., Princess.
 Courson, J. F., Gen. For., Penn., Seaside.
 Dambach, C. O., Gen'l Mgr., Unity Ry. Co., Alamac.
 Davis, A. C., S. M. P., Penn., St. Charles.
 Dearest, G. L., Chf. Clerk, C. D., C. & R. R. of N. J., Sterling.
 Denney, C. E., Nickel Plate, Ritz Carlton.
 Dickerson, T. B., Supt. Loco. Shop, C. K. R. of N. J., Sterling.
 Ditmore, Archie G., Div. Car. For., D. & H., Monticello.
 Diven, J. B., M. M., Penn.
 Ennis, J. B., V. P., Amer. Loco. Co., Traymore.

- Fahnestock, McClure, Asst. M. M., Penn.
 Farrington, T. B., M. M., Penn., Traymore.
 Ferguson, Geo. G., Insp., Penn.
 Feuse, Frank, Gen. For. Car. Dept., L. V., St. Charles.
 Fletcher, J., G. F. C. D., Sealboard Air Line, Strand.
 Force, H. J., Engr. of Tests, D. L. & W., Traymore.
 Fredricks, J. T., Gen'l Mgr., M. P., Princess.
 Fry, L. H., Gen. Insp., Baldwin Loco. Works, Brighton.
 Goodard, E., Gen'l. El., Penn., Dennis.
 Grun, Charles B., F. C. S., Atl. City City Rys.
 Harris, A. A., M. S. N. Y. N. H. & H., Haddon Hall.
 Hassett, John C., M. E. N. Y. N. H. & H., Traymore.
 Heald, W. B., Supt. Const.
 Hedley, Frank, Insp., Interborough Rapid Transit, Shelburne.
 Henry, H. B., Asst. Dir. of Pur., S. P., Traymore.
 Hertz, D. F., Dis. M. P. Insp., B. & O., Adelford.
 Hedges, A. H., M. M., B. & O., Adelford.
 Hogan, H. E., Man. Dept. Shop Labor, N. Y. C., Marlborough.
 Hogan, P. J., Gen. Car For., N. Y. N. H. & H., Pennhurst.
 Hooper, M. B., M. M., C. & J., Ambassador.
 Hooper, N. H., P. A., Cambria & Ind., Ambassador.
 Hopkins, J. W., M. M., E. & A. Div., Traymore.
 Huber, H. G., Asst. Engr. M. P., Penn., Haddon Hall.
 Jones, L. B., M. M., Penn., Dennis.
 Kapp, J. B., M. M., Penn., Haddon Hall.
 Keegan, J. E., G. F., Insp., Penn., Haddon Hall.
 Kelly, R. J., F. M. P., L. I., Shelburne.
 Keppelman, H. L., Gen. Car Insp., P. & R., Haddon Hall.
 Kniessing, E. W., F. C. Insp., Penn., Netherland.
 Lacey, H. S., P. A., Jackson, Term., Princess.
 Larsen, Chas. A., G. C. F. N. Y. N. H. & H.
 Lee, F. H., Supr. Frt. Car Main., Alamac.
 McCahery, R. E., M. M., R. F. & P., Dennis.
 McGill, A. M., Asst. S. M. P., Penn., Princess.
 McGraw, John C., Travel Engr., P. & R., W. Phila.
 McIntosh, James, M. M., N. Y. N. H. & H., Haddon Hall.
 Manchester, H. C., S. M. P. & R. S., D. L. & W., Traymore.
 Martin, H. P., Asst. to G. M., N. Y. N. H. & H., Shelburne.
 Mills, J. S., For., L. I., Elberon.
 Moore, A. F., Gen. For., Penna., Schlitz.
 Murphy, T. J., Asst. to P. A., B. & O., Strand.
 Nihil, H. S., Asst. S. M. P., Penn., Chalfonte.
 O'Neal, James, Gen. Car For., G. M. & N., Princess.
 Poole, E. P., Supvr. of Shops, B. & O., Chalfonte.
 Porcher, Samuel, G. P., A. Penn.
 Prater, E. P., M. M., M. P., Princess.
 Quinn, Maurice A., Gen'l. Fore., D. L. & W., Bothwell.
 Reed, John, Supt. of Shops, N. Y. N. H. & H., Princess.
 Richards, E. C., Asst. T. S. A. S. M. C., Ambassador.
 Ricker, H. P., S. M. P., L. I., Dennis.
 Rossiter, C. A., Gen. For. Car. Dept., Wash. Term., Elwood.
 Rueger, H. A., For., L. I., Elberon.
 Russum, T. N., S. P. C. D. B. & O., Dennis.
 Sage, R. V., Car Eng., Cambria Steel Co., Marlborough.
 Sakers, Ross C., Sec. to Purch. Agt., Penn., Princess.
 Sears, E., Dist. & Elec. M. M., C. M. & St. P., Chalfonte.
 Sellman, F. E., Asst. M. M., Penn.
 Shafer, S. W., C. C. C. to Pur. Agt., C. R. R. of N. J.
 Shelton, E. M., Supt. Loco. Shop, D. L. & W., Strand.
 Shull, G. F., M. M., Clinchfield, Ohio, Princess.
 Sloan, J. R., Chief Elect., Penn.
 Smith, Abram E., V. P., Union Tank Car Co., Traymore.
 Smith, H. J., Gen. Car Insp., D. L. & W., Sterling.
 Smith, John L., G. F., P. & L. E., 125 S. Illinois.
 Snyder, F. M., G. F., Penn., Fredonia.
 Speck, N. J., G. F., Penn.
 Stanton, E., J. E. Car Insp., N. & P., Oshorn.
 Stedman, W. M., Chf. Chem., B. & O., Arlington.
 Stevens, J. R., Chf. Eng., M. P., Princess.
 Stevens, F. J., M. M., N. Y. & O.
 Stofflet, Howard A., Elec. Eng. M. P. D. P. & R., New England.
 Stoilberger, Phillip, M. M., M. P. & R. E. Dept., Atlantic City.
 Straub, C. F., Supvr. Car Repair Bill Bur., P. & R., Orville.
 Cramb, G. W., M. M., K. & E., Arlington.
 Strong, F. H., G. P. Loco. Shop, L. I., Dennis.
 Telford, A., Asst. Gen. P. A., Southern, Haddon Hall.
 Tutt, T. I., Pres., Penna. Tank Car, Traymore.
 Vandyndy, C. P., Water Eng., B. & O., Arlington.
 Walker, E. B., Ch. E. E., Canadian National.
 Walsh, F. O., S. M. P. A. & W. P., Strand.
 Walther, E. W., Asst. to P. A., B. & O., Strand.
 Wheat, G. C., G. Car Insp., Penn., Worthington.
 Wheeler, Richard H., Gen'l. Mgr., Clean, Brad. & Sala., Arlington.
 Whitley, Geo., Asst. S. M. P. C. P., Ambassador.
 Whitman, E. B., M. M., Penn.
 Whitsitt, W. B., Chf. Draft., B. & O., Shelburne.
 Wiesbeckel G. F., S. M. of E., Retired, Dennis.
 Willson, L. M., M. M., Penn.
 Wintersteen, John, M. M., Cornwall, Traymore.
 Wyman, R. L., M. M., L. & N. E., Pennhurst.
 Yergy, J. P., G. F., Penn., 817 Pacific.

Special Guests

- Apgar, Albert R., Electrician, Penn.
 Ardis, L. T., For., Penn.
 Baha, Kumeo, Gov't. Insp. Elect. Loco., Imperial Gov't Railroads, Japan.
 Princess.
 Bachman, E. L., Asst. M. M., Penn.
 Bailey, R. W., Car Shop Insp.
 Banbridge, Howard N., For., L. I.
 Baker, G. H., Spl. Agt., Amer. Ry. Co., Atl. City.
 Bartmington, Wilbur, Cornwall, Traymore.
 Barton, E. O., For., Penn.
 Bateman, Frank, Dir., Atlantic City Railroad.
 Becker, E. E., Erect. For., L. I., Clarendon.
 Bracken, J. L., Asst. Elec. Engr., N. Y. N. H. & H., Chalfonte.
 Brackett, C. A., Gen'l. For., Penn., Princeton.
 Buell, C. J., G. S., Duluth, Mis. & Nor.
 Burleigh, G. H., Spl. Agt., Supt. Shops, C. & N. W., Strand.
 Burns, Thomas, Asst., For., M. P. & R. R. Dept., P. & R.
 Canning, John R., Welding For., N. Y. N. H. & H., Traymore.
 Clarkson, A. A., Asst. Engr., N. Y. C.
 Cornwell, H. R., For., Wash. Term., Warwick.

Conventionalities

J. E. Simons of the Joliet Railway Supply Company is attending his twenty-eighth convention.

Miss M. Olive Cromwell is accompanying her father, O. C., of the Baltimore & Ohio, to the convention this year. Mr. Cromwell is especially interested in gasoline motor cars just now.

Mr. and Mrs. John P. Landreth are accompanied to the convention this year by Mrs. A. L. Eustice, also of Chicago. Mrs. Eustice is a sister of United States Senator Arthur Capper of Kansas.

George N. DeGuire, assistant to the manager of the department of equipment of the United States Railroad Administration, drove over from Washington in his car with Mrs. DeGuire, arriving here Wednesday afternoon.

F. M. Whyte, formerly chief mechanical engineer of the New York Central, is back at the convention again this year, having returned recently from Australia where he served as a member of the Uniform Gage Mission of the Australian Railways.

Those who know Le Grand Parish and his organization, know Miss Lawton. She is here—for her first convention. Not as a buffer for her worthy chief, but as a "holder-on" to keep them happy while waiting to hear all about the new double arch.

Almost continuously for the past 40 odd years H. M. Perry has attended the mechanical conventions. He joined the M. C. B. Association at the first meeting in Chicago and is probably the only surviving member who attended that meeting. Thirty years ago Mr. Perry took out his first side bearing patents.

W. P. Borland, chief of the Bureau of Safety of the Interstate Commerce Commission, looks as if he had been having a strenuous time of it lately. No doubt he has, since it has been necessary for him to follow critically all of the proceedings in connection with the automatic train control and the power brake hearings.

A. L. Humphrey, without whom a convention would hardly seem complete, is able to make but a flying week-end visit this year. He arrives this morning but will be able to spend only Saturday and Sunday with his many old friends. Mr. Humphrey sails with his wife and son Fred on June 24 for a few months' tour of Europe.

It is with pleasure that we announce the election to the board of directors of the Murphy Varnish Company of Claude M. Baker. Mr. Baker is attending the convention this year, as has been his custom for many years. His connection with the Murphy interests has been one of long standing. During the past three years he has been sales manager at Chicago.

F. Van I Dodds got in a day late this year. He motored down from central valley, N. Y., and had to make a number of detours. This is not entirely responsible for his delay, however. His daughter Dorothy was married in the chapel at West Point at high-noon on Wednesday to Vera Carlton Spalding who was graduated from West Point on Tuesday.

J. W. Brahear, director and superintendent of manufacture of Dearborn Chemical Company, has been connected with the company continuously for 28 years and somehow has managed to stay away from the conventions

all that time. He finally visited Atlantic City this year and like most of those attending for the first time, was greatly impressed with the exhibits.

Le Roy Kramer comes to the conventions this year as vice-president of the Symington Company. Mr. Kramer left the vice-presidency of the Pullman Company during the war to become federal manager of the St. Louis-San Francisco Railroad. On the termination of government control he became vice-president of the Willys-Overland Company at Toledo, Ohio. He is happy to be back among his old associates in the railroad and railroad supply businesses.

Business is improving. Clyde P. Ross, contracting manager of the Roberts & Schaefer Company, is here and is wearing a smile. He reports that his company has recently secured contracts for four of the largest fireproof coaling and sanding plants ever built in the United States. The orders came from the Delaware & Hudson, Michigan Central, Chicago & North Western and Chesapeake & Ohio. Mr. Ross is accompanied by Mrs. Ross.

"Dan" Brady is looking fine, although he passed through a most severe illness during the latter part of the winter. Dan was given a testimonial dinner by a large group of his friends at the Commodore Hotel, New York, May 18, 1922. The toastmaster was H. H. Vreeland and the speakers were Judge Morgan J. O'Brien, Hon. Luke Stapleton, John A. Dwege of the New Haven; Col. Charles DeLans Hine, President Besler of the Central of New Jersey, and President Hustis of the Boston & Maine. President Hedley of the Interboro, presented Mr. Brady with a bronze statuette.

A delegation of well chosen convention attendants is here from a New England road—the Boston & Maine. There are 12 in all: L. G. Coleman, assistant general manager in charge of maintenance of equipment; C. H. Wiggin, superintendent of motive power; C. B. Smith, mechanical engineer; E. T. Millar, general car inspector; J. Craig and R. W. Band, general shop inspectors; Tom Jennings, D. E. Davis and F. H. Eddy, shop superintendents; C. S. Hall, master mechanic; H. A. Bliss, general air brake inspector; J. E. Gardiner, air brake instructor, and P. J. Callahan, supervisor of car and locomotive electric lighting.

L. K. Silcox, general superintendent motive power of the Chicago, Milwaukee & St. Paul, who has been nominated this year as a member of the general committee of the Mechanical Section, will not be able to come to the convention because of a number of important matters requiring attention at Chicago. The St. Paul has recently ordered both locomotives and cars. The road has also taken over the Chicago, Terre Haute & Southeastern, which serves the Illinois coal fields, and Mr. Silcox is giving special attention to getting the equipment on this road in condition for handling the heavy business that is anticipated when the coal strike is settled.

Among those attending the convention this year are three men who have played an important part in one of the latest developments in aerial transportation, the production of helium for lighter than air craft. M. H. Roberts, of the Franklin Railway Supply Company, is chairman of the Helium Board of Engineers of the United States Government. Associated with him are Harvey N. Davis, professor of Mechanical Engineering and Physics at Harvard University, best known as one of the authors of the Marks and Davis Steam Tables, and Professor W. DeLaure of the University of Nebraska, a specialist in heat transfer, who served during the war as a member of the research department of the navy at Annapolis.

One of the veteran visitors at the conventions who will be missed by many persons this year is Frank S. Dinsmore, who died last February. Mr. Dinsmore became connected with the *Railway Age* in 1897, and attended his first convention that year at Old Point Comfort. He attended the mechanical conventions every year that they were held from then until his death. He was one of the workers on the *Daily Railway Age* almost from its inception, and helped get it out in years when it was much smaller but when the difficulties of editing and publishing were even greater than now. No man ever lived who more universally commanded the affection and respect of those who knew him than Mr. Dinsmore, and his passing is a great loss to his many friends.

N. W. Storer of the Westinghouse Electric & Manufacturing Company is attending the convention. Mr. Storer is one of the most prominent railway electrification engineers in this country, having been for more than 30 years in the railway engineering department of the Westinghouse Company and in intimate touch with railway problems since 1891. He is a pioneer in early electrification development and an authority on high-voltage direct-current electrification. Mr. Storer was associated in the designing of the most powerful freight locomotive in the world, an experimental 4,000-hp. electric locomotive, operating in freight service on the Pennsylvania Railroad around Philadelphia, and also of the electrical equipment of the Paoli suburban electrification operation out of Broad street terminal.

The Northern Pacific has a representative party attending the conventions—men from all departments, well selected to absorb all phases of the business discussed during the convention. Eight representatives of that road have come from the great northwest and are registered as follows: J. P. Anderson, shop superintendent, Brainerd, Minn.; W. J. Bohan, assistant general mechanical superintendent, St. Paul; C. E. Emerson, master mechanic, Dilworth, Minn.; George F. Endicott, assistant master car builder, St. Paul; Charles J. Mitchell, roundhouse foreman, Missoula, Mont.; J. H. Remick, M. C. B. billing clerk, St. Paul; Joseph Zuber, roundhouse foreman, Mandan, N. D.; and Silas Zwright, mechanical superintendent, lines east, St. Paul. By such careful choosing of convention attendants it is possible for the railways to derive the greatest benefits from the convention.

B. B. Milner, formerly with the Pennsylvania Railroad and later chief mechanical engineer of the New York Central, who resigned two years ago to become associated with Fraser & Co., Japanese importers and exporters, and who is now consulting engineer to the Japanese Government Railways, writes that his headquarters are at the Government Railways office at Tokyo. Milner still "hits the trail", for he writes under date of May 21 that he has covered, since March 1, the lines north of Tokyo, including some 1,200 miles on the northern island of Hokkaido, and was just preparing for a quick trip over Korea and Manchuria which would lead him as far as Harbin on the Chinese Eastern. We miss Milner this year, but a good many of his friends are "sporting" the very handsome Japanese canes which were sent over in time for 1921 convention which failed to materialize. Milner will be glad to hear from his friends when the spirit moves.

J. H. Cooper, who represents the Dearborn Chemical Company, the Bradford Draft Gear Company, the Pilloid Company, Fairbanks, Morse & Co., and a few other concerns in Mexico, has come on from his home in Mexico City to attend the conventions. Mr. Cooper believes that

President Obregon of Mexico is a very able man and that if his government receives outside recognition, especially from the United States, he will be able to maintain peace and restore normal conditions. The general situation in the country, he says, is improving daily. Mr. Cooper states that much work and a large expenditure are still required to put the Mexican Railways in good shape. Much is being done to repair and improve the track. In the months January to April, inclusive, 1,452,000 ties were distributed to be put in track, although probably not all were actually laid. Little new rail has been laid recently, but the railways have arranged to get rail from the Monterey Steel Company. Mr. Cooper is optimistic regarding the future course of events in Mexico, provided President Obregon is given a fair chance by the governments of other countries.

Do you know Asheville Johnston? You may think you don't, but you probably do, or at least have heard of him. He has and deserves the reputation of possessing the most remarkable memory on the Boardwalk. Asheville is the hat boy at the entrance to the American dining room of the Marlborough-Blenheim Hotel, and, without knowing his name, you probably have marvelled at the fact that, without checking them at all he almost invariably returns promptly to the right persons the many hats and canes that are left with him. Asheville has been at the Marlborough-Blenheim since 1908. "How do you do it?" he was asked yesterday. "Well," he said, "I always did have a good memory, and I have cultivated it. When a man hands me a hat, I take a good look at him and the hat, and associate them in my mind. Then, when he comes back, I take a good look at his face, and that recalls the appearance of what he gave me and the place where I put it. It is easy, of course, to do this for many of the people coming to the conventions, because they have been coming here a long time, and their faces are familiar to me. That's all there is to it." That isn't all there is to it, though, as everybody who has seen Asheville in action will testify. Such memories as his are born, not made.

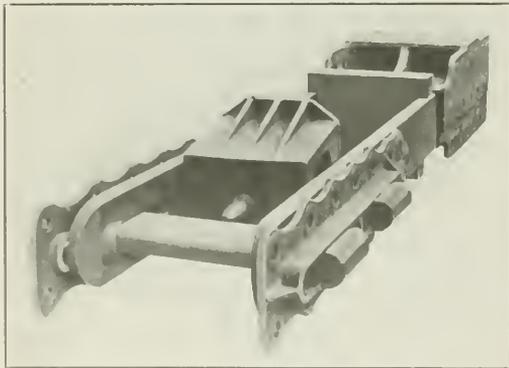
C. F. Fritz, manager of mines and South American properties of the Vanadium Corporation of America, is here at the convention after an absence of about four years. During that time he has been in Peru enlarging and developing the company's mines. Mr. Fritz has had a most interesting experience. The mines are located in an almost inaccessible part of the country, at an elevation of about 16,000 ft. above sea level. He has been called upon to avail himself of almost every mode of transportation known to man. In the first place it was necessary to get material for new construction at the mines in order to increase production. Mr. Fritz found it necessary to transport this material on men's backs, mules, horses, ox-carts, llamas, rafts and later by motor trucks. He has built a narrow-gage line about seven miles long with a drop in elevation of 1,200 ft. from the mine to the top of a bluff some 500 ft. above a lake some 10 miles long, and has established a system of barges for transporting the ore across the lakes, the barges being handled by motor boats. This lake is undoubtedly the highest regularly navigated body of water in the world, being at an elevation of some 14,000 ft. From the foot of the lake to the head of regular rail transportation the ore is handled by motor truck. Plans have been laid and the work begun for handling this material on another narrow-gage line. This road will be about 15 miles long. This is a fine example of what some of our American companies are doing to bring trade to this country and to give the United States supremacy in the use of alloy steels.

New Devices Among the Exhibits

Improvements in Farlow Draft Attachments

THE FARLOW ATTACHMENTS for connecting spring or friction draft gears to the car underframe, made by the T. H. Symington Company, New York, have been manufactured and sold for the past 18 years, the design having been improved from time to time to meet the requirements of increasingly heavier service. The original attachments were of the three-key type with separate side links. From this was developed the present form, having two draft keys and a horizontal forged yoke.

The present standard attachments, which meet all the A. R. A. requirements for strength are regularly furnished with a standard gear pocket length of $24\frac{5}{8}$ in. from the rear face of the follower block to the end of the horizontal draft yoke, thus accommodating any standard friction draft gear whose parts are contained within the pocket limits. The standard check plates provide for full A. R. A. travel of $2\frac{3}{4}$ in. so that any draft gear meeting



Latest Design of Farlow Attachments

the A. R. A. specifications may be later substituted, if desired, for that first used.

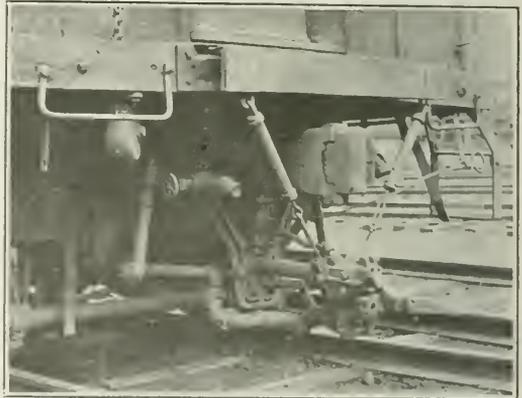
Recent improvements in the Farlow details include the use of A. R. A. standard 6 in. by $1\frac{1}{2}$ in. round edge horizontal keys, adequate reinforcement for strength and bearing area at the front end of the horizontal draft yoke, a box-section front follower block and a design of back-stop casting providing ample resistance to all possible service loads and distributing the latter to the underframe at the bolster over a sufficient sill area to prevent buckling or deformation of the draft sills or the loosening of rivets.

The follower block interposed between the coupler butt and the friction draft gear is designed to withstand the maximum load which the coupler slank is capable of delivering to it, this load often being far in excess of that required to close the draft gear. The malleable iron of which the block and check plates are manufactured is a high grade, uniform product whose minimum ultimate tensile strength and elongation are 50,000 lb per square inch and 10 per cent respectively. Malleable iron specifications of a few years ago required only 38,000 lb per square inch ultimate tensile strength and 5 per cent elongation, and a

comparison between these figures and those now regularly attained by the manufacturers of high-grade malleable castings demonstrates the marked improvements which have recently been made in a material which from its structure and treatment is peculiarly adapted to resist shocks without crystallization and which when overstressed gives ample warning by its slow deformation before fracture.

Improvements in Futrell Train Line Connector

THE AUTOMATIC TRAIN LINE connector which is being shown at the convention by the Futrell Coupler Company, Streeter, Ill., embodies several improvements that have been made since a description was given in the *Railway Age* of March 4, 1921. The gathering arms have been changed to increase their gathering capacity and to insure their coupling on the sharpest of yard curves. The connector body has been cored out to give an air opening between the lower portion containing the steam heat connection and the air ports. This keeps the air port gasket cool and prevents vulcanization even

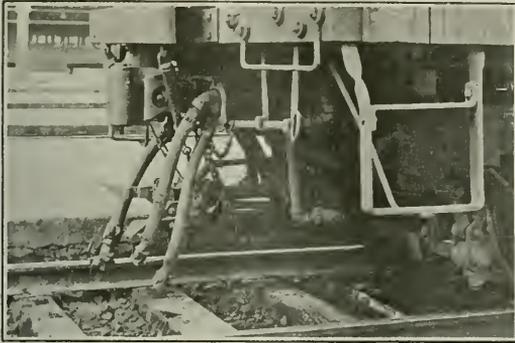


Connector in Position for Coupling.

when high pressure steam is used in the steam heating line. The steam heat gaskets have been changed to the standard type in common use where ordinary hose couplings are used.

Another important change has been made which will be of considerable advantage during a transition stage when cars equipped with the connector may be called upon to couple with other cars not so equipped. It consists in the method used for determining the position in which the coupler hangs. With this connector, the ordinary hose connections are not disturbed, but are left intact for use at any time, although where the connector is in regular use it is customary to remove the hose and their couplers. In the latest design of connector the bracket connected to the center sill, which acts as the spring seat

and from which the yoke holding the connector is hung, is provided with two pin holes. With the pin in the forward hole the connector will hang free in the position for coupling. By taking the pin out, pushing the head back and slipping the pin into a second hole, the con-



Connector Swung Back for Interchange.

connector is held 9 in. farther back than is ordinarily the case. In this position there is ample clearance between the connector and the regular hose, and consequently all chances of their being chafed and damaged are removed. It is only a few minutes' work to again shift the pin and restore the connector to its forward position when it is to be used.

Sessions-Standard Friction Draft Gears

TWO NEW MODELS of friction draft gears, known as types KD and Jumbo No. 2 are prominent features of the exhibit of the Standard Coupler Company, New York.

The type KD is designed to meet the ever-increasing demands of greater draft gear strength and efficiency so vital to a car or locomotive in train operation. The travel, closing capacity, dimensions and application with all standard attachments are the same as for the improved type K; the weight, however, is greater.

The friction elements and springs are the same as those in the older type, except that the spring barrel is not interchangeable. The strength of this gear, (Figs. 1 and 2) when solid is 35 per cent greater as a column than the

standard type D coupler. The great cross-sectional area of the spring barrel, 30 per cent more than type K, is made possible without encroaching on the spring space by its unique shape. The corrugations afford excellent guides for the springs and give the barrel a maximum strength as a column. The design of the spring barrel is such as to prevent any tendency to upset it in spots, but a still greater advantage is the large amount of support near the ends of the friction box keeping the friction surfaces from spreading and at the proper angle. The corrugations are so arranged that the friction box retaining lugs, made to fit them, will also encircle the cylindrical barrel used on the type K, making still greater interchangeability possible.

The Jumbo No. 2 gear, shown in Figs. 3, 4, is an exceptionally strong and high-capacity gear suitable for 70, 100 and 120-ton cars when fitted with standard heavy springs; it is ideal for lighter freight and all-passenger cars when equipped with lighter springs. It has a travel of $2\frac{3}{4}$ in., all of which is friction travel, and in addition is shipped and installed under $\frac{1}{4}$ -in. friction compression that prevents any accumulation of slack for a long period of service, thereby maintaining its original high capacity. The gear is built and assembled under a high initial spring compression that makes it very effective in the early part of the stroke and at the same time eliminates chafing and

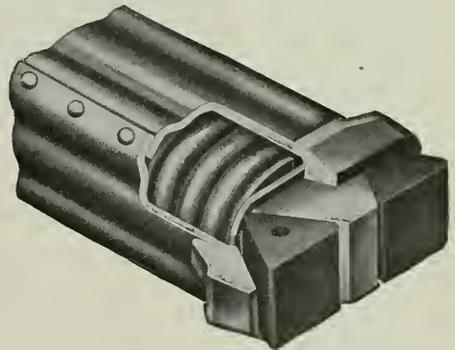


Fig. 1—The Type KD Gear Has a Stronger Barrel than the Old Type K

wear of the friction elements for minor impacts where the resiliency of the car construction is ample to absorb such impacts without damage or frictional movement of any part of the gear or car relative to any other part. This gear, self-contained, is shipped and applied as a

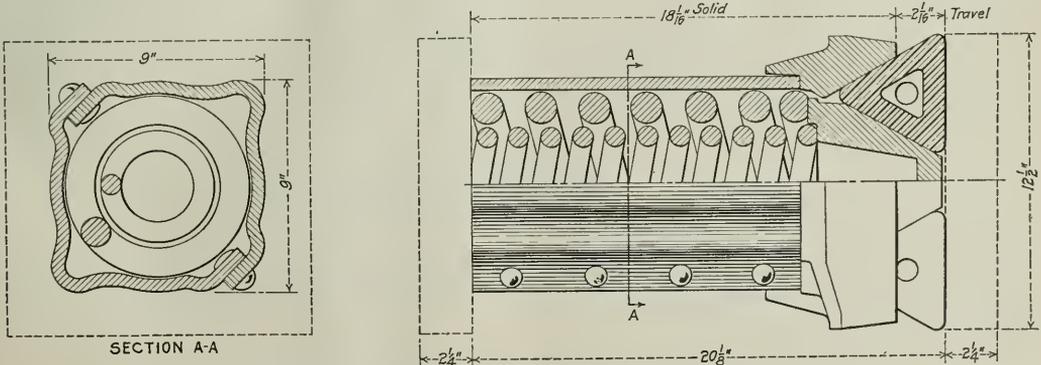


Fig. 2—Sessions-Standard Friction Draft Gear, Type KD

unit to cars with any type of attachments providing a standard draft gear pocket. No additional followers or yoke fillers are required, the barrel corners being rounded to accommodate the bend in forged yokes.

The gear is smooth in its action which makes it suitable for passenger equipment while the capacity may be lowered at will by the use of lighter springs, the over-solid strength remains high, higher in fact than any gear tested under the draft gear test of the U. S. R. A. and about 45 per cent stronger than the type D coupler. The drop capacity with a standard springs is 33 in. total fall under the 9,000 lb. drop, also exceeding anything in the

block, all friction travel, high initial spring and friction compression, round barrel corners.



Fig. 3—Jumbo No. 2 Gear for Passenger and High Capacity Freight Cars

U. S. R. A. test. It differs from the Jumbo gear in that test in the following respects: travel reduced to $2\frac{3}{4}$ in., made self-contained, improved design of spring barrel with re-inforced bottom, spring barrel made of cast-steel instead of malleable iron, elimination of spring plate and key, forged steel instead of cast-iron center friction

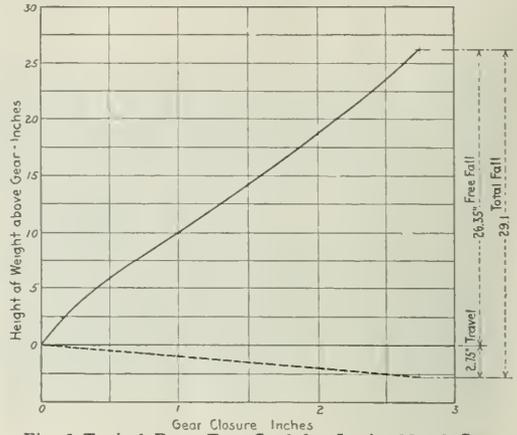


Fig. 5 Typical Drop Test Card for Jumbo No. 2 Gear

There are five double-coil springs arranged to take advantage of all available spring space and so located as to allow numerous re-inforcing webs or ribs immediately opposite the coupler butt thus preventing any possibility of piercing the bottom of the spring barrel. These ribs in part extend the length of the barrel, giving ample strength to the side walls. The per car weight of the gear, including followers, is 860 lb.

Four Jumbo No. 2 gears were submitted to capacity tests under 9,000-lb. drop. The average total fall required to close the gears was 29.1 in., or 21,825 ft. lb., as com-

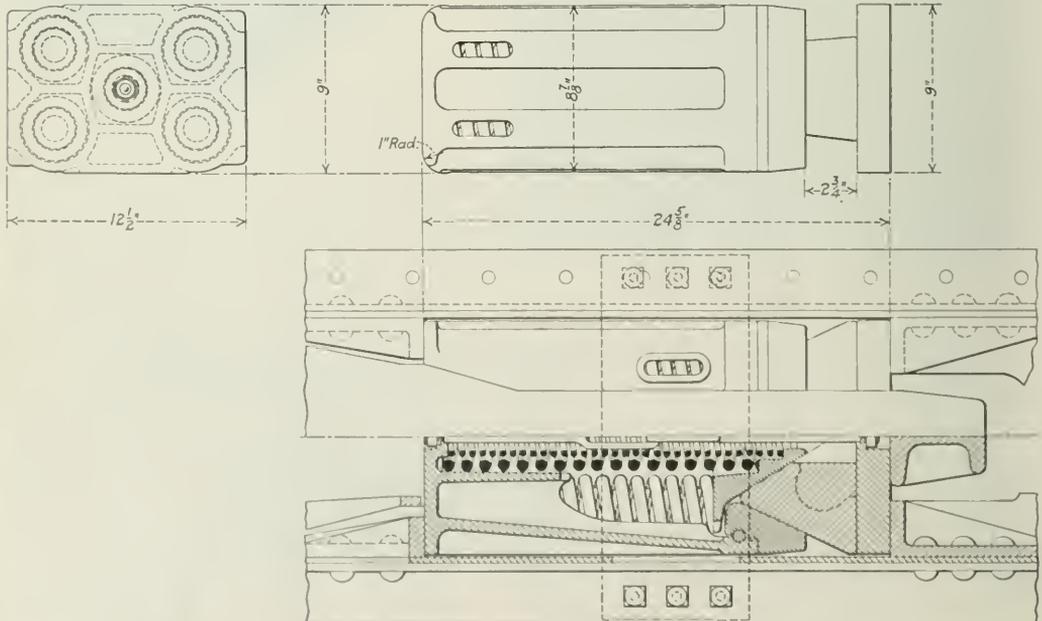


Fig. 4—Sessions-Standard Friction Draft Gear, Jumbo No. 2

pared to 28.1 in. for the older Jumbo gear in the U. S. R. A. tests. The average drop test card is shown in Fig. 5.

Two of the gears were subjected to car impact tests at the plant of the T. H. Symington Company, Rochester, N. Y. Although the tests were made in January during a light rain and snow, the gears required a closing speed of 4.83 m. p. h. on the 148,000-lb. test car as against 4.22 m. p. h. for the older Jumbo gear in the U. S. R. A. tests.

Two of the gears were subjected to destruction tests under the 9,000 lb. drop when supported upon a solid anvil. It required an average over-solid blow of 18-in. to produce noticeable distress in any part. Bulging was finally produced in the cast-steel barrel but after carrying the total free fall to 50 in. they were still in condition for service.

Service Metal Gage for Steel Wheels

AMONG THIS YEAR'S exhibits is a new device shown by Bernard Cook, Roanoke, Va., for gaging the amount of metal to be removed from worn-flange wheels to restore the standard contour and to indicate in advance of turning the final tape of the wheel so that re-mating may be done without loss. The A. R. A. interchange rules allow \$1.61 for each $\frac{1}{16}$ in. of service metal on a 33-in. wheel; hence no neglect should be countenanced in the handling of wrought steel wheels.

This gage, which is known as the I-D service metal wheel gage, gives accurate information in advance of returning, not only of the final tape of the wheel and of the amount of metal that will be removed, but it also indicates the amount of service metal that will remain on the wheel. This latter provision frequently foretells that the

scale on the long leg of the gage shows that before returning there are $1\frac{5}{16}$ in. of metal available above the condemning limit, so that after turning there will be $\frac{7}{16}$ in. of service metal remaining. Such a wheel would accordingly be allowed a credit of $\frac{7}{16}$ in. of service metal, amounting to \$11.27.

The gage is of equal value in handling car wheels and driving wheel tires in shops where they are turned. By its

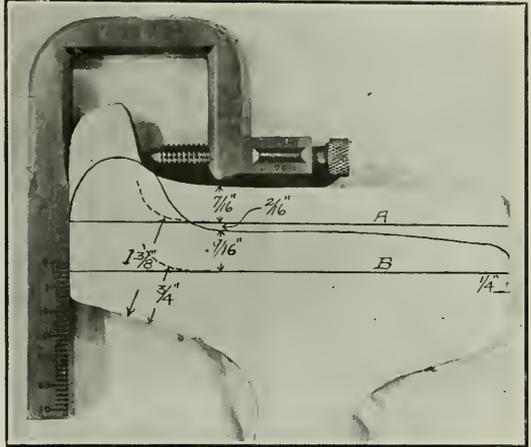


Fig. 2

use wheels can be selected and mated before turning with a minimum loss of service metal. A re-mating table accompanies the gage to show the tape of the wheel after turning.

Fig. 2 illustrates how the I-D gage prevents false credit being allowed for a wheel that should have been given scrap credit only. A. R. A. Rule 7, Fig. 4, allows a wheel to be turned down to within $\frac{1}{4}$ in. of the limit groove as indicated by line B, but also sets a limit of $1\frac{3}{8}$ in. above the "critical" line, this limit being indicated by line A. If the wheel in the illustration were settled for on the basis of the limit groove, the owning road would be given credit for $\frac{7}{16}$ in. of service metal remaining after turning the wheel to restore standard contour, or a credit of \$14.49 would be allowed for this wheel, plus an equal amount allowed under the rule for the mate wheel, or a total of \$28.98 for service metal in this case. The gage shows, however, that the wheel, in fact, will be $\frac{5}{8}$ in. under the minimum allowance from the critical line, so that no credit whatsoever should have been allowed for service metal in the above case.

The illustration is of a wheel actually detected by this gage and for which scrap value only was allowed, under Rule 7, Fig. 4, of the A. R. A. code.

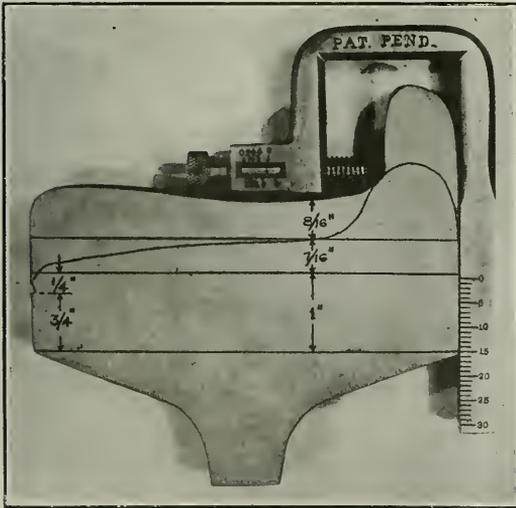


Fig. 1

wheel will fall within the scrapping limits after it has been re-turned and saves not only the labor of re-turning, but protects the handling road from allowing false credits to the owning road for wheels that should have been given scrap credits only.

The use of the gage is illustrated in Fig. 1. The micrometer screw indicates that $\frac{8}{16}$ in. of metal must be removed to restore the standard contour. The graduated

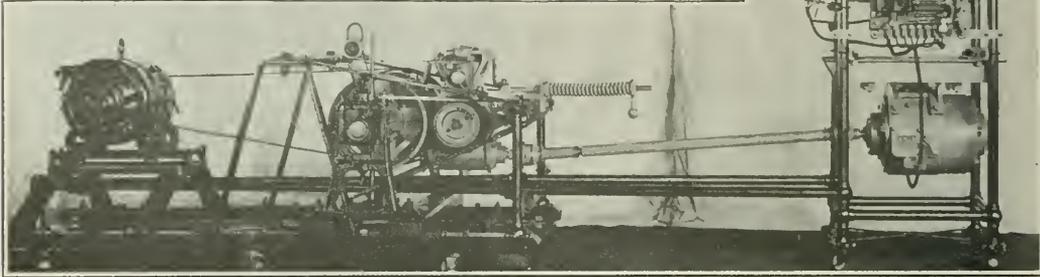
Pressure Filter for Dining Cars

ANEW PRESSURE filter for use in dining cars has been designed by the Henry Giesel Company, Chicago. The cover is opened and closed with a locking bolt operated by a handle in front. No clamps or bolts are used and as the bolt is attached to the handle it cannot be mislaid. After the cover has been taken off the filter stone may be easily removed by a wrench furnished with the filter.

Direct Drive for Car Lighting

A SHAFT DRIVE for axle-driven car-lighting generators has been developed and is being shown in operation by the U. S. Light & Heat Corporation, Niagara Falls, N. Y. The machine has been tried out in the shop with satisfactory results, and arrangements are now being made to make road tests under practical operating conditions.

The drive consists essentially of a double cast iron pulley which drives two rubber tired friction wheels mounted on either end of a shaft parallel with the car axle. This shaft carries a helical gear and drives another similar

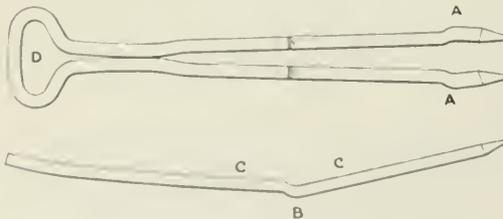


The U. S. L. Shaft Drive Equipment Complete With Motor-Drive and Lamp Bank Load

gear at twice the speed and the axis of which is at right angles to the first gear. These gears run in oil. The shaft of the second gear is connected to the generator on the body of the car by a telescoping shaft and two universal joints, similar to the arrangement used for automobile shaft drives.

Self-Locking Brake Shoe Key

THE NUMBER of brake shoe keys which are lost from freight cars, particularly on those roads where cars are unloaded by dumping machines, is an item of considerable expense. To save this loss an improved type of key has been brought out by E. Emery, Pittsburgh, Pa. The key is of a rectangular section, the steel containing sufficient carbon to insure the proper spring and give good wearing qualities. The shoulders, *AA*, shown in the illustration, open out below the lower lug of the brake head and



Brake Shoe Key Designed to Prevent Loss of Key or Shoe

ards and pulls the shoe up tightly against the head. This gives a double bearing to the key on the head at *CC*, and a bearing against the shoe lug at *B*. The head of the key not only prevents the key from working down but is so shaped that by inserting a bar under the head at *D* it can be pried up until the shoulders, *AA*, are compressed into the slot in the brake head, when the key can be easily pulled out without damage and be ready for reapplication with a new shoe.

This key should not only reduce the losses of keys but also prevent the loss of brake shoes with the resulting further expense due to injury to brake beams, even if a derailment and wreck do not occur.

This key should not only reduce the losses of keys but also prevent the loss of brake shoes with the resulting further expense due to injury to brake beams, even if a derailment and wreck do not occur.

Automatic Slack Adjuster

A NEW DEVELOPMENT of its automatic brake slack adjuster which is especially adapted to freight and locomotive service is shown by the Gould Coupler Company, New York. It takes the place of the usual bottom rod connection and will maintain a uniform piston travel until the shoes are entirely worn out when it may be instantly shortened to permit the application of new shoes. This adjuster consists primarily of a bottom rod composed of two wrought steel bars with spacing pieces between to admit the ends of the live and dead levers. The live lever end of the rod is provided with a series of ratchet teeth which engage a pair of steel dogs attached to the brake lever. The function of the heavier of these two dogs is to transmit the brake pressure through the bottom rod to the brake shoes and of the smaller automatically to lengthen out the bottom rod as wear occurs in the shoes.

The only change required in the foundation brake rigging to apply this adjuster is the drilling of one hole in the lower part of the lever. Laboratory and service tests are reported to have been quite satisfactory.

Double Automatic Control Vapor System for Passenger Cars

THE VAPOR CAR HEATING COMPANY, Inc., Chicago, has recently marketed a double automatic control vapor system, the purpose of which is to change from a constant temperature of 70 deg. while the car is in service to 50 deg. in yards and terminals without manually operating the cut-out valves.

On the average, passenger cars lay over in yards or terminals two-thirds of the time, and during such lay-over periods are excessively heated as the result of leaving all the heat turned on to prevent freezing of water pipes and to permit of washing and cleaning the cars. By auto-



Electro-Pneumatically Operated Control Valve

matically regulating the temperature to 50 deg. in cars laying over in the yards steam is used in the heating pipes less than one-fourth of the time. This means a large saving in coal consumption, conservatively estimated on the basis of actual tests to average from 15 to 20 tons per car per season.

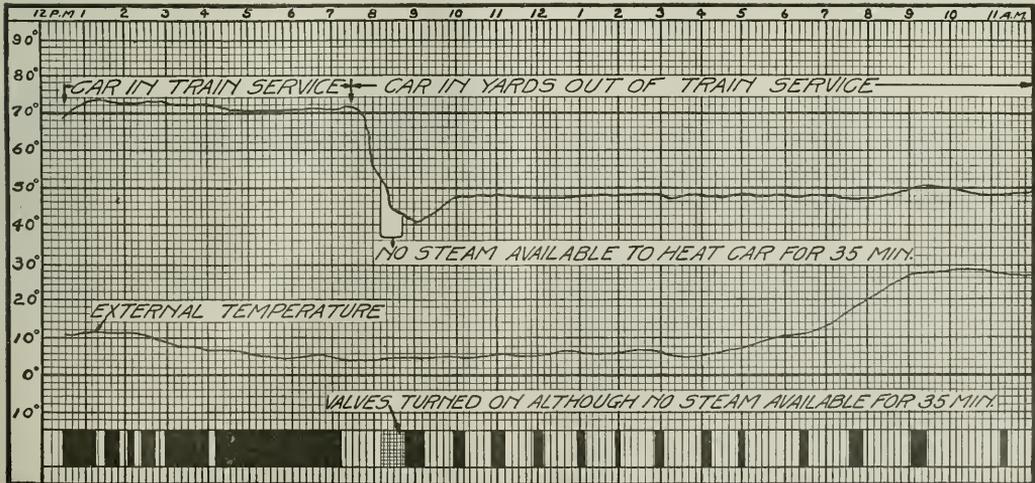
The new arrangement may readily be applied to cars already equipped with the "Vapor" system, as the only change involved is the substitution of the automatically

operated cut-out valves in place of the present hand-operated valves. In the case of an ordinary coach, chair or dining car, instead of the two hand-operated Vapor cut-out valves now used, one magnetically operated control valve is used on each side of car. This valve operates on the same short-circuit self-drawing principle as the manually operated Vapor cut-out valve, and therefore serves constantly to keep the outlet of the system warm at all times, positively preventing freezing of the system.

In addition to the magnetically operated control or cut-out valves, there is one double thermostat located at the center of the car near the basket rack. One of the elements of this thermostat is set for a permanent temperature of 70 deg. and the other for 50 deg. The thermostats never require adjustment or change. At the end of the car, near the electric light switchboard, is a control cabinet, which contains a combination air-pressure and electric device which automatically selects either the 70 deg. or the 50 deg. thermostat. When the car is attached to a locomotive for passenger service, the pressure from the air line operates this device, putting the 70 deg. thermostat in control and maintaining a temperature between 70 and 72 deg. at all times when steam is being supplied from the locomotive. When the car is removed from service and goes into the yards, the pressure on the air line is released and the combination air pressure and electric device then puts the 50 deg. thermostat in control.

This arrangement of the control system removes the necessity for train crews or yard men to operate the steam admission valves by hand at any time.

In cases where cars are placed under steam while occupied by passengers, in stations, or at lay-over points, while waiting for the locomotive to be attached, a 70 deg. temperature control may be obtained by lifting a button provided on top of the combination air and electric device in the control cabinet. After pulling up the button for this purpose, no further attention is necessary, as the system again becomes automatic as soon as air is applied. There is a snap switch in the control cabinet to be used only to cut off current in the summer months or for repairs. In case the electric current fails the magnetic

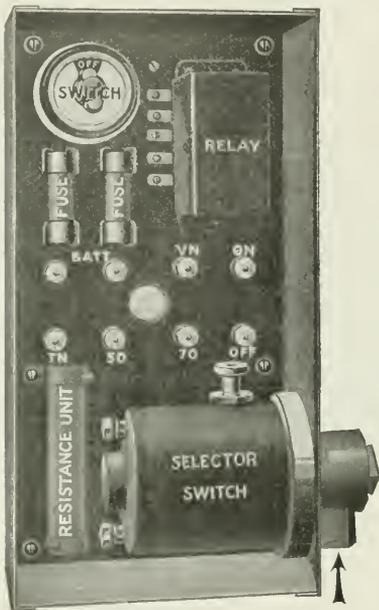


Black bars show the time steam was actually turned on.

Diagram Showing Results of Test of the Automatic Control Equipment

valves may be operated by hand the same as any Vapor cut-out valve.

The system is operated by electric current from the car lighting batteries and requires less than 0.1 ampere per hour, but the electrical mechanism of the cut-out valve



Control Cabinet Containing Electro-Pneumatic Selector Apparatus

is such that the current is automatically cut off from the magnets with the completion of the act of moving the valve from one position to the other. The electrical equipment is simple and of standard materials, and the entire system is constructed with the view of operating indefinitely at the minimum expense for maintenance.

Pneumatic Tools

TWO NEW DEVELOPMENTS in pneumatic tools made by the King Pneumatic Tool Company, Chicago, are a sleeve-type valve for riveting hammers and a "Progressive" lock for both chipping and riveting hammers which prevents the handles from coming loose on the cylinders.

The King sleeve valve for riveting hammers is designed to eliminate valve breakage and reduce the necessity of oversizing valves to a minimum. In the King riveting hammer valve the hard and fast hitting qualities of the hollow-valve type riveting hammer are maintained and the question of valve breakage is claimed to be solved. Formerly a riveting hammer piston in hollow-valve type hammers came in direct contact with the valve; the piston and the valve moved in opposite directions and the piston came in direct contact with the valve 1,050 to 1,720 times per minute, according to the length of stroke of the hammer. This constant contact between piston and valve resulted in fatigue of the metal in the valve itself, with resulting valve breakage.

In the King sleeve-type valve the sleeve is interposed

between the valve and the piston, making any contact between the two impossible. At the same time the sleeve provides a continuous bearing surface for the piston. An added advantage of the sleeve-type valve is that the sleeve serves as a guide to the valve in its travel, thus reducing the lateral wear to a minimum. This new device has been so successful in eliminating valve breakage that last year, out of 5,000 King sleeve valves placed in service, only 15 cases of breakage were reported.

King pneumatic tools are now made entirely of molybdenum steel, which has added to their strength and durability.

Forged Reversible Brake Beam Strut and Safety Brake Shoe Key

THE FORGED REVERSIBLE brake beam strut made by the Buffalo Brake Beam Company, New York, and shown in the illustration, was designed especially for quick repair work. It may be applied to any style of beam and, being made of forged steel, ample strength, durability, economy and safety are insured. A special feature of the



Buffalo Forged Reversible Brake Beam Strut

strut is the fact that it may be reversed so as to make either a right-hand or a left-hand beam without disturbing the nuts or tension on the beam.

The Buffalo safety brake shoe key is made to A. R. A. standards in all essential dimensions. Although it may be applied and removed practically as easily as an ordinary key, it cannot work out in service or when cars are being dumped on a machine. The principle of the key is apparent from the illustration. That portion which extends below the lug on the brake head is punched out and ex-



Buffalo Safety Brake Shoe Key

panded. The key is made of spring steel and when it is inserted the expanded lugs or cars close in and automatically open out when the key is in place, thus making a positive lock to prevent its coming out unless intentionally removed.

Weather Stripping

AMONG A NUMBER of new devices shown by Midgley & Borrowdale, Chicago, is included the Protecto metal-bound felt weather stripping for passenger car windows. This is made of all-wool, hand-pressed weather felt, cut to length as specified. This weather stripping has been adopted as a standard by the Canadian Northern.

Railway Age

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WE GUARANTEE that of this issue, 12,400 copies were printed; that of these 12,400 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,500 copies for distribution at Atlantic City.

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Have you any idea as to just what extent electrical apparatus is used by the steam railroads? It is not easy to determine this quantitatively, but a careful examination of the exhibits will furnish some interesting information. There are 336 exhibits at the convention and out of this total, 98 exhibitors are showing apparatus which is in part at least electrical. Some of the exhibitors have reception booths only and others, such as publishers, cannot properly be classified. If these are subtracted, the number which include electrical equipment will become about a third of the total. This proportion as to the extent to which electrical apparatus is used on the railroads may or may not prevail in actual practice, but it is in a measure at least representative and indicates a trend of the times. Are you making adequate provisions for the maintenance and selection of all electrical apparatus? During the past 30 years or more, electrical men have been taken into steam railroad organizations and they are employed by several of the departments on many roads. A few

A Factor of Increasing Importance

roads have well-organized electrical departments that can handle all electrical matters thoroughly and efficiently. Is it not time that every other road should give consideration to organizing their electrical work in a similar manner?

roads have well-organized electrical departments that can handle all electrical matters thoroughly and efficiently. Is it not time that every other road should give consideration to organizing their electrical work in a similar manner?

A number of mechanical men whose interests center to a large extent around the operation of shops and terminals have expressed regrets that no reports were given this year by the committee on engine terminals, car repair shop layouts, or welding. To many these are matters of vital importance, and for that matter it is hard to see how such subjects could fail to be of interest to every man in the mechanical department. Neither is there any reason why the interest should stop at mechanical department lines, for when these subjects are approached from the broader economic viewpoint they present aspects that must be recognized and given attention by the highest operating and executive officers. Far too many subjects taken up at these conventions seem to be dealt with from a narrow and purely mechanical department viewpoint. If this department is to assume the importance that is its due, the outlook must be a much broader one.

Do Not Forget the Shop

There have been oceans of correspondence, an untold amount of controversy, hard feelings, accusations, charges and countercharges about "Wrong How to Eliminate Repairs." Car Associations, Interchange Bureaus, Arbitration Committees, railroads and individuals have discussed this problem for years. The discussions and arguments are always the same. They are aptly summarized as follows:

!!!!*****XXXXXXXXX!!!!?????-----*****?????
XXXXXXXXX!!!!????????*****XXXXXXXXX!!!!????????

Ad Infinitum

The best solution of this problem, as presented by T. H. Goodnow at the informal discussion of the Arbitration Committee's report on Wednesday afternoon, is: BE SURE TO APPLY DEFECT CARDS WHEN YOU SHOULD.

Any one who reads the report of the Committee on Train Brake and Signal Equipment is likely to conclude that the question of automatic connectors is receiving little attention from the railroads. The list of equipment fitted with connectors in the report is far from complete. The committee fails to mention another significant fact—that such representative roads as the Baltimore & Ohio, the Monon, Chicago, Burlington & Quincy and Chicago, Milwaukee & St. Paul are now testing connectors. Where the most approved types of connectors have been applied even those who were skeptical at first have recognized the benefits in improved operation and reduced maintenance cost. Many mechanical officers agree with the opinion expressed by C. E. Fuller at the 1919 convention, that connectors are bound to come. At present the Mechanical Division is taking no active part in the development of connectors. At least five different types of heads are now in use. Most of the installations are confined to individual roads, but as the number of connectors increases, interchangeability will become a serious problem. Will

Will History Repeat Itself

Will History Repeat Itself

the roads face a condition similar to that which existed when automatic couplers were introduced, when some 50 different styles were in use? By guiding the development of connectors at this time, at least insofar as interchange is concerned, the association can save the railroads the trouble and expense that will result if many installations of non-interchangeable types are made.

Why do some foremen fail? Here is what one foreman has to say in reply to this question: "Superintendents call their foremen together and then call them *down*. Subjects discussed are bum work, not enough work, and look out for your jobs! Do you wonder that foremen get disinterested?" Let us hope that this sort of spirit does not exist on many roads, and yet, unfortunately observation leads us to believe that it is entirely too prevalent. It is true that railroad officers are harassed by all sorts of difficult problems and that they find little time to do as much constructive work as they should like to do. Officers who deal with their foremen, as above suggested, are standing in their own light, and sooner or later will have to step down and out to make room for better men. You cannot get the best work out of men by scolding them, continually finding fault with them, or by adopting a "please explain" attitude. A real leader does not find it necessary to drive his men. Rather does he show a spirit which enthuses and inspires them to put forth greater efforts and to do better work. A little commendation oft-times puts new spirit into a man. The foreman who made the statement at the head of this paragraph followed it up with this one: "Nowadays the superior officer is made to appear as an executioner and is about as popular, simply because many of the evils for which he blames the supervisors can be traced to the superior officers themselves."

Great advances have been made in stores department methods and practices in recent years, but unfortunately many railroads have been forced to continue the use of inadequate storehouses which were built from 25 to 40 years ago. The storekeepers in charge of these buildings are struggling along as best they can, "trying to do a 100 per cent. business with a 35 per cent. building and facilities." It speaks volumes for these men that they are doing as well as many of them are, but can the railroads afford to allow them to continue to operate under these handicaps any longer than is absolutely necessary? True, the railroads have great difficulty in raising new capital and must apply such money as is available where the greatest need exists. A good up-to-date building with adequate storage capacity, ample facilities in the way of yardage, scrap dock, etc., and such machinery and appliances as will conserve labor, can be shown to realize a good percentage of the investment. It is strictly up to the stores department of each, however, to assemble such data as will prove this conclusively to the men who must approve of the appropriation. The executives are confronted with a heavy demand for additions and improvements that they can only approve of those which are of the greatest importance and will show the greatest returns on the additional investment. It is up to the stores department to build up its reports with data and figures which will demonstrate the needs beyond question and which will result in being accepted from the proposed

It is a far too common error to assume that any old machine tool is good enough for an engine house. Even at the present time it is the policy on many roads to install modern machines in the back shops, transferring those which are displaced to enginehouses and outlying points.

This practice may be justified in certain specific cases but as a rule it is costly. In the first place machines are seldom displaced in railroad shops until they are 15 or 20 years old, having been designed in an earlier period when machines worked under comparatively light cutting feeds and speeds and when no special effort was made to have them easily operated. The labor cost of operating such machines in back shops is no greater than the cost of operating them in enginehouses. Looking at the question from another angle there are sound arguments why roundhouses should have just as good and in some cases better machinery than the backshops. The fundamental object of a roundhouse is to get engines turned and ready for service with the least possible delay. It is evident, therefore, that speed and accuracy are two qualifications of roundhouse machine operations even more urgent than when performed in backshops. For example, a main rod back end brass may need to be reduced and rebored for a certain engine which is going out immediately. If the machine operations on this brass are performed by filing and attempting to bore the brass on an old engine lathe there is obviously a great chance for the locomotive being delayed. Not only that but when the brass is rebored there is no certainty that the job will not be inaccurate and have to be done over again. Obviously rapid and accurate work and machines adapted to the different kinds of work handled are essential in roundhouses.

A new star appears this year in the convention firmament at Atlantic City—the Air Brake Association. Possibly it more properly should be classed as a comet among the other bodies of the A. R. A., since it is not so fixed in position as to make Atlantic City its permanent annual meeting place, but will meet in convention with the other associations periodically and with sufficient frequency to insure a closer affiliation in the co-operative work necessary to secure maximum efficiency in its efforts. The Air Brake Association is unique in character, being different from, yet closely related to, the other railway associations now convening in Atlantic City. It is primarily and fundamentally educational in nature, and incidentally uncovers much of practical operating and maintenance value which can be utilized advantageously by the other parental associations having the responsibility of railway direction. These features make closer and more effectual co-operation possible and desirable. The numerous problems of modern and complex train operation involve many air brake factors which must be recognized and dealt with. New employees entering the service must be instructed in the part which the air brake plays and old employees must be kept abreast of the times in new air brake developments. Casual and desultory attempts will not suffice. Specialization in this exceedingly important work is necessary, and the best results come only from constant and concerted effort; hence the necessity for the Air Brake Association and a suitable fitting of its work into the perfect co-ordination of the several associated railway organizations. This, of necessity, must bring about a closer affiliation with the Mechanical Division, yet permit the Air Brake Association ample freedom of action to follow effectually its educational work.

Machine Equipment for Engine Terminals

Why Foremen Fail

Needs of the Stores Department

A New Star—or Comet?

The Work of the Mechanical Division

THE OFFICERS of the mechanical departments are responsible for the disbursement of from 35 to 40 per cent of the operating expenses of American railroads; they determine the nature of the additions and improvements to facilities which in the aggregate account for more than 20 per cent of the total investment in railway property.

To be aware of these facts and the tremendous bearing they have on the welfare of our transportation system, the programs at recent meetings of the Mechanical Division seem inadequate. The Mechanical Division is dealing admirably with many problems. But has it been dealing with all the problems it should be dealing with, or that in view of the history of the organizations that preceded it, it is reasonable to assume its members would be disposed to deal with if they felt they had an entirely free hand? To be specific, it is time to raise a question as to whether the incorporation of the mechanical associations in the American Railway Association is having a good effect.

During the decade following the Civil War, when the unlimited exchange of products which railway transportation seemed to make possible was in danger of being throttled by the restrictive effects of chaotic equipment conditions, the Master Car Builders' Association was organized by a group of far-seeing car department officers. These men and the generations following them, functioning on their initiative as individuals, built up and secured the adoption of a system of standards and limiting requirements for freight cars which, though far from perfect in detail, effectively removed the barriers of interchange from the free circulation of the country's commerce—the life blood of its material civilization.

Bringing the record down to our own time, the development of the standard Type "D" coupler is a noteworthy addition to the list of its great accomplishments.

The American Railway Master Mechanics' Association, although dealing with matters on which little occasion has arisen for the development of universal standards, for a half century was a voluntary medium for the "advancement of knowledge concerning the principles, construction, repair and service of rolling stock." Its real accomplishments have been the crystallization of opinion on such important developments as, for instance, the superheater, by a free exchange of facts and personal experiences at its sessions. It was the medium through which the only extensive scientific study of the drafting of locomotives ever made, was given to the railway public. It was also instrumental in bringing together the injector manufacturers and the railroads in the development of standard flange pipe connections.

In 1918 the two parent associations were reorganized as a section of the American Railroad Association. By this move they passed definitely under the control of its executive committee, on which the Railroad Administration at that time had a dominating influence. This committee, following the reorganization of the American Railway Association at the close of Railroad Administration control, has become a committee of the Association of Railway Executives. Since these reorganizations, there has seemed to many to be a growing tendency for the programs of the mechanical conventions to omit subjects which ought to be included. No criticism is implied because certain important committees with well developed programs under way have found it necessary to present progress reports this year. It is the long list of subjects in which the members individually and the railroads they represent are vitally interested, but with which the Me-

chanical Division has not been dealing, that invites comment.

What is the most trying problem faced by mechanical department officers today? Every mechanical officer would make the same answer. It is the personnel problem, of course. In testifying before the Senate Committee on Interstate Commerce, A. H. Smith, president of the New York Central Lines, said that "the efficiency of a railroad depends principally upon its men. It is estimated that 95 per cent of railroading is human."

True, certain conditions affecting labor have been largely removed from the control of railroad officers, and it may not be desirable to have too free an expansion of opinion on these matters,—not in public, at least. But would it not be wise to discuss the training of foremen? Progressive railroad officers have come to a strong realization of the importance of these men to the effectiveness of an organization and are giving special attention to selecting, training and cultivating them.

Is the training of apprentices, to perpetuate the army of capable mechanics required by the railroads, a subject which must be discussed in whispers behind closed doors? Conditions affecting apprenticeship are constantly changing, and opportunity for organized constructive work is perennial.

Is it necessary to remain silent regarding the shortcomings often shown by the executives in relation to the maintenance and operation of equipment? Chairman Tollerton dwelt on it in his opening address. It is a point meriting more attention. Most shortcomings of this kind are caused by ignorance. How is ignorance to be dispelled by a policy of silence on the part of the only men qualified to give the executives the facts? Minor associations of railway officers discuss such matters constructively. Why should not the Mechanical Division?

The locomotive is the most important material factor in the operation of the railroads. Whether it be the selection of a new locomotive type to meet local requirements, the distribution of power to meet changing conditions, the best train loading, or the development of effective methods of train operation, an intimate knowledge of the limitations of the locomotive, as well as of other operating characteristics, is essential.

There are few operating officers who know the limitations of the locomotive; there are few mechanical officers who know the limitations imposed on the operating officer by the character of the traffic and of other facilities. What are the possibilities of long locomotive runs? What effect will they have on the cost of locomotive maintenance? Will the practical limitations on this development prevent the attainment of increased locomotive mileage? Can these limitations be made less restrictive by improvements in grates, drafting appliances and details of the running gear?

If the mechanical officer is to be a factor in answering these questions and in controlling the utilization of the locomotive, he must broaden his horizon to take the operating officer's problems into his perspective. What better medium is there for bringing this about than the Mechanical Division? If this organization does not take up these problems, some of other live organizations will do so.

In his addresses at three successive conventions, Chairman Tollerton has advocated the development of some means for co-operative research, and for joint testing of railway appliances. At the 1920 convention the report of a committee on the Establishment of a Co-operative Research Bureau outlined a wide range of work which

could suitably be handled by such a bureau and asked to be continued to study the relation of such a bureau to the development of policies of the association. Has the subject been buried in committee?

Are there no unsettled questions as to the proper ratio between the expenditures for running and back shop repairs? Is it not possible that the correct determination of this ratio might have a material influence on the aggregate cost of maintenance and the future expansion of back shops and division terminals? Members of the Mechanical Divisions are studying these problems. Would the association not benefit by taking them up for discussion?

What are the committees on Engine Terminals, Design and Operation and on Car Repair Shop Layouts doing? Are there no improvements in terminal and shop facilities, in their organization and in operating practices which could be discussed with profit by the members of the Mechanical Division?

None of these subjects is suitable for treatment by the strong arm methods of legislation, nor are many of them ready for the committee investigation. But every one of them has been the subject of close investigation and study by one or more of the members of this organization. The advanced work of leaders is considered worthy of the attention of the voluntary organizations in other fields. The by-laws of the American Railway Association set forth its object as "the discussion and recommendation of methods for the scientific and economical construction, maintenance and operation of American railroads." Is the failure of the Mechanical Division to deal with subjects such as those mentioned the fault of the Mechanical Division, or is it the outgrowth of repressive measures of control or to fear of possible executive displeasure?

The car committees, generally speaking, have well defined tasks, the objects of which are the development or modification of legislative measures for controlling the interchange of equipment. The work of these committees is now the principal work done by the Division. But if they confine their activities to the development of the recommendations only, and do not present fully the reasons for the recommendations and give opportunity for discussion of them, why hold a convention? If the committees are to confine themselves merely to making recommendations they had just as well report their findings to the General Committee, to be referred to the representative members for action by letter ballot. In any case the vote of each member will depend on how the interests of his road seem to be affected. Why come to Atlantic City unless the subjects are to be illuminated by a frank exchange of personal opinions, free from the fear of official displeasure? Plenty of opportunities are given in the sessions for such free interchanges of opinion, but few take advantage of them.

This leads up to a question as to the real effectiveness of the legislative work of the organization. The repeated extensions of time for the retirement of undesirable types of equipment, indicates the complete dependence of progress in these matters on the consensus of opinion as their value to the railroads individually. Obviously, unless this opinion can be changed by the work of these committees, just as rapid progress will be made without legislation as with it. The real work of these committees has only just begun when an agreement has been reached by the committee members. If the work is to be effective the committees must be able to present a convincing array of facts as to the economic effect of the changes or standards proposed. Unsupported opinions are not convincing and have little effect in changing the trend of a motion when the ballots are cast.

The work of the Mechanical Division should be highly educational as well as legislative. The list of subjects here suggested as suitable for consideration by no means exhausts the possibilities for future constructive work—they are limitless. Neither does it imply a belief that the organization should not have an official connection with the American Railway Association. There are well-defined advantages in this relationship, provided the Association encourages great freedom of development of the Division and does not attempt to pour it into a mold of its own making. But it is evident that wise guidance by the Association and courageous leadership in the Division will be required if the incorporation of the Division into the American Railway Association is to do more good than harm. The greatest possible good will be done only if the higher executives of the railways encourage the fullest investigation and free discussion of all important mechanical department matters, and if the members of the Mechanical Division take the fullest advantage of the opportunity thus afforded.

Programs for Today

Four railroad conventions will meet in Atlantic City today.

Division VI, Purchases and Stores, A. R. A.

The meetings of this association will be held in the Hotel Traymore. The session will open sharp at 9 a. m. and will adjourn at 1 p. m. The program is as follows:

	A. M.	A. M.
Meeting called to order by Chairman.....		9:00
Invocation	9:00	to 9:10
Address of Welcome by Mayor of Atlantic City.....	9:10	to 9:20
Response by J. H. Waterman.....	9:20	to 9:30
Address by R. H. Aishton, President, American Railway Association.....	9:30	to 9:45
Address by W. G. Besler, first vice-president, American Railway Association.....	9:45	to 10:00
Address by Elisha Lee, vice-president, Pennsylvania System, (Eastern Region).....	10:00	to 10:15
Opening of Meeting by Chairman.....	10:15	to 10:40
Recess	10:30	to 10:40
Communications.....	10:40	to 10:50
Appointment of Committees (Resolutions and Memorials).....	10:50	to 10:55
Action on Minutes of 1921 Business Meeting.....	10:55	to 11:00
New Business:		
Report of General Committee.....	11:00	to 11:15
Discussion of General Committee's Report.....	11:15	to 11:20
Discussion of reports on:		
Subject 1.—Stores Department Book of Rules.....	11:20	to 11:40
		P. M.
Subject 2.—Classification of Material.....	11:40	to 12:30
		P. M.
Special Subject: "Distributing and Accounting for Gasoline," by Mr. L. V. Hyatt.....	12:30	to 1:00

Division V, Mechanical, A. R. A.

The meeting of this organization will be held in the Greek Temple on the Million Dollar Pier. The meeting will be called to order sharp at 9:30 a. m. and will adjourn at 12:30 p. m. The program is as follows:

Discussion of Reports on:
Mammal.
Election of Officers
Discussion of reports on:
Specifications and Tests for Material.
Locomotive Headlights and Classification Lamps.

(Continued on Page 1551)

Picked Up On The Million Dollar Pier

A Few Comments, Critical and Otherwise, of the Work of the Mechanical Division

IT IS INTERESTING and oft-times exceedingly profitable to listen to and then weigh carefully some of the observations that are made by the railroad men and others at the conventions as to the present shortcomings of the Mechanical Division and how they may be overcome. *The Daily*, of course, assumes no responsibility for the following statements which have been made to its representatives but publishes them as a matter of news and with the idea that some of them may suggest means by which the work of the associations may be made more effective.

* * * * *

One member has suggested that it might be well to retain a specialist who is a good reader with a strong voice to present the reports at the meetings. The chairman of the committee could stand alongside of him and interrupt during the reading of the abstract of the report, if he wished to make special comments on any point. Much of the value of the presentation of the reports is lost because of the fact that the committee chairmen will not, or cannot, speak up loudly and plainly and make themselves heard throughout the room. Surely men who have charge of hundreds and sometimes thousands of other men, and who direct their energies, should be able to make a better presentation than some of them do. How can they be made to feel the importance and necessity of so doing? Is it necessary to provide a professional reader?

* * * * *

Another member has made the suggestion that the effectiveness of the presentation and discussion of the reports would be greatly increased if every member of each committee was present when the report was presented and if they all sat together in a body at or near the platform. This practice is followed by the American Railway Engineering Association. The members all sit behind a long table on the platform and the chairman of the committee frequently calls upon other members of the committee to present certain parts of the report; or if questions are asked from the floor, designates the member of the committee who is in the best position to give the answer. It is unfortunate that often only one or two members of an important committee are present to support their chairman; it has been suggested that prior to the meeting each year the General Committee should notify the executive officers on the different railroads of the names of the men on their roads who are on the committees, and ask that special efforts be made to see that they attend the convention and support their committees.

* * * * *

Someone has called it the "Amen Corner." The connection at first was not quite clear until it was explained by some of the members who have not been able to find seats near the front of the meeting room. It seems that several members who take part in the discussions of the reports have a habit of sitting near the front of the room and speaking direct to the chairman and in such an indifferent manner that most of the members present are deprived of the privilege of following their remarks in-

telligently. Courtesy, of course, demands that those members taking part in the discussion should address the chairman, but there is no good reason why they should not aim to at least partially face the audience and speak clearly, so as to get their remarks over.

If some of the younger members want to make a record for themselves they can do so by studying how effectively to address the meeting and then putting their strength and energy into making themselves heard. Not only is this necessary, but the men ought to aim to "get their personalities over." This is not always easy to do, but men who expect to make good as executives in these days have got to perfect themselves in public speaking. The man who made these comments, by the way, was not an agent for one of the correspondence school courses on public speaking, but was a hard-headed mechanical department officer who is trying to get as much good as he possibly can from the meetings, and would like to hear everything that is being said. We hesitate to refer to the comments made by the official reported, and he is located in a most advantageous position.

* * * * *

If it were possible to compute, on the basis of the salaries received by the people present at a given session, the total compensation for the group per minute, the size of the figure might be startling. If, then, each member were to realize that every minute he took to express himself cost this amount of money, the result might be interesting. It might lead many of the members to study the advance copies of the reports more critically before they try to discuss the reports and might make them look up the answers to obvious questions themselves before the meeting, rather than to waste the time of all the members present. It might inspire the different committees to complete their reports early enough so that they could be sent out to the membership and be thoroughly digested well in advance of the time of the meeting. It might force the presiding officer to bring down the gavel hard and shut off members who are wandering from the subjects under discussion, or who are not utilizing the time to the greatest advantage. It might, in the final analysis, tremendously add to the practical value of the proceedings and the prestige of the Mechanical Division.

* * * * *

Many comments have been received commending *The Daily* for its editorial on Friday morning on "Make Room for the Young Men." One member has suggested that this is entirely up to the young men themselves. "If they have the right sort of stuff in them they will force themselves to the front, even though they may not be encouraged." Men like C. G. Juneau, W. H. Winterrowd, W. J. Bohan, C. T. Ripley, M. H. Haig (not here this year) etc., have made themselves felt. Undoubtedly the older men in the organization would be delighted to have more of the younger men follow the leadership of this younger group. One member has suggested that live and progressive organizations always utilize the energy, ambition and vision of the younger men and that one of the principal functions of the older executives is to encourage these men and allow them plenty of room for the display of

unfortunately, what is everybody's business is nobody's business. If every superintendent of motive power would deliberately aim to encourage his more ambitious subordinates to get into the work of the Mechanical Division and get on their feet at the meetings and then back up these younger men in putting over some of the really big things that they want to do, there would be club and it is getting to be more important every day that little room for complaining about the programs or work of the Division.

* * * * *

One member suggests that when the mechanical department officers are at home they spend the greater part of their time in dealing with problems relating to the handling of men and to questions of operation. On the other hand, when they come to the convention, the great bulk of the reports and discussion are concerned with mechanical details, or as a member expressed it, "bolts and nuts." This man was quite enthusiastic over the editorial in Saturday morning's *Daily* entitled "Why Not Discuss Labor Questions?" He suggested in addition, however, that there are many operating questions, such as lengthening out the locomotive runs, possibilities of motor cars, etc., that ought to be reported upon and discussed at Atlantic City.

Another member suggested that developments during the past decade have shown that in proportion as the strength of the cars has been increased, so the carelessness of the train service men in handling the cars has increased. This, of course, cannot go on indefinitely. The dead weight per revenue ton must be kept to the lowest possible point if America is to lead in carrying freight and passengers expeditiously and safely at the lowest cost and still continue to pay its employees the highest wages. Mechanical department officers have got to do their part in educating operating officers and others to this truth and have got to stop trying to make equipment which will stand unlimited abuse. If train service men will not see this thing and operating officers continue to stand for the increasing abuse of the equipment, then in the last analysis the public will either be forced to pay exorbitant rates or the men will have to have their wages reduced.

* * * * *

A lively discussion developed among a group of mechanical department officers in one of the reception booths. The point blank statement was made that the Mechanical Division was not putting over as strong a program as it should and that unless it pulled itself together and did more effective work it would rapidly lose its prestige. Stories were told by some of the older men in the group of the remarkable accomplishments of the Master Car Builders' Association and the Master Mechanics' Association. Three reasons were advanced as to why the Mechanical Division was not doing as good work as should be expected of it.

One reason was that the discontinuance of conventions during the war and reconstruction period had interfered greatly with the carrying on of the committee work and this had restricted efforts largely to routine matters and had interfered with the consideration of new and more constructive work. The fuel was also developed that mechanical department officers had had some neglect of their problems to contend with during the reconstruction period and that those had prevented them from taking up many problems which otherwise would have received consideration. In reply to this however, others advised that never was there a time when the movement had been confronted with such growth and vital problems and that a serious mistake had been made

in not providing for a thorough study and discussion of these, in order that the proper leadership might be supplied in these difficult times.

The second reason advanced for the poor showing of the Mechanical Division was that the taking over of the M. C. B. and M. M. Associations by the A. R. A. had put the brakes on them, so to speak. There appeared to be two sides to this question also. Some contended that the higher executives were discouraging the mechanical department officers from taking up many of the larger subjects which should receive consideration, while others contended that the officers of the American Railway Association would be only too glad to see the mechanical men show more initiative, and place the Division on the basis of a Moses leading the mechanical departments out of the wilderness. Some thought that the situation is large by psychological or rather that the mechanical men are a bit too timid and have allowed themselves to get into a state of mind that is not productive of the best results.

It seemed to be agreed, however, that it is up to the mechanical department officers to get busy and start something; this would either demonstrate that the trouble is entirely a question of psychology or it would clearly develop what the limitations of the Mechanical Division are. The final suggestion was that it would be a bully good thing if the officers of the American Railway Association would put it right up to the mechanical department men to study, discuss and report upon some of the really big questions relating to personnel problems and operation which are now being overlooked, possibly for fear of criticism from above.

The third reason advanced for the somewhat unsatisfactory showing of the Mechanical Division is that the whole thing is largely a matter of personnel. You can't keep a good man down, and it was contended that if the leaders of the Mechanical Division would show the same initiative as has been shown by the American Railway Engineering Association, the Fuel Association, and the Railway Accounting Officers' Association, like results would follow.

It is a good thing occasionally, it was suggested, to have a drastic reorganization. One great international organization has found that it is necessary to more or less reorganize and revise its program periodically, say, once every 10 years. It was suggested that the Mechanical Division in the same way ought to put a "vacuum cleaner" at least on its subcommittees and see that each committee is headed by a "live wire" and that the men of the greatest vision, initiative and ability be selected to back them up.

It was suggested, also, that more individual papers should be presented on vital topics and that the Mechanical Division meetings could be very greatly improved, not only by doing this but by arranging for thorough and formal discussions of the reports or individual papers as is now being done to such great advantage by some of the more progressive railroad clubs.

* * * * *

One railroad man asked some of his friends just how the committees were appointed and as to whether they held frequent meetings in developing their reports. "It would appear," he said, "that some of the committee members hardly know that they are on a committee, or at least are not familiar with the report when it is finally developed." In supporting this statement he directed attention to the fact that a member criticised one of the committee reports from the floor last week and was invited by the chairman of the committee to submit to the committee certain data which he referred to. Investigation revealed

the fact that the member who criticised the report and was in a position to furnish additional data was included among the names of the members of the committee on the printed report that was under consideration. Are the committees working as committees or are some of them dominated by one man or a minority of the committee? When a man is appointed on a committee is the head of his department notified and does the railroad agree to back up the committee member by allowing him sufficient time to attend to the committee work and assisting him to secure information so far at least as the questions under consideration relate to the practices of his own road?

* * * * *

One critic handed in the following in writing:

"As one reads over the program of this year's convention of Division V—Mechanical, he finds many old friends both among the subjects and among the lists of men on the various committees. Some of the committees, with few or many changes in membership, have been doing duty for many years and reports from them are looked for just as one looks to see the waves come rolling in from the ocean onto the beach at Atlantic City. There are members on some committees who have done valiant work in the past on matters new and vital, and recognition and reward should justly be given if it has not already been done.

"There is a question, however, whether this should take the form of a life membership on a committee. It might be better to grant honorary degrees, as is the custom of our colleges at this time of the year, or following this example, start an emeritus list. Another way might be to have on some of the old committees a list of consulting members to include those whose services have been of so much value in the past. This would bring some of the younger men into position to assist the association to take new steps forward. It is even possible that as the committee list is gone over it will be found that some subjects have been so well covered that the committee which has been standing so long could be allowed to sit down, possibly to take a nap or even go to sleep. There certainly is a sufficient number of new and vital subjects that might be taken up at these conventions even though some of the good old standby subjects were not included."

The Power of the Railroad Club

GEORGE M. BASFORD has always been greatly interested in the work of the railway clubs and the various mechanical department associations. More-over no man in the railroad field has done more to encourage and help young men. He has urged the younger men to take part in the meetings and programs of these organizations, not only that the young men might help themselves, but also because of the energy and help that they could give to improving these organizations and making them more effective. Mr. Basford has been acting as chairman of the Committee on Subjects of the Central Railway Club during the past year and has done much through the improved programs to increase the interest and enthusiasm of the members in the work of the club.

We found George in a quiet corner on the pier a day or two ago and, knowing his hobby, started him to talking on the possibilities and power of the railroad clubs, and as to how they might be utilized by the younger men to the advantage of both the men and the clubs.

"A friend told me how, many years ago, he was hired as a specialist in an immense organization," said Mr.

Basford. The first one he talked with was the president, a very successful man. The president said this to him: "Young man you have come to the foot of our ladder. It is a long one. Remember that I am lonesome up here at the top and that you are in a big crowd at the bottom. But every rung in this ladder is a perfectly good one for climbing."

"My friend did climb out of the crowd to the presidency of a successful company in a business that he built up from the ground. This is mentioned because his success was due largely to railway clubs and other organizations of railroad men. He spent 20 years on railroads and not only joined but took active part in club work. He gives the clubs and the old Master Car Builders' Association credit for inspiring him and broadening his vision. In his office at his busy factory, he told me that nothing had ever helped him more than to write a paper or take part in a discussion which compelled him to prepare to tell somebody something that was worth telling.

"Urge the young men to join the railway clubs," he said. "I made a list a short time ago of 24 important, influential men who have used the railway clubs to their own advantage, to the advantage of the clubs and to the great advantage of their employers. But in doing so much for themselves they have done even more for many others who have been helped by their examples.

"One of these men is at the head of one of the world's greatest electric companies. For years he was an obscure young railroad man. He had no friends but the ones he made. He attended meetings. He made it a rule to prepare something to say and to say it at every technical meeting—something worth while. He wrote papers and they are classics, the last word to date on his subject. He inspired himself and inspired others by being in and a part of every new railroad development—operating, mechanical and signaling. He made friends and mixed in discussions in the corner of the room before and after the meeting when others told what they lacked courage to tell on the floor. When he started to write a paper he found how much he did not know of the subject and he fortified himself. No one could embarrass him by an attack on the floor because he was always sure of his ground. Speaking in public was distasteful to him but he overcame this. I am sure he would not be where he is today and in position to help the railroads as he is today, without the railway clubs. Get the young men to do as he did. Get them to put some valuable thought into the record of every meeting. They will take more thought away than they bring.

"Years ago one of my friends wrote three important papers. Within a short time after the presentation of each of them he received a promotion to a better job. Another friend definitely owes the acquaintance that made him successful to a paper he wrote for a railway club 25 years ago.

"The railway clubs are forums for railroad men that are needed as they never have been needed before. Operating officers, track officers, those in charge of cars, locomotives, signals, bridges and terminals, never, not even on their own roads, get together as they may in a railway these officers should mingle to study and to understand each other's problems.

"Do track officers generally appreciate the influence they may exert over locomotive fuel consumption? Do signal engineers realize how greatly their work affects the cost of maintenance of cars? Do operating officers see that much of the success of electric locomotives is due to the improved operating methods employed in every electric installation and that steam locomotives would yield remarkable results under similar methods?

"These suggest the possibilities of the railway clubs to

bring together these men who supply equipment, power and track and the men who use them. Most railway clubs have been unbalanced, one-sided, mostly mechanical. They may be broadened and will be broadened when a few young men from each road see what the railway club can do for them.

"Latent talent in great abundance among obscure, unknown young men crowding the foot of the railroad ladder may be brought out by these clubs. It is the privilege and duty of those of us who are older to get young men to see the light that railway clubs can throw into their futures—and the future of transportation is to be guided by these young men on whom the welfare of the country depends.

"Urge the young men to join the clubs; attend the meetings; suggest topics to the Committee on Subjects; write papers, no matter how short, but each must bring a message. Take part in the discussions. Bring out some good point for the benefit of others, some fact or constructive suggestion that will help the railroads even a little bit. This desperate railroad situation may be materially changed by inside team work."

"Our railway clubs," said Mr. Basford, "present a truly wonderful field of opportunity today and it is not by any means only young men who should take advantage of them. Older men may keep younger and may widen vision, improve usefulness and increase their measure of success by using the railway clubs as they should be used."

Force of Habit

"YES," SAID THE specialist, as he stood at the bedside of the sick purchasing agent, "I can cure you."

"What will it cost?" asked the sick man, faintly.

"Five hundred dollars."

"You'll have to shade your price a little," replied the purchasing agent. "I had a better bid from the undertaker."—*Adscript.*

Lost and Found

LOST—A platinum bar pin set with diamonds. Please return to Mrs. W. B. Leach, Hunt-Spiller Manufacturing Corporation, Booth 562.

LOST—A black Paradise feather in front of the Ambassador Hotel. Please return to J. R. Blakeslee, Ajax Manufacturing Company, Space 65.

FOUND—A string of beads, a bracelet, a key, a shoe buckle, a setting for a ring and a cuff link. These articles will be returned to their owners upon application to Secretary Conway at the Enrollment Booth, after making proper identification.

LOST—Badge No. 8243. Mrs. Jos. J. Edwards.

Prof. A. J. Wood Promoted

ARTUR J. WOOD, professor of railway mechanical engineering at Pennsylvania State College, has been appointed head of the Department of Mechanical Engineering.

Professor Wood was graduated in 1896 from Stevens Institute of Technology; his father, the eminent teacher and engineer DeVolson Wood, devoted twenty-five years of his life to that institution. After graduation, Professor Wood was on the editorial staff of the *Railroad Gazette*, combining practical engineering work with this

position. Later he was instructor in mechanical engineering at Worcester Polytechnic Institute, professor of mechanical and electrical engineering at Delaware College, and since 1904 a member of the mechanical engineering faculty at Pennsylvania State College, where he received his Master of Science degree in 1916. More recently he has been in direct charge of the engineering experiment station.

Since coming to Penn State, Professor Wood's work has been characterized by the organization and conduct of the course in railway mechanical engineering, the development of researches in heat transmission, the preparation of his text book on Locomotive Operation, and by a varied consulting practice chiefly in power plants and railroad work. He has also presented many papers before engineering and scientific societies, and is widely known for researches in heat transmission. He is a member of the Sigma Tau honorary engineering fraternity.

In reply to an inquiry as to the future of the course in railway mechanical engineering at Pennsylvania State College, Professor Wood says: "My appointment to the head of the Department of Mechanical Engineering will enable me to direct the work in railway mechanical engineering so as to insure a gradual and more permanent development of it in our course of study. I have never been favorable to over-specialization in railroad work and our course given in the Department of Mechanical Engineering has not been specialized to the exclusion of a good foundation in the fundamentals of straight mechanical engineering subjects.

"It may be of interest to note that five members of the present mechanical engineering faculty have had considerable railroad experience and during the past year three of these men have been giving instruction in railway mechanical subjects. We have had many requests for members of our graduating class to take up special apprenticeship courses, but can supply few of these calls. One of the items in the request for state appropriation which will be made during the coming year is for a transportation building. Altogether, I anticipate a strengthening and broadening of our course in railway mechanical engineering."



Mexican Railway President at Conventions—Left: Leon Salinas, Executive President, National Railways of Mexico; Right: F. P. De Hoyos, General Agent at New York

Programs for Today

(Continued from Page 1546)

Air Brake Association

The twenty-ninth annual convention of this association will be held at Haddon Hall, Vernon Room, and opens at 9:30 a.m.

Edwin F. Bader, mayor of Atlantic City, will deliver the address of welcome. The Reverend Newton W. Caldwell, pastor of the Olivet Presbyterian Church, will invoke divine blessing.

The first subject for discussion will be the committee paper on "Air-Operated Auxiliary Devices on Locomotives." This will be followed by a paper by Prof. S. W. Dudley of Yale University on "Wastes in Air Brake Service."

Association of Railway Electrical Engineers

The association will hold its semi-annual convention at the Hotel Dennis. The meeting will be called to order promptly at 9:30 a.m. This will be the first official get-together of the electrical men for two years and a large representation is expected. The order of business is as follows:

- Address of President.
- Report of Secretary-Treasurer.
- Unfinished Business.
- New Business.
- Progress of Committee Train Lighting Equipment and Practice.
- Progress Report of Committee on Locomotive Headlights.
- Progress Report of Committee on Data and Information.
- Progress Report of Committee on Electric Welding.
- Progress Report on Committee on Illumination.
- Progress Report of Committee on Electric Repair Shop Facilities and Equipment.
- Progress Report of Committee on Motor Specifications.
- Progress Report of Committee on Power Plants.
- Progress Report of Committee on Power Trucks and Tractors.
- Paper on Industrial Heating by B. F. Collins.

Entertainment Features

10:30 a.m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3:30 p.m.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier. Tea Will Be Served at 4:30 p.m.

9:00 p.m.—Informal Dance, Special Features, Ball Room, Million Dollar Pier.

Locomotives on Track Exhibit

THE PHILADELPHIA & READING is exhibiting on its track in Mississippi avenue, a little south of the pier near the boardwalk, two modern locomotives. One is of the Pacific type, built at its own shops and used on Atlantic City trains. The weight, exclusive of the tender, is 183,700 lb. and the rated tractive effort 39,046 lb.

The other is a new Consolidation locomotive, No. 1900, built by the Baldwin Locomotive Works. This has 25-in. by 32-in. cylinders, 55½-in. drivers, 94.5 sq. ft. grate area and 3,752 sq. ft. equivalent heating surface. It carries 210 lb. boiler pressure, weighs 286,000 lb., exclusive of the tender, and has a rated tractive force of 64,300 lb. It is equipped with a Duplex stoker and Worthington feedwater heater.

Then there is the oil-burning Santa Fe type locomotive built for the Southern Pacific by the Baldwin Locomotive Works and fully described elsewhere in this issue.

Official Registration Lists

The Official Registration Lists will be published today and Wednesday, June 21. No list will be issued on Tues-

The McBarmma Golf Tournament

THE MCBARMMA GOLF CLUB—"the most exclusive golf club in the world", as one of its members facetiously called it—had its annual tournament at the Seaview Golf Club on Saturday. The tournament was followed by the annual dinner and election of officers. The new officers elected are: president, B. F. Flory; Vice-president, George H. Sargent; directors, H. C. Manchester and W.L. Conwell; secretary-treasurer, Clement F. Street.

The golf play resulted in the awarding of the following prizes: championship and first prize in Class A, H. Gilliam, 86-4-82; Class A, second prize, W. L. Conwell, 88-2-86; Class B, first prize, Robert F. Carr, 94-10-84; Class B, second prize, A. H. Sission, 95-9-86; Class C, first prize, F. H. Clark, 96-16-80.

The Carr cup for the low net score of the afternoon play went to F. H. Clark.

It was alleged that "pop" Sisson was disqualified because he did not play the nineteenth hole or smoke cigarettes, and Clement F. Street claimed the second prize in Class B. Mr. Sission seems to be out of luck, since nobody has ever yet successfully contested any position taken by Clement regarding any feature of the club or proceeds thereof.

F. H. Clark on Chinese Railway Conditions

F. H. CLARK, formerly general superintendent of motive power of the Baltimore & Ohio, recently returned from China, where for over two years he was technical adviser of the Ministry of Communication of the Chinese government. Mr. and Mrs. Clark and their daughter are here attending the conventions. Regarding railway conditions in China, Mr. Clark said yesterday:

"The railways of China amount to about 7,000 miles, including concessional lines, provincial and private lines and the lines of the Chinese Government Railways. The latter have a total of something like 4,000 miles and include about 15 different lines built mainly by foreign capital but partially by the Chinese themselves. Railway construction was making some progress at the time of the outbreak of the war in 1914, but was soon afterward discontinued and has only recently been resumed in a relatively small way.

"China has made contracts or agreements covering approximately 1,000 miles of additional lines and will eventually need a great deal more to serve properly her area and population. She has an area greater than that of the United States, a population supposed to be three or four times as great and a railway mileage of less than three per cent of that of the United States.

"These figures should not be used as a basis for estimating the ultimate railway mileage of China, but only as an indication of her need for a considerable amount of additional mileage. With the inauguration of a stable government having the confidence of Chinese and foreign investors, the development of the country should proceed very rapidly.

"Manufacturing and mining are generally done on a small scale suited to local needs. This is largely due to a lack of transportation facilities and as these are provided and markets broadened we may expect to see production on a larger scale.

"Large cotton mills, flour mills and various other industries are already in successful operation in some parts of the country. Coal, iron, ore and other minerals seem to be widely distributed.

"China has always been an agricultural nation but seems to have the raw materials and the labor, which if properly directed, should make her a great manufacturing nation."

Enrollment Today

THE ENROLLMENT BOOTH at the entrance to the Million Dollar Pier will be open today from 9 a.m. to 1 p.m.; 2 p.m. to 6 p.m.; and from 8 p.m. to 9 p.m.

Santa Fe Dinner

JOHN PURCELL, assistant to the vice-president in charge of the mechanical department of the Atchison, Topeka & Santa Fe, tendered an informal shore dinner to the Santa Fe guests who are attending the conventions, including a number of old time Santa Fe men and their wives. About 18 were in attendance and the evening was enjoyed by all.

Registration Figures

THE COMPARATIVE REGISTRATION figures for 1922 and 1920 up to 1 o'clock Sunday noon are as follows:

	1922	1920
Div. V.—M. M. and M. C. B.....	695	707
Div. VI.—Pur. and Stores.....	127	140
Special guests.....	477	441
Supply men.....	2,117	2,262
Railroad ladies.....	619	569
Supply ladies.....	564	634
Total	4,599	4,753

Equipment Orders Still Coming In

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered five Mikado locomotives from the Baldwin Locomotive Works and the Lehigh Valley is inquiring for five locomotives.

The Western Pacific expects to let contracts this week for 2,000 refrigerator cars; the New York, Chicago & St. Louis has ordered 1,000 freight cars from the Illinois Car & Manufacturing Company; and the Grand Trunk has ordered 250 refrigerator cars from the National Steel Car Corporation, Hamilton, Ont.

The Interborough Rapid Transit Company has ordered 100 new cars from the Pullman Company.

Ticket Office for Convention Attendants

THE PENNSYLVANIA RAILROAD will open a ticket office at 9 a.m. this morning for the convenience of the people in attendance at the conventions. The office will be located at the entrance to the pier, adjacent to the Enrollment booth. Reservations may be made for all trains on the Pennsylvania running to Philadelphia, Pittsburgh, New York, Chicago, etc., and tickets will be issued at any point on the Pennsylvania System. Extra charges will be placed on all trains that will be used by attending convention visitors, but reservations should be made as early as possible in order that proper and sufficient accommodations may be provided.

News from South America

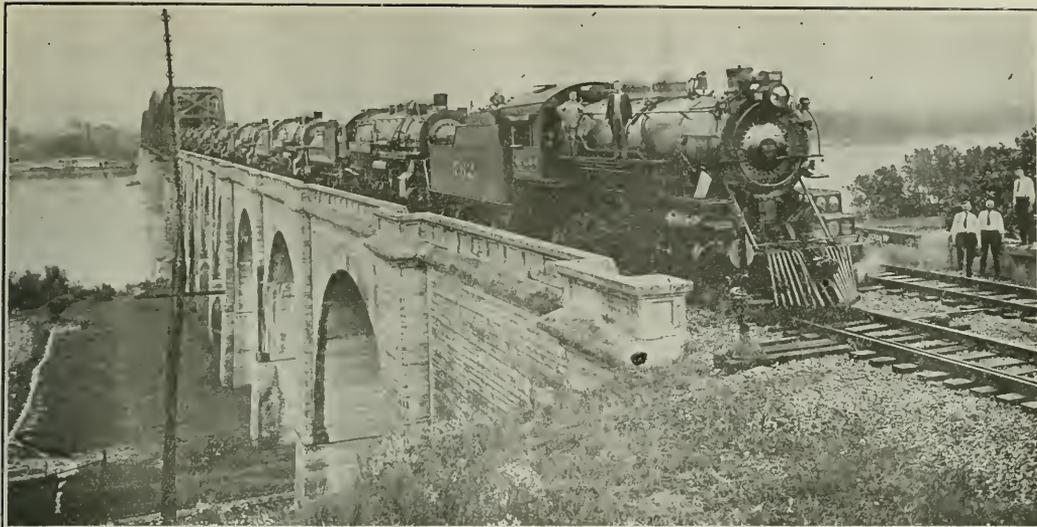
S. G. DOWN, general sales manager of the Westinghouse Air Brake Company, has but recently returned from a three-months' tour of South American countries, including Brazil, Argentina, Chile and Peru. In commenting on the conditions in South America, Mr. Down believes that there will be a good market for American railway material in the near future, particularly from the Government owned lines. As regards the privately owned roads, the possibilities of the United States for business are not as good, primarily because they are operated on English capital, which naturally means that purchases will be made in England where possible. In this connection Mr. Down pointed out that before America can hope to derive any great amount of business from privately owned railway companies, it must be ready to invest money in foreign enterprises, for it is financial that business will go to that country which has financial control of the properties in question.

Mr. Down also commented on the lack of proper American steamship connections with South American countries. Speaking of the general practices on the railways, Mr. Down said that on the national railways of Brazil, Argentina and Chile, the Westinghouse air brake is standard, and that a large number of the railways in Peru are using this brake. South American countries seem to favor the American type of equipment. This is logical, for with clearance limitations larger than those obtaining in many of the European countries, the South American roads are at liberty to develop more along the lines of larger and more powerful engines, as is the case in the United States.

Registration, American Railway Association, Div. V, Mechanical

- Aiken, Arthur, Chf. Clk. to P. A., Penn., Ambassador
- Albers, L. H., Supvr. of Air Brakes, N. Y. C., Haddon Hall.
- Anderson, H. A., Asst. P. A., Penn., Traymore
- Andreucci, J. A., Asst. Elec. Eng., C. & D., Penn., Traymore.
- Bardo, C. S., C. M., N. Y. N. H. & H.
- Beaumont, H. A., G. F., B. & O., Ilwaco.
- Bell, E. E., M. Insp., S. L. & S. F., Dennis.
- Berg, R., Supt. Loco. Shops, P. & E., Strand.
- Biam, W. L., Mech. Asst. to Pres., N. Y. N. H. & H., Shelburne.
- Billau, J. S., Ass. Elec. Eng., B. & O., Chalfonte.
- Bingaman, Chas. A., M. E., P. & R., Bothwell.
- Black, W. G., M. M., Nickel Plate, Haddon Hall.
- Boland, W. E., Sig. Engr., S. P., Shelburne.
- Boltwood, Harvey, M. E., Div. of Liquid, of Claims, Haddon Hall.
- Booth, J. K., M. M., B. & L. E., Chalfonte.
- Boyer, F. G., C. R. R. of N. J., Terminal.
- Branges, Paul H., M. M., Chelsea.
- Brooks, C. F., Mech. Asst. to V. P. C. N., Haddon Hall.
- Brown, Chas. G., Act. Asst. M. M., Penn., Chalfonte
- Barke, Arthur J., Asst. Clk. Stores Dept., P. & R.
- Bushnell, F. A., P. A., G. N., Shelburne.
- Cantley, W. L., M. E., L. V., Traymore
- Chandler, J. E., G. S., Duluth & Iron Range, Shelburne.
- Chenoweth, E. G., M. E., C. R. L. & P., Chalfonte.
- Clark, R. A., Gen. Mgr., Rahway Valley, New England.
- Clarke, A. B., G. F., P. & R., Stanley.
- Clem, W. A., Asst. P. A., P. & R.
- Gemmitt, J. H., P. A., N. & W., Ritz
- Cochrane, John T., Pres. & Tech. Mgr., A. T. & N. Shelburne.
- Cochrane, Jr. John T., L. & N., Shelburne
- Colklesser, W. R., P. A., B. & O., Ambassador.
- Cooper, I. F., M. M., D. & W., Shelburne
- Cooper, W. H., Div. Store, P. & R.
- Cordova, G. C., to P. A., Nat. Ry. of Mexico, Ambassador
- Courtney, Harry, M. E., P. & L. E., Strand
- Curley, Wm. J., Air Brake Insp., P. & R.
- Davis, D. G., Gen. Store C. M. & St. P., Traymore.
- Davidson, W. G. S., J. C., Dennis.
- Davis, W. L., G. F., Penna., Martique
- Dawson, A. N., Div. Store B. & O. Ritz
- Deming, James, Chf. Insp., B. & H., Haddon Hall.
- Diehl, W. L., P. A., M. & O., Traymore.
- Dillon, S. J., S. Insp., Penna., Loxwa.
- Donellan, T. E., M. M., D. & H., Haddon Hall.
- Donnan, Henry, Sp. Engr., C. N. & P., Strand.
- Dougherty, Daniel A., Asst. Clk. Stores Dept., P. & R.
- Doughs, T. W., M. M., Atlanta Joint Term. Rvs., Princess.
- Drake, J. A., G. S., N. Y. N. H. & H. Peru
- Drums, M. J., Mech. Insp., N. Y. F. G., Chalfonte.
- Dunn, P. T., M. M. C. & D. Div., Penn., Haddon Hall.
- Elands, G. S., M. M. P. D. & H., Haddon Hall.

(Continued on Page 1561)



Prosperity Special Leaving Thebes Bridge, Illmo, Mo., June 7, 1922.

A Notable 2-10-2 Type for the Southern Pacific

Feedwater Heater and Booster are Features of Latest Design Which is Exhibited at the Conventions

DURING RECENT WEEKS the newspapers have been filled with accounts of the progress of the "Prosperity Special." A solid train of twenty 2-10-2 type locomotives, part of an order of 50 of this type for the Southern Pacific, left the Eddystone, Pa., plant of the Baldwin Locomotive Works on May 26 for California, where the equipment will be delivered to the railroad. Interest in this event among those attending the conventions has been increased by the fact that one of the locomotives included in the same order is the principal feature of the track exhibits this year.

Through the courtesy of the locomotive builders, members of the railway and supply associations and their guests were afforded an opportunity of seeing the moving pictures showing the progress of the train between Philadelphia and New York. On the occasion of this exhibit, which was held last evening in the Rose Room of the Hotel Traymore, Samuel M. Vauclain, president of the Baldwin Locomotive Works, who was primarily responsible for the movement of the train, delivered an address.

A solid train of locomotives is such an unusual sight that the "Prosperity Special" has attracted great crowds at all points along the route. The train was moved only during the day, giving all who were interested opportunity to inspect it at the points where it stopped. The route chosen was over the Pennsylvania System to East St. Louis, thence over the St. Louis-Southwestern to Corsicana, Texas, where connection is made with the Southern Pacific Lines.

One of the most remarkable events of the trip was the run around Horseshoe Curve, west of Altoona, Pa., where the train was moved with six locomotives, two in front,

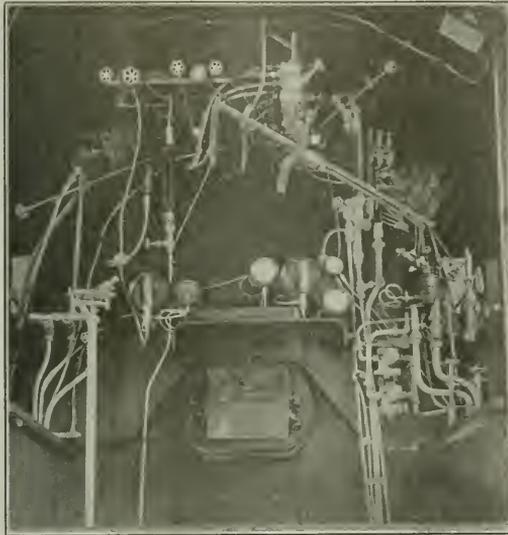
two in the center and two pushing. Moving pictures were taken of the train at various points on the curve; these were among the pictures shown last night.

Details of the Locomotives

Aside from the fact that this order is one of the largest that has been placed for locomotives of the 2-10-2 type, the equipment is notable because it marks the first extensive installation of feedwater heaters and of the locomotive booster. Although they are exceeded in total weight by other locomotives of similar types, the appliances mentioned probably increase boiler output and starting tractive effort beyond anything heretofore obtained.

The first Baldwin locomotives of the 2-10-2 type built for the Southern Pacific were constructed in 1917 and were designated as Class F-1. These locomotives weigh 348,000 lb. and develop a tractive effort of 65,300 lb., and have been successfully used not only in heavy freight service but also in passenger service on grades exceeding two per cent. They were followed in 1920 by a group of larger locomotives known as Class F-3, having a total weight of 385,900 lb. and developing a tractive effort of 75,150 lb. These locomotives were briefly described in the *Railway Age* of July 2, 1921. The new locomotives (Class F-4) are practically identical with the Class F-3, except for the addition of a feedwater heater and booster. The tractive effort of the main engines is the same as the Class F-3 locomotives. In addition the booster develops 9,500 lb. at starting, or 8,950 lb. at a piston speed of 250 ft. per min. The combined tractive effort at starting is therefore 84,650 lb. All the locomotives referred to above burn oil for fuel and are equipped with superheaters.

The boiler used on Class F-4 is of the straight top type with a slope on the bottom of the middle ring in order to provide a sufficiently deep water space under the combustion chamber. This increases the shell diameter from 90 in. at the first ring to 100 in. at the throat. On the second ring, which carries the dome, the longitudinal seam is placed on the top center line and is welded throughout its length, in addition to being reinforced by inside and



Interior of the Cab

outside welt-strips. The inside strip is wide enough to cover the entire area under the dome base. The auxiliary dome is on the third ring immediately ahead of the combustion chamber and is placed over a 15-in. manhole so that the boiler can be easily entered for inspection purposes.

In the construction of the boiler unusually large plates were used. The firebox crown sheets and side sheets are in one piece and the wrapper sheet is also made from a single plate. The dimensions of the plates for these parts were 247½ in. by 195½ in. by ¾ in. and 291 in. by 149 in. by ¾ in. respectively.

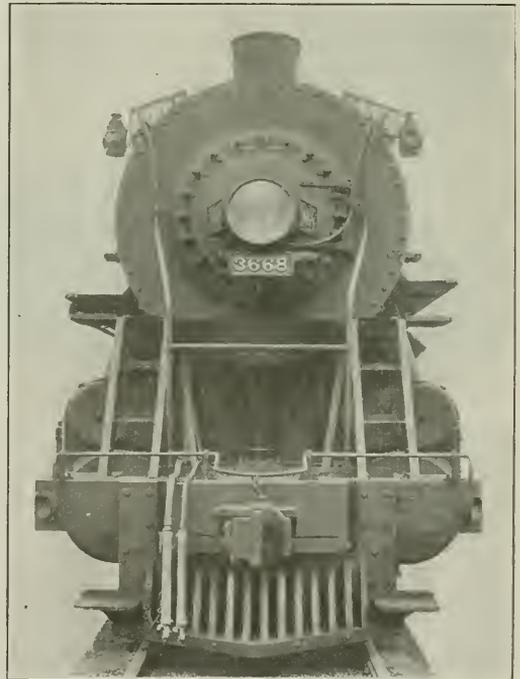
The combustion chamber is 64 in. long and has a complete installation of flexible bolts in the water space, while four rows of such bolts stay the front end of the crown. The throat is also stayed by flexible bolts and they are used in the breakage zones in the sides and back. Two fusible plugs are applied, one at the front end of the crown and the other over the outlet of the oil-burner. The oil-burning equipment is arranged in accordance with Southern Pacific standards.

The feedwater is supplied by one non-lifting injector placed on the right-hand side, and one combined open type feedwater heater and pump of 7,200 gal. capacity per hour, placed on the left side. The pump is supplied by a steam pipe leading from a valve in the turret. With the heater and pump and air reservoirs located on the left-hand side, it has been necessary to place the two cross-compound air compressors on the right-hand side. These are low down under the running board so that they do not obstruct the engineman's vision when looking ahead.

With limited space available, special attention had to be

given the arrangement of the piping in order to render it accessible and at the same time not exceed the limit of width. On the left side the feedwater heater requires a four-inch feed pipe which is placed under the running board and above one of the air reservoirs. The latter is hung on cast steel supports which are specially designed to provide room for the feed pipe. On the right-hand side there is no room to place the four-inch booster exhaust pipe outside the frames, and it is therefore placed between them. This pipe enters the smokebox and discharges into an annular opening surrounding the main exhaust nozzle.

The cylinders are fitted with cast iron bushings and the pistons have cast steel heads and cast iron bull rings. The piston rods, main crank pins and driving axles are heat treated and hollow bored. Flanged tires are used on all the wheels, notwithstanding the fact that the locomotives are designed to traverse 20 deg. curves. The lateral play between rails and flanges on the first, third and fifth pairs of drivers is 7/8 in. and on the second and fourth pairs and the truck wheels, 5/8 in. There is in addition a lateral play between wheel hubs and boxes, including shoe and wedge play, of 1-13/16 in. on the front drivers and 5/16 in. on the remaining pairs. Long main driving boxes are applied, the journals measuring 13 in. by 22 in., while the



The Head End Is Arranged for Convenience and Safety

lateral motion boxes on the first driving axle have journals 11 in. by 20 in.

The rear truck is of the Delta type and is equalized with the three rear pairs of driving wheels. In this design the back equalizing beams are fulcrumed on the truck frame and the main frames are supported on the truck center pin and also on two sliding supports placed wide apart back of the truck wheels. The load on the center pin is transferred through a spherical bearing. The booster is sup-

mounted on the rear transverse member of the truck frame which is depressed sufficiently to provide the necessary clearance.

The piston valves are 15 in. in diameter and are set with a maximum travel of 7 in. and a constant lead of $\frac{1}{4}$ in. Walschaert valve gear is applied and is controlled by the Ragonet power reverse mechanism.

The main frames are of massive construction with a uniform width of 6 in. and a maximum depth under the cylinder saddle of 14 in. A cast steel rear frame cradle is applied.

A comparatively short cab is used, but it has large window openings in the sides and special attention has been given the arrangement of the fittings. The steam turret is placed outside the cab and the various valves have extension handles which are clearly labeled. The lubricator has seven feeds, including those to the water pump and the booster engine.

The maximum width over the cab boards is 10 ft. 10 in. and the overall height of the locomotive is 16 ft. 4 in.

The tender is notable both because of its design and capacity. It is of the cylindrical type, carrying 4,000 gal. of fuel oil and 12,000 gal. of water. The water tank has a diameter of approximately 8 ft. 6 in. and an overall length of 36 ft. 7 $\frac{3}{4}$ in. It is carried on a cast steel frame made in one piece with the bumpers and the transverse bolsters which serve as tank supports. The transverse distance over the outside edges of the two longitudinal frame members is 51 in. and the ends of the front and back bumpers are braced by diagonal members which join these

Boiler	
Type	Straight-top
Steam pressure	200 lb. per sq. in.
Fuel	oil
Diameter, first row outside	90 in.
Firebox, length and width	132 in. by 91 in.
Combustion chamber, length	64 in.
Tubes, number and diameter	261—2½ in.
Flues, number and diameter	50—5½ in.
Tubes and flues, length	21 ft. 0 in.
Grate area	82.5 sq. ft.
Heating surfaces:	
Firebox, incl. comb. chamber	381 sq. ft.
Tubes and flues	4,722 sq. ft.
Total evaporative	5,103 sq. ft.
Superheating	1,29 sq. ft.
Comb. evaporative and superheating	6,432 sq. ft.
Tender:	
Water capacity	12,000 gal.
Fuel capacity	4,000 gal.

Visitors from Chile

ON SATURDAY AFTERNOON four representatives of the Chilean State Railways arrived at the pier for an inspection of the exhibits. The party included Manuel Trucco, director general; Carlos Schneider, assistant superintendent of motive power; Enrique Palma and Domingo Santa Maria, inspecting engineers. They were accompanied by Charles R. Cullen, manager of the Baldwin Locomotive Works at Santiago, Chile.

Messrs. Schneider, Palma and Santa Maria are in this country for the purpose of inspecting the consignment of



A Powerful, Efficient Locomotive for Freight and Passenger Service on Heavy Grades

longitudinal members at the frame truck bolsters. The trucks have cast steel frames with swing bolsters. They are of the equalized pedestal type, fitted with both helical and triple elliptic springs. The journals are 6½ in. by 12 in. Side bearings are used on the rear truck only. The weight of the tender loaded is about 223,000 lb.

The principal dimensions and weights are as follows:

Cylinder diameter and stroke	29½ in. by 32 in.
Valve gear	Walschaert
Valve, knee and gear	Piston, 15 in. diameter
Weights of working engine	
On wheels	306,000 lb.
On frame and truck	31,500 lb.
On tender	69,500 lb.
Total engine	388,000 lb.
Tender	223,000 lb.
Total engine and tender	711,500 lb.
Total engine, tender and tender	84,650 lb.
Wheel base	
Driver	72 ft. 16 in.
Truck	42 ft. 4 in.
Total engine and tender	67 ft. 11 in.
Clearance	
Overhead	6 ft. 11 in.
Over track	34 in.
Over road bed	47 in.
Over ground	0 in.

39 electric locomotives being built by the Baldwin-Westinghouse people for the Chilean electrification between Valparaiso and Santiago. These engines are to operate on 3,000 volts direct current and have a horsepower of 2,000. The section of track over which they are to operate is 150 miles in length, including branch lines, and there is a heavy grade for about 15 miles with a maximum grade of 2.4 per cent. It is anticipated that this line will be completely electrified by September, 1923.

The Chilean State Railways have entered upon a more or less extended program of electrification. After the Santiago-Valparaiso line is complete, a new district of 200 miles in length, including branch lines, will be electrified between Santiago and Talca. The electrification of the Chilean railways is an economic necessity, for the price of locomotive coal is almost prohibitive, averaging between eight and ten dollars per ton on a locomotive. There is an abundance of water power available in Chile for the railway electrification, and the electric locomotives are to be equipped for regenerative braking. Mr. Trucco, who is not assigned particularly to the inspection of the locomotives, is making a tour of inspection throughout the country visiting particularly the electrified railways. He has already spent some time on the Pennsylvania and the Norfolk & Western.

Welding Men Meet

AN UNOFFICIAL but highly successful meeting of railroad and supply men interested in welding was held on the pier at five o'clock on Saturday afternoon. About 50 men assembled at Booth No. 1 and then retired to the east balcony where the meeting was held. The meeting was suggested by the fact that there will be no report on welding presented during this convention and because of the large amount of welding apparatus on exhibit. C. A. McCune, president of the American Welding Society, was asked to explain the aims and activities of that society and of the American Bureau of Welding, after which the temporary chairman resigned in his favor.

The American Welding Society

With respect to the American Welding Society, Mr. McCune said: "When mention was made of the welding interests present at the convention this year we began checking them up. Besides the welding apparatus manufacturers and the railroad interests, there are also several companies which are exhibiting welded devices, such as the Locomotive Firebox Company, the Symington Company, the Flannery Bolt Company and a few others. Combined they represent about nine per cent of the total exhibits. These figures, I imagine, are rather startling.

"I have noted in the daily issues of the *Railway Age* the address of Mr. Tollerton on co-operative research. He said that the research should be conducted at some central bureau, but that it should not interfere with any individual interests, which was perfectly right; that is the object of the American Welding Society, to assist in co-operative research and at the same time not stand in the way of any individual research.

"The American Welding Society is a national body, whose object is to promote welding—that is, promote it by standard methods, standard specifications for material and generally the laying out of standard methods of handling the process, which will be of assistance to the entire welding industry. The American Bureau of Welding, which is affiliated with the National Research Council, Engineering Division, is the research body of the American Welding Society. All the information gathered and all the research accomplished through the American Bureau of Welding is published by the National Research Council, Division of Engineering, through the American Welding Society. Thus the object of the American Welding Society is to set forth all the valuable and authentic information that it can possibly gather as a result of co-operative research."

W. E. Symons, consulting engineer, supplemented Mr. McCune's statements by saying: "With respect to the number of exhibits and percentage or relation it bears to the whole, I think President McCune has been very conservative in his statement; in addition to those he mentioned—18 exhibitors of welding equipment—about six per cent, we might safely say that a larger percentage are interested in welding. They are interested because there are many concerns represented that do not make welding equipment in addition to those mentioned by Mr. McCune, but which use welding processes in their shops in the manufacture of other equipment. In fact, there are very few lines of manufacture today where welding is not used in some manner." Mr. Symons concluded his remarks by pointing out the benefits which members derive from the American Welding Society and showed the need for increasing its personnel. He spoke of the society as pure democracy.

Metal and Thermit Corporation

J. H. Deppeler, also enlarged on the needs and possibilities of the American Welding Society. He said:

"There is one thing which has appealed to me greatly during the past few years. When we first started this welding society we thought of the conflicting interests—the gas, electric and thermit welders. We in the Metal & Thermit Corporation and in the Westinghouse and General Electric Company, and in others, felt that if we would really co-operate as the society tried to make us—and our individual concerns were further advanced than some of the others—we might lose business. I think it is really essential that we should all know the other fellow's process and that we ought to help boost his work. We can all boost welding by boosting each of the processes instead of only our own."

C. J. Holslag, Electric Arc Cutting and Welding Company, enlarged on Mr. Deppeler's remarks by saying that after the members of the Welding Society got acquainted they all discovered that their competitors were normal human beings that did not wear horns as they had suspected.

W. A. Slack, Torchweld Equipment Company, enlarged on the explanation of the activities of the American Welding Society by telling of the journal published by it and describing its purpose.

Welding in Construction

C. M. Rogers (Locomotive Firebox Company) said in part: "Welding is quite an essential factor in the Nicholson thermic syphon, inasmuch as there is a large amount of welding and the practice is to weld instead of rivet sheets in the firebox. We are, like many others, entirely neutral with respect to the method of welding. In our travels about the country looking after the application of syphons, we see welding of great variety and there is an indication that we are still at a point where there is considerable development possible and very much needed. On the other hand, we find places where the art has been developed to a point of great efficiency and this is well proved in the service results that we get in the use of the syphon. It certainly is a splendid test if welding a device of this kind, as well as other devices, passes the requirements and comes through with success. The field is broad and I am glad to see the art recognized in just such a way as this at this convention." Mr. Rogers also spoke on the value of reclaiming equipment by welding.

Welding and Welding Materials

The principal address of the meeting was made by H. T. Bentley, superintendent of motive power and machinery, Chicago & Northwestern. He said:

"I don't know what the railroads of this country would have done during the times when we were hardly able to get material of any kind if it had not been for the welding apparatus and appliances brought into use in the last few years. Mr. Symons says there isn't any question but that there is a great need of an organization with just as much concern in the interests of autogenous welding as the Master Mechanics' Association has had for mechanical details and I am very glad to know that there is a national society that now has branches in a good many of the cities which are apparently doing very good work. I sincerely hope that any of you men who have the opportunity of lending your influence to join such an organization will do so, because I am certain it is going to be of benefit to your railroads and to yourselves. I have attended a few meetings at Chicago and I want to tell you that those I have attended have been full of interest. Of course, we go through the shops as officers and we see these things done, but when you go to meetings and find out from the men who are doing the things how they should be done so that failure can be overcome, it is an inspiration.

"It is a money making proposition for you and your

continue to further the interests of the American Welding Society by joining it, or by becoming members of the local sections that may be started in your town. The welding art has a future before it. It is in its infancy now, and some day five or six years hence we will be astounded to know what is being done and what can be done by the autogenous welding processes. I presume that certain jobs can be done better electrically and that for others the gas method of welding is superior. Each system has its uses and it is up to us to learn which will do the work the most economically and safely.

"There is one thing, however, I am a little bit worried about and that is welding wire and welding rods. Sometimes we seem to get a batch of welding material that is absolutely first-class, and then we will get it from the same place and it doesn't seem to answer the purpose at all. I presume in time it will mean specifications for all kinds of welding rods for the various processes. I realize that welding rods that may be first-class for a certain job may be absolutely improper for some other welding job, so that it seems to me that we have got to get together. We should have some sort of specifications so that when we are going to do a certain job, say on steel, we will know what kind of materials to use to give the best ductility, weld, etc.; similarly for cast iron welding.

"Great progress has been made, but once in a while I come across complaints that the welding wire in one batch did not seem to be uniform. That is the greatest thing to contend with. The apparatus is doing splendid work, the torches are good, gases are satisfactory, electric welders seem to be doing splendid work, but the material for welding seems to require a little bit more care in its standardization; if that can be done, I am satisfied that we are going ahead in fine shape."

Mr. McCune responded to Mr. Bentley as follows: "There is a welding wire specification committee which has been engaged in research for two years. There have been many difficulties but their aim is just what Mr. Bentley desires. A welding wire specification has been published by the society. There are certain specifications for gas and one for electric welding, including the various analyses of welding material which have proved satisfactory. We had a meeting in April of all the best minds we could get on welding wire—the wire manufacturers, railroad men, metallurgists and the like—and although our specifications have only been published and in force less than eight months in printed form, this committee could not find any way of improving the specifications.

"There is also a committee now working on specifications for material to be welded. Its purpose is to determine what kinds should be welded and when it should and should not be welded, and to distinguish between burnt metal and good metal, and we hope to be able some day to present such data. We believe the welding wire specifications as published so far are pretty well advanced, considering that autogenous welding or fusion welding has been a commercial process for only 10 or 12 years and that never before has any organized body, technical or otherwise, made any attempt to prepare specifications for welding material."

Edward Wray, publisher, Railway Purchases and Stores, was asked to present the impressions of an observer in the Stores department. Mr. Wray said:

"It does not take any amount of thought to appreciate the importance of welding when we see a large and important machine put out of commission by a broken part which may be repaired by welding for a few dollars. It does not require any argument to sell welding in that line. Welding is coming in on such work as the reclamation of materials. The railroads are beginning

now to use welding extensively in the reclamation of all manner of things, such as frogs, couplers, knuckles, crossings and a great many materials are now being repaired and put back into service through welding which were formerly thrown away.

"I am sure that this is going to develop to a far greater extent in the future than it is today. Next week, Tuesday, I believe, the Committee on Reclamation of Division VI—Purchases and Stores, will make its report and I am sure that that committee will consider what articles should be reclaimed and what should not. Without a doubt welding will occupy an important part of the discussion. I hope you gentlemen will be present at some of the meetings and I am sure that the chairman would be pleased to have you take part in the discussion. It is quite an important opportunity for manufacturers of welding equipment and accessories to take part in the advancement of the science in reclamation. Although I am not authorized to extend any invitation for Division VI, having no official standing whatever, except having the trade paper devoted to their interests. I feel sure that you gentlemen will be at least interested in what comes up at that time and that they will be interested in the information that you can give in that connection."

One Man's Gain—Another Man's Loss

W. L. Bliss, U. S. Light & Heat Corporation, related an unusually instructive and amusing incident: "I made a little trip not long ago to the middle west and looked at some interesting pieces of welding in some of the locomotive shops. I witnessed an incident that I think brings out the fact that great economy is possible with welding. The case was that of a couple of railroads that ran into St. Louis. Without mentioning any names, I will call these "Railroad A" and "Railroad B." It seems that Railroad A had on hand a large number of side trucks, say of the Andrews make, that had outlived their guarantee. The tension members were cracked underneath and they were ready for the scrap heap, as there was no possibility of getting any further settlement with the manufacturer. They had run as long as they had been expected to run. I heard that those truck sides cost, new, \$32 a piece and that Railroad A sold 5,000 of these to a junk man in St. Louis for \$4 a piece.

"The other railroad, Railroad B, had a storekeeper who was well acquainted with the junk men in St. Louis and who knew this particular junk man well. He found out the price paid to Railroad A for the side frame and reported it to his management and got permission to buy the 5,000 truck sides for \$5 a piece. These trucks were then transferred to one of the shops of Railroad B that was well equipped for reclaiming and storing this kind of salvage, and at an expense of \$8 they restored all side frames to perfectly good service."

W. C. Arp Dead

W. C. ARP, retired superintendent of motive power of the Pennsylvania Railroad, died at his home in Terra Haute, Ind., at 10.50 p. m. on Friday, the 16th, after a lingering illness. He was one of the oldest members of the association and had attended all conventions until this year. Mr. Arp was retired from service on the Pennsylvania because of pension requirements on July 1, 1918. He was succeeded by J. E. Meehling, who is now in attendance at the conventions. Mr. Arp was in the service of the Pennsylvania for 48 years, starting as an apprentice at Williamsport, Pa.

The Machine Tool Market

SPEAKING of the machine tool market and the present demand for machine tools, Ernest F. DuBrul, general manager, National Machine Tool Builders' Association, had the following to say:

"Many railroad master mechanics are telling the machine tool builders that they want a lot of tools for the railroad shops but that they are told by the purchasing authorities, that the purchases will be held up until machine tool prices come lower than they are. I believe the purchasing authorities are deceiving themselves as to the present situation. The machine tool builder may likewise be deceiving himself, if he does not keep his eye on the labor situation, particularly as affecting the larger types of machines that are not now in stock and never are built for stock.

"The labor situation is such that if the market had a lot of orders right now, the machine tool builder could not find a sufficient supply of skilled labor of the sort necessary to build these tools. During the war, and for the year after the war, the machine tool builder did not train any general workmen—skilled all-round mechanics—so that as compared to the supply of this sort of labor in 1914 we have a deficiency.

"The reason is very obvious. During the war machine tool orders came in in much larger quantities than ever before. This prompted the machine tool builder to take men in and train them in special operations. He had neither the time nor the disposition to train a more general class of workmen, as he had done before the war. Demand from now on, dropping back to the smaller quantities that are more normal to the machine tool business, will require the general workman rather than the specialist.

"During the war the general machinist moved up the scale. He became a tool maker or he became a foreman, either in the machine tool shop or in some war industry shop, his place in production being taken by the specialist. Then, after the slump, these specialists went back to the farms or they are now engaged in the building industries, or elsewhere, and machine tool builders who are putting on more men, or trying to, find difficulty in getting these men back into the machine tool industry, which has been so deeply depressed for so long a period.

"To coax them back much higher wages will have to be paid to make up for the irregularity of employment, and to overcome their preference for the jobs they may now be filling. Not only that, but the heavy tools of course require much more general men, because they cannot be produced in quantities, as in the case of the lighter tools. The railroads need the tools right now, and it is short-sighted policy to defer the purchasing any longer, because as business picks up the available mechanical labor will be absorbed by the other industries and the bid the machine tool builder will have to make will have to be much higher. Such a policy of delay will merely concentrate the demand for machine shop labor at a later date, with the usual consequences, instead of spreading it out and making it easier all around. It is the early bird that will get the worm, as usual. The wise buyer, who now gets in his orders will not suffer either from delays in delivery or higher prices that are sure to follow, according to the present outlook on the labor market.

"Another point that must not be forgotten is that the restriction of immigration since the beginning of the war, and the consequent shortage in common labor that is evident in all sections of the country, even with the present amount of activity, is sure to create a demand for labor saving machinery of all kinds; and this of course means a demand for more machinists. At a period of intense activity—if the machine tool buyer waits too long—he will have the privilege of paying extremely high

prices to induce production of machine tools, rather than in the present stage of the cycle.

Second Hand Tools

"The purchasing powers seem to imagine that there are a lot of bargains to be found among second-hand tools. As a matter of fact, these are very deceptive bargains. The machine tool builder selling new equipment has nothing to hide, whereas the second-hand dealer selling stuff that he bought "as is," would probably rather not have too close an inspection of what he is offering. Buyers of second-hand machinery should very carefully investigate the history of the machine in question—how long it has run, the class of work that was done on it, whether the long runs were on repetition work, so that the same gears were always used and worn out, whereas other gears might be in relatively good condition.

"This is very difficult information to secure, particularly as it has been whispered that certain serial numbers on machine tools bought by purchasers do not correspond to the numbers that the machines bore when they left the factory. Of course, legitimate dealers would not stoop to this, but it only shows how necessary it is for the purchaser to look carefully, not only into the tool, but also to be well posted on the methods of the dealer who is offering it."

Reductions in Railway Wages to Date

THE RAILROAD LABOR BOARD has announced reductions in the wages of the station and clerical forces, the stationary engine and boiler forces, and the signal department employees. The reductions in wages made by the Board in its recent decision are now estimated officially as follows:

Clerical and Station Forces.....	\$24,336,317.43
Maintenance of Way and Structural and Unskilled Forces.....	48,898,873.44
Shop Employees.....	59,669,347.32
Stationary Engine (steam) and Boiler Room Employees.....	551,954.76
Signal Department Employees.....	1,532,428.36
Total.....	\$134,988,921.31

The latest decision of the Board authorizes reductions in the wages of clerical and station forces, stationary engine and boiler room employees, signal department employees, floating equipment employees, train dispatchers, dining car and restaurant employees, and miscellaneous groups not specifically included in any of these classifications.

Reductions of three cents per hour in the rates of pay of storekeepers, assistant storekeepers, chief clerks, foremen, subforemen and other clerical supervisory forces, clerks with an experience of two or more years, train and engine crew callers, assistant station masters, train announcers, gatemen, and baggage and parcel room employees (other than clerks), are ordered by the decision to be effective July 1.

Reductions of four cents per hour are authorized in the rates of pay of clerks with an experience of one year and less than two years, clerks whose experience is less than one year, janitors, office, station and warehouse watchmen, employees engaged in assorting way-bills and tickets, operating appliances or machines for perforating, addressing envelopes, numbering claims and other papers, gathering and distributing mail, adjusting dictaphone cylinders, and other similar work, office boys, messengers,

clore boys, other employees under 18 years of age, filling similar positions, station attendants, station, platform, warehouse, transfer, dock, pier, storeroom, stockroom, and team track freight handlers or truckers, and others similarly employed, and all common laborers in and around stations, storehouses and warehouses, not otherwise provided for.

Clerks without previous experience hereafter entering the service will be paid a monthly salary of \$60 per month for the first six months, and \$70 a month for the second six months, instead of the old rate of \$67.50 and \$77.50.

Telephone switchboard operators under the new rates are guaranteed a minimum of \$85 a month, those now receiving higher wages not to be reduced.

The differential between truckers and sealers, sealers and fruit and perishable inspectors, stowers or stevedores, callers or loaders, locators and coopers, are to remain the same under the terms of this order.

In the group designated as "Stationary Engine and Boiler Room Employees" reductions of two cents an hour have been authorized in the wages of stationary engineers, stationary firemen and engine room oilers, and boiler room water tenders and coal passers.

In the signal department, leading maintainers, gang foremen and leading signalmen, signalmen, assistant signalmen, signal maintainers, and assistant signal maintainers, will receive reductions of five cents an hour and helpers six cents an hour. No reduction is authorized in the wages of signal foremen, assistant signal foremen and signal inspectors.

All of the disputes which were before the board relating to the wages of floating equipment employees are remanded for further negotiation.

The Board ruled that existing conditions do not testify any reduction at this time in the wages of train dispatchers.

In regard to miscellaneous employees, the Board ruled that "for miscellaneous classes of supervisors and employees in the hereinbefore named departments properly before the Board and named in connection with a carrier affected by this decision, deduct an amount equal to the decreases made for the respective classes to which the miscellaneous classes herein referred to our analysis."

A dissenting opinion by two labor members and an analysis of the dissenting opinion by the majority were appended to the decision. The text of the decision and the dissenting opinion and its answer will be described fully in the regular issue of the *Railway Age*.

Chamber of Commerce

Railroad Committee

ANNOUNCEMENT HAS JUST BEEN MADE OF THE appointment of the new Railroad Committee for the Chamber of Commerce of the United States. George A. Post, who has given so much of his time and energy to this work in the past, is continued as the chairman of the committee. The other members are: Harry A. Wheeler (Union Trust Company), Chicago; Carl R. Gray (Union Pacific), Omaha; W. W. Salmon (General Railway Signal Company), Rochester, N. Y.; Charles E. Lee, East Orange, N. J.; Emory R. Johnson (University of Pennsylvania), Philadelphia; F. C. Dillard, Sherman, Texas; Walter S. Drake, Kansas City, Mo.; Alexander W. Smith, Atlanta, Ga.; F. J. Frost, Boston, Mass.; John F. O'Brien, Boston, Mass.; W. J. Dean, Minneapolis,

Minn.; T. C. Powell (Erie Railroad), New York; and George W. Simmons (Simmons Hardware Company), St. Louis.

Cornell Dinner

THE CORNELL DINNER will be held this evening at the Traymore Hotel at 7 o'clock. Twelve Cornellians have registered up to the present time and in order that proper accommodations may be made, any further reservations should be made as early as possible.

Annual Meeting of the R. S. M. A.

THE ANNUAL MEETING of the Railway Supply Manufacturers' Association was held in the Greek Temple Saturday noon and officers were elected for the ensuing year. Charles W. Beaver, of the Yale & Towne Manufacturing Company, of New York, was elected president and L. S. Wright, of the National Malleable Castings Company, Chicago, was elected vice-president. They will take office on the first of September, 1922, the beginning of the fiscal year of the association. A past president's badge was tendered John F. Schurch, the retiring president.

District elections were also held for the members of the Executive Committee from District 2 (New York and New Jersey) and District 4 (Ohio, Indiana and Michigan). Charles C. Castle, of the National Railway Appliance Company and Gilbert E. Ryder of the Superheater Company, were elected executive committee members from District 2. L. D. Kingsley of S. F. Bowser & Co., Inc., Fort Wayne, Ind., and George T. Johnson, of the Buckeye Steel Castings Company, Columbus, Ohio, were elected executive committee members from District 4.

Consolidated Machine Tool Corporation of America

WE ARE ABLE definitely to announce the formation of the Consolidated Machine Tool Corporation of America rumors concerning which have been current for some time. The corporation is capitalized for, \$30,000,000 and includes the Betts Machine Company, the Colburn Machine Tool Company, Hilles & Jones Company, Modern Tool Company and Newton Machine Tool Works, Inc., all of which are represented here at Space 91-101 in Machinery Hall.

This new consolidation is one of particular importance to the railway field, for it brings under the head of a single corporation a wide variety of tools that are especially adapted to railway shop use. The new combination will handle heavy-duty and wheel and axle lathes; boring mills, slotters; planers; including crank and plate edge; heavy duty drilling machines; internal and external cylindrical grinding machines; horizontal and vertical milling machines; horizontal and vertical punches; shears of various types; cold saws; bending and straightening rolls; automatic die heads, and miscellaneous small tools, and a complete line of shop equipment.

The company has recently engaged offices at 17 East Forty second street, New York, and while the officers of the corporation have not yet been elected, it is anticipated that W. H. Marshall, formerly president of the American Locomotive Company, will be chairman of the board, and C. K. Lassiter, who is resigning his position of vice-president in charge of manufacture of the American Locomotive Company, will be president.

Registration, American Railway Association, Div. V, Mechanical

(Continued from Page 1552)

Edmondson, O. N., Asst. M. M., Penn., Marlborough.
 Edmondson, W. G., Asst. Engr., M. P., & R., Craig Hall.
 Elizondo, F. A., Asst. P. A., National Ry. of Mex., Ambassador.
 Elmora, D. R., Asst. to G. M., Fruit (growers) Exp., Calvert.
 Ennis, J. E., Engr. of Equip. Claims, N. Y. C., Lewellyn.
 Eppright, A. W., Sup. Scales & Weighs, Penn., Craig Hall.
 Farwell, W. F., Supt. Div. Amer. Ry. Assn., Traymore.
 Fealey, M. P., Genl. Eng. House Fore., D. L. & W., Princess.
 Flynn, H. A., Genl. Sup. Air Brakes, D. & H., Pennhurst.
 Foltz, T. F., Elec. Engr., Wash. Ten. Co., 4017 Ventnor Ave.
 Foster, W. E., Genl. Engr., M. P., & R., Princess.
 Ephaler, F. P., Supt. L. Maint. B. & O., Princess.
 Francis, G. E., Fore., Penn.
 Frier, T. J., P. A., Wabash, Ambassador.
 Gallaway, A. K., M. M., B. & O., Haddon Hall.
 Gallaway, C. W., Jr., Oper., B. O., Marlborough.
 Geib, F. A., G. F., Penn., DeVille.
 Geist, J. R., Spec. Pass. M. P. Insp., B. & O., Louvan.
 German, N. J., V. P., Montreal.
 Gettys, H. M., M. M., Virginia, Haddon Hall.
 Gill, C. A., S. M. P., B. & O., Marlborough.
 Goodchild, A. A., G. S., C. P., Haddon Hall.
 Gordon, H. D., Ex. M. M., Penn., Strand.
 Grinstead, W. V., P. A., W. & L., Union.
 Grubbs, F. C., Material Agt., Penn., Ambassador.
 Gurnee, W. H., Genl. Joint Car Fore., Cent. New Eng., Princess.
 Hall, W. K., Genl. Sup. of Stores, U. P., Traymore.
 Hammond, F. D., P. A., & Genl. Store, C. & D., Strand.
 Hanegan, Guy W., Genl. Store, M. & St. L., Blackstone.
 Hanna, H. L., Asst. Eng., Nickel Plate, Mamac.
 Hanrahan, James L., Reporter, A. R. A., Runnymede.
 Hanson, F. E., Asst. P. A., Southern.
 Harrison, W. R., M. M., Sante Fe.
 Hartman, W. J., Air Brake Insp., C. R. I. & P., Pennhurst.
 Hauth, W. A., Fore. Car Rep., Penn., Martintique.
 Howard, F. J., Genl. Store, G. A., Alamac.
 Heazlett, B. Y., P. A., Ky. & Ind. Term., Marlborough.
 Helme, Chas. M. L., V. P., St. Charles.
 Henskins, F. W., Asst. Ch. of M. P., Penn., Dennis.
 Henry, C. L., Asst. M. M., E. L. Div., Penn.
 Herbig, J. J., M. M., B. & O., Alamac.
 Herold, E. E., Stationer, B. & O., Strand.
 Holzemer, J. F., P. A., Tenn. & Ohio Cent., Traymore.
 Hopkins, W. A., Supply Agt., M. P., & C. W., O., Ritz.
 Horng, E. C., Asst. to Mgr. Gen. P. A., N. Y. C., Chalfonte.
 Hornville, C. H., Asst. to Gen. P. A., A. T. & St. Fe, Alamac.
 Howe, C. A., P. A., Pitts. & West Va., Ambassador.
 Howe, John, Supt. Shop, B. & O., Marlborough.
 Huffman, R. S., Asst. Genl. Store, N. Y. C., Pennhurst.
 Hurst, G. E., M. M., Penn., Strand.
 Jackson, J. C., Genl. Strkpr., G. T., Alamac.
 Jackson, R. R., Dist. Store, B. & O., Ritz.
 Jeffrey, Thos., G. Insp., M. D. & W., Clearfield.
 Jeffries, W. E., Asst. Chf. Clk. P. A., B. & O., Strand.
 Jones, E. S., Genl. Car Insp. B. & O., Pennhurst.
 Kahler, C. P., Elec. Eng., O. S. L., Chalfonte.
 Keene, E. F., Genl. Car Fore., East Div., Penn.
 Kelker, J. F., Genl. Fore. East Div., Penn.
 Kelley, Wm. M., G. F., Penn.
 Kendall, A. A., M. M., C. P., Ambassador.
 Kenzel, C. H., E. E., Chelsea, Troy.
 Kneass, Strickland L., Asso. Member, William Sellers Co., Brighton.
 Korha, A. J., Asst. Genl. S. K., C. M. & St. P., Carlton.
 Kramp, E. C., Dist. Strkpr., S. P., Amashador.
 Langan, P. J., Genl. P. A., Supr., M. P., & C. W., Traymore.
 Lehman, E. H., Genl. Store, N. Y. C., Traymore.
 Lehr, Harry W., G. F., Penn.
 Loux, John P., M. M., L. V., Traymore.
 McAulister, J. G., Genl. Fore., C. & D., Traymore.
 McAuliffe, J. W., Asst. Genl. Material Agt., Penn., Traymore.
 McGarr, C. E., M. M., B. & O., Ambassador.
 McGoff, J. H., Mech. Supt., A. T. & S. F., Traymore.
 McGraw, M. J., S. M. P. & C. W. & L. E., Strand.
 McNaughton, Jas., M. P., Baldwin Loco. Wks., Ritz.
 Mansfield, Hector, A. T. M., P. R.
 Mayer, F. A., G. M. B., Penn., Princess.
 Mengel, J. C., M. M., Penn., Marlborough.
 Minshull, Phillip, M. M., N. Y. C. & W., Haddon Hall.
 Monroe, E. T., Chf. Clerk Pur. Dept., B. R. P., Traymore.
 Montague, W. T., Asst. Eng. M. P., Penn. East Ohio Div., Haddon Hall.
 Morehead, A. S., Asst. Car. Store, I. C., Dennis.
 Morris, J. M., M. M., Penn., Ambassador.
 Murphy, J. P., Genl. Store, N. Y. C., Traymore.
 Nichols, J. H., G. S., K., Nickle Plate, Chelsea.
 Nicholson, S. M., Dist. Store, Penn., Holmhurst.
 Nimmo, J. K., M. M., M. D. & Sante Fe.
 O'Neill, W. J., M. S., C. R. I. & P., Strand.
 Orr, J. J., Genl. Fore. B. M., D. L. & W., Worthington.
 Packard, W. F., Haddon Hall.
 Parker, H. S., S. A., Chalfonte.
 Parker, H. H., M. M., N. & P., Belt Line, New England.
 Parker, William J., Asst. M. M., East Div., Penn., Elberon.
 Fatten, C. S., S. M. P., S. A. L., Traymore.
 Patterson, J. H., Genl. Fore. & Sante Fe.
 Pearce, N. C., Dir. of Par. of Stores, C. & O., Traymore.
 Pearson, E. J., Pres., N. Y. N. H. & H.
 Peck, Frank S., Dist. Store, C. M. & St. P., Haddon Hall.
 Peck, W. F., Sup. Air Brakes, B. & O., Bouvier.
 Peddle, C. R., P. A., Penn. Southwest., Marlborough.
 Phelps, W. G., P. A., Penn., (Cent. Reg.) Traymore.
 Phillips, A. T., Asst. Gen. Fore., A. T. & Sante Fe.
 Phillips, J. W., M. B., Genl. Fore., B. & O.
 Prentice, W. H., Insp. M. C. B., Clear. House, Penn. Star Cottage.
 Prentiss, George N., Eng. of Tests, C. M. & St. P., Strand.
 Prentiss, George N., Eng. of Tests, C. M. & St. P.
 Purcell, Marks, Genl. Sup. of Stores, N. Y. C., Princess.
 Ramehart, E. A., M. A., P. & L. E., Princess.
 Raymond, A. A., Asst. M. M., N. Y. C., Haddon Hall.
 Reardon, F. C., S. Stores, D. & H., Pennhurst.
 Redding, D. J., Asst. Sup. M. P., P. & L., Strand.

Reed, F. D., Vice Pres., C. R. I. & P., Traymore.
 Reinhart, Bert, Asst. Fore. M. P. & R. E. Dept., P. & R.
 Rey, H. E., G. S., A. T. & S. F., Traymore.
 Robinson, W. L., Supt. Fuel & Loco. Pere, B. & O., Runnymede.
 Roesch, P. F., Genl. Mgr., Standard Stoker Co., Blackstone.
 Rogers, S. M., V. P., E. J. & E., Ambassador.
 Roush, C. S., Asst. M. M., Penn., Haddon Hall.
 Sadtler, J. H., Mech. Insp., St. L. & S. E., Dennis.
 Sandhuas, N. L., Gen. Insp., C. R. I. & P., Bothwell.
 Scott, G. E., P. A., M. K. & T., Traymore.
 Selden, L. P., A. C. St. P. M. & O., Traymore.
 Shnapland, E. S., Div. Store, I. C., Dennis.
 Shreeve, J. C., M. M., E. J. & E., Chelsea.
 Shriver, Wm., Air Brake Inst., B. & O., Bothwell.
 Shultz, G. H., Pur Dept., Penn., Marlborough.
 Skinner, L. H., P. A., Southern, Ambassador.
 Smith, Adam F., Storekeeper, P. & R., Windemere.
 Smith, B. T., G. F., Penn.
 Smith, C. B., G. F., B. & O.
 Smith, John L., Sup. M. P. & Eq., Pitts. I. & Nor., 125 S. Illinois.
 Smith, M. P., P. A., Penn., Chelsea.
 Smith, P. F., Jr., Works Mgr., Penn., Brighton.
 Speaks, H. E., Gen. Mgr., T. & Ohio Cent., Traymore.
 Sprong, J. White, P. A., D. & H., Ritz.
 Stark, C. W., S. M. E., N. Y. C., Berton.
 Steen, W. E., Dist. Store, B. & O., Blackstone.
 Stewart, J. A., G. S., M. N. Y. O. & W., Haddon Hall.
 Stokes, W. D., Asst. G. S., I. C., Dennis.
 Stuart, J. C., Genl. Store, C. B. & O., Traymore.
 Summerdays, W. A., Lumber & Tie Agt., I. C., Traymore.
 Taylor, W. H., Storekeeper, Penn., Holmhurst.
 Thornley, F. W., Asst. Pur. Agt., B. & O., Haddon Hall.
 Toomey, T. H., G. F., Penn.
 Towles, J. H., G. S., V. P., C. R. I. & P., Chalfonte.
 Veil, Moses, C. K., N. Y. O. & W., Haddon Hall.
 Velasco, J. M., P. A., Notl. Ry. of Mexico, Ambassador.
 Velair, H. A., Super. Safety Appl., B. & B., Alamac.
 Wade, J. G., S., Nor. & West., Traymore.
 Wallis, J. T., Ch. of M. P., Penn.
 Wallschlaeger, W. O., Insp. of Stores, C. M. & St. P., Haddon Hall.
 Walsh, P. H., Gen. B. Store, A. C. L., St. Charles.
 Walton, N. S., Sup. Air Brakes, B. & O., Bothwell.
 Wanmaker, H., Dis. S. M. P., N. Y. C., Traymore.
 Warren, L. C., Gen. Mgr., S. & N. Y., Traymore.
 Williams, A. C., Store, West, G. L., Alamac.
 Williams, C. B., P. A., C. R. R. of N. J., Traymore.
 Williams, E. G., Eng. M. P., Penn., Dennis.
 Wonnell, G., Storekeeper, Penn., Ambassador.
 Wood, A. J., Prof. Mech. Engr., State College, Pa., Arlington.
 Woodard, R. H., Storekeeper, G. T., Alamac.
 Wray, R. W., M. M., Penn., Strand.
 Wright, C. S., G. S., E. J. & E., Chelsea.
 Yeaman, C. W., P. A., Belt Ry. of Chi., Dennis.
 Young, C. B., Genl. Mech. Engr., C. B. & O., Traymore.
 Young, James Jr., M. M., Penn., Strand.
 Young, J. B., Eng. of Tests, P. & R.
 Young, W. H., Asst. Store, Penn.
 Zeigler, C. J., Chf. Elect., F. E. C., Marl.

Special Guests

Aberle, Charles, Asst. Fore. C. R. R. of N. J., Terminal.
 Anthony, Garrett S., F. M., P. & R., Strand.
 Armstrong, W. H., Dist. Store, B. & O., Westboro.
 Auman, Wm. S., Foreman, P. & R.
 Baldinger, Stephen, Clarindon.
 Barrow, T. H., Insp. B. & O., Schlitz.
 Beaman, J. A., For., Penn.
 Beatty, James R., Mach., P. & R.
 Beer, Charles P., Motive Power Dept., P. & R., New Roberts.
 Beirns, G., For., C. R. R. of N. J., Reading.
 Berry, Jr., Alexander, For. Elec. Frac., Penn.
 Belk, M. S., Genl. Air Brake Inst., Southern, Haddon Hall.
 Bickell, C. H., G. P. A., Tidewater Oil Co., Chelsea.
 Black, Wm. Jr., Haddon Hall.
 Boadevex, E. A., Gang Fore., Penn., Aredale.
 Bogart, J., Vanc. Fore. Elec. Div., V. C., Craig Hall.
 Bond, R. J., Div. Eng. West Jersey & Seashore.
 Bower, Earle E., Train Div. Reading Div., P. & R., Sterling.
 Bowers, E. F., Fore. P. T. Div., Penn., Islesworth.
 Brause, E. W., Eng. House Fore., Penn.
 Brendel, Henry, Asst. Fore. Cent. Ry. of N. J.
 Brennan, T. J., Secy. to Gen. St. Kr., A. T. & S. T., Craig Hall.
 Briggs, Joseph H., Asst. For., P. & R., New Roberts.
 Brown, Chas. G., Fore. Sol. Huntington & Bond Top Mt., Chalfonte.
 Brown, Thos., Asst. Genl. Fore. P. & R., Stevenson.
 Buch, C. A., Sec. Am. Ry. Assn., Wash. Div.
 Carr, A. J., For., Penn., Haddon Hall.
 Carr, T. E., Ch. Clerk, M. C. B., S. A. L., Princess.
 Chase, D. K., M. P. Insp., Penn.
 Chase, E. P., Asst. Engr., Penn., Pennhurst.
 Channey, F. R., Clk., Southern.
 Childs, F. R., Fore. Elec. Div., O., Craig Hall.
 Collins, M. J., G. P. A., A. T. & St. Fe.
 Cotton, W. A., Erie, Marlborough.
 Coull, Alexander, For., Eng. House, P. & R.
 Cromwell, H. T., B. Asst. M. C. B., O., Chalfonte.
 Callen Peter V., For., C. R. R. of N. J.
 Curtis, James, C. M. & St. P., Traymore.
 Curtis, Paul, C. M. & St. P., Traymore.
 Davidson, B. R., Miller Cottage.
 Davidson, E. H., Insp., I. C. C., Martintique.
 Davison, E. H., Jr., I. C. C., Martintique.
 Deleher, H. C., Insp. Test Dept., B. & O., Princess.
 Dewler, R. F., Insp. B. M. O., Penn., Martintique.
 Dornisfe, Ralph A., Drafts., P. & R., Gage.
 Dowling, A. J., M. S. Asst., C. of G.
 Dudley, Prof. S. W., Prof. Mech. Engr., Yale Univ., Haddon Hall.
 Durall, H. C., Bureau of Safety, C. & O., Traymore.
 Dunn, Charles F., Car Dept. W. & L. E., Princess.
 Duvall, L. F., Chf. Order Clk., A. C. L., St. Charles.
 Edwards, Rudolph, Car Insp., Penn.
 Eisman, C. R., For. Car Shop, L. I., Shelburne.

Conventionalities

A party of prominent men arrived in Atlantic City on Saturday evening as the guests of John H. Hubbard of Hubbard & Co., Pittsburgh, having accompanied Mr. Hubbard from New York on his yacht, the Alicia. The Alicia was expected at about 5 p.m. Saturday, but high winds and a rough sea delayed her for some hours. Mr. Hubbard's guests included A. H. Smith, president of the New York Central; Charles M. Schwab, and W. W. Atterbury, vice-president of the Pennsylvania Railroad.

A. D. Prendergast, formerly with The Texas Company, is attending the convention this year in his new capacity as general mechanical inspector of the Central of Georgia.

A. R. Ayers, superintendent of motive power of the Nickel Plate, who arrived at the convention on Friday, is receiving congratulations on the birth of a daughter, Helen, now just two weeks old.

George R. Carr of the Dearborn Chemical Company found it necessary to hurry home to Chicago on the Broadway Limited yesterday because of the illness of his wife, who is in the Presbyterian Hospital.

B. T. Jellison, for many years at the head of the department of purchases and stores of the Chesapeake & Ohio, has just been made southeastern representative of the Pittsburgh Steel Products Company and is attending the convention this year in that capacity.

Among the Japanese guests at the convention this year is Kumeo Baba, inspector of electric locomotives for the Imperial Railways of Japan. He is making a two-day visit at Atlantic City and after a tour of inspection of the railways in the United States will proceed to England and the Continent for further investigation.

President E. J. Pearson and General Manager C. L. Bardo, of the New Haven, motored down from New Haven, arriving at Atlantic City early Saturday morning. They put in a busy day on the pier and left for home on Saturday afternoon.

S. Inglis Leslie, who for many years has been an active member of the Enrollment Committee, and J. J. Cizek, who is on the Entertainment Committee, have been called to New York to attend the funeral of Mr. Leslie's cousin, J. H. Legate, secretary of the Leslie Company.

David J. Champion, president of the Champion Rivet Company, of Cleveland, is not attending the conventions this year because of the death of his wife, who passed away on June 8. His many friends at the convention are deep in their sympathy for him.

J. G. Gunning, secretary-treasurer, Electric Arc Cutting & Welding Company, is attending the convention in charge of the exhibit of that company. It is his first convention here with this company; he was formerly with the Splittorf Company as assistant to the general manager.

Dave Redding, assistant superintendent of motive power, Pittsburgh & Lake Erie, accompanied by his shop superintendent, Karl Berg, and Mechanical Engineer Harry Courtney arrived on Sunday morning. Dave is looking fine, although, as many of his friends know, he was seriously ill during the winter and suffered also from

a fractured leg. He has fully recovered and is ready to get back into the game with his usual vim.

F. E. Russell, assistant mechanical engineer, Southern Pacific is here with his wife and daughter from San Francisco, coming all the way across the continent to attend the conventions. C. E. Peck, superintendent of motive power of the Oregon Railway & Navigation Company, is another far western member of the association who is attending the conventions.

Many of the Pacific coast members of the association are prevented from attending the conventions this year because of the heavy passenger traffic occasioned by the Shriners' convention. The Southern Pacific is to run 36 special trains between San Francisco and Portland to accommodate the jolly-Masons.

In the conventionality item concerning J. H. Cooper published in Saturday's Daily, we neglected to state that Mr. Cooper is the Mexican representative of the Barco Manufacturing Company. During the past year he has installed the Barco connections on most of the new locomotives purchased by the National Railways of Mexico and all of the new locomotives purchased by other Mexican railroads.

Taizo Hattori, a mechanical engineer of the Japanese Government Railways, arrived in New York a few days ago and expects to make his headquarters there for the next two years as a resident representative of the Government Railways of Japan. Mr. Hattori spent two days looking over the exhibits. He expressed great surprise at their extent and elaborateness and made many friends with the people with whom he will have to deal during his stay in this country.

G. Marks, assistant to the general manager of the New York, New Haven & Hartford at New Haven, Conn., who has been so successful in using electric trucks in handling freight at terminals, is attending the conventions this year. During the past year Mr. Marks presented an extremely interesting and instructive paper on this subject before the New England Railroad Club at Boston.

The "New Haven Twins" are here this year—the inseparable Joneses of the New York, New Haven & Hartford, V. L. and W. J., both in the executive department as assistants to W. L. Bean, mechanical assistant. The New Haven Twins, although of the same name are not of direct relationship. They began their Siamesian relations when they were both students of Columbia University. They are strong boosters for 100 per cent locomotive efficiency.

Guy M. Bean, the Pacific Coast representative of the American Arch Company brings reports of booming business in the Far West. From present indications the green fruit business will be very heavy; a bumper crop is promised. Conditions in general in California are booming and the depression in business was not felt nearly as much as in the East. The railways particularly are in good physical condition and are enjoying a good wholesome traffic.

Frank Hedley, president of the Interborough Rapid Transit Company, has at last come to the locomotive supply field seeking aid to relieve him of his transit problems in New York City. When told of a new order for 100 boosters to be applied to existing locomotives on the New York Central he promptly began negotiations for the entire booster output of the Franklin Railway Supply Company for an indefinite period. He wants to use this

large supply to counteract the effect of the overwhelming number of "Knockers" who ride on his road.

Steinmetz—Electrical Wizard. Yes, that's right, but watch your step. C. P. (Charles Proteus) Steinmetz is chief engineer of the General Electric Company, and W. R. Steinmetz is manager of the heavy traction division of the Westinghouse Electric & Manufacturing Company. Those who wish to avoid any possibility of confusion in the future may have the opportunity of meeting W. R. S. at booth 27.

Last night at the Marlborough a uniformed lad came down "peacock alley" crying "Hershey's, Hershey's," and people began digging for a dime to buy some milk chocolate. But that wasn't the game. It was only a page calling for the genial O. W. Hershey, of the Westinghouse Electric & Manufacturing Company. Mr. Hershey is the man who started in the Westinghouse apprenticeship course and in 15 months was on the road as an erecting engineer. That was some speed. He is now in the Pittsburgh office handling the relations of the Westinghouse Company with the steam railroads of that district.

If one wants to find out quickly who's here any member of the Enrollment Committee can tell you, almost in a jiffy. All this is due to the installation of a new filing system in the committee's office on the pier. Chairman Franklin H. Smith and his committee, whose names have previously appeared in the *Daily*, have moved quickly and efficiently during the past week and are entitled to credit marks of appreciation. Mr. Smith has now served on the Enrollment Committee for nine conventions. He has also served with credit the interests of his company, the Gold Car Heating & Lighting Company, for 13 years. Franklin is also proud of the record made by his nephew, Major E. H. Armstrong, who has been called America's foremost radio expert. This young wizard has so perfected radio apparatus that largely through his inventive genius radio broadcasting and wireless telephone communication have been greatly perfected, aeriels abolished and spark interference largely eliminated.

A hero among the younger generation and a man of "refined steel" among the older generation is Charles H. Hogan, the famous driver of engine 999. He it was who made the world's record for speed of 112½ miles per hour with the 999 at the time of the Chicago World's Fair. Mr. Hogan was formerly district superintendent of motive power of the New York Central at Albany and when the time for retirement came an exception was made in his particular case, for he is being retained in special work under the direction of Howard L. Angersoll, assistant to the president. This is considered a great honor on the New York Central, for the only other officer of the road accorded similar recognition was Chauncey M. Depew, who, in spite of his 89 years, is still retained as chairman of the board. Mr. Hogan may be readily identified on the pier by his badge, No. 999, which is granted him year after year in recognition of his famous performance many years ago.

Dr. J. Stumpf, of Berlin, Germany, inventor of the Anaflow steam engine which is handled in this country by the Stumpf Anaflow Steam Engine Company, Inc., is attending the convention. He is accompanied here by Charles C. Trapp, vice president of this company. Dr. Stumpf is a professor in the Technical High School of Charlottenburg. He said yesterday that the physical condition and service of the German state railways was rapidly being restored to normal. On the other hand, their operating expenses continue to be excessive, and they are operating at a large deficit. Dr. Stumpf attributes this

largely to the political influence exerted by the labor unions which are very powerful. They resist efforts to make needed reductions in the number of employees and other increases in efficiency and the government is afraid to force the issue. Hence losses continue to pile up, and, as under government control in the United States, the tax payers have to pay the bill. Before the war employees of the Prussian state railways were not allowed to belong to labor unions and were subject to a military discipline, and Dr. Stumpf attributes mainly to these conditions the much greater economy and efficiency of operation then obtained.

There has been a lot of talk this year among baseball fans about a revival of the annual ball game. In the event that the "talk" takes definite form, we have been served with notice that the old warhorse "Midge" (Captain Stanley W. Midgley) is still on the job and is prepared with a "full crew" to line up and "try" to trim the East as trimmed on a few occasions in years past. Midgley, by the way, started his unbroken attendance at the conventions just twenty years ago and, if our records are correct, lined up in the western team with Joe Taylor, son of the former secretary of the M. C. B. and M. M. Associations, in a battle royal with the eastern team. Midgley seems to be in good form this year, and the fact that he has become eligible to the membership of the Colorado Mountain Climbers Club as a result of an exceptional record established last year in climbing Long's Peak, 14,250 ft., in one day—a distance of 15 miles—would bear out this statement. Midgley is here with his partner in business, Barrowdale, and is prepared to make good in more ways than one.

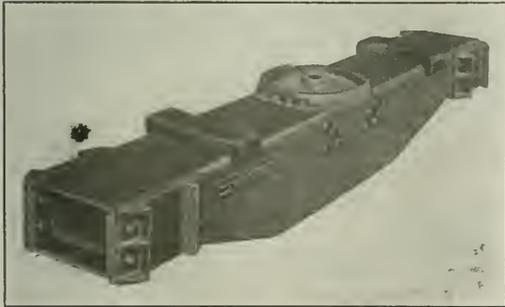
Mell Hatch, mechanical engineer of the Missouri, Kansas & Texas, comes to the convention this year with the reputation of a "star gazer," whatever that may mean. He is planning to hitch his wagon to a star and is making a very careful study of the wonders of the universe in order to learn which star to choose. This "star gazing", it must be understood, is very incidental to what is going on in the brain of the new mechanical engineer of the M. K. & T. His railway is traveling a rapid road to prosperity. With constantly increasing net revenues it is finding it possible to enlarge, develop and improve its facilities. Mr. Hatch is particularly interested at the present time in the purchase of machine tools for a 22-stall roundhouse which is to be built at Ray, Texas, just outside of Demmon, in connection with the hump yard being built at that point. This roundhouse will handle five Class 3 repairs per month and will be provided with a small, first-class power house. Plans have also been completed and the expenditure authorized for the construction of a 10-pit locomotive repair shop, which will be designed on the transverse principle and so constructed that it can be later enlarged to handle 40 locomotives per month. This shop will require practically all new tools and will be up to date in every respect. Mr. Hatch also reports the careful investigation of locomotive feedwater heating. The road will make comparative tests between the Elesco, the Worthington and the exhaust steam injector. Two each of the Elesco and Worthington heaters have been ordered for this purpose and one exhaust steam injector. In commenting upon the long passenger engine runs made by the Katy engines, Mr. Hatch points out the fact that they are all oil burners and that they run for 23 hours at a stretch covering distances of 650 to 700 miles. The Katy is one of those roads which has had a most healthy recovery from receivership difficulties and it is anticipated that its reorganization will be completed and put into operation within a few weeks.

New Devices Among the Exhibits

Wrought Steel Bolster

THE BOOTH of the T. H. Symington Company, New York, there is shown a very interesting wrought steel truck bolster flanged or forged in one piece from steel plate and following in its design and manufacture the principles so successfully used in the development of the wrought steel truck side frame which was described in an earlier issue of the *Daily*.

The bolster plate is first blanked out, then flanged and



Truck Bolster Pressed from Steel Plate

finally folded into a complete box section, the contacting flanges being welded together along lines not subject to service stress. Adequate reinforcement is provided under the center plate and over the truck springs and the bolster guides are of the usual standard design. The assembled bolster, being a complete box-section girder, has none of the defects inherent in all built up or riveted designs.

The bolster meets all the present A. R. A. requirements for interchangeable dimensions and strength and its designers consider it a step in advance beyond any bolster of its general type which has yet been developed.

Plug Valves for Tank Cars

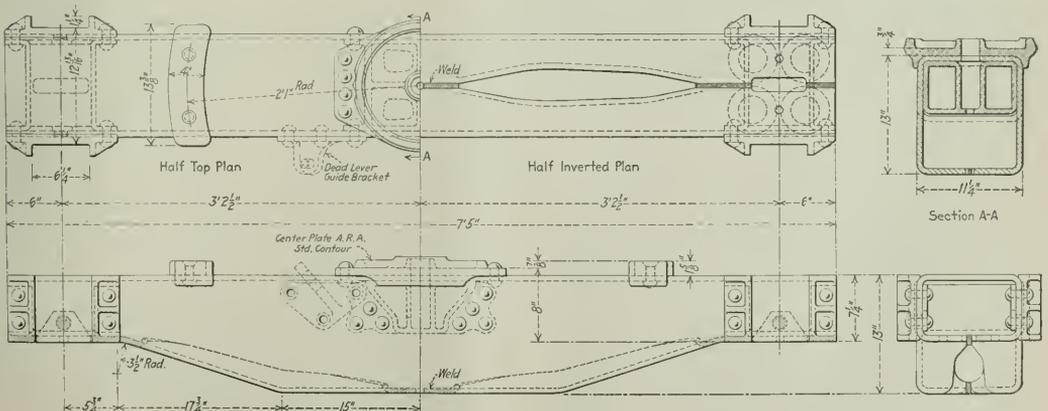
AN ADAPTATION of the Merco-Nordstrom type of plug valve for use as a discharge valve for tank cars has been made recently by The Merrill Company, Chicago. Preliminary results obtained from a few valves that have been applied to tank cars are said to be quite satisfactory.

The peculiar feature of this valve, which has been used in other classes of service for a number of years, is the method of applying a lubricant to prevent sticking or leaking. The grease used to lubricate the valve is placed in a cavity in the center of the valve stem, the upper end of the cavity being closed by a screw. From this cavity passages extend to the outer surface of the plug near the top, thence along grooves to the chamber below the plug. Applying pressure to the lubricating screw forces the grease to lift the plug from its seat. The plug is thus free to turn and the lubricant is distributed from the grooves and grease chamber below the plug. An asbestos packing lined with anti-friction metal is inserted between the top of the plug and the upper cap. The asbestos has enough elasticity to allow the plug to be lifted sufficiently for the distribution of the lubricant.

Double Sectional Arch

A SMALL MODEL firebox equipped with a double security arch is shown in the exhibit of the American Arch Company, New York. As will be noted from the illustration, this device consists of a double arch supported on two sets of arch tubes, the brick being arranged in such a way as to increase the effectiveness of gas mixing and distribution of the flame throughout the firebox. The use of an increased number of arch tubes materially increases the boiler circulation and evaporation.

To quote from a paper on the "Effect of Circulation on Locomotive Boiler Efficiency," read at the recent fuel

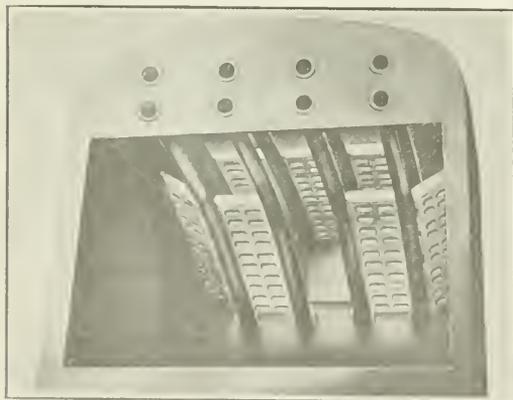


Drawing Showing Details of Construction of the Bolster

convention by F. G. Lister, mechanical engineer, El Paso & Southwestern: "The velocity at which the water and steam pass through the arch tube, approximate $V=8Vh$, in which V =velocity in feet per second and h =head in feet, or the difference between the vertical height of the upper and lower ends of the tube, the velocity of flow through the tube increasing until the water all becomes steam.

"The greatest quantity of water circulating through the tube, however, is when the column is half water and half steam. From the above rule the circulation through the tubes may be readily determined, provided they permit of the free flow of water so that the bends do not retard the flow. If we consider a locomotive boiler having four arch tubes, each 3 in. outside diameter No. 8 B. W. G., and 5.94 sq. in. cross sectional area, or a total area of 0.165 sq. ft. in the four tubes, and a head of four feet, we should have $8Vh=16$ ft. per sec., multiplied by 0.165 sq. ft. =2.64 cu. ft. of mingled steam and water discharged from the arch tubes per second, one-half of which (0.132 cu. ft.) would be steam. At 200-lb. gage pressure, the steam would weigh 0.47 lb. per cu. ft. Then 1.632 lb. of steam would be discharged from the tubes per hour. Water at the temperature of steam at 200 lb. pressure weighs 54 lb. per cu. ft. and the steam 0.47 lb., so that the steam forms but $\frac{1}{115}$ part of the mixture by weight; therefore, each particle of water will make 115 circuits before being evaporated when working at this capacity and circulating the maximum weight of water through the tubes.

"Four thousand, seven hundred and fifty-two cu. ft. of water will pass through the four arch tubes per hour, and as the average locomotive boiler of today contains about



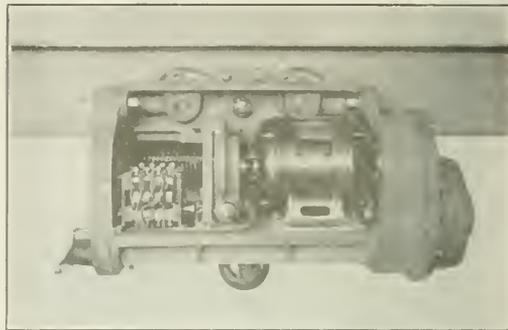
Model of Firebox Cut Away Showing Arrangement of Double Arch

600 cu. ft. the water would all pass through the arch tubes seven times per hour."

Increasing the number of tubes reduces the time required to circulate all the water. The use of eight arch tubes will reduce the time required to $3\frac{1}{2}$ min. These calculations clearly indicate the value of the arch tubes in retarding the circulation of the water in the boiler. The use of a double arch, such as shown, also insures a better taking of the combustible gases and oxygen, increases the combustion efficiency, reduces smoke and spreads and distributes the flame in such a manner as to completely fill the firebox—thereby increasing the heat absorption of the firebox—without any loss.

Electric Hoist with Short Headroom

THE PRINCIPAL FEATURE of a new hoist developed by the Standard Electric Crane & Hoist Company, Philadelphia, Pa., is the short headroom required for its operation. The three-ton hoist exhibited can be operated with a headroom as low as 14 in., this dimension



Standard Electric Hoist With Cover Plate Removed

being considerably less than needed for the usual electric or chain hoist.

The new standard hoist is of simple and rugged design, being entirely enclosed as a protection against dust and weather. A straight spur gear drive is used throughout. All gears and main bearings operate in an oil bath, other bearings being lubricated by the Alemite high pressure system. The arrangement of the hoisting motor, holding brake and controller are clearly shown in the illustration. The hoist is equipped throughout with high-duty Hyatt bearings and an efficiency of over 80 per cent is said to be obtained with a standard stock hoist. All track wheel pins are made of manganese axle steel.

Accessibility for inspection and repairs is a valuable feature of the standard hoist. It is possible to remove all working parts without disassembling the main frame or body of the machine. The hoist has been thoroughly tested under overload and regular shop conditions.

Sediment Measure for Storage Batteries

A MEANS FOR DETERMINING the exact amount of sediment in a car lighting battery jar without the necessity of removing the groups, has been devised and is being exhibited by the Electric Storage Battery Company, Philadelphia, Pa.

The device is a long thin strip of wood veneer. It is inserted through the vent of the front cell to the bottom of the jar through one of the spaces in the wood separator. After being allowed to remain in that position for a few moments, it is withdrawn and the discoloration, caused by the sediment, is noted.

This device will give the car lighting man in the yard a method of determining the time when the battery requires cleaning. Without any accurate and convenient method of determining the condition of sediment in the jar, there is undoubtedly a tendency to dismantle and wash batteries oftener than is necessary. The company announces that a supply of these probes is available with its compliments to any railroad which may request them.

Railroad Shop Equipment and Machine Tools

Descriptions of Most of the New Shop Equipment and Machinery on Exhibition
Appeared in the June "Railway Mechanical Engineer"

THE PRESENT IS an age of machinery and labor saving equipment, and railroads should take advantage to the fullest possible extent of this equipment to reduce to a minimum the cost of maintaining and operating cars and locomotives. If antiquated, inefficient shop machinery is still used, whether avoidably or unavoidably, with ensuing high labor costs and low production, it certainly will not be the fault of the manufacturers, who have developed some really remarkable machines during the past year in spite of adverse business conditions which would have discouraged any but the most resolute.

A glimpse of the exhibit in Machinery Hall can hardly fail to impress railroad men with the efficiency and value of the machines shown and the impression will be in exact proportion to the time spent in studying them. Most of the new equipment brought out during the past year, and now being exhibited, was described in the June *Railway Mechanical Engineer*, copies of which are available. Inasmuch as subscribers to this paper receive copies of the *Daily Railway Age*, detailed illustrated descriptions of the new equipment cannot consistently be repeated in this issue but the equipment is of special interest and value to railway men and attention is, therefore, called to it by means of the following brief comments:

Colburn Vertical Boring and Turning Mill

An improved Colburn 42 in. vertical boring and turning mill is being exhibited at the booth of the Dale Machinery Company, New York. This machine is one of a line of boring mills made by the Colburn Machine Tool Company, Cleveland, Ohio, incorporating many new features of design; it was described in detail on page 344 of the June *Railway Mechanical Engineer*. The Colburn boring mills are made in sizes from 36 to 84-in. swing, inclusive, the entire design being developed with the idea of securing high power and production together with easy and convenient control by the operator. The machines can be provided with two swivel heads or one turret head if preferred.

The drive consists of a primary and secondary speed unit, the latter being located within the bed of the machine and providing three speed changes. The primary unit provides four changes, thus affording a total of 12 speed variations ranging from $2\frac{1}{4}$ to 70 r. p. m. in geometrical progression. The heads are entirely independent both as to the direction and amount of feed. The turret is tilted to an angle of 8 deg., affording ample clearance for large tools when swung over the slide. Complete control for each head and ram, for both feed and rapid traverse, is obtained by a single lever, the lever being always thrown in the direction of the desired movement.

The rail-lifting device is of special interest, and consists of friction clutches and gears contained in one contact unit and controlled by a single lever. Another unusual feature of design is the spring counterweight for the ram which eliminates the use of weight, cables, sheaves, wheels, etc. Power rapid traverse permits the heads and rams to be moved in all directions by power at the rate of approximately 12 ft. per min. Special attention has been given to the proper lubrication of this machine, also to the provision of safety guards for both operator and mechanism. The machine is well adapted for the many

boring and turning operations performed in railroad shops.

Improved American Engine Lathe

Two features of special importance in the 24-in engine lathe exhibited by the American Tool Works Company, Cincinnati, Ohio, are the new geared head and the motor drive arrangement; details of these improvements are described on page 347 of the June *Railway Mechanical Engineer*.

The new head provides 12 speeds instead of 8 as formerly. The spindle is under instant control through either of two levers, one located on the right side of the apron and the other on the left side. A powerful external hand brake enables the spindle to be instantly stopped or allowed to drift when the driving friction is released. Another feature of the new head is the arrangement for removing one gear unit and operating lever so that four speeds are available instead of 12 when a two-to-one or three-to-one variable speed motor is being used. An automatic oiling system of special merit has also been devised for this lathe.

The new motor drive arrangement consists of three steel herringbone gears with a patented flexible coupling enabling the motor armature to float without crowding the gear. Noiseless, smooth running operation and long life are said to be secured by this construction.

Two New Hendey Machines

The Hendey Machine Company, Torrington, Conn., is exhibiting two machines described on pages 357 and 354 of the June *Railway Mechanical Engineer*, embodying many improved features of design. These machines include a 24-in. crank shaper and a 14-in. toolroom lathe. The shaper is self-contained and compact, being designed for durability, simplicity and convenience of operation. An extended table is provided, enabling work with a considerable overhang to be rapidly set up. The operating lever for starting and stopping the ram is conveniently located and the statement is made that the ram can be stopped at any point in the stroke within $\frac{1}{2}$ in. under the heaviest of cuts.

A point of special interest about the 14-in. toolroom lathe is the location of the driving motor under the oilpan. This arrangement is very compact, since no additional headroom or floor space is required for the driving motor. The motor is easily accessible and does not obstruct the light or vision. Reduction gears are placed between the motor and the feed box, which is in the left pedestal of the lathe. The usual Hendey construction of taper spindle and bearings is provided, with an additional distinctive feature in the method of taking up end play on the spindle. Other points of interest are the construction of the single pulley and pinion running on a sleeve, operation of the intermediate sliding feed gear by eccentric levers and 18 speed changes, nine being direct through a belt to the spindle and nine through the customary back gears. Motor control is by means of push buttons.

Niles-Bement-Pond Turret Tool Post

Speed of changing cutting tools in an important factor in wheel lathe operation and the Niles-Bement-Pond Company, New York, has for a long time made its wheel lathes with tool posts equipped to clamp the tools pneumatically.

Some railroad men prefer the turret type of tool post, however, and for the benefit of those holding this preference, the Niles-Bement-Pond Company has developed a special turret tool post which is described on page 368 of the June *Railway Mechanical Engineer*.

An unusual feature of this tool post is the arrangement for two positions, the turret turning in a vertical plane. The roughing tool is held in the solid part of the post enabling extremely heavy roughing cuts to be taken. The turret is a massive piece of forged hardened die steel, provision being made for a wide taper key to take the thrust on the turret after adjustment. This relieves the spindle of the turret from undue torsional or shaving strains. The levers and hand wheels for operating the turret are conveniently located and the turret can be indexed in a fraction of a minute. The taper key and turret are carefully protected from dust and chips by a hardened chip guard.

Clark Gasoline Power-Lift Truck

The Clark Tractor Company, Buchanan, Mich., is exhibiting a gasoline power-lift truck with power-elevating platform, which was described in detail on page 351 of the June *Railway Mechanical Engineer*. The special advantages claimed for this truck are low initial cost, ease of maintenance, flexibility and continuous 24 hr. service when necessary.

The lifting mechanism is operated by hydraulic pressure, the power for both locomotion and elevating the load being derived from the 15-hp. four-cylinder gasoline engine. A three-point suspension is used, the steering wheel forks being supported in a steel casting pivoted at the center of the frame. The driving and elevating controls, mounted on the rear of the engine compartment, are operated by the driver who drives standing. Arrangement is made so that the truck lift stops automatically if the operator steps off while the machine is running. This truck is designed to climb a 10 per cent grade with a 4,000 lb. load. It has two speeds in each direction. The total weight is 2,500 lbs.

Thor Pneumatic Rivet Buster

A pneumatic tool known as the Thor No. 90-S rivet buster, for cutting off and backing out rivets in all sizes is being exhibited by the Independent Pneumatic Tool Company, Chicago. This substantial tool is designed to be operated by one man instead of three and is therefore adaptable for use in close quarters where it will be impossible for three men to work at the same time. The tool delivers its blows with greater speed than usual with the result that rivet heads are sheared off smoothly on the surface of the sheet without disfiguring or spoiling the material. The blows, being rapid, are not so severe and do not buckle the plate at the rivet holes. Both chisel and backing out punches are provided with individual safety retainers and can be quickly changed when desired. This tool is described on page 347 of the June *Railway Mechanical Engineer*.

Laughlin-Barney Tube Shearing Machine

A machine of unique design has been developed by the Laughlin-Barney Machinery Company, Pittsburgh, Pa., for shearing pipe and tube rapidly without the loss of material and with a square cut free of fins, the pipe or tube not being revolved. The novelty of this machine consists in the shearing principle employed. The cutting mechanism includes an internal arbor and two shear knives made in the form of two hardened steel rings which are placed close together and through which the pipe or tube passes. On account of one shear knife being eccentric and the other carried in a head which follows

an eccentric path the pipe or tube is sheared off in one revolution of the machine. The action of shearing is said to have little wearing effect on the cutting edges of the knives and the machine is always under the accurate control of the operator through a positive clutch operated by a foot treadle. This machine is described in greater detail on page 365 of the June *Railway Mechanical Engineer*.

Gray Maximum Service Planer

Important improvements in the planer design are incorporated in the maximum service planer, exhibited by the G. A. Gray Company, Cincinnati, Ohio, and described in detail on page 777 of the December, 1921, *Railway Mechanical Engineer*. The new planer has many features of interest and value, the fundamental thought underlying the entire design being the necessity for reducing the cost of planer work by combining high productive capacity with maximum ease of operation.

The best way to appreciate the possibilities of this machine is by a personal inspection. Go and see it in operation. Among the features of special interest may be mentioned the rail-setter stirrup for conveniently setting the rail; the rail-lock for applying massive steel clamps which lock the rail to the inside edge of each housing; the single-shift, rapid-power traverse levers, controlling the rapid movement of both side and rail heads; the patented cant slip feed which is positive instead of being driven by band frictions and enables any feed from .001 in. to 1 in. to be instantly obtainable. The operator has full control of the planer without walking around it or using wrenches of any kind.

Involute helical gearing is used to produce a drive of unusual smoothness, durability and power. Since planer work is usually placed close to the operator's side of the machine the rack has been widened toward that side of the table so that the driving force is applied in direct line with the cutting tool. In design and construction the attempt has been made to produce a powerful, rigid planer which can handle the heaviest work and be so easily controlled that even an inexperienced operator can secure large production.

Universal Horizontal Boring Machine

A new boring machine of the horizontal type, known as the Original Tri-way universal machine, is being exhibited by the Universal Boring Machine Company, Hudson, Mass.; a detailed description appeared on page 44 of the January *Railway Mechanical Engineer*. The name of this machine is suggested by the fact that it has a three-way bed, reducing the overhang of the table to a minimum. The machine is designed to bore, mill, drill, face and tap work in one set-up; the proportions and construction are such as to produce accurate work under unusually heavy cutting feeds and speeds. The arrangement of the operating levers is worthy of special attention, the design enabling every operating lever to be reached by the operator's right-hand without changing the position of his feet. The operation of speed and feed levers are identical, thus greatly reducing the possibility of mistakes. All speeds and feeds on this machine are in geometrical progression.

Lassiter-Millholland Staybolt Machine

Two staybolt machines, known as the Lassiter-Millholland staybolt machine, are being exhibited by the Dale Machinery Company, New York. These machines, described in detail on page 285 of the May *Railway Mechanical Engineer*, are intended for reducing the centers, also turning and threading both straight and taper ends of staybolts in uniform pitch and continuous lead. The Model B machine for cutting and threading radial, button-head and crown stays is worthy of special attention. This

is an entirely new machine, rigid and well proportioned, with a special feed-box, apron and lead screw designed to prevent lagging or creeping of the die head when threading. This machine is equipped to turn the taper and straight diameters simultaneously, the taper and straight surfaces also being threaded simultaneously in uniform pitch and continuous lead. The turning and threading operations are done separately but on the same machine by replacing cutters by chasers. The heads of the machine for threading are held in constant relation on the slide, which is advanced by a nut and lead screw in the apron. In the case of button-head radial stays a cross slide is provided for facing the button-heads. This machine has a capacity to turn and thread bolts from $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. in diameter and 14 in. to 36 in. long.

Hose Dismantling and Assembling Machine

A complete description of the hose dismantling and assembling machine exhibited by the Covington Machine Company, Covington, Va., is given on page 780 of the December, 1921, *Railway Mechanical Engineer*. This machine is self-contained, air-operated and designed for the sole purpose of dismantling and assembling air signal and steam hose. All of the operating levers, handwheels and various parts of this machine are designed for maximum convenience in handling this work. In an assembling test one operator is said to have taken new lengths of hose, put on clamps, forced the coupling and nipples into the hose, squeezed up the clamps, inserted clamp bolts and put on nuts, finishing 30 air hose ready for service in 60 min. In this particular case the time taken to assemble each hose ready for the clamp bolts averaged 30 seconds and the balance of the time, or $1\frac{1}{2}$ minutes for each hose, was required for squeezing up the clamps, putting in the bolts and running up the nuts. The dismantling operation can be speeded up where large quantities of hose are to be handled by having one operator on the shear end of the machine cutting clamp bolts while the other is stripping the hose. This machine should prove of great value especially in car shops and reclamation plants where large quantities of hose are reclaimed for further service.

Williams Receding Die Head

Among the exhibits of the Williams Tool Corporation, Erie, Pa., is a receding die head for pipe threading machines, which was described on page 721 of the November, 1921, *Railway Mechanical Engineer*. This die head cuts either standard or special threads of any degree or length, regardless of the width of the chaser. The important features of this device may be outlined as follows: Any length of taper may be cut, regardless of the width of the die. By changing the dies and the small taper guide plate, any thread or taper may be cut. More dies are used than previously, giving more bearing points on the pipe and making less work for each die to do. When starting the thread the dies remove the excessive metal in heavy chips, receding as the cut progresses. This means that the greatest power is used at the start, gradually easing up as the cut is finished. On the old type of head the greatest strain on the dies was just near the finish, when the full width of the die was cutting on the pipe. This is generally the time when the dies are hottest and most likely to pick up stickers. The dies on the new Williams head are designed for long life. Being narrow, they do not heat up like the wide chasers. The operation of the head is rapid and simple, being practically identical with the adjustments on the old type of standard head. Threads can be cut on pipe up to 16-in. in diameter.

Arc Welding Set and Electric Melting Pot

A portable electric welding device which controls the feeding of the electrode wire into the arc, and which can

be used in any place where welding current is available, has been developed by the General Electric Company, Schenectady, N. Y. The automatic or semi-automatic method increases the speed of welding and makes it possible for a comparatively inexperienced man to do good work consistently. A more detailed description of the device appears in the June issues of the *Railway Mechanical Engineer* (page 354) and the *Railway Electrical Engineer* (page 202).

Two electric melting pots for babbitt, solder and similar alloys or metals, which will hold as much as 1,000 lb. and will operate at temperatures up to 800 and 1100 deg. F., respectively, have also been developed by the General Electric Company. The heat is controlled automatically by thermostats. The devices are described more in detail in the June issues of the *Railway Mechanical Engineer* (page 360) and the *Railway Electrical Engineer* (page 202).

Racine Junior Power Hacksaw

AN ENTIRELY NEW addition to the line of machines made by the Racine Tool & Machine Company, Racine, Wis., has been developed in the Racine Junior power hacksaw. This machine has a normal capacity to cut 4 in. stock and its principal feature is the ability to operate at unusually high speed, using light gage blades. This insures quick cutting both on account of the increased number of strokes per minute and the small amount of metal which has to be cut away.

Another feature of the Racine Junior power hacksaw is the automatic listing device which is positive in action, raising the blade on the non-cutting stroke. The teeth do not drag back, no matter how great the pressure on the blade. The machine is designed for efficiency and economy, the use of the positive draw cut principle allowing light blades of 21 gage or heavy hand blades to be operated at high speed. The feed is by gravity thus applying an accurate pressure pre-determined for every class of material being cut. An automatic knock-out stops the saw when the cut is finished.

The saw frame guide holds itself automatically at any height which is a convenience when placing stock in the machine. Quick and easy adjustment for wear is provided, the frame sliding on V-ways giving maximum bearing surface. Provision is made so that if necessary to cut stock larger than 4 in. by 4 in., a simple adjustment will increase the capacity of the machine up to 6 in. by 6 in.

Huther Inserted Tooth Metal Saws

A NEW TYPE of metal-cutting saw blade, known as the Huther high speed inserted tooth blade, has been developed by the Cochrane-Bly Company, Rochester, N. Y. A feature of unusual interest is the use of a laminated body consisting of two tempered plates riveted together. High speed steel tooth segments, riveted and shouldered to one of these plates, are provided with side clearance front to back, thus overcoming in a practical way the tendency of the teeth to stick in the cut due to the abrasion of small particles of metal on the sides of the teeth. Because of this construction it is maintained that excellent alignment or trackage of the teeth is obtained without internal stress due to wedging action.

The Huther high-speed saw blade is designed to cut blanks up to 6 in. in diameter, both straight and smooth, at feeds up to $2\frac{1}{2}$ in. per min. Ordinarily the cuts do not

vary over .005 in. from parallel. All grades of mild machinery steel can be cut at feed from 2 in. to 2 $\frac{1}{4}$ in. per min. in sizes up to 6 in. in diameter with a production of 6,000 to 8,000 sectional inches per grinding of the blade. The teeth in these blades are alternately high and low, with the corners of the high tooth beveled. For the best results this blade is ground in an automatic saw-sharpening machine, also made by the Cochrane-Ply Company, a round blade being secured in which every tooth cuts its proper chip. The high beveled tooth cuts a groove in the center of the slot and breaks the chip into three parts. This assists not only in the clearance of chips from the slot, but contributions also to the more efficient lubrication of the cutting points.

Heavy Duty Crank Planer

TO MEET the requirements for a heavy duty tool for short stroke work, the Newton Machine Tool Works, Inc., Philadelphia, Pa., has brought out a new model crank planing machine, made with one or two heads on the crossrail as may be required. The rated capacity of the machine is 32 in. wide and 32 in. high,



View Showing Motor Drive Arrangement

with a maximum stroke of 34 in. The base is a one-piece box-type casting, in which all thrusts and cutting strains are concentrated. The motor is mounted on the off-side of the machine, variations in speed being controlled by the motor box. The speeds provided are 6, 8, 12 $\frac{1}{2}$, 17 $\frac{1}{2}$, 23 $\frac{1}{2}$ and 33 $\frac{1}{2}$ strokes per minute.

The construction of the drive is clearly illustrated. The motor driving gear is of the helical type, transmitting power to the toothed main shaft giving a relatively uniform cutting speed with the advantage of a slightly lower speed at the start of the cut. The quick return is 1 $\frac{1}{2}$ to 1 measure. The table is provided with an adjustment of 20 in. which can be made while the machine is running. After the table is positioned the driving element is fully clamped by the square end shaft shown at the end of the table. Table control is through a clutch

and brake, provision being made to lock the operating lever out of position so that it cannot re-engage and injure the operator. The feed motion is of the cycle type, operating on the return stroke of the table. This motion is transmitted to the cross-rail through a rack and pinion, giving cross, down and angular feed. The cross-rail is raised and lowered by power.

In operation cuts on forged steel $\frac{3}{8}$ in. deep with $\frac{1}{16}$ in. to $\frac{1}{8}$ in. feed are taken. The length of stroke is set from the operating side of the machine with an indicator to show the length is obtained. Providing, as it does,

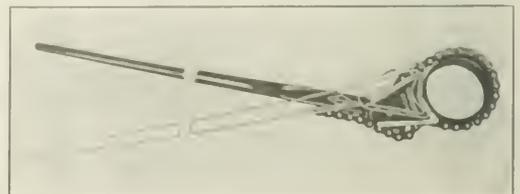


Newton Heavy-Duty Crank Planer

positive stroke with a fixed quick return and a wide range of speeds, the new Newton crank planer is an efficient tool for short stroke work, being particularly adapted to the machining of die blocks, forming dies, locomotive cross heads, shoes, wedges and many other similar parts.

Walworth-Bostong Pipe Wrench

AN IMPROVED PIPE wrench of the chain type, known as the Walworth-Bostong wrench, is being introduced to the railroad field by the Walworth Manufacturing Company, Boston, Mass. This wrench is designed to withstand the hardest service and contains some



Walworth-Bostong Reversible Pipe Wrench

novel features which should make it particularly valuable for locomotive and car work. In tools of this class strength is an important characteristic. Parts subjected to stress or wear are of generous size and to avoid excess weight special steels are employed for the chain, pins and bolts. The chain is proof tested up to two-thirds the breaking strain.

There is no lost motion in this wrench, the cam action being such as to insure a rapid positive grip and release. It is reversible and may be turned to the right or left practically without any adjustment in chain or jaws.

Improved Design of Locomotive Booster

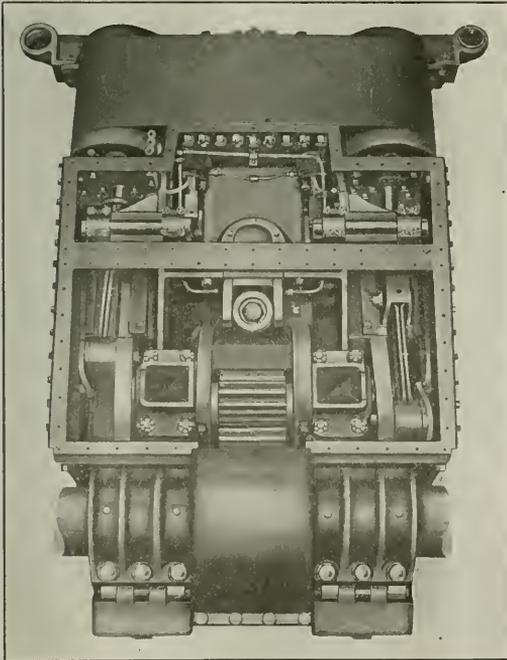
NUMEROUS CHANGES in details of design have been made in the latest type of booster exhibited at the booth of the Franklin Railway Supply Company, New York. The exhaust steam from the booster engine instead of going to the tender is now exhausted through the locomotive nozzle. The steam inlet and exhaust passages are combined in a manifold extending across the cylinder heads. All steam connections are now fitted with universal joints to care for both vertical and lateral movements instead of the slip joints formerly employed. The

instead of bronze bearings, and drop forgings have replaced steel castings in several important parts. The trailer box end has been changed to a unit construction so that the gears run in a bath of oil. A unique design of idler gear and support have been applied, which prevents any stress being transmitted to the mechanism which throws the gear in and out of mesh. The bedplate has been redesigned making it oil-tight and affording splash lubrication for the bearings. The booster has a spherical seat on the trailing truck and the design is so arranged that when the trailer axle housing is disconnected the booster can be taken out without disassembling other parts.

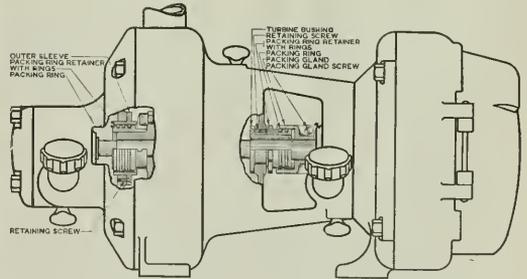
The control mechanism has been simplified and the cylinder cocks designed for either pneumatic or manual control. The connection between the reverse lever and the booster is now arranged so that the booster can be operated while the main engine is using steam expansively. The new design of booster, when operating with 200 lb. pressure and a 45-in. trailer wheel, delivers a drawbar pull of 11,000 lb. at starting and 6,000 lb. at 22 miles an hour.

Headlight Turbine Packing

SPRING RING packing for locomotive headlight turbines is being shown by the Pyle-National Company, Chicago. The rings are placed in glands on each side of the turbine in practically the same manner that piston rings are used in the cylinder of a gasoline engine. The fundamental difference is that the relative



Type C-1 Booster With Cover Removed



Side Elevation of Headlight Set With Sections Showing Construction of Packing Glands

motion in the glands is one of rotation instead of reciprocating motion.

Three rings are used on the turbine end and two in the generator end. The three rings are stationary, while the two on the generator end rotate with the outside collar of the gland. There is a clearance of about .05 in. between the ring grooves, so that there is practically no packing friction. The seal is effected by the water of condensation that finds its way into the grooves. This type of packing can be applied to all types of Pyle-National headlight turbines.

new booster engine is adapted for higher operating speeds, the maximum speed for which it is designed being 22 miles an hour.

The arrangement of the machinery parts has also undergone considerable modification. Outside valve motion has been substituted for the eccentrics and straps originally used. White metal lined bearings have been applied

Motor Bearing With Provision for Emergencies

A SLEEVE BEARING for motors, which is designed to meet emergency conditions, is being shown by the Howell Electric Motors Company, Howell, Mich. The bearing is made in two parts and consists practi-

ally of two bearings of a little more than half the usual length, placed side by side.

The inner half of the bearing is pressed tightly in the housing in the usual manner while the outer half is pushed into the housing with a light press fit. A set screw in each half keeps it from turning. If at any time the bearing should develop wear so that the motor rubs on the stator, or so that the motor does not function properly, the set screw in the outer half can be loosened and the outer half of the bearing turned through an angle of 180 deg., thus realigning the motor shaft. A screw driver is the only tool needed for this operation.

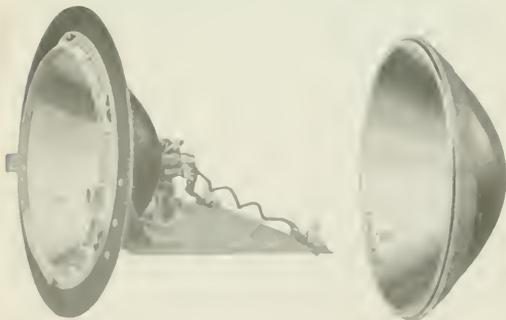
The particularly desirable feature of this type of bearing is that if the bearing should fail at a time when the motor is needed badly, only a few minutes are required to put the motor back in service and the service may be continued for a considerable time before a new bearing is required.

The bearing housing has an additional feature in the form of an oil well barrier so designated as to prevent oil being drawn into the motor by the ventilating air. This bearing is standard equipment with all sizes of the Howell Red Band motors.

Locomotive Lighting Equipment

SEVERAL NEWLY DEVELOPED lighting devices for use on locomotives are being exhibited by the Pyle-National Company, Chicago. These consist of a glass reflector mounting for locomotive headlights, a 14-inch glass reflector, a cast metal headlight case and a rear tender lamp. In addition to these, the company is also showing two new types of flood lighting units for general service.

The glass reflectors are made of a moulded heat-proof optical glass may be either of clear glass or of a colored glass known as "Nonglare." They are fire polished on the inside and are annealed to toughen the glass, after which the back of the reflector is ground to a parabolic curvature. They are polished by a special process, and then chemically silvered. The silver is covered with an electrolytically deposited coating of metallic copper. For further protection, an additional backing is placed over the copper, which has acid, gas and weather resisting



Glass Reflector Mounting for Sheet Metal Headlight Cases and a 14 Inch Glass Reflector

qualities. It is claimed that the "Nonglare" reflector reduces the glare from the light without materially affecting the beam or useful power. Either of the two reflectors can be substituted in 12 in. or 14 in. diameters with a focal length of 2 1/2 in.

The interior sheet metal reflector mounting has been de-

signed for the purpose of applying glass reflectors to the sheet metal headlight cases made by the Pyle-National Company. The reflector is encased in a drawn steel protector shell and is held in place by an aluminum ring. The mounting is interchangeable with the 18 in. copper reflector.

The cast headlight cases are made either of cast iron, or of an aluminum alloy, and are provided with a 14 in. glass reflector, and a 250-watt, 32-volt lamp. A machine taper fit is provided between the door frame and the body of the case to make the unit smoke, dust and gas-proof. A goggle door lock of improved design locks the door when closed. A weather-protected, accessible junction is provided between the case and the locomotive conduit system. There is a pre-assembled, electrical distribution with the case, so designed that it is only necessary to connect the main leads with the distribution block to provide constant numeral light with full, dim and extinguished headlamp. The standard 14 in. cast iron case



Headlight with Cast Metal Case

is 16 1/2 in. high, 14 1/2 in. deep, 18 in. wide and weighs about 85 lb. The cast aluminum alloy case is of the same dimensions and weighs something less than 45 lb. The body of both cases is cast in one piece.

The rear tender lamp is cast of a non-corrosive metal, is tapped at the top for 3/4 in. conduit and is provided with three supporting lugs. The front door, into which a standard 55-3/4 in. white signal lens is secured, is hinged, leaving the interior of the lamp accessible for lamp renewals and wire connections. The door is fastened with a spring latch. A receptacle with grips is used, and the connections to the receptacles are made in such a manner as to leave them accessible for testing the lamp circuit. A plate glass covers an opening in the bottom of the case through which a beam of light is thrown downward and outward, lighting the coupler and step. The beam light through the lens is augmented by mirrors. The lamp is 7 1/2 in. high, 8 in. wide and 5 1/2 in. deep. It is claimed to be water-tight and constructed throughout to meet the most severe locomotive service.

Simplex Reverse Gear

A NEW TYPE of locomotive reverse gear is being shown by J. M. Wideman, Norfolk, Va. This is a combined power and hand operated mechanism where-by power may be used to effect reversal and hand operation may then be used independent of the power operation to obtain suitable and accurate adjustments. An air operated cylinder controlled by a valve in the cab

serves to reverse the engine. Close adjustments are secured by a handwheel and screw. No air is used when the locomotive is running and the piston can not creep and affect the cut-off. Hand and power gears are entirely independent. The mechanism is simple and should be easily and cheaply maintained.

Locomotive Headlight

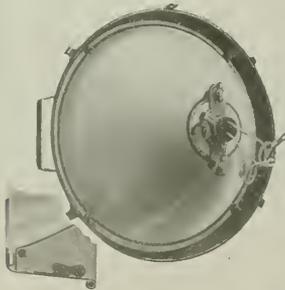
A LOCOMOTIVE HEADLIGHT has been developed by the Sunbeam Electric Manufacturing Co., Evans, Ind., which employs the principle used in the manufacture of automobile headlights of having the reflecting surface and front glass contained in a separate airtight unit or goggle. The airtight unit can be removed from the headlight case and is held in the case by heavy spring clamps; there are no hinges. The lamp is mounted in a universal focusing device which can be removed from the airtight unit without disturbing the position of the re-



Headlight With Number Door Open Showing Focusing Device and Terminal Connections

flector or front glass. The manner in which the reflector and front glass are held in place is shown in the sectional view.

In case it is necessary to renew the front glass, the four clamps holding the goggle are opened and the airtight unit removed. The unit is laid face downward on a bench, or



Rear View and Section of Air Tight Unit Showing Method of Holding Reflector

on some part of the locomotive, and the spring clamps shown in the detailed section are snapped open. This is done by inserting a screw driver or similar tool behind

the link which holds the spring. The spring and link form a toggle which swings entirely outside of the unit when it is loosened.

The reflector is made from heavy copper, spun to a parabolic curve and triple silver plated. It is 18 in. in diameter by 9 in. deep. The apex or filler ring which is removed with the focusing device and lamp is polished and has the same contour as the reflector, thus adding to the beam candle power of the headlight.

The case is made of 16-gage iron protected with baked automobile fender enamel. The weight of the headlight is 68 lb.

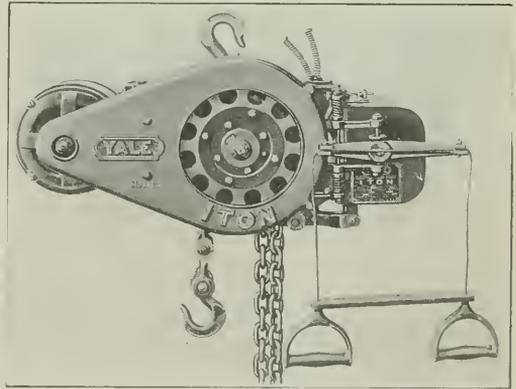
Industrial Truck and Chain Hoist

A NEW ELECTRIC CRANE model of industrial truck and a new and improved electric chain hoist are noticeable features of the exhibit of the Yale & Towne Manufacturing Company, Stamford, Conn.

A type of truck which is particularly well adapted for use in railroad shops and storehouses consists of a combination of an electric crane mounted on a Yale A-17 truck. It is intended for service where material is to be raised or lowered vertically and then transferred horizontally, the work being accomplished by a single mechanical and electrical unit.

This truck has two-wheel drive with two-wheel steer, and a turning radius of 7½ ft. at the center of the truck. It is particularly well adapted for inter-plant or yard service where heavy castings, structural shapes or bulky crated material must be handled safely and expeditiously.

The extreme flexibility of this mobile hoisting and conveying unit is unique. The crane mast is mounted on heavy-duty thrust ball-bearings, permitting the boom to be easily rotated through an arc of 180 deg. The operator has direct control of a two-speed hoisting mechanism, con-



Model 20 Electric Chain Hoist With Double Handle Control

sisting of a motor direct-connected to a worm-and-gear and a grooved hoisting drum. A single electrically welded hoisting chain interlocks with a load sheave located on the end of the hoisting boom; a ratchet mechanism permits the operator to spot the hoisting hook in any desired position and to either raise or lower the load and the boom singly or simultaneously.

The boom consists of two 4-in. steel channels and has

an outreach of from 24 in. to 69½ in. from the center of the mast. The height with boom in lowered position is 91 in. The weight complete with batteries ranges from 3175 lb. to 3285 lb., dependent upon the type of battery used. The hoisting speed varies from 12 ft. to 52 ft. per min., dependent upon the load. The capacity ranges from 1100 lb. at the maximum reach to 1900 lb. at 24 in.

The Yale Model 20 electric chain hoist is exhibited in two types—the ordinary method of control with two handles and a new method of remote control by means of push buttons. This model, made in units ranging from ¼ to 2 tons capacity, when used singly or in conjunction with hand cranes, occupies a position midway between the hand-block and the electric traveling crane. Wherever loads up to two tons must be lifted quickly, moved horizontally, and placed in position many times a day, as in serving automatic machines or furnaces, in loading cars, in storing material, the chain hoist meets every requirement. It is a quick-acting piece of apparatus that requires no particular skill to operate and uses a small quantity of power.

The roller ratchet mechanism is an important improvement. Where formerly the cast iron ratchet wheel and ratchet pawl have been used to prevent slippage of the load in hoisting, the Yale Model 20 embodies a distinctly different principle. A hardened steel ratchet wheel carries



A Crane Type Industrial Truck Is Exceedingly Useful in Railroad Shops and Storehouses

hardened steel rollers in a bath of oil within a closed compartment. All surfaces in contact are ground to an accurate finish so that frictional resistance is minimized during the lifting period.

The function of holding the load is accomplished by the advancement of the steel rollers along the evenly distributed inclined wedges of the ratchet wheel. Being applied gradually around the entire circumference of the wheel simultaneously, they effectively prevent any slippage of the load when the power is shut off.

Two asbestos friction discs, one on either side of the ratchet wheel, provide large surfaces for the dissipation of the heat developed in lowering the load.

The load is fitted with a drum brake positively operated by the controller handle. When the current is on, the brake arms are lifted clear of the drum, so that there is no dragging or friction during the hoisting operation.

Immediately the current is shut off, the brake arms clamp tightly around the hoisting drum, producing a powerful, quick-action brake.

Under certain conditions it is necessary for the hoist operator to watch his load carefully and at times to use one hand in guiding the load during the hoisting and lowering operations. The push button control model has been developed to give the operator the greatest amount of freedom under these conditions. The push buttons are set in a block that is suspended from the hoist on a flexible cable. The block fits easily in the hand and the buttons can be operated by the thumb or one finger. The raising and lowering circuits are mechanically interlocked so that it is impossible to operate in both directions at the same time, even when both buttons are accidentally pushed in together.

A solenoid brake is applied to the motor shaft and so arranged that the brake is immediately applied as soon as the circuit is opened either by removing the finger from the button, by the action of the limit switch, or by the loss of voltage from any cause.

On the push button model hoist the limit switch is arranged to open the circuit positively when the load reaches its maximum travel in either direction, so that the solenoid brake is immediately brought into play. When the limit switch functions, either for raising or lowering, the corresponding push button is thrown out of circuit so that it is not possible to operate the motor again until its direction of rotation has been reversed, thus relieving the limit switch.

A Large Capacity Welding Set

A PORTABLE WELDING outfit of increased capacity is being exhibited by the U. S. Light & Heat Corporation, Niagara Falls, N. Y. It consists of a motor-generator set and control apparatus mounted on a four-wheel hand truck.

The generator has a continuous capacity of 300 amperes, and for cutting and other work of an intermittent nature will develop 400 amperes. It is designed with



The 350-Ampere U. S. L. Welding Set

inherent regulation and has the same characteristics as the 200-ampere machine made by the same company. The generator is also furnished for belt or gas engine drive.

The set is supplied with either a direct or alternating current motor and weighs complete about 1,700 lb.

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WE GUARANTEE that of this issue, 12,400 copies were printed; that of these 12,400 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,500 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

In spite of any and all arguments for or against classification of material for accounting purposes, it is believed that the Interstate Commerce Commission will eventually demand it.

Classification of Material

That being the case, it is largely a waste of valuable time and energy to argue anything except the items in the classification.

By acting well in advance of the I. C. C., the Purchases and Stores Division of the A. R. A., the members of which are the real experts in their line, can prepare a classification that will best meet the railways' needs and which will be acceptable to the Commission. The only really valuable discussion on this subject during yesterday's session consisted of the few remarks which questioned the classification in which certain items were placed. It is very clear that any classification at best is liable to be confusing. It is therefore necessary that the problem be given very careful consideration. The Purchases and Stores Division can well afford to pick a select committee to handle this important subject and this committee should call for and analyze carefully suggestions from the membership of the association. Above all things it should be ready with something concrete, definite, simple and logical when the time comes that the Interstate Commerce Commission asks for advice on this matter. It is by such service that our railway associations can serve the railways as a whole.

In considering the various systems of automatic train control that have been developed, there appears to be two distinct types—the ramp and contact shoe type, and the magnetic induction type. Either type requires more or less equipment on the locomotive and with some systems the electrical circuits are so complicated that they can only be properly tested and maintained by men skilled in such work. It is this feature which is certain to cause a division of responsibility between the electrical and the signal departments—at least, as they are organized at present. Heretofore, the signal men have had no association whatever with locomotives, nor have the electrical men had anything to do with signals. The electrical department, however, has charge of headlight equipment and it seems but logical that the same men should look after such electrical apparatus as is carried on the locomotive. Herein lies a new field for the electrical engineer, which he would do well to familiarize himself with, since it is likely to prove a considerable and interesting addition to his rapidly widening scope of activities.

Planers, like drills and engine lathes, are so commonly found in railroad shops as to be taken pretty much for granted. Yet these machines are employed in such large numbers that unless modern efficient types are used there is a big aggregate loss in their operation. Much has been said, and rightly so, about the need for milling machines and other production tools in railroad shops but this does not mean that the planer has in any sense of the word outlived its usefulness. In fact in the last analysis of railway machine shop work of which we are aware, 28 per cent of the machine operations were performed on lathes, drills handled 17 per cent, and planers 11 per cent of the total machine operations. As indicated by the 11 per cent proportion there is no lack of machine work to keep planers busy. There may be some overlapping of the fields for planing and milling work, but as a rule the fields are quite distinctly marked. In general for production work on similar parts the milling machine is best adapted, but for miscellaneous machine operations the planer is by far the more adaptable tool and does not involve the same expense for cutters. It would appear, therefore, there will always be enough planer work in railroad shops to warrant the installation of the best modern machines which it is possible to obtain.

Have Planers Outlived Their Usefulness?

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Anyone who was in attendance yesterday morning during the presentation and discussion of the report on Locomotive Headlights and Classification

Headlights a Live Subject

Lamps could not help being impressed by the manner in which it was done. The short but meaty report was read slowly and carefully by A. R. Ayers of the Nickel Plate, while all the members present paid close attention. Mr. Ayers elaborated on the report sufficiently to hold the interest of his listeners and the report was then discussed exhaustively for the better part of an hour, with eight different men taking part. The only unfortunate condition was the lack of electrical men present. When the discussion led to matters which were purely electrical, there was no one to an-

swer the questions raised. This was due to the fact that the Association of Railway Electrical Engineers was holding its semi-annual meeting at the same time at the Hotel Dennis, where the same report was being discussed. The headlight report was placed first on the program of the Mechanical Division so that electrical men could leave the Mechanical Division meeting and go to the Electrical Engineers' meeting, but because of a misunderstanding most of the electrical men were not able to attend both meetings. The two discussions if combined will contain all of the desired information. It is to be hoped that in the future such conflicts will be avoided and that provision for joint meetings will be made in such cases.

One of the best ways to prepare engine terminal forces for handling work with the greatest speed, accuracy and thoroughness is by the development of specialized gangs responsible for various phases of the work. The extent to which this specialization can be carried out will depend largely on the size of the terminal, but even at points turning only a comparatively few locomotives some degree of specialization can be employed profitably. It goes without saying that the men who clean fires and handle ashes are thoroughly familiar with this work and under the proper supervision accomplish it with the least expenditure of time and energy. Within the roundhouse, it will also be found a paying proposition to have certain men handle a definite class of repair work. As examples of the work which may be specialized, experience has shown that one man can look out for piston and valve packing, the adjustment of driving box wedges and the reseating of exhaust tips when they leak. It is a big advantage to have one man who is responsible for this work and to whom the foreman can look for thoroughness. Not only that, but the specialist on any job naturally becomes more familiar with it than the man who works at it only occasionally and the result is a better grade of work done in a shorter time. Box packers, rod cup men and mechanics working on truck bearings can also be trained for their particular work and make a specialty of it with resultant important savings.

Enginehouse Work Specialized

The commercial interest in electric headlights has apparently settled down to a steady replacement market. If the law has been complied with, the number of locomotives that are operated without electric headlights is comparatively small. This does not mean that the final chapter in locomotive head-lighting has been written, for it is altogether improbable that any great number of wiring systems now in use can be considered as perfect. Changes and revisions for the improvement of both headlights and cab lights are certain to be made from time to time in accordance with the ideas of the men in charge of this work on the different roads. As in all other operating problems, the electrical engineer's goal is a record of perfect performance and to achieve such a record he must look to the quality of materials used and manner of installing them. Good headlight equipment will function to just about the same degree of reliability as it receives careful maintenance. Several problems still remain unsolved, and this is not to be wondered at when one considers the wholesale application of electric headlights in a comparatively short time. Questions of ball bearing selection, lubrication and location of equipment are among

Headlights and Cab Wiring

those which have not yet been solved to everyone's satisfaction. It is easy enough to disapprove of certain practices and methods, but the man who performs his full duty is the one who by careful analysis of conditions is able to offer constructive suggestions, which if applied will manifest themselves in better service at a lower cost.

The following extract is taken from a letter written by a railroad shop foreman. "And personal loyalty! There

Support Your Foremen

is no such thing. The reason? Because when in a doubtful situation we cannot go to our superior with our problem. He no longer encourages and points out the way with wisdom and knowledge begot of long experience—he applies the goad; he is not an adviser, he is a driver! * * * This is not inspired by any feeling toward some particular officer, but is the result or conclusion reached by one who has met and compared experiences with many foremen on different roads and represents the average position on the subject. * * * I am sure that it is useless for us to attempt to keep up with progress by reading and observation, when all that is wanted is a good strong whip hand." We may question the logic of the writer and his peculiar conclusion. On the other hand, he clearly reflects conditions that are deplorable. Let us hope that they pertain to very few roads or shops. How can we, however, hope to develop a spirit of good-will and co-operation between the men and the managements if the key men, or the connecting links, feel as does this man? You may say that such conditions do not exist on your own road, but are you doing everything that you should to encourage loyalty on the part of the foremen and subordinate officers? Are you seeing that they are fully informed as to the best practices to follow? Are you coaching them in how to manage men and entuse them, and how to develop teamwork?

The discussion on the reference to the lumber specifications in the report of the Committee on Specifications and Tests for Materials, while not generally participated in, reflects a situation which is far from satisfactory and is attracting a growing amount of attention both from railroad men and the lumber industry. The customs of the lumber trade with respect to grading rules vary widely in different territories and the grades are so loosely defined that there is considerable latitude for variations in their interpretation. This has led to much misunderstanding between the purchaser on the one hand and the wholesaler and producer on the other. The producers claim that railway specifications are difficult to adhere to without considerable waste in production that the purchaser pays for, whether he knows it or not. When lumber is bought on price, which is quite generally the practice, the temptation is open to the bidder to make concessions in order to secure the business; for these he reimburses himself by a loose interpretation of the grading rules, the effect of which is to include as much material as possible that a strict interpretation would place in the next lower grade and exclude at the top of the grade material which might strictly be included. In other words, the railroad gets just what it pays for. This situation is in need of careful study, not only to promote better relations between the railroads and the lumber industry, but to provide for more economical use of the lumber resources of the country. While it is true that the user is in the better position to

Railroads and the Lumber Industry

decide the question as to what character of material is most satisfactory for his purposes, is it not possible that some concession as to patterns and sizes, in order that more liberal use of commercial patterns may be made, would result in better prices to the railroads without the sacrifice of quality that is a corollary of the present policy of buying on price? A movement is now under way to bring about a better understanding between the various lumber interests and the users of this material in which the American Railway Association is represented, and it is sincerely to be hoped that some very definite results may be accomplished.

Anyone who has watched a lively rally between professional tennis players is reminded of the way in which mechanical and stores department men sometimes "pass the buck" between each other. To see the way these departments often work one would never suspect that they are each a sub-division of the same transportation system whose sole duty is the provision of adequate transportation at a minimum cost. The mechanical department can help itself as well as the stores department by determining its material needs at the earliest possible time and notifying the stores department without delay. Comparatively large items like new cylinders, steel underframes, or deck castings are usually shown on work reports placed in the hands of shop men and storekeepers before an engine or car comes to the shop. It is the smaller items which often escape attention and which in the aggregate cause equipment delays due to inability of the stores department to furnish material promptly. As far as possible the needs for material should be anticipated. For example, it is becoming more and more customary to manufacture certain standard parts, such as cylinder and valve packing, at central plants, which may be at some distance from outlying terminals. Suppose that the cylinder bushings on a certain class of locomotives are worn almost to the limit. The stores department should be advised of this fact and arrangements made for the prompt shipping of smaller packing rings as soon as new bushing are applied, whereas, based on consumption records, the storekeeper would probably have on hand only rings which were too large. Making the storekeeper acquainted with the condition of these bushings will also give him a chance to see that new bushings are ordered and on hand for application to the locomotives as needed. This is simply one of hundreds of ways in which mechanical men can greatly assist the stores department, at the same time expediting repair work. The storekeepers should be advised of material needed for new power. They should know as soon as parts are superseded by new designs; otherwise these parts will continue to be ordered, based on consumption records, for a considerable time after they are obsolete. The stores and mechanical departments can often co-operate in at least partially using up obsolete material.

Although there was a lively discussion following the presentation of the report of the Committee on Specifications and Tests for Materials at yesterday morning's session, it was noticeable that almost none of the speakers referred in detail to the specifications proposed by the committee that were contained in the appendices to the report. In order to touch on the provisions of any of these specifications a thorough study of the text of the appendices would be

required and for any of the members except those whose work throws them in daily contact with material specifications, even this would give little insight into their exact purpose. Similarly, few of the members are able to discuss in detail on their merits the recommendations of other committees whose work is largely the formulation of standards. No doubt, all of these committees have well defined reasons why they believe that their recommendations should be adopted, and the development of these reasons has probably constituted no small part of the committee work. Would it not make possible a much more thorough consideration of the subjects if the committees were to set forth at some length the reasons why these recommendations are made and explain how they may be expected to operate? The subjects are all matters in which the members are interested and on the broader phases of which they are in a position to comment intelligently, not only with benefit to the committees in their future work, but also with the possibility of crystallizing much more intelligent opinions of the requirements of the situation among the members of the Mechanical Division before the recommendations are presented to them for letter ballot.

Many of the convention attendants probably read with interest and enthusiasm the interview published yesterday in which George M. Basford made some observations on the opportunities afforded by the railroad clubs. Most of these clubs started out under the leadership of mechanical department men and for a long time confined their discussions largely to mechanical subjects. Some clubs, like the New York, have always covered a wider field and have been railroad clubs in a large sense—in fact as well as in name. This is well, for no man, regardless of what department he is in, can afford to restrict his vision and activities to that one department. One great value of the railway clubs is that they have deliberately tried to carry on educational programs which would give all of their members a larger comprehension of the relation of the various departments to each other and of the necessity for teamwork between the departments. The railroad clubs, if properly conducted, should present a fertile field for cultivating closer relationships between the higher executive officers and the subordinate officers and foremen—in helping the railroads to cultivate a family spirit. If they can be only a partial factor in bringing this about they will repay many, many times over all the energy and effort which have been expended in developing them. Executives like Presidents Besler of the Central of New Jersey, Hedley of the Interborough, Pearson of the New Haven, Hustis of the Boston & Maine, and many others, will never know how much their friendly interests in the railroad clubs have done to encourage the subordinate officers and foremen. Just so far as this good work is continued, so much greater will be the opportunity for the development of the younger men and the opportunities for good as outlined in Mr. Basford's address.

Operated on a non-competitive basis and considered more or less an auxiliary of the transportation business, railroad shops often use obsolete and worn-out machinery which would not be tolerated in any other business—which could not, in fact, be tolerated if that business were to meet competitors' prices and survive. The need of modern machine tools in railroad shops has been demonstrated many times

Help The Stores Department

Railroad Clubs and Their Opportunities

Machinery Hall Teaches a Lesson

A Suggestion to the Committees

and is quite generally admitted. In size, diversity and labor-saving possibilities the exhibition in Machinery Hall this year is perhaps the most remarkable machinery exhibition yet held. Volumes would be required to explain in detail the merits of the lathes, planers, shapers, grinders, drilling, boring, forging and other machines exhibited. In general these tools embody the admirable features of design developed by modern manufacturers, including ample strength to push high-speed tools to the limit and maximum convenience of operation. The ease and speed with which operating adjustments to these machines can be made are truly wonderful. Railroads as well as other industries should benefit by the resulting high production. As one shop superintendent said, "It seems almost criminal that we should be struggling along with inefficient, old machines when tools are on the market able to do the work of four or more of the old ones." What is the answer? One live-wire master mechanic has supplied it as follows: "Find out if the new machines will show a net return of 15 per cent on the investment; put the facts up to the proper authorities and the necessary appropriations will be made." Of course, many railways continue to use obsolete machine tools because of difficulty in raising the new capital required to provide them as well as other improvements; but, really, is not this an explanation which is often overlooked?

Selection of Special Apprentices

THIS IS THE TIME of the year when the technical graduate completes his college course and is available for employment. The majority will be ready to report for work July 1. It is only in the spring of the year at the close of the second semester of college that this class of employe can be secured. Many of them have already been placed for this year. If selection has not yet been made, those roads which desire to train some of these young men as special apprentices must make arrangements within the next week or two, or the supply of available material will be exhausted, and the roads will be required to wait another year before receiving applications for these special apprenticeships.

In one way it is unfortunate that these men are on the market for employment at this particular time, when many roads are feeling the necessity for reductions in expenses, and consequently are slow to increase the number of any class of employes, or to increase the payroll by employment of a class of men not heretofore employed. On the other hand it is fortunate for the railroads that the present business depression throughout the country has lessened the opportunities open to these young men with engineering and manufacturing concerns and has made many more of the better type of the graduates in mechanical engineering available for railroad employment this spring. There never was a time when so many of these young men desired to enter railroad work. The railroads should take advantage of this opportunity to pick out some desirable college graduates and start them on a course of training.

Some roads have already made selections, having followed the practice of the commercial concerns by sending representatives to the engineering schools to explain the system of training offered, discuss the opportunities open, and to interview prospective applicants. This plan is most commendable. Railroads inspect materials and equipment purchased. It is equally important that brains purchased be likewise inspected. One reason the special apprentice has not been held in higher repute has been due to the fact that the industrial concerns went after and

secured the cream, those coming to the railroads being in many cases the left-overs—those with little initiative, who finding no other work available followed the line of least resistance and accepted the railroad employment with no particular liking or fitness for the work.

College graduates, like any other class of people, differ in ability, in make up, in fitness. You cannot make a purse out of sow's ear. College training merely develops the talents one possesses. It is not a guarantee of ability or fitness; it is merely a guarantee that the good man has been made better, has been developed and trained for greater usefulness. If railroads are to receive worth-while results from the training of technical graduates, care must be exercised in the selection of the men to be given the training, the most important qualifications to be considered being his liking for the work, his loyalty to his employer, his willingness to go through the routine and at times drudgery of training so essential if he is to fortify his scholastic acquirements with the practical realities and experience so necessary to fit him for useful railroad service.

Take a Broad View of it

THE GENERAL COMMITTEE of the Mechanical Division will soon have to determine how long next year's convention will last, what subjects shall be reported on and discussed and whether there shall be an exhibit. The question of confining the convention within a single week has been directly raised. It is believed by some that money could be saved in this way. It could be. The important point to consider is not merely what would be saved, but what might be lost.

Directly and indirectly the mechanical department officers determine whether expenditures for maintenance of equipment and for fuel which recently have exceeded \$2,000,000,000 a year shall be made to the best advantage. What is the total cost of the conventions and the exhibit compared with that huge sum? A slight decline in the efficiency of the mechanical departments would cost many times more than all the direct and indirect expenses of the conventions and exhibit, while a slight increase in the efficiency of the mechanical departments of the railroads would save a corresponding amount.

The real question is how best to promote the efficiency of the mechanical departments. The best way to promote it is to enlarge the opportunities, increase the knowledge, broaden the vision and stimulate the initiative of all officers of the mechanical department, from superintendents of motive power and master car builders down to foremen and assistant foremen. Will this be better done by reducing the length of the mechanical convention, and thereby restricting the number of subjects that can be considered, and the fullness with which they can be discussed, as well as the thoroughness with which the equipment and devices on exhibition can be studied; or will it be better done by continuing to have the convention extend over parts of two weeks, and increasing the number of subjects considered, encouraging full and free discussion of them and giving full opportunity to study the exhibits? When the conventions extend over two weeks more people can attend because they can come in two relays.

The railways should be developed, managed and operated with the greatest possible efficiency and economy. But the future as well as the present must be considered. They cannot be developed, managed and operated as efficiently in the future as they have been in the past without equally intelligent, broad and capable officers. Broad education as well as the best experience and training are necessary to the making of such officers. The technical

associations of the railways have done much to educate the past and present generations of officers. Are these associations to cease to be forums for the full, constructive discussion of technical problems and to be reduced to the mere role of registering standards regarding comparatively unimportant matters? If so, the technical officers of the next generation will not be equal to their duties and responsibilities, for they will lack the necessary education and breadth of vision.

We believe many men, including many executive officers, are thinking entirely too much about what association work costs the railways and much too little about what it has saved them in the past and can be made to save them in the future. As the *Daily Railway Age* said yesterday, the conventions should be highly educational as well as legislative. They should be used to make better officers as well as better methods and standards; in fact, without better officers the railways will never be able to develop and adopt better standards.

The giving of excessive attention to immediate and relatively small economies, largely in disregard of the effect they may have in the long run on the major expense accounts of railway operation, will save hundreds or thousands of dollars now, but cost millions of dollars later.

Today's Program

Three railroad associations will hold meetings in Atlantic City today.

Division VI, Purchases and Stores, A. R. A.

The meeting will be held in the Hotel Traymore, beginning sharp at 9 a.m.

	A.M.	A.M.
Discussion of Reports on:		
Subject 4—Material Accounting and		
Mechanical Facilities.....	9:00 to	9:30
Subject 21—Unit Piling of Materials and		
Numerical Numbering System, and Moving		
Picture Illustration of Unit Piling.....	9:30 to	10:30
Subject 16—Supply Train Operation.....	10:30 to	11:00
Subject 10—Scrap Classification — Handling		
and Sales.....	11:00 to	11:30
		M
Subject 12—Purchasing Agent's Office Records.....	11:30 to	12:00
		P.M.
Subject 3—Reclamation of Material.....	12:00 to	12:30
		P.M.
Special Subject: "Inventories," by Mr.		
D. C. Curtis.....	12:30 to	1:00

Division V, Mechanical, A. R. A.

The meeting will be held in the Greek Temple on the Million Dollar Pier, beginning sharp at 9:30 a.m.

Discussion of Report on:
Locomotive Construction.
Feed Water Heaters.
Modernization of Stationary Boiler Plants.

Air Brake Association

Lantern illustrated lecture by the Committee on Air Operated Auxiliary Locomotive Devices. Slides showing the graphic charts covering all phases of the maintenance of the various devices will be accompanied by a clearly explained use of the charts. A considerable number of railroads have already adopted and daily use the system proposed by the committee. The Air Brake Association also has on sale a hand-book covering in detail the committee's recommendations.

Following this illustrated lecture will be another lantern illustrated lecture on the universal passenger car

equipment, submitted by the Manhattan Air Brake Club, through J. C. McCune, the secretary of the club.

Recommended Practice will be the next subject taken up.

Entertainment Features

10:30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3:30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier. Tea will be served at 4:30 P. M. in Entrance Hall.

9:30 P. M.—Grand Ball, Ball Room, Million Dollar Pier

Flight of the Prosperity Special

THE "PROSPERITY SPECIAL," with which everybody attending the conventions is familiar, was the most unique train ever run. Some of the railway men who saw the moving pictures and heard S. M. Vauclain's address at the Traymore on Sunday night were wondering whether the train had to be divided to go over bridges. The train ran as one section over the Pennsylvania Railroad from Philadelphia to Indianapolis. It was run in two sections from there to St. Louis, and in one section over the Cotton Belt from St. Louis to Corsicana, and over the Southern Pacific to El Paso. It is running between San Antonio and El Paso today. From there on it will be run in two sections, not because of any danger to bridges, but because of mountain grades.

The Baldwin Locomotive Works sent out circulars announcing the flight of the Prosperity Special, and there were demonstrations and celebrations in its honor at various points, most of them under the auspices of chambers of commerce, boards of trade, Rotary clubs, Kiwanis clubs, etc. The farmers along the way became especially interested at many points, and granges and other of their organizations were represented in the celebrations.

At Mansfield, Ohio, and several other places the schools were closed to give the children a chance to see the special.

At one point a farmer asked how much each locomotive cost and how much power it had. He was told the cost per engine was \$75,000 and the tractive power 3,000 horsepower. "That's an average of only \$25 a horse," computed the farmer. "I can't buy horses as cheap as that."

The total horsepower represented was 65,000. Every locomotive had on it an engineer who was charged with the duty of seeing that it was going along all right, and especially that the bearings did not get hot. The engineers on the fifth, eighth and thirteenth locomotives were captains, and it has been figured out that each of them had charge of the equivalent of 15,000 horses.

At Ft. Wayne the Chamber of Commerce took complete charge of the celebration, and had all the locomotives in the train strung with electric lights and a grand stand erected beside the tracks for viewing the train and for speech-making. At Indianapolis the principal speaker was former Senator Beveridge, who talked on "Permanent Prosperity for the people." At St. Louis the principal speaker was Mayor Kiel. The biggest celebration of all was at Houston, Tex., where a great crowd turned out to meet the train.

The Prosperity Special will be in Los Angeles on July 4, where it will be one of the big features of the Independence Day celebration.

A crowd so large that it had to be shown the pictures in installments attended the moving picture show illustrating the flight of the Prosperity Special, which was given by the Baldwin Locomotive Works at the Traymore. Sun-

day night. S. M. Vauclain, president of the Baldwin Works, was introduced by Grafton Greenough, vice president of the company. He said the Prosperity Special was Mr. Vauclain's sole idea. Mr. Vauclain said the purpose of the train was not merely to advertise the Baldwin Works, but to create a spirit of optimism throughout the country by giving tangible evidence that prosperity is really returning.

Frederic F. Gaines

AT THE MEETING of the Mechanical Division yesterday, C. E. Fuller paid the following tribute to the late F. F. Gaines.

"Since our last meeting, death has claimed one of our workers, Frederic F. Gaines, who passed away Friday, August 26, 1921, at his home in Washington, D. C.

"He was born at Hawley, Pa., on March 28, 1871, the eldest son of Stanley and Margaret Gaines. After graduating from the public school at Hawley, he prepared for college at the Wyoming Seminary, Kingston, Pa., and entered Sibley College in the fall of 1891. At college he proved to be a good student, specializing in locomotive engineering and was elected to Sigma Chi in his senior year. During his summer vacation he worked in the locomotive repair shops of the Erie & Wyoming Valley Railroad at Dunmore, Pa., thus beginning his active connection with railroading, which continued until his death.

"Upon graduation he entered the employ of the Lehigh Valley, being successively draftsman mechanical engineer and master mechanic. After serving the Philadelphia & Reading, as master mechanic at Reading, he was appointed superintendent of motive power of

the Central Georgia at Savannah, Ga., which position he held until the formation of the United States Railroad Administration, when he was made mechanical superintendent of the Southern region with headquarters at Atlanta. Upon the creation of the Railroad Administration Board of Wages and Working Conditions, he was appointed a member and moved to Washington, serving until that body was disbanded at the end of 1920.

"He was the author of numerous technical papers and developed a number of inventions, of which the Gaines locomotive furnace is the most important. While with the Central of Georgia he superintended the designing and erection of the repair shops at Macon, Ga., and modernized its locomotive and car equipment.

"For many years Mr. Gaines was a prominent member of the Master Mechanics' and Master Car Builders' Associations, having served as president of the Master Mechanics' and filling this position with credit and honor. He was a man of sterling qualities, possessing a strong personality, a keen intelligence and a good knowledge of mechanical work and affairs in general.

He was a Shriner, a Knight Templar, a member of the Society of Colonial Wars and Sons of the American Revolution. He at one time served as president of the Southern and Southwestern Railway Club and was a member of the Columbia Country Club at Washington, and various clubs in Atlanta and Savannah.

"On October 5, 1897, he married Miss Frances E. Loomis, of New York City, by whom he is survived, together with a daughter, Clarissa, and a son, Frederic, Jr.

"In the death of Mr. Gaines this association and a host of friends has lost a kind, sympathetic and jovial companion."



With the age of M. K. Nagle, Chief Photographer

Representatives of the Rock Island at the Pier Last Week

W. I. T. general mechanical superintendent, and chairman, Division V—Mechanical, A. R. A.
 G. S. G. mechanical engineer, J. H. Milton, superintendent car department, John Baker, chief clerk to general
 S. W. M. superintendent, S. V. S. shops, T. H. Beacom, vice president and general manager, W. J. O'Neill, mechanical
 L. A. R. mechanical superintendent, first district.



American Railway Association—Division V—Mechanical

Reports on Headlights and Material Specifications;
Much Interest in Axle Steels and
Lumber Specifications Evident

Chairman Tollerton called the meeting to order at 10 a.m.

Locomotive Headlights and Classification Lamps

In its report for 1920 this committee submitted recommended practices regarding the capacity and voltage of the turbo-generator and its location on the locomotive, wiring, lamps and dimmers. These were later adopted by letter ballot. The present report outlines the proposed extension of the recommended practice and covers bolt spacing of the generator base and headlight casing, sizes of steam, exhaust and drain pipes, sizes of ball bearings, brushes and screw threads and lubrication. Suggestions regarding design of generators are also made.

The cleaning of the silver-plated; copper type locomotive headlight reflectors has always been troublesome. The report for this year indicates that glass reflectors which require less attention probably meet the requirements of the Interstate Commerce Commission and it is to be expected that official tests will soon be available. Other work suggested for future reports includes the preparation of maintenance regulations which, it is thought, will be of assistance to the railroads in obtaining the best possible results from electric lighting equipment on locomotives.

APPROVAL of the plan to work jointly with manufacturers of headlight turbo generators and the Association of Railway Electrical Engineers in developing certain standard practices was given this committee at the 1920 convention, and in addition it was found advisable to include manufacturers of ball bearings.

The resulting recommendations for each of the subjects referred for development, with additional recommendations for brush holders and spacing of bolt holes in base of headlamp cases, are herein submitted for consideration, it being understood, where the recommendations necessitate redesigning, that they will apply to future construction only.

The lack of uniformity in number as well as location of supports or feet on the various makes and types of turbo generators, which is illustrated in Fig. 1, renders interchange difficult, and is detrimental to the best interests of manufacturers as well as objectionable to the railroads. The spacing recommended can be adapted to future designs without much difficulty, thus overcoming the present chaotic situation.

The recommendation for the location of the steam inlet may appear to allow the manufacturer more latitude than is desirable,

but to fix a definite location appeared to be an unnecessary handicap in the freedom of design. With the variation in location of steam inlet from the longitudinal and transverse center line of bolt spacing and vertically above the base plate in increments of $\frac{1}{2}$ in., any make of turbo generator can be applied without the necessity of changing the steam pipe from the boiler by using standard fittings and proper lengths of pipe nipples, standard lengths of which vary by $\frac{1}{2}$ in. increments.

The restriction of turbo generator manufacturers to one size of ball bearing was likewise considered as unnecessarily hampering future development, and particularly with reference to the design of the shaft. Much of the ball bearing trouble that is being experienced can be attributed to (1) rotating parts out of balance; (2) shaft running near the critical speed, producing excessive vibration; (3) shaft loose in bearings, which, existing, rapidly increases; (4) shaft too small, which, when attachments thereto are out of balance, springs out of line to seek its balance, thus throwing bearings out of alignment; (5) faulty design of bearing housing, which permits dirt to work into bearings. This condition is aggravated by centrifugal action of revolving parts,

creating a tendency to discharge air through all possible outside openings and draw in air near the center of the shaft, carrying dirt with it.

Shafts of larger diameter with a higher critical speed are less liable to distortion on account of parts out of balance, and with a range of the following three sizes of ball bearings (the principal dimensions being given in inches) which the ball bearing manufacturers agreed could be expected to give satisfactory results, a greater opportunity is afforded the designer to overcome the difficulties enumerated than would be the case if he were restricted to one size of bearing.

Bearing Number	Outside Diameter (Base of Housing)	Inside Diameter (Diam. of Shaft)	Width of Roll
306	2.8347	1.1811	.748
308	3.5433	1.5748	.9055
406	3.5433	1.1811	.9055

A method of overcoming the possibility of dirt working into bearings is a problem yet to be worked out by the designers of turbo generators, and in this connection the suggestion has been made that some form of air inlet near the center of the shaft be provided in such a way that the incoming air would not pass through the bearings; also that a pressed steel disc carried by the shaft running close to a pressed steel disc carried by the housing would soon fill with grease and form an effective dirt seal.

Experience has demonstrated that oil is best for lubrication. It should be as light as possible consistent with the conditions of heat under which it operates, but not so light that there will be excessive evaporation. The best results will be obtained if the oil is filtered and kept in a covered receptacle.

The bolt spacing for base of headlamp cases, while not one of the subjects originally referred to this committee, was considered advisable to standardize if possible, and it is believed that the recommended spacing, Fig. 2, can be readily adapted to all designs. Where a railroad's standard location for headlamp is on the top or near the top of smoke box, and the recommended bolt spacing will bring the top of the headlight casing above clearance limits, the transverse spacing of bolt holes can be changed to 14 in., but as there are so few railroads where this condition exists, it was not considered necessary to cover this addition in the recommendation, it being believed advisable to leave the matter to the railroads affected to arrange with the manufacturers.

In this committee's report to the 1920 convention, reference was made to headlight reflectors that were being developed which would not require as constant attention to keep clean as is the case with the silver-plated copper reflector. A large number of such reflectors of crystal and uranium glass with silvered backs and varying in diameter from 12 in. to 18 in., the size most commonly used being 14 in., have been in service a sufficient length of time to demonstrate the permanency of their reflecting value and the small expense required to keep clean.

From information received of tests that have been conducted, there seems to be no doubt that these reflectors, used in conjunction with lamps which have been adopted as standard, will produce ample illumination to meet the requirements of the Division of Locomotive Inspection of the Interstate Commerce Commission, but in the absence of what might be termed official tests, it is not considered advisable to present any recommendations at this time.

Consideration has been given to the advisability of using carb lamps of smaller dimensions, with the idea of reducing the size of lamp cases, and the lamp manufacturers are co-operating in an endeavor to produce a satisfactory 15-watt S-14, 33-volt lamp to be used in place of the present S-17 lamp, but the development has not advanced sufficiently to warrant other than mention. The S-14 lamp is approximately 1 $\frac{1}{16}$ -in. shorter and $\frac{3}{8}$ -in. smaller in diameter than the S-17 lamp.

A number of new and commendable styles of headlamp cases have been developed by the manufacturers since the last convention, lightness of weight coupled with durability being the dominant features, although other noteworthy refinements have been accomplished. However, the committee has not thought it advisable to consider their standardization other than with respect to the bolt spacing of the base.

There will be found at the end of this report several recommendations for maintenance practice, and while the recommendations submitted at this time are few, it is hoped that the start that has been made will eventually result in the formulation of a set of maintenance regulations which will be of assistance to

the railroads in obtaining best possible results from the electric lighting equipment on locomotives.

The committee recommends that the following be submitted to letter ballot as recommended practice for future designs, and to be added to recommended practices previously adopted:

1. Turbo generators to have three feet for support and attachment to base plate, thickness of feet at bolt hole to be $\frac{3}{4}$ -in. and ribbed on sides to engage head of bolt to prevent turning; ribs to extend to body of generator to strengthen the feet, holes in feet to be $\frac{1}{16}$ -in. diameter for $\frac{5}{8}$ -in. bolts, bolts to enter from the top, with nuts on underside of base plate. Bolt hole spacing to provide for one bolt at generator end on longitudinal center line of machine 5-in. from transverse center line and two holes at turbine end on opposite sides $5\frac{1}{2}$ -in. from longitudinal center line and 5-in. from transverse center line.

When clearance between foot and body of generator prevents entering bolt from top, foot may be slotted, but where it is necessary to slot all feet slot in foot at generator end should be parallel with longitudinal center line and slot in feet at turbine and parallel with transverse center line.

2. Steam inlet of turbo generator to be for $\frac{1}{2}$ -in. iron pipe, exhaust outlet to be for 2-in. iron pipe and drain to be for $\frac{1}{2}$ -in. iron pipe.

3. The variation in location of steam inlet from longitudinal and transverse center lines of bolt spacing and the distance above the base plate to be in increments of $\frac{1}{2}$ -in. steam inlet to be on left side facing turbine end.

4. Ball bearings to be of any of the following numbers, which also designate the size:

No. 306	No. 308	No. 406
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5. Brushes to be 1-in. wide, $\frac{1}{2}$ -in. thick and not less than $1\frac{1}{2}$ -in. long.

6. Brush holders to be equipped with springs so designed that no adjustment is necessary or possible during the full life of brush and commutator, and to provide uniform pressure during 1-in. wear of brush. Brush holders to be machined inside, set $\frac{3}{32}$ -in. from commutator and at an angle of 10 deg.

7. Bolt spacing for base of headlight casings to be 12-in. by $12\frac{1}{2}$ in., the center line of back holes to be not more than 5 in. ahead of rear of case, bolt holes to be $\frac{7}{16}$ -in. diameter for $\frac{3}{8}$ -in. bolts, general design of casing to permit bolts to be applied from top with nuts on underside of bracket.

8. Screw sizes smaller than No. 12-28 thread not to be used, heads to be either fillister or flat and material to be brass or steel. For sizes larger than No. 12 use $\frac{1}{4}$ -in., $\frac{5}{16}$ -in., $\frac{3}{8}$ -in., etc., bolt sizes, heads of $\frac{1}{4}$ -in. and $\frac{3}{8}$ -in. bolts to be slotted to permit use of screw driver.

9. Lubrication for turbo generators to be oil. The committee also recommends the following to be submitted to letter ballot as recommended practice for maintenance of turbo generators:

1. Oil for lubrication to be as light as possible consistent with the conditions of heat under which used, to be filtered before using and kept in a covered receptacle.

2. Oil reservoirs to be kept free from accumulation of grit and dirt.

3. Extensive repairs, and particularly repairs to rotating parts, to be done only at shops or designated points where adequate facilities are available.

The report is signed by W. H. Flynn (Chairman), Michigan Central; C. H. Rae, Louisville & Nashville; A. R. Ayers, New York, Chicago & St. Louis; H. M. Curry, Northern Pacific; J. L. Minick, Pennsylvania System; E. W. Jansen, Illinois Central; and R. W. Anderson, Chicago, Milwaukee & St. Paul.

Discussion

In the absence of the chairman, this report was read by Mr. Ayers, who said: "In connection with ball bearings I might call attention to the fact that bearings Nos. 306, 308 and 406 carry with them certain definite dimensions of the fit of the shaft in the bearing and the size of the bore in the housing. The size of the ball varies a little in different makes of bearings, so that the committee was not able to select the size of the ball that had to be covered by the shaft fit and the housing bore. By reference to the last column 'size of ball,' you will see that it works out fairly well."

During the reading of this report, Mr. Ayers further said: "I would call your particular attention to one dimension in that recommendation and that is the spacing of the two bolt holes at the turbine end. Since this report was agreed upon by the committee, it has developed that the resulting spread of bolts to eleven inches, in some cases, would be so wide that some of the boiler plate brackets now on locomotives would not take the new bolt spacing. The committee will be asked to consider changing their recommendation from 5½ in. from a longitudinal center line, to 4½ in. I think, for future designs, all of the manufacturers could meet the 9 in. dimension.

The committee thinks recommendation No. 3 is the most important of all.

C. T. Ripley (Santa Fe): I feel that the committee should be in a position to make definite recommendation as to the use of the glass reflector. These have now been in service for five years, and have proven so superior both in service and maintenance that there appears to be no reason for the application of silver reflectors—at least to new power. I do not know what is meant by official tests, but there are plenty of railroad tests which show that a glass reflector is the best now available.

As regards paragraph 5, your committee should discuss with the committee of the Railway Electrical Engineers, the question of the voltage of cab lamps. About two years ago this voltage was reduced from 34 to 33. We all know that we cannot hold the voltage of our generators constant. The change in voltage from 34 to 33 in the rating of the lamps means added life. Under the present conditions, we cannot buy 34-volt lamps. The 250-watt headlight lamp also needs attention, as a great many replacements are due to the bulbs becoming loose from the base. This can be overcome by lengthening the base, and I would like to see this new type lamp made standard.

H. B. Bohan (N. P.): I would like to concur with the gentleman's remarks on the glass reflectors. The experience of the Santa Fe has been the same as the Northern Pacific. I should also like to ask if any of the members have had any experience on the so-called illuminated dials and gages on cab lamps. We have been making quite a few experiments with illuminated gages for use in the caboose cupola and I just received a report at Atlantic City that the success of that type of gage has been uniformly good. The more we can keep off of the boiler, the better it is. If we could use an illuminated gage for the various gages in locomotive cabs, we would eliminate just so much wiring and conduits.

C. F. Giles (L. & N.): I would like to call attention to the development of the air-tight headlight casing that is being worked out by one of the manufacturers. I think it is worthy of the consideration of the committee in connection with their next year's report. We have made a test of one of them in a roundhouse for six or seven months, and it appears to be very satisfactory. The idea has been developed from the experience that people have had with the air-tight headlight on automobiles. The headlight reflector does not corrode nearly as readily when air is admitted to the casing.

H. H. Bentley (C. & N. W.): I am heartily in sympathy with what Mr. Ripley said about the glass headlight reflector, but it seems to me that we ought certainly to come to some conclusion as to what size reflector we want to use. It would not only help the manufacturers, but would help everybody else, and it seems to me that we ought to conduct a test to see which is the better size reflector for all purposes; that is, either 12, 14 or 16 in., as the case may be. I would recommend that the committee be authorized and instructed to make such tests as will conclusively determine the size of reflector that should be made standard.

There is one thing that our railroad copied from the Illinois Central in connection with headlights, and that is a shield over the headlight casing. I am just bringing it to your attention so that you may think about it. We heard from Mr. Bell that they were having very good results from a shield over the top of the headlight casing and the engineers were reported to be very much in favor of it. It kept the rays down and permitted them to see the signals much better than they could otherwise. We put a lot of them on our road and have now made it standard. I do not know whether any of you have seen it, but if you want a blueprint, I will be glad to furnish one. It certainly is working out very satisfactorily.

During the Railroad Administration there was some attempt made at standardization and, as I recall it, the committee at that time decided on a standard base for headlights. I am wondering how that standard conforms to or varies from the one that is now being recommended by the committee.

I am inclined to think that we ought to get away from the use of sheet steel for headlight casings. It seems to me that the development has been carried far enough so that some composition casing, which would be light in weight and not corrode, would be more satisfactory than the steel casing.

We had some trouble with the turbo-generator and it got so bad that finally we adopted a flexible connection which has apparently overcome all the trouble.

I am heartily in sympathy with recommendation No. 3 which reads: "Extensive repairs, and particularly repairs to rotating parts, to be done only at shops or designated points where adequate facilities are available." That is the practice we have had for a good many years. Before that we were having all sorts of improper repairs made to the air pumps with many failures on the road. Taking pumps to the place where we had the proper repair facilities reduced our air pump failures. I am satisfied in the case of a little turbo-generator which a man can carry around, that it should be taken to the repair shop for repairs instead of making them on the locomotive.

W. L. Bean (N. Y., N. H. & H.): I think that for road use the 16-in. glass reflector will be found sufficient and in comparison with the silvered steel reflector, we found that after it has been out for a while the 14-in. glass reflector will give higher illumination than the old style reflector.

As to keeping the diameter of the reflector down to just what may be necessary; I believe that to be particularly important in working out a desirable cast case because the weight is so much greater as compared with sheet iron. The cost of the reflector also increases rapidly with the increase in diameter. I think it will be found that 14-in. reflectors will be sufficient for road use and 12-in. reflectors for yard use. By the adoption of cast cases, the maintenance will be negligible to what it is now, especially in such locations as on the tenders of switching engines.

Mr. Ayers: Some of the electrical people can correct me if I am mistaken about the 33-volt and 34-volt lamp but my impression is that the voltage for a locomotive lamp should be the same as the car lighting lamp. If you put in a lamp with too high a voltage rating, the car-lighting battery will not supply it to its full illuminating power.

About spacing the headlight stand, I am not able to answer Mr. Bentley's question directly. The space recommended has little to do with any other spacing for the reason that almost no two of the stands are alike. We found different combinations. Some stands have bolts with a wide spread and others with a narrow spread; what the committee had to do was to get the generator manufacturers together to see what compromise could be made

which would not interfere with the operation of the equipment.

Mr. Ripley: It is true that that particular type of lamp (15-watt lamp) is used for car platforms and a different type of lamp is recommended for use in car lighting. Why cut down the lighting of all the headlight lamps to accommodate a few lamps on platforms.

Frank J. Hill (M. C.): In answer to Mr. Ripley's remarks; I do not think there is any difference in the illuminating value of a 33- and a 34-volt lamp. If you order a 33-volt lamp you will probably get a 34-volt lamp. That is something you will have to take up with the lamp manufacturer. If you get a 33-volt lamp you get a lamp that has a range of one volt either way.

Chairman Tollerton: In this discussion we would particularly like to hear from the electricians who have charge of this equipment and especially if they are having any troubles or difficulties in maintenance of the generators or other parts of the light equipment. This committee on electric headlights is seeking information. They have asked for certain instructions from the members of the convention and they cannot work intelligently unless they get some ideas of the troubles you are having.

C. E. Brooks (Canadian National): In connection with item No. 3, I believe that about 75 per cent of shaft renewals are due to the fact that the bearings are loose and this is generally due to the fact that the internal diameter of the bearing is too small. It seems to me that the committee could well cut down the number of choices that we have in the bearing and that we could get down to a bearing such as No. 308 which has the largest internal diameter.

Mr. Ayers: In selecting a size of bearings, the committee had to be careful not to place obstruction in the way of mechanical developments. There are several combinations of bearings for supporting generator shafting: One case in which the bearing is on the extreme edge of the shaft; another where both bearings are in the center, between the turbine and armature; another where the bearing is at the generator end; and another where the bearing is at the turbine end. Where there is a bearing in the center, it has to slip over any intermediate features and then to the bearing at the outer end of the shaft would nominally have a smaller bore. I think I am correct in saying that all three of the bearings recommended are larger than those commonly in use. The committee considered particularly the inside diameter, that is, the shaft diameter; there are bearings in use today that have a considerably smaller shaft diameter than the No. 306, which is the smallest one recommended by the committee. I believe it will be found that the construction is an improvement upon the previous method.

G. P. Kempf (P. & W. V.): Has the committee made any investigation as to lowering the generator with the shaft parallel with the center line of the boiler, or at right angles to it? I believe there have been some investigations as to decreasing the maintenance cost and insuring a longer life of the generator by making some rearrangement of this kind.

Mr. Castle (N. Y., N. H. & H.): In looking over the committee's recommendation there does not seem to be any reference to the consideration of lock nuts and lock washers. I think that matter should be considered in this connection. One other item is the size of pipe of the turbo-generator. On most roads the turbo-generator is located near the source of supply at the head of the cab and the 1/2 in. pipe will be found adequate, but it is a question where you carry the pipe up to the headlight near the stack, or even on the deck below the smoke box, whether the size of the pipe should be increased.

The last item that I wish to mention is the 3/8-in. bolts in

the headlight casing. If a smaller and more flexible casting is used it may be only a question of time when corrosion takes place and the bolts will be too small.

Chairman Tollerton: Mr. Ayers, will you state whether the committee has considered the question relative to generator location?

A. R. Ayers: There was considerable discussion about that and I think one road (Illinois Central) has made some experiments along that line. The question of the gyroscopic action was discussed; also the thrust of the bearings due to the sidewise oscillation of the locomotive but the jar on headlights, longitudinally due to a rough coupling, is probably a great deal more severe than side oscillation due to rolling. There are so many arguments on both sides of the question that the committee could not reach any conclusion. There did not seem to be any definite evidence that one method was better than another.

W. J. Bohan (N. P.): I would like to comment a little on what Mr. Giles had to say about the air-tight headlight casing. I do not believe that a headlight case could be continued on a locomotive indefinitely without developing leakage. We must not lose sight of the fact that the silvered reflector will corrode from gases which exist around a locomotive, while the glass headlight will not. One more word about Mr. Bentley's remark as to the size of the headlight casing: I do not think that that matter should be taken too seriously, either. What we want on a locomotive is a headlight case that will give us the most returns for the expenditure and the handling of the headlight case is not a very serious matter. The tendency is to charge very nearly twice as much for the lighter alloy casings and I believe we could get the straight, cast iron case down to where it will be reasonable to handle and at a very much lower price.

Mr. Ripley: The location of the turbo-generator does make a difference. It has been found in actual service that it is considerably more difficult to maintain bearings on any turbine that is located longitudinally of the boiler. Our road is one of the earliest roads to use electric headlights and we have found to our entire satisfaction that the turbo-generator should be located transversely of the boiler.

Mr. Ayers: Defective bearings are probably responsible for more turbo-generator trouble than any other one thing because, as bearings wear, the armature gets down on the field. The ball bearing manufacturers told us that the bearings already in service were capable of higher speeds and far greater loads than anything they had to carry, which brings out the great importance of doing everything possible to keep the bearings in good shape.

I want to call your special attention to what is said about filtering the oil and keeping the oil channels clean. As time goes on and bearings with dirt shields and dust shields become more available, I believe that question should be considered. In other words, if we can keep the bearings on these machines in first-class condition, at all times, a great deal of our trouble will disappear.

The balancing of the rotating parts at the time of repair is very important. The chance is slight of being able to take off a carefully balanced turbine wheel and replace it with a turbine wheel out of stock and have that turbine wheel run at a good balance, three or four thousands revolutions per minute. In spite of this fact, I doubt if a great many people are rebalancing armatures or rotating parts after they make repairs. These are things we will have to give a great deal of attention to if we are going to keep these machines in good operating condition. *(It was voted that the report be accepted and submitted to letter ballot.)*

Chairman Tollerton: The chair regrets to announce the

death of W. C. Arp, one of our old and valued members. The death occurred at Terre Haute at 10.50 p.m., on

the night of June 16. A suitable resolution will be prepared at the proper time on Mr. Arp's death.

Report of the Committee on the Manual

The best evidence of the work of this committee lies not in the formal report, but in the Manual itself. This volume, bound in loose leaf form, contains the complete mass of standards and recommended practices of the Mechanical Division, not only conveniently arranged in section groups but thoroughly cross-indexed. For the first time in the history of the Division and of its predecessors, the Master Car Builders' Association and the American Railway Master Mechan-

ics' Association, the completed work of the organization is compiled in usable form so that it may readily be referred to as conditions require.

It is not at all improbable that much of the inertia in actually putting into effect many of the recommendations of the older associations arose from the great difficulty in determining just what were the latest developments as to standards or recommended practices on any particular subject. The loose leaf form permits the issuing of revisions with a minimum of delay.

AT THE DIRECTION of the General Committee, and with the assistance of the committees responsible for recommendations which have been adopted as Standard or Recommended Practice, your Committee on Manual has codified and published in one loose leaf volume the Standard and Recommended Practice of the Division; text and drawings. The adopted practices of the former American Railway Master Mechanics' and Master Car Builders' Associations have been carefully checked and harmonized and together with the practices since adopted by the Mechanical Division, American Railway Association, are included in this volume.

This book is designated as the Manual of Standard and Recommended Practice, Mechanical Division, American Railway Association.

For ready reference this Manual is divided into twelve Sections under the following headings:

- A—Specifications for Materials.
- B—Gages and Testing Devices.
- C—Car Construction—Fundamentals and Details.
- D—Car Construction—Trucks and Truck Details.
- E—Brakes and Brake Equipment.
- F—Locomotive Wheels, Tires and Miscellaneous Locomotive Standards.
- G—Safety Appliances for Cars and Locomotives.
- H—Train Lighting, Headlights and Classification Lamps.
- I—Rules for Fuel Economy on Locomotives.
- J—Inspection and Testing of Locomotive Boilers and Rules and Instructions for Inspection and Testing of Steam Locomotives and Tenders.

K—Specifications for Tank Cars.

L—Miscellaneous Standards and Recommended Practice.

Each of the Sections is provided with an index and in addition there is a complete detailed index to the entire Manual.

The Rules of Interchange and Loading Rules are not included in this Manual even though adapted as standards. They are published in separate handy form and are revised and supplemented so frequently it would not, in the opinion of your committee, be practicable to include them.

Circular No. D. V. 231, dated May 16, 1922, has been issued to the members advising as to prices, etc. for this Manual.

The report is signed by W. E. Dunham (Chairman), C. & N. W.; A. R. Ayers, N. Y., C. & St. L.; W. F. Kiesel, Jr., Penn. System; A. R. Kipp, Soo Line; J. Hainen, Southern; J. T. Carroll B. & O., and J. McMullen, Erie.

Discussion

F. W. Brazier (N. Y. C.): I move the committee's report be accepted and the thanks of the association be extended to them for the splendid manner in which this manual is gotten up.

Mr. Kiesel: It should be stated that a large amount of the credit is due to our secretary, Mr. Hawthorne, who has worked very hard on this report.

(The motion was duly seconded, put to a vote and carried.)

Specifications and Tests for Materials

The committee submitted the following report on the subjects listed in our circular during the past year.

Sub-Committees

Sub-committees have been appointed and are now actively engaged in work on the subjects assigned.

- (a) Cooperation with the Rubber Association of America on the preparation of Specifications for Mechanical Rubber Goods.
- (b) Specifications for Welding Wire.
- (c) Recommendations for Water Gages and Lubricator Glasses.
- (d) Revision of present specifications for Galvanized Sheets.
- (e) Revision of specifications for Structural Steel.

MEMBERS DESIGNATED TO THE COMMITTEE BY THE GENERAL COMMITTEE

- (a) *Chairman*—W. E. Dunham, C. & N. W. Has the process

of heat treatment decreased the number of failures to any appreciable extent?

The committee felt that it did not have sufficient information among its members to satisfactorily answer this question and therefore requested the secretary of the association to circularize all members to secure the expression of opinion from those who have been using heat treated steel.

This circular was sent out and the original replies received have been tabulated in the following summary:

Total number of replies received, 77.

Number reporting no information, 52.

Of the remaining 25, four report that they consider heat treated axles and crank pins more satisfactory than untreated. Nine report that they are using heat treated material, but are doubtful as to the value of the heat treatment. Five report that they prefer annealed steel rather than the heat treated. Six report that their

experience with heat treated material has been unsatisfactory. One road reports that they consider heat treated axles satisfactory, but are using annealed steel for piston rods.

In some of the replies it is pointed out that a possible reason for some of the difficulties experienced with heat treated steel was due to an improper heat treatment and that it was possible that the same material, if properly heat treated, would have given satisfactory results. In some quarters there is a strong opinion that the best steel for locomotive forgings is that which has been given a proper annealing treatment to thoroughly refine the grain and relieve all stresses.

(b) *Revision of Specifications for Lumber, if such revision is needed. Representatives of the Purchases and Stores Division to be requested to co-operate with the Committee on Specifications and Tests.*

No action has been taken on this subject. The committee has not received any replies to the questions asked of the members in its report of 1921 regarding the value of the present lumber specifications and requesting suggestions for revision. This subject will be continued on the docket for future action.

CO-OPERATION WITH THE AMERICAN SOCIETY FOR TESTING MATERIALS ON THE SUBJECT OF SPECIFICATIONS FOR STEEL CASTINGS FOR RAILROADS

The Committee has had representatives serving with representatives of the American Society for Testing Materials on the Joint Committee on Specifications for Steel Castings for Railroads,

Comment and criticism of these specifications are requested from members of the association so that final action may be taken on them in the report for 1923.

Recommendations

REVISION OF STANDARD SPECIFICATIONS

Air Brake and Train Air Signal Hose. In order to take care of the provision of Rule 57 of the Rules of Interchange, it is recommended that Section 15, Label, be revised to permit the use of a rectangular label in addition to the band label, the wording of the paragraph to be as follows:

"15. Label. Each length of hose shall have vulcanized on it a label of red rubber, as shown in Fig. 2. This label shall be applied on the hose at a point 6 in. from the end (a variation of ½ in. either way will be permitted) and with the top of the lettering toward the center of the hose. The use of a rectangular label in addition to the band label is optical with any railroad, providing space, preferably 2 in., is allowed between the two labels."

The committee also submitted exhibits containing revisions of numerous recommended practice specifications and new specifications as shown below. These exhibits are voluminous and because of their specialized character, they are not reproduced here.

REVISION OF RECOMMENDED PRACTICE SPECIFICATIONS

- (a) Specifications for Turpentine.

Of the large number of subjects covered in the report, probably the most important is the specification prepared by the Joint Committee on Steel Castings for Railroads. The specification has still to be submitted to the membership of the American Society for Testing Materials and, as noted in the report, has not yet been considered jointly with the other mechanical division committees interested. The advantage of a single specification with one chemical content for all railroad steel castings is apparent, from the standpoint of the manufacturers as well as the railroads.

The question of revising the lumber specifications is also an important matter although no action has yet been taken. Some of the lumber associations have advocated more elastic grading rules claiming that the present requirements throw a large part of the log into the lower grades and increase the cost of supplying the quality of lumber which the railroads demand. It may be advisable to consider whether the disadvantages of slightly lower grade lumber would offset the reduction in the cost that might be effected.

which has been working for the past two years and which held a final meeting on March 24, 1922, and approved proposed specifications for submission by each of the representatives to their parent bodies.

The A. S. T. M. representatives have submitted their report to Committee A-1 on Steel, which has approved the specifications to be included in their report to the society in June, 1922, as a proposed tentative specification to be published in their proceedings in order that it may be available for comment and criticism.

The committee's representatives have made their report transmitting the proposed specifications to the secretary of the association. The committee feels that the specifications proposed by the joint committee are the best that have so far been produced and that they cover grades of cast steel suitable for all railroad purposes. The committee would unhesitatingly recommend these specifications to go to letter ballot of the association as Recommended Practice in place of both the tentative specifications for steel castings submitted with their report of 1921, and the present standard specifications for steel castings, were it not for the fact that the Car Construction Committee and the Coupler Committee were also represented on the Joint Steel Castings Committee, and there has been no time for joint consideration of the specifications by these committees. In view of this condition the specifications are included in this report (Exhibit A) for information only.

- (b) Specifications for Oxide of Iron Paste.
(c) Specifications for Black Paint.
(d) Specifications for Raw Linseed Oil.
(e) Specifications for Boiled Linseed Oil.
(f) Specifications for Red Lead.

NEW RECOMMENDED PRACTICE SPECIFICATIONS

- (a) Specifications for Mineral Spirits.
(b) Specifications for Red Lead and Oil.
(c) Specifications for Extended Red Lead Paste Paint.

The Committee recommended that the above revisions and new specifications be submitted to letter ballot of the association.

The report is signed by F. M. Waring (Chairman), Pennsylvania System; J. R. Onderdonk, Baltimore & Ohio; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Fetters, Union Pacific; H. G. Burnham, Northern Pacific; J. C. Ramage, Southern Railway; J. H. Gibboney, Norfolk & Western; H. P. Hass, New York, New Haven & Hartford; T. D. Sedwick, Chicago, Rock Island & Pacific; G. N. Prentiss, Chicago, Milwaukee & St. Paul; G. E. Duke, New York Central and H. D. Browne, Engineer Tests, Chicago & Northwestern.

PROPOSED STANDARD SPECIFICATIONS FOR CARBON STEEL CASTINGS FOR RAILROADS

As Agreed Upon by

THE JOINT COMMITTEE ON STEEL CASTINGS FOR RAILROADS AT ITS MEETING HELD AT PHILADELPHIA, FRIDAY, MARCH 24, 1922.

1. **Scope.**—(a) These specifications cover all carbon steel castings for locomotive and car equipment, and for miscellaneous use, classified as Grade A and Grade B.

(b) Grade A castings shall be furnished annealed unless otherwise specified by the purchaser.

Grade B castings shall be furnished annealed.

(c) The purposes for which the two grades are generally used are:

Grade A, unannealed, covers only such special castings as may be approved by the purchaser. Grade A, annealed, covers such castings not covered by Grade A, unannealed.

Grade B, covers all castings for high stresses, such as truck side frames, bolsters, couplers and coupler parts, locomotive frames and locomotive drivin. and trailer wheel centers.

I. MANUFACTURE

2. **Process.**—The steel may be made by one or more of the following processes: open hearth, electric furnace, crucible or side blow converter.

3. **Annealing.**—(a) Castings shall be allowed to become cool. They shall then be uniformly heated to the proper temperature to refine the grain and allowed to cool uniformly.

(b) **Annealing Lugs.**—For the purpose of determining the quality of annealing at least two and not more than four annealing lugs shall be cast on all castings 150 lb. and over and on such castings less than 150 lb. as required by the purchaser or his representative. The location of the annealing lugs shall be such that when removed by the inspector they shall be indicative of the character of annealing. The standard annealing lug shall be 1 in. in height and 1 in. width and $\frac{5}{8}$ in. thickness where it joins the casting.

(c) If, in the opinion of the inspector, a casting is not properly annealed, he may at his option require the casting to be re-annealed.

II. CHEMICAL PROPERTIES AND TESTS

4. **Chemical Composition.**—The steel shall conform to the following requirements as to chemical composition:

	Grade A.	Grade B.
Manganese, not over.....	.85 per cent	.85 per cent
Phosphorus, not over.....	.05 per cent	.05 per cent
Sulphur, not over.....	.05 per cent	.05 per cent

5. **Ladle Analyses.**—An analysis of each melt of steel shall be made by the manufacturer to determine the percentage of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made from drillings taken at least $\frac{1}{4}$ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative when requested, and shall conform to the requirements specified in Section 4.

6. **Check Analyses.**—An analysis may be made by the purchaser from the broken tension test specimen or from a casting representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 4. Drillings for analysis shall be taken not less than $\frac{1}{4}$ in. beneath the surface, and shall be taken in such a manner as not to impair the usefulness of a casting.

III. PHYSICAL PROPERTIES AND TESTS

7. **Tension Tests.**—(a) The steel shall conform to the following requirements as to tensile properties:

	Grade A.		Grade B.	
	Unannealed.	Annealed.	Unannealed.	Annealed.
Yield Point, per sq. in.	29,000 lb.	29,000 lb.	36,000 lb.	36,000 lb.
Elongation, per cent.	1,100,000	1,600,000	1,600,000	1,600,000
	Tens. Str.	Tens. Str.	Tens. Str.	Tens. Str.
Elongation, not under.	34 per cent	24 per cent	22 per cent	22 per cent
Reduction of Area, per cent.	2,400,000	2,400,000	2,400,000	2,400,000
	Tens. Str.	Tens. Str.	Tens. Str.	Tens. Str.
Reduction of Area, not under.	30 per cent	35 per cent.	30 per cent.	30 per cent.

(b) The tensile strength shall be reported as information.

(c) The yield point shall be determined by the drop of the beam or by the dividers, the method being optional with the purchaser, and at a crosshead speed not to exceed $\frac{1}{8}$ in. per minute. The tensile strength shall be determined at a speed not to exceed $\frac{1}{2}$ in. per minute.

8. **Test Specimens.**—(a) A sufficient number of test coupons, from which the required test specimen may be prepared, shall be cast attached in the neighborhood of each end of each locomotive frame, attached to each locomotive cylinder, to each wheel center, and to miscellaneous castings weighing over 150 lbs. These test coupons shall remain attached to the castings throughout the annealing and until the castings are presented for inspection. If the design of the casting is such that the test coupons cannot be attached they shall be cast in runners outside of the casting, but attached to it to represent each melt. The location of the test coupons, as well as the method of casting such coupons, shall be subject to mutual agreement by the inspector and the manufacturer. In the case of any orders for castings weighing under 150 lbs., the physical properties as required in Section 7 may be determined from an extra or spare test bar cast with and attached to some other casting from the same melt.

(b) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and the manufacturer.

(c) Tension test specimens shall conform to dimensions shown in Fig. 1. The ends shall be not less than $\frac{7}{8}$ in. in diameter and of a length and form to fit the holders of the test machine in such a manner that the load will be axial.

A. S. T. M. Standard Test Specimen
A. R. A. Standard Test Specimen

These are alike except diameter, which is: A. S. T. M. 0.5 in., A. R. A. 0.505 in.

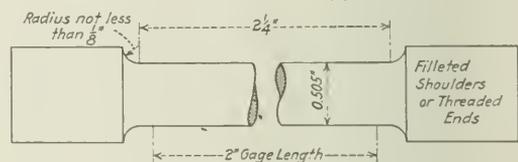


Fig. 1

9. **Number of Tests.**—(a) General Requirements. (1) One tensile test shall be made from the neighborhood of each end of each locomotive frame and both tests shall meet the requirements of the specifications. One tensile test may be made from each wheel center and each locomotive cylinder castings, but at least one of each kind of such castings in each melt shall be tested. For miscellaneous castings from melts which do not include frames, wheel centers or cylinders, one tensile test shall be made from each melt, except as provided in Section 9B-1.

(2) If the test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(3) If the percentage of elongation of any tension test specimen is less than that specified in Section 7 and any part of the fracture is more than $\frac{3}{4}$ in. from the center of the gauge length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

(4) If the results of the physical test lot do not conform to the requirements specified, the manufacturer may re-anneal such lots, but not more than twice, and retest shall be made as specified in Section 7.

(5) No part of this specification shall operate to cause any one tensile test to apply to more than 40 tons of castings as offered for inspection.

(b) Special Requirements for Miscellaneous Castings.

(1) After 15 consecutive melts, which may contain any or all classes of castings (except frames, wheel centers and cylinders) covered by these specifications on one or more orders have been tested and accepted in accordance with the above requirements, the manufacturer may group the succeeding melts in lots of five melts each, but each lot not to exceed 40 tons, the entire group to be accepted if the test specimen selected from the lot fulfills the chemical and physical requirements herein specified. If this test fails, a reheating will be granted on the melt that the failed

bar represents, and the other four melts of the group shall be tested individually.

(2) If there is a period of more than six months between shipments of the class of castings covered by these specifications, then each melt shall be tested individually until 15 consecutive melts have been accepted, after which the melts may again be grouped as in paragraph 9b-1.

(3) If one or more melts are rejected, each succeeding melt shall be tested individually until 15 consecutive melts have been accepted, after which melts may again be grouped as in paragraph 9b-1.

(4) In case of small orders for bolsters, truck sides, draft arms, yokes or castings weighing over 150 lbs., where the size of the order and the available pattern and foundry equipment are such that not more than five castings can be cast in any one melt, the physical properties, as required in Section 7, will be determined from an extra or space test coupon cast with and attached to some other casting of the same melt.

10. **Alternative Tests to Destruction.**—In the case of orders including only castings not exceeding 150 lbs. in weight, the test to destruction of one casting from each 100 castings or smaller lot may be substituted for the tension tests at the option of the inspector. This test shall show the material to be ductile, free from injurious defects and suitable for the purpose intended.

IV. WORKMANSHIP AND FINISH

11. **Workmanship.**—(a) All castings shall substantially conform to the size and shape shown on purchaser's drawings, and shall be made in a workmanlike manner.

(b) The castings shall be free from injurious defects.

(c) Minor defects which do not impair the strength of the castings may be welded by an approved process with the approval of the inspector. The defects shall first be cleaned out to a solid metal, and after welding the castings shall be annealed, if required by the inspector.

V. MARKING

12. **Marking.**—The manufacturer's name or identification mark and the specified pattern number shall be cast on all castings. In addition the month and year when made shall be cast on all bolsters, truck sides, frames, wheel centers, cylinders and similar castings. The location and size of numbers shall be agreed upon by the manufacturer and the inspector. In accordance with the standard practice of the individual foundry to identify individual castings, a serial number may be cast or the melt number may be stamped on bolsters, truck sides, frames, wheel centers, cylinders and similar castings as agreed upon by the manufacturer and the inspector. The melt number shall be legibly stamped in all other castings weighing over 150 lbs.

VI. INSPECTION AND REJECTION

13. **Inspection.**—The inspector representing the purchaser shall have free entry at all times while work on the contract of the purchaser is being performed to all parts of the manufacturer's works which concern the manufacture of castings ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. Unless otherwise specified, all tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment.

14. **Rejection.**—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 6 shall be reported within five working days from the receipt of samples.

(b) Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected and the manufacturer shall be notified.

15. **Rehearing.**—Samples tested in accordance with Section 6, which represents rejected castings, shall be preserved for two weeks from the date of test report. In case of dissatisfaction with the results of tests, the manufacturer may make claim for rehearing within that time.

Discussion

Mr. Ayers: Would it be practicable to have the letter ballot, in the case of these specifications, state briefly what the change was in the proposed specification from

the old specification, and why that change was proposed?

Mr. Waring: That will be taken care of in the letter ballot in the usual way, by printing the old specification along with the proposed revision, so that direct comparisons can be made.

Mr. Ayers: That takes a good deal of time and, to a person who has not made a study of the subject, the reason for the change is oftentimes not known. I was wondering whether it would not perhaps save some printing and clarify the subject, if the letter ballot should be confined particularly to the change from the old specification and that change was made.

Mr. Waring: There is no doubt that would be excellent information and if it meets with the approval of the members and they will authorize the committee to prepare that statement, we will be glad to do it.

Mr. Ayers: I make a motion that the committee be instructed to do that in submitting their report to letter ballot.

(The motion was duly seconded and carried.)

H. F. Bentley (C. & N. W.): I notice that the Rubber Association is co-operating with the committee in regard to specifications and I was wondering why the American Welding Society should not be called upon to do the same in working up specifications for welding wire. I had occasion to talk before some of the members of the American Welding Society the other day and brought up the question of specifications for welding wire. I would suggest that they be asked to co-operate with this Association.

A large number of driving axle failures have probably been charged up to the kind of steel in the axle. We were having so much trouble that we made a careful study and found, by etching the broken parts, an original check had been made in the bearing of the axle by a pointed, diamond-shaped tool. Subsequent operations on this bearing, consisting of rolling the bearing to a smooth finish, had covered up those grooves made by the pointed tool and to all appearance we had an excellent finish. We had the assistance of Dr. Howard, engineer physicist of the Interstate Commerce Commission who proved to us conclusively that the initial start of the fractures on the majority of these axles was not due to the quality of the steel but to the impression left by a sharp-pointed tool in the roughing cut.

E. E. Chapman (Santa Fe): With regard to the effect of sharp tools in causing fractures, we have found by a great many investigations that failures are directly chargeable to this cause rather than to defective material. Also on certain classes of engines we find that it is a question of the life of the axles. When they become from seven to nine years old, we have a good many failures.

G. W. Rink (C. of N. J.): The question of heat treated axles and crank pins has not been fully settled yet. We recently had 25 heavy Mikado locomotives built with heat treated axles, crank pins and so forth, and I was much surprised to learn that those engaged in doing the heat treating did not recommend heat treated material for that purpose. They predicted all kinds of calamities, stating that in the very near future, we would have broken axles. Personally, I am a believer in open hearth steel thoroughly annealed but this time we strayed from the beaten path and thought we would get something a little better. As I stated before, however, the people who were doing the heat treating did not think as much of heat treated steel for axles and crank pins as they did of the annealed steel.

Several of these axles broke during the hammer test and fractured clean through, similar to a chrome vanadium shaft that I saw on a big hoisting engine some years

This hoisting engine had a 17-in. shaft which was in service only about six months when it failed through the center. This shaft was made of chrome vanadium steel, but a 40-point carbon shaft, put in to replace it has been running for the last ten years without any signs of deterioration. I presume that is right in line with the argument that sooner or later we will experience trouble with these axles.

W. F. Kiesel: We have used a large number of heat-treated axles, crank pins, and other parts, and naturally, made a study to find where the difficulties lie. Segregating is very bad, and, as indicated before, if you have a nick or a sharp corner or anything of that kind you are almost certain to start a detailed fracture, but if your chemistry is right, you have no segregation. If you are careful to have nearly uniform sections with large radii at shoulders, the heat treated axle does very well and gives you the benefit of heat treatment. I remember one case where we had axles with the radius between the wheel seat and the body of the axle not clearly defined on the chart. Some of the radii seemed about $\frac{1}{4}$ -in. and fractures started at these points. After we increased the radius to an inch and a half the fractures ceased. Furthermore it is a good thing to be sure that all segregation is eliminated by drilling a hole through the center of the axle, or a crank pin whichever it may be. This will show if there are any internal checks, rolling imperfections, or checks in the billet, which will be accentuated by heat treatment.

Mr. Brazier: I would like to digress a little, if I might, from the report. There is nothing on a railroad that gives as much trouble today as bursting of airhose. You cannot judge a man's physical condition by the clothes he has on; he may have a very poor heart covered up with a nice suit of clothes. Neither can you judge the airhose by its outward appearance. Years ago we used to have a label showing the dates of application so as to give an idea how long hose had been in service. I have endeavored through the committee and through the secretary to have this question brought up because there are quite a number of railroad officials who think that we should have a time limit on hose. A hose that has been in service four or five years, deteriorates. When you put on the air pressure, you do not know what minute the hose will burst. We have a rule on our railroad that we take from passenger service all airbrake hose after it has been in service one year. It is then put in freight service, our rules used to be for two or three years) and finally scrapped. We dare not run the risk of longer service, but today I do not know how we are going to tell how long a hose has been in service, or what its condition is unless we go back to the use of a label, showing the date of application. Personally I can see no harm in going back to the old way of putting on the dates of application so you will have something to go by in judging how long an airhose has been in service.

Chairman Tollerton: I would like particularly to hear from the engineers of tests. They are vitally interested in these discussions. After specifications are adopted and after the work of this committee has finally received the approval of the railroads we do not want engineers of tests to tell the purchasing departments that the specifications are no good. If you have any criticisms now is the time to discuss them and we would like to hear from everyone.

Mr. Fuller: I do not know of any subject that is more important today than the subject of steel. My friend Brazier got off on hose. I think steel is more important.

We are using heat treated chrome vanadium and other grades of steel. We are buying the best that the steel

makers can make and we are having more trouble today than we had with iron. It seems to me that the steel makers should at least give the purchasers of steel some information as to how their steel should be handled. You buy billets in cold weather and in warm weather take them in the blacksmith's shop and work them, you get indifferent results. The manufacturers will tell you that you should not work certain steel until the frost is taken out of it—after you have had your trouble. Now, if it is true that certain alloys of steel cannot be stored outdoors in cold weather and should not be put in the blacksmith's shop furnace or fire without certain "decent" treatment as they call it, I think we should have the information. We are having, and so are other roads having, an epidemic of broken crank pins. We thought a goodly amount of it was due to punishment in the shop in turning the pins out and leaving toolmarks, but we found some that showed no indication of tool marks.

It seems to me that this Association, with the help of the steelmakers, can help the railroads and each other if what can be done with certain kinds of heat treated steel is made plain.

If we have any steel representatives here I would like to hear from them. We have a condition right now of billets that look like an oak plank, split on the ends and on the side with cracks $1\frac{1}{2}$ in. in depth. They were not split when shipped because no steel maker would ship a carload of billets with the ends checked. I think that the steel maker should come to our rescue and tell us what we can do with their steel.

C. E. Chambers (C. of N. J.): Mr. Fuller is placing the steelmakers in a very embarrassing position. I will tell you how I would handle that matter if I had any trouble in regard to steel. I would get in touch with the manufacturer who made the steel and thresh it out with him. He might be more willing to talk across a desk than to get up and discuss the matter before the convention.

Mr. Fuller: I want to apologize to the steelmakers if I have been taken wrongly. I appreciate that the steelmakers are doing, possibly, all they can. We could take this matter up with them and see if some change could be made so that these conditions would be avoided. However, I still believe that if the steelmakers were here, they could tell us of certain abuses to be avoided in handling steel.

G. W. Rink (C. of N. J.): I would like to have an expression from the convention as to what is considered the best metal for Walschart valve gear links, wrought iron case hardened, or mild steel case hardened. No doubt some of our members have had experience with both metals and I would like to know what the percentages of failures are with the various kinds of metal.

Prof. Endsley (University of Pittsburgh): With regard to some comments by Mr. Brazier, I will say that some tests were run a few years ago at Purdue University which partly demonstrated, at least, that the age of the hose was worth more than its appearance in determining whether it was a good hose or not. Of course there were some exceptions to the rule in these tests, but the general average of the tests was in favor of the age of the hose determining its condition.

In regard to tool marks left in the rough turned axle, either from a sharp tool or a torn place due to a heavy cut, these can never be rolled out. Any rolling of the metal causes a compression longitudinally in the axle and this longitudinal compression causes a tension on the bottom of any of these checks, increasing the possibility of failure at that point.

In some vibratory tests which I have conducted, I found that a mere scratch upon the polished surface will influence the life in vibrating this metal. In reversal of stress,

and that is what an axle is subject to, these imperfections, whether rolled out or not, are bound to produce failures.

With regard to co-operation between the steel maker and the users of steel, I am confident, that this should be close. They should co-operate; the manufacturers should tell the temperature at which a given steel should be worked and the users should follow these instructions closely. It is a known fact that the temperature at which steel is worked has a large bearing upon the service which will be obtained.

Mr Waring: The standard label does show the date when the hose was made so that the age of the hose can be determined from the label.

The date of application, however, is not given.

Your committee will be glad to act on the suggestion that was made to co-operate, if possible, with the American Welding Society in connection with the specifications for welding wire.

Your committee also wanted to call attention to the fact that in presenting these specifications for paints, and paint materials your committee is of the same opinion that such specifications should not be standardized. They should be presented as recommended practice because conditions vary in different parts of the country on different railroads and it is nearly always necessary for the individual railroad to prepare specifications for paint. These specifications are submitted merely as a guide and recommended practice.

Your committee wishes you particularly to give careful attention to the proposed specifications for carbon steel castings for railroad use and the committee would be glad to have any comments or criticisms on these specifications sent in as soon as you can after the convention.

T. H. Goodnow (C. & N. W.): I wish to refer to the committee's report where they refer to a "revision of specifications for lumber" in connection with which they are apparently undecided as to whether any action is necessary at this time. I believe that the specifications need revision and my opinion is based on the recent experiences we have had in trying to harmonize the grade wording under the present specifications with the various lumber associations. If the committee does undertake the revision of the lumber specifications in connection with representatives of the purchases and stores department, I feel that there should be co-operation through some channel of the A. R. A. and the various lumber interests to bring about these revisions. In this way the wording of the grading that is used in our specifications will be such that we can buy lumber and buy it intelligently. At the same time there will not be this constant question arising as to what the wording means. No. 1 may mean one thing in the northern part of the country and may mean another thing in another section.

With regard to Mr. Brazier's remarks about the label, age is not to be depended upon entirely for the removal of rubber hose. Some very careful investigations and tests were made some years ago, showing that after all, you have to decide upon the removal of hose from its appearance at the time it is being inspected.

The secretary calls attention to the fact that at the time the badge was changed the Train Brake and Signal Committee set up the soap suds test to be used as the determining factor in the removal of hose.

Mr. Fuller: I do not want to do all the talking, but Mr. Goodnow, I think, is absolutely correct when he says that the specification for lumber should be worked out with the lumber dealer. We find it is almost impossible to buy lumber under car specifications, due to the fact that the lumber associations keep changing their grade of lumber. That is especially true on the western coast and there is no use in our getting up a set of specifications and then,

when we want to buy lumber, we cannot buy it without paying exorbitant prices. I think it will save time and help the railroads more if we will co-operate with the lumber associations in making up the specifications for lumber.

Chairman Tollerton: The secretary advises that Mr. Hoover, secretary of the Department of Commerce, is working with the American Railway Association along the lines suggested by Mr. Fuller and Mr. Goodnow.

Before calling for action on the committee's report, there is a motion before you, made by Mr. Ayres and duly seconded, that in sending out the letter ballot for the approval of the report, the changes made in the report be printed and issued with the letter ballot. Are you ready for the question?

(The question was duly put to a vote and carried.)

Chairman Tollerton: A motion is in order that the report be accepted, and the recommendations contained in the report submitted to letter ballot.

(This motion was duly put and carried.)

C. E. Chambers: The committee would like to submit for the approval of the Convention, the following telegram:

"Atlantic City, June 19, 1922.

Mrs. W. C. Arp,
Terre Haute, Indiana.

Word just received of death of Mr. Arp. Master Car Builders and Master Mechanics Division of American Railway Association in convention here extend to you their deepest sympathy in your sad bereavement.

W. J. Tollerton, Chairman,
Mechanical Division."

Mr. Fuller: I move that the message be sent.

(Motion seconded and carried.)

Mr. Chambers: The Committee on Resolutions will offer a resolution that the subject of wheels be reopened, as the particular part of the subject which we have in view is vital in the locomotive question. Also the further use of steel wheels when removed from engines in local service to be applied to yard service engines in order to get maximum wear before scrapping should be discussed.

O. C. Cromwell (B. & O.): The committee made a report last week relative to reducing the limited wear on steel tires for yard service. As you know now, the limit of wear is $\frac{1}{4}$ in. above the limit of the rail groove. That ordinarily gives $1\frac{1}{2}$ in. of metal between the spread and the nearest point of the critical line. That limit was established quite a number of years ago before we had much experience in the performance of rolled steel wheels. It was predicated largely upon experience gained through the use of steel tired wheels.

Many improvements have been made in railroad steel wheels and I think your present cuts show that you have a thickness of $1\frac{3}{8}$ in. on rolled steel wheels as against $1\frac{1}{2}$ in. on wheels with a straight bore. That figure was originally established because there was not a definite knowledge as to the inside contour under the rim, but we have established a standard section of tread and that has been used for some time. Your committee has had before it for some time the question of reducing this limit, bringing it down to $1\frac{1}{8}$ in for tenders in switching service.

Prior to these limits being incorporated in the I. C. C. rules some roads had had experience in running wheels in light service and found it could be done with safety. The committee would like to present this matter now to the association and would like to have some discussion as to the point of reducing that wear on tender wheels in switching service.

Chairman Tollerton: I do not believe there was any second to the motion.

Mr. Giles: I will second it.

(*The motion was put and carried.*)

H. C. Oviatt (N. Y. N. H. & H.): It does seem to me this is a question which ought to be given considerable thought before any final action is taken. The possibility and danger of getting such wheels mixed up and applied to the wrong class of equipment seems to me important. Where wheels of that description are turned down for switching service they are liable to get under passenger equipment, which might be dangerous. I want to inject that thought before any final action may be taken.

Mr. Giles: I will state for the benefit of Mr. Oviatt and the members of the association that this has been our practice for eight or ten years and we have had no trouble in keeping the wheels apart and we do not get them mixed. It is a perfectly feasible proposition.

Mr. Ripley: In further answer to Mr. Oviatt's question, I wish to state that the committee felt that the switching service should be used for the test inasmuch as it would be possible to observe the results more readily than in road service, as well as there being less chance of accident in case of flange failure. The switching engines operate over sharper curves and if there is any tendency to flange weakness it should develop in this service.

There is another feature in regard to comparing the scrapping limits of steel tired wheels and forged steel wheels not mentioned in the former discussion. That is the fact that the steel tires are shrunk on the center which means an initial strain tending to increase breakage. The best metal in the rolled steel wheel is that on the inside of the rim, as the pressure of the rolls comes directly at this point.

Mr. Chambers: I think that this is a vital question. Every railroad man is constantly being advised to adopt every means of bringing about economical operation. That is something that must be considered and if we can put a used wheel on some locomotive tender in the yard and get a year or eighteen months of additional service out of it we are not justified in scrapping it.

Mr. Giles: It appears to me that the secretary in calling attention to the consideration that was given this matter by the General Committee, should refer to the understanding that the committee had with Mr. Pack that the question would not be discussed at this meeting of the association.

Mr. Chambers: I might say that on our road for years, we put some of these wheels which had reached the limit for heavier passenger car service, in lighter passenger service and never had any accidents.

Mr. Ripley: I may mention that your committee wishes to be conservative on this entire question. They first ran laboratory tests and next studied flange failures. Both of these indicated distinct possibilities of reducing the scrapping limit on all railroad steel wheels they would first reduce the limit on switch engines in order to get a service test. They feel and hope that this test will prove beyond question that the limit can be reduced on all wheels. The railroads will then be able to make a great saving.

A. G. Pack (Chief Inspector, Bureau of Locomotive Inspection, I. C. C.): I do not know whether it is permissible for me to make any remarks on this matter, but I want to say that I have a very high regard for the opinion of this organization as an association and am perfectly willing to go along with this Association in its recommended and standard practices. I am also ready to meet and discuss matters with your representatives. I am, however, very much averse to adopting any standards in switching service and also road service wherein the parts are not easily interchangeable.

Again, I believe that stresses on the flanges in yard serv-

ice are equally as great, if not greater, due to rough track and heavy curves and many turn-outs, frogs, etc., than on road locomotives.

In comparing the locomotives on the railroads in the United States—more than 70,000—I find that it is practically impossible now to keep many of them legally within the requirements of the rules and I fear very seriously that if you adopt a standard for switching locomotives it will be put into use in connection with the road service. If it is an unsafe practice in road service that would certainly compel the Bureau of Locomotive Inspection to take action we are not desirous of taking; that is, in enforcing the punitive side of the law.

If after due consideration by this Association, you are willing to go on record in your usual careful way and say that the reduction of the metal on the forged steel wheel is perfectly safe, I will go along with you, but I do not want you to ask me to agree to something where life and limb is at stake and there is property that may be damaged. We find $\frac{3}{8}$ in. of lateral motion on cross-heads and $\frac{1}{4}$ in. of vertical motion. We have looked into many of these cases and that is our experience. I have no doubt you will admit that is too much. On the ground of safety to the public, of course, you will give this subject very careful consideration and I want to assure you again I am willing to go as far as this organization, as such, is willing to recommend. (On motion the subject was closed.)

(*After the election of officers, noted elsewhere, the meeting adjourned.*)

Chairman Tollerton on the Work of the Mechanical Division

CHAIRMAN TOLLERTON, in turning the meeting over to his successor yesterday, made the following comments:

"In turning over the gavel to my worthy successor, probably a few words based on observations I have made in the two years I have had the honor of presiding over this organization may not be out of the way. I offer them merely as a suggestion.

The heads of the car and locomotive departments come to these conventions for the benefits they receive from the discussions in the convention and the education from the exhibits. I have tried to encourage a free discussion of the papers to the best of my ability, particularly by the younger men of the Association. I am afraid that their failure to discuss the papers is due to the fact that they may think that the older officials know more about the subjects under discussion than they do, and they hesitate to enter the discussions. We appreciate that these younger men will be the older railroad officials in a few years from now, and therefore I would like to offer this suggestion to the motive power representatives here—that in future conventions when they send their staffs to the convention, that they charge them with familiarizing themselves with some of the subjects coming up for discussion.

These reports of the committees are invariably in the hands of the members from a month to six weeks ahead of the convention. You can all familiarize yourselves with the committee reports in that time, and the younger men can think of what they are going to say, and if they desire they can write it down if necessary. I would like to see very much more activity in the discussions by the younger members, because it is on their shoulders that the burden of carrying on the activities of this Association for years to come will fall. I want to thank you one and all for the assistance and the help you have always given me.



F. D. Reed
Vice-Chairman



H. E. Ray
Chairman



J. P. Murphy
Secretary



W. J. Farrell
Assistant Secretary

American Railroad Assn.—Section VI—Purchases and Stores

Inspiring Address by Elisha Lee; Reports on Stores Department Book of Rules and Classification of Material

CHAIRMAN H. B. RAY called the meeting to order at 9:15 a.m.

A letter of regret was read from R. H. Aishton, president of the American Railway Association, who was unable to attend the convention, and from W. G. Besler, president of the Central Railroad of New Jersey, who is vice-president of the American Railway Association and the member of the executive committee assigned to advise with Division VI.

The following committees were appointed:

Resolutions: J. H. Wallace, W. H. Deal, and J. A. Deary.

Memorials: H. A. Anderson, C. H. Thomas of the Southern Pacific, and J. A. Stewart of the N. Y. O. & W.

Address by Elisha Lee

Chairman Ray: There are many of us who have had the pleasure and the value of Mr. Lee's personal acquaintance, and those who have not been so lucky have known him by reputation—what he has done as a railroad builder and operator. So it is going to be like listening to an old friend, and one who talks a language we can understand.

I cannot refrain from recalling at this time the first time I ever heard of Mr. Lee. It was not so many years ago, either, and I confess it with some embarrassment; but it was in the dark days of railroading, when it was difficult to foresee what was going to happen to the railroads. Along with a lot of other small fry I was in a

certain office waiting for instructions from our superiors as to what to do under certain contingencies. We began to receive telegrams indicating that the entire matter was in the hands of Elisha Lee. He was in Washington carrying all of the burden of the railroads in the country and trying to bring order out of chaotic conditions and was thus holding my job and your job. As the matter progressed I could see in some small way at that distance just how ably the matter had been handled and I said "Surely I would like to see that man." But I never had the opportunity then. However, when we came to choosing a man to come here and talk to us, I felt I would like to have him. I take great pleasure in introducing Elisha Lee, vice-president of the Pennsylvania.

Elisha Lee: The work of Division VI since it started, has been watched by your officers from the highest down and I want to bring to you a word of congratulation and thanks for the work that you have done. In these days, you know, when a railroad man talks, he talks or should talk with a reasonable amount of discretion and I have found it of great help in keeping myself straight and not making remarks that were not intended, to stick pretty close to my notes.

Since receiving the highly appreciative invitation which brought me here today I have supplemented my previous general knowledge of the subject of purchasing and stores by reading a little more fully of the activities of that branch of a railroad which you represent. I can



W. A. Hopkins



H. C. Pearce



E. W. Thornley



S. B. Curtis

Members of General Committee, Div. VI., Purchases and Stores, A. R. A.



E. N. Bender



E. A. Bushnell



H. H. Loughton



W. G. Phelps

Members of General Committee, Div. VI., Purchases and Stores, A. R. A.

... with the greatest sincerity, I have been deeply impressed. Statistics and figures of railroad purchasing read like the budget of a world power. They are truly stupendous and give a vivid idea of the immensity of the great enterprise in which we are all engaged. Normally, the railroads of America buy and consume about two billion dollars' worth of supplies annually, which exceeds the prewar cost of running our National Government. Current supplies on hand for all our railroads as shown in their reports to the Interstate Commerce Commission, represent upward of \$800,000,000 worth of property, the economical buying, time of delivery, and safekeeping of which are your particular duties and functions. These are, indeed, great responsibilities.

The general purchasing agent of the Pennsylvania, Samuel Porcher, recently analyzed the elements of ideal purchasing and stores work. Briefly he defined them to be first to obtain the right kind and quality of material for the specific purpose desired; second, to supply it at the right place, namely, where it is needed; third, to have it there at the right time when it is needed; fourth, to furnish it in the proper quantity; fifth, to have it accurately counted and receipted for; sixth, to have it properly stored and protected; seventh, to buy it for the least expenditure of money. What I wish to do, having brought Mr. Porcher's carefully thought-out definition to your attention, is to leave with you some further thoughts from the viewpoint of the executive officer responsible for the general results of operation.

In my position on the railroad as vice-president in charge of the Eastern Region, official responsibility embraces both the rendering of service satisfactory to the people and the production for the company's corporate purposes of a proper amount of net revenue. That net revenue, to be satisfactory, must be sufficient to meet my regional share of rentals and charges, the dividend upon our stock

and a proper margin for surplus. The purchasing and stores work of the Eastern Region and of the system as a whole has an important bearing upon the discharge of that responsibility. Railroadings is a public service. We all realize that fact and must keep it constantly before our eyes, but it is also a business carried on for the production of reasonable profits and the earning of a fair return upon invested capital.

In 1920 this country had the greatest boom in its history; in 1921 we had a smash that in its way was quite as spectacular. Thousands of mercantile and other business concerns went to the wall, and I venture to say that in at least 95 per cent of the cases the real trouble was some error in business judgment and management, namely, too big an inventory. Some of our railroads, too, were caught in 1921 with extremely undigested stocks of supplies. Therefore, I would say, from the viewpoint of the executive management responsible for general results, there is no more important duty resting upon the purchasing and stores officer of any railroad than that of keeping down stocks of all kinds to a minimum consistent with meeting proper and reasonable demands.

This necessity is threefold; first, to minimize the amount of capital at risk in stores; second, to reduce the interest loss on the idle capital; third, to keep the company in a position to cope promptly with changes in markets or general business conditions without incurring serious loss.

There may from time to time be a tendency on the part of officers in other departments than yours to order supplies without due consideration for the risk and waste in unnecessarily high stocks. This is not surprising, because quite often readily available supplies of material, which can be drawn on at any time that may be momentarily convenient, save a great deal of trouble to the man on the ground; sometimes it saves a great deal of hard thinking and planning. It then becomes your function and un-



J. G. Stuart



W. A. Summerhays



E. J. McVeigh



U. K. Hall

Members of General Committee, Div. VI., Purchases and Stores, A. R. A. (S. B. Wight missing)

doubted duty to step in and prevent such action and put back the responsibility for properly planning for the work of other departments where it belongs. Your responsibility, when further considered, is that of trustee for the public. Our railroads, in the trust and best sense, are owned by the people, both through the wide dissemination of stocks and bonds in the hands of individual holders and through that still broader distribution of ownership, which is brought about by the widespread holding of these securities on the part of the great fiduciary institutions of the people, notably the banks, savings funds, and insurance companies, in whose welfare and safety practically every citizen is directly or indirectly interested. We have in this way a genuine public ownership of the railroads in our country; that is, ownership by the public, a far better thing than ownership by the government, which in the end means by and for politics.

From the viewpoint of executive management it is helpful and clarifying to consider the materials and supplies of a railroad system as so much money in the process of being converted into transportation or facilities for service. Fuel and water are manufactured directly into service. Most other supplies go into facilities. Therefore, try to visualize to yourself the fact that what you are handling is money all the time, and couple this thought with the fundamental principle of business, that money should not ever be kept idle longer than is absolutely necessary. Therefore, other things being equal, the smaller the stocks that are carried and the shorter the time the material remains on hand, the better is the quality of the purchasing and stores work.

Let us consider just what this means. On our road as a whole, supplies on hand at any given time may be said to amount in value from \$60,000,000 upward. I am not prepared to express an opinion as to just what may be considered, an allowable maximum figure, that doubtless varies from time to time according to circumstances, but often the minimum of \$60,000,000 is equal to two years' dividends on our stock at our old rate of six per cent. A day's interest on that sum is \$10,000, enough to pay the wages of 2,000 or more men. The interest on the cost of material stocks of all railroads in the country would pay the wages of between 25,000 and 30,000 men. This item of inventory represents a large portion of our working capital and should be kept as nearly fluid as circumstances will permit, for the greater the turnover or the smaller working capital required to finance a year's purchases. There is of course, a word of caution due. If stocks are brought down too low, a point will be reached at which savings in the purchasing and stores work will begin to be overbalanced by added cost elsewhere, through inability to obtain material with reasonable promptness.

Besides your responsibility from the viewpoint of efficient operation, the influence of your work upon the prosperity of your country as a whole must not be forgotten. Railroads are the principal consumers of products of some of our most important basic industries, taking one-third or more of the country's steel production, some 30 per cent of its actual output. The list of articles, commodities and materials regularly bought by our purchasing department which is typical of the railroads in general, numbers about 200,000 separate items. Indeed there is scarcely any branch of production in which the railroads are not important consumers. Active buying by the railroads has always been one of the chief factors leading up to every period of prosperity which our country has experienced.

Perhaps you might be interested in a brief outline of the general organization of conducting purchasing and stores work for our system. Our organization is com-

paratively new, a little over two years old, and has had time to be tested. We have what we call a regional plan of operation. At system headquarters in Philadelphia, we have our staff of general executive and administrative officers with broad jurisdiction and responsibilities under the board of directors, for the production of results throughout the system as a whole and for the guidance of general policies in all departments. For the carrying out of the actual detail work of operation the system has been divided territorially into four regions, eastern, central, northwestern and southwestern with headquarters respectively at Philadelphia, Pittsburgh, Chicago and St. Louis. Each region is in charge of a vice-president generally responsible for the work of all departments in his territory. Regional vice-presidents are provided with staff officers, heading the various departments in the regions corresponding to the departmental organization of the systems administrative staff at Philadelphia. The latter may be likened in a military organization to the general headquarters of the Army, and the region to the sectors in which the actual work is subdivided for campaign purposes. The G. H. G. devises general plans and policies and secondly the regional staffs carry them out.

At Philadelphia we have two system officers, a general purchasing agent and a general supervisor of stores; each heading his own department and separately responsible for results, through working in the closest harmony with each other. Both report to the same system executive vice-president in charge of real estate purchases and stores.

In each region there are a purchasing agent and general storekeeper responsible to the regional vice-president for the performance of their duties and at the same time in constant touch with the general purchasing agent and general supervisor of stores for guidance as to policies and co-ordination of purchasing and stores work in all regions. Our Altoona Works, located at Altoona and Juniata, are also treated as a separate entity under the Chief of Motive Power, distinct from any of the four regions, with its own supply force.

We feel that our plan of organization of the purchasing and stores work provides that degree of decentralization of authority and responsibility which is so highly desirable in a large, complex business like our own, while at the same time, true co-operation between the region and general supervision exercised at system headquarters in Philadelphia, guard against such errors as competition between the regions for delivery, or inadvertent bidding against each other. The arrangement also gives us a valuable mechanism for distributing supplies between the four regions and the subdivisions, and provides a means for quickly equalizing conditions of surplus or scarcity which may arise at given points.

I am, indeed, happy to have had this opportunity of meeting so many officers of the stores and purchasing department of our great American railroads. The railroad management of the country think enough of the men in your branch of the service to trust you with the custody of not far from a billion dollars' worth of property, with an actual spending in active times of twice that sum. That is a pretty good guarantee of character for the men in charge of these very important departments of railroading. I wish to express to you my sincere thanks and appreciation for the honor which you have given me in permitting me to address you.

Chairman Ray: Mr. Lee, I wish I could adequately express my personal appreciation for your courtesy in coming here and giving us this wonderful talk. I know in doing so I voice the sentiments of all who have listened. Mr. Lee has told us what I think we all will appreciate

and that is the importance to railroad operation that purchases and stores bears to the general result, and it is our hope in this three-day session, which we propose to devote to real hard work, we will profit and go better prepared to handle business than we have been heretofore. I think that we ought to have a rising vote of thanks for Mr. Lee and if agreeable, I wish you would all rise.

Chairman Ray: I want to congratulate Mr. Farrell and the various committees for the good work they have done

this year. The percentage of attendance at the committee meetings was greater than ever before, and as a consequence the reports are exceptionally valuable.

Division VI is not so constituted that these reports are to be considered mandatory; they are recommendatory entirely, and should be handled and discussed as such.

Necessarily this discussion will bring out the real benefit which we are to derive, but that does not lessen the value of the reports.

Report of General Committee

The General Committee reviewed briefly the action taken since the meeting in June, 1921, which pertained mostly to the programs for 1921 and 1922. Practically all the reports approved by the Division at the business meeting in 1921 were approved in their entirety by the American Railway Association at its annual meeting. Objection was raised to the recommendation made in the report on material accounting that all material stocks should be carried in the accounts of the stores department, as it was felt that some roads would prefer to have a separate accounting

department. The Accounting Committee has included a further recommendation on this question in this year's report.

The Committee on Committees thought it advisable to extend the scope of the committee on Subject 4, Material Accounting, to include mechanical facilities; also Subject 15, Buildings and Structures, to include facilities. The committees on Subject 6, Cross-Ties, and Subject 13, Lumber, have been combined into one under Subject 13, the title of which has been changed to Forest Products.

IN ACCORDANCE WITH instructions from R. H. Aishton, president of the association, a meeting of all chairmen and secretaries of the various divisions and sections was held at New York on January 31, 1922. The purpose of the Advisory Council is to consider the elimination of duplication of effort among the various divisions and sections and ascertain in what subjects there may be contact, and a remedy for the situation.

The chairman and secretary attended this conference, and information is being compiled for submission at the next meeting of the Council. The chairman has appointed H. C. Pearce to represent Division VI—Purchases and Stores, on the Advisory Council.

In accordance with Section 4 (g) of the Rules of Order, the General Committee offers the names of the following members as candidates for the Committee on Nominations during the ensuing year:

F. A. Bushnell, Purchasing Agent, Great Northern Railway Co., St. Paul, Minn.

J. G. Stuart, General Storekeeper, Chicago, Burlington and Quincy Railroad, Chicago, Ill.

W. C. Bower, Assistant Manager, Purchases and Stores, New York Central Lines, New York City.

H. P. McQuilkin, General Storekeeper, Baltimore and Ohio Railroad, Baltimore, Md.

G. A. Secor, General Storekeeper, Chicago and Alton Railroad, Bloomington, Ill.

The report is signed by H. E. Ray (chairman), Atchison, Topeka & Santa Fe; F. D. Reed (vice-chairman), Chicago, Rock Island & Pacific; J. P. Murphy, New York Central; E. N. Bender, Canadian Pacific; F. A. Bushnell, Great Northern; H. H. Laughlin, Southern Railway; W. G. Phelps, Pennsylvania System; J. G. Stuart, Chicago, Burlington & Quincy; W. A. Summerhays, Illinois Central; U. K. Hall, Union Pacific; W. A. Hopkins, Missouri Pacific; S. B. Wight, New York Central; E. J. McVeigh, Grand Trunk; H. C. Pearce, Chesapeake & Ohio; E. W. Thornley, Baltimore & Ohio, and D. C. Curtis, Chicago, Milwaukee & St. Paul.

(The report was adopted as read.)

Stores Department Book of Rules

YOUR COMMITTEE RESPECTFULLY submits the following report: A questionnaire, as follows, was prepared and sent to the member railroads, from which 61 replies were received:

- (1) Use of a net ton of 2,000 lb. in all transactions.
- (2) Discontinue the use of dozen and gross in quotations and calculations, basing the quantities on ten or multiples of ten.
- (3) Avoid card system. What experience have you had in ordering material, receiving material, or in keeping a stock record by use of the card system? Stock book. Please submit sample of your stock records in use in the general storekeeper's office, general storekeepers and local depots.
- (4) Avoid the metric system of weight and measures in place of the present system.

Net Ton

To the proposal of the discontinuance of the use of the net ton of 2,000 lb. in all transactions, 36 of 61 replies were, as agreed to in the selection. The committee points out the fact that the standard weight for the net ton is the

basis of reporting and sales of scrap, whereas certain commodities, such as rails, fuel, etc., are requisitioned and purchased, and accounted for upon a gross ton basis of 2,240 lb. requiring adjustment of carrying or disbursing charges in the stores accounts.

Therefore, we recommend for favorable consideration of the proper division of the American Railway Association, that as the tariffs are revised, they be based upon the net ton of 2,000 lb. on all commodities purchased by the ton.

Unit of Dozen and Gross

To the question as to the discontinuance of the use of dozens and gross in quotations and calculations, basing the quantities on (10) or multiples of ten, the replies were 43 favorable and 18 unfavorable.

The committee is investigating this matter further in connection with the National Association of Purchasing Agents with a view of bringing about the use of ten or multiples of ten instead of dozen or gross.

The report brings up two important questions that affect all departments; the use of the metric system and of the net ton in all transactions. Closely related to these is another topic, the discontinuance of the dozen and gross as units and basing all quantities on multiples of ten.

There are many active advocates of the metric system in this country and bills which seek to make this system compulsory are continually being introduced in Congress. Some people believe that the most satisfactory results would be obtained with a compromise system of weights and measures, using a decimal system, but based on a new unit related to the English units. As for in-

stance, 40 in., which would be approximately the same as the meter.

It is interesting to note that while the proposal to use units of 10 is in accordance with metric practice, the net ton of 2,000 lb. is a move away from that system, the metric ton being approximately the same as the long ton, while pro-metric agitation in this country does not seem likely to succeed for some time, the railroads will be directly affected by any action that is taken regarding weights and measures, and it is a good thing to have the question brought before the association occasionally to determine the sentiment among the members.

Visible Card System

To the question as to what experience members of the association have had with the use of the visible card systems for stock records, replies were received from 60 railroads, of which 11 were "yes," and 49 reported no experience.

The expressions received from the railroads on this question would seem to strongly endorse the use of a stock book, rather than the use of a stock card.

The canvass of the railroads using the stock books develops that out of 57 replies received, 29 are using the A. R. A. standard stock record, or the standard stock record with slight modifications, and 28 using stock books other than American Railway Association.

The committee wishes to further emphasize the importance of the stock book and recommends the use of the American Railway Association stock book, which by reason of its simplicity can be adopted either in detail, or with slight modifications, to meet practically every condition in securing accurate knowledge of the stocks of material on hand.

Metric System

To the question with reference to the use of the metric system of weights and measures, replies from 61 railroads were received, of which 8 were favorable, 12 favorable if the system were adopted by the U. S. Government, and 41 opposed.

The committee would not recommend any definite action on this question at this time, but would suggest that inasmuch as the question of the use of the metric system of weights and measures in place of our present system is under consideration by a number of manufacturing and commercial organizations, and if approved by the United States Government, the members of the division give consideration to the question in order that they may be prepared to intelligently discuss the matter if any future action is deemed desirable.

Comparison of Stocks

It has come to the attention of the committee that there is no means of comparing the amount of stock on hand, or the cost of operation of the stores department of one road with another, and it is recommended that a special committee be appointed to investigate and report on this subject.

The report is signed by J. W. Gerber, (Chairman), Southern Railway; W. E. Brady, Aitchison, Topeka and Santa Fe; F. N. Dobbs, Southern Pacific; C. J. Irwin, Gu'l, Colorado and Santa Fe; R. D. Long, Chicago, Burlington and Quincy; H. P. McQuilkin, Baltimore and Ohio; W. S. Morehead, Illinois Central; C. D. Young, Pennsylvania System; J. G. Stuart (Chairman Ex-Officio), Chicago, Burlington and Quincy.

Discussion

J. W. Gerber, chairman of the committee, who presented the report, stated that the committee realized that the adoption of the short ton—2,000 lb.—will require some time. It is out of date to have two tons, one at 2,240 lb. and the other at 2,000. The same annoyance arises when

you consider the dozen and gross. Many quotations are based on these units; many of the articles are billed singly and packed singly instead of by dozens or grosses. The same is true of 100. Again, while railroads might buy by the dozen or by the gross, yet they never issue the material in that form. Requisitions from foremen are always for 10, 50, 20 or 1. As to the metric system, he believed the division should also take some decided action in the way of education.

J. G. Stuart, of the C. B. & Q., stated his experience was directly opposite to that of Mr. Gerber. He found too many orders using the dozen. The C. B. & Q. has gone a long way as suggested in the matter of prices. Generally speaking, the road is trying to get away from the dozen and gross units.

A. W. Munster (Boston & Maine) suggested that this matter be taken up through the Hardware Manufacturers' Committee as it is mostly in hardware that the dozen and gross are encountered.

W. A. Hopkins, of the Missouri Pacific, considered changing to multiples of 10 as satisfactory but advocated that the consideration of the metric system be left to the engineering and mechanical departments.

H. C. Pearce (C. & Q.) stated that he felt there is no reason whatever why railroads should not adopt 2000 lb. as a ton. As regards the units of dozen and gross the purchasing officer has only to make his contracts on the basis of 100. In the matter of the metric system, Mr. Pearce was not in favor of making any changes. He thought the question of the list discount arrangement is more important and should be taken up. Would like to see this committee instructed to investigate thoroughly the discontinuance of the list and discount method of price determination.

T. J. Frier (Wabash) thought the division should be a little slow about doing away with the dozen and the gross and that it would be well to go to the American Iron and Steel Institute and persuade them to co-operate in getting the 2,000-lb. ton adopted.

N. M. Rice (N. Y. N. H. & H.) stated that the use of the dozen and gross is a long established commercial practice. He did not believe the division should interfere.

F. D. Reed (C. R. I. & P.) expressed the opinion that the 2,000-lb. ton should be used as the unit and that that part of the committee's report should be accepted and adopted as Recommended Practice of Section VI. As to the dozen and gross, he thought that part of the report should be continued and the committee continued for an-

other year. With reference to the visible card system, he believed the division should adopt that section of the report and recommend as Standard Practice the use on all railroads of a standard stock book of the type which has been in use on many railroads and was adopted as Recommended Practice by the Railroad Administration. As to the metric system, he felt the division should not do any-

thing until the government comes out in favor of the metric system. Mr. Reed moved that the report of the committee be accepted and the committee continued with instructions to follow up with the National Association of Credit Men and other national organizations the question of units, dozens and gross. The motion of Mr. Reed was adopted.

Committee on Classification of Material

The report of the committee includes a complete revision of the standard material classification which lists practically every article used in all the departments of the railroads, and is so voluminous that it cannot be reproduced in full. The standard store department classification is in use on a very large number of roads, and for that reason changes in the system require the most careful consideration.

The principal change has been the elimination of the main or departmental subdivisions, thus

permitting each material to be placed in a single class, irrespective of where it is used. Many additions have been made to the classification, and with the very complete index it should be more useful than ever before.

Over 4,000 items are included in the classification, which gives some indication of the amount of work involved in the revision which the committee has made. It is a big job well done, and reflects credit on the men who carried it out and on the Purchases and Stores Division.

THE need for revision of the material classification to meet modern conditions is recognized. Many changes have been made in standards and additions of units to maintenance and operating materials not contemplated in the original report.

Replies to a canvass made indicated a general opinion that the work should be done at this time. Consideration was also given to the fact that there is a demand for a large number of copies, and that the original is now out of print.

In making the report—reclassifying and adding to the original, as indicated by asterisks in the detail—the committee was guided to a considerable extent by recommendations received from various members of the association.

The elimination of the four grand headings, indicating the kind of operation or maintenance for which the material classes listed thereunder were used, was for the purpose of providing a better arrangement. The following changes in classification are recommended by the committee:

PRESENT CLASS	PROPOSED CHANGE
Class No.	Class No.
1-A. Frogs, switches and crossings, and parts of same.	5-B. Cross ties, treated.
1-B. Track fastenings, track bolts, spikes, etc.	5-C. Cross ties, untreated.
1-C. Track tools, all kinds, miscellaneous track material and wire fencing.	6. Iron bridges, turntables and structural steel, all kinds.
1-D. Motor, hand, push and velocipede cars, and parts of same.	7. Ballast, all kinds, including rip-rap.
2-A. Interlocking and signal material.	8-A. Rail, new.
2-B. Telegraph and telephone material.	8-B. Rail, second hand, except scrap.
3. Building and paving brick, cement, lime, stone, cast iron water and sewer pipe, roofing tile and slate, prepared roofing, all kinds, for buildings, sewer and drain tile, etc.	9-A. Fuel and water station material, and scales and parts.
4-A. Bridge ties.	9-B. Elevators, and coal and ore handling and conveying machinery.
4-B. Lumber, bridge and line piling posts, shingles, and manufactured lumber for bridges and buildings.	9-C. Steam derricks, steam shovels, steam ditchers, pile drivers and other such portable equipment used in roadway work and special material for same.
5-A. Switch ties, treated or untreated.	10. Chemicals for timber treatment.
	11. Bolts, nuts, washers, rivets, lag screws, pins and studs.
	12. Springs, helical and elliptical, all kinds, for locomotives and cars.
	13-A. Flues for locomotive and stationary boilers, arch tubes, dry pipes, all kinds.
	13-B. Arch brick for locomotives.
	14. Brass, copper, and steel tubing, copper ferrules, soft metals in bars, pigs or sheets.
	15. Bar iron and steel, spring steel, tool steel, shaped steel, chain, except light coil, wire netting and sheet steel under 13 gauge.
	16. Boiler, firebox, tank and sheet steel. No. 13 gauge and heavier, all kinds.
	17. Heavy forgings for locomotives, such as crank pins, piston rods, quadrants and levers, motion links, valve yokes, etc.
	13-A. Flues or tubes for locomotive and stationary boilers, dry pipes, all kinds, superheater material and firebox syphons.
	13-B. No change.
	14. No change.
	15. Bar iron and steel, spring steel, tool steel, steel shapes, sheet iron and steel under $\frac{3}{16}$ " wire netting and chain, except light coil.
	16. Boiler, firebox, tank and sheet iron and steel $\frac{3}{16}$ " and heavier, all kinds.
	17. Forgings and pressed steel parts for locomotives, such as crank pins, piston rods, quadrants and levers, motion links, valve yokes, pressed steel gate side bars, front ends, cylinder and steam chest casing, etc.
	7. No change.
	8-A. No change.
	8-B. No change.
	9-A. No change.
	9-B. No change.
	9-C. No change.
	10. No change.
	11. No change.
	12. No change.
	1-A. No change.
	1-B. No change.
	1-C. Track and roadway tools, all kinds, miscellaneous track material and wire fencing.
	1-D. No change.
	2-A. No change.
	2-B. No change.
	3. No change.
	4. Lumber, bridge and building, piling, posts, bridge ties, shingles, and manufactured lumber for bridges and buildings.
	5 A. No change.

PRESENT CLASS	PROPOSED CHANGE	PRESENT CLASS	PROPOSED CHANGE
Class No. 18. Car forgings, iron and steel, for passenger and freight cars.	Class No. 18. Car forgings, iron and steel, and fabricated or shaped steel, for passenger and freight cars.	Class No. 33. Trucks for equipment, locomotives and cars.	Class No. 33. No change.
19. Locomotive castings, including gray iron, malleable and steel, rough and finished; also cylinders, rough and finished.	19. Locomotive castings, including gray iron, malleable and steel, rough and finished; also cylinders and driving wheel centers, rough and finished.	34. Material in process of manufacture.	34. No change.
20. Car castings, including gray iron, malleable and steel, all kinds, brake beams and parts, couplers and parts, metal bolsters, side frames and metal car roofs.	20. No change.	35. Floating equipment material, all special material peculiar to floating equipment. 36-A. Locomotive, train and station supplies, including tinware, all kinds; lanterns, train, switch, and other signal lamps and parts; locomotive and caboose tool equipment, such as jacks, shovels, wrecking frogs, train chains, etc.; baggage and warehouse trucks, caboose and station stoves and parts, ticket cases, tool handles, and all kinds of woodenware.	35. No change. 36-A. Locomotive, train and station supplies, including tinware, all kinds; lanterns, train, switch, and other signal lamps and parts; locomotive and caboose tool equipment, such as shovels, wrecking frogs, train chains, etc.; baggage and warehouse truck, caboose and station stoves and parts, ticket cases, and all kinds of woodenware.
21. Rough and finished brass castings and journal bearings.	21. No change.	36-B. Grain doors, grain and coal door lumber, and coopering material for grain and flour cars.	36-B. No change.
22. Air brake material, all kinds, for locomotives, passenger and freight cars, except hose, but including air pump and parts.	22. Air brake material, all kinds, for locomotives, passenger and freight cars.	37. Oil house material, all kinds, including lubricating oils and grease, illuminating oils, boiler compound, all kinds, and waste, all kinds.	37. No change.
23. Mechanical appliances for locomotives, such as injectors, lubricators, bell ringers, sanders, pop valves, air and steam gauges, whistles, boiler checks and parts, water gauge and lubricator glasses, and speed recorders.	23-A. Standard mechanical appliances for locomotives, such as injectors, lubricators, bell ringers, sanders, pop valves, air and steam gauges, whistles, boiler checks and parts, water gauge and lubricator glasses, and speed recorders. 23-B. Special mechanical appliances for locomotives, such as stokers, power reverse, patented valve gear, coal pushers, boosters, feed water heaters.	38. Ice, sawdust, hay and straw for ice houses.	38. No change.
24. Passenger car trimmings, all kinds, including oil and gas lamps and fixtures, steam heat fixtures and fittings, except steam hose, mail car, coach and chair car seat fixtures, including upholstering material of all kinds, such as carpet, linoleum, rubber tiling and matting for cars and buildings.	24. Passenger car trimmings, all kinds, including oil and gas lamps and fixtures, steam heat fixtures and fittings, mail car, coach and chair car fixtures, including upholstering material of all kinds, such as carpet, linoleum, rubber tiling and matting for cars and buildings.	39. Fuel, locomotive, including coal and wood and fuel oil for locomotive use only.	39. No change.
25. Electric material for electric and steam locomotives.	25-A. Electric material peculiar to electric locomotives.	40. Fuel for stations and cars; includes coal, coke and wood.	40. Fuel for stations, cars, ferries and power plants; includes coke and wood.
26. Electric material peculiar to steam and traction line cars.	25-B. Electric material peculiar to steam locomotives.	41. Commissary supplies for dining cars and restaurants.	41. No change.
27. Power plant equipment, including steam and electric power plants and generating stations, motors, and other electrical equipment for operating shop machinery.	25-C. Electric material peculiar to steam and traction line cars.	42. Pipe, iron and steel, except boiler flues.	42. Pipe, iron and steel, and fittings, all kinds, for steam, air and water, valves and cocks for same.
28. Electric lighting material and supplies for buildings and grounds.	25-D. Electric material for power plant equipment and generating stationary motors, and other electric equipment for operating shop machinery. (See Class 49.)	43. Pipe fittings, all kinds, for steam, air and water; valves and cocks for same.	43. (Blank—consolidated into Class No. 42.)
26. Electrical material for steam and traction line cars.	25-E. Electric material and supplies not included in Classes 25-A, 25-B, 25-C, 25-D and 26.	44. Electric lighting material and supplies for buildings and grounds.	44. (Blank—see Class No. 25-D.)
27. Shop fuel, smiting coal, coke, fuel oil for furnaces, gas-oil, charcoal, etc.	26. Material peculiar to gasoline and electric passenger motor cars, automobiles, auto trucks, tractors, power trucks, etc.	45. Hardware, all kinds, including nails, jacks, small hand tools, emery wheels, wire and wire cloth.	45-A. Hardware, all kinds, including nails.
28. Foundry supplies, fire brick, fire clay, etc.	27. No change.	46. Rubber and leather goods, including air, steam and water hose, packing, all kinds, including metallic packing, asbestos, rope, belting, pipe covering and boiler lagging.	45-B. Hand and small machine tools, such as drills, taps, reamers, dies, chasers, including air tools and parts.
29. Wheels, tires and axles for locomotives and cars, including driving wheel centers, cast iron, steel tired and rolled steel wheels.	28. No change.	47. Glass, drugs, chemicals and painters' supplies, such as brushes, scrapers sand and emery paper and cloth; also paints, oil and varnishes; all kinds, for equipment and buildings.	46. Rubber and leather goods, including air, steam and water hose, all kinds, fibrous packing, asbestos, rope, belting, pipe covering and boiler lagging.
30. Lumber, locomotive and car, rough and finished, including manufactured articles.	29. Wheels, cast iron, steel tired and rolled steel, tires and axles, for locomotives and cars.	48. Stationery and printing.	47. No change.
31. Machinery and machine tools, including all power driven shop machinery.	30. No change.	49. Power plant equipment including steam and electric power plants and generating stations, motors, and other electrical equipment for operating shop machinery.	48. No change. 49. Power plant equipment other than electric materials. (See Class 25-D for Electric Material.)
32. Locomotive boilers, fire boxes, locomotive tenders and frames.	31. Machinery and repair parts, including all power driven shop machinery.	50. Scrap, all kinds, including scrap rail.	50. No change.

The report is signed by W. D. Stokes (Chairman), Illinois Central; J. E. Byron, Boston & Maine; E. Harty, Southern Pacific; E. H. Hughes, Kansas City Southern; W. L. Hunker, Chicago, Rock Island & Pacific; C. W. Kinnear, Pennsylvania System (Northwest Region); C. D. Longsdorf, New York Central; G. T. Richards, Chicago, Milwaukee & St. Paul; D. W. Roberts, Pere Marquette; C. L. Wright, Missouri, Kansas &

Texas; and U. K. Hall (Chairman Ex-Officio), Union Pacific System, Omaha, Neb.

Discussion

C. D. Young (Penna.): We have a classification built on 15 or 20 years practice, but we have watched the A. R. A. classification with interest. With the present tendency to go into steel equipment, I would suggest to the committee a closer survey of their classification as proposed in 15, 16, 17 and 18. These four classifications on a road having a large percentage of steel equipment, still represents a very large investment in money. Practically all of the motive power money is tied up in these four accounts, and with the classification as worded here, it is impossible to carry out the proposed practice of the A. R. A., namely to know how much money you have in stock as between the locomotive and freight equipment. I suggest that consideration be given to splitting numbers 15 and 16 so that it is possible to identify the raw material from which you are to make classifications 17 and 18.

I believe Classification No. 15 could be clarified. The material in No. 15 is designated as "steel shapes," meaning the unfabricated material such as channels, I-beams, etc. "Steel-shapes" does not clearly indicate that this includes the steel as it comes from the mill.

Mr. Hall: The committee believes that sooner or later the Interstate Commerce Commission will prescribe and require material classification, as they did with the operating classification and it is thought that all roads could use this classification.

The report of the previous committee had been acted on by the Railway Accounting Officers' Association. It had been adopted by this association as recommended practice, and by the Railway Accounting Officers' Association and if the Interstate Commerce Commission ever attempts to prescribe a classification, it is believed that they would give its careful attention to a classification which had been recommended by the two representative bodies dealing with this subject.

It was the idea of the committee that this report would bring about a revision that would make a practical accounting proposition, and a practical physical proposition. We all feel our stock books should be lined up with our accounting classification. I believe that this convention should appoint a committee to confer with the Railway Accounting Officers' Association, presenting to them the revised classification, the reasons therefor, and endeavor to have them accept the revision, so that we would then present a united front to the Interstate Commerce Commission in submitting a good and practicable and workable classification.

There is no snap judgment in this report. It was considered at various times from all angles and there are roads that are today waiting and expecting to change to the adopted classification when they feel it is stable enough to warrant them doing so. It is regrettable that a classification has to be changed. It involves a lot of labor and expense, and the committee feel that the classification prescribed here would meet the views of future committees.

Mr. Curtis (C. M. & St. P.): This classification is a good workable classification. I have worked under four or five classifications, and I have never yet seen a classification someone could not find fault with. This classi-

fication, made and adopted by the Association and which the Milwaukee is using, is a good, workable plan. I feel that this committee has made wonderful progress in the recommendations they have made. We must either go forward or backward. We cannot afford always to copy the same classification. In regard to the four major headings, I do not see why any railroad should not use them if they want them. All they have to do is to draw their totals under each existing sub-division and go ahead and use their statistics. There is no rule to prevent them.

Mr. Young: You have got to deal with material in the individual items from the storekeeper's standpoint, but you cannot present to your executives, nor to your Board of Directors individual items of material. They know only one thing and that is money. You must have a classification that reflects your material balance in money. It is the only common unit in the material account, and everything is equated.

Mr. Pierce: The Interstate Commerce Commission is going to require a classified statement of the assets of the railroads as represented by materials and supplies. There is no question that in the same manner they have prescribed a classified statement of expenditures. This statement is not of material issued to the storekeeper and the controller of stock. It is not intended to be. It is ridiculous to consider the material balance as a means of controlling stock that must be ordered from two, to three, four, five or six months in advance of its need. Its functions are not for that purpose. The stock book is a detailed classification balance which every storekeeper must have, and upon which is based the control of stock. A classified statement is for the purpose of general and executive officers having before them a resume of what has transpired, the same as other operating expenses, and for the further and more important purpose of putting a check where a check is needed.

Mr. Pierce: I desire to go on record as requesting a class for car steel, a separate class, I would call it 18-A, and segregate it from Class 17, and I also suggest that superheated material be eliminated from 13-A "flues and tubes," and placed in Class 23-B, "special mechanical appliances."

I am not in accord with the principal of the classification being the same as the physical vocation of the material. When your executive officer desires to know how many flues and tubes you have, he don't want to know how much superheating material you have.

Mr. Rice: I move that we adopt the report of the Committee as read, and continuing the Committee, who will investigate the suggestions offered from time to time by the various members.

(The motion was duly seconded, put to vote and carried.)

The Chairman: I might say that a number of railroads have written to the Secretary for copies of the classification. He has orders now for about 2,000 copies, and I will ask if it is the intention that we print a standard classification separately, for distribution to those railroads that may want it.

(The motion was put to vote and carried.)

Meeting adjourned at 1:10 p.m.

Distribution and Accounting for Gasoline

PROBABLY THE CONSUMPTION OF no one commodity used by the railroads has increased so much and advanced in price so rapidly in the last decade as gasoline.

With its uses greatly extended, with its consumption multiplied a thousand fold, with the old price quadrupled, the storage, dis-

tribution and accounting for this commodity becomes a subject well worth the serious consideration by those who carry the responsibility of the economical and accurate handling of railroad material and supplies.

The stores department of the Missouri Pacific has given this

Some enterprising mathematician recently figured out that the gasoline purchased by the Illinois Central in 1921 was enough to have run an automobile, at the rate of 20 miles to the gallon, more than 400 times around the earth. It would keep the car going continuously 24 hours a day at 20 miles an hour for more than 50 years. This is a striking illustration of the amount of gasoline used by the railroads and emphasizes the importance of the subject of Mr. Hyatt's paper.

The equipment which has been developed on the Missouri Pacific for handling gasoline includes transfer pumps at the main storage points, a special tank car fitted with a measuring pump and delivery hose to take care of distribution to roadside tanks and corrugated drums for underground storage. To prevent the misuse of gasoline for automobiles, a small proportion of lubricating oil is added to it as it is delivered from the supply cars.

commodity special study, and without having much in the way of precedent, we feel that during the last ten years we have worked out some satisfactory and economical methods and practices, especially in the storage, distribution and facilities for economical handling.

Ten years ago, we had gasoline storage capacity averaging from 1,500 to 9,000 gallons at each of our 16 different division stores. Today we have consolidated this storage to four central points and installed batteries of tanks giving any one of these central distributing stores a storage capacity of from 20,000 to 30,000 gal. from which gasoline is distributed to 16 operating divisions; 9 by supply tank cars, and 7 by drum shipments.

Four of our supply car outfits include with their equipment, one 10,000 gasoline tank car, which we specially constructed with reinforced frame and trucks, to avoid as far as we could the possibility of the car becoming bad order, and getting tied up out on the divisions, thus breaking our supply car schedule, which we all agree causes extra expense and crippled service. Each of these gasoline supply cars has a steel housing built and riveted to one end of the tank (3 ft. deep, 5 ft. 4 in. wide and 7 ft. high) which protects and incloses a five-gallon self-measuring pump.

This housing serves the double purpose of protecting the pump and its operator from the elements, from mechanical injury and also prevents tampering by unauthorized persons when the attendant is absent.

It is quite important that this steel housing and the pump be built and joined integral to the steel tank, so that a shock such as would cause the tank to shift on the trucks and frame will not damage either the pump, the housing, or piping. Broken pumps and damaged piping will be avoided by following this suggestion.

We also have built a boxed trough along full length of each side of the tank car, in which is kept a 50-ft. steel armored 1½-in. gasoline hose. One end of each of the two hose is connected to a pipe line, which extends from the pump to the running board of the car on each side, the object of this arrangement being to avoid the necessity of dragging the hose back and forth between the cars, to serve the underground storage tanks at tool houses which are located on either side of the track.

When supply cars are spotted at the tool house, one of the supply car men ascertains the contents remaining in the storage tank with a special measuring stick, so as to avoid running the tank over, as might happen, should he not know how much gasoline was in the tank, as quite likely the majority of the requisitions filled by supply cars are made out from 20 to 30 days in advance of delivery, and the quantity of gasoline ordered is more or less a guess on the part of the section foreman, censured by the roadmaster, who has the advantage of knowing the average quantity ordered by all his sections and should detect any abnormal order.

The quantity ordered on the requisition is governed by what is considered as full protection for 30 days at each given storage point, and in very few instances is it necessary to completely fill the 120-gal. storage.

On some roads the quantity of gasoline put in these roadway storage drums for a 30, 45 or 60-day supply rests entirely with the supply car man and his judgment which, in some cases is aided by providing him with a blue print table showing the average monthly mileage made by the motor car or cars obtaining fuel

from each given section storage tank, and the maximum quantity of gasoline required; the print also showing the number of oil lights operated on each section and an illuminating oil schedule.

Eight or ten years ago when the first great strides were beginning to be made on railroads to substitute and replace man-driven power with gasoline-driven power, the first problem confronting the stores department of the Missouri Pacific was to design and adopt a standard storage tank for roadway use, and after some time spent in experimenting and study we adopted an underground storage tank which has since proved entirely satisfactory.—this drum is a 120-gal. corrugated No. 18 galvanized iron drum, which we specify to be painted with rust resisting paint. The capacity of 120 gal. was chosen in order to insure sufficient storage at a time when gasoline was being shipped out in 55 or 110-gal. lots, giving a little storage leeway to avoid holding the shipping drum. The corrugated style was adopted not only to give strength but also to have a drum that would stay buried as we found that water would force smooth-sided tanks out of the ground in the swamp districts of the South.

These drums are buried at the end of the section tool house, usually about 15 or 20 ft. from the track, which is in easy range of our filling hose. They are set vertical and from six to ten inches below the surface, a 2½-in. nipple with chained cap extending above the surface, from which gasoline is drawn by use of a tin gasoline pump, which is kept locked up in the tool house.

This pump is manufactured by the store department, and its construction is not only simple but very durable. We consider that this complete outfit makes a very economical method of handling gasoline for sections and pump stations.

Bridge and building outfits, or in fact any unit of our forces who move from point to point, carry these same storage drums in their open outfit cars. We have 846 of these drums in service on our lines, or 120-gal. gasoline storage for every (9) miles of railroad.

Prior to the general adoption and installation of these underground storage drums, we either used ten-gallon oil cans, or held the oil companies' 55-gal. shipping drums to answer as storage, and there were times when we had as high as 2,000 drums on our lines, and the enormous volume of clerical work in recording their movement, length of time held, and tracing and obtaining the final return to the owners or paying for drums we lost entailed an expense which has been eliminated so far as gasoline is concerned, on the Missouri Pacific.

The Santa Fe, Union Pacific and several other roads have found it both expedient and economical to reclaim a variety of old drums, reservoirs and miscellaneous containers, which after being tested for leaks and painted with a good coat of preservative against rust are distributed as roadway storage with varied capacities at different locations.

One source from which they obtained a great many gasoline storage receptacles was by making use of all the Pintsch gas reservoirs which were removed from their passenger equipment at the time electrical lighting was installed, these gas drums being cut in two in the center, cleaned of all sediment and incrustations and each half made into a drum by being headed and provided with a uniform hole for the filling and withdrawal of gasoline.

One of 10,000 gal. gasoline supply tanks serves four divisions having 220 storage drums, to take care of this same territory by drum shipments would require at least 300 of the standard commercial 55-gal. drums, and considering that the average life of one

of these shipping drums cannot be figured as over four or five years, and their cost from \$5.50 to \$10.00 each; also figuring the loss and damage in transit, it is reasonable to assume that the circulation of one large tank car is more economical than the handling and circulation of 300 shipping drums.

At our main store points where we have our battery of gasoline storage tanks, we have installed small reciprocating transfer pumps which operate either by air or steam pressure, according to which is the most handy; these pumps quickly and economically transfer gasoline into our storage from line tanks, or from our storage to the supply tank cars.

The labor cost of filling a large line tank car by use of these transfer pumps at headquarters is practically nothing, while the unloading, filling, and reloading of 10,000 gal. gasoline in separate 55-gal. shipping drums will cost close to ten cents for each drum handled (based on actual test), even with the best facilities.

Accounting

In writing of the accounting we will deviate from the strict meaning of the word as used on railroads and instead dwell on the matter of controlling the issues and the stoppage of gasoline leaks or of gasoline being confiscated for purposes other than company or railroad use.

To control the issues and consumption of gasoline on the Missouri Pacific we are following the matter up on all divisions by

Railroad			
MAINTENANCE OF WAY DEPARTMENT			
Station	Division		
Month of	19		
Kind of Station			
Type and Kind of Engine	Factory No.		
Hours Engine Operated	H. P.		
Condition of Plant	Rated RPM		
	(Other Oils)		
On hand 1st of Month	Gasoline Gallons	Headlight Oil Gallons	Engine Oil Pints
Received from Store Department			
Received from other sources			
Total			
Used in operation of Engine			
x—Used for other purposes			
o—Furnished other parties			
Total			
Balance on hand			
(Signed)			
REMARKS			

* Examination should be made under "Remarks" what purpose used for.
 o Must have signed receipts to cover total amount of consumption under this item.

Exhibit A

requiring all section or extra gang foreman to furnish their superintendent a monthly report on which they show the total number of miles they have run their motor car during the month and the total gallons of gasoline they have used as well as the amount of

The report also shows how much if any of their stock of gaso-

line was furnished to itinerant motor cars so that proper charge can be made through the superintendents material distribution, officers or other employes taking this gasoline have instructions to leave a note in the section tool house advising the gasoline taken, or else tell the foreman along the road when they come across him.

The one railroad, requires a monthly statement from their gasoline users, that requires more detailed information and a monthly balance of the gasoline on hand, sample form submitted. (Exhibit A.)

Some of our superintendents have requested and are procuring from our storekeepers a monthly statement giving our record of the gasoline which our supply cars furnish each of his section and B. & B. foremen, and undoubtedly if this report is used in conjunction with the one he gets from his own men, all is being done so far as records and statistics are concerned as would be within the bounds of practicability to regulate issue.

Where a blue print schedule, as previously mentioned, is furnished the supply car men, giving the allowances of gasoline to each point, it would be questionable as to the necessity or value of such a statement.

To discourage or avoid theft there are many effective methods, practically all of our storage drums that are located along the line or in isolated places have some device to prevent access. Many of the underground storage drums have small platforms built on the surface fastened to driven posts to make them secure, these platforms having one plank hinged and by use of a hasp and staple are kept locked.

Another effective method of locking an underground tank is to have a slot cut through the gas pipe leading to the drum, then by using a flat tee shaped iron slide with a hole in one end for a padlock, it can be locked against the insertion of either a hose or pump.

However, the very design of our standard storage outfit practically precludes the use of any pump other than the pump furnished with the equipment.

On some of our divisions at the time the gasoline is delivered from the supply cars, it is doctored by the addition of lubricating oil. One pint of oil to sixteen pints of gasoline seems to be most generally used. This makes the fuel unfit for anything but the roadway types of motor cars, and as Mr. Hall stated in his article, "A person might try this mixture in his automobile once but never again."

The Santa Fe has gone very extensively into the proposition of the making and the use of a mixed fuel for railroad motor cars which cannot be successfully used for automobiles, and at the same time being a cheaper fuel than straight gasoline.

At their stores from which the supply cars operate, they have constructed a large mixing tank which is connected by pipes to their gasoline storage and to their kerosene or distillate storage.

The mixing tank is filled with 60 per cent gasoline and 40 per cent kerosene or distillate, and after the addition of the proper proportion of heavy lubricant, the contents are thoroughly mulsi-fied by agitation which is accomplished by the admission of compressed air into the tank through an arrangement of pipes, the mixture is then conveyed to storage tanks for use.

The writer does not know whether the above mixture gives satisfaction the year around or not, it may be that the percentage of gasoline is increased for winter use on their northern lines.

In the use of mixed motor car fuel, provision would have to be provided at terminals from which inspection or official cars having automobile engines could procure their supply of straight gasoline.

(The above report was prepared by L. V. Hyatt, Inspector of Stores, Missouri Pacific.)

Mechanical Division Elects Officers

THE ELECTION of officers of Division V, Mechanical, A. R. H., yesterday resulted as follows: Chairman, James Coleman; Vice-Chairman, John Purcell; Members of General Committee, C. F. Giles, T. H. Goodnow, A. Kearney, J. T. Wallis, W. H. Winterrowd, C. E. Chambers, and L. K. Silcox. To fill unexpired terms on General Committee ending June, 1923: W. J. Tollerton and H. C. Oviatt.



Mark Purcell
First Vice-Pres.



L. P. Streeter
President



George H. Wood
Second Vice-Pres.

1922 Convention of the Air Brake Association

Large Gathering Listens to Paper by Prof. S. W. Dudley
on Wastes in Air Brake Service

THE TWENTY-NINTH annual convention of the Air Brake Association opened Monday, June 19, 1922, in the Vernon room of Haddon Hall hotel, with an attendance of over 350 people. This is the first time that the association has held a convention at Atlantic City and of course the first time that its meetings have been in conjunction with those of the Mechanical Division of the American Railway Association. No regular convention was held in 1921. The officers and executive committee held a meeting, however, at Hotel Sherman, Chicago, May 3, 1921. At that time such business was transacted as required attention and reports from the various committees were received, but were not discussed. Several of these, however, will be taken up for topical discussion at the present convention.

Some 225 registered before the convention started. This compares well with previous meetings, but somewhat delayed the opening, and the meeting was not called to order until 10:30 a.m. by the president, L. P. Streeter, air brake engineer of the Illinois Central. Doctor Newton W. Caldwell, pastor of the Olivet Presbyterian Church, then opened the convention by invoking the divine blessing. The address of welcome was delivered by Edwin F. Bader, mayor of Atlantic City. This was scheduled to

follow immediately after the opening prayer, but Mr. Bader was delayed on account of having to attend an important conference. He arrived a little later in the morning, however, and gave the association a most hearty welcome to Atlantic City and presented to the chairman a full-sized key to the city.

A past president's badge was given to L. H. Albers, New York Central, the presentation speech being made by B. J. Feeny, Illinois Central. One was also presented to T. F. Lyons, New York Central, the speech being made by E. F. O'Connor, Southern Railway.

President's Address

President L. P. Streeter then presented the following brief opening address:

It is with keen appreciation of the honor which the Association has conferred upon me that I extend a cordial welcome to you at this convention. I believe our convention will be productive of great benefit to all concerned, and there is every reason why it should be the best held so far.

This is the first time that many of our members have had the opportunity to see the extensive exhibits brought together annually by the railway supply men of America,



Otto Best
Treasurer



F. M. Nellis
Secretary



C. M. Kidd
Third Vice-Pres.



R. C. Burns
Ex. Com.



H. L. Sandhas

H. A. Clark

W. W. White

M. S. Belk

Members of Executive Committee, Air Brake Association

which draws railway men from all sections. The genius and mechanical ability of our country, especially in railway transportation, leads the world. Keeping this in mind, I trust you will all make careful study of the exhibits and take back to your respective managements the results of a study of means and ways to improve conditions, which can best be accomplished by men like you who know the situation from the practical point of view.

We have a right to be proud of achievements of our Association which during the twenty-nine years of its existence has stood for a higher development of the air brake art, and I believe is largely responsible for the safety and care of the traveling public and the safe movement of goods necessary to their comfort. The Air Brake Association has developed a body of men of which we have reason to be proud, and they can be classed with the most conscientious and hard-working part of our railway organization, many occupying positions of responsibility and honor.

Our organization is filling successfully a highly specialized field of work with increased responsibilities, and our cordial relations with the American Railway Association evidenced by our meeting here during its convention goes to show that we are a recognized factor in the railway world. Our work also has the hearty indorsement of the Bureau of Safety of the Interstate Commerce Commission.

I believe the future of our association is a bright one if we keep in mind the fact that we are primarily an educational body, endeavoring to encourage in every way the so-called "little fellow" who by our help may develop into a most useful member in the railway field, and if I

have helped toward this end in any way, I will feel well repaid for such efforts as I may have devoted to the cause.

Following the opening remarks by the president the report of the secretary was presented by F. M. Nellis. In the absence of Otto Best, Mr. Nellis then read the treasurer's report. These reports showed the association to be in a healthy financial condition.

Denver Secures Next Convention

In order that the educational work of the association may be of the greatest benefit to its members, many of whom attend at their own expense and who are scattered all over the country, it seemed best to the executive committee to continue the practice of holding some of the meetings in the West as well as in the East.

In announcing the decision of the executive committee to hold the next convention in Denver, the president also called attention to the fact that instead of a direct amalgamation with the American Railway Association which has been under consideration for some time, it had been decided best to maintain the present individuality of the Air Brake Association. A close affiliation and co-operation with the A. R. A., which the amalgamation question has brought about should, however, result in all the benefits which would have been obtained by affiliation.

The only paper presented at the first session was by Prof. S. W. Dudley, of Sheffield Scientific School, Yale University. The paper contained much that should prove an incentive to every member to carry out the aim of the association which is "to obtain a higher efficiency in air brake service."

Wastes in Air Brake Service

By S. W. Dudley

Waste Commission, W. W. R. Isn't this a country of unlimited resources? Most of us know better than to make any such claim. I don't but yet are we willing to face the problem of waste, conserve our energy and act according to the plan laid out by the Government? Waste is not new records of production and increasing our industrial industry and commerce have been successful products of our past results, making a new record. Efficiency is our motto. Under the conditions of our present time, the most important of a new industry, the establishment of a new industrial enterprise, the holding of a train in a limited number of minutes, or more, or less, had to produce a new record, not the most, but the most in view. But is there not a waste, a waste which we return to poverty, if not those wastes produced will surely, although perhaps not obviously,

diminish unless our natural resources—our capital funds—material and otherwise are conserved?

The Great War has brought home to thoughtful people here the cruel lesson of the European nations, who are, and have been for years, faced with the struggle for existence in what seems to us a hopelessly narrow margin between natural resources and national needs. Only recently have any of us become much impressed with the necessity for conserving our two vast natural resources. It has now become a common saying that some nations would live comfortably on what we, as a nation, waste.

Nature herself is, of course, a colossal wastrel—witness the multitudes of acorns which never become oaks. But nature is also a bountiful provider. Man, when he uses the resources pro-

vided by nature, wastefully and without replacement, is thoughtless, careless and ignorant, if not criminal. It is not the use, but the abuse, that is dangerous to the well being of ourselves and our children.

"There is that scattereth, and yet increaseth; and there is that withholdeth more than is meet, but it tendeth to poverty."

Material waste is only one side of the story. The waste of human time and effort, under our modern complex industrial systems is equally far reaching.

It is one of the encouraging signs of the times that these questions are being studied scientifically and earnestly by the best trained brains in this country and that their conclusions and recommendations are being listened to and acted upon by practical men, executives and financiers in all lines of industry.

Late in 1920 Herbert Hoover was elected the first president of the newly formed Federated American Engineering Societies and with characteristic practical vision he asked the question, "What can this Society do to benefit industry?" At the first meeting for organizing the Federation Mr. Hoover himself proposed an answer. "There is a vast amount of restriction and waste in the 288,376 industrial establishments listed by the census of 1919. Let us study this waste—see what it is, and what can be done about it."

It is well to stop a moment here and notice the standing and ideals of the organization proposing this study. The Federated American Engineering Societies is an inclusive national organization of over 75 national, regional and local engineering and allied technical societies, such as the A. S. M. E., the A. S. C. E., the A. I. E. E., the A. I. M. E. and so on. Their common ideals have been expressed as follows: "Engineering is the science of controlling the forces and of utilizing the materials of nature for the benefit of man, and the art of organizing and of directing human activities in connection therewith. As service to others is the expression of the highest motive to which men respond and as duty contribute to the public welfare demands the best efforts man can put forth, now, therefore, the engineering and allied technical societies of the United States of America, through the formation of The Federated American Engineering Societies, realize a long cherished ideal—a comprehensive organization dedicated to the service of the community, state and nation."

Waste in Industry

This organization accepted Mr. Hoover's suggestion with enthusiasm and a committee of 18 engineers of broad experience, clear vision and unbiased attitude toward industrial problems was named to make a study of the waste in industry.

The essence of the plan adopted by the committee was to gather quickly such concrete information as might be used to stimulate action, and lay a foundation for other studies. Within the remarkably short time of five months there had been completed an analysis of waste in six typical branches of industry. The complete report is included in the volume entitled "Waste in Industry," published in 1921.

This report has been discussed before engineering societies and clubs, industrial organizations and conventions of all sorts. It therefore seems to me most fitting that this Air Brake Association, which has been actively engaged in promoting a higher efficiency in air brake service for almost 30 years, should signify in a rather definite way, its hearty interest in and support of this nation-wide movement against avoidable wastes in industry.

We may feel justly proud of the many papers and committee reports on record in our proceedings dealing with various phases of this subject in our own field. Probably 50 per cent of the technical papers and reports presented at our conventions have dealt with ways and means of preventing waste of materials, labor, time or human effort and energy in air brake service.

Stopping Air Leaks

An excellent example is the magnificent work accomplished by the Committee on Air Consumption of Locomotive Auxiliary Devices, under Mr. Weaver's able leadership. His reports, at this and the two preceding conventions, are full of original and practical information and sound recommendations. They deserve to be studied and acted upon. The railroads will benefit directly as the sources of loss and efficiency mentioned are attended to. This Association and the railroads could show the appreciation which this thorough investigation merits in no better way than by

adopting its standards of performance and methods of testing as a part of their recommended or standard practices.

The conditions disclosed by the report of this committee certainly justify immediate and thorough action. Such action has already been taken on several railroads. Why should not the supervisor of air brakes have at least one man, possibly one at each terminal and division point, whose sole duty should be the finding and stopping of air leaks? He would be a busy man and might need several helpers, but would it not pay? A good live young fellow, interested in his job, would soon learn a lot about what should and could be done. Call him the air leakage inspector, if you choose. I believe the committee will back me up in saying that the results would astonish you.

What Kind of Wastes?

Wastes in air brake service are by no means only those direct losses due to leaky or inoperative devices, or to materials or supplies actually lost or damaged. In a foreword to the Engineering Societies' Committee report, Mr. Hoover said some things which apply to the air brake service, as well as to the general industrial situation which he had particularly in mind: "We have probably the highest ingenuity and efficiency in the operation of our industries of any nation. Yet our industrial machine is far from perfect. The wastes of unemployment during depressions; from speculation and over production in booms; from labor turnover; from labor conflicts; from intermittent failure of transportation of supplies or fuel or power; from excessive seasonal operation; from lack of standardization; from loss in our process and of materials—all combine to represent a huge deduction from the goods and services that we might all enjoy if we could do a better job of it."

In assigning responsibility, i. e., relative opportunity for knowing and doing better, the committee placed (roughly speaking) 50 per cent upon management and 25 per cent upon labor, the remainder being placed upon outside contacts, such as the public, trade relationships, etc.

Management has the greatest opportunity and hence responsibility for eliminating waste. But it must have the cooperation of labor in order to better the present record.

Do not overlook the fact that waste is a permanent impairment of our reserves. We are in large measure opportunists. We think only of the present, we live today;—let tomorrow take care of itself as we have had to do.

Time; energy, both human and mechanical; money, materials, and equipment must all be wisely directed and intelligently used. Many of our most serious losses arise from our failure to use the time and energies of past generations, as well as those of living men. Committees, rules and reports point the way but are powerless until translated into right action at the right time and place by the man on the job,—whether he be the general manager or the yard inspector.

What is a Good Organization?

The Federated American Engineering Society's Committee found that good organization was one of the best safeguards against waste in industry. What is a good organization? Suppose you had a crew made up of Charley Weaver, Otto Best, Mark Purcell, Frak Barry, Charley Kidd, George Wood and Pat Langan. That would be "some" organization, wouldn't it? But who would carry the stencil brush and the grease pot?

An organization is a good deal like a locomotive. You will find a few cranks and eccentrics. There are some very rigid and unyielding members, like the frames and the guides. There are some that make a lot of noise, like the bell and the exhaust. There are some that actually restrict and restrain, like the throttle and the yokes. But the cranks make the wheels go around. The eccentrics actuate the valves, the rigid and unyielding frames and guides keep the moving parts together—and also apart. Noise, in its proper place, means protection and safety. Restriction and restraint, properly exercised and in proper amount, mean adaptability to the task in hand and plenty of reserve for peak loads and unexpected emergencies.

So with an organization—"It ain't the star performer alone that makes the goal, but the everlasting teamwork of every bloomin' soul."

Weil, there are many causes, some evident and easy to cure, some not so evident and not so easy to overcome. Lack of vision,

faulty management, ignorance, carelessness, lack of team work, inadequate or improper equipment or installation, lack of proper or sufficient repair parts, materials or tools, the wrong man on the job and (perhaps the most serious of all) not enough trained men to do the work.

I want you to read again Mr. Frank McManamy's address before our 1920 convention particularly. Listen—"I have always felt that the air brake man was working under a rather strong handicap and that while he was a mighty good fellow, there were too few of him." "With the additional work the air brake man has to perform outside of organizing his departments and looking after the brakes, and looking after men that handle brakes, he is able to give entirely too small a proportion of his time to the actual maintenance and operation of the brakes. It seems to me that we shall never get the air brake conditions which are desirable, and which are in fact necessary under modern methods of railroad operation, until we increase the air brake departments on practically all the railroads."—"We must have first, men to plan the reorganization. We must have, second, the facilities to permit the work to go forward. To get both of these we must have support from the higher officials of the railroads, because while it will cost them a little money at the start, it will pay. It will be one of the biggest dividend payers that they have on their railroads."

Make no mistake about this. This is not an air brake man trying to land a job or get an increase in salary. It is the deliberate practical judgment of a good business man, an executive of wide experience, accustomed to look for the facts wherever they may be found and to face them squarely when found—A little further on he says: "If the rules and recommendations of this Air Brake Association were being observed on all the railroads in the country, we would not need any federal laws relative to the condition of air brakes." This is a compliment and a challenge. Gentlemen, it lies in your power today, more than ever before, to make these rules and recommendations effective through cooperation with the proper agencies of the greater Association with which you are now affiliated.

What Can We Individually Do to Improve Matters?

Keep right on, pegging away. Get and create in others, habits of foresight, analysis, thrift, efficiency and effectiveness. Look ahead a little, size up the job and make every move and everything count. Education is needed all along the line. Show the management the facts and what ought to be done. Perhaps they will not listen or understand at first—probably you didn't. But keep right on urging proper equipment, proper installation, proper and sufficient repair parts and tools, and above all better men and more of them.

Just a few concrete examples of what you men on the fring line see every day. And in this connection let no one miss the point that mere muck-raking as a pastime is no longer the fashion. The spirit of constructive criticism has taken its place. Today we look for the facts, favorable or otherwise, because we want to find out how to do better tomorrow. The times change rapidly and tremendously. What could and should be tolerated to help along the progress of yesterday needs curbing, perhaps elimination, today. Standards must advance with knowledge and facilities. Fault finding is profitless, but not to see and take advantage of an opportunity to improve conditions is a crime.

First a quotation from a letter from L. W. Wallace, the executive secretary of the Federated American Engineering Societies.

"I am very much interested in knowing that you are discussing the topic 'Waste in Air Brake Service.' This is an important subject.

"Perhaps you will be interested in knowing that the larger part of my professional experience has been in connection with railway mechanical engineering. While serving a special apprenticeship on the Santa Fe, I specialized somewhat in air brake work. At the time, I made a study of the waste of compressed air at the Cleburne Shops. It was found that there was a very large waste occurring through leaky valves, improper hose connections, faulty air drills and by workmen leaving the air turned on so long that while not using it, at noon hours and other times. In discussing these things, a *lack of air supply* was mentioned as a *handicap* and a *low pressure*, brought about by *leaky valves and faulty air supply* pressure. This made it necessary to *buy large additional air compressors* which had

been contemplated. I am confident that this situation is duplicated in many of our railroad shops."

Without further mention by name, but with hearty thanks for their cooperation, I wish to quote or refer now to several suggestions received from active and influential members of this Association (most of them members of the Manhattan Air Brake Club) as to concrete cases which illustrate clearly what we have been thinking about. Excessive leakage is, of course, an old and an everpresent source of waste, delay and inadequate control.

First, therefore, a good suggestion regarding leakage:—"I do not feel that you can lay too much stress on the necessity of railroads providing a departure yard suitably equipped with air brake charging lines with a view of eliminating excessive leakage and correcting irregularities that may exist when there is adequate time, rather than performing this work after the hauling locomotive is attached to the train when the time is limited. This does not only mean assisting the life of the compressor and accessories but goes a long way towards assisting proper and economical functioning of the air brake equipment."

Insecure pipe clamps, use of the human instead of the soap brush to locate leaks and carelessness about retainer pipes and unions are well known but altogether too common sources of leakage. These and other short comings of installation and inspection are of much more consequence on a locomotive than on a car, because "a locomotive failure is a train failure."

Why Is Leakage Tolerated?

Do you know why this leakage is tolerated? As in most other cases, the answer has an economic flavor. It is because coal costs only \$400 per ton.

They don't know what leakage is in Europe. One of your best known members told me of riding on a French railway locomotive during the war and being almost paralyzed to see the engineer calmly reach over and shut the throttle valve in the air compressor steam pipe shortly after leaving the station. There was about 80 lbs. pressure in the system and there it stayed until the brakes were used to make the next stop, when the pump throttle was opened up and the pressure restored. There *were* no leaks—they were not tolerated. Why? Because at that time coal was \$64 per ton and the engineer received a bonus on every pound he could save. So it *can* be done.

We avoid the cost of a good tight pipe job, of close inspection and of competent repairing, but burn more coal. We need to do more than make rules about these things. We must have the right kind of men, enough of them and encourage them by giving them the tools, the materials and the proper places to do the work. No man can turn out a decent job with only a pipe wrench, a paint brush and a lack of proper material or conveniences.

The following describes conditions perhaps not entirely unfamiliar to some of you.

"Probably the greatest handicap suffered, in my experience, was and is due to the extreme poor quality of the men that we are provided with for air brake work, it seeming to be understood that any kind of a man will answer the purpose, which of course results in a great loss of time and material, as well as safety. To illustrate:

"While checking triple valve repairs not so long ago, it was found that paper wads had been used to fill the triple piston packing ring openings, which for the minute, permitted the valves to pass the test rack requirements and for the same purpose and in the same lot of valves, a very heavy grease had been used on the piston ring and cylinder.

"Improper tools is another cause for a waste of time and material. While watching one of our men cleaning the brake equipment on a car recently, it was noted that he was using a hammer and chisel for removing nuts from the bolts. On inquiry it was found that he had but a 12-in. pipe wrench for the purpose and this could not be used due to lack of space.

Waste in Air Brake Service

"Pipe wrenches are used also for removing valve chamber caps, reversing valve chamber caps, etc., resulting in spoiling the hexagon, so that the pieces have to be thrown into the scrap.

"Carelessness in the use of new material, instead of repairing the old, results in a great loss. This is especially serious where piece work is in vogue.

"At one time 26 steam heads for 9½-in. compressors were found hidden away in one of our shops instead of being repaired and used because it was much easier to apply new. Of course, these had been some time in collecting, but it illustrates the waste and nearly the same condition prevailed at the same shop in connection with slide valve feed valves for engineers' brake valves."

The savings in material and time which can be made possible by improvements in storerooms and repair yards would scarcely be credited. Here is a concrete case:

"For several years we were unable to have the stores department handle second-hand material. When surplus air brake material was repaired, they refused to allow us to place it in stores for filling orders to outside points, claiming that this put the burden of cost on them. At the same time requisitions were not submitted to me for approval. About four years ago I made a check of extra material on the system and found about \$35,000 worth of distributing valves, brake valves, feed valves, pump governors, cut-out cocks, etc., lying in engine houses, shops and repair tracks. This material was repaired and stored for less than \$600, including labor. In this lot there were 30 distributing valves that only required a piston packing ring, or an application piston packing, feed valves that only required cleaning, governor bodies requiring re boring, new portions of governors that had been stripped to make repairs to second-hand material and triple valves. This was the direct result of drawing on the stores department for new material without returning the old parts for repairs. While we furnish enginehouse inspectors with material that requires no work except application to the locomotive or tender, they do not clean feed valves or distributing valves, but draw new ones on the stores department. We found that the shop repairmen and pipe fitters were ordering material that did not move from the stores department in many instances for eight to ten months. The pipe fitters were going to the stores department for new material when the old material would have served the purpose just as well. As evidence of this we found 1,200 ¾-in. and ½-in. cutout cocks which were thrown in different places in the shops, all of which were made good by regrounding and placing them again in service.

"After noting the indifference of the men in regard to material, we checked all requisitions to prevent duplications of the above parts, and are satisfied that from our present system we are saving from \$10,000 to \$15,000 per year without in any manner diminishing the safety or efficiency of the service. We then checked all the storehouses on the system and found hundreds of parts of special retaining valves, feed valves, governors, etc., which we assembled and placed in stock for distribution. The result of this is we have not ordered any of these parts, including triple valves, for the past four years, and having a check of the number of whole parts on hand at the different points on the system, duplications can be made only through loss by accident.

"At our main car shops where heavy repairs are made which require taking down the entire brake apparatus, we found that the amount of pipe work was so great and the distance from the pipe and cutting machine so far, that six men were required to do the work which four men could do equally well.

"Where five foreign lines deliver to us, we found that the number of non-operating brakes were so great that it was necessary to add six men to the force, two on each eight-hour trick. In our fast freight trains we put in at least four to eight cylinder packings in each train. To save time we furnished pistons complete with packing leathers, so that when one was removed from the cylinder under the car, a complete piston was added and the work of re-applying the leather was done when there was no train work. The trains then departed with 100 per cent operative brakes, and nearly always on time. We have placed standard triple valve test racks at all terminals where air is supplied to repair tracks, 10 in number, and all cleaning of triple valves is done in the shops instead of on the car. A laborer carries the triples to and from the test racks to the cleaners. All triple valves are sent to one point for repairs.

"Lack of material was always an excuse for not doing work properly and efficiently. I found on visiting the different stations that they were always short of certain material, and that requisitions were not promptly filled. We appointed one man whose sole duty is to visit all repair stations, note requisitions and see

that no place suffers for want of material. This worked out perfectly as we find now that there are no delays in shipments of material, unless it is that for which we are waiting delivery from the manufacturer.

"It is a noteworthy fact that foremen at shops, enginehouses and repair tracks never check up the work of air brake men. This is probably due to the fact that they were never interested in the work and know very little about it. We, therefore, depend upon the men to honestly perform their work, and to do this they must be furnished with the necessary devices and material. The proper location of locomotive and car air devices is essential, as an improper location of such devices means neglect on the part of the workmen."

In your own Proceedings and in those of many of the railway clubs these truths have been emphasized over and over again. One of the most notable of these is a paper on "Freight Brake Maintenance" presented by F. B. Farmer before the Canadian Railway Club, April 1918. This paper should be studied and adopted as a standard text by every air brake instructor and inspector in the country.

The sole purpose of a railway is to save time. Therefore, the greatest possible waste is that of time. To operate the railways human energy and skill are necessary in the highest degree. Therefore, misdirected or unduly overloaded human energy is a source of avoidable waste. To permit human energy and skill to function effectively and efficiently, proper organization, policy and support must be provided. Therefore inadequate organization, lack of understanding and vision, and insufficient funds, materials and equipment cause lower efficiency, diminish effectiveness and result in far-reaching wastes. Expensive "economy" and wasteful "saving" must be guarded against. To paraphrase a well-known Arabian proverb:—

"He who wastes and *knows* that he wastes is a fool. Avoid him. He who wastes and *knows not* that he wastes is simple. Teach him.

He who wastes not and *knows not* that he wastes not is asleep. Wake him.

But he who wastes not and *knows* that he wastes not is a wise man. Follow him."



"Courtesy George A. McKeague, Official Photographer."

Three M. C. B. Veterans

Left to Right—F. W. Brazier, N. Y. C.; John S. Lentz, L. V.; and J. J. Hennessey, C. M. & St. P.

Efficiency of Enthusiasm

One of our friends has handed in the following tribute to the men who have set up and arranged the big exhibit:

"To the observer who has been present on the Pier during the last two days the transformation from a scene of absolute chaos to one of order and perfection must have made a deep and lasting impression. On Monday morning with the exception of a few large and elaborate exhibits, some of which require many days and even a week or more to set up, there was practically nothing but an indiscriminate mass of packing cases and debris of all kinds strewn over the pier. Apparent disorder seemed to reign supreme, but behind and underlying all was a definite well-thought out program which within a few hours would be put into effect.

"In the brief period between Monday morning and Tuesday night the entire pier has been converted into a glorious and beautiful display of the finest mechanical products of American skill and ingenuity. And when one contemplates the speed and almost magical swiftness with which these packing cases have been turned into magnificent exhibits arranged with artistic skill and in a manner best to educate and interest those for whom they

have been created. One cannot but be impressed with this remarkable transformation and he naturally wonders how is it all possible.

"How is it possible to accomplish all this work in so short a time as perhaps twenty-hours? There is only one answer and that is that this wonderful work is the result of interest and enthusiasm. No paid help could accomplish what has been done in twenty hours on the Pier in ten times the number of hours. Nay, it is safe to say that paid help could not have done it at all. Nor are the men who have set up these exhibits with few exceptions skilled workmen. Most of the work is done by salesmen, engineers, advertising men, clerks and office help. But what these men have lacked perhaps in skill as workmen, they have made up a thousand-fold in their interest and enthusiasm.

"Just look at these beautiful exhibits. As much the work of artists as any painting or statuary. Put up in absolutely perfect shape without blemish, not even a finger mark marring the finish of these really works of art. Such is the result of American resourcefulness, American energy, and that indomitable spirit of progress that pervades the entire railway supply fraternity. Who can help but admire that wonderful attribute of our American civilization so forcefully exemplified in this demonstration of the efficiency of enthusiasm."



Enrollment Committee, 1922, at the Pier

Enrollment Committee

Front Row (left to right): R. C. Johnson, The Okonite Company; C. L. Birt, Railway Review; H. S. Patterson, Walworth Manufacturing Company; C. W. Johnson, C. K. Packing Company; J. I. Brown, O'Malley Valve Company; S. Inglis Leslie, The Leslie Company; L. D. Mitchell, United States Railway; A. G. Diller, American Locomotive Company; F. C. Koch, Railway Age.

Back Row (left to right): M. V. McKelvey, The G. L. Co.; H. K. Williams, Safety Car Heating & Lighting Company; J. F. Dodson, United States Railway Company; Thomas H. Archibald, Gas Car Heating & Lighting Company; G. A. Basden, King Pneumatic Tool Company; G. E. Ryder, The Standard Oil Company; J. H. W. Wright, Railway Puffing and Soring (missing).



L. C. Hensel
President



E. S. M. MacNab
1st Vice-President



E. Lunn
2nd Vice-President



J. A. Andreucetti
Secretary-Treasurer

Electrical Engineers Meet at Hotel Dennis

Lengthy but Interesting Program Draws Large Attendance
and Provokes Good Discussion

THE SEMI-ANNUAL MEETING of the Association of Railway Electrical Engineers, held at the Hotel Dennis, yesterday morning, was called to order at 10.10 a.m., by E. S. M. MacNab, first vice-president of the association, in the absence of the president, L. C. Hensel. In presenting the opening address Mr. MacNab spoke as follows:

"I am glad to welcome you to this semi-annual convention of the Association of Railway Electrical Engineers, and to see such a good attendance of members.

"I must first apologize for the absence of our president, L. C. Hensel. Those of us who know him, I am sure, agree that it is most urgent business which prevents him being with us today, as he has always been most attentive both at convention and executive committee meetings.

"This is the first semi-annual meeting which has been held for two years owing to depressed business conditions. However, I feel confident that we have passed the lowest point on the curve and that the near future will restore the normal flow of business which is essential for the prosperity of the railways and the country in general. The railway equipment purchases during the past five months, as shown in the *Railway Electrical Engineer*, were as follows: Passenger cars, 1195; freight cars, 77,053; locomotives, 400. These figures would bear out this contention.

"There will be presented for your consideration and discussion, progress reports from several committees, and I would ask that we have a very full discussion, and if any member has any data or information which he can bring out it will materially assist the several committees and at the same time make their reports more complete.

"We will also be favored by having a paper on 'Industrial Heating' read to us by B. F. Collins, of the General Electric Company, which I am sure will be both interesting and instructive. It is a subject that has come to the front of late and this paper will constitute a valuable addition to the proceedings of the association.

"In closing, it is hardly necessary to draw attention to the splendid collection of exhibits on the pier. I often think that we do not sufficiently appreciate the advantages we have by being able to inspect the latest additions in all the branches of the railway mechanical engineering field, and I am safe in saying that in no other part of the world,

would it be possible to duplicate this A. R. A. convention."

Data and Information

Immediately following the opening address the report of the Committee on Data and Information was presented by E. A. Lundy, *Railway Electrical Engineer*. Mr. Lundy spoke of the importance of securing authentic data and information and of the need of tabulating it so as to establish valuable records which will show just what is being done by the different roads. Along the same line, J. R. Sloan, Penn. R. R., suggested that it might be desirable to plot curves showing the increase or decrease of electrical equipment during the years.

E. Wanamaker, Rock Island Lines, said he believed it would be of much benefit to the electrical fraternity if some valuation were placed on electrical equipment. He drew attention to the primary importance of electrical apparatus in present day railroad operation and cited the growth of the investment in electrical material during the past 20 years from \$3,000 to \$3,000,000. Railroad operation is dependent upon electrical equipment to a far greater extent than is generally realized. Railroad managements should be shown the importance of building up an efficient electrical organization so that it can properly purchase, install and supervise electrical equipment.

It was stated by J. A. Andreucetti, Chicago & North Western, that roads did not have figures available which they could supply the committee, although conditions were getting better in this respect since the establishment of valuation departments. He further stated, however, that probably the heads of electrical departments could very likely approximate the value of materials under their jurisdiction.

L. D. Moore, Missouri Pacific, thought that while it might be difficult, that probably the members of the committee themselves could arrive at an approximate figure. It might not be possible to get definite costs, but they could develop a report that would show the relative value of the equipment used on the various roads. The fact is that there has been an increase of six or seven hundred per cent in electrical equipment on the Missouri Pacific during the past 10 years, and if the matter could be brought before the railroad managements the electrical departments would undoubtedly benefit by it.

F. Wanamaker significantly remarked that the tremendous growth of the importance of electrical equipment was not fully appreciated by the electrical men themselves and therefore it could hardly be expected that others would recognize how vital this apparatus had become in railroad operation.

Motor Specifications

The report of the committee on Motor Specifications was presented by Mr. Wanamaker, who stated that the report was at present a tentative specification. Contrary to expectations he said, the various motor manufacturers, as well as the Electric Power Club, had given the committee the heartiest co-operation in preparation of the material included in the report. The specifications as drawn cover alternating and direct current motors of the open type ranging from 1 hp., 1800 r.p.m., to 75 hp., r.p.m. Mr. Wanamaker further stated that if the committee was continued that it was its intention to take up the matter of specifications for mill type, motors, crane motors, control motors and protective devices.

He also emphasized the importance of bearing design in connection with motors, declaring that there never had been any standards for motor bearings. Two chief causes for motor failures he attributed to failure of insulation and to faulty bearings. Mr. Wanamaker commented upon the great amount of interest manifested in the meetings of the committee which was manifested in the large attendance at monthly meetings and in some cases semi-monthly meetings. He said it was surprising to find how little was actually known regarding the life of motors in service. When conflicting opinions were averaged it was found a life of ten years was the resulting figure.

Committee on Illumination

The report of the Committee on Illumination was presented by L. S. Billau, Baltimore & Ohio. He emphasized the necessity of reducing the number of standards for incandescent lamps as much as possible, stating that the committee had striven to do this. He further stated that the 100-watt lamp was being introduced into car lighting service. It is interesting to note that the increase of car illumination which was prophesied several years ago is now becoming a realization. He stated that the Mazda C gas-filled lamp was now available in the 25-watt sizes. One of the most important factors which electrical men should familiarize themselves with, Mr. Billau stated, was the industrial lighting codes which have been adopted in various localities. He said that the probability was that these codes would become more strict as time went on.

G. W. Bebout, Chesapeake & Ohio, introduced the subject of mill type Mazda C lamps for use on extension cords and stated that the C. & O. had adopted this type of lamp as a standard for this service. He said this type of lamp was giving complete satisfaction and had replaced the old carbon lamps entirely. Mr. Andreucetti held quite an opposite opinion, stating that while the efficiency of the Mazda mill type lamp was high, he could not get long enough life out of them to warrant their use. He stated that the renewals were five times as great as when the carbon lamps were used.

F. Jansen, Illinois Central, agreed with Mr. Andreucetti.

Mr. Wanamaker said the Rock Island had just begun using the Mazda lamps in portable service but that they were having good results and suggested that perhaps there was some difference in the type of lamp being used by the other men.

At this point the discussion swung over to the life of incandescent headlight lamps and cab lamps. It was clearly evident that incandescent lamp life and service life were two

quite different things. The discussion became very general and many took part.

A. L. Broc, Edison Lamp Works, gave some interesting facts on the subject of lamp manufacture. He stated that cab lamps and car lamps were made with two entirely different aims in view. The cab lamps, he said, were made rugged at the expense of efficiency while the car lighting lamps were manufactured with the idea of securing maximum efficiency. Referring back to the mill type lamp he stated that these should not be confused with the Mazda C, gas-filled lamp, for although they were similar in appearance the mill type lamp was not gas-filled.

T. P. McGinnis, Pyle National Co., gave some interesting information concerning lamp life tests which his company had conducted on 125 locomotives. He said that by considering the total headlight lamps purchased and dividing the number by the total number of hours burned by all lamps a value of approximately 320 hours of life was obtained. This did not compare favorably with individual test made which showed that 520 hours was frequently secured. The discrepancy shows clearly that many lamp were broken, lost or burned out.

Report on Electric Welding

The report of the Committee on Electric Welding was briefly presented by E. Wanamaker. He stated that it was exceedingly difficult to draw a set of specifications for the reason that there existed so many variable opinions and ideas. Five meetings of the committee had been held and it was expected that a number of additions would be made before the report was presented in its final form in the fall.

Report of Committee on Stationary Power Plants

The committee report on stationary power plants was presented by L. C. Bowes, Rock Island Lines. He emphasized the necessity of distributing the charges made for steam consumption for various railroad purposes. It was a matter which had never received proper attention and was of the greatest importance if any basis for comparison for charges could be arrived at.

Mr. Moore wanted to know if the committee contemplated including methods or a list of items to be used in arriving at power plant costs. He said it was very difficult to get accurate costs of power plant operation.

In reply Mr. Bowes said it was the intention to show what the cost should be so far as labor and materials were concerned, but that interest and depreciation of equipment were very difficult to obtain.

C. Quinn, Norfolk & Western, related his experience with steam flow meters, extending over 15 years. Steam flow meters he said served as an excellent check on steam consumption by various users. The amount of steam used by air compressors he said could be computed from the revolutions of the compressor.

Electric Repair Shop Facilities and Equipment

Mr. Bebout presented briefly the report of the Committee of Shop Facilities and Equipment. In connection with this report Mr. Quinn described the system in vogue on the Norfolk & Western regarding the record of motors. Each motor, he said, was given a number indicating the month and year that the equipment was purchased. A complete record was then available, no matter how many times the motor was transferred from one place to another.

Power Trucks and Tractors

The report of the committee on Power Trucks and Tractors was presented by Mr. Moore. He stated that considerable difficulty was encountered in securing cost data for the reason that many roads did not keep complete records. Industrial concerns using this equipment were very much better in this respect and most of his

cost data had been secured from them. The gasoline tractor, he said, should be included in the report of the committee, as the subject did not specifically state that electric tractors alone should be included. Some diversity of opinion developed as to the attitude of insurance companies relative to the gasoline equipment. It was found that in some cases this equipment was used in buildings and while not specifically prohibited was not recommended for interior use. For long hauls where a greater portion of the route was out-of-doors, it was felt that the gasoline tractor could be used to advantage.

Report of Committee on Train Lighting

The report of the Committee on Train Lighting was presented by Mr. Billau, who drew particular attention to the essentials for direct drive for car lighting generators, which formed a very important part of the report. It was evident from the interest manifested that the time had arrived when the subject of direct drive should receive the most careful consideration and thought. Although a number of devices have been developed by different companies, none has been tried a sufficient length of time to warrant its general adoption. There is obviously a pressing need for some reliable device especially in northern latitudes where belt trouble is excessive.

The barrel type axle pulley recently adopted by the Pullman Company was discussed at some length. Mr. Sloan related his experience with this type of pulley in some tests conducted on a curved track with radius of 247 ft. The pulley in question was 18 in. in diameter in the middle, 16 in. at the ends and was 28½ in. long. Under the most adverse conditions the belt did not come nearer than 1½ in. from the pulley flanges. To mount such a pulley he stated took 18 minutes, and five minutes were required to remove it.

Locomotive Headlights and Classification Lamps

The report of the committee on Locomotive Headlights and Classification Lamps was presented by L. C. Mulheim, supervisor of headlight equipment, Baltimore & Ohio. Mr. Mulheim added to the report by speaking of the possibilities of alternating current headlight generators and also roller bearings for headlight sets. The matter of lamp voltage rating which stumped the A. R. A. discussion of the same report was threshed out by the A. R. E. E. members and the decision reached that the matter was a question of operation, governor adjustment and depended largely upon what was expected from the cab lamps with respect to life and candle power. C. H. Quinn, chief electrical engineer, Norfolk & Western, told how he has greatly reduced his cab lamp costs without any complaints regarding lack of illumination in the cab by using carbon lamps.

E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific, introduced the subject of automatic train control and showed why the A. R. E. E. should take part in activities relating to the subject. He stated that the A. R. E. E. could undoubtedly co-operate with the Air Brake Association on this subject.

After the presentation of reports, a very able paper on the subject of Electric Heating was read by B. F. Collins of the General Electric Company. Metallic resistor furnaces of all kinds and sizes can be supplied for purposes requiring temperatures up to 2000 deg. F. A vote of thanks was extended to Mr. Collins.

Chairman MacNab concluded the meeting by complimenting the association on its work and calling attention to the fact that it was the most successful and the largest semi-annual convention ever held by the A. R. E. E.

Lost and Found

Lost—Silver mesh bag by Mrs. B. V. H. Johnson of St. Louis. Kindly return to Secretary Conway's office.

Enrollment Today

THE ENROLLMENT booth at the entrance to the Million Dollar Pier will be open from 9 a. m. to 12 m.; 2 p. m. to 5 p. m. There will be no enrollment period in the evening today.

Registration Figures

THE COMPARATIVE registration figures for 1922 and 1920 up to 5 o'clock Monday afternoon are as follows:

	1922	1920
Div. V—M. M. and M. C. B.....	950	805
Div. VI—Pur. and Stores.....	333	406
Special guests.....	800	687
Supply men.....	2,285	2,465
Railroad ladies.....	924	746
Supply ladies.....	569	660
Totals	5,861	5,769

Last Registration Book

IT HAD BEEN planned to issue only two registration books this week—one on Monday and one Wednesday. The executive committee decided yesterday to publish a book this morning in place of the one scheduled for Wednesday morning. This will be much more serviceable to the exhibitors and others than if issued the last day of the meetings.

Registration, American Railway Association

Division V—Mechanical

- Adamson, C. W., M. C. B., Interboro R. T., Chalfonte.
- Ahern, W. J., Gen. For., C. & O., Alamac.
- Allen, G. S., M. M. Retired, P. & R., Pennhurst.
- Anderson, H. P., Asst. to Ch. Op. Off., M. K. & T., Chelsea.
- Baker, Geo. H., Pres., Ry. Ed. & Assn., Shoreham.
- Balldo, F. E., S. S., N. Y. N. N. & H., Haddon Hall.
- Band, F. W., Genl. Shop Insp., B. & M., Chelsea.
- Benning, F., G. S., So. Bldg., Wiltshire.
- Berger, John, Sp. Eng., N. Y. C.
- Bingham, C. E., Supr. Mech. Exam., M. C., St. Charles.
- Bodemer, C. J., Asst. S. Mch., L. & N., Chalfonte.
- Borell, E. A., Engr. M. P., P. & R., Bothwell.
- Boyd, J. W., Supvr. Elec. Welding, B. & O., Chalfonte.
- Boyer, H. A., M. E., Erie, Haddon Hall.
- Bradbury, O. H., A. B. Instr., Southern, Shelburne.
- Brady, J. E., Asst. M. M. B. & O., Lamar.
- Brewer, H. W., S. S., B. R. & P., New England.
- Brown, M. G., M. M., M. S. B. & P., Terminal.
- Brown, Wallace W., Genl. Fore. Recl. Plant, B. & M., Colonial.
- Broyden, J. E., S. M. P., A. C. L., Princess.
- Budwell, Leigh, M. E., R. F. & P.
- Burkley, H. J., M. M., B. & O., Schlitz.
- Burrell, W. G., Stationery Agt., G. T., Rummymede.
- Buskirk, J. H., Van, M. E., N. Y. C., Chalfonte.
- Butler, E. A., M. M., B. & A., Chalfonte.
- Butler, F. M., Supt., E. B. T. R. R. & C. Co.
- Butler, J. L., M. M., M. P.
- Butler, T. F., M. M., Penn., Craig Hall.
- Byron, A. W., M. M., Penn., Marlborough.
- Caley, G. W., M. M., N. Y. C., Fredonia.
- Callahan, P. J., Supr. Car & Loco. Elec. Ltg., Colonial.
- Carman, J. H., G. F. C. D., N. C. & St. L., New England.
- Carr, T. L., Genl. Fore. Penn., Craig Hall.
- Carty, F. J., M. E., B. & A., Alamac.
- Chaffin, N. B., M. M., Penn., Fredonia.
- Chambers, W. C., M. M., Wabash.
- Coburn, H. S., G. F., Penn.
- Coddington, H. W., Eng. of Tests, N. W., Chalfonte.
- Collett, R., Supv. Fuel Economy, N. Y. C., Traymore.

Cochran, J. L., M. M., L. Y., Pine Hall.
 Connor, A. J., Sr., Asst. C. M. Eng., United Rys. of Havana, Brighton.
 Conroy, J. T., R. E., West Eng., F. E. C., Lexington.
 Coombs, W. J., M. E., West Maryland, Myrtown.
 Cooney, F. G., Spec. Insp., B. & O., Wiltshire.
 Curry, Geo., Membr. M. C. R., Am. L. Co., Traymore.
 Cusack, J. L., M. M., Erie, Brokers.
 Cusack, J. H., M. M., N. Y., N. H. & H., Haddon Hall.
 Davies, F. A., Road Fore of Engrs., F. E. C.
 Dwyer, D. N., M. M., P. & R.
 Davies, S. K., Fore. Air Brakes, Southern, Breakers.
 Davis, A. J., M. M., Erie, Breakers.
 Davis, Herion H., M. M., D. & W., Alamac.
 Davis, J. E., M. M., H. V., Traymore.
 Davis, W. R., R. F., E. T. & O. C., Haddon Hall.
 Dennis, W. A., M. M., B. & O., Ambassador.
 Denzler, J. M., Air Brake Instr., Penn., Craig Hall.
 Deque, Geo. T., M. S., Erie, Ritz.
 De Salis, J. H., M. M., N. Y. C., Pennhurst.
 Devey, T. S., Sr., Erie, Arlington.
 Dixon, A., Genl. For. C. P., Chalfonte.
 Dixon, W. L., Asst. M. M., B. & O., Elberon.
 Dobson, F. L., M. M., Penn., Chalfonte.
 Duke, G. E., Engr. of Tests, N. Y. C.
 Donaldson, T. C., M. M., R. F. & P., Rrund.
 Duke, W. D., Gen. Mgr., R. F. & P., Rrundede.
 English, W. M., M. M., C. I. & L., Glaslyn Chatham.
 Ewing, T. J., M. E., C. & O., Seaside.
 Feeny, B. J., Travel Engr., I. C., Haddon Hall.
 Fetters, A. H., M. E., C. P., Traymore.
 Firnhaker, F. R., Air Brake Fore., N. Y. & W., New England.
 Flinn, R. N., M. M., Penn., Craig Hall.
 Foran, Thos., Air Brake Insp., L. V., Arlington.
 Frael, Geo. B., S. M. P., Penn., Dennis.
 Fromm, A. B., S. S., I. H. & B., New England.
 Gallagher, F. S., Engr. Roll Stock, N. Y. C., Traymore.
 Gallagher, John E., Road Fore of Engr., P. & R., Martinique.
 Gardner, C. C., Jr., M. M., Penn., Brighton.
 Gelhausen, F. R., M. M., B. & O., Haddon Hall.
 Gilles, W. H., Gen. Fore., Elec. Equip., L. I., Haddon Hall.
 Gillespie, H. C., M. M., C. & O., Chelsea.
 Gillis, H. A., Retired Eng., Seaside.
 Glenn, J. H., R. F. of E., P. & W. V., Sterling.

Good, G. W., S. S., M. C., Haddon Hall.
 Goodin, Geo., Genl. Car Fore., M. C. & S.
 Goodrich, Max, M. M., N. Y. C., Seaboard.
 Graef, C. S., Supvr. Elec. Welding, B. & O., Chalfonte.
 Gray, B. H., S. M. P., Gulf Mob. & North, Strand.
 Gray, C. B., M. M., Penn., Traymore.
 Greenwood, H. F., S. S., N. & W., Brighton.
 Grinshaw, P. G., S. M. P., Penn.
 Gross, E. G., M. M., A. & W. P., Blackstone.
 Hall, C. S., M. M., B. & M., Chelsea.
 Hall, M. A., S. of Mlch., K. C. S., Traymore.
 Hanlin, J. L., M. M., S. H. L., Princess.
 Haupt, H. H., Asst. Eng. M. P., Penn.
 Haynes, T. F., Asst. Eng. M. P., Penna., Craig Hall.
 Headington, R. V., Genl. For., Penn., Princess.
 Hildreth, Fred, F., Asst. Engr. M. P., P. C. C. & St. L.
 Hines, F. D., Genl. Loco. Insp., P. & R.
 Hltch, C. B., M. M., C. & O., Alamac.
 Hofmann, K. E., Asst. Engr. of Tests, W. J. & Seashore.
 Holder, J. A., Genl. Master Boiler Maker, S. A. L., Chelsea.
 Hollingsworth, F. A., Arch., F. E. C., Strand.
 Hopkinson, J. M., M. M., S. & A., Alamac.
 Hull, G. A., Asst. M. M., C. R. I. & P., Chalfonte.
 Hunt, Robert, M. E., S. A. L., Traymore.
 Irvin, I. B., M. M., P. S. & N., Terminal.
 Jackson, W. S., M. S., Erie, St. Charles.
 Jefferson, M., M. M., L. V., Princess.
 Jenkins, E. M., M. E., Virginia, Traymore.
 Jenks, W. J., Gen. Man., N. & W., Marlborough.
 Jennings, J. F., Asst. Supt. M. P., M. C. C., St. Charles.
 Jones, C. D., V. P., Eng. Road Top R. R. Co.
 Jones, Geo. C., Gen. Road Fore. of Eng., A. C. L., Bothwell.
 Kerby, F. W., Supt. Loco. Oper., B. & O., DeVille.
 Knott, F. W., Shop Supt., S. A. L., Princess.
 Laizure, Lee R., Gen. Supt., Erie, Arlington.
 Laking, Ed., Air Brake Supvr., C. & E. L., Bothwell.
 Langston, Geo. H., M. M., Virginian, Marlborough.
 Lanning, H. H., M. E., A. T. & S. F., Chalfonte.
 Leonard, L. P., Air Brake Insp., Penn., Seaside.
 Leonard, W. E., Air Brake Insp., Saur, Ferdinand.
 Livingston, William, Asst. Night Fore., C. R. R. of N. J., Edison.
 Lingenfelt, C. F., Ch. A. B. Insp., Penn., Seaside.
 Lotz, H. B., M. M., Penn., Myron.



Members of the Transportation Committee. Photographed.

Transportation Committee

Members of the Transportation Committee: W. H. Gray, Magnuss Metal Company; J. F. Norton, Globe Seamless Steel Tubes Company; H. S. Lellarge, H. B. Chan Company; W. A. Hooton, Esch Dixon Criddle Company; F. H. Williams, Chicago Cleveland Car Roofing Company; H. F. Danelschajman, W. H. Hooton Company; W. B. P. Rakes, Edwin S. Woods & Co.; J. A. McFarland, Bradford Dratt Gear Company; C. Beaman, Boss Nut Company; R. K. W. White, U. S. Metal Products Company; A. H. Weston, T. H. Stinson Company; H. M. Cook, Columbia Nut & Bolt Company; J. W. Hooton, Ralph Bowe, The Curtin Supply Company; F. C. Folsom, The Railway Materials Company; W. F. Walsh, Galena Signal Company; J. H. Hooton, The Waco Railway Appliance Company; G. H. Snyder, American Steel Foundries; A. Roberts, Grip Nut Company; K. A. Hooton, The Erie Locomotive Works; G. H. Hooton, The National Reining Company; A. L. McNeill, Central Electric Company; J. W. Hooton, The Erie Locomotive Works; J. J. Gullidge, Buckeye Steel Castings Company; W. S. Atkinson, Cook Paint & Varnish Company; J. F. C. Umeo, Hutch & Co.; J. W. Hooton, The Erie Locomotive Works; G. A. M. Kelly, Mag. W. Metal Company; H. A. Pestre, Liberty Manufacturing Company; T. J. Gullidge, Buckeye Steel Castings Company; H. B. R. K. Hooton, American Steel Foundries; A. S. C. Watkins, Southern Wheel Company.

Love, Dumont, Supt., Air Brakes & Fuel Supt., F. E. C., Lexington.
 MacMillan, Fred. L., Supr. of Mat., N. Y. C., Fredonia.
 Macnab, E. S. M., Car. Lt. Eng. C. O., Craig Hall.
 McIvaine, C. L., S. M. P., Penn., Traymore.
 McSweeney, F. J., M. M., B. & O., Haddon Hall.
 Madden, T. P., Trav. Boiler Insp., M. P.
 Mailer, J. I., S. M. P., Ft. Smith & West., Traymore.
 Marriott, E. L., Chf. Drafts, C. & O., Seaside.
 Maxfield, E. G., Genl. Fore., B. & O., Sterling.
 Mellin, C. J., American Loco. Co., Marlborough.
 Metzger, Louis, Gen. Loco. Insp., Erie, Arlington.
 Miller, H. C., Div. Store, B. & O., New England.
 Miller, R. W., Asst. Eng. Office Mech. Eng., West J. & Seabore.
 Mohan, John L., Mech. Office Asst. to Pres., U. P., Traymore.
 Moll, G., Hd. Fore. of Eng., P. & R., New England.
 Monroe, J. W. M. M., Penn., Princess.
 Moore, Wm., S. S., Erie, Arlington.
 Moran, R. P. T., Head. Supr., B. & O., Craig Hall.
 Moriarty, G. A., M. S., N. Y. N. H. & H., Chalfonte.
 Murphy, J. W., G. F. E. & A., Ambassador.
 Morris, John S., Asst. Eng., Nickel Plate, Alamac.
 Murray, F. N., Mech. Supt., Erie, Arlington.
 Needham, H. S., Asst. M. M., Penn., Craig Hall.
 Nesley, F. P., Div. M., M. C., St. Charles.
 Nelson, F. W., M. M., N. H., Traymore.
 Nelson, Wm., M. E., K. C. & So., Traymore.
 Norton, C. N., M. M., Erie, Arlington.
 Onerdonk, J. R., Eng. of Tests, B. & O., Marlborough.
 Page, Chas. N., R. F. of E., L. V., Arlington.
 Parson, C. F., M. H., N. Y. C., Haddon Hall.
 Parson, J. G., S. S., N. Y. C., Haddon Hall.
 Pegg, M. Sr., D. G., United Rys. of Havana, Brighton.
 Peters, D. F., Sup., N. & W., Marlborough.
 Pickrell, W. J., M. M., C. P., Strand.
 Pohlman, Wm., Genl. Fore. Loco. Shops, O. & W. (Middletown), New England.
 Porter, W. B., Asst. Engr. M. P., Penna., Miller.
 Quinn, J. H., G. F., Penn.
 Reese, O. P., Supt. M. A. Varney, Penn., Brighton.
 Rhoads, Geo. Asst. M. E. Div., Penn., New England.
 Rhodes, Robert S., Asst. Engr., N. Y. C., Rummeyde.
 Richardson, E. E., Asst. to Engr. of M. P., B. & L. E., St. Charles.
 Richers, G. J., M. M., Penn., Traymore.
 Riegel, S. S., Mech. Engr., D. L. & W., Arlington.
 Ritter, O. H., M. M., N. Y. N. H. & H., Traymore.
 Robertson, Geo. W., M. M., B. & O., Alamac.
 Roy, E. H., M. M., S. A. L., Alamac.
 Rudd, W. B., Asst. Engr. M. P., Penn., Haddon Hall.

Rusling, W. J., Asst. Engr. M. P., Penn.
 Sasser, J. W., S. M. P., Virginian, Marlborough.
 Scheiffe, John, Road Fore. of Eng., P. & R., New England.
 Schneider, G. A., M. M., Penn., New England.
 Schwindy, H. H., Genl. Fore., Penn., Craig Hall.
 Sechrist, T. O., Asst. S. M., L. & N., Chalfonte.
 Seldou, E. F., G. F., I. Y., Edison.
 Seibert, W. G., G. M. M., N. P., Majestic.
 Shull, C. O., Insp. M. P. Dept., Penn.
 Slater, Jos., M. M., Erie, Breakers.
 Smith, G. W., M. M., Wabash, Alamac.
 Sneeck, Harry, Supv. of Air Brakes, B. R. & P., Pennhurst.
 Snell, E. J., M. M., N. Y. C., New England.
 Spaide, Geo. S. W., Fore., Atlantic City R. R.
 Stayton, C. E., Dist. Fore., U. P., Arlington.
 Steins, C. K., Asst. Engr. M. P., Penn., Morton.
 Stevens, H. R., M. M., A. C. L., Ambassador.
 Stubbs, C. M., Sp. Insp., Erie, Breakers.
 Stumpt, F. L., Air Brake Inst., Penn., Princess.
 Sugg, C. R., Elec. Engr., A. C. L., Ambassador.
 Sutherland, A., M. M., Med. M. C., Ambassador.
 Swanick, Arthur, G. F., W. J. & S. S.
 Tate, M. K., Mgr. of Serv., Lima Loco. Works, Chelsea.
 Thibaut, Geo., M. M., Erie, Arlington.
 Thomas, F. W., Sup. Appre., Santa Fe, Chalfonte.
 Tuma, F. M. M., Erie, Arlington.
 Walther, H. J., S. M. P., R. F. & P.
 Waring, F. M., Eng. of Tests, Penn., Haddon Hall.
 Watson, R. B., Eng. of Tests, Erie, Haddon Hall.
 Webb, E. R., Div. M. M., M. C., Haddon Hall.
 Weedon, R. E., Supt. Roadway Shops, Southern, Traymore.
 Westbrook, M. H., Supt. Loco. Shops, G. T., New England.
 White, J. F., Air Brake Supr., Penn., Seaside.
 Wiggin, C. H., Sup. M. P., B. & M., Chelsea.
 Williams, A. J., Gen. Air Brake & St. Heat Insp., Penn., Seaside.
 Wilson, D. M., Shop Supr., F. E. C., Sterling.
 Wood, H. R., Fore., Penn.
 Woolover, W. B., Act. M. M., L. V., Princess.
 Yaeger, J. P., Gen. Car Fore., P. S. & N.
 Zimkowski, Frank, Gen. Car Ligh. Inc., N. Y. N. H. & H., Colonial.

Division VI—Purchase and Stores

Adams, R. H., Asst. P. A., I. A. & S. L., Traymore.
 Alexander, C. W., G. S. C. of Ga., Ambassador
 Austin, Frank S., G. S., B. & A., Chalfonte.



"Courtesy George A. McKeague, Official Photographer."

Entertainment Committee

Bottom row, left to right: W. R. Walsh, The Glidden Company; R. L. DeArmond, Lowe Brothers Company; A. R. Miller, B. F. Goodrich Rubber Company; O. C. Hayward, Williams-Hayward Company; R. J. Himmelright (chairman), American Arch Company, Inc.; A. G. Johnson, Armspear Manufacturing Company; M. A. Varney, Sunbeam Electric Manufacturing Company; W. J. Carrigan, International Machinery & Supply Company, Ltd.; C. R. Naylor, T. H. Symington Company.

Second row: S. W. Sargent, American Steel Foundries; F. W. Venton, Crane Company; G. W. Taylor, The R. T. Jones Lumber Company, Inc.; C. L. Brown, Manning, Maxwell & Moore, Inc.; R. P. Cooley, Vapor Car Heating Company; J. J. Cizek, The Leslie Company; A. N. Dugan, Bronze Metal Company; W. G. Krauser, Union Draft Gear Company; D. L. Eubank, Galena Signal Oil Company.

Third row: L. J. McCombs, The Patterson-Sargent Company; G. A. Nicol, Jr., Johns-Manville, Inc.; C. W. F. Coffin, Franklin Railway Supply Company; W. G. Cook, Garlock Packing Company.

Top row: C. M. Rogers, Locomotive Firebox Company; G. E. Haas, Pyle-National Company; J. W. Fogg, Boss Nut Company (Missing); L. O. Cameron, Edgewater Steel Company; W. J. Doherty, Continental Iron & Steel Company; C. D. Eaton, American Car & Foundry Company; W. A. McWhorter, Bradford Draft Gear Company; N. C. Naylor, Railway Steel-Spring Company; Leslie R. Pyle, Locomotive Firebox Company; W. M. Wilson, Flannery Bolt Company.)

Conventionalities

We would respectfully refer anyone who wishes to study African golf to Frank Hedley.

W. Harold Tyler, who is now connected with the traffic department of the Denver & Rio Grande Western at New York came down to visit his parents, Mr. and Mrs. W. T. Tyler, at the conventions for a few days.

F. N. Bard, who recently succeeded his father as president of the Barco Manufacturing Company, finds it impossible for the first time in many years to attend the convention owing to the pressure of business.

C. D. Young, general supervisor of stores, Pennsylvania Railroad, reached Atlantic City for the conventions Sunday, having stopped at Ithaca on his way here for a two-day celebration of the twentieth anniversary of his graduation from Cornell University.

Dave Pye tells us that he has gotten his golf score down to 125, but he doesn't say for how many holes. He has left with us a blue print showing graphically the functions of the arms and club and just how they move in the golf swing as outlined at certain periods.

I. H. Milliken, representative of the McConway & Torley Company, Pittsburgh, is not here and sends his regrets to inquiring friends. Milliken has been very active at these conventions for a great many years and it is to be hoped he will be on the job next year.

The double quartette from the Philadelphia & Reading shops at Reading, Pa., proved to be one of the best groups of entertainers that have attended the conventions. The singing and other specialties on the pier Wednesday night and Thursday afternoon were greatly enjoyed and appreciated.

Monday being Harry W. Finnell's birthday; and there being no way in which to celebrate it appropriately at Atlantic City, he left in the afternoon for New York to join Mrs. Finnell and some friends to eat and have a merry time there that evening. Mr. and Mrs. Finnell expect to get back to Columbus Saturday.

F. A. Bushnell, purchasing agent of the Great Northern, is accompanied to the Purchases and Stores convention, as in prior years, by his mother. Mrs. Bushnell is "Mother" to many of the members of the Purchases and Stores Division and is always a welcome visitor.

Allan E. Ostrander is missed by a host of friends. He is taking a needed vacation in Arizona, his present address being Prescott. We take this opportunity of congratulating him on his birthday, which occurs on the twenty-third.

Mr. Ostrander has wired the Daily as follows "Please give my regards to the fellows—see you all next year."

"Sid" Wight, manager of purchases and stores of the New York Central, is not attending the convention of the Purchases and Stores Division this year. He went to Europe a few weeks ago to take the first real vacation he has had in about 20 years. His daughter

has been living in Switzerland for some time, and he will spend most of his vacation there. He expects to return to the United States about the middle of July.

Among the arrivals Monday were A. Cooper, assistant chief mechanical engineer, and M. Pegg, assistant division superintendent of the United Railways of Havana. As the only representatives of the United Railways of Havana, they are finding much of interest to them at this, their first convention. After leaving Atlantic City Mr. Cooper intends to go to England for a few months rest.

Among the "old timers" and attendants this year is George S. Allen. Mr. Allen, who has reached the ripe old age of 86 years, is a retired master mechanic of the Philadelphia & Reading, having been on the retired list for the past 16 years. He has not missed a convention since 1892 and is a life member of the American Railway Master Mechanics' Association. He expects to meet many friends here this year.

Elisha Lee, vice-president of the Pennsylvania Railroad, Eastern Region, who addressed the Purchase & Stores convention, told *The Daily* yesterday that in spite of the coal strike the Pennsylvania recently has been handling 10 per cent more freight business than a year ago. Considering that the Pennsylvania is a very large coal carrier, this is a remarkable fact. "All indications are," said Mr. Lee, "that when the coal strike is ended and coal begins to move in normal volume, the railways of the country are going to have all the business they can handle, and probably many of them will have more than they can handle."

The carnival on the pier Saturday night proved to be one of the most popular entertainment features ever given at the conventions. It was attended by a big crowd, was entirely informal, and everybody had a jolly time. The "kiddy car" races furnished some excitement and a great deal of amusement, while the "Gypsy Trio" was welcome everywhere. The entire Entertainment Committee was on duty and participated in making the carnival a success. The committee especially in charge was composed of Fred W. Venton, chairman, J. Cizek, assistant chairman, W. G. Cook, R. P. Cooley, R. L. deArmond, George E. Haas, Arthur G. Johnson, C. R. Naylor, George A. Nicol, Jr., and H. A. Varney.

Speaking of "old timers" at these conventions reminds us of Stephen C. Mason, of The McConway & Torley Company. In the days of souvenirs Mr. Mason always gladdened the hearts of the editors of *The Daily* by leaving a box of cigars on the desk of the editor-in-chief. While those good old days are passed and gone and the editors now have to buy their own cigars, nevertheless it made our hearts glad to welcome Mr. Mason again this year. His perpetual youth is even more invigorating than were his cigars.

J. H. Waterman, superintendent timber preservation of the Burlington, is unable to attend the convention of Division V. this year because of the illness of his wife. The members of the association sent him the following telegram: "Your friends, which embrace all the members of Division VI. of the American Railway Association, at the opening of their third convention learn with deep sorrow that you cannot open our meeting with your benediction. Each of us individually and all collectively offer a silent prayer for helpfulness for your devoted wife's recovery, and with the knowledge that your thoughts are with us as ours are with you."

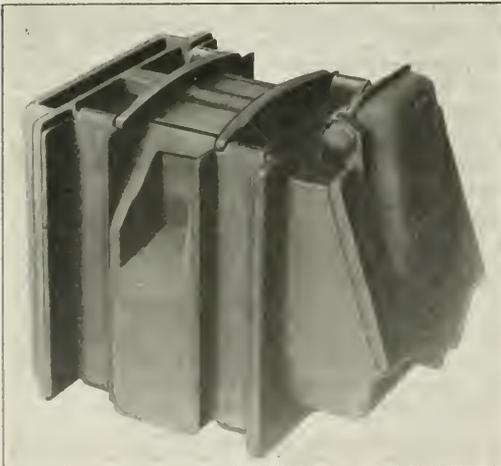
New Devices Among the Exhibits

Passenger Car Journal Box with Renewable Liners

SINCE THE LAST convention, the T. H. Symington Company, New York, has perfected a malleable iron passenger car journal box equipped with renewable pressed steel liners in the pedestal ways and equalizer seat. The grey iron journal box, which is still used extensively notwithstanding its excessive weight and liability to breakage, has been retained primarily because the material of which it is made has a reasonable amount of resistance to abrasion from the pedestal jaws and equalizer bar. The plain malleable iron box, while lighter and much stronger, shows wear in the pedestal ways and equalizer seat more rapidly than the cast iron box.

For many years designers have been endeavoring to develop a type of pedestal way reinforcement which would be economical and effective. This box is designed on the theory that wear is inevitable until there is either developed a type of pedestal which will provide for adequate and continuous lubrication or a combination of materials in contact which will greatly reduce the coefficient of friction.

The pedestal way liners are formed of mild or medium steel, of a degree of hardness which will not wear the more expensive pedestal jaws. The liners are heated before application to the box, forced into position and the top and bottom ends clamped securely around corresponding ribs on the box. The equalizer seat liner is either of cast steel or a drop forging case-hardened, fitted



Liners Are Provided in the Pedestal Ways and Equalizer Seat

neatly into a cored recess in the journal box roof and held in position by pressing over the surrounding metal.

The liners, when sufficiently worn may be easily replaced and a journal box thus equipped should outlast from six to ten years of service. In cases where the liners wear more rapidly than the plain journal box, the substantial economy of this method is obvious.

Annular Disc Boiler Check

THIS NOVEL FORM of boiler check valve, designed by Wm. Sellers & Company, Inc., Philadelphia, Pa., is intended especially for use in the feed-water line between the boiler and the pump of locomotive feed-water heaters and embodies certain new and interesting features.

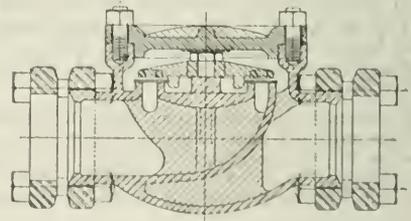
The usual type of locomotive boiler check is not adapted for steam actuated feed pumps on account of the intermittent flow of the water and rapid excessive variations of pressure in the pipe line. It is necessarily made heavy and with a lift sufficient to give the required area of flow; in this form of valve, the shock of closing is severe and soon tends to hammer the valve to pieces. It is, therefore, obvious that the lighter the valve and the shorter the lift, the lighter will be the blow on the seat, reducing the amount of repair and increasing the life of the valve.

The present design includes an annular discharge area with two large circumferences of outlet for the feed-



External View of Annular Disc Boiler Check

water; this annular area is controlled by a light, flexible, non-rusting disc valve, having a short lift. The seat on the body is also of a special form which gives the full area of contact when the disc valve is flexed under boiler pressure. An important advantage of this design is that there is less



Section Showing Construction of Annular Disc Check Valve

tendency to destroy the seat or the valve when foreign matter lodges between the two surfaces; a heavy valve, with its momentum proportional to the lift and boiler pressure, striking a heavy blow, tends to drive such material into the metal, destroying the surface and inducing further leakage. The disc valve, on the other hand, seats easily and gently without shock, causing no damage to either surface, so that both seats are cleaned off during the next flow of feed-water.

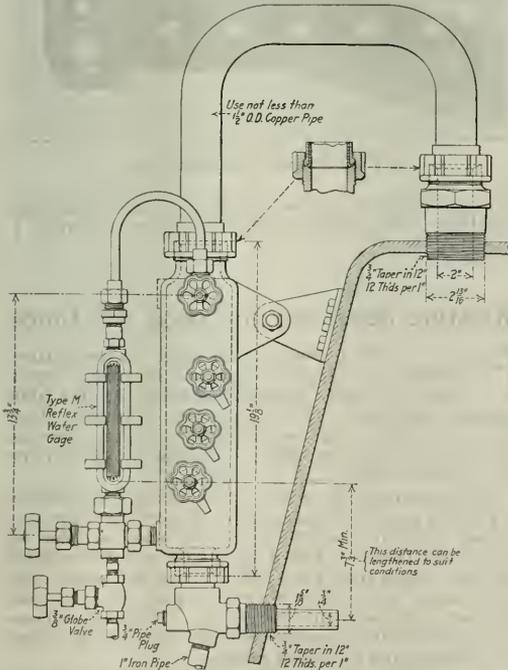
The valve is made at present in the 2½-in. pipe size only. It is interchangeable with the U. S. Government standard locomotive check.

Catenary Hanger

THE WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has on exhibit a new catenary hanger especially designed for steam railroad electrification. This type of hanger is made of copper and is extremely light, the 12-inch hanger weighing but 8 ounces. The design is such that the hanger rods are not weakened where they are attached to the jaws. A pull of 1600 lb. is required to pull the hanger from the hanger rod and the force required to strip the trolley wire from the jaws is 2000 lb. It is claimed that the hanger will not kink the trolley wire when subjected to blows from the pantagraph running at high speed.

Edna Water Column

A WATER COLUMN for locomotive service which can be relied upon to indicate the actual water level in the boiler is being shown by The Edna Brass Manufacturing Company, Cincinnati, Ohio. As will be noted from the drawing, the upper part of the column is connected to the top of the boiler by a U-shaped piece of copper pipe, at least 1½ in. diameter, while the bottom of the column is connected to the water space. The distance from the lower gage cock and the bottom of the



Edna Water Column Insures Accurate Reading of Water Level

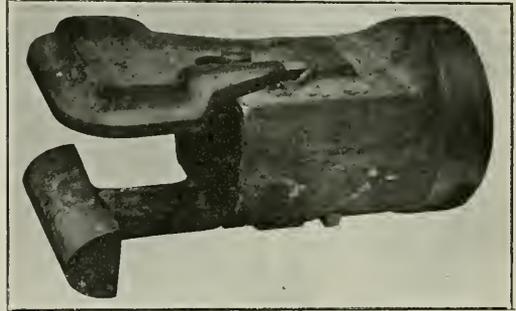
Reflex water gage glass is at least 7¼ in. and may be longer to suit conditions.

The bottom connection of the column is provided with a drain or blow-off cock and a ¾ in. plug, the removal of which permits inspection and cleaning of the water

connection. In addition to the three gage cocks the column is regularly fitted with a type M Reflex water gage although a tubular water glass may be substituted if desired. This column meets all of the safety requirements desired by the Bureau of Locomotive Inspection.

Stoker Distributor Tube

A NEW DESIGN of distributor tube for Duplex Stokers is being shown by the Locomotive Stoker Company, Pittsburgh, Pa. This tube, which is a notable improvement over the old style single-piece casting, is made in three pieces, the top and bottom portions being removable. Should the parts which extend into the firebox



The New Distributor Tube of the Duplex Stoker Is Made in Three Pieces

burn off they can be replaced at small expense and without the necessity of throwing away the tube itself and buying an entire new distributor.

In addition, changes have been made in the shape which give a better distribution of coal than was obtained with the old distributor.

Firefax Cement

FOR SOME TIME furnace operators have felt the need of a refractory cement having super-refractory qualities to be used in the general repairing and patching of high temperature furnace linings and for laying up brick. The demand has been for a cement that would stand up under the highest temperatures encountered in commercial furnace work—a cement that would not melt, disintegrate or blister. To meet this demand The Carborundum Company, Niagara Falls, N. Y., has developed a new cement known as Firefax.

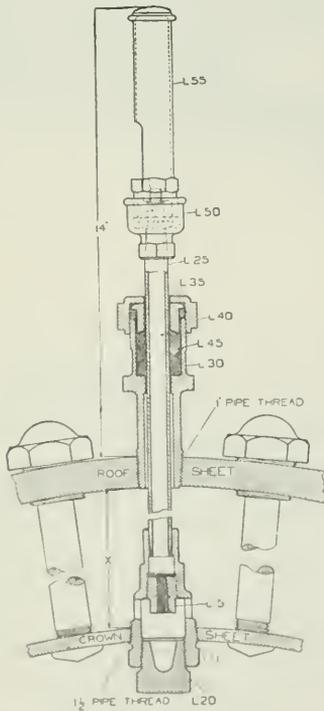
Firefax cement is a mixture of alumino-silicate materials having extremely high refractory properties. Exhaustive tests have proved that it will stand up under the severe conditions of high temperature work without melting, cracking off or even blistering; and it shows such long life as to materially reduce repair costs and lessen the need of costly shutdowns.

Firefax cement will quickly harden at room temperature. It lays smooth and it sticks, making it easy for the furnace builder to handle. It sets or hardens at 1472 deg. Fahr. Firefax is shipped wet ready to use, there being no need of adding any refractory materials to it because it is in itself a super-refractory. This cement can be applied with a cement gun or by ordinary hand methods.

Cleveland Low Water Alarm

THE CLEVELAND low water alarm made by The Talmage Manufacturing Company, Cleveland, Ohio, is a simple fool-proof, reliable device which can be easily applied and cheaply maintained. It consists of a steel cage, ordinarily mounted on the highest point of the crown sheet, from which a copper pipe leads up through a roof sheet stuffing box to a whistle. The crown sheet cage carries the fusible plug which is suspended slightly above the crown sheet and removed from the intense heat and fire-box gases. A closing fire-box plug is screwed into the bottom of the crown sheet cage and furnishes a means for removing the fusible plug.

The fusible plug in the alarm device bears no relation to the fusible plug of common practice which upon melting allows a small jet of steam to blow into the fire-box. In the Cleveland low-water alarm the melting of the fusible plug opens a direct passage way only to the alarm whistle, thereby warning the engineers of the dangerous condition in the boiler in time for them to replace the



Construction of Cleveland Low Water Alarm

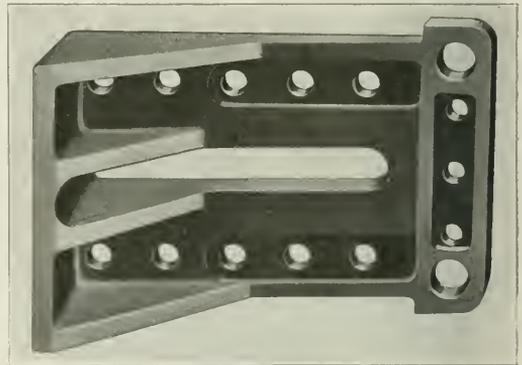
water without any damage to the boiler. After the water rises to a point above the openings in the crown sheet cage, the whistle will stop blowing but the water will continue to escape from the whistle. As the opening in the fusible plug is only 1/4 in. in diameter, the loss of water through the whistle does not necessitate killing the engine but acting as a tell-tale it at once fixes the responsibility for low water. The elimination of all levers, valves, springs and moving parts of any description, and the use of a suitable trap for the fused metal in the fire-box plug insures the proper operation of this device

while the government requirements concerning fusible plugs at the monthly washouts insures its proper maintenance.

The continual loss of life and great property damage resulting from crown sheet failures due to overheating emphasizes the need of a reliable low-water alarm which will give a warning, even though the present boiler appurtenances or the human element fails to function.

Drop Forged Draft Gear Lugs

THE ILLUSTRATION shows a drop forged draft gear stop of the type recently developed by the Standard Forging Company, Chicago, and one of which is being exhibited on the pier. Lugs of this and other de-



A Drop Forged Draft Gear Lug.

signs are forged from open hearth steel, after which the rivet holes are punched. The illustration shown is a front lug.

Moisture Separator for Shop Air Lines

FOR MANY OF THE purposes for which the use of compressed air is applied in car and locomotive repair shops it is highly essential that the air be free from moisture and dirt. The Independent Pneumatic Tool Company, Chicago, has on exhibition a device known as the Thor air separator, which is particularly adapted for use in railway shops.

The construction is simple. Inside of a steel cylinder is placed a pipe, the entrance to which is arranged for connection to an air main and the exits of which are slots so placed that the air is blown against the cylinder walls at an angle which creates a whirling action and causes foreign matter to be removed, leaving pure air to be discharged at the outlets of the cylinder. There are no moving parts and the apparatus requires no attention except for drainage and occasional cleaning.

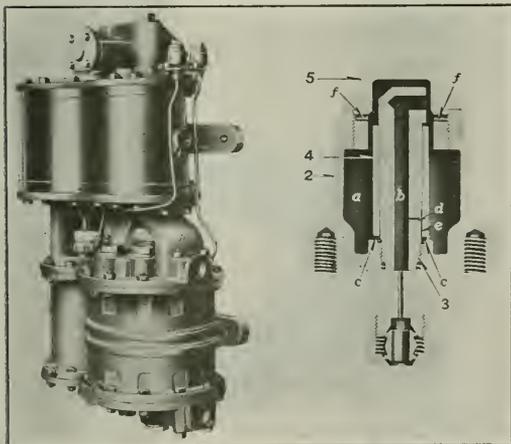
The use of this device is particularly desirable in connection with paint spraying operations and it is obvious that the efficiency of air hammers and motors is increased when clean, dry air is available. Freezing of air tools is positively prevented.

Two sizes are manufactured. A capacity of 150 cu. ft. of free air per minute is provided by No. 150 and 400 cu. ft. of free air per minute can be supplied by No. 400.

Automatic Lubricator for Steam-Driven Air Compressors

THE TYPE B AUTOMATIC LUBRICATOR for steam driven air compressors is a new device now being placed on the market by the Westinghouse Air Brake Company, Pittsburgh, Pa. One of the vital problems in the attainment of efficient air compressor operation is to provide means for supplying lubrication to the air cylinders in proper quantity and at regular intervals. Non-automatic methods may be employed and satisfactory results obtained as long as care and attention are exercised to provide just enough lubrication to keep the compressor in a properly lubricated condition, but experience has shown that this is very difficult to obtain. The ideal method is obviously that which involves feeding the proper amount of lubricating oil to the air cylinders during each cycle of the pistons and causing this feeding of oil to cease when the compressor stops operating. The *Type B lubricator* has been designed to meet these automatic requirements.

The construction and operation of this lubricator are simple, as will be evident from the illustration. There is an oil chamber *a* which is filled from the top when the cap nut 5 is removed. A stem 3 screwed into the body 2 has a central passage *b* communicating at the bottom with the pipe connection leading to the air cylinder, and at the top with chamber *a* through the cavity in the cap nut. An oil port *d* of definite size is located in the stem and connects passage *b* to an annular feeding cavity *e* which is formed by a recess in the stem and the neat-fitting sleeve, around it. This sleeve has two diametrically placed notches *c* at its lower end which connect chamber *a* with cavity *e*.



Type B Automatic Lubricator as Applied to 8½-in. Steam Driven Air Compressor

When the compressor makes its upward stroke, air is forced up through passage *b* and into the space above the oil in chamber *a*. This pressure forces the oil through notches *c* and into annular cavity *e* and from thence through port *d* into passage *b*. When the compressor makes its downward stroke, the air above the oil in chamber *a* is drawn back into the air cylinder of the compressor. As this action takes place, the oil which was forced into passage *b* on the upward stroke of the air piston is broken up into fine particles by the compressed air being drawn

back through this passage, and is carried into the air cylinder in the form of a fine spray. This small amount of oil supplied regularly and reliably is ample to adequately lubricate the air cylinder.

Due to the ability of this type of lubricator to supply minute particles of oil in uniform quantities to the air cylinder of the compressor during each cycle of operation, one filling of its oil chamber will supply sufficient lubrication to the compressor air cylinder for the average trip of a locomotive.

Water Treatment at Wayside Tanks

IN TREATING LOCOMOTIVE feedwater with chemicals, which act inside the boiler, two problems have always been hard to overcome successfully. First, the difficulty of getting the chemicals applied with regularity, and, second, the attempt to treat all waters on a road division or district with the same formula or compound of chemicals. This latter is manifestly unscientific and impracticable since waters generally vary considerably at different sources, some coming from surface streams and others from driven wells. The formula that is chemically suitable for one source is not proper for all—in fact, may have a detrimental effect on the others.

The wayside tank method used by the Paige & Jones Chemical Company, New York, was designed to overcome these two objections to chemical treatment of road engine feedwater. At the pumping plant a feeder made from a piece of pipe is connected with the discharge line of the pump at the bottom, and with the suction line at the top, thus permitting a small stream of water to flow through the chemicals and back into the main line. When water is taken from the city pressure, the feeding device is attached to the feed pipe of the wayside tank.

The compounds are made in hard form, ball shape, weighing one pound each and of such a constituency that they will dissolve in the desired time, 8, 12 or 24 hours, depending upon the amount of water that is allowed to pass through the chemicals. This is regulated by a valve on the intake pipe to the feeder. The required number of balls, depending on the amount of water used, is placed in the feeder at the proper intervals, and with the valve correctly adjusted, all the water that goes into the wayside tank is uniformly treated, and with a formula suitable for that particular water.

Force Feed Locomotive Lubricator

A FORCE-FEED locomotive lubricator, built on the Kipp valveless principle, is being shown by the Madison-Kipp Corporation, Madison, Wis. This lubricator is usually attached to the valve chamber head and, being driven from the valve gear, it starts and stops with the engine. It is consequently automatic in its action and feeds more or less oil according to the speed of the parts that it must lubricate. The oil pumping mechanism contains no ball or spring seated valves.

This lubricator will always furnish the same quantity of oil regardless of the differences in viscosity due to hot or cold weather. Being located outside of the cab, the lubricator is out of the hands of the engineman and the oil feed may be adjusted to a definite allowance with assurance that this allowance will be maintained. Another advantage claimed for force-feed lubrication is that the consumption of oil is somewhat reduced, while the steady supply is responsible for lowering the cost of locomotive maintenance.

Large Size Boiler Plates

PROBABLY COMPARATIVELY FEW realize the large size of the plates which are being used today in some of the latest designs of locomotive boilers. The fact that the largest plates in the world have been and are now being rolled in American mills has made it possible to use a single sheet for the crown and sides of fireboxes, a practice which has recently become quite common.

Among the large size boiler sheets which have been rolled by the Lukens Steel Company, Coatesville, Pa., for locomotive fireboxes are those for the Union Pacific which were 250 in. by 183 in. by $\frac{3}{8}$ in., some for the Atchison, Topeka & Santa Fe, 250 in. by $195\frac{1}{2}$ in. by $\frac{3}{8}$ in., others for the Union Pacific, 241 in. by 195 in. by $\frac{3}{8}$ in., and also the large sheets for the new Southern Pacific locomotives on exhibition, 223 in. by 150 in. by $\frac{3}{8}$ in.

Sheets of very large size and of greater thickness are used for marine boilers. For such boilers, shell sheets have been rolled which were $144\frac{1}{4}$ in. by 246 in. by 2 in. and weighed 21,000 lb. each; also flanged heads, 183 in. diameter, $1\frac{1}{4}$ in. thick and flanged 11 in. deep, the sheets before flanging being 199 in. diameter. For stationary boiler sheets have been used which were 280 in. by 196 in. by 23 32 in. and weighed 33,400 lb. each.

The mechanical difficulties of rolling such large sheets of only $\frac{3}{8}$ in. thickness have been considerable and the fact that they have been made is a real achievement. The use of such sheets is distinctively advantageous to the railroads, as the number of seams is reduced with a saving in rivets and labor; also the possibility of leakage is decreased.

Type D Radial Buffer

With the original Type C buffer made by the Franklin Railway Supply Company, New York, owing to the tension imposed on the adjustable chafing plate through the springs, it has always been necessary when connecting the locomotive to the tender to call in the services of another locomotive. This locomotive was generally backed against the rear end of the tender, forcing it up to its own locomotive against the spring tension so that the drawbar pin could be slipped into place. All this has been made unnecessary with the type D buffer.

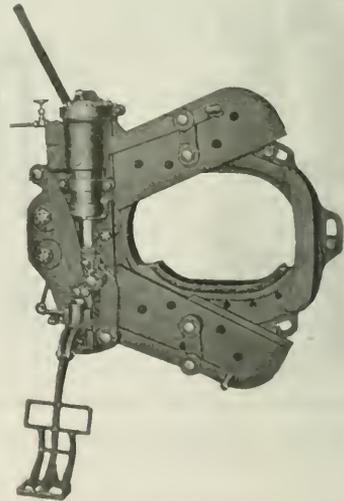
The adjustable chafing plate is equipped with a lug at each end through which a substantial bolt is passed. The chafing plate pocket in turn is also equipped with lugs supported by ribs which strengthen the slots by which the nuts are held from turning. The lug in addition to performing its regular work of drawing up the spring also compensates for the amount of metal which is necessary to cut out of the end of the main pocket. In connecting the locomotive and tender it is merely necessary first to insert the bolts in place and screw the nuts down by hand until the heads rest against the lugs on the adjustable chafing plate. In that position the springs will be at their free height. A wrench is then applied to the head of the bolt at each end and the adjustable chafing plate is drawn up against the spring tension a sufficient amount to enable the drawbar pin to be easily dropped through the eye of the bar. With this in place, the bolts are merely backed off and entirely removed, allowing the springs to force the adjustable chafing plate into position against the floating chafing plate in the regular manner.

When the engine and tender are connected and it is des-

sired to separate them temporarily, the bolts are applied in the same manner, drawing up the adjustable chafing plate against the spring tension until the blocks are entirely free. As this removes all binding, the pin can be very easily taken out. The bolts are then left in place so that when reconnecting engine and tender, it will be merely necessary to bring them together as above stated and drop the pin into place. On new equipment the lugs on the chafing plate pocket can be cast integral and on old power it is only necessary to cut out a portion of the end of the spring pocket, bolting and welding thereto a small separate lug. On both old and new power a new adjustable chafing plate embodying the lugs will be required.

Shoemaker Radial Fire Door

THE SHOEMAKER radial fire door is the especial feature of this year's exhibit of the National Railway Devices Company, Chicago. This new development from the older types of Shoemaker horizontal and vertical doors combines the feature of air operation with balanced arc-moving doors and results in an effective automatic fire door that is locked shut when not operating. The doors are air operated, the control valves being opened and closed by connection from a foot pedal. By using two pistons of different size combined with suitable ports, the doors are cushioned both in opening and in closing, so that they do not open with a jar or slam shut. Provision is also made for cracking the door when entering terminals or at other times when steam is shut off, this being accomplished by opening a pet cock and then



Shoemaker Radial Fire Door

throwing over the lever shown at the top of the illustration.

These doors insure protection against accidents from steam or gas blowing back through the fire opening, provide quick movement combined with quick action, are easy to operate, and give full width of opening for the shovel.

Ohio Low Water Alarm

AS AN EXTRA safeguard against the danger of explosions or burned crown sheets in locomotive boilers due to low water, the Ohio Injector Company, Chicago, has designed the automatic alarm shown in the illustration. This device includes a fusing chamber shell screwed into the crown sheet; and a fusing chamber plug which passes through this shell and extends 1 1/4 in. into the firebox and is held in position by a nut. The plug is insulated from shell and nut by an air space surrounding the plug and by two gaskets. The upper portion of the plug is provided with a chamber to receive the fusible material which consists of nothing but pure Banca tin.

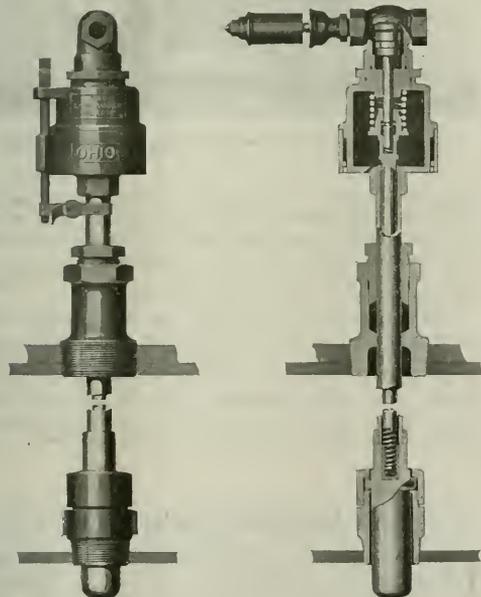
A tube is screwed into the plug, passing up through a stuffing box in the wrapper sheet and supporting a valve cage. Into this cage is screwed the complete valve assembly that controls communication between a steam supply pipe from the boiler to the whistle in the cab. This valve assembled consists of a body valve on the upper end of a stem with a retainer and an opening spring.

The operating rod is threaded at its lower extremity and these threads are in engagement with the fusible material in the plug. The upper end is provided with a hexagonal section to permit of its being rotated by a wrench, and is in contact with the valve stem through a small expansion

surrounds the upper portion of the plug and cannot absorb the heat. This results in a rapid rise of temperature in the upper portion of the plug, causing the fusible material to melt. The rod then no longer having any means of support drops in the molten tin to the bottom of the chamber; it is assisted in its downward movement by the large spring which opens the valve, causing the alarm whistle to give warning.

When the alarm whistle sounds, giving warning that the water is low, although the crown sheet is not uncovered, the engineman should proceed at once to start his injectors and bring the water to the proper level, which will again surround the upper portion of the plug with water and thereby cool the tin and solidify it. The lower extremity of the rod is threaded and having dropped to the bottom of the chamber in the plug will have the solidified tin cast around it somewhat in the form of a nut.

The engineman after making certain that he has 2 in. of water in the water glass, should break the seal and withdraw the wrench, which permits him to remove the cage sleeve and thereby gain access to the hexagonal portion of rod. He can not rotate the rod with a wrench, thereby shutting off the whistle, restoring the device to its initial position and placing it in readiness for another alarm. After replacing the cage sleeve and wrench the absence of the seal indicates that the device has operated.



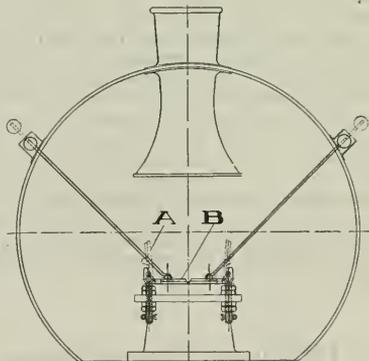
Ohio Alarm for Indicating Low Water

spring. A wrench passes through slots provided in the cage and cage sleeve, thereby closing access to the hexagonal portion of the rod. It is sealed in this position, as shown in the view at the left.

With the rod screwed up, the valve to the whistle is closed. As long as a proper level is maintained in the boiler, water will surround the upper portion of the plug and absorb the heat conducted by the extension into the firebox, thereby keeping the fusible material below its melting point and providing support for the rod. With the water lowered to a dangerous point it no longer

Automatic Exhaust Nozzle Cover

AMONG THIS YEAR'S EXHIBITS of the Detroit Lubricator Company, Detroit, Mich., is an automatic device for closing the exhaust nozzle openings when steam is shut off. The application shown is for a double low nozzle and consists of two covers or clack valves, hinged at the outer sides. The valves are held open by the escaping steam and are closed by gravity when the exhaust ceases. Attached to the valves are tell-tales which



Detroit Exhaust Nozzle Cover

may be used for demonstrating purposes, but have nothing to do with the operation.

A noticeable feature of the device is the hinge connection which is designed to eliminate the possibility of cinders and carbonization preventing positive action. The use of these exhaust nozzle covers will prevent smokebox gases and cinders from entering the cylinder and causing carbonization, thus increasing the life of cylinders, piston rods, valves, valve stems, piston rings, bushings and packing.

Sand Drier Stove

AN IMPROVED SAND DRIER stove of the cone type, known as the Perfection, has been placed on the market recently by the Princeton Foundry & Supply Company, Princeton, West Va. This stove has five or more downwardly sloping cones which set on top of the firebox, having an opening of $1\frac{1}{2}$ in. between each other. This feature allows the draft of heated gasses going to the smoke pipe to pass out through the openings between the cones and draw a large portion of the steam and dampness out of the sand instead of forcing it out through the body of the sand as is done in the ordinary drier.

The sand hopper around the stove tapers more than 20 in. from top to bottom, leaving a space at the bottom of 6 in. to 8 in., the height of the firebox, where the remaining amount of dampness—left after the sand has passed the cones—is removed by the direct heat of the firebox. As it is necessary to carry only a small amount of fire to obtain full capacity, this stove is unusually economical in the use of fuel.

For general railroad service, where the stove is to be operated 24 hours a day, stoves with 6 or 7 cones and a hopper 50 in. to 56 in. high are commonly used. The capacity of such a stove is upwards of 425 tons per month. As a protection and aid to long life, the firebox is lined with a special fire brick lining.

Although the first stove was only made in 1918, they have been installed on a number of railroads which are said to report savings in fuel and labor with an increase in capacity.

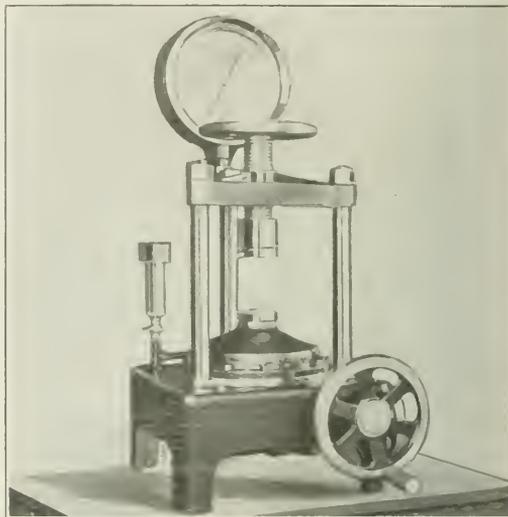
Hand Fire Extinguisher

THE FIRE GUN MANUFACTURING COMPANY, INC., New York, is exhibiting a new line of hand fire extinguishers, made in three sizes which range from 1 quart to $1\frac{1}{2}$ quarts capacity. The double-action of this new device is designed to insure a steady stream of a special fluid which instantly vaporizes when it strikes the fire. The heavy gas so generated forms a blanket, excluding the oxygen and extinguishing the fire. The Fire Gun is easily operated and can be discharged in 20 seconds. It is made of brass and built to withstand rough usage. The liquid is said to be effective where water is useless, since it does not freeze at temperatures down to 50 deg. F. below zero. It is a non-conductor of electricity, does not deteriorate or evaporate in the gun and, it is said, will not injure the most delicate fabrics. A more recent addition to the Fire Gun Manufacturing Company's products is Fire Gun Type B, a 2½-gallon soda and acid fire extinguisher.

Pittsburgh Cement Tester

VARIOUS ENGINEERING bodies over the country have been giving the subject of testing cement in compression considerable attention for the past two or three years and have seriously considered the elimination of the tensile test and the substitution thereof of the compression test. This is due to the fact that concrete is considered good for compression only. To meet the demand for a compact, low-priced machine which would at the same time be of ample strength and yet simple and quickly operated by hand, the Pittsburgh Testing Laboratory, Pittsburgh, Pa., has designed and built at its own shop a cement-testing machine of the compression type.

The operation of the machine is simple. The 2-in. by 4-in. cylindrical specimen is placed on the ram in the center, the upper spherical head is brought down into contact by the handwheel on the square-threaded upper screw, and hydraulic pressure is applied on the ram by turning the handwheel in front in a clockwise direction. The



Simple Machine for Testing Cement in Compression

pressure is shown by the gage. After the specimen has been broken the handwheel in front is given a turn or two in a counter-clockwise direction, after which the ram is returned by the handwheel at the right side.

A dead-weight tester, shown at the left of the ram, may be used to test the accuracy of the gage.

The area of the ram is 50 sq. in., and a rubber diaphragm is used to keep the glycerine from leaking past the ram. The capacity of the machine is 15,000 lb., which is obtained at a pressure of 300 lb. per sq. in. on the liquid. The outer graduations on the dial show the total load, while the inner graduations show the load in pounds per sq. in. on the 2-in. diameter cylinder of cement.

Air Drills for Light Work

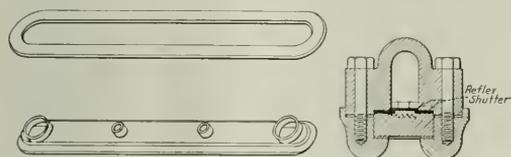
PNEUMATIC DRILLS which are remarkable for their convenience, small size, and lightness in relation to the capacities available, have been added to the Thor line of pneumatic tools and are being shown by the Independent Pneumatic Tool Co., Chicago.

These drills, known as the "Pigmy" type, are of 4-cylinder design, with an aluminum casing, and ball bearings throughout. Three sizes are available with drilling capacities up to $\frac{1}{4}$ in., $\frac{3}{8}$ in. and $\frac{1}{2}$ in., respectively. The weights range from 5 lb. to 6 lb. according to the capacities. In addition to their usefulness for light locomotive drilling such as tell-tale staybolt holes, these drills may be equipped with a brush or may be adapted in car work to light drilling, to wood boring, and driving screws. The construction throughout is of the durable type required in railway shops.

Reflex Water Gage Shutter

AN INTERESTING PROTECTOR or shutter for water gage glasses of the Reflex or Klinger types has been perfected by the Sargent Company, Chicago; after having been thoroughly tested out in locomotive service it is now being shown for the first time. This shutter consists of a thin, non-corrosive diaphragm which is located between the water space and the gage glass. Its use will prevent or very greatly reduce the three kinds of wear or erosion which reduces the life and effectiveness of Reflex gage glasses. Distilled water, constantly dropping from the condensation in the water gage top, has a strong affinity for glass. The shutter is, therefore, so shaped that such condensation is prevented from coming in contact with the exposed upper part of the glass.

Water gages must be frequently blown out and this rush of steam and water has an erosive effect on the inner Reflex glass face which the shutter also prevents. Moreover, the shutter is so fitted between the gasket and the glass as to give added tightness to that steam joint, consequently preventing leakage which quickly ruins the glass.



Sargent Reflex Water Gage Shutter

It will also be noticed from the illustration that the shutter is provided with holes which allow a free circulation and the clearances are such that there is no difference in the appearance of water and steam spaces from that of the gages not equipped with a shutter.

In addition to the water gage shutter, the Sargent Company is showing a locomotive water gage column.

Spiral Fluted Taps

AN ENTIRELY NEW FEATURE in staybolts is being exhibited this year by the W. L. Brubaker & Brothers Company, Millersburg, Pa., in their spiral fluted tap. Among the advantages claimed for the spiral flute is that in case a thread tooth becomes broken, the tap will still tap a hole of exact size. Also, with the spiral



Brubaker Spiral Fluted Tap

flute, the cutting action is at an angle to the work being performed; hence, metal is removed with less resistance, thus increasing the life of the tap to a noticeable extent.

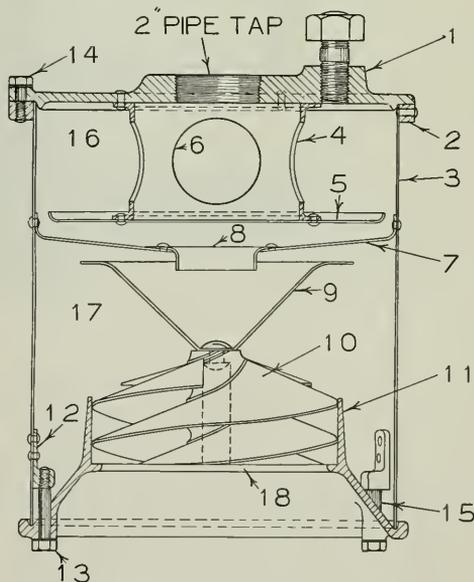
Special small tools adopted as standards by the American Railway Tool Foremen's Association, are included in the exhibit. These standards comprise the radial staybolt tap, spindle tap, button head radial staybolt tap, standard boiler head and wash-out tap.

Welding or closing in of old staybolt holes has placed a severe test on the threading tool and the spiral fluted staybolt tap was developed and tested out for this severe work. The results are so satisfactory on this difficult work that the spiral flute is being adopted for all classes of work.

Centrifugal Air Pump Strainer

AN AIR PUMP strainer of a distinctively novel and interesting type is being exhibited by the New York Air Brake Company, New York. This strainer as shown in the illustration, consists of a cast iron top plate 1, to which is attached a cylindrical shell or chamber 3 and a bottom cover 11. The chamber is divided into two parts by a partition 7 with a central opening 8. The bottom cover 11 holds a spiral 10, to the top of which is attached a bell-shaped deflector 9. In the upper chamber and attached to the top plate is a cylindrical sleeve 4, having four openings 6, the bottom of the sleeve being closed by a baffle plate 5.

In operation, air enters the bottom at 18 and in passing up through spiral 10 receives a rotary motion. After leaving the spiral the air comes in contact with deflector bell 9, which causes the particles of entrained dust to strike the outer wall and fall down into the lower portion 15, where they are deposited. The air flow is next reversed, passes inward between deflector 9 and partition 7, reverses again to flow up through opening 8 when it strikes the baffle plate 5. This diverts it to the outer wall of chamber 16,



A New Type of Strainer for Air Compressors

from which it flows through the openings 6 and through the pipe connection to the compressor. Any particles of dust which fall down from partition 7, baffle plate 5 or outer walls of the upper chamber, will be deposited in the bell-shaped deflector 9. By removing the bottom cover 11

any dirt which has accumulated around its outer edge or in the deflector ϕ may be quickly and completely removed.

This strainer not only has a high initial efficiency, but this efficiency will remain constant instead of being gradually decreased as is the case with strainers which depend upon curled hair or other substances which slowly fill up with dirt until removed and cleaned.

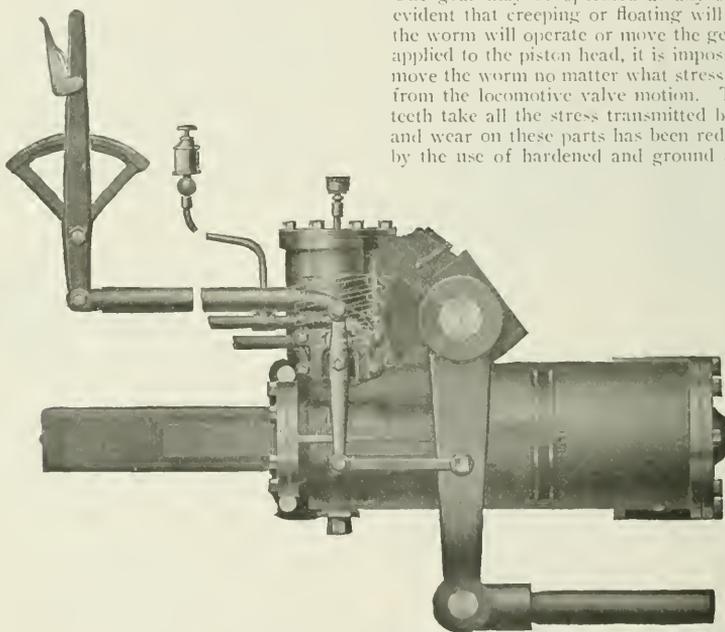
Changes in Barco Reverse Gear

THE POWER REVERSE GEAR shown this year by the Barco Manufacturing Company, Chicago, embodies a new idea in power reversing mechanisms. The gear does not depend upon the sensitiveness or tightness of the valve or piston to hold it in position, and eliminates the balancing feature.

It is designed to use either air or steam, which may be alternated without causing any dis-arrangement, or without requiring any adjustments. Air is used to operate the gear, and not to hold it in position. As soon as the gear has been moved to the required point of cut-off by means

the lever is in central or neutral position, both ends of the cylinder are open to the atmosphere through the exhaust ports in the valve. When the quadrant lever is moved either forward or backward, air is admitted to one end of the cylinder, immediately moving the piston in the direction desired. A vertical, one-piece steel pinion and worm is connected directly to the piston by the horizontal rack, which takes the place of a piston rod. The worm engages with a segment or gear, attached to the reach-rod arms through the shaft, which is in one piece with the gear or segment. A floating arrangement, connecting with the quadrant lever at one end, and the reach-rod arm at the other, with a central connection to the rotary valve, makes the operation of the link motion and the quadrant lever simultaneous. It will thus be seen that any movement of the quadrant lever will immediately produce a corresponding movement through the reach-rod arms on the link motion.

The combination of worm and gear insures positive and accurate adjustment, and produces a maximum amount of power with a minimum pressure and volume. The gear may be operated at any speed desired. It is evident that creeping or floating will not occur, as while the worm will operate or move the gear when pressure is applied to the piston head, it is impossible for the gear to move the worm no matter what stress may be transmitted from the locomotive valve motion. The worm and gear teeth take all the stress transmitted by the valve motion, and wear on these parts has been reduced to a minimum by the use of hardened and ground alloy steel forgings



Barco Improved Reverse Gear

of the quadrant lever in the cab, the air is exhausted and both ends of the cylinder remain open to the atmosphere through the exhaust ports in the valve until the position of the quadrant lever in the cab is again changed.

It can readily be seen that a leaky valve or leaky piston rings cannot cause the gear to creep or float, and that no air is admitted between the periods of adjustment. For instance, if the gear is hooked up to the proper cut off on a road engine, no further air will be required until such time as it is necessary to change the cut off, due to variation of speed or grade.

The operation of the Barco reverse gear is controlled by the usual quadrant lever located in the cab, connected by a reach-rod, attached to the body of the gear. When

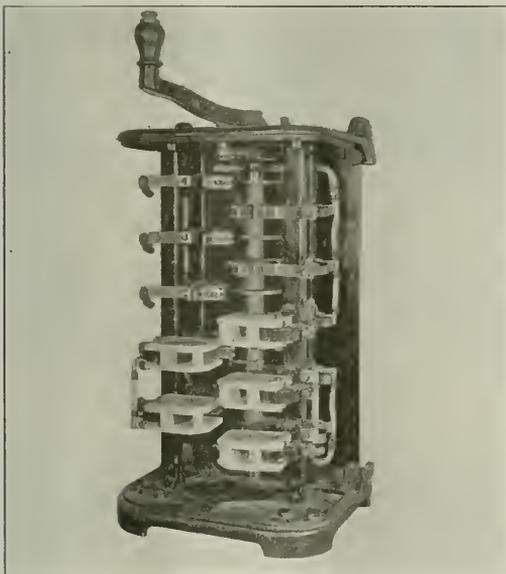
and castings, which operate in a bath of oil similar to the differential on an automobile.

It sometimes happens with all power reverse gears that the air or steam supply pipes are cracked or broken in service, thus causing an engine failure. In fact, a number of railroads have installed flexible joints in the supply pipes to eliminate breakage from expansion or vibration. An interesting feature of this gear is that the engineman or fireman may adjust the valve motion in any position desired, either forward or backward, by applying an ordinary 12 in. monkey wrench to the hexagon end on the bottom of the pinion, which extends below the body of the gear. This eliminates possibility of reverse gear failure, which might be caused by broken pipes, levers, etc.

Controller for Turntable Motors

ONE OF THE devices being exhibited by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is a special form of drum controller for the wound-rotor induction motors used on turntables. The controller is designed to control two motors in cases where they required speed of turntable operation makes the use of two desirable.

The contacts are of the rolling type and are actuated by cams. The main line carrying contacts are protected



The Controller Has Rolling Contacts and Magnetic Blow-Outs

against burning by magnetic blow-outs of the same type that are used by magnetic contactors. It is claimed that this form of construction considerably lessens the burning and pitting of the contacts and that the controller is particularly suitable under conditions of hard and frequent service.

Rogatchoff Piston Bull Ring

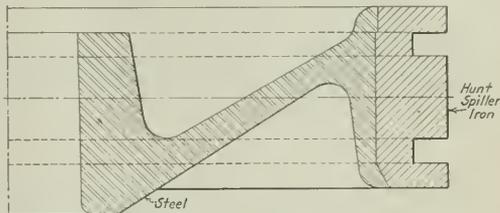
STEEL PISTONS have the bull rings attached in different ways: by bolts, rivets, pins, plugs, retaining rings, and electric welding. The application or removal of the bull rings is a time-consuming process and in many cases is responsible for breaking cylinder heads and cylinders, or bending piston rods and main rods.

The improved method of shrinking bull rings on pistons, as developed by the Rogatchoff Company, Baltimore, Md., eliminates all of the above mentioned attachments to hold the bull rings on the piston and there is nothing to become loose and cause damage.

The front end of the piston for a distance of $\frac{3}{4}$ in. is turned $\frac{1}{32}$ in. larger in diameter than the main portion. When putting on a bull ring it is expanded sufficiently to slide over this enlarged portion and when the ring has cooled this acts as an effective retainer. At the inner

end the bull ring comes into contact with an enlarged tapered shoulder.

The Rogatchoff method of shrinking the bull ring on the piston cuts down the labor to less than other methods



No Separate Retaining Devices Are Required With This Bull Ring

of application. Such a bull ring has been tested in heavy freight service, the mileage thus far obtained being from 35,000 to 40,000 miles.

Thermic Syphon Tests on Central of Georgia

TO DETERMINE the merits of the Nicholson thermic syphon the Central of Georgia decided to make a trial application. The test was made on a 1600 Class locomotive; these have never been considered free steamers and at times have given considerable trouble due to lack of steam.

Locomotive 1605 used in the test is a 10-wheel type saturated locomotive having cylinders 21 in. diameter by 26 in. stroke. The firebox is of narrow type, $40\frac{3}{4}$ in. wide by 108 in. long, with a grate area of 30.56 sq. ft. The steam pressure was 180 lb., and the tractive effort 28,250 lb. This size firebox is suitable for a single syphon, which was designed to present 31 sq. ft. of additional firebox heating surface. Two arch tubes were also used in this firebox to aid in supporting the arch brick. The complete firebox heating surface was 216 sq. ft.

Locomotive 1609, chosen to run opposite the 1605, came out of the shop with similar repairs about the same time as the 1605. The two locomotives were alike in every respect except the firebox, the 1609 having arch tubes but no syphon. The firebox heating surface was 185 sq. ft.

During the test care was exercised to hold all conditions as nearly uniform as possible. Three round trips on each locomotive were run and the data secured were used in compiling the results. Water was carefully measured and coal was as carefully weighed, an extra allowance being provided where necessary to build or maintain the fire when not in use on the road. Losses due to safety valve injectors, etc., were carefully recorded and considered. Feed-water temperature and temperature of the atmosphere averaged respectively the same for both locomotives. Coal analyses showed that the quality of fuel was practically the same.

The test was conducted on a division totaling 200 miles for the round trip and the average train load varied only 10 tons. The amount of coal used per thousand gross ton-miles was 335 lb. for the non-syphon locomotive 1609, as compared with 288 lb. for the syphon locomotive 1605, a difference of 14 per cent in favor of the 1605. In addition the syphon locomotive used nearly six per cent less water per thousand gross ton-miles than the opposite

locomotive. General results are shown in accompanying table.

As for maintenance costs, locomotive 1605 has been in service nearly a year and there has been no expense involved in connection with the syphon. It was only necessary to wash out the syphon when the remainder of the boiler was washed.

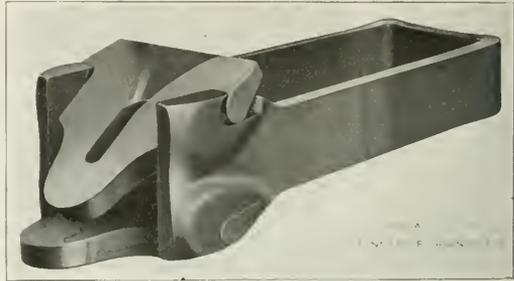
As a result of the test and of subsequent performance of locomotive 1605, the General of Georgia contemplates equipping the remainder of the 1600 Class locomotives and locomotives of other types.

SUMMARY OF RESULTS OF TEST

	Eng. 1609	Eng. 1605 favor	Eng. 1609	Eng. 1605 favor	Eng. 1609	Eng. 1605 favor	Eng. 1609	Eng. 1605 favor
	New Syphon	Syphon Difference	Non Syphon	Syphon Difference	per cent.	per cent.	per cent.	per cent.
Date of test	Dec. 1921	Dec. 1921	Dec. 1921	Dec. 1921				
Tonnage—average per trip	256	266	200	200				
Mileage per trip	200	200	51,200	53,200				
Gross ton—miles—average per trip	5	5	5	5	5	5.17		
Number of cars—average per trip	1,000	1,034	17,160	15,317				
Total coal used—as fired—lb.—average per trip	17,160	15,317	95,807	93,769	2.127			
Total water used—lb.—average per trip	335	288	13	13				
Lb. coal (as fired) per 1,000 gross ton-miles	85.3	76.6	10.7	10.7				
Lb. coal (as fired) per locomotive-mile	17.16	14.81	13.7	13.7				
Lb. water evaporated per lb. of coal	5.58	6.12	9.7	9.7				
Lb. water per 1,000 gross ton-miles	1,871	1,726						
Annual fuel consumption—tons	3,080	2,758						
Annual cost at \$3.73 per ton on tender	\$11,522	\$10,287						
Annual saving per locomotive								\$1,235

is drawn out under a hammer and the ends are drop forged.

Two important features make the use of this yoke attractive on both tenders and cars. The process of forging eliminates any possibility of porosity and makes the sectional area a practically certain quantity. The three-part construction makes it possible to renew any part



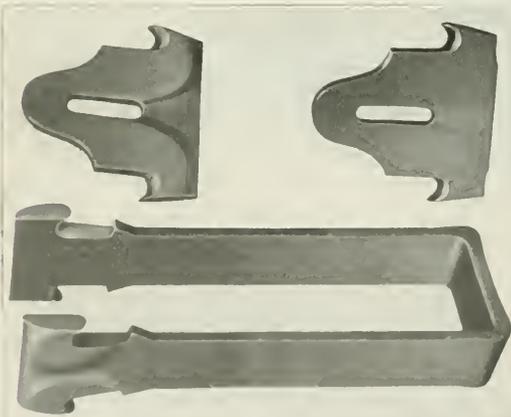
Yoke Partially Assembled

separately so that the entire yoke does not have to be scrapped in case the limit of wear at the key-way has been reached or other condemning causes exist. Should repairs become necessary, either the strap or the heads can be salvaged. The head members are interchangeable and can be replaced easily.

Key Connected Forged Coupler Yoke

THE SALIENT FEATURES of the key connected forged coupler yoke, which has been perfected recently by the Standard Forgings Company, Chicago, and is now ready for the inspection of those attending the conventions, have drawn much favorable comment.

The complete yoke consists of three parts which include two head members and a strap. The shapes of the



Head Members and Strap of Key-Connected Forged Coupler Yoke

parts are such that they can be assembled without difficulty and liberal surfaces and sectional areas are provided for meeting the severe service requirements.

The parts are forged from solid steel billets. The head members are drop forged and fitted so as to present a unit of strength and dependability. The body of the

Otis Train Control

THE OPERATION of a new train control device is being shown by the Otis Automatic Train Control, Inc., Spokane, Wash. It is operated by movable ramps placed alongside the track. The normal position of the ramps is at danger with the center peak four inches above the rail; it is held in this position by a weighted cam unless pulled down for a clear block by a solenoid in circuit with the track.

Attached to the locomotive are two plug type rotary brake setting valves with hollow shoes, one being used when running forward and the other when backing up. Connections to these valves are reversed by the engineer in accordance with the direction in which he is running. A speed control attachment is also included which consists of a mechanical governor driven by a belt from the track axle. When the speed at which the governor is set is exceeded, it acts to discharge air from the brake pipe, thus causing an application of the brakes, and when the speed has been reduced the exhaust is closed and air is again admitted to the brake pipe to cause a release.

Air Cooled Rod Packing

ONE OF THE MOST INTERESTING of recent developments in metallic packings for piston rods and valve stems is the one shown by Morris Brewster, Inc., Chicago. In this packing the ordinary arrangement of parts has been reversed, the sliding plate being placed at the bottom of the box and the spring at the outer end. The packing itself is of the well-known King type. Only the sliding plate and inner face of the packing are exposed to steam pressure. The spring and outer end of the gland box are open to the atmosphere and consequently remain relatively cool.

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WE GUARANTEE that of this issue, 12,400 copies were printed; that of these 12,400 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,500 copies for distribution at Atlantic City.

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We have commented several times in preceding *Dailies* upon the importance of the foremen and the subordinate

Importance of Personnel Problems

officers who come into direct contact with the men in the ranks. Some roads, many of them in fact, have secured excellent results by regularly holding foremen's meetings, discussing not only current detail problems, but often providing for the presentation of special subjects of a more general nature by different foremen. On some roads, for instance, the foremen are encouraged to read the current railway publications which make a special appeal to them, and to report at the meetings on those things which they believe should receive special consideration in their own shop or on their own road. One encouraging feature of some of these meetings is the fact that the discussion frequently gets away from detail shop practices and covers larger problems, such as the management of men and the recruiting and training of apprentices, etc. After all, it is these discussions relating to personnel that will be productive of the greatest results. There is no more important question in industry today. Fortunately an understanding of these problems does not require a college or university training. Pioneers have blazed the trail and the average

officer or foreman by well-directed reading and study, and the application of a reasonable amount of common sense, can go a long way in perfecting himself. A dull tool is a poor thing to work with and a little expenditure of energy in sharpening it will produce wonders when it comes to increased production for the expenditure of a given amount of energy. The same principle applies to studying your relationship to the men under you and applying the good things which industry and other departments and railroads have learned as to the management of men. Don't be a dull tool!

Much has been said, and justly so, in praise of the modern milling machine because of its accurate production work,

As a rule, this machine shows to the best advantage in making duplicate parts. Modern slab and vertical mill-machine operations are now on the market which would simply open the eyes of rail-

road men of former days if they could see the cutting feeds and speeds used in machining rods and other heavy locomotive parts. The fork ends of side rods, for example, are now milled with one roughing and two finishing cuts in a small fraction of the time formerly required to drill and slot. But milling is by no means confined to this relatively large work. Experience shows that for planing large numbers of driving boxes, cross-heads, shoes and wedges, and other work of a similar type, the milling machine is a most effective tool. An interesting example of what is actually being accomplished with a four-head planer-type milling machine, recently installed in the Beech Grove shops of the Big Four, is described in the December, 1921, *Railway Mechanical Engineer*, page 766. The machine referred to is used mostly for milling driving box shoe and wedge ways and crosshead shoes, assembled on the crossheads. Ten cross-heads or 40 driving boxes are machined in eight hours, and the driving box and crosshead requirements of Beech Grove are filled in three days a week, leaving the machine free the remainder of the time for other work. In sizing up a shop to determine what machine operations can best be performed on millers, the plain and vertical knee type milling machine should not be left out of account. These machines are now made rugged, and are accurate, easily-controlled and designed to operate consistently under the heaviest cutting feeds and speeds which high-speed milling cutters will stand.

The statement has been made that if the installation of any machine tool will show a return of 15 per cent on the investment and the facts can be pre-

**Must a Machine
Tool Be Operated
Continuously?**

sented before the proper authorities, necessary funds will be available for purchasing the machine. The question is how to determine exactly what saving will be effected by a machine and this involves some more or less careful calculations regarding the present cost of doing work and what the cost will be as done on the new machine. The time element is a direct factor in possible savings as it is evident that if a machine can perform a certain operation in 30 min. (including the time for setting up work, sharpening tools, etc.) at a saving of 25 cents, the total saving in an eight-hour day will be 16 times 25 cents, or \$4.00. There are many practical men who have a violent antipathy to machine tools standing idle and it is true that if they are idle either all or a large enough proportion of the time, interest charges on the investment and depreciation will represent an in-

creasingly heavy loss. While it is desirable to keep machines running all the time (in which case maximum savings are effected) there is no justification for arbitrarily refusing to install any machine simply on the ground of lack of work to keep busy all the time. It is simply a case of applying common horse sense and balancing relative costs. In the particular case cited, for example, it may develop that a saving of \$3.00 a day will provide the required 15 per cent return, in which case the machine would have to perform the operation 12 times (in six of the eight hours). If there is enough work to keep this machine busy for six hours a day, install it even if it has to stand idle the other two hours. Any work which is done in those two hours represents a net return over and above 15 per cent. There is another factor which should not be forgotten, namely, that almost any type of modern production tool after being installed is eventually utilized for other work besides that for which it was purchased. It is often found adaptable for unexpected uses and can then sometimes be run on two or more shifts, in which case the net return to the company is just so much greater.

The past two or three years has witnessed a wide variation in labor and material prices and unless careful checks have been made at some recent date, there is probably not a railroad reclamation plant in the country at which some parts are not now being reclaimed at a loss. It is important

Check Your Reclamation Work

that a continual check be kept on reclamation operations because, while there is a possibility of great saving, there is also a possibility of great loss when attempting to reclaim scrap at excessive labor or other cost. Every item should be subjected to critical examination in view of the changing labor and material prices. The determination of what it pays to reclaim and what is not worth reclaiming can be arrived at only by an accurate knowledge of prevailing material prices and the actual cost of reclamation work. Among other things a careful check should be made to see that no material is sent to central reclamation departments if not suitable for reclaiming. Failing to do this may result in unnecessary handling charges and transportation costs. The way this particular feature of reclamation work is handled on the Chesapeake & Ohio is described by E. A. Murray, shop superintendent at Huntingdon, W. Va., in an interesting article in the June *Railway Mechanical Engineer*. The inspectors on that road examine all scrap material, marking each piece which is suitable for reclamation with white paint and each piece which cannot be reclaimed with yellow paint. In this way all the material reaches its proper destination without back travel or rehandling in any way. Scrap reclamation is a highly important subject and one which must be watched closely, otherwise material will be reclaimed at a cost which is greater than required to buy the parts new.

Railroad shops are not as a rule provided with enough modern heat treating equipment, including suitable furnaces, pyrometers and quenching mediums. While heat-treating methods are primarily for tools, certain roads are heat-treating rods and other parts of the motion work. In both cases the best qualities of the steel cannot be brought out unless the proper heat treatment is given. Guess-work methods must be eliminated and replaced by modern methods to accomplish the results desired. High-speed

steel is entirely too expensive to be spoiled, and not only are tools spoiled when given improper treatment, but there is a big loss due to inefficient or spoiled work. A word may well be spoken, in this connection, for the tool makers who heat-treat railroad tools. Most of these men have read about and studied the heat treatment of steel, otherwise they would be unable to get the results desired; they should be encouraged by the managements as much as possible to extend their studies. The sectional and annual meetings of the American Society for Steel Treating afford a valuable opportunity for tool makers to broaden their knowledge of the art and the net return to the railroads will justify the expense necessary to send these men to the conventions. It is a short-sighted policy to place anything in the way of tool makers acquiring this additional information. In a specific case a young tool maker who had acquired considerable skill decided to attend the annual Steel Treaters' convention, being graciously accorded permission to go, with transportation afforded him. The traveling expenses, however, aside from transportation, had to be taken out of his own pocket and he was not paid for the two days he was away. If the rules of the railroads are so inflexible that no provision is made for a case of this kind it is certainly time for some radical action. Shop superintendents should have authority to send their men to such meetings with all expenses paid and wages continued, where the information gained may be worth to the railroads many times what it cost.

The necessity of keeping the percentage of turnover of material purchased by railroads as high as possible for a given period is self-evident and needs no supporting arguments. Each year the railroads spend an increasingly large proportion of their gross revenue for material, and in 1920 this proportion reached 17.3 per cent, or slightly over one billion dollars for Class 1 roads; this is exclusive of coal. On railroads having well organized and efficient stores departments the material turnover is in the neighborhood of 25 per cent a month, whereas the turnover on roads not giving the same attention to their service of supply may be only 12½ per cent a month, or lower. This means that if two roads in these respective classes are of the same size the latter road carries its material just twice as long as the former and therefore pays twice the interest on the investment to say nothing of depreciation, obsolescence and handling costs. These latter factors are all extremely important and furnish additional reasons for making the turnover percentage as high as possible. Material held in stock too long becomes obsolete and then is good only for the scrap bin. Many kinds of material depreciate rapidly even with the best of care. Costly as the practice is, metallic parts and bar stock are often stored outdoors where they rust and deteriorate rapidly when subjected to inclement weather conditions. For example, spring steel stock has been known to rust and corrode to such an extent that it was valueless. This condition is often accentuated by the fact that new stock is added to old piles and when a requisition is received for this class of material it is always taken from the top of the pile with the result that material at the bottom never gets used, or at least not for a long period. If this material is of a kind subject to corrosion or deterioration it eventually becomes valueless. Rubber hose and other rubber goods furnish an additional example of material which deteriorates rapidly even when stored with the greatest care and it is doubly important therefore to ob-

Stores Department Turnover

tain a quick turnover on this class of goods. In view of the amount of money involved and the possible savings it is practically impossible to place too much emphasis on the need for a high percentage of turnover of stores department stocks.

The modernization of the large power plant or the selection of suitable equipment for the new power plant is very largely an engineering problem and the benefits of wise planning are continuous as long as the plant remains in service. Even the supervision of the large plant to insure that the maximum efficiency of which the facilities are capable be continuously developed, is a comparatively simple matter. But the small boiler plants located at engine terminals and small shops, widely scattered over the railroad lines and operated by forces of indifferent ability, present a much more serious problem. In the aggregate it is not improbable that these plants consume more fuel than the comparatively small number of plants large enough to be equipped with adequate modern facilities. The need for some system of supervision over the operation of these plants was brought out forcefully in the discussion on stationary boiler plants during Tuesday's session of the Mechanical Division, by the experience of one railroad on which a careful check of the steam requirements of a small plant brought to light the fact that about 40 per cent of the total steam consumption was accounted for by radiation and leakage losses. The situation was one which no doubt would have justified a considerable expenditure for the improvement of facilities, but the pertinent fact is that means were found whereby the stand-by losses during the time when the shop was not operating could be very largely eliminated without the necessity of making any capital expenditure whatever. For roads of considerable mileage this situation is one which can best be handled by a staff supervisor whose duties require him not only to check the performance of the power plant operators, but also periodically to make a careful survey of the power requirements and the condition of all steam generating and power distribution facilities. The benefits to be derived from the work of such a supervisor will in large measure depend on the selection of a man with the right personality. His methods must be those of persuasion rather than of force and results will be measured by the extent to which he is able to secure the co-operation of local shop and division officers. The field of such a supervisor should include water service stations and plants under the jurisdiction of other departments as well as the mechanical department.

**Supervision
of Small
Boiler Plants**

The problem of the college man in railroad service has been under discussion for many years and at the present time the results of the efforts to induct these men into the service of the mechanical departments, is even more unsatisfactory than ever before. A few roads continue to take a limited number of mechanical engineering graduates into their service as special apprentices. But, although it is beyond question that the railroads need recruits who have trained minds and a thorough grounding in the fundamentals of engineering, it is a fact that other industries continue to take the pick of the college men. Is it impossible to develop satisfactory methods of academic training or to find a practicable means of enlisting the product of the engi-

**The College
and
the Railroad**

ering schools in railroad service? The instructors and executives of the engineering colleges of the country have organized the Society for the promotion of Engineering Education, and this body has a committee, the purpose of which is to consider this and other questions pertaining to special apprenticeship on the railroads. Here is an opportunity to remove the lack of understanding by the engineering schools and the railroads of each other's problems, by their joint consideration, if a committee representing the Mechanical Division were to act with the special apprenticeship committee of the society. The colleges are as much in need of this sort of co-operation as the railroads. It is essential for the development of effective academic work that the schools have a clear vision of the opportunities for college men in railroad work, to what extent specialization in railway mechanical engineering should be carried, and what schools should be encouraged to develop the special courses. Should these courses be confined to purely engineering subjects or ought they to include a groundwork in the economics of railway transportation? These are all problems in the solution of which the advice of the practical leaders in the railway field is needed. On the other hand, the railroads have much to learn as to the proper development of the special apprentice after he has entered the service. Is it not as essential that the special apprentice be required to follow a regular course of study to supplement the practical work to which he is assigned, as it is that the regular apprentice be required to apply himself in this manner? There are doubtless many other specific questions which would be developed by joint inquiry if representatives of the two organizations were to come together with a serious purpose to understand and help each other.

One of the radical forward steps in locomotive development taken during the past year has been the application of the steam turbine to the locomotive. To be sure, the suggestion is not really new and several early and poorly worked out attempts were made a number of years ago, but until last year little of consequence had been accomplished. The rapid increase in the cost of fuel as a result of the world war has brought out a demand for many changes in engineering practices which formerly were given only superficial attention. Economies in locomotive operation have assumed increasing importance and European designers have seriously attacked the problem of perfecting the turbine locomotive, with the result that locomotives of this type are now in regular operation in Sweden, England and Switzerland and are under construction in other countries. No detailed information in regard to the designs is yet available and only meager data concerning steam and coal consumption have been given out. There has been sufficient, however, to make it certain that the efficiency is far ahead of anything previously obtained from a steam locomotive. No one expects that these early applications will be perfect in design and it may take years before certain mechanical difficulties are overcome. We have in this country engineers who have done much to bring the locomotive to its present stage of development, also those who have aided greatly in perfecting the turbine. Instead of waiting for European engineers to develop the turbine locomotive and thereby losing several years' time as we did waiting for them to develop the superheater, feedwater heater, outside valve gear and many other locomotive features, why not undertake some of the real pioneer work in this country? The incentive is there and the returns from success are bound to be large.

**Turbine
Locomotive
Possibilities**

Program for Today

Three railroad conventions will be in session in Atlantic City this morning.

Division VI, Purchases and Stores, A. R. A.

This meeting will be held in the Hotel Traymore and will be called to order sharp at 9:00 a.m.

	A.M.	A.M.
Discussion of Reports on:		
Subject 13—Forest Products.....	9:00 to	9:30
Special Subject, "The Need of a Sinking Fund to Care for Deterioration, Obsolescence, and Other Losses Incidental to the Handling, Use and Distribution of Materials," by H. H. Laughton.....	9:30 to	9:50
Subject 15—Buildings and Structures and Facilities.....	9:50 to	10:00
Special Subject: "Office Routine in Purchasing and Stores Departments" by E. W. Thornley.....	10:00 to	10:15
Special Subject: "Stationery, Including Repairs to Typewriters," by C. B. Tobey.....	10:15 to	10:45
Special Subject: "Educating Employees of the Store Department for Their Duties," by A. S. McKeligion.....	10:45 to	11:15
Special Subject: "The Human Equation in Railway Service of Supply," by M. J. Wise.....	11:15 to	11:30
Subject 19—Fuel Conservation Joint-Committee.....	11:30 to	11:45
		M
Report of Memorials Committee.....	11:45 to	12:00
		P.M.
Report of Resolutions Committee.....	12:00 to	12:15
Report of Nominating Committee.....	12:15 to	12:30
Election of Officers.....	12:30 to	1:00

Division V, Mechanical, A. R. A.

The meeting will be held in the Greek Temple on the Million Dollar Pier, and will be called to order sharp at 9:30 a.m.

Discussion of Report on:
Design and Maintenance of Locomotive Boilers.
Subjects Referred for Discussion.
Closing Exercises.

Air Brake Association

The meeting will be held in the Vernon Room of Hadson Hall and will be called to order sharp at 9:00 a.m. This is done in order to permit of an early adjournment so that those who so desire can leave immediately after lunch.

The two papers which will be presented for consideration are the reports of the Committees on Recommended Practice and on Triple Valve Repairs.

The annual election of officers will follow the presentation of the papers.

Entertainment Features

10:30 a.m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

Lost and Found

Lost—An earring. Please return to Mrs. Argyle Campbell or to Secretary Conway's office.
Lost—A bridge #622. Return to John L. Nicholson, Locomotive Fire Box Company.

Lost—A round pearl, sapphire pin. Please return to Mrs. Mildred Tucker, Booth 21.

Lost—A silver watch, which has been his constant companion for many years. The finder is requested to deliver it at the *Daily Railway Age* booth.

Registration Book

So many people registered yesterday that the executive committee of the R. S. M. A. decided to issue another enrollment list this morning.

Appreciation of Good Work

THE EXECUTIVE COMMITTEE of the Railway Supply Manufacturers' Association yesterday showed its appreciation of the good work done by its retiring president, J. P. Schurch, and its secretary, John D. Conway, in a substantial manner. It presented Mr. Schurch with a pair of white gold cuff links set with diamonds, and Mr. Conway with an amber-headed cane.

Annual Purchases and Stores Ball

THE ANNUAL Purchases and Stores Division grand ball which was held on the Pier last night, was largely attended and every body had a good time. The committee in charge was composed of N. C. Naylor, chairman, Lewis C. Cameron, W. G. Cook, C. W. Floyd Coffin, W. J. Doherty, A. N. Dugan, Oscar C. Hayward, George A. Nichol, Jr., Leslie R. Pyle, W. R. Walsh and W. M. Wilson.

G. S. Edmonds Elected

President of Cornell Alumni

THIRTY ENTHUSIASTIC ALUMNI of Cornell University met at the Traymore on Monday evening for the dinner of the Cornell Association of Railway and Supply Men. Among those present were several who had attended class reunions at Ithaca last week and A. R. Ayers, president of the association, called on a number to tell of their experiences while visiting their alma mater. The officers elected for the ensuing year are: President, G. S. Edmonds, superintendent motive power, Delaware & Hudson; secretary, A. F. Stuebing; *Railway Age*.

Enrollment Today

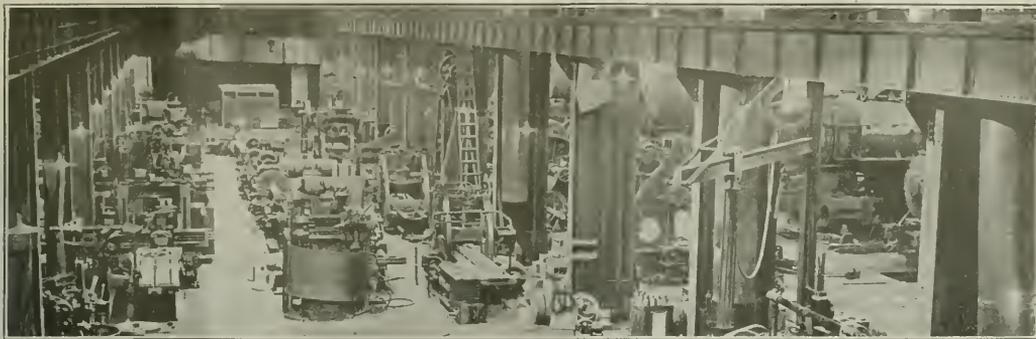
The enrollment booth at the entrance to the pier will be open from 9:00 a. m. to 11:00 a. m. this morning.

Invitation From E. S. B.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia, Pa., extends an invitation to convention attendants to visit its factory at Nineteenth street and Allegheny avenue, Philadelphia, Pa., on Thursday, June 22.

Additional Exhibitors

DuPont Valve Company, Philadelphia, Pa.—Automatic drain and relief cocks. Represented by R. A. Parkinson. Space 528.
Johnson Manufacturing Company, Urbana, Ohio.—American railway standards of tinware, including locomotive oilers, tall-tow pins, sprinkling cans, oil containers, signal guns, etc. Represented by Isaac T. Johnson and H. W. Jacques. Spaces 328-330.
National Graphite Lubricator Company, Scranton, Pa.—Type B National graphite lubricators. Represented by H. H. Brady and F. S. Watters. Space 24.



American Railway Association—Division V—Mechanical

Reports on Locomotive Construction, Feed Water Heaters,
and Boiler Plants on Tuesday's Program

Chairman Coleman called the meeting to order at 10 a.m.

Report on Locomotive Construction

The committee's report is in effect eleven separate reports on as many separate subjects, all pertaining to locomotive details or appliances, except one, which presents a comparison and summary of the various formulas for calculating the tractive effort of Mallet locomotives.

In few cases do the committee's investigations indicate the practicability of making definite recommendations. The definite conclusions are to

the effect that the life of the flanged bottom tank will be longer than that of the bottom riveted type; that an automatic drifting valve is desirable if one can be developed which will operate successfully both at high and low speeds, without undue maintenance costs; that the tank syphon is adapted for use with lifting injectors, and tank valves with non-lifting injectors; and that metallic feedwater connections between engine and tender need further development.

THE COMMITTEE this year has confined its report to the study of various details of locomotive design and construction which have been referred to it. Each of these subjects is reported upon separately under the following headings.

The tractive effort of Mallet locomotives working simple has been considered and it is not believed advisable to recommend a uniform formula. Mallet locomotives with an intercepting valve design to allow steam from the boiler to pass direct to the low pressure cylinders and the exhaust from the high pressure cylinders direct to the stack permit an increase of approximately 20 per cent in the tractive effort of the locomotive. This calculated increase is not available unless the factor of adhesion is high enough to prevent the wheels from slipping. Where the factor of adhesion is low, it would be more practical to divide the weight on the driving wheels by about 3.8 and determine the tractive effort in simple operation on this basis.

The railroads can best determine for themselves what tractive effort to choose in simple operation dependent upon the design and weights on drivers of the locomotive.

There are other variables that could enter into a formula such as the compounding system, travel and valve setting, kind of valve gear, but it does not appear advisable or necessary to take all of these into account.

The American Locomotive Company's formula for the tractive effort of Mallet locomotives working compound is based on a total M. E. P. of 91 per cent. of the boiler pressure. The Baldwin Locomotive Works' formula is based on a total M. E. P. of 85 per cent. of the boiler pressure. The I. C. C. formula for Mallet locomotives is based on a total M. E. P. of 94 per cent. of the boiler pressure.

To illustrate the difference in formulae for compound working, the tractive effort has been calculated for five different Mallet locomotives in the table, in which

C = diameter of high pressure cylinders in inches
c = diameter of low pressure cylinders in inches
S = stroke in inches
P = boiler pressure in pounds
D = diameter of driving wheels in inches
R = ratio of cylinder volumes
K = a constant
T = tractive effort working compound at maximum cut-off and low speed

Locomotive	Type	Cylinders C c S	P	D
A	2-6-6-2	20- $\frac{1}{2}$ -33 x 32	210	57
B	2-6-6-2	21- $\frac{1}{2}$ -34 x 32	200	57
C	0-8-8-0	26 -40 x 28	220	51
D	2-8-8-0	25 -39 x 32	240	57
E	2-6-6-2	23 -35 x 32	225	57

Locomotive	A. L. C.	B. L. W.	J. C. C.
	$T \frac{C^2 \times S}{K \times P} \times D$	$T \frac{C^2 \times S}{R + 1} \times D$	$T \frac{C^2 + C^2 \times S \times P}{4 \times C^2} \times D$
A	64,320	60,779	65,127
B	66,715	63,044	67,050
C	103,333	97,580	102,747
D	107,386	101,464	107,374
E	84,022	79,338	83,231

Broken Frames and Suggested Remedies

In but a few instances will it be found that the breaking of frames can be ascribed to method of attaching boilers to frames. Usually locomotives remain in service several years before frame failures occur, and possibly there will then be an epidemic, indicating that time is an element. Investigation of failures on different classes of locomotives on one railroad, indicated that the principal zone of failure was in the neighborhood of the main wheel, or ahead of the front pedestal, and little trouble occurred at the point where furnace is attached to the firebox.

If locomotives are designed with frames of proper strength to withstand stresses, little trouble should be experienced with broken frames, if a locomotive receive necessary running maintenance. Neglect of loose pedestal binders, loose wedges and worn rods, result in many frame failures.

Locomotives have been designed with insufficient frame cross-ties and cross-ties deficient in strength, or improperly located so that frames are not properly tied together. When many of the older locomotives were designed, the art had not advanced to a sufficient degree to clearly understand the varied stresses set up in locomotive frames, and undoubtedly there is much yet to be learned in this respect.

The vertical loads due to the dead weight carried, as well as the vertical, longitudinal and lateral loads caused by the piston thrust, brake equipment, etc., produce strains that cannot be completely analyzed. This, therefore, requires that the frames be designed with very low stresses per unit of section, or very liberal sectional areas, to allow for these unknown forces. The frame, frame bracing and boiler when fastened together, should form a rigidly connected structure, and in whatever direction the thrusts may be applied, it must retain a fixed relation of one part to another.

The springs and spring equalizer rigging must provide the necessary flexibility and absorb the stresses which are imposed on the locomotive laterally, due principally to centrifugal forces on curves, and the reaction of the guiding effect of the engine truck, which is concentrated at the first frame pedestal as a fulcrum, with its resulting lateral bending stresses in the frame, between the pedestal and the cylinder. The longitudinal flexibility, due to brake application, is likewise absorbed in the spring rigging, as well as the vertical pressure due to the dynamic augment resulting from the driving wheel counter-balance.

The pressure due to the piston thrust produces vertical pressure on the guides. This guide construction, must form a rigid framework in itself, as the fatal results from any flexibility in the working of these parts will be easily understood.

The bracing of the frames should be applied as closely as possible to the points of application of pressure in the various directions. It is most improper in designing frames simply to add metal to prevent breakage, instead of designing to absorb the stresses in the proper manner. The adding of weight to the frames would serve practically no purpose in remedying frame breakages. On certain existing locomotives, the addition of one or more waist sheets would have a beneficial effect. It must also be kept in mind that if a sliding bearing is used under the front and back of the furnace, it should be provided with brass bearings. Otherwise it is liable to become corroded and stuck, in which case broken frames are apt to result. When the top waist sheet angle is riveted to the boiler, and also to the waist sheet plate, there have been many instances where it was most difficult to keep either boiler or plate in the top or bottom of the waist sheet plates. This difficulty has been overcome by applying support that is flexible at the ends, so that the boiler merely rests upon a bearing, which is free to move when the boiler expands.

A very interesting method used by some railroads which claim advantage therefrom is this material. In 1914 the Committee on Use of Special Alloys and Heat-treated Steel, reported in a general way the various wire stresses as used by the locomotive engineer for frames, as well as other parts. So far as locomotive

frames are concerned, the practice is still in use, though more or less elaborated. The American Locomotive Company formula is:

$$S = \frac{T}{C} \text{ Where } S = \text{section area of frame}$$

$$C = \text{piston thrust}$$

$$T = \text{constant (see table below)}$$

	From cylinders to main pedestal, including top rail over main pedestal	Back of main pedestal
A—Top of Pedestals.....	2,500-2,700	2,900-3,200
B—Top rail between pedestals.....	3,000-3,200	3,500-3,800
C—Lower rail between pedestals.....	4,300-4,500	5,100-5,300
D—Integral single rail at back of cyl. key-ing lug.....	1,600-1,800	.....

This method gives sectional areas back of main pedestal approximately 15 per cent. less than similar areas at or ahead of the main pedestal. The depth of the top rail ahead of the front pedestal must not be less than that of the top rail over the front pedestals. In general, these stresses are used regardless of whether the material is open hearth carbon steel or vanadium cast steel.

Some of the steel companies are at this time in position to furnish one piece cast steel locomotive bed, which does away with many of the undesirable features of present frame design. The main advantage, however, is stronger frame with less weight, and it would seem to be a very great improvement over what has heretofore been used.

Slide Valves On Mallet Locomotives

In early locomotives of the Mallet type the "D" slide valve was used on the low pressure cylinders. In the early service when used as pushing locomotives, there was no particular trouble experienced with the cutting of the low pressure slide valves and cylinders. As these locomotives were employed in road service, the cutting of the slide valves in the low pressure cylinders developed. The piston valve was then resorted to to overcome this trouble, and locomotives already built with slide valves, had brass valves applied on cast iron seats or brass false seats applied to the cylinders, on which the cast iron slide valves worked. This effected considerable improvement, and reduced the cutting of these parts, but trouble was still experienced with the low pressure cylinders cutting.

Attention was then directed to the system of lubrication employed with a view of overcoming the cutting.

The different methods of application of lubrication to the cylinders and valves which have been tried have not proved satisfactory, and the problem is yet to be solved.

There is being tried out a new lubricant recently placed on the market, to be delivered through a hydrostatic lubricator, in which graphite is employed, the graphite being broken up so fine that it is readily held and carried in suspension with the lubricating oil, the claim being that the graphite will adhere to the surfaces lubricated, thereby forming a coating, which prevents cutting of the metal. As graphite lubricant on bearing surfaces has proved to give good service, we may reasonably hope that the methods now being used will demonstrate that graphite is a satisfactory lubricant for steam surfaces, and the committee will follow this up with interest.

Extended Piston Rods

Extended piston rods have been tried out with more or less success on a large number of American roads as a means of reducing cylinder and piston wear. Any means employed for relieving the cylinder and piston from the weight, shock and consequent wear attendant upon a free piston, would seem to be a direct benefit. If it were always possible to preserve the alignment on both ends of the rod, the extended piston rod would be beneficial in preventing cylinder wear and would also permit the use of cast steel, thereby resulting in some reduction in weight. On the other hand, the extended rod itself results in considerable increase in weight, which seriously complicates the question of counter balancing.

Two general methods have been resorted to in treating the extended piston rod, one, the use of another metallic packing on the front cylinder head, while the other employs an extension sheath in which the piston rod is permitted to reciprocate the bronze or other suitable form of bearing at the inner end of this sheath to take the weight of the rod and piston. In the former

case the upkeep of an extra metallic packing is a serious objection, while in the latter case the steam clearance is considerably increased, and it is difficult to design a bushing of sufficient bearing to prevent rapid wear.

On one road at one time having a large number of Vaucain compounds, extended piston rods of sheath type were introduced, but the upkeep on bushings was estimated to be higher than the natural wear that would have taken place without the extended rods. On this same road several years ago the problem arose of equipping large locomotives with 29½-in. cylinders, and the question of extended rods was seriously considered. After looking up all data available at that time, it was decided that instead of using extended rods, to bronze the entire circumference of the cast steel Z-type piston. This was applied to a number of 2-10-2 type locomotives, and the results have been most satisfactory. These engines have been in service since 1917, and up to date have made an average of 112,000 miles each. These engines still have the original pistons, which require re-bronzing about every ten months. In no case has cylinder wear been excessive, and the problem of lubrication, or rather the problem of running pistons at times without lubrication, has been simplified.

On another road it is ascertained that the benefits depend to a large extent on maintenance, and the fact that if main cross-head and extended piston rod crossheads are properly maintained, the piston head will be carried in the cylinder without wear. On this road there appear to be records where the mileage has been as high as 137,000 miles without cylinders being bored. It is the judgment of officers of this road that cylinders of 25 in. and over in diameter should be equipped with extended piston rods.

Another prominent road reports that it has investigated extended piston rods, and it is a question whether they are of any material advantage. They have, therefore, arranged to remove them.

The committee believes finally that as there seems to be a diverse opinion as to the merits of extended piston rod, definite conclusions should be deferred and more investigation made on this subject.

Solid Bushed Front End Main Rods

For the purpose of securing data in connection with this subject, a number of Railroads and also the locomotive builders were asked to submit information on the following questions:

(1) What design of front end of main rod do you use, solid front end of main rod with bushing, or keys and two piece brass?

All replies but three state they are using the front end of main rod design of keys and two piece brass only, and that the service from this design is entirely satisfactory. Three of the roads use both designs.

The builders state that several years ago quite a number of roads had locomotives equipped with solid front end main rod and bushing, but have since gone back to the use of keys and two piece brass on account of the solid bushing not giving entirely satisfactory service.

(2) What kind of lubrication of oil or grease, or both, do you use?

All replies except one state that both oil and grease are used. On the lighter locomotives oil is used and on the more modern locomotives they are internally lubricated by grease through the wrist pin. One road uses oil on all classes of locomotives. Roads which are using grease are getting satisfactory service.

Flange vs. Riveted Tank Bottom

The sub-committee appointed to investigate the construction of locomotive tenders with flanged bottom tanks, compared with the usual method of construction by the use of the angle irons and lap joints, has collected from various railroads, and has also made personal investigation. It is the opinion that the flanged tank possesses certain features of distinct merit, as enumerated below:

(1) The top and bottom sheets of the tank are flanged so that rivets are horizontal. By this method the angle and tee irons are dispensed with.

(2) The design appears to prove more rigid construction and permits of better interior bracing. The interior parts are secured to the upturned edges of the sheets.

(3) There being no rivet holes through the bottom of the tank, the cost of repairs should be materially reduced, as it is unnecessary to lift the tank from the frame to repair leaks, which

is frequently required with tank bottoms constructed with flat seams vertically riveted.

(4) The claim is made by certain railroads that the construction of the flanged bottom tanks is less expensive by 6 per cent than construction of tanks with lap joints. Locomotive builders, however, consider it would cost more to build the flanged tank. Much depends upon the number of tanks to be constructed at one time, and the proper tools for forming sheets. It would appear from the design that there may be some saving in labor and material such as rivets, etc.

(5) There has been some question concerning the strength of the corners and difficulty in repairing them, if same become weakened by corrosion or cracking. Our best information, however, from the users of such tanks, indicates that corners are sufficiently strong and that no difficulty is experienced in repairs.

After careful consideration, your committee feels that the efficiency of the flanged tank should be equal to the old style of construction in every way. It is felt that ultimate life should be somewhat extended, and that the cost of construction should be no greater. Leaky tanks are Federal defects, and any design that will eliminate liability of such leaks is a desirable improvement.

Mikado vs. Consolidation Engine

The first locomotives of the Mikado type were built by The Baldwin Locomotive Works in 1897, for the Nippon Railway of Japan; in 1902 a locomotive of similar type was built for the Bismarck, Washburn and Great Falls Railway in the United States.

The Mikado type locomotive permits the use of a long boiler with a wide and deep firebox, which is placed back of the driving wheels and over the trailing truck. This form of firebox is especially suitable for burning high volatile coal, as there is sufficient furnace volume for the combustion of the gases before they enter the tubes. Cases are on record where Mikado type locomotives have successfully burned fuel of a quality too poor for use in Consolidation type engines of equivalent hauling capacity, but having smaller fireboxes.

With a given weight on driving wheels and equal ratios of adhesion, a Mikado type locomotive will show no superiority over a Consolidation type, as far as starting tractive effort is concerned. As the speed increases, however, the tractive effort of the Mikado type will fall off less rapidly than that of the Consolidation, because of the greater boiler power of the former locomotive. On some roads the Mikado type locomotive has made an excellent combined passenger and freight locomotive, being used interchangeably for either service as occasion requires.

The Mikado engine, on account of its wheel base arrangement, is somewhat easier on flange wear, and somewhat safer in high speed without danger of derailment.

On Consolidation type locomotives having wide fireboxes, and comparatively large driving wheels, the depth of the furnace throat is necessarily restricted, making it difficult to apply a satisfactory design of brick arch. This difficulty is avoided in the Mikado type, as there is ample space between the grate and bottom row of flues for an arch with its supporting tubes. The necessity of placing a driving wheel under the firebox makes it practically impossible to apply a satisfactory ash pan to the Consolidation type because the pocket over the driving wheel is so close to the underside of the grates.

Relative Advantages of Non-Lifting and Lifting Injectors

For the purposes of securing data on this subject a questionnaire was prepared and sent to sixteen railroads from which eleven replies have been received. The advantages of the non-lifting injectors are reported as follows: (1) Larger capacity for same size injector, injector pipes and connections; (2) grades closer, giving a wider range for each size of injector; (3) gives less trouble from restricted openings in the feed water supply pipe; (4) located on the outside of the cab, thus relieving congested conditions inside; (5) more reliable and dependable; (6) application and maintenance cost less; (7) more accessible for repairs and repairs can be made on the injector in place without disconnecting from the piping; (8) will work with less water in tank, also operate with feed water at a considerably higher temperature.

The disadvantages of this type injector are its greater liability

t) being knocked off by derailment, side swipe, etc., and the liability to freeze in extremely cold weather.

The advantages of the lifting injectors are stated as follows: (1) Mounted in cab where engineer can more easily see and observe its workings; (2) if trouble occurs on the road it is easier for the engineer to remedy it; (3) self contained and fewer parts to operate; (4) easier operated and controlled.

Its disadvantages are: (1) Less grading range than the non-lifter; (2) more readily affected by restricted feed water opening and length of lift; (3) must be taken down from pipe connections to repair the tubes; (4) tubes coat up more rapidly than in the non-lifters; (5) it is subject to failure from a leaky boiler check, worn steam nozzle or combining tube, leak in feed pipe, or if injectors become overheated they must be cooled off before they will operate.

It would appear from the replies received that:

(a) Little is known about the comparative efficiency of the two types of injectors with respect to steam consumption for a given quantity of water delivered; (b) The cost of repairs and maintenance is less with the non-lifting injector; (c) The non-lifting injector is more easily located and repaired; (d) The non-lifting injector is generally considered preferable and is gaining in favor, particularly on large locomotives.

Saturated Steam Drifting Devices For Superheater Locomotives

For the purpose of securing data on this subject a questionnaire was prepared and sent to 16 railroads from which 14 replies have been received. It would appear from replies received that:

(a) Automatic drifting valves on superheater locomotives are not generally being used; (b) the common practice when drifting is to crack the throttle; (c) the use of the manually controlled steam line from cab to valves and cylinders has not proven satisfactory; (d) some roads are using home made devices for supplying air compressor exhaust steam to valves and cylinders with satisfactory results; (e) a few roads are using automatic drifting valves with apparent success; (f) a few roads are experimenting with various forms of automatic drifting valves; (g) an automatic drifting valve is desirable if one can be found or developed which will operate successfully both at high and at low speeds, and be simple and rugged enough to be reliable and stand the service requirements without undue maintenance cost.

Tank Syphons Versus Tank Valves

In order to determine modern practice of representative railroads, a questionnaire was prepared and sent to 24 railroads, from which 16 replies have been received. Summarizing the data submitted by the various railroads, it appears to your committee that the syphon is well adapted for use with lifting injectors, while the tank valve is more suitable for non-lifting injectors.

Tank Hose vs. Metallic Connections

To our inquiry regarding the subject, nine replies were received from railroads and one voluntary report from a manufacturer. All of these roads but one, were large systems. Five roads had no experience whatever with metallic tank connections. One road reported trying out one in 1909 without success. Another road has tried one on a switch engine for three years with no cost for repairs beyond three or four gaskets and their application. The Erie has one connection applied to engine No. 2509. This has been in service for the last 18 months. The test is to cover a period of two years. One large system reported having had "a little experience" with metallic tank connections, adding "We are not extending it."

From our study of this subject it appears that metallic connections for steam, air and signal lines are almost universally used. All of the roads but one reported unanimously in this regard. None of the present devices are heartily endorsed sufficiently to warrant your committee in making a recommendation.

The maintenance of tank hose amounts to very little if it is manufactured of first class material and properly applied. Tank hose suffers more from abuse than from use. It is put up wrong as often as it is put up right and is in many instances a badly neglected detail. If the hose connections are properly angled and the hose cut to proper lengths, the kinking will be reduced to the minimum and the maintenance likewise, as it is the kinking of this stiff wire-lined hose that destroys it. Standard diameters and lengths

are easily maintained, but in the application the drawing cannot be adhered to literally for the length—it has to be adjusted for existing conditions. When engine and tender are coupled up the water hose should hang in such a manner as to make one continuous easy curve from the point of the feed pipe connection on the engine to the tank well connection. Any other form is apt to kink the hose.

Your committee concludes that in the light of the information in hand we are not justified in discarding the hose. We feel assured that with a reasonable amount of attention to this detail the present maintenance may be considerably reduced.

The report is signed by H. T. Bentley (Chairman), C. & N. W.; H. C. Oviatt, N. Y., N. H. & H.; C. E. Fuller, Union Pacific; F. H. Hardin, N. Y. C.; H. M. Curry, Northern Pacific; E. C. Chenoweth, C. R. I. & P.; M. F. Cox, L. & N.; W. I. Cantley, Lehigh Valley; G. H. Emerson, B. & O.; P. F. Smith, Jr., Penn. System; and W. H. Winterrowd, Canadian Pacific.

Discussion

H. T. Bentley (C. & N. W.): As your committee was required to handle so many subjects, I would suggest that all of the members of this committee come forward and as each of the subjects come up the chairman, or if he is not here a member of that subcommittee, can read the paper and be in a position to discuss it more satisfactorily than perhaps I might be. If that is satisfactory I will call on the committees to come forward.

I would suggest that F. H. Hardin be asked to read the paper on Tractive Power of Locomotives.

F. H. Hardin (N. Y. C.) then presented Exhibit A and at its conclusion said: I was asked a few moments ago why this paper was submitted merely for discussion. The question was raised by someone for consideration by the Committee of Locomotive Construction. In looking into the matter, these differences, of course, soon appeared and the sub-committee thought that it might be advisable to recommend to the convention a uniform formula. On canvassing the situation we found that there was more or less opposition to that on account of the fact that the rating of practically all the Mallets, (I guess all of the Mallets in the United States,) would have to be changed. For that reason no definite recommendation was made. We also made inquiries to see whether there were any actual definite tests that would indicate which of these three formulae could be considered more accurate and we were not able to obtain any information along that line. As a result the committee thought that the paper should be submitted in this manner for discussion.

Exhibit A is now before you for discussion. This is a very important subject, and I suppose it will be necessary for the chair to call on some of you gentlemen. I would like to call on Mr. Pilcher of the Norfolk & Western.

J. A. Pilcher (N. & W.): The question of the accuracy of the formula, of course, is simply a question of how close it comes to the actual performance of the locomotives. The fact that the formula is calculated one way or another will not affect the pulling power of the locomotive. I was a little struck with the fact that in making the report the committee says it would have to change the rating. The rating is going to be made on what actually happened and not on the formula. As I understand it the test is being made simply to get some method of expression of what is actually taking place on the locomotive when it is in operation. A formula is a good thing to work to, but it will require some further test to show which of these is the most accurate. I am sorry I have not the information, but probably we will be able to develop it some time in connection with some test using the dynamometer car.

C. E. Brooks (C. N.): May I ask if the same heating surface values were used in the three different formulae, including the firebox and flue heating surface values.

Mr. Hardin: The heating surface values were not taken into consideration in the formulae at all. In other words, it is a question of boiler pressure, mean effective

boiler pressure in the cylinders, cylinder diameter, stroke and diameter of drivers. It is assumed that sufficient heating surface is available to provide the steam for the locomotive being built.

G. Greenough (Baldwin Locomotive Company): In the formulae, you will notice at first glance that there is a considerable difference in the actual tractive power as obtained with the three formulae. If the differences are analyzed you will notice that the Baldwin formula, in each instance, is approximately six per cent below that of the American Locomotive Company and the I.C.C.

Analyzing the matter a little further, you notice that the Baldwin Locomotive is based upon 85 per cent of the boiler pressure as a minimum effective pressure obtained in the cylinders at full stroke, whereas both of the others are 91 per cent of over. That difference, roughly speaking, is about seven per cent or a little more, which would indicate that when you eliminate the difference of opinion as to what the mean effective pressure is in the high pressure cylinders, you practically eliminate the difference within a matter of one or two per cent in the formulae.

Consequently it becomes a question if it is advisable to assume that we obtain 91 percent of the mean effective pressure, or 85 percent, or something in between these two.

The Baldwin Locomotive Works always endeavors to retain in their formula what may be termed average conditions. I have no doubt but that in some locomotives where the steam ports and the various exits from the throttle to the cylinder are large, 91 per cent, or even more, is possible at low speeds. We hold to the opinion, however, that 85 percent more nearly represents average conditions so it seems to me there is not much to choose between the formulae, aside from that matter of mean effective pressure.

I notice that the paper is entitled "Tractive Power of Mallet Locomotives," but these formulae, as has been intimated in the paper, only deal with the tractive power of Mallet locomotives at starting or at very low speeds. I will therefore ask if it is in order for me to say a word with regard to the tractive power of locomotives as they are running?

Chairman Coleman: Certainly. This, as I understand it, is a report on the Tractive Power of Mallet Locomotives but will include all the other locomotives.

Mr. Greenough: I would like to bring to your attention the fact that for years we have given a great deal of attention to the tractive power of Mallet locomotives when starting, but very little attention to the tractive power while running.

I do not know how many of you are aware that H. V. Willey, of the Baldwin Locomotive works, recently made a study of this matter and has developed a valve gear for bringing about or making possible a constant cut-off on the low pressure cylinders. It seems almost incredible that for years we have been operating Mallet locomotives in the present manner. We introduce steam in the high pressure cylinder; that in turn goes to the low pressure cylinder; and, as we hook the engine back and cut off the steam in the high pressure cylinder, we do the same thing with the low pressure cylinder, exhausting the steam from the low pressure cylinder into the air before it has done half its work.

The valve gear which I speak of is so designed that the low pressure cylinder does not exhaust the steam until the end of the stroke no matter how far back the high pressure cylinder may be cut off. I think this is something that is well worth considering. In the few experiments that have been made with this apparatus, a saving of from 20 to 30 percent in the coal bill has been effected.

W. F. Kiesel, Jr. (Penn.): It would be very desirable to have the committee give a formula as a basis on which

hereafter we could compare compound locomotives. There is very little difference in the formulae of the American Locomotive Company and the Baldwin Locomotive Company. The formulae are nearly the same, except for the efficiency factor of 85 per cent in one case and 91.7 in the other. We have a simple engine formula based on 85 percent efficiency. Therefore, it would seem desirable to use the same co-efficient .85 percent. None of the three formulae give exact results; they are merely indicative of what the engine might be and as Mr. Pilcher stated, they should have no effect whatever on the road rating. I would therefore suggest that we decide on a standard formula for Mallet engines.

Chairman Coleman: The committee will take that under advisement.

H. T. Bentley (C. & N. W.): In accordance with Mr. Kiesel's suggestion I move that the committee be continued and be asked to cooperate with the three locomotive builders so that a uniform formula may be developed.

Mr. Hardin: May I suggest that the Interstate Commerce Commission be called into that also?

Mr. Bentley: I will be very glad to include that in the motion.

(The motion was seconded, put to a vote and carried.)
H. C. Oviatt (N. Y., N. H. & H.) then presented Exhibit B.

C. E. Fuller (U. P.): I would like to ask the members what experience they have had with the waist sheet braces riveted to the shell of the boiler, as regards cracking of the shell. The committee reports trouble in keeping the bolts tight. I would like to know whether any of the members have had trouble with the waist sheets cracking due to the angle iron of T-iron being riveted to the boiler.

S. Zwight (N. P.): We have had a great deal of trouble on various classes of engines with the waist sheets working loose both at the top of waist sheet near the boiler and also at the bottom, but we have had very little trouble from cracking of the sheet, as referred to by Mr. Fuller. In looking into the cause of the continual working loose of waist sheets, we found that it was not due to the stress brought about by the frame, but invariably on account of the motion bearer. In some cases the boxes were fastened to the bottom portions of the braces. In looking for a way of overcoming this I examined locomotives on five or six different railroads running into Chicago and found that apparently they were all experiencing about the same difficulty. They all applied braces of various kinds, some from the motion bearer up to the boiler in a rigid brace, others with a sort of a knuckle joint in it, and some tied the frame together. We made a good, heavy, draw clamp, you might call it, to go over the top of the motion bearer, coming down under the frame and shrunk it on so as to tie the whole tightly together. We have not had any trouble on that class of locomotives where we have applied these braces so that the frame will carry the strain placed on the motion bearer and rocker boxes instead of transmitting it to the boiler brace.

S. Mullinix (R. I.): My personal observation proves to me that most of our frame breakages are due to improperly fitted binders or poor maintenance work in keeping them tight and I am inclined to believe that the lateral wear has considerable to do with broken frames. I am of the opinion that the railroads, as well as the locomotive builders, have in a great measure corrected the tendency towards broken frames by using heavier frames. I think that by watching the binders to see that they fit properly and are maintained, the frame breakages will be eliminated to a very great degree.

G. W. Rink: (C. of N. J.) We have had considerable

trouble with our locomotives in connection with attaching waist sheet braces to boilers. When we used the plain angle irons we got the waist sheet extended up inside of the angle. We had trouble with cracked boiler sheets, especially on locomotives with thin shells. We later developed a standard practice of using a heavy T-iron forming a shoulder on one side for the sheet to rest against, in order to take the sheer off the bolts. We riveted these T-irons to the boiler shells and we have had wonderful success. I really believe that is the only satisfactory way for securing waist sheets to boiler shells. In the one case the vertical pressure is off center, while with the T-iron the load is practically distributed along the vertical center line of the neutral axis of the T-iron; in that way movement of the angle iron on the boiler shell which causes that cracking effect is prevented.

W. J. Tollerton (C. R. I. & P.): This question of locomotive frames is a very important one and I think that the committee's suggestion of proper design and proper maintenance will cure the matter. We had locomotives built in 1911 with 57,000 lb. tractive power and heavy Mikado type locomotives since that time with not a single frame broken. All of our difficulties with frames were in the older type of locomotives. I am satisfied it was due to improper designing at that time, and possibly to improper maintenance.

T. F. Barton (D. L. & W.): Referring to Mr. Tollerton's remarks: Our experience has been that the principal frame breaks have occurred on locomotives that were in service some time before superheaters were applied and have broken since the superheaters were applied.

C. E. Chambers (C. R. R. of N. J.): I attribute broken frames to three distinct causes. First; the engineer in designing does not allow a large enough section. Second; material sometimes is not just what it ought to be. Third; I agree with Mr. Mullinix as to a great many broken frames being caused directly by binders working loose. If a binder is properly fitted so as to have sufficient draw and is so maintained I think at least 50 percent of frame breakages will be eliminated.

W. L. Bean (N. Y. N. H. & H.): The road with which I am connected has had trouble with several classes of older engines. The breakage was so general that it became necessary to apply new frames. The distribution of breakages was so extensive over the entire frame that there was only one conclusion to be reached and that was that too little allowance had been made at the time of designing in order to meet the weight requirements. We found, in comparing the area of the sections with what is now the accepted practice, that they were from 18 to 30 percent undersize. The breakages were so great that there was an average of three failures per locomotive per year, so we have undertaken a program of reframing.

I would like to speak of one thing in connection with this matter of frames on large modern power, particularly with reference to the boiler. It is very necessary to maintain a proper distance from the front of the mud ring to the top of the frame and if that is not done the boiler, being rigid, will cause unequal loading and bending of the frame under the front of the mud ring. Many difficulties have been experienced with breakages at that point and they have been taken care of by re-establishing that dimension and maintaining it.

C. L. Fuller (V. P.): One of the most vital points in this connection is maintaining the proper relation between the boiler and the frame. I will venture to say that a large number of shops in passing the engine through for repair have given very little attention to the original alignment of the boiler with the frames. Especially that true on roads whose practice it is, in applying a new firebox, to cut off the butt end and take it to the

boiler shop, reapplying the butt end after the firebox has been applied.

The use of flexible bolts for supporting the firebox to the frame, has been responsible for a large number of broken frames. It is almost impossible to maintain bolts of the height required and the bolt holes will wear. The result has been that the locomotives have been passed through the shop without taking the opportunity to raise the boiler up to the proper height.

Another thing which has happened, especially where the barrel-brace connected to the guide yoke and the angle iron or T-iron is riveted to the boiler, is that unless the proper distance is maintained between the front end of the mud ring, and the throat sheet of the frames, an undue strain is put on the guide yoke brace.

After having a great many barrel sheets separated from the holes we decided that it is better to leave it loose, and start the locomotive with probably 1-32 in. between the barrel and the front brace at the center, $\frac{1}{8}$ in. on the front end, and run the T-iron around the boiler in one piece, rather than two. Then, by maintaining the proper height at the rear end, a great many broken frames may be avoided. Cutting off the butt end and oftentimes letting the boiler be carried where it is bolted to the cylinders, on the front yoke or guide yoke causes sprung frames or fractured frames. If the alignment of the boiler under the frame is given the attention and all of the binders are kept up there will be less frame breakage.

Mr. Bentley: The member of the committee who was to have presented Exhibit C is not present. Most of the trouble appears to have been with the lubrication of Mallet low pressure slide valves and as the method of forced lubrication seems to be coming into general use I would like to ask if any of the members operating the Mallet locomotives have used the forced-feed lubrication instead of the hydrostatic lubricator? If so, with what results?

S. Zwigl (N. P.): We have used the forced-feed lubricator on Mallet locomotives but I think there are only about a dozen places where we have used them to any extent. The others are the hydrostatic lubricators. The forced-feed lubricators have given entire satisfaction. We have changed them from time to time in the way of introducing the lubrication into the valves and cylinders, as explained in this paper, but we have secured good results and have no difficulty with forced-feed lubrication. That includes the use of the forced-feed lubrication on superheated Mallet locomotives.

C. E. Chambers: I note by this report that "old man graphite" is still alive. I will agree that if you could confine the graphite to the wearing surfaces it would be a wonderful thing, but my experience with graphite is that it goes to other places where you do not want it.

Mr. Fuller presented Exhibit D, Use of Extended Piston Rods on Locomotives; Minimum Size of Piston on which they shall be applied.

C. E. Brooks: I would like to ask the chairman of the committee what the recommended difference in diameter for the extended piston rod should be;—that is, the difference between the ordinary type of piston rod and the extended piston rod? How much smaller are you recommending the extended piston rod to be?

Mr. Fuller: The roads using the extended rod say that you can use an extended rod which is $\frac{1}{2}$ in. smaller than the diameter of the cylinder; in fact, the whole question depends on the extended piston rod being maintained in proper position. If you can keep the piston rod up where it belongs you can run the extended piston rod a good deal smaller, dependent upon the depth of the packing. From many of the replies to our inquiry we were led to believe that maintaining the piston rod in the center of the cylin-

der is a hard thing to do; therefore, if the piston drops down you cannot use a piston rod which is any smaller.

Mr. Brooks: There is a great variation in practice on this subject. Some roads are adopting a size of piston rod as accurate when used for the extension piston rods as they would for the main piston rods. The American Locomotive practice was originally $\frac{3}{4}$ in. less when the cylinder was new. That being the case, I do not see any reason why there should be any more difficulty or why there should be any more care taken in the alignment of the extension rods and guides than with the old type of piston.

If instead of attempting the use of large piston heads we should adopt the old practice of using a piston head considerably smaller than the diameter of the cylinder ($\frac{1}{4}$ in. smaller being the practice) there should be very little difficulty in maintaining conditions that would prevent wear on the cylinder when the extended piston rod is being used.

Mr. Fuller: I tried to make myself clear. In starting out an engine with an extended piston rod, you can start with a much smaller rod and it is just as satisfactory in its operation but if you do not maintain the support at the front and back fairly central, you cannot allow the rod to be worn down without trouble.

Mr. Chambers: I am against the extended piston rod all the time. In the first place, you have two fixed points, governed by a crosshead, and the bushing governing the extension rod. They are never kept in the same position. The idea of the extension piston rod is no doubt a good one, theoretically. If the bushing was maintained, the piston would float. I never saw one that would float longer than a week or two. I do not think anyone who has had extension piston rods has failed to find pistons riding on the cylinders. As to the advantage of having the piston $\frac{1}{4}$ in. smaller than the cylinder, I would like to know what there is in that. I maintain that the nearer you keep the piston head to the size of the cylinder, the better protection you get. The extended piston rod is absolutely a failure, in my opinion, and I have observed it for fifteen years.

Mr. Brooks: I think the advantage of the $\frac{1}{4}$ in. smaller piston which Mr. Fuller mentioned is that it will float.

Mr. Chambers: It never does.

Mr. Brooks: There is some chance of floating when you have it $\frac{1}{4}$ in. smaller but there is no chance of its floating when you endeavor to do what many roads are doing and that is to put in pistons of the same size as the regular piston head, and then depending on the round-house men to keep them floating. It cannot be done.

Mr. Fuller: Mr. Chambers hit the keynote of the whole thing. It is my opinion that if the piston can be maintained in the central position with the extended rod, all well and good. My experience has been the same as Mr. Chambers. You cannot do it and you do not do it and the result is that the piston head is riding on the bottom of the cylinder. There are few locomotives at present, judging by the information which the committee obtained, which are still equipped with the extended piston rod. I have never had satisfactory results with an extended piston rod.

S. Zwiatt: I want to say a word in favor of the extended piston rod. I think it all resolves itself into a matter of the design of the carrier and maintenance of the piston rod extension. We tried several different kinds of carriers for years. The first was merely a sling, with the piston rod operating through it, which would wear very rapidly and could not be maintained centrally. Later we got an extended piston rod, practically the same except for some kind of packing to hold it in

position, as in the regular piston rod. This, like the first method, was not successful and would not maintain the piston rod centrally; the result was that the packing immediately began to blow. In cold weather we could not maintain them and then we sawed the extended piston rods off. We do not recommend the use of the extended piston rod with a cylinder less than 24 in. in diameter. We have a carrier, known as the A. L. C., with a bored guide and a shoe on the end of the piston rod, sliding in this guide. It does not require much lubricant; there is practically no wear; and I see no reason why it cannot be maintained centrally. You maintain the crosshead within the limits of the piston body, with a carrier, or without a carrier, and we try to maintain it as close to those limits as we can. We have locomotives put into heavy freight service in December 1920 and in these we had not touched the cylinder packing up to 30 days ago. I do not think that could be done without an extended piston carrier but it will depend on operating conditions. If you have a level division where locomotives work steam continuously, there is no need of having the carrier, but where you are drifting down hills without enough pressure to hold the piston up, the carrier is essential and will reduce the piston wear and the cylinder wear.

Mr. Chambers. One more reason why I do not like the extended piston rod is that you have three distinct places where you are liable to get into difficulty. These are the steam gland joint, the packing, and the cap joint.

Mr. Fuller: I would like to call the attention of the members of the third paragraph in Exhibit D. The reason I am calling that to your attention is that this is taken from the practice on our railroad. Mr. Zwiatt said if you have a level road you possibly would not need any extension rod. In the case of the 2-10-2 class locomotive with $29\frac{1}{2}$ -in. cylinders, it was necessary to keep the weight down as much as possible and we went to the Z-shaped cast steel piston. On the part of the road on which these locomotives are running the grade is about 97 feet to the mile with sharp curves, and about 40 or 50 miles of it is downhill. We bronzed the piston heads, and made as high as 112,000 miles without the piston ever being taken off in order to rebronze the head. It is a practice which has proven eminently successful. We are running all the Mallet locomotives and others of our 2-10-2 type with bronzed piston heads. If you will investigate I believe you will find this a form of construction in which you have less weight and get as good service as with any extended piston rod ever put in.

I simply call attention to this because here are the facts in connection with a service which has been going on for several years. The wear of the bronze is amazing. If anybody wants to know how these heads are bronzed, a reference to the proceedings of the association about three years ago, will give the information.

Chairman Coleman: We will now pass on to Exhibit E, Use of Solid Front End Main Rod With Bushing Instead of Keys and Two-Piece Brass. We will call on Mr. Bentley to present that part of the report.

H. T. Bentley: The committee has not received enough information up to this time to make any definite recommendations in connection with Exhibit E.

Chairman Coleman: We will proceed to Exhibit F, Tender Tank Bottom—Flange Tank Bottom Compared with Riveted Joints.

(Mr. Orvatt presented the exhibit.)

Mr. G. Greenough: You will note in the committee's report a reference to the fact that the locomotive builders are inclined to believe that the type of tank under discussion will cost a little more than the ordinary tank with the angle iron seams at the lower corners. There are two reasons for that. I notice that one or two of the roads

using the flange bottom tanks have reported difficulties due to cracks in the corners. I would not be surprised to find that they had attempted to use too low a grade of steel in making the bottoms of those tanks. It is just as important to have a good quality of steel in the tank bottom as it is to have a good quality of steel in firebox or where any firing takes place. Consequently, tank steel cannot be used and the ordinary grades of boiler steel may not be used in certain grades of construction, but you will need the best quality of flange steel which costs more.

As to the cost of the construction itself, we have had occasion to discuss this matter with several roads which could not understand why we charged a little more for the flange construction than for the angle iron construction, basing their opinion upon the fact that in their own shop or in some railroad shops there was no difference in the cost. The reason is that the locomotive builders are equipped with the most modern methods of building tanks helled together by angle iron seams. The angle irons are punched by automatic machines; there is no laying out of rivet holes; the plates are treated likewise and the riveting is done by either hydraulic or pneumatic riveters especially designed for that work. Consequently, when you put a flange plate construction in that particular shop the cost of work on the flange tank is relatively greater than the cost of the old style construction, although, taking the matter in the abstract, the cost of building the flange construction tank is no more in any railroad shop and it is apt to be less than in some shops which are similarly equipped. Should the flange construction be determined upon, it will be necessary for not only locomotive builders but the railroads to devise methods of constructing flange bottom tanks by methods as improved as are now used for the angle iron construction.

Mr. Mullinix: We have on our road approximately 100 flange bottom locomotive tanks. We have had them in service the past 3 or 4 years and have experienced no trouble whatever. I have made personal inspection of those locomotives as they come to our shops and I never found any indication of leaking.

Chairman Coleman: If there is no further discussion, we will refer to Exhibit G, Mikado vs. Consolidation—Which is Preferable and Why?

(Mr. Fuller read Exhibit G.)

J. Snowden Bell: The conclusion of that report is so decidedly in favor of the Mikado type that I will not attempt to argue anything in favor of the Consolidation. Although I confess I am rather prejudiced. The Baldwin Locomotive Works recently built a number of large Consolidation engines, probably the largest built, for the Western Maryland and I would like Mr. Greenough to say in just a few words relative to those engines, as to what they did and what their performance has been on the road, in a general way.

Mr. Greenough: Mr. Bell has referred to Consolidation locomotives recently built for the Western Maryland. We could also refer to Consolidation locomotives recently built by the Pullman & Richmond, an exhibit of which is now on display. As you know, I think, however, I will [read] a few words relative to the heaviest Consolidation locomotives in our competition, the American Locomotive Company, [read] a few words. I think, a heavier engine for the [read] [read] [read].

Chairman Coleman: I think you are mistaken as to that, Mr. Greenough. I investigated those weights and your engine is lighter.

Mr. Greenough: Well, I was told otherwise. I wanted to be sure I was right. However, the three sets of locomotives built by the [read] [read] [read] in all three cases the [read] [read] [read] comparatively short runs; in all three cases the roads are not bound by the handicap as

to the cost of the fuel that some of our western lines are. They are all roads which tap the coal regions. The roads in all cases have very firm road beds and heavy rails and they are able to carry more per wheel than the majority of roads throughout the country. Consequently these three roads are in a peculiarly happy condition as to the loads they can carry on drivers, as to the amount of coal they can use, and as to the length of runs. Taking the items wherein the Mikado locomotive outclasses the Consolidation locomotive, you will find that in these particular cases the Consolidation locomotive is built to get by, because of the peculiar conditions under which they are running. If you eliminate those conditions, there is no question at all but that the report of this committee is absolutely correct that the Mikado is superior to the Consolidation locomotive as a type, where the maximum efficiency and locomotive design is necessary to meet road conditions.

Chairman Coleman: If there is no further discussion on Exhibit G we will refer to Exhibit H, Advantages and Disadvantages of (a) Non-Lifting Injectors, (b) Lifting Injectors.

(Mr. Bohan read Exhibit H.)

G. W. Rink: We have had a little experience with non-lifting injectors. Our first experience came about due to the purchase of administration design locomotives. These non-lifting injectors were screwed to the locomotive frame and we had considerable trouble on switching locomotives, due to side swiping, and the dislocation of injectors due to derailments. We also had trouble with the pipe connections. Then we hit upon the scheme of securing the injectors to the mud ring of the boiler and all our troubles, as far as the pipe joints are concerned, have ceased. It also gave us an opportunity to raise the injectors on these particular low wheel locomotives.

Chairman Coleman: If there is no further discussion of Exhibit H we will refer to Exhibit I, relating to Drifting Valves.

(Mr. Bohan read Exhibit I.)

A. H. Fetters (U. P.): I have not had much experience with drifting valves but I sincerely believe that a drifting valve is necessary for superheated locomotives. The practice of cracking the throttle is generally used on most roads but engineers are likely to indulge in abuses of this practice. I have observed many times that the last thing an engineer does in making a station stop is to close the throttle. The result is that the cylinders are left full of steam and the pressure kept on the throttle pipe will often show as high as 160 lb. when the engine first comes to rest. That is an abuse of the locomotive which it ought not to be required to stand. Drifting with a cracked throttle would be all right if it were scientifically carried out; that is to say, if the steam were used in drifting until within a train length or two of the station, then being entirely shut off and the brake used the rest of the distance. As a rule the brakes are used too much and the steam is in the cylinders to that extent. I think that a drifting valve, to be a success on a locomotive, should be entirely automatic and it should be removed entirely from access by the engineers or the roundhouse men. A pilot valve in the cab is likely to be overlooked; I have seen many locomotives go over the road with a drifting valve which was not operating because the pilot valve was not closed. Sometimes the valve is left open and may cause creeping which is serious and dangerous. Therefore, a drifting valve should be entirely automatic in its performance and should be so arranged that it will be as simple as possible in mechanical details and not subject to freezing. It should be reliable and always on the job.

I do not know that any such drifting valve exists at the

present time but there is a big field open for the inventive talent of the railroad men today in that line. I think ultimately something of that kind will be developed and it will be a great help on superheated locomotives.

Chairman Coleman: If there is no further discussion on this Exhibit, we will refer to Exhibit J, Tank Syphons vs. Tank Valves.

(Mr. Bentley read Exhibit J.)

H. H. Lanning (Santa Fe): The road with which I am connected formerly used tank syphons almost exclusively. We found two very serious drawbacks; probably the worst was this: that corrosion of the syphon pipe took place inside of the tender permitting air to leak into the syphon pipe and break the vacuum. We got along fairly well with these until we came to the non-lifting injector. The lifting injector would prime

the syphon each time, overcome the air leak, and operate with a fair measure of success so long as there was a reasonable amount of water in the tank. Coming to the non-lifting injector, which had a smaller lifting power, these air leaks in the syphons caused a great deal of trouble and practically forced us to use tank syphons.

Chairman Coleman: If there is no further discussion of this Exhibit, we will refer to Exhibit K, Tank Hose vs. Metallic Conditions.

(Mr. Bentley read Exhibit K.)

Chairman Coleman: This is a very creditable paper. It has been discussed very thoroughly and is a credit to the committee.

(A motion to accept the report was voted on and carried.)

Feed Water Heaters for Locomotives

The committee finds that there are 58 feed-water heaters in service and 139 on order for locomotives on the railroads of the United States and Canada. Test data quoted show feedwater temperature rises ranging from 145 deg. to 175 deg. F. and fuel savings of from 10.5 per cent to 16.5 per cent.

The committee concludes "that it is a generally accepted fact that the use of a feedwater heater will increase the efficiency of a locomotive. There is very little complaint in regard to their maintenance, but more information on this subject and

further improvements in design may be expected when feedwater heaters are applied in larger numbers, so that they are subjected to the same character of repair work and supervision as other parts of the locomotive.

"It is recommended that the work of this committee be continued and that additions be made to the rules covering locomotive tests, whereby standard methods may be introduced for testing the two types of heaters so that the results of heater tests made on different roads may be comparable."

THAT CONSIDERABLE INTEREST in the use of feed water heaters has developed during the last two years is evident from the number that have been applied. The committee's report for the year 1920 showed that there were 16 locomotives equipped at that time. There are now 186 feed water heaters in service or on order; 15 open type in service and 110 on order; 43 closed type in service and 29 on order.*

All new applications reported to the committee have been exhaust steam heaters, either of the open type, manufactured by the Worthington Company, or of the closed type, manufactured by the Superheater Company, with the exception of one, a Foster-Thompson exhaust gas heater.

*A table accompanying the report shows that 106 of the open type heaters on the order are for the Southern Pacific and 24 of the closed heaters on order are for the New York, New Haven and Hartford.

A questionnaire was again submitted to the members this year. The replies are summarized below.

Maintenance Cost

The cost of upkeep of either the open or closed type heaters as reported by the different roads varies from \$1.00 to \$9.00 per 1,000 locomotive miles. Such a range is to be expected, as development work is still in progress and we can not expect close agreement of the cost figures until a large number of heaters are in service and the supervision and repairs follow the general practice accorded other devices.

Tests at Inspection Pits

No railroad reports any systematic daily inspection of feed water heaters. The usual practice is to depend upon the engineer's report, and to supplement it by having the engine house inspector run the pump and note its action and any leaks in the pump or piping. Some roads report that at boiler wash periods they make a

systematic inspection which includes special examinations of valves, tubes and other parts.

Piping.—Some trouble has been experienced in maintaining the joints, but some of the roads advise that, by using iron pipe, bracing it thoroughly, and keeping the number of joints to a minimum, little trouble will occur. A majority of the replies report the use of iron pipe with flanged joints.

Boiler Check.—A number of the roads reported difficulty maintaining the boiler check, but have overcome it to a certain extent by reducing the lift of the valve. Where a small valve was in use, a larger valve was applied to compensate for the reduced lift.

Freezing of Heater.—In ordinary cold weather the heat radiated from the boiler has been sufficient to prevent freezing and where proper precaution is used no trouble should result. All roads are using suitable drain cocks where necessary and in addition some of them have applied a small steam supply line to the suction pipe, which is used when the pump is not working. Both the open and closed type heaters are thoroughly lagged.

Oil Separator.—The use of oil separators with heaters seems to be general. Only two roads report having found traces of oil in the boiler, and both state that it has not resulted in any damage to the boiler. One of these roads, which is located in bad water districts, attributes an increased amount of foaming to the presence of oil in the boiler.

The other road, which is located in a good water district, reports that they have had heaters in service for several years and that frequent chemical analyses of the boiler scale have never shown more than a trace of oil, although one heater was in service for one year with the oil drain from the separator closed.

Economy Tests

A number of the roads have made economy tests of the heater in comparison with the injector, and some very excellent results

have been obtained. The committee has no information as to how these tests were run and can not vouch for the accuracy of the results reported, but give them as information.

ROAD No. 1—CLOSED TYPE	
Increased evaporation per pound of coal.....	15.3 per cent
Coal saving per 1,000 gross ton miles.....	12.3 per cent
Increase in over-all boiler, furnace and grate efficiency.....	14.3 per cent
Type of locomotive tested (cylinders 27 in. by 30 in., drivers 69 in., 200 lb. boiler pressure).....	4-8-2
ROAD No. 2—OPEN TYPE	
Coal saving.....	12 per cent
ROAD No. 3—CLOSED TYPE	
Increased evaporation per pound of coal.....	24.1 per cent
Decrease in fuel consumption.....	10.5 per cent
Decrease in superheat.....	3.6 per cent
ROAD No. 4—OPEN TYPE	
Saving in coal per 1,000 ton miles.....	14.0 per cent
Increased boiler efficiency.....	16.1 per cent
Exhaust steam recovered from the cylinders, condensed and returned to the boiler.....	8.6 per cent
Decrease in superheat, deg. F.....	21.7
ROAD No. 5—CLOSED TYPE	
Saving in coal per 1,000 ton miles.....	8.9 per cent
ROAD No. 6—OPEN TYPE	
Saving in fuel oil.....	12.5 per cent
ROAD No. 7—CLOSED TYPE	
Saving in coal per trip.....	12.5 per cent
Increased evaporation per pound of coal fired.....	16.0 per cent
ROAD No. 8—CLOSED TYPE	
Saving in fuel.....	13.0 per cent
ROAD No. 9—CLOSED TYPE	
Saving in fuel.....	16.5 per cent
ROAD No. 10—CLOSED TYPE	
Saving in fuel.....	14.0 per cent

Temperature of Feed Water

The rise in temperature of the feed water is a very definite indication of the economy which is gained by the use of feed water heaters, and accordingly in the questionnaire temperatures obtained, with the locomotive working at or near maximum power and also with a light train, of the delivery water, suction water and exhaust steam, were requested in order to more fully bring out this feature. A digest of the replies shows that the rise in temperature for heavy trains ranged from 135 deg. to 185 deg. F., with an average of 156 deg. F. For light trains the rise ranged from 92 deg. F., to 175 deg. F., with an average of 144 deg. Many of the roads reported but small differences in the temperatures obtained for heavy trains and for light trains.

Cleaning of the Heaters

In good water districts no trouble has been experienced with the collection of mud or scale in the heaters, but in bad water districts such has been the case and consequently it has been necessary to clean them.

With the open type the usual method has been to scrape the scale and mud loose and then wash it out with a hose. With the closed type the inside of the tubes are usually cleaned by pumping through them a solution of muriatic acid and the outside of the tubes are cleaned by boiling them in a solution of washing soda for about twenty minutes and then washing them with hot water.

Exhaust Nozzle

There was no agreement as to the necessity or the advisability of changing the size of the exhaust nozzle. Four roads found it necessary to decrease the size of the nozzle and ten have made no change at all.

Indicating Device for Pump

Pressure gauges of various types have been the only device used to indicate the action of the pump. The opinion is general that there should be some device which will tell the engineer that the pump is running, but the results so far obtained with the gauges have not been entirely satisfactory due to their inability to stand the severe service.

Use of Heater When Locomotive Is Standing or Drifting

When the locomotive is standing or drifting the use of the heater is not recommended. Objection has been made to the application of feed water heaters on the ground that it would be impossible to prevent their use when there was no exhaust steam to heat the water and then cold water introduced into the boiler would have a bad effect on the flues and firebox.

The replies to the questionnaire indicate that there is no evidence that the use of the feed water heater has resulted in any damage to the boiler.

The use of exhaust steam from the auxiliaries, such as air pump, feedwater generator and stoker may be advisable in order to main-

tain the temperature of the feed water when the locomotive is not working. Several roads express the opinion that any damage from the introduction of cold water to the boiler would be reduced by the use of a top head check.

Capacity of Heater

The question with reference to the capacity of the heater developed the fact that a few of the roads were of the opinion that the capacity of the heater should be equivalent to that of one injector, while the majority desire an increased capacity ranging from 10 per cent to 100 per cent, with an average of about 33 per cent. Some additional capacity no doubt should be provided to compensate for the reduction in the capacity of the feed water heater due to worn packing, worn cylinders or leaky valves.

It is recommended that the work of this committee be continued and that additions be made to the rules covering locomotive tests, whereby standard methods may be introduced for testing the two types of heaters so that the results of heater tests made on different roads may be comparable.

The report is signed by F. M. Waring (Chairman), Penn. System; A. Kearney, N. & W.; W. Kelly, Great Northern; G. W. Rink, C. R. of N. Y.; L. P. Michael, C. & N. W.; G. S. Edmonds, D. & H., and H. C. Oviatt, N. Y., N. H. & H.

Discussion

F. M. Waring (Penn.): Your committee can only report progress and submit a short summary of replies that it has received to its inquiries made to the members regarding their experience with feed water heaters.

It is interesting and encouraging to note that the table giving the number of heaters in use is already out of date, before the report is presented. We have unofficial information that the number of open heaters should be increased by about 19 and the committee will endeavor to bring that table up to date before the report is printed.

J. Snowden Bell: Inasmuch as this report shows a fuel saving from 8 and 9 to 14 percent and averaging 12.6 on nine reported cases, there can be no question but that the feed water heater is a fuel saving device. It comes directly within the suggestion of the chairman for full and careful consideration and I earnestly hope that it will be discussed. The subject is by no means a new one. Feed water heaters were introduced in this country and put in service (I saw them in 1883) as early as 1836 and from time to time since that year various designs have been experimented with and used to some extent. The Pennsylvania has about ten. There were a very large number on the Reading but for some reason they were discontinued and it is only recently that they have been revived.

We have before us two types in the open and the closed heaters. They are not half-baked experiments, or any sort of theoretical scheme, but they are well developed, actual constructions which have stood the test of use. I do not think, Mr. Chairman, that the last word has been said as to either type, nor do I think that these will be the only types. These, however, come before us with well reported success and it seems to me that they certainly ought to have a very full and careful consideration and discussion.

In preparing the paper which I presented at the 1918 meeting on feed water heaters and their development, I sent inquiries to members and there were 51 favorable to feed water heaters and 11 who either expressed doubt or were unfavorable. The very material increase in favorable sentiment since then is evidenced by the fact that in 1920 there were only 16 locomotives equipped and now 197 heaters are in service or on order.

I recently saw a design of smokebox jacket heater which impressed me very favorably for its simplicity. I have never approved of the smokebox heater and it has failed for the reason that we have got too many things in the smokebox now. We do not want anything more in there and if we take out a few of the present parts it will be

of advantage. It always seemed to me that a smokebox jacket heater would get the benefit of the heat if it could be made in a simple manner. That was the design presented. I do not know how far it has been carried out but if Mr. Giles is here he probably can tell us because it emanated from his department. It was constructed very much on the style I described in the 1918 report, regarding which the superintendent of motive power on the road that was using it said: "This heater was in use for about two years, but on account of the application of a superheater it was taken out. The arrangement showed a good saving in coal and repairs to the boiler and the water entered the boiler at a temperature of 250 deg. I am of

the opinion that the device has merit both in economy in fuel and in repairs to the boiler, as the boiler has a more even temperature than when supplied by an injector."

Mr. Flory: I would like to make a suggestion that the work of this committee be extended to include an investigation of exhaust steam injectors. The exhaust steam injector, while new in this country, presents great opportunities for fuel saving, possibly as much as the feed water heater, and we should get all the information we have on that subject.

Mr. Waring: We will look into that.

(A motion that the report be accepted and the committee continued was carried.)

Modernization of Stationary Boiler Plants

There are two distinct types of committee work in an organization such as the Mechanical Division. One is what might be termed the legislative type, leading to the development of standards to which all are expected to adhere; the other is one of service, in which the committee labors to the end that each member of the organization may have available the fund of basic data required as a foundation on which to build his own structure.

The report of this committee is an example of

a real service well rendered. It has compiled a large fund of valuable comparative data which is digested and presented in a form for convenient use as a guide in the selections of (a) the most economical type of stack construction, (b) the kind of pipe joints to be used, (c) the most economical type of prime mover, and (d) the piping arrangement and setting for horizontal return tubular boilers. These are all problems encountered either in modernizing existing power houses or in planning for new ones.

Schutz Crushed Coal Furnace

THE SCHUTZ CRUSHED coal furnace is a coal-burning device using a coal that has been finely crushed but not pulverized, and without extracting the moisture. Some progress has been made with the development of this furnace, but it is as yet not a commercial proposition. Owing to general business conditions existing since last annual report, a great deal of experimental work has not been done that would otherwise have brought this furnace to a higher stage of development.

This furnace, however, was applied to a 500 hp. boiler in a commercial power generating station, and results obtained were very favorable. However, experimenters are not ready at this time to publish their findings and are waiting also for additional development before recommending this furnace for a commercial proposition.

Chain Grate Stokers

In districts where highly volatile coking coal is available, the chain grate stoker is a very popular form of coal-burning device. The coal is carried into the furnace, ignited, the combustible burned up, and the ash continuously dropped over the rear end of this stoker. This stoker operates with a minimum amount of labor and maintenance, due principally to the absence of handling clinkers and the continuous self-cleaning feature.

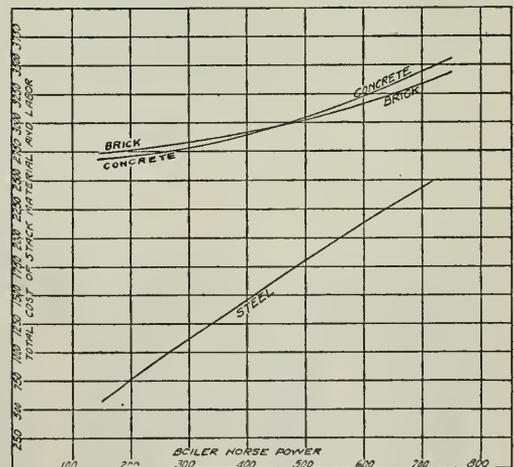
Over 60 per cent of all stokers west of Pittsburgh are of the chain grate type, with the exception of points where West Virginia coking coal is available. These sections are in the vicinity of Cincinnati, and also in the Wisconsin and Michigan regions.

Owing to the coking nature of coal generally found east of Pittsburgh, the chain grate type stoker has not proven very successful, probably less than 10 per cent of all stokers east of Pittsburgh being chain grate. This applies to the natural draft chain grate stoker.

In recent years there has been developed a traveling grate utilizing forced draft. While the method of feeding coal and disposing of ash is similar in this forced draft and natural draft stoker, there is a great difference in the kinds of coal that can be burned with these two stokers. The forced draft traveling grate has been very successful in burning coke breeze and certain eastern

coal such as anthracite culm. There are numerous installations of this forced draft traveling grate type of stoker, which according to all reports are giving very successful results.

Owing to the low maintenance cost of this type of grate, and the



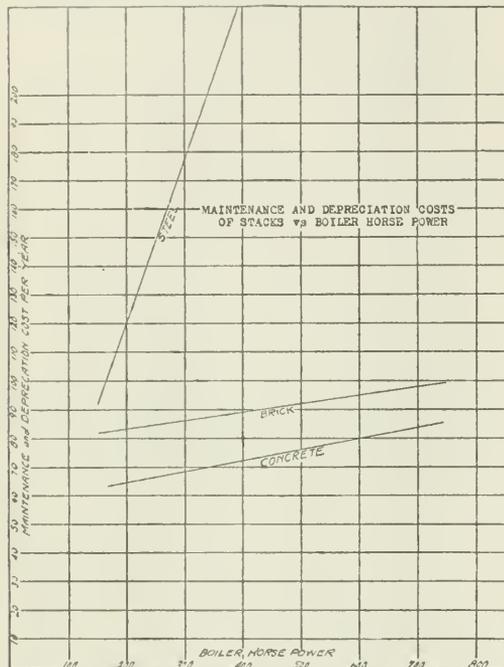
Relation of Stack Costs to Boiler Horsepower

minimum amount of labor required for its operation, and the fact that it provides a means of meeting fluctuating loads and burning fuels heretofore considered as waste, it has all the advantages of the natural draft chain grate stoker with very few of its disadvantages. It provides a means whereby boiler capacity can be

increased without the addition of new boilers and with a minimum expenditure in adapting or changing present natural chain grates for the forced draft type of traveling grate.

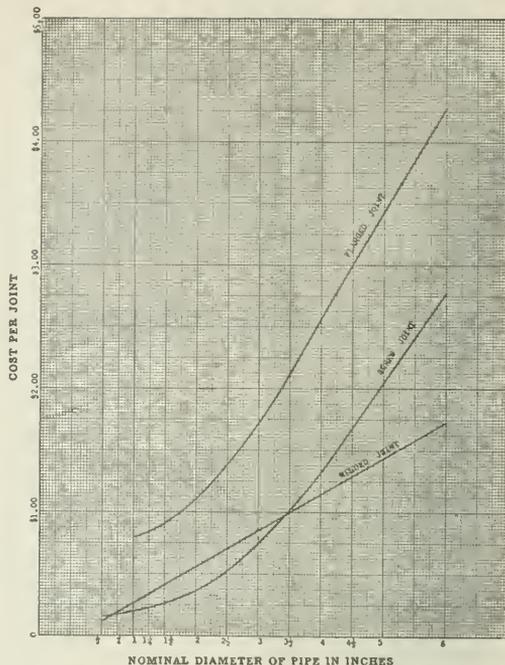
Relative Cost of Steel, Concrete and Brick Stacks

The curves of stack cost represent the average total cost taken from a number of steel, concrete and brick stack costs. While



Relation of Maintenance and Depreciation Costs of Various Types of Stacks to Boiler Horsepower

no allowance is made for a small variation in diameter and height of stack for plants of the same boiler horse-power, the result

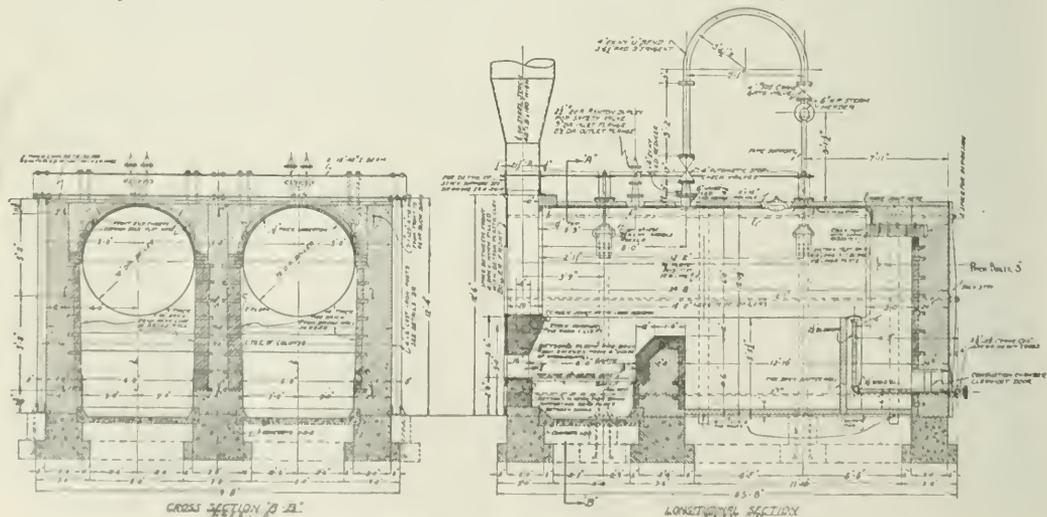


Relation of Maintenance and Depreciation Costs of Various

represents a fair comparison in the cost of stacks for plants of from 150 to 600 boiler hp, and may be considered fairly accurate.

Steel stacks increase in cost directly in proportion to the boiler horsepower of the plant, this being due to duplication of stacks for the larger plants. The cost is much lower for smaller plants, but gradually approaches the cost of concrete and brick as the size of plant increases. Concrete stacks decrease in cost per boiler horse-power as the size of the plant increases, the cost being slightly higher than the cost of brick for the same size of plant above 500 hp, and less for plants below 500 hp

The maintenance curves are plotted on the basis of maintenance



Recommended Setting of Return Tubular Boilers in Double Units

and depreciation of 2½ per cent of total cost for concrete stacks per year, 3 per cent for brick stacks and 16 per cent for steel stacks. This, however, may be variable, depending upon local conditions, design and proper maintenance, but appears to represent a basis of comparison which is comparatively accurate. From this it is seen that the maintenance and depreciation is lowest for concrete stacks, as there is practically no appreciable upkeep to a concrete stack. Brick stacks require pointing up from time to time, while steel stacks require painting annually or bi-annually, with renewing of top sections frequently.

The Welding of Pipe Lines in Power Plants

The accompanying curves show cost of fitting pipes with flange fittings, screw fittings and welded joints, based on the cost per joint, which would include cutting two threads, fitting two flanges and bolts in case of the flanges fitting, or screwing and coupling in case of the screwed fittings

It will be noted that for sizes under 3½ in. the cost per joint in case of welded pipe is a little more than the cost of screwed fittings, until the smaller sizes are reached, where the two costs run about equal. For sizes 3½ in. and larger it will be noted that there is a material saving in cost in favor of welded joints. Comparing this with flange fittings, it will be noted that the saving is considerable for all sizes, averaging close to 50 per cent from 1-in. to 6-in. sizes. However, the saving is not all in the first cost of fitting, but by eliminating threaded joints much longer life and less maintenance can be expected. The weakest point of threaded pipe is at the threads so far as life is concerned. It is at this point that corrosion first takes place, which in a short time results in leakage.

Two methods of welding pipe are suggested: (1), a butt weld, in which the pipe is carefully faced on the end and in some cases scarfed, and (2), a lap weld, made by using a sleeve, similar to a coupler without threads, slipped over the joint and welded to the pipe at either end. Where the latter method is used special fittings such as "T's," "L's," etc., could be made up economically on a production basis when demand for such fittings becomes sufficiently large. When the butt weld is used great care must be taken to prevent possibility of fins forming inside and obstructing the pipes. This is eliminated where the sleeve type of weld is used and the latter also tends to give greater strength to the pipe at the weld.

No definite recommendations are made at this time for the welding of pipes, and merely a few suggestions are presented. However, the possibility of saving by use of welded instead of flanged or screwed joints is very great with the smaller size pipes, 6 in. and under, with pressures not to exceed, say, 150 lb. For power plant work where high pressure headers are used a different method of welding would have to be adopted.

In both the modernization of old stationary power plants and the design and installation of new plants, much study is required in determining the proper selection of the type of prime movers.

In late years the choice of prime movers for stationary power plants has been in favor of the reciprocating steam engine or turbine. General rules governing selections are without purpose, since each particular installation is a problem in itself. Floor space, capacity, cost of fuel, water rate, steam pressure, water supply, load characteristics, exhaust steam requirements, size of foundation, vibration, first cost, attendance, maintenance, depreciation, taxes and interest on the investment, all govern the selection of type. The principal factor governing the size of units is the station load curves; where these curves are known, the problem is a comparatively simple one, but when they must be assumed, as is generally the case with a new project, it is largely a matter of experience.

Recent developments in the perfection of the uniflow engine have resulted in remarkably low guaranteed water rates being offered by engine builders. This, with the mechanical efficiency of this type of engine being higher than other types of reciprocating engines, owing to the absence of complicated valve gears, has made the uniflow engine, running non-condensing or condensing, show superior economy over the turbine for sizes up to 600 kw.

In a general sense the piston engine is superior to the turbine for variable speed, slow rotative speeds and heavy starting torque; while the turbine has superseded the engine for large central station units and for auxiliaries requiring high rotative speed. The high-speed turbine, in connection with efficient reduction gearing, has many advantages over the piston engine for low-speed drives and is rapidly replacing the latter in this connection. Com-

pared with other prime movers, steam turbines have the following principal advantages: Low first cost, less floor space, lighter foundations and less attendance, better utilization of high vacuum and lower oil consumption, no reciprocating masses with their resulting vibrations, no rubbing parts outside of the bearings; they have extreme overload capacity, and freedom of the exhaust stream from oil, increased reliability due to simplicity of construction; excellent regulation and with favorable conditions as regards steam pressure, superheat and vacuum, economies as good as steam engines for moderate powers and much better economies for units of larger sizes.

A general comparison of the water rates of piston engines and steam turbines is very unsatisfactory because of the wide range in operating conditions. In a general sense, the piston engine is more economical in the use of steam than the turbine for non-condensing service and the reverse is true for high pressure, high-vacuum condensing service. Condensing engines of the uniflow or poppet-valve type have shown superior economy (under favorable conditions) to the turbines for sizes up to 3,000 hp. and, in some instances, up to 5,000 hp., but heat economy is only one of the many factors entering into the ultimate cost of power. For sizes over 3,000 hp. the turbine is in a class of its own.

The most efficient types and sizes of turbines are the impulse type for very small units, the reaction or impulse reaction type for medium and large size units and the reaction type for units of very large sizes.

Tables showing water rates of reciprocating steam engines and turbines at variable loads and conditions are given below. It should be remembered when referring to these tables that the water rates given do not hold good for all operating conditions. Water rates vary with superheat or moisture, and back pressure; therefore, no comparison of water rate alone can be fair, unless the steam conditions are known.

Table I gives the steam consumption per horse-power per hour which may be expected from various types of engines with different steam pressures, running at most economical load. The figures are believed to be fairly accurate in a relative sense.

TABLE I—STEAM CONSUMPTION OF DIFFERENT TYPES OF ENGINES

Type of Engine	Lb. of steam per hp. per hour	Steam pressure, lb. gage
High-speed simple non-condensing.....	32	80-100
High-speed compound non-condensing..	24.26	150-110
High-speed compound condensing.....	19.21	150-110
Corliss simple non-condensing.....	26	80-100
Corliss simple condensing.....	21	80-100
Corliss compound non-condensing.....	20.22	150-110
Corliss compound condensing.....	14.15	150-125
Triple-expansion condensing.....	13	150

Table II gives guaranteed performances of uniflow engines offered by various well-known engine builders.

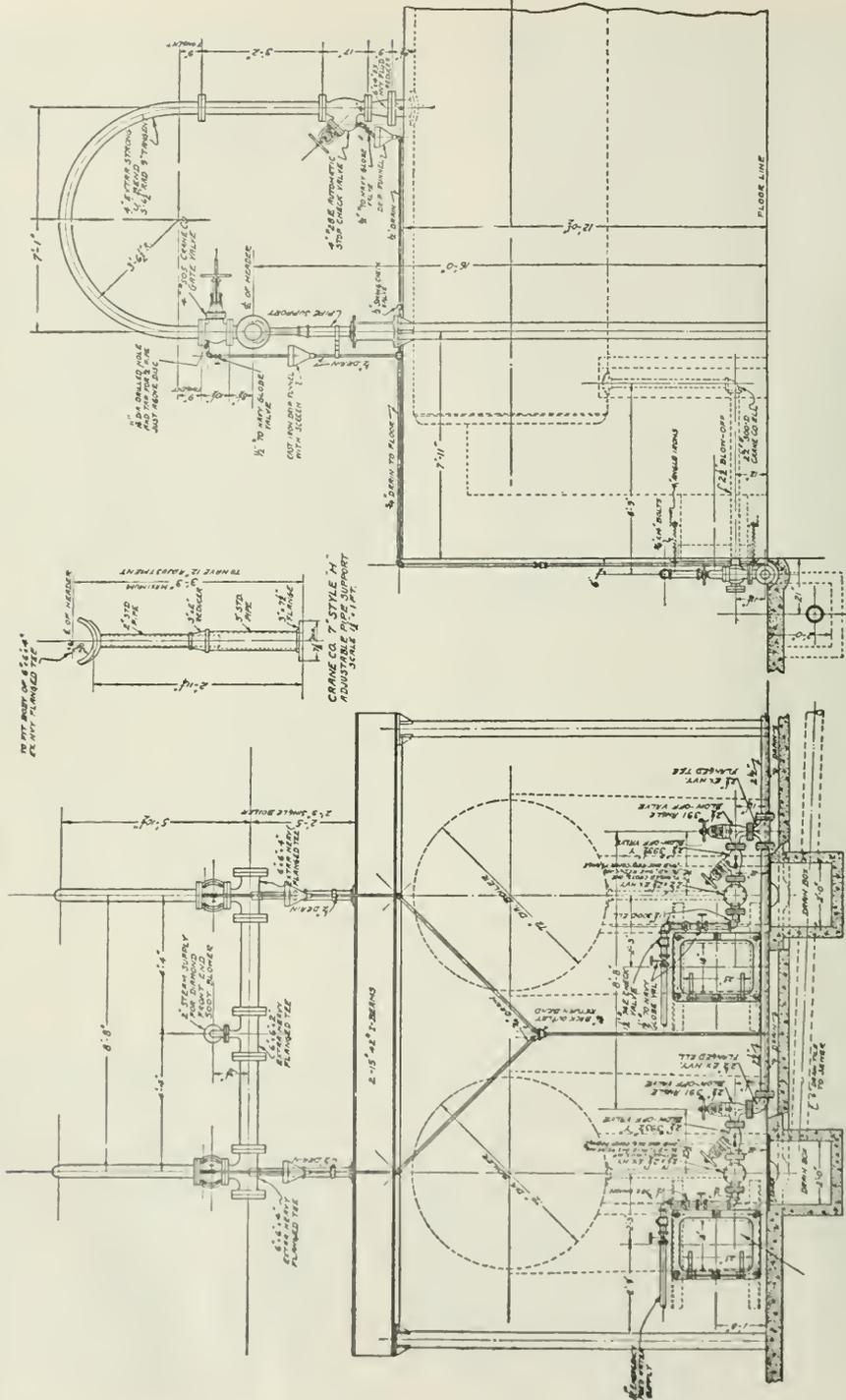
TABLE II—WATER RATES OF UNIFLOW ENGINES AT VARIABLE LOADS

Rated Capacity	R.P.M.	Initial Pressure lb. abs.	Back Pressure			Lb. steam per 1 hp. per cent load.				
			lb. or vacuum in.	Super-heat, deg. F.	25	50	75	100	125	
150 k.v.a.	257	110	2 lb.	0	22.5	21.9	21.5	21.7	22.1	21
150 k.v.a.	257	110	2 lb.	0	21.6	20.8	20.6	21.1	21.4	20
150 k.v.a.	225	110	2 lb.	0	24.8	22.4	21.8	21.9	22.3	21
150 k.v.a.	225	110	2 lb.	0	23.9	23.2	22.8	22.6	23.1	20
200 kw.	150	200	1.25 lb.	0	.....	.....	.....	.....	.....	18.5
250 kw.	150	200	1.1 lb.	0	18.6	18.4	18.3	18.8	19.1	18
250 kw.	140	26 in. vac.	0	0	13.6	13.5	13.7	13.8	14.1	13
400 kw.	200	200	1.25 lb.	0	.....	.....	.....	.....	.....	19.7
525 kw.	150	210	2 lb.	0	.....	.....	.....	.....	.....	19
525 kw.	150	26 in. vac.	0	0	.....	.....	.....	.....	.....	14.1
525 kw.	150	26 in. vac.	150	0	.....	.....	.....	.....	.....	11.2

Table III gives approximately the limitations of water rates that can be expected for turbo-generators. The better figure is probably the best that can be obtained in general practice.

TABLE III—WATER RATES OF TURBO-GENERATORS

Condensing		Noncondensing	
Steam at 150 lb. gage, 28 in. vacuum	Steam at 200 lb. gage, 150 deg. superheat, vacuum	Water rates, lb. per hr. per kw.	Water rates, lb. per hr. per kw.
Rating kw. incl. excitation	Rating kw. incl. excitation	Rating kw. incl. excitation	Rating kw. incl. excitation
50 32.0 to 32.0	4,000 12.0 to 13.3	50 52.0 to 60	50 52.0 to 60
100 21.2 to 27.5	5,000 11.9 to 13.0	100 43.5 to 50	100 43.5 to 50
200 19.5 to 25.0	7,500 11.6 to 12.6	200 38.4 to 44	200 38.4 to 44
300 18.7 to 22.3	10,000 11.2 to 12.3	300 36.5 to 42	300 36.5 to 42
400 18.2 to 21.0	12,500 11.1 to 12.0	400 35.2 to 40	400 35.2 to 40
500 17.7 to 19.3	15,000 11.1 to 11.8	500 34.1 to 38	500 34.1 to 38
600 17.7 to 19.0	17,500 11.0 to 11.6	600 33.6 to 37	600 33.6 to 37
750 17.0 to 18.8	20,000 11.0 to 11.4	750 32.7 to 36	750 32.7 to 36
1,000 16.5 to 18.6	25,000 10.9 to 11.3	1,000 31.7 to 35	1,000 31.7 to 35
1,250 16.2 to 18.3	30,000 10.8 to 11.2	1,250 31.0 to 34	1,250 31.0 to 34
1,500 16.0 to 18.0	35,000 10.7 to 11.1	1,500 30.7 to 33	1,500 30.7 to 33
2,000 15.7 to 17.7	40,000 10.5 to 11.1	2,000 30.1 to 32	2,000 30.1 to 32
2,500 15.5 to 17.4	50,000 10.5 to 11.0	2,500 29.4 to 31	2,500 29.4 to 31
3,000 15.4 to 17.1	60,000 10.5 to 10.9	3,000 28.9 to 30	3,000 28.9 to 30
3,500 15.3 to 16.9	75,000 10.4 to 10.8	3,500 28.6 to 29	3,500 28.6 to 29



SIDE ELEVATION

REAR ELEVATION OF BATTERY OF BOILERS
SHOWING BLOW-OFF PIPING
SCALE 1/2" = 1'-0"

General Layout of Piping for Return Tubular Boiler Installation

The information outlined above should be used as a general guide in the redesign of an old plant, or in the construction of a new one; however, it should be remembered that the water rates given are subject to continual improvement.

Settings for Stationary Boilers

At this time we are confining recommendations to H. R. T. type of boilers only, because water tube boilers usually require a different setting with each installation, and in the majority of cases are stoker fired.

The drawings show a recommended practice for the setting of return tubular boilers in double units. This setting shows a distance of 42 in. from the grates to the lowest heating surface of the boiler, which should be considered a minimum rather than a maximum, particularly with middle western coal.

The additional features to be recommended for this class of setting are that the boilers are suspended from the steel work, and set so that all columns are well outside of the brick work. This eliminates the trouble usually incurred with burnt out columns when columns are inserted between settings. The flat suspended type of arch is proving very satisfactory for rear arch with this type of setting.

Particular attention should be drawn to the drains on the non-return stop valve and header valve shown in the piping drawings. These valves are in full view of the operator and in compliance with the A. S. M. E. Boiler Code requirements.

It is of particular importance when setting return tubular boilers to make the boiler independent structurally from the brick work, and make stack independent from either boiler or brick work. This results in longer life of brick setting, better alignment of boilers and better opportunity for maintenance and repair work without undue expense and disturbing of such sections as are in good condition for the purpose of repairing sections in need of attention.

The report is signed by L. A. Richardson (Chairman), C. R. I. & P.; J. V. B. Duer, Penn. System; J. H. Davis, B. & O.; L. C. Bowes, C. R. I. & P.; J. F. Raps, Illinois Central, and D. W. Cross, Toledo, St. Louis & Western.

Discussion

Mr. Bohan: I have read this paper with a good deal of interest and I would like to make a few comments on the general situation. Probably there is no facility on railroads which has generally received less engineering attention than the stationary boiler plant. From the pump boiler at the outlying water station to the shop plant, the generation of steam has been too generally considered an expedient rather than a scientific business, the economical conducting of which means dollars and cents in the treasury.

The kind of boilers and other appliances and their installation has been left too much to the other fellow who either had equipment for sale, who was looking at the original cost, or who perhaps had an old locomotive boiler he did not know what to do with. Too little fundamental analysis has been made to determine the conditions to be met and the kind of a plant that would most economically meet them. Further, original mistakes have been augmented in many instances by too little attention to the selection of the men to operate the plants and their supervision. The result is that we now have many poorly designed, inefficient plants, badly maintained and wastefully operated. There are, of course, exceptions and numbers of plants exist which were installed in accordance with the best engineering practices of the time and which are operated as economically as possible. The rapid and material improvement in stationary plant equipment and its installation and operation has, however, made many of these plants obsolete.

Unfortunately, too little is done except under immediate economic stress and we are now confronted with the question of modernization of stationary boiler plants. The subject of modernization is one that should receive most careful consideration, particularly as to installing new

equipment or the application of new appliances to existing equipment.

To what extent is the addition of new appliances or changes to old plants justified and what should they be? When should old plants be scrapped and new ones provided and what kind of plants should be provided? There is no hard and fast rule and no "standard" or "recommended practice" that can be universally applied either to the design of the plant, the equipment used, or its installation. Each case requires its particular analysis and solution.

No expenditure is justified that will not result in increased betterment and returns over the existing condition. No wasteful operation is justified where it can be remedied by improved facilities or practices except as a temporary expedient in such instances as lack of funds or proper labor supply.

Assuming that funds are available, in considering the modernization of a stationary boiler plant such questions as the following should be conclusively answered:

1. What kind of service is demanded? Will it be of one kind, such as the generating of electric current, or will it be mixed, including generation of electric current, operation of air compressors, pumps, steam heating, and the like? Will any part or all of the service be intermittent or continuous during specific periods? What will be the minimum, maximum and average demands of the different kinds of service and the totals of each? A careful check and tests will be required to answer these questions.

2. What kind of a plant is at present installed? Is it of sufficient capacity? What is its condition? Is it maintained and operated as economically as possible? What does it cost to produce a horse power? What kind of fuel is used and what kind is available? What kind of labor is used and what is available? To what extent, considering the capacity and the service demand, should the plant be modernized? Is it mechanically practical to modernize the plant to the desired extent? What will it cost? What can power be produced for in the modernized plant? Can any or all of the service demands be supplied by Public Utilities and at what cost? Frequently such service can be supplied at lower cost than it can be produced for by the railway. Will the decreased cost of power production with the modernization justify the expenditure necessary?

The design of the plant, the kind and capacity of the boiler units and auxiliaries, whether water tube or return tubular and the installation, depend upon the character and importance of the service, minimum, maximum and average capacity demand, available fuel and water supply, labor supply, etc. As previously stated, there is no design that will meet all conditions. The best engineering both mechanical and electrical are necessary and well worth while.

There is one suggestion I would like to make in connection with boiler plant operation in the interest of economy and service: That the control of the personnel of power plant employees and their supervision be removed from the authority of local officers and placed in the hands of one qualified supervisor provided with the necessary corps of inspectors to enforce proper maintenance and operation of boiler plants, believing that by this means only can proper economies be effected.

E. R. Breaker (S. A. & A. P.): I want to speak a word in regard to the small shop or small terminal. The small shop is our problem and we have got to meet the question of reduction in shop fuel and to meet it without spending very much money. The small terminal of the large railroad has a similar problem to meet. They cannot afford to spend as much money on small terminals but there is an investigation which can be

made for very little expense and with very little trouble which oftentimes pays a big return on the investment.

I commenced to look into that in our own particular shop about 60 days ago, and in making the investigation I first listed the various uses which we were making of steam and then conducted some tests to see, first, how efficient our boiler plant was, and, second, just what we were doing with the steam after we had generated it. I found that the boiler plant, which was a water tubular boiler, was fairly efficient, but I found a big loss by radiation and evaporation. Relative to the radiation leakage from the steam line, I found that on account of the fact that that loss was going on for twenty-four hours in the day, that we were losing something like forty per cent of the total steam generated by the radiation from the steam lines and the loss through leakage, most of which were not leaks of any considerable moment, but were small leaks at various joints and connections which would be passed up, generally, in the operation of the plant; large leaks were being taken care of as they developed. I found that the roundhouse, for which we furnished steam 24 hours a day, consumed about 12 per cent. The roundhouse operation for getting out about 12 locomotives in the 24 hours, was scattered all through the 24 hours—together with the radiation losses and leakage through the valves this amounted to practically 50 per cent of the total steam used in the shops which includes small shops and car shops in addition. The air compressor used about 20 per cent of the total and the stationary engine and the tie treating plant, for which we furnished steam, about 25 per cent; small miscellaneous, about 8 per cent.

The big item is the reduction of roundhouse consumption. In small terminals where we have to get engines hot throughout the twenty-four hours, it has been assumed that we must have a steam plant, but in casting around for a way to avoid that, in our particular case, I have found a simple remedy. I can shut down the shop plant at the end of the 24 hours and save this loss 16 hours out of the 24, cutting the 50 per cent loss down to about 16 per cent from that cause.

Our plant is probably no better or worse than the general small plant. It grew up with the needs of the service and was not particularly designed as to the layout of the piping and I find that condition existing among most small terminals. I believe, by looking into that question, we can cut down the length of pipe lines and number of connections thereby materially reduce our losses.

I have found in investigating the air lines that probably every joint and every cock has a certain amount of leakage. These leaks are not always noticeable. They are not strong enough to hear and you cannot always see them, but by testing you will find that a cock which seems to be all right by the ordinary test is leaking 3 or 4 cu. ft. of air per min. If we can weld the joints of these pipes and reduce the number of openings to a minimum, I think we will solve that problem.

C. B. Smith (B. & M.): I notice on the figure dealing with horizontal return tubular boilers that they indicate a flush front setting. The original horizontal return tubular boilers used to be set with a flush front and for 15 years or more it has been our practice in the east to set boilers with overhanging front due to the trouble of burning on the dry sheet. I would like to ask, and it may be of interest to other, the reasons why the committee has shown the flush front and what provision is made for preventing the burning out of the dry sheet. From the experience of the committee and the roads which have been using that method, I suppose there is an advantage in having a hot head rest over the fire door.

Mr. Rink (C. & N. J.): In answer to the gentleman's question, it has been our experience on the Rony Island that

by using plastic brick work up to the arch over the dry sheet on the front we get excellent results and eliminate the burning out of the dry sheet. I do not think we have had a dry sheet burn out in the last six years. We find, however, that it is absolutely necessary to maintain all this plastic fire brick work in good condition and that the furnace lining should be maintained in good condition. I think our practice in the past has been to neglect the furnace linings until they got into such shape that they required expensive rebuilding. We do not have to rebuild a lining any more on our road because we maintain and perpetuate them by catching bad spots before they go too far.

G. W. Rink (C. of N. J.): I would like to make a few remarks in connection with B. & W. water tube boilers. Some members may have such boilers in their power houses and perhaps also the Rony stokers as we do, utilizing buckwheat No. 1 coal for developing steam. We were not getting the full capacity of our B. & W. boilers, due to the fact that the openings in the grate were not sufficiently large to admit sufficient air for perfect combustion. I think that is common with Rony stokers in general and we recently changed our patterns, cutting out the sides of the grate fingers in that way increasing the openings from 9 to about 18 per cent. It is surprising how much better combustion we then got within the firebox.

We have also found that our baffle walls, as a rule on B. & W. boilers, are not in good condition, resulting in high stack temperatures, as high as 750 degrees. After the baffle walls were repaired the temperatures dropped to about 550 degrees at the outlet of the stack. In the B. & W. boilers the baffle wall above the bridge wall runs at right angles to the tubes and also the baffle wall below the flame wall runs at right angles to the tubes. We find by taking out the baffle wall above the bridge wall and inclining it, the result is to restrict the opening on top to about 70 per cent of the grate area and as a result we get any desired flame through that pass. Also by restricting the opening at the bottom of the flame wall we get a great reduction in temperature.

Changes of that character provide for fuel economy in the power house, which is also obtained by the elimination of cracks in the walls. In the case of the bridge wall we make use of American fire brick and low temperature cement. We do not use the loose brick generally furnished for that purpose.

I might also add, in connection with steam piping, I also prefer the Van Stone type joint, either with the threaded flange, or even the solid flange, because it gives a chance to line up the pipes. We have never had any trouble in the way of leakage in any of our plants when we used corrugated copper gaskets all the way through.

In the case of steam and exhaust pipe which has been in service since 1913 we have never had occasion to repair the joint.

It is sometimes a difficult problem to get rid of the ashes, especially where they have to be hauled out by hand. We have introduced at one of our plants, where we have about 2,000 horsepower, a steam jet ash-handling system which gives entire satisfaction. Recent figures indicate that our two separate ash handling systems working 5 hours out of 24 hours, have a steam consumption of approximately 3,000 lb. per hour. We simply have a pit in front of the boilers, the ashes being pulled out and delivered by a steam jet to an overhead storage tank. When the tank is full it is unloaded into tender cars outside.

Mr. Giles: I move that the subject be closed, the report be received and the committee continued to handle this subject during the coming year.

(The motion was duly seconded, put to a vote and carried.) (The meeting then adjourned.)



Section VI—Purchases and Stores—American Railway Ass'n

Interesting Paper by M. J. Wise; Committee Reports Reclamation of Material, Scrap Classification, Inventories, Material Accounting, etc.

CHAIRMAN H. B. RAY called the meeting to order at 9.30 a. m.

After formally opening the meeting, Chairman Ray retired from the chair in favor of O. V. Daniels, Assistant General Storekeeper on the Pennsylvania, who introduced his honor, Mayor Edwin F. Bader of Atlantic City. Mayor Bader welcomed Division VI to the city and complimented the members by stating that of all the conventions that came to Atlantic City, this is the best.

Response to the mayor was made by Mr. U. K. Hall,

General Supervisor of Stores on the Union Pacific System.

U. K. Hall: We have met here for a very serious and definite purpose. Mr. Lee brought to us yesterday morning some figures that showed to the very largest extent the responsibility that rests upon the members.

After a brief response by Mayor Bader the chair was again taken by Mr. Ray who introduced M. J. Wise, Manager of the Dept. of Materials and Supplies, Division of Liquidation of Claims, U. S. R. A. who read the following paper:

Proper Organization in Service of Supply Real Basis for Successful Achievement

By MARION J. WISE

Manager, Department of Material and Supplies, United States Railroad Administration

MY work for the past two years has brought me more or less closely in touch with the activities of most of your individual members as well as, in a general way, the work you have been doing collectively as Division VI of the American Railway Association, and in this way I have acquired a rather clear insight as to your aims, difficulties and successes. The difficulties you have had to encounter, at times, have seemed almost insurmountable. Some of them have been overcome. There are, however, others of a most difficult nature still ahead of you, but with the courage that has characterized your past performances, I feel sure you will continue to push forward until you have reached that goal of recognition to which the service of supply is entitled.

My study of service of supply constantly brings to me the realization that an important basis factor for its highest achievement is organization. Having this strong conviction, I will endeavor to plainly give you my viewpoint with respect thereto, as well as other phases of its functions on our modern day railroads that may be closely related to the main subject.

While organization is the systematic union of individuals in a body whose officers, agents and members work together for a common end, the character of such organization for religious, political, governmental, economical, social or commercial purposes has for the ages been a most absorbing topic of study. The ravages of time and changed conditions have allowed none

created for the purposes named above to preserve their original form. Those which have survived are the ones having a worthy aim, a strong personnel and proper esprit de corps. It takes but little study of the pages of history to convince any one that proper organizations for the purposes described above are the foundation of progress in the various lines of human endeavor. It would seem to follow that this foundation, to be enduring and productive of the most good should be built on the solid rock of sound experience, and not the shifting sands of unproven theory. This does not mean, however, that any organization should be "hide bound" and not venture from the trodden path, because progress means a going ahead, and going ahead means a leaving behind. Cautious progress may set a foot forward but to draw back and try another route. If no foot is raised, however, for a step on the new way, excessive caution is holding the foot still, and a standing object is more easily toppled over than one moving forward.

Fundamental Principles of Good Organization

There are certain fundamental principles governing all movements that cannot be ignored with impunity, and these fundamental principles have been and must be established irrevocably by the teachings of experience.

Railroad operation is the production of transportation and the highest aim of its organization should be to safely handle

freight and passengers between more or less widely separated points with the greatest possible despatch at the lowest possible cost.

The service of supply is an integral part of this organization and to function with proper effectiveness must have a complete organization of its own, synchronizing with all the other parts.

When the responsibility as to operating expenses of the service of supply department is seriously considered and the fact that it is in charge of 35 to 40 per cent of such cost is given due weight, its importance should be at once proven. The value of a completely organized and adequate department of this kind has been rated too low in the past, and still is in some quarters. This is largely responsible for railway operation falling short of a higher achievement.

This bare statement, however, without amplification, would be misleading. There are some railroad companies that have placed face value on their service of supply and are earning commensurate returns therefrom. There are others, who, seeing only through a glass darkly, have partially viewed the economical results that could be obtained, given only mediocre recognition to the importance of this branch of their service, and are, therefore, securing only partial returns. There are still others which have failed to take even a faltering step forward, and this class is suffering from a lack of efficiency that is adversely affecting their balance sheet in a most pronounced way.

The Human Factor

Organization is primarily concerned with human factors. Let us then consider whether organization is really vital in economic operation, or are its component parts merely conductors of currents, i. e., are the members of the organization only mediums through which instructions are carried out, or is there not some dynamic force in and of itself which should emanate from them that is of the highest importance. While it occupies no place on a railroad company's balance sheet, it cannot be successfully denied that organization has a value in proportion to the channel into which its activities are diverted. That value cannot be accurately gaged in dollars and cents and yet it does have a bearing on the real value of the property as a going concern.

The importance of the personnel of a railroad's operating force is being recognized more clearly every day and is as essentially a factor in its successes or failure as its financial status, the character and volume of its traffic, its plant and its operating rules and policies. If this were not so, then why the campaigns for safety, prevention of loss and damage, heavier loading of equipment, fuel economy and reclamation and saving of material, all of which must fundamentally base their success or failure on the interest of the personnel of the organization? Is it a real live asset or is it an unrecognized liability? There can be no satisfactory middle ground. It must be one or the other. It seems essential that the head of each operating organization should have the courage fearlessly to study and face the situation on his own road, and if his service of supply department is not organized to produce the most effective results that can be obtained, at least honestly admit it to himself and take the necessary action.

Passing from the broader phases of organization to a more concrete study as affecting service of supply, I present for your careful thought the statement,—that performance of an organization is based, first, on its personnel and form or character; second, upon the facilities with which it has to work; third, upon the methods and practices it employs. If this statement is fundamentally sound, and I believe it is, then it may be helpful to discuss its component parts with a view of attempting to apply our best judgment to what constitutes the essentials in each and the coordination of all of them into a composite whole for the production of the most efficient results.

Personnel

With this end in view, let us first take up the subject of personnel.

Upon the purchasing agent and the general storekeeper rests the major responsibility of the proper functioning of the service of supply and as they are the heads of the two branches of this important operating organization we may use them as type. They should be models in their respective departments, for every officer and employe therein. Under our form of gov-

ernment, as every American citizen that is born is a potential President of the United States, so under present operation of railroads every employe is a potential head of the department in which he serves, and as a natural corollary is a potential president of a railroad. If, therefore, we consider the degree of worth of the purchasing agent and general storekeeper to the operating organization, we at the same time in substance, apply like principles to each officer and employe under them.

Their value, as individuals, in the operation of service of supply, would seem to be dependent upon the following chief personal attributes in the following order:

- (a) Intelligence, integrity and industry.
- (b) Experience, courage and initiative.

I direct your particular attention to the three qualifications under heading "a," which I designate the three "I's." In every line of endeavor they stand out preeminently as essential characteristics for successful accomplishment. Any two of them linked together, without the other, no matter in what order arranged, fail to meet the full requirements for proper handling of duties connected with the service of supply. I commend to your especial consideration and thought these qualities in the personnel of your organization and I am sure if you will select, as well as train the men you now have, primarily thereon, you will eventually have an organization whose possibilities for effectual service are without limit. I am not unmindful of the difficulties surrounding the improvement of the personnel. It is a hard, laborious task and the peak of perfection can perhaps never be reached. This very fact, however, is an incentive to the man of intelligence, integrity and industry and the degree in which he accomplishes results is the barometer of his executive ability.

Experience, Courage and Initiative

We next come to experience, courage, and initiative. A great deal could be said about each one, but I will touch only the high spots of their value in the personnel of the service of supply department.

While experience in an executive is not absolutely essential, lack of it is a handicap,—not insurmountable, but difficult to overcome. There are positions, however, in service of supply where experience is an essential of the highest importance. We all know that the service of supply department has too many men in it fitted by neither experience nor training for the positions they hold. It is too often made the recipient of employes from other departments who are no more fitted for their positions than a non-railroad employe. The service of supply department is as essentially technical in its requirements as any other department of a railroad, but lack or faulty knowledge of its importance has led many executives to foist upon it for one reason or another inexperienced men, some of whom could never be properly fitted for the positions and others who were costly experiments during the time they were learning.

Courage is an often abused word and as often misapplied. The angle from which I desire to view it as used in this connection is that of conviction. Our opinions are our own,—no can take them from us, but it would be interesting to know how many officers and employes when asked for an opinion courageously voice their own convictions and how many hold them to the model they think their executive officers want. It is but natural to try and express an opinion that will fit in with a superior's view of the same thing and it is, therefore, all the more necessary to watch carefully that we be true to our own ideas and have the courage to express them. However, when that is done to the best of our ability, our responsibility ceases and if superior authority does not agree and instructs that the matter be handled contrary to our views, as good soldiers we should carry out our instructions. The man of honest conviction, however, who has the courage to express his own opinion can not help but inspire respect and has a quality that makes him valuable. This particular quality has done as much as any one thing to place some service of supply departments in the position they now occupy on their roads because the heads of that department had the courage continually and convincingly to present to their executive officers the necessities and importance of service of supply.

Initiative has had as much to do with the development of American railroads to their present standard as any one thing, and there is equally as much of it in the personnel of service of supply as any other branch of the service. That the results have not been fully developed as in some other branches is due not

to lack of it in the individual members compared with other departments, but because organized service of supply is younger and its limitations have been more circumscribed by lack of recognition of its importance by executive officers. The accomplishments of this body within the last few years as a testimonial of no mean importance to this quality of its members. Yet, have we developed it as far as we might and have we installed it into the rank and file in such a way as would improve our organizations? I think all will agree there is room for considerable improvement in this connection.

Let us now pass on to the form or character of reorganization. In discussing this phase of the question I am not unmindful of the fact that there are many divergent views with respect thereto.

Lack of Supervision

One of the points that stands out with extreme clearness in considering the organization of the service of supply department is the fact that it has been and still is, lacking in supervision. Did you ever stop to consider that it is responsible for 35 to 40 per cent of the operating expenses; that at all times it is responsible for material on hand representing approximately two-and-a-half times as much cash as there is in the treasuries of the railroads and measured by this responsibility the amount spent for supervision is not greater than one-sixth and often less than the amount spent for supervision in any other department? Has not the dollar spent for materials and supplies and tied up in them as many cents as the dollar spent for anything else, and if there is any merit in the generally accepted theory, and I for one believe there is great merit in it, that proper supervision is an important factor in securing satisfactory results, then it would seem not only logical but necessary, that a greater appreciation of this be extended the service of supply department.

It seems a natural sequence that this department on the large systems should have as its head an executive officer devoting his time exclusively thereto, with the heads of the immediate purchasing and stores departments reporting to him direct. It seems to me fundamentally wrong that either department should report to the other except in an advisory way, or that either or both of them should report to any other than an executive who could co-ordinate their respective activities. I cannot reconcile myself to seeing anything but a fundamental error in an organization for a large system where the purchaser of material has charge of its distribution and use or the user or distributor of material has charge of its purchase.

On smaller systems the heads of the Purchasing and Stores Department should report to the executive officer having charge of general operations.

Organization—Purchasing Department

The purchasing agent should have absolute charge of the purchase and sale of all material of every kind on a railroad. In addition to a well organized office force consisting of a full complement of experienced clerks for their particular duties, the purchasing agent should have directly assisting him, experts in the purchasing of steel, coal, lumber, cross ties and stationery where the size of the railroad is such as to justify it. If the purchasing agent is qualified for his position, no one can purchase material to better advantage than he; his value is discounted when he is not the ultimate authority on all matters involving the purchase and sale of material. If he is unfitted for the place, he should be relieved as proper results cannot be obtained by divided responsibility for the purchase of materials and supplies.

Organization—Stores Department

The general storekeeper should have charge of the handling and distribution of material and, under the supervision of the Accounting Department, the accounting for all unapplied and scrap material. A wide range of observation has given me a very decided opinion that all primary accounting for material should be under the jurisdiction of the stores department, subject only to the general supervision and check of the accounting department. Experience and operating conditions seem to make this branch of the service better fitted than any other to account for this phase of operation, just as the agency forces are best fitted for the accounting of freight and passenger business. There should, however, be the same close supervision and check of the accounting department made of the storehouse department records as is made on other departments.

The general storekeeper should have in his organization, where the size of the road justifies, sufficient traveling storekeepers to keep him in touch with the physical conditions at all major material distributing points. In addition, he should have a full complement of division storekeepers and district storekeepers so that the distribution and accounting for all material shall actually be under the jurisdiction of the stores department.

In the co-ordination of the two branches, there should be the widest exchange of views, reports and conditions, and it is in my opinion, essential in order to secure the best results, that the purchasing agent and general storekeeper should, in conjunction with the heads of other departments, make more frequent trips over the road. It is sad but true that there are some general storekeepers, and especially purchasing agents, who know less of the physical conditions surrounding the material that is under their charges than the heads of other departments. When inspection trips are made over the road, it is as necessary that the purchasing agent and general storekeeper accompany the executive officer as it is for the Chief Engineer and Superintendent of Motive Power to make it a complete success. The purchaser and distributor of material should see it on the ground and in conjunction with the heads of other departments many difficulties can be promptly overcome that would otherwise by correspondence take weeks and months. On these trips, methods and practices can be discussed and action taken to fit the local conditions. I need not recite many advantages that can be secured in the economical and efficient handling of material in close co-operation on the ground between the heads of the Service of Supply Department and the heads of the other departments of the operating organization; the closer the association, the closer the co-operation.

Department Facilities

We will now take up the question of facilities with which the organization has to work. This presents a very broad phase of discussion, and I can only touch on it in a most general way. The heads of every department of a railroad continually have their eyes open for savings in operating expenses that can be effected by capital expenditures, and the savings that can be effected in the material and supply department from this source are as great, relatively speaking, as in the other departments. Every general storekeeper knows the advantages of well-built, well-lighted, properly arranged and adequate storehouses for the care and distribution of material. They know the advantages of adequate lumber and tie yards, platforms, casting and bar iron racks and other facilities necessary in the proper storing of material, and in the distribution of capital expenditures their claims for a proper share therein should be so well presented to the management as to justify them.

The service of supply department should not be content with merely presenting a claim for capital for additional facilities and letting it go at that, but should have back of that claim evidence of a substantial character that the spending of the money is justifiable from an economical as well as every other standpoint. This, of course, requires resourcefulness, initiative, study and persistency of the highest character. I think all of us can remember times when we might have secured facilities had we presented our claim for same in a more explicit way.

There is also another feature to be considered in connection with the facilities. The resourceful storekeeper, by the employment of initiative and industry, can remodel and add to existing facilities in such a way as to increase their capacity to a remarkable degree. Another thought that occurs to me in connection with this particular subject is that care should always be exercised to suit the facilities to the conditions, and all permanent work should be done with a definite plan in view, although its ultimate consummation can be obtained only over an extended period of time.

The proper location of facilities is also of the highest importance. A facility, no matter how well adapted for the storing and care of material that is constructed in such a location as to make the expense of the distribution high is of no more advantage than a poor facility in a good location. This statement may seem axiomatic, but we all know of many instances when there has been construction of unsuitable and improperly located facilities, due to all factors in connection with the storing, handling and distribution of material not having been fully considered at the time the plans were made.

That the best results can be obtained by the closest co-operation between the maintenance, stores and engineering organ-

izations almost goes without saying, and the Service of Supply Department should impress its views upon the other departments with such intelligence, force and convictions that the plans may all be worked out and agreed upon in every essential detail before the application for the capital expenditure is made to executive officers. I believe this will have a tendency to aid in the securing of more and better facilities for the service of supply.

While I would like to discuss more in detail the question of facilities, I must pass on now to the latter phase of performance as modified by methods and practices. They play a most important part in the performance of the service of Supply Department. It would be strange indeed if opinions did not differ as to what constitute best methods and practices. I cannot discuss them except in the broadest way, calling your particular attention to some of the more important ones with respect to which I have, through a wide range of observation, been imbued with very decided personal opinions in regard thereto. For the sake of convenience and not because of their relative value, I will sub-divide them between purchasing and stores departments. The items thus selected are taken largely because of their close connection with the subject of organization, and the part it plays in the successful performance of its function.

Purchasing Department—Price Records

A proper price record is one of the most important tools with which the purchasing department has to work. Its value, however, is largely dependent upon the character of the record and the accuracy and up-to-dateness with which it is maintained. Every road maintains a price record of some character, even though that record may consist only in filed copies of invoices. The results in human achievement are largely determined by comparison or contrast, and when we consider that purchasing agents, in the ordinary course of business, purchase from twenty-five to one hundred thousand varieties of articles, dependent on the size of the road, the utter futility of his remembering the prices of the various items over any extended period of time, is easily visualized. He must, therefore, in determining whether a bid, received on 95 per cent. of the articles purchased, is reasonable, see how same compares with previous purchases. If, in doing so he is forced to examine files of invoices, the amount of valuable time thus consumed is very much in the aggregate and might have been profitably directed in other channels, whereas, with an up-to-date, complete price record, he can see at a glance what he had paid for the article over a series of months, and form his opinions and decide on a line of action promptly. My opinion of a record of this kind is that it should be a loose-leaf continuous monthly record covering all articles, where the amount purchased in a year involves a considerable sum of money. As an adjunct to the price record, it also seems advisable to keep a bid record. This can be maintained in conjunction with the price record, but I believe preferable on cards. This record enables the purchasing agent at any time to determine promptly what a manufacturer may have bid on particular articles of material and may influence and help him in securing lower prices. The value of these records, however, is in proportion to the degree of accuracy and up-to-dateness with which they are maintained. While on its face it would seem that the liberal help thus employed might be used to better advantage elsewhere, one complete item of information may be helpful in saving the salary of the clerk maintaining same for more than a year.

Identification Numbers

Experience and observation has led me to the decided opinion that all items of material purchased by a railroad company in considerable quantities should have distinctive corporation numbers or symbols. This practice is now being largely applied to engines, all locomotives and stationary. Many railroads have found that a most real relief of confusion has resulted from different descriptions of material of different points being applied to the same article of material. However, where a distinctive symbol is given to every item of material and this symbol is carried, in addition to the description on requisitions, order, manufacturers' invoices and receipts, the opportunities for mistakes are often greatly decreased. Many manufacturers as well as railroad purchases and other organizations, have local or abbreviated descriptions for identical articles of material, which are often not easily recognized or are mistaken for something else by others handling the various documents pertaining thereto. If

it is advantageous for air brake material and casting to be given distinctive identification, then it would seem that the same principle could be applied with equal success to other items of material. The extent to which this should be carried, of course, depends largely upon local conditions peculiar to individual railroads. The effectiveness of the practice and the results obtained therefrom are, in the final analysis, greatly increased by the spirit and whole-hearted support which is given to it by all concerned.

Relationship With Manufacturers

This is a subject of vital importance to every purchasing officer and his company, and often upon it rests more than is realized, the results obtained in the purchase of material. I have known of cases where many purchasing officers have failed to receive important trade information and trade benefits because of their attitude towards the people from whom they buy. It is true that in a buyers' market that little consideration can be given the sellers of material and the purchasing officer can drive good bargains, but the relative condition of supply and demand frequently change, and the ability of the purchasing officer is put to the real test in a seller's market. Sellers of material are human and have the same feelings that are common to mankind, and slights and lack of proper consideration for "peddlars" have often resulted in purchasing officials failing to secure the best material at the lowest price at which it could be purchased. I have had representatives of supply concerns say to me, "Well, so-and-so did not give me a square deal, but it is a long lane that has no turning," or words to that effect. Of course, there are times when supply men imagine they are unjustly treated when such is not the case, but generally, my observation has been that they are good losers in fair competition.

It is well not to lose sight of the fact that representatives of supply companies, as a general proposition, are men particularly trained and experienced in their individual lines and usually have not only a general but a technical knowledge of their business, while the purchasing officer dealing with innumerable items of material and supplies, cannot possibly have a full knowledge of all. It is seldom that a genial wide-awake purchasing officer, by discussing with the representatives of supply houses in detail their particular line of business, cannot obtain some information that will be helpful to him in his work.

Stores Department

The supply train is a subject that has been discussed from many angles and in listing it as an item for special treatment I am not unmindful of the fact that there is a diversity of opinion in regard to its operation being a success or failure, but practical experience and a rather extended range of observation leads me to believe that fundamentally the supply train is an economic factor in the distribution of materials. The spirit with which the practice is carried out is the governing factor. To be successful in the proper degree, this train should be accompanied by representative division officials of the Maintenance of Way and Transportation Departments who should enter into the spirit of economy with the same zest that should and generally does actuate the storekeeper. The operation of a supply train gives an opportunity for closer co-operation between the division officers of the various departments, and if properly handled, cannot help but result in large economic returns.

The representative of the transportation department has an opportunity to visit stations on a mission distinctly different from the general routine. He can, on such a trip, carefully look into the use of stationery and other station supplies, with a view of securing their most economical use. Likewise, the representative of the roadway department has an opportunity to become acquainted with the economical use of tools and other material; both have the opportunity of picking up surplus material for transfer to other points or return to stock for future use and clearing up miscellaneous scrap at station and section houses. I have mentioned cleaning up scrap particularly because every supply train should make this a special function. If all these officers are thoroughly imbued with the thought that material represents actual money and that its proper care and conservation enters into the expense of operation to the same, if not a greater extent, than labor, then proper results will undoubtedly be secured.

The handling scrap and reclaim material is a feature of stores methods and practices that is exceptionally important and

upon its proper handling depends very large returns. All scrap, no matter where located, is the equivalent of its market value in actual money, and only in rare instances can there be failure to realize upon it. Furthermore, all scrap contains a large amount of actual and potential usable material, which can be applied to maintenance purposes rather than purchasing new material.

To secure the greatest returns from the sale of scrap, it should always be assorted into proper classes and sold monthly. It has been the practice on some roads to hold scrap in dull seasons, for a rising market, but a careful study of the subject over a series of years, taking into consideration all the factors that might enter into it, indicates that monthly sales bring the best general results. The money that would otherwise be tied up can always be used to advantage; the lost efficiency that always must occur in disbanding experienced scrap sorters; the lack of a systematic reclaiming of usable material; and the general slackening of interest in the matter, are all debits against the possibly greater amount of money that might be realized by holding the material for higher prices. Of course, such items as wheels, axles, old machinery and rails may at times be held to advantage.

Reclamation of material is always a subject that presents interesting features to purchasing and stores officials. It would seem that from an economic standpoint, there are four general principles of paramount importance:

1st—The cost of reclamation should not be prohibitive.

2nd—Material should be reclaimed only when the advantages derived therefrom are greater than can be obtained from the use of new material.

3rd—Reclamation of all material should be under the jurisdiction of the Storehouse Department.

4th—Use of modern machines and facilities for reclaiming material.

Discussing the foregoing paragraphs seriatim:

1st—Many stores organizations have deluded themselves into the belief that the reclamation of certain items of material was a paying proposition, when as a matter of fact, if all of the factors entering into the cost and use thereof were carefully examined, it would be apparent that it would be better to scrap the old material and buy new. To secure paying returns in this connection, it is well to be sure that every item of cost and all circumstances and conditions relative to its distribution and use are given careful and accurate consideration before reclamation is commenced.

2nd—Many items of material are reclaimed which, when put in actual service, are of such an inferior character that the amounts expended for labor in reclaiming and applying, more than offset the cost of new material. Of course, all mechanics prefer to use new material and in an excess of zeal, some reclamation plants have forced upon the Maintenance of Equipment and Roadway Department material that should never have been used. Every one of these and other phases of the question should be carefully threshed out before the reclamation work is started. It is also essential that a careful inspection should be made of all reclaimed material before it is distributed for application.

3rd—This is also an item upon which there has been difference of opinion, but my belief is that the best results can be obtained by having the reclamation of all material under the jurisdiction of the stores department. The main duty of the stores department is to furnish material, and the main duty of the maintenance department is to use it. Where reclamation of material is under the jurisdiction of the stores department, it is generally given special attention, whereas, if it is under the jurisdiction of the maintenance department it, by the very nature of their duties, it becomes of secondary importance. This would seem to present a fundamental argument of a rather convincing character, without elaborating on others, in justification of the statement made above.

4th—Where actual demonstration of economy has been made in reclaiming of certain items of material, it has been in many instances, nullified to a large extent by the use of obsolete machines and facilities. The old adage that "if a thing is worth doing at all it is worth doing well," applies with full force here. If a bolt threader is discarded by the mechanical department as being out of date, it is certainly out of date for use in the reclamation branch. Surely a triple header bolt, threader, in contradistinction to a single header, can take care of three times as many bolts with the same labor in the reclamation department

as it can in the mechanical department. The statement of this fact almost proves itself.

Distribution of Material

The prompt distribution of material and accurate accounting therefore is of major importance in proper operating efficiency. This, in my opinion, should be entirely under the jurisdiction of the stores department. While an increase in the stores department labor forces to distribute material is often looked upon as an item of expense that can be saved, as a matter of fact it is not. The hours wasted by highly paid mechanics in looking for material, when it should have been distributed to them by the stores department, can never be estimated.

The distribution of material by a department not directly interested in its use, is also a check against waste by the other departments. The argument could be presented, however, that there might be such lack of interest in the use as would result in delays in the maintenance departments, but this is seldom the case, as most stores men know, principally for the reason that the maintenance departments keep so constantly after the stores department for the material they have been authorized to use that the latter cannot afford to become dilatory in this respect.

Stock Books

The arguments in regard to the effectiveness and necessity for accurate and up-to-date stock books are almost time-worn, but this practice is not being given the attention to which its importance entitles it. Here again, the value of the practice is dependent largely upon the human equation. To be of the greatest value, the stock book should contain an accurate and up-to-the-minute record of all material on hand, all material on requisition, all material ordered, and the amount used. This knowledge is almost invaluable in ordering and in transferring material, as well as keeping the stock balances within reasonable limits. Imagine the confusion in any large supply house, with hundreds of salesmen on the road and branch stores throughout the country, not having an accurate and up-to-date stock book. A few minutes' reflection on this subject should convince any one, without any extended argument, how almost invaluable are stock books.

A Tribute

In conclusion permit me to pay a tribute to the large number of purchasing and store officials of this organization who have accomplished almost unbelievable results in spite of lack of proper recognition, antiquated facilities, and out-of-date or unsound methods and practices, many of which they were in no wise responsible for. The purchasing agent who faces bills long unpaid, unscientific ordering and urgent demand for immediate delivery, who is able to secure material at a reasonable cost, is not an unfamiliar figure. The general storekeeper, who by hard work, initiative and without adequate co-operative assistance keeps the operating department supplied at a low cost of handling and saving of waste, is not also unknown. Their value in thousands of instances can never be estimated and is often never appreciated. Then think how much greater would have been results had these same men had all that could be desired.

Discussion

I am particularly impressed with the compliment Mr. Wise has paid to the individual storekeeper, the general storekeeper, the purchasing agent, and the general purchasing agent. He is correct in his statement that the greatest handicap has been the lack of men who are primarily fitted for the work to which they are assigned and for which they are held responsible.

The organization which is recommended by Mr. Wise has been generally accepted during the last few years as being fundamentally sound. The need of facilities is of course equally well known. Passing tracks, depots, terminals, shop buildings, and any number of valuable improvements are needed; so that after all we must not be discouraged because we cannot get even the things which we know are so necessary for the economical and proper administration of our affairs. There is a tremendous amount of valuable facilities that can be obtained by pre-

sending constantly the need of these things in a way which will show in dollars and cents the actual savings which can be effected. Many valuable and necessary improvements have been lost because their need has not been shown in the forcible and direct method of measure in dollars and cents.

There can be no question about the needs of a stock book. It is absolutely essential, but in order to get the real benefits from it, it must be maintained. Neither is there any question about the supply train. It is one of the most valuable methods of distribution and control in the stores department. The next step, and a necessary part of it, is the stores delivery system, or what Mr. Wise calls the distribution of material, which means of course the delivery of material to the workman. However, the best of plans never can and never will produce results unless they are applied.

Chairman Ray called upon F. W. Brazier for a few remarks.

F. W. Brazier (N. Y. C.): I want to say that this association is doing a grand work. I am a member of that grand old M. C. B. Association. It is a legislative body, you are an educational body. But your work and our work go together and we want to show the officials of this country that by your work you are making conditions better for all the railroads of the country. Another thing, you come here and you hear something read. Assimilate it and apply it to your own conditions. Don't think you know it all. Get away from home once in a while and

learn what others are doing. That is the way to be successful and will help you to reduce the cost of production.

The Chairman: Those kind of talks put enthusiasm into us and we will take it home with us. I want to ask Mr. Yeomans to say a few words to us. He is an old friend of ours and he has fought our battles a good many years.

Geo. G. Yeomans: There is just one thought running through my mind and I do not know exactly how to put it into words. It is what these conventions mean to me and whether we all of us grasp the real significance of what we are here trying to do. We are here to try and profit by what the other fellow has done, not by what we have done ourselves, but get out of our own and into the other fellow's territory and grab away from him all the good ideas that he has. It also involves a sacrifice. In a body of men such as this it is not possible to make any advance toward the general good without giving a little, sacrificing a little, for the good of the whole. That is what these conventions are really for. It is for the general good of everybody, not for the particular good of someone individually, and I do think that if we can carry out this spirit throughout all these meetings that we are going to eventually come to a point where the weak as well as the strong are going to meet on a plane that will elevate all of us.

Upon the motion of F. D. Reed (C. R. I. & P.), a rising vote of thanks was given to Mr. Wise.

Material Accounting and Mechanical Facilities

Some criticism of the 1920 report of the committee, recommending that all material stocks be carried in stores department accounts, is answered in this year's report. The 1920 report in this respect seems to accord with recommendations of the Railway Accounting Officers' Association, and

three additional reasons are given why the 1920 report, as originally submitted and approved, should remain unchanged. Valuable recommendations regarding the use of mechanical devices, such as comptometers, adding machines, typewriters, calculating, listing and electric tabulating machines are included in this report.

OBJECTION was entered at the 1921 annual meeting of the American Railway Association to the recommendation made in the previous report of this committee, that all material stocks should be carried in the accounts of the stores department, which will have supervision and handle the accounting for same. It was felt sure that some roads would prefer to have a separate accounting department.

Your committee has given this question further consideration and reports as follows: (The following is an extract from the report of the Committee on General Accounts, Railway Accounting Officers' Association.)

3. *Accounting for Materials and Supplies.*—The chief accounting officer shall have general supervision and prescribe the accounting for all material.

4. The officer in whose account the value of the material is carried shall keep such accounts and records, and render such reports to the audit office as prescribed by the accounting department.

The following is an extract from the report of the Committee on Material Accounts, made at 1920 annual meeting of Division VI. A. E. A.

"The present organization is felt that in addition to the movements recorded by the ordering and physical handling of such materials it is necessary within the province of this organization, now known as the stores department, also to supervise and direct

the accounting for material as it affects its distribution under the direction of the auditor."

1. Your committee finds, therefore, that its report is in accord with the recommendations of the Railway Accounting Officer's Association.

2. The stores department should handle the primary accounting as a matter of convenience, economy and efficiency.

3. Where the department using material is billed by the stores department and afterwards charged to primary accounts, it makes a duplication of effort and often results in not charging out material in the month's account in which used.

4. There is some merit in having a special department do all the accounting, but this is much more than offset by more accurate results with reduced cost when having the work done by the stores department with its detailed knowledge of material and its value.

It is therefore recommended by your committee that no change be made in the report as originally submitted and approved at our 1920 annual meeting.

Mechanical Devices Used in Stores Accounting

Your committee has made investigation as to mechanical devices in use on a great many railroads and finds that practically all are equipped with such devices as comptometers, adding machines, typewriters, calculating and listing machines.

In addition, we have found that several railroads are using an electric tabulating machine.

While these machines have been in use for a number of years in the commercial world and are now in use on numerous railroads in the freight accounting department, they were not adapted to stores department material accounting until 1919. The results obtained since that time justify the use of these machines, due to their accuracy and economy, and they are, therefore, recommended by your committee.

Inasmuch as the system followed in the use of the tabulating machine is a radical departure from the conventional methods in stores accounting, a detailed explanation of the forms and mechanical units of these tabulators is deemed advisable.

Either a blank or a dual card may be used. The dual card, Exhibit A, is preferable, as it entirely replaces the ordinary shop foreman's material requisitions.

The blank card can be used if desired, and by its use the information shown on the shop foreman's ticket is transferred by punching to a separate card.

The dual card is used by the shop foreman in the same manner as the ordinary shop material requisition. The card is then priced and extended by comptometer operator in the usual manner, and is later punched out by a machine, known as the key punch, to indicate the same information in a mechanical way.

There is practically no limit to the number of different punchings that can be made on one card in a single operation, the location of the punchings governing the mechanical action of the machines. The only restriction in the use of these cards is that they must be of uniform size, 3 1/2 in. by 7 3/8 in.

The key punch is operated similarly to the typewriter, with

accounting situation, including material issues, invoices, vouchers, shop orders and freight charges.

Pay-roll information and analysis can also be handled on these machines.

There is practically no limit to the detailed information which can be secured mechanically through the use of these machines, either daily, weekly or monthly, providing proper provision is made on the cards originally. Their use eliminates the possibility of mistakes due to their mechanical accuracy.

Another important feature in favor of their use is the saving, which can be effected under the old style hand system. On a railroad where monthly detailed accounting averages \$500,000.00, a saving of 15 percent in clerical work has been effected over and above the costs of operating the machines.

The greater the volume of the accounting, the more pronounced is the saving.

No special training is required for operation of the machines, outside of a few days' instructions. Speed in punching, of course, is acquired by practice.

There are bookkeeping machines that can be used where the volume of work will justify their expense. The individual railroad of necessity must work out the information as to the advisability of their purchase.

Comparison of Stocks

This committee recommends that some uniform method of comparing stock balance of the various railroads be adopted, and offers the suggestion that such comparisons be on the basis of the

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Discussion

H. H. Loughton (Southern): The report as it is presented is very complete with the exception that there has been left out that portion which relates to Fuel Accounting. I find that at the 14th Annual Convention of the International Railway & Fuel Association, which was held in Chicago on May 22 to 25 inclusive, the committee report on fuel accounting, as shown in page 1288, Volume 72, No. 22, of the *Railway Age*, has adopted the recommendation of the Purchases and Stores Division of the American Railway Association on Fuel Accounting. It seems that they have adopted something that we have never adopted, therefore, I suggest that the committee be instructed to submit a report on this subject.

Not only is this Fuel Association looking to us for

recommendations, but the Association of American Railway Accounting Officers is desirous of the same thing.

W. F. Jones (N. Y. C.): This committee is not to determine who is to do the accounting so much as to determine the method of accounting. We have been trying for many years to get a distinct method of accounting for educational purposes, whether we adopt it or not. Therefore, it would be well to appoint a special committee to consider and report here next year on Fuel Accounting alone, keeping it separate from all Material and Stock questions.

It was moved and seconded that the report of the committee be adopted and that the subject be continued and that a special committee be appointed to consider fuel accounting.

Inventory—Special Subject

Preparation for the taking of inventory and the instruction of employees concerned with the work are concisely described in a special report. The methods employed on one railroad serve as a basis for recommendations for carrying on inventory work in a logical manner.

Office records and listing of materials in transit are provided for; the form of requisitions, stock transfers, invoice records, store orders, price books, etc., are outlined. Listing of new and reclaimed stock; material stripped from equipment and many other items heretofore too difficult to handle in inventories are definitely classified and records provided for.

Methods of recording weights, prices, and accounting are outlined and the accurate tabulation of material values is made possible through a system of computation which provides for price changes.

The recommendation includes listing and classifying of track materials and provides for the utilization of the regular employees at outlying points to handle the inventory of isolated stocks. The report also comments on the inadequate provisions made for inventory in past years and indicates wherein modern methods of accounting may be made to increase the efficiency of the stores department.

ON MANY RAILROADS the taking of inventory is now reduced to a system where it is easily taken care of at each point with the regular Store Department forces.

Preparation for the inventory is the governing factor and a proper inventory can be made only by proper preparation. A good inventory must begin weeks in advance a definite system for preparation must be made and definite instructions sent to all officials and all employees; all must be familiar with the instructions. For our guidance we used the following instructions:

GENERAL

1. *Instructions.* Every member of the Store Department organization must be familiar with these rules.

2. *Date of Inventory.*—Inventory will be taken on dates specified by the General Storekeeper.

3. *Object of Inventory.*—In accordance with instructions issued by the Interstate Commerce Commission, an inventory will be taken of all material and supplies in store stock on the railroad as of midnight of date specified. The taking of this inventory will not only give the Interstate Commerce Commission the total value of material in the railroad, but it will also be the basis of an adjustment of the book balance to the actual inventory. The inventory must be accurately taken.

4. *Scope and Jurisdiction.* The inventory of all materials and supplies, including commissary supplies, telegraph material and locomotive fuel will be under the jurisdiction of the General Storekeeper. Inventories of the Commissary Department, Telegraph Department and Fuel Department will be taken by members of these departments as directed by the Store Department.

5. *Help Required.* Necessary help for the proper taking of the inventory will be arranged for by the Storekeeper with the Superintendents or others interested.

6. *Inventory Forms.*—Inventory of all material, excepting track material, will be taken on Form 500. Track material on sections will be inventoried in memorandum books and will be transcribed to Form 500, as described hereinafter.

7. *Preparation for Inventory.*—Preparations for inventory must be started several weeks in advance of the actual taking of the inventory.

All scrap must be sold to the scrap dock. All usable material must be in storehouses or racks neatly piled in units.

Storekeepers must be thoroughly familiar with relation of all material to the stock balance; they must know the location of every piece of material on the division. Places to be given particular attention are, B. & B. tools cars, water service department, work shops, fire department material, racks, points where there are no store department representatives such as small roundhouses and car departments, carpenter shops, blacksmith shops and B. & B. material yards, also bridges, culverts, depots and other buildings and places where material is distributed to be charged out when used, including emergency stocks.

8. *Material with Outside Companies.*—Material purchased and paid for and charged to the stock of material of some division which is being held at the plant of some outside company or manufacturer, shall be included in the inventory of the division to which it stands charged.

If such material has not been charged to stock of material it shall not be inventoried. The value of such material is carried in suspense account by the Auditor of Expenditure, and the General Storekeeper will arrange for necessary record for inventory purposes.

9. *Rejected Material.*—Separate lists on Form 500 will be made of all rejected material and each case will be handled on its merits.

10. *Consignment Stocks*.—Material on consignment will be listed on separate sheets and so marked. Proper care must be exercised to see that consignment is properly segregated and plainly marked. The inventory of consignment material is for record purposes only, its value will not be included in the inventory; the sheets on which such material is listed should not be priced, classified or extended.

11. *Shipping During Inventory*.—Shipments of material between stores should be discontinued one week before date of listing, being confined to shipment of materials necessary to fill emergency requirements only. Each store keeper should arrange with users of material in his territory to see that no material is shipped within three days prior to the actual taking of inventory, except in emergency cases.

12. *Counting and Weighing*.—Material that will cause delay in listing on day of inventory will be counted and weighed in advance. Each person in charge of the counting and weighing shall mark the result of the count on a slip of paper and securely fasten it to the material counted. Parties issuing or receiving any of this material must deduct from or add to the quantities shown on the count any material taken out or any material added. Two bins or shelves containing the same kind of material must be counted and marked separately. The Storekeeper and foreman should make test checks of all counts and weights, as they will be held responsible for accurate results.

13. *Scales*.—All scales must be balanced and put in good working order. Where it is impracticable to use scales, figured weights may be used on such items as bar iron, using Kent, Ryerson or Scully's table of weights.

14. *Inventory of Sections*.—Two weeks before actual listing, storekeepers will sectionalize by definite lines their stocks of materials by buildings, locations and sections, so that callers and listers may be assigned to definite territories of sufficient size to enable them to complete the inventory of each section in one day. Each section should be given a permanent number or letter.

15. *Callers and Listers*.—A list of callers and listers will be made up by the storekeeper and mailed to the general storekeeper, at least two weeks before date of inventory. Each team will be given a card on which space will be provided to show their names, the section they are assigned to, the time they start and the time they complete the work. The card will be filled out as called for and turned in with the inventory, to be used as a permanent record and guide for sectionalizing in future inventories.

OFFICE RECORD

16. *Office Records*.—All office records and correspondence relating to material affecting inventory must be up to date and in proper shape for reference.

17. *Requisition*.—All charge requisitions, credit requisitions, stock transfers and AFE requisitions covering issues or transfers of material filled prior to midnight of inventory date must be handled to be included in the month account prior to taking of inventory. Storekeepers will see that requisitions for all material used from emergency stock are prepared and accounted for in the month preceding the inventory.

18. *Stock Transfers*.—Form 1722 and 1722-A covering shipments of material made one week subsequent to inventory must be plainly marked on the face of same to show whether or not the material shown thereon has been taken into the inventory of the shipping storekeeper. Rubber stamps reading "Included in Inventory" and "Not Included in Inventory" have been provided for and must be used for this purpose. Storekeepers must review all Form 1722 received and any material shown thereon as having been shipped prior to date of inventory and not received by them, or material shipped subsequent to inventory not included in the inventory of the receiving storekeeper, shall be listed on separate sheets headed "Material in Transit." Care must be exercised to see that material which may be in transit between stores on any division is listed in the inventory.

19. *Invoice Record*.—Invoice records will be divided into live and dead files which should be carefully checked. Receiving sheets must be checked with the invoice records and receiving brought up to date. All material received for which invoices have not been taken into account of the month ending on the day on which the inventory is taken shall be listed direct from Invoice Record to Form 500 and on separate sheets. The amount of these items shall be treated as a deduction from the inventory. Invoices covering material not yet received shall be listed on separate sheets and treated as an addition to the inventory.

Shipments of purchased material on hand at destination pending unloading or in transit shall not be considered as received and therefore shall not be included in the inventory, but shall be taken into receipts of subsequent month on the basis of actual unloading date.

Consignment material which has been used and charged out, but for which stock of material has not yet been charged, shall be treated as purchase material for which invoice has not been taken into account. Such items shall be listed on separate sheets to be deducted from inventory. Particular attention is called to Locomotive Arch Brick, an important item which requires handling in accordance with the provisions of this paragraph.

20. *Store Orders*.—Store orders should be given special attention. All unfinished orders should be completed prior to the taking of the inventory, those which can not be completed should be cancelled as of the date the inventory is taken and new orders issued if necessary. Storekeepers will see that no material is delivered for use on store orders that will not be used up before the inventory is taken. Accountants will see that all completed or cancelled store orders are figured up and necessary charges made in the current month. Where it is not possible to cancel uncompleted store orders a list of charges to such store orders will be made on Form 500 by the accountant and furnished to the storekeeper to be treated by him as an addition to the inventory, it being understood that charges to store orders are carried in stock of material Class 34.

Labor which may have been charged to uncompleted store orders shall be included in such lists. Storekeepers will confer with accountants in regard to the handling of store orders to see that proper cut-off is made.

Partial deliveries to storekeepers of material manufactured on store orders will be reflected in the regular inventories and accountants must see that proper deductions for such deliveries are made from the lists of charges to uncompleted store orders which they submit to storekeepers.

21. *Price Books*.—Price Books must be kept up to date, showing source of price and all necessary information. New weighted average prices must be figured for all items on which weighted average prices are kept.

22. *Sold Bills*.—At all points where material is sold care should be taken to insure the inclusion in the previous month's account of all sale bills for material shipped prior to inventory.

23. *Scrap*.—Scrap which may be on hand but which has not been credited to the work from which released must be covered by credit requisition, Form 1728, and taken into the accounts of the month preceding the inventory before it is inventoried.

LISTING

24. *Store Stock*.—All store stock must be listed in the inventory. Store stock includes all unapplied material and supplies on the railroad, including commissary supplies, telegraph material and locomotive fuel. Such materials and supplies as are in use and such as have been charged to the proper account or AFE although not yet applied or in use are to be considered store stock and should be inventoried.

Air pumps, injectors, lubricators, engineers' brake valves and other appliances of this nature when not applied or assigned to equipment must be considered store stock. Repaired and needing repair triple valves will not be considered store stock.

25. *Equipment Material*.—Care must be taken not to list or include in the inventory, side rods, locomotive frames, appliances or parts of locomotives or cars, stationary boilers, motor cars, machinery, steam shovels, coal sheds, etc., removed from equipment temporarily while equipment is out of service and undergoing repairs.

26. *Following Material*.—The callers in taking inventory will follow the physical arrangement of the material, i. e., material in racks will be taken as each item is reached, starting at the top and going across, then dropping down one tier, etc., until the entire case is taken. Material piled on floor will be taken in rotation. In no case will the caller follow any alphabetical or numerical arrangement.

27. *Number Copies of Inventory*.—The inventory will be taken in duplicate; an original and one carbon will be made.

28. *Separate Sheets for Each Location*.—Separate sheets must be used for each separate location.

29. *Showing Information Called for*.—All information called for in the heading of each sheet, such as lister's sheet number, lister's name, caller's name, location, division, etc., must be shown.

30. *Erasures.*—Listers must not make erasures on inventory sheets. In case errors are made, lines should be drawn through the wrong items and correct listing done on the following lines.

31. *Numbering Sheets.*—Listers will number their sheets numerically beginning with No. 1 in the space provided. Upon completion of each sheet all unused lines should be diagonally ruled. The last sheet of each lister's inventory must be numbered and marked "Final" in large letters. In case listers move from one location to another they should not begin a new series of numbers, but should continue numbering with the next number following that given to the last sheet of the location that was finished. There should be only one "Final" sheet for each lister.

32. *Calling.*—The caller will call the name of the material first, then the size of pattern number and finally the quantity. The lister will repeat his call as given in each case to the caller.

33. *Checking Sheets.*—At the completion of the sheet the caller will examine the sheet to see that it has been properly filled out by the lister.

34. *Weights, etc.*—Each item shall be listed according to actual kind, weight and measurement at the time listing is done. In cases of large quantities of any kind of small castings, bar iron, etc., which require weighing, a sufficient number of each kind or pattern shall be weighed and the quantity and weight shall be shown on the inventory sheet in the column headed "Lot Weight." The number of pieces weighed shall be shown under the heading "Pieces" and the weight under the heading "Pounds." The total weight will be figured from the lot weighed. In the case of large castings or other material requiring weight, one piece only need be weighed of such kind or pattern and the weight shown on the inventory sheet in the pound column under the heading "Lot Weight." The total number of such pieces on hand shall be indicated in the column headed "Quantity or Number."

35. *Territory.*—In no case should a set of callers or listers go outside the territory assigned to them for taking inventory, without instructions.

36. *Separate Piles.*—When listing material of which there are several distinct bins or piles of one item, the quantity in each pile or bin must be listed separately.

37. *Ice.*—The inventory of stock of ice shall be made on the actual measurement, regardless of any book balance or report. The actual measurement of ice as to height, width and length shall be reduced to tons on a basis of 50 pounds per cubic foot of ice.

38. *Emergency Stocks.*—Actual inventory must be taken of all so-called "Emergency Stocks." In no case should inventory of such stock be made from book records.

39. *Signal Material.*—Stocks of Signal Material carried in maintainers' shanties must be listed in the inventory, as these materials are carried in store stock until reported by the maintainers as having been sold. Storekeepers should arrange with maintainers for them to take the necessary inventory.

40. *Legibility.*—The original inventory will not be rewritten and effort must be made to have it neat and legible. A No. 3 lead pencil should be used.

41. *Castings.*—In listing castings the terms "CI" shall be used for cast iron, "MI" for malleable iron and "CS" for cast steel.

42. *Kind of Material.*—Material will be listed as new, S. H. (second-hand) or Scrap.

43. *Needling-Repairs Material.*—Needling-repair material will be listed on separate sheets priced and classified as directed by the storekeeper.

44. *Side Notes.*—All computations and notes in connection with counting or listing must be made on the face of Form 500. In listing material where it is necessary for the caller to count and make computations as, so many high, so many wide and so many on top, listing shall be done as follows:

Bolts, Sq Hd, Machine $\frac{3}{8}$ by 18
18 wide by 12 high
10 on top

45. *Proper Description.*—In listing material sufficient description should be given to enable proper pricing and classifying, using a sufficient number of lines for this purpose.

46. *Locomotive Fuel.*—Locomotive Fuel will be inventoried by the Operating and Mechanical Department forces as directed by the Store Department. The fuel inventory shall include all compressed coal, fuel oil and wood for use in locomotives and shall be listed on separate sheets.

47. *Shop Fuel, Engine Sand, Acetylene, etc.*—Where acetylene,

oxygen, shop fuel, engine sand, etc., are charged out when received, they must not be included in inventory.

48. *Marking.*—White chalk will be used for marking material inventoried and where practical the marks should be made on the material itself. As each row or line of material is completed a white chalk mark (X) will be put on the floor where possible to do so to designate that such section has been taken. Care must be taken not to disfigure cases.

49. *Care of Forms.*—As fast as listing is completed, listers shall turn over to the storekeeper both original and duplicate copies of Form 500. When all sheets have been turned in they will be verified to see that each lister's sheets are complete. The storekeeper will then number consecutively in the upper right hand corner the original and duplicate of all sheets, beginning with No. 1 and numbering and marking the last sheet "Final."

PRICING, ACCOUNTING, ETC.

50. *Pricing.*—Pricing and classifying, wherever possible, will be done at the time of listing, where not possible as soon as inventory sheets are received and numbered by the storekeeper they will be priced and classified. Both sheets of the inventory will be priced. Stock prices will be applied to all items of new material. Weighted average prices will be used on items where weighted averages have been established, otherwise last prices will be used. Material inventoried as second-hand will be priced in accordance with existing instructions governing pricing of second-hand material. Prices for scrap will be provided by the general storekeeper.

51. *Extensions and Totals.*—For checking, the original copies will be separated from the duplicate and the extensions checked by different persons. As fast as sheets are priced they will be extended and totaled, and errors or differences corrected. The sheets will next be totaled according to buildings and locations, as for example, main storehouse, oil house, iron rack, lumber yard, casting platform, etc. Such subdivisions should be maintained from inventory to inventory for comparative purposes.

A recapitulation of all material showing the value in dollars and cents by classes, which shall include all additions and deductions account material on hand and not charged for, material charged for and not received, etc., shall then be made and furnished to the accountant and this will be the figure shown on the new stock report as representing the value of material on hand as of the date inventory was taken. Copies of this recapitulation shall be sent to the General Storekeeper and District Storekeeper.

52. *Requisitions Filled Before and After Inventory.*—All requisitions covering the issue or transfer of material not listed, which were filled during the week prior to actual listing of the material, shall be included in the accounts for the month prior thereto and shall be stamped or plainly marked "Before Inventory," and shall not be added to the inventory as listed by the Store Department.

Requisition covering material issued or transferred, filled subsequent to midnight of inventory date, but prior to the date that the actual listing is completed, the material not having been included in the inventory by the Store Department, shall be stamped or plainly marked "After Inventory" for the purpose of indicating it is included in the Inventory.

Such material shall be listed by the Storekeeper, including the prices and extensions as shown on the requisition and considered as an addition to the inventory.

Requisitions covering material issued or transferred, filled subsequent to night of inventory date, but after material has been listed on inventory sheets by the Store Department shall be stamped or plainly marked "After Inventory" for the purpose of indicating that the material covered by such requisitions has been properly included in the inventory, and no further accounting is necessary for such material with respect to the inventory.

53. *Rails and Ties.*—As all unapplied rails and ties will be included in the inventory by the Store Department, Division Accountants are instructed to exert special care to insure the inclusion in previous month's account of all rail and tie transactions.

TRACK MATERIAL

54. *Listing Track Material.*—Inventory of track material on sections will be taken in memorandum books of size convenient to handle. Material on each section must be listed separately, showing exact location, so inventory figures may be used to show quantities on hand in Section Foremen's material report books, Form 2574.

55. *Classification of material.*—Listing shall show complete description, the same as is necessary when ordering material. Blue prints and date showing necessary description should be referred to so that proper listing may be done. Rail should be listed separately as between new, usable and scrap, and the class of track (No. 1 MT, No. 2 MT, No. 1 ST or No. 2 ST), in which the usable rail should be used, classified in accordance with specifications covering classifying rail as issued by the Engineer of Maintenance of Way. The storekeeper or his representative must go over the division to take the track material inventory.

56. *Help.*—The Superintendent will furnish a motor car and instruct either the Roadmaster or an experienced track man to accompany the Storekeeper.

57. *Listing Direct.*—Track material inventory only may be listed in memo. book as described above. All other inventories must be listed direct on Form 500.

58. *Recapitulation.*—A transcription in duplicate of all material listed in memorandum book shall be made on Form 500, and shall be considered the original inventory. The memorandum book from which the transcription is made shall be filed as supporting the inventory.

59 and 60. *Special Recapitulation of Track Material.*—After listing has been completed a special recapitulation of track material shall be made as follows:

On Form 500-A. Covering all new rail, new angle bars and new patented joints.

On Form 500-B. Covering all usable rail, usable angle bars and usable patented joints.

On Form 500-C. Covering all scrap rail, scrap angle bars, scrap patented joints, scrap tie plates and scrap rail anchors.

On Form 500-D. Covering all new tie plates and new rail anchors.

On Form 500-E. Covering all usable tie plates and usable rail anchors.

The recapitulation shall be by Roadmasters Divisions, and shall be made in duplicate, the original shall be sent to the general storekeeper, and the carbon copy to the roadmaster, so that he may have information to make his form 46 reports of rail and track fastenings on hand with actual figures.

61. *Rail and Fastenings.*—Stock of rail and fastenings carried by storekeepers at points other than Savanna Rail Mill, Miles City Rail Yard and Tacoma Rail Yard will be included in the inventory of the roadmaster having jurisdiction over that territory.

The rail and fastenings at Savanna Rail Mill, Miles City Rail Yard and Tacoma Rail Yard now carried by the storekeeper will be inventoried separately from that of roadmasters and reported separately.

Track fastenings carried in storehouses will not be listed in Roadmasters inventories but will be listed by the storekeeper direct on Form 500 along with other material.

TIES

62. *Forms.*—The inventory of ties will be taken in the memorandum book along with other track material.

63. *Classification and Listing.*—Cross ties will be listed to show separately treated and untreated ties, each of which classes shall be subdivided as between kinds of woods, as white oak, red oak, hard maple, cedar, beech, fir, etc.

64. *Switch and Bridge Ties, Crossing Timbers and Head Blocks.*—Switch ties, crossing timbers and head blocks shall be listed in the same manner as cross ties, but shall in addition show the size, length, width, thickness of each tie, timber or block.

65. *Ties at Treating Plants.*—The inventory of ties at treating plants will be arranged for by the general storekeeper.

66. *Ties Produced on Division.*—On divisions which produce ties, care should be taken not to include in the inventory any ties which have not been inspected and accepted by the tie inspector.

67. *Ties in Transit.*—Ties in transit from one division to another or from one point on a division to another point on the same division shall be inventoried as provided for in Section 18 of these instructions.

68. *Ties Distributed Along the Right-of-Way.*—All ties distributed along the right-of-way ready to put into track must be included in the inventory.

FINAL

69. *Disposition of Inventory.*—The original inventory complete with recapitulation by classes shall be sent to the accountant. The duplicate will be retained by the storekeeper.

Paragraph 15 provided for the callers and listers. It is the practice to use all the clerks from the office, girls as well as the men, for the listers, using experienced help in the sections for the caller.

The line material should be taken thirty days in advance of the Store Department material. This enables the Store Department forces to go out on the line, property list and check all line material and then work the figures forward for that month and include them with the regular inventory.

A tag should be provided for each material item. This tag should show proper description, class, line and page in the stock book, and on the C. M. & St. P., we also show the price. The pricing and classifying are done at the same time as listing of the inventory. All work of listing, pricing, extending and drawing up summary by classes ready for the accountant to make adjustment should be done by the Storekeepers' forces.

The forces should be so organized that the inventory at the store point is listed in one day and the extending, summarizing, etc., should be closed up in one week. Listing of an inventory in one day, the extending and summarizing in one week is not only possible but very practicable. If work on the inventory is allowed to drag and is done intermittently, it interferes with the regular routine to such an extent that the inventory becomes a secondary consideration with consequent errors.

To have good inventories not only must proper preparation be made, proper rules and regulations given, but sectional stockmen must be educated as to the value of material in their charge, the value of proper accounting and their responsibility for the proper ordering, distributing and care of the millions of material dollars that come out of the treasuries of the railroad and for which storekeepers, assume the responsibility.

The report is signed by D. C. Curtis, General Storekeeper of the Chicago, Milwaukee and St. Paul.

(The report as read by D. C. Curtis was accepted as Recommended Practice.)

Report on Reclamation of Material

THIS SUBJECT is of vital importance, as past experiences have very clearly demonstrated that large savings can be effected by giving this work proper co-operation and attention, and we therefore reiterate and urge that this principle be followed out to fullest extent in our future activities.

We have given consideration to previous reports on this subject, all of which have covered the work thoroughly from various viewpoints, but it was realized that we should endeavor to submit something in the nature of constructive work that could be formed as a basis for future activities and decided, therefore, to recommend the following:

1. General Reclamation Plant Layout (Exhibit A).
2. Classified List of Material and Supplies to Be Reclaimed, Showing Operation and Facilities Necessary (Exhibit B).

3. General Suggestions Pertaining to Reclamation of Material and Supplies (Exhibit C).

4. Progress Made in Reclaiming Chipped Rail Ends, Frogs and Switches in Track.

5. Additional Forms (Exhibit D).

1. General Reclamation Plant Layout (Exhibit A)

The drawing submitted of a general reclamation plant layout is so arranged as to be sufficiently elastic to take care of the needs and requirements of the large, as well as the small, railroads. On this print is shown the general layout of the entire plant, including the following: Scrap yard, reclamation yard, trackage, paved driveways, machinery and appliances, buildings and structures, location of each department, class of work and function to be performed by each department, and proposed organization.

This year's report of the Committee on Reclamation is considerably more extensive than the one presented in 1920. The report is marked by commendable thoroughness in detail, making it valuable for reference on questions of standard practice.

Exhibit B shows a classified list of material to be reclaimed, together with the operations and equipment required, and the suggestion that Exhibit B be printed in pamphlet form for distribution to members of the association is a good one. Special attention is given to the reclamation of rails with chipped ends, frogs and switches in the track by building up with welding. This process saves not only rails, frogs and switches, but

also the labor involved in replacing them. Further investigation along this line should provide additional information on the relative advantages of gas and electric welding for this work, together with a comparison of costs and wearing qualities.

As indicated in the opening statement of the committee, reclamation is a subject of vital importance, presenting the possibility of great saving. There is also a possibility of serious loss, or at least failure to realize maximum savings, unless the railroads co-operate in comparing practices and checking the cost of reclamation work against continually varying labor and material costs.

The layout contemplates the handling of scrap by cranes equipped with magnets. The material to be reclaimed is to be handled in and out of plant by tractors.

2. Classified List of Material and Supplies to Be Reclaimed, Showing Operation and Facilities Necessary (Exhibit B)

There is also submitted a revised list showing operation and equipment required for various kinds of material and supplies, which has been arranged in classified order, as it is the belief of the committee that this arrangement will better suit the purpose than alphabetical arrangement of items.

be beneficial and should be placed in the hands of employees whose duty is to handle scrap.

We recommend this list be revised from time to time in the same manner as the list showing material to be reclaimed, and that this form a supplement to said reclamation list and that it be kept up to date and finally become a valuable source of information.

4. Progress Made in Reclaiming Rails with Chipped Ends, Frogs and Switches in Track

The committee has made a study of this line of reclamation and finds that several roads have made considerable progress. It is

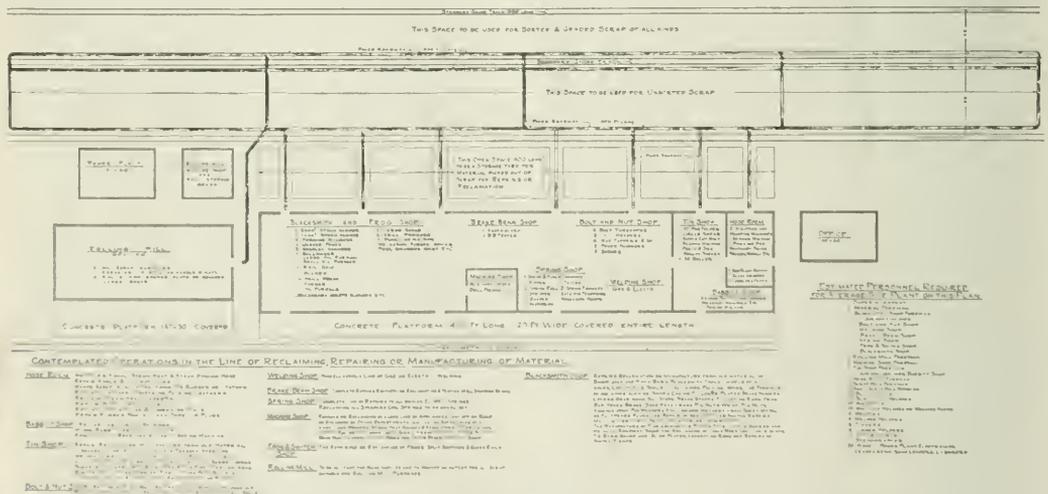


Exhibit A—Plan of General Reclamation Plant Predicated on the Use of Self-Propelling Magnet Cranes

While this list includes all items reported at the 1920 annual meeting of the division, there has also been added a number of new items.

In submitting the list referred to the committee has in mind that it will be revised from year to year as new ideas develop, so that it will be maintained at all times.

It is suggested that this list be printed in separate pamphlet form so members of the association can obtain as many copies as desired for distribution among their employees.

3. General Suggestions Pertaining to Reclamation of Material and Supplies (Exhibit C)

We have presented a statement showing general suggestions for reclamation work, which it is believed should

be felt that this process of reclamation work is still in its infancy, but in view of what has so far been accomplished, the committee urgently recommends that it be further advocated, inasmuch as there are great possibilities of saving to the railroads.

It may be of interest to know that our investigations have determined an estimated saving of 72 per cent in the building up of a worn frog in track in lieu of replacing with a new frog; also a saving of 60 per cent in building up switch points in track.

Consideration should also be given to the labor consumed in replacing a worn-out frog with a new one, or a set of switch points with new as well as the capital investment of stocks of new frogs and switches, which can be materially reduced by rigidly following the reclamation practices referred to.

The building up of chipped rails in track by means of weld-

ing is a reclamation feature of recent innovation and brings about substantial saving, which is self-evident when it is considered that if rails were not so reclaimed it would mean they would have to be taken out of track, replaced with similar kinds, either new or first-class second-hand, respacing of ties, building up the road bed, picking up of all rail from track and transporting this and the new rail to and from the job, as well as investment in large sums in new rail.

5. Additional Forms (Exhibit D)

Previous committees have covered this field quite thoroughly, and we therefore have but one form to recommend, entitled "Suggestions for Reclamation," copy of which is appended hereto.

The object of this form is to obtain suggestions, not alone from reclamation plant, but from various shops and other institutions and employees of the railroad, and in this manner have the widest field possible for the increase in reclamation work.

Another object of the form is to clearly demonstrate whether the process suggested is economical, which should at all times be definitely settled before adopting or following out any particular line of reclamation work.

This form also to be used in obtaining the approval of the head of the using department when desired, and when approved becomes a standard item of reclamation.

General Remarks

The subject of conservation of railroad material and supplies is featured more and more on various railroads and it is therefore expedient that this all-important subject be recognized by this

Exhibit B

RECLAMATION CLASSIFICATION and

RECOMMENDED PRACTICES IN CONNECTION WITH RECOVERY OR RECLAMATION OF VARIOUS ARTICLES, APPLIANCES, MATERIAL AND SUPPLIES.

Item No.	CLASSIFICATION AND DESCRIPTION	OPERATION	EQUIPMENT REQUIRED
Class 1-A			
1	Bars, head	Worn holes—upset or welding and refile.	Welding or smith shop equipment
2	Bars, tie	Worn holes—upset or welding and refile.	Welding or smith shop equipment
3	Clips, transit, for split switches	Can be made from old boiler plate. Also remove serviceable clips from scrap switch points.	Smith shop equipment
4	Cranks, switch stand	When bent, not cracked—straighten and put back into service.	Nothing special
5	Crossings, railroad	When battered or worn—build up in track by welding process.	Welding apparatus
6	Frogs, rail	Build up by welding process.	Welding equipment
7	Frogs, rail	Repair by utilizing second hand parts as far as possible.	Frog shop equipment
8	Plates, switch slide	When bent, heat and straighten. Swedge to standard height and redress on plates.	Smith shop equipment, etc.
9	Points, switch, worn	Build up by welding process and dress by emery grinder.	Welding equipment
10	Points, switch, worn	Build up by welding process and dress by emery grinder.	Welding equipment
11	Rails, guard	Can be made from second hand rail.	Frog shop equipment
12	Rods, connecting	Worn holes—upset or welding and refile.	Welding or smith shop equipment
13	Stands, switch	Make standard repairs.	No special equipment
14	Tables, switch stand	When cracked or broken—repair by welding process.	Welding equipment
Class 1-B			
1	Bars, angle	Worn holes—plug and drill new holes.	Smith shop equipment
2	Bars, angle	Straighten and reform.	Smith shop equipment
3	Bolts, track	If not too badly rusted, use circular steel wire brush to clean threads and die to test smaller size and fit with standard U. S. thread nut.	Stand and circular steel wire brush
4	Bolts, track	Use circular steel wire brush to clean threads and die to test smaller size and fit with standard U. S. thread nut.	Bolt cutter and threader nut
5	Joints, continuous	If cracked, or with uneven surface on top repair by welding process.	Welding apparatus
6	Joints, continuous	When worn on shoulder or top surface heat and reshape.	Furnace and dies
7	Plates, tie	If worn on edge straighten.	Smith shop equipment
8	Plates, tie	Repair for other sections of rail.	Power punch and dies
9	Spikes, track	Straighten if not too badly cut under throat.	Quick acting power hammer
Class 1-C			
1	Bars, claw	Redress and straighten. Apply new ends if needed.	Furnace and power hammer
2	Bars, claw	Manufacture into lining bars.	Furnace and power hammer
3	Bars, lining	Redress and straighten.	Furnace and power hammer

lamation work; in other words, the committee desires to amplify the importance of thoroughly advertising the subject of conservation and reclamation.

The report is signed by O. Nelson (Chairman), Union Pacific, Omaha, Neb.; Wm. Davidson, Illinois Central, Chicago, Ill.; R. J. Elliott, Northern Pacific, St. Paul, Minn.; W. J. Diehl, Mobile & Ohio, St. Louis, Mo.; R. C. Harris, Pennsylvania System (Central Region), Pittsburgh, Pa.; B. W. Griffith, New York Central,

4	Bars, tapping	Redress and straighten. Apply new ends if needed.	Furnace and power hammer
5	Bits, round shank track drill	Flatten far use with Rich Spindle and Chuck.	Nothing special
6	Bits, flat track drill	Can be made to advantage from old files.	Smith shop equipment
7	Chisels, track	Change from convex to concave obtaining necessary length for repairs.	Smith shop equipment
8	Chisels, track	Redress and straighten.	Smith shop equipment
9	Cutters, weed	Manufacture from old track shovel blades.	Nothing special
10	Cylinders, motor car	When over-size, scored or worn, bore out and bush.	Machine shop
11	Drills, track	Repair using old serviceable parts cut down to smaller lengths and use for tool handling.	Nothing special
12	Hulls, old wood	Repair using old serviceable parts cut down to smaller lengths and use for tool handling.	Nothing special
13	Jacks, track	Repair, using old parts as far as practicable.	Nothing special
14	Picks, all kinds	Refile. Apply new ends made from scrap tire steel.	Smith shop equipment
15	Punches, track	Can be made from short spike tools.	Nothing special
16	Plugs, spark	Refile by using second hand parts "as is possible."	Nothing special
17	Shafts, motor car crank	When worn, turn and bush.	Small lathe or Marriott Machine
18	Shovels and scoops	Utilize serviceable blades on scrap handles or vice-versa.	Machinery's vice, hammers, chisels, punches, etc.
19	Shovels and scoops	Cracked in blade or split in strap on shank can be welded.	Welding apparatus
20	Tools, various, such as nail pullers, bars, etc.	Manufacture from scrap coil springs.	Nothing special
21	Wheels, pressed steel motor, hand or push car	Build up worn flange or worn tread by welding process.	Welding apparatus
22	Wrenches, track	Jaws redressed.	Small furnace and power hammer
Class 2-A			
1	Cases, battery carrying	Remove serviceable parts before placing in the scrap.	Nothing special
2	Elevators, battery	Remove serviceable parts before placing in the scrap.	Nothing special
3	Poles, metallic signal	Cut down and use for bell posts, rick posts, etc.	Nothing special
4	Roundels, colored	Broken or unbroken have a market value.	Nothing special
5	Straps, fibre side	Manufacture from second hand slide plates.	Hand saw and drill
6	Wire, copper insulated	Subject to slight heat only, in removing insulation.	Nothing special
Class 2-B			
1	Cells, standard 2 1/2 & 6	Strip and utilize zinc, carbon, sealing wax.	Stripping machine
Class 3			
1	Bases, smoke jacket	Manufacture from old metallic roofing.	Tin shop
2	Fishing, gutter	Manufacture from old metallic roofing.	Tin shop
3	Sacks, cement	Clean in revolving rattler made of second hand lumber and poultry netting, or other home-made device.	Power driven rattler

(West) Collinwood, Ohio; K. R. Stewart, Atchison, Topeka & Santa Fe, San Bernardino, Calif.; E. A. Workman, Baltimore & Ohio, Baltimore, Md., and W. A. Summerhays (Chairman Ex-Officio), Illinois Central, Chicago, Ill.

EXHIBIT C

GENERAL SUGGESTIONS IN CONNECTION WITH RECOVERY, REPAIRS OR RECLAMATION OF VARIOUS MATERIALS AND SUPPLIES

CLASS 1-A

1. Tie bars, head bars, connecting rods and similar parts should not be disposed of as scrap unless they are beyond repairs or beyond upsetting or welding and grilling.
2. Care should be used in disposing of any frogs or split switches in the scrap. In case of doubt, hold up the article, awaiting further inspection.
3. Old type switch stands need not necessarily be scrapped. They can be repaired by using parts of other stands and used in back tracks.
4. Switch stand cranks which are bent but not cracked can be straightened and put back into service.
5. Cracked or broken switch stand tables can be safely Oxwelded and used in repairs to switch stand for back track service.
6. Scrap frogs should not be cut apart by track men or others merely to facilitate loading.
7. Railroad crossings can be built up in track or Oxweld process with obvious saving.
8. Trans clips for split switches can be manufactured if desired out of old boiler plate.
9. Switch stands on other parts of same should not get away in the scrap.
10. Gauge plates, slide plates, and similar switch parts can be repaired by one process or another and put back into service.
11. Split switch points, worn or broken, can safely be built up by welding process and put back into service.

CLASS 1-B

1. Old track bolts larger than 1 1/2 inch can be cut down to smaller diameter and used with standard machine bolt nuts, also can be upset and rethreaded.
2. Old continuous joints should not be disposed of as scrap unless they are cracked or broken or worn to thin edge on the base.
3. Slow moving tie plates can be replanched to other sections and gotten into service.
4. Track spikes not excessively throat worn can be strengthened and reissued.

Association, and in view of its close relation to reclamation work we recommend that future committees on Subject III, Section VI, A. R. A., be also entrusted with this subject and that the heading of the subject be revised to read "Conservation and Reclamation."

We further wish to reiterate what has already been recommended to this Division in past years; namely, the essential necessity of all employees on railroads co-operating to the fullest extent so as to bring about the best and most complete results in rec-

- 5. Tie plates should not be scrapped unless they are cracked or broken or worn to knife edge.
- 6. Old continuous joints with uneven top surface caused by low joint action can be reshaped.

CLASS 1-C

- 1. Old wooden handles can be cut down to smaller lengths and used economically for tool handles.
- 2. Shovels or scoops with slight cracks in blade or slight splits in strap or shank can be welded. "P" shovels and scoops should not be put through the fire in order to burn the wood, as it destroys the temper in the steel.
- 3. Malleable "D" grips or serviceable wooden handles should be properly taken care of.
- 4. Satisfactory flat track drill bits can be manufactured from old files.
- 5. The contour on track chisels can be changed from convex to concave and thus obtain additional length in repairs.
- 6. A satisfactory weed cutter can be made from short track shovel blades.
- 7. Track racks can be repaired in many ways, lost motion in the standard being taken up by inserting a plate of iron or steel, or by building up by oxweld.
- 8. Track punches can be manufactured out of short spike mauls.
- 9. Round shank track drill bits can be flattened so as to fit Rich spindle and chuck.
- 10. A number of roadway tools such as nail pullers, bars, etc., can be made from scrap coil springs.
- 11. Pressed steel motor car, hand car or push car wheels should never get in the scrap unless absolutely worn, broken or beyond repairs. There are different methods of reclaiming these.

- 5. Insulated scrap copper wire should be subjected to only slight heat to remove the insulation.

CLASS 2-B

- 1. Standard dry cells, 2 1/2 by 6, can easily be stripped and the zinc, carbons and sealing wax utilized in proper way.
- 2. Old wire, in addition to being used for stripping open cars, is also valuable for tying up material of various kinds for shipment.

CLASS 3

- 1. The question of cast iron pipe in dead water lines should be periodically looked into.
- 2. The matter of using surplus cast iron elbows for culvert work is open to debate.
- 3. The matter of finding use for sludge from water softeners is open for comment.
- 4. Empty sacks of every description should be properly taken care of, as they have a return value.
- 5. Smoke jack boxes, flashing, guttering, down spout, etc., should be manufactured from old material so far as practicable.
- 6. A cement rattler for cleaning cement sacks can be fitted up at nominal expense.
- 7. Old burlap sacks have a value and should not be thrown on the dump.

CLASS 12

- 1. No unbroken coil or elliptical springs should be thrown away in the scrap without the most rigid inspection.
- 2. "S" wrenches can be manufactured from broken leaves of elliptical springs.
- 3. Coil springs can be retempered and brought up to standard set.
- 4. Nail pullers, chisels and similar tools can be manufactured from scrap coil springs.
- 5. Packing books and irons can be manufactured from brake cylinder springs.

CLASS 13

- 1. All flues turned over as scrap should be properly passed on by M. P. & C. Department. No flues should be disposed of as scrap unless the scale has been removed, indicating proper inspection.
- 2. Snow fence stakes can be made from scrap flues.
- 3. Scrap superheater flues should be kept separate from other flues, as they bring higher price.
- 4. Fence posts can be made from old locomotive flues.

CLASS 14

- 1. Scrap zinc can be used for acid cutting purposes in preference to new zinc.

ITEM No.	CLASSIFICATION AND DESCRIPTION	OPERATION	EQUIPMENT REQUIRED
Class 4			
1	Butts, pile	If long enough, split and use for stock yard or fence posts	Nothing special
2	Butts, pile	Resaw and use for box culverts	Circular saw
3	Signs, metallic roadway	Manufacture from old material	Smith and tin shop
4	Timber, old bridges	Resaw to make standard size lumber	Circular saw
Class 5-A			
1	Tire, switch, oak	Saw up to take care of temporary shortage of car and locomotive oak	Mill equipment
Class 6			
1	Bridges, iron	Such as held for use. Paint periodically and mark date thereon	Nothing special
3	Turntable parts, rollers and bearings	If worn out of round, bore and bush	Nothing special
Class 8			
1	Rails	Battered ends. Saw off and redrill	Rail mill
2	Rails	Clipped ends. Build up in track by welding	Welding equipment
Class 9-A			
1	Scales	When broken or in bad order repair and put back into service	Scale shop equipment
2	Tanks, air or gas	When out fit for original purpose use for storage of liquids by necessary alterations	
Class 9-B			
1	Coal chute or coal conveyor parts	Repair and put back into service	Machine or smith shop equipment
Class 11			
1	Bolt ends with nuts	Remove nuts for rewrapping	Bolt and nut shop equipment
2	Bolts, large diameter	Where long lengths are needed, weld two bolts together to make necessary length	Smith shop equipment
3	Bolts, car	Sort to size, straighten and re-thread	Power hammer, shear and bolt threads
4	Bolts, engine	Cut down large size to smaller, either in length or diameter	Machine and bolt shop equipment
5	Bolts, stay	Rattle and hammer into slab and use for locomotive forgings	Rattler and power hammer
6	Nuts	Sort to size, strap and place in stock	Sorting table, rattler and nut tapper
7	Washers	Sort to size and clean in rattler. Can be made from old sheet metal or from scrap flues flattened	Rattler and sorting table Washer punch
Class 12			
1	Spring, elliptical	"S" wrenches can be made from broken leaves	Smith shop equipment
2	Spring, coil	Rebagger and bring up to original set	Spring shop equipment
3	Spring, coil	Manufacture nail pullers, chisels and similar tools	Smith shop equipment
4	Spring, brake cylinder	Manufacture packing books and irons	Smith shop equipment

12 It is not proper to Oxweld sledges or similar tools subject to strenuous service.

13 In cutting rivets from track chisels, a cold chisel seems to be preferable to using hot rivets.

14 Old saw bars beyond repairs as such can be manufactured into iron rods.

15 The end track chisels should be dipped in the blade in black paint before being put out on the line.

16 Malleable iron shank chisels which are worn can be turned, bushed and made more serviceable than before.

17 The process of boring out motor car cylinders and applying a lining is not a permanent or indefinite.

18 Any motor which can be economically repaired and use found for it should be repaired, should so be handled.

CLASS 2 A

- 1. Scrap wire can be manufactured from second hand fiber sole plates.
- 2. Old metallic signal poles can be cut down and used for bell posts, relay posts, etc.
- 3. Old battery elevators or carrying cases should not be disposed of without removing their parts.
- 4. Broken or colored roundfiles have a value and should not be thrown away on the dump.

ITEM No.	CLASSIFICATION AND DESCRIPTION	OPERATION	EQUIPMENT REQUIRED
Class 13			
1	Flues, scrap	Manufacture sign posts	Smith shop equipment
2	Flues, scrap	Manufacture snow fence stakes	Smith shop equipment
3	Flues, scrap	Cut to suitable length and use for fence posts	Usual shop equipment

Class 14

1	Babbitt	Manufacture from various metals accumulating in scrap yard or reclamation plant	Babbitt shop equipment
2	Ferrous, copper	Remove from scrap flues	Nothing special
4	Zinc, scrap	Use for acid cutting in preference to new	

Class 15

1	Cable, second hand steel	Splice and make into switch ropes	Nothing special
2	Iron, round	Short pieces of new iron accumulating at shear can be made into bolts	Bolt shop equipment

Class 16

1	Iron, welding	Use scrap or second hand in preference to new welding iron	Welding apparatus
2	Steel sheets, second hand	From coal chutes and similar places. Use in manufacture of ash pans, steel car work, etc.	Regular shop equipment

Class 17

1	Axles, car	Manufacture into knuckle joint pins, wrist pins, etc.	Smith shop equipment
2	Axles, locomotive driving	Manufacture into locomotive crank pins, piston rods and similar forgings	Smith and machine shop equipment
3	Pins, worn draw bar	Use for driver brake pins, trailer equalizers and spring hanger pins	Smith and machine shop equipment
4	Rods, locomotive piston	Hammer out and use for brake levers and similar forgings	Smith and machine shop equipment

Class 18

1	Beams, brake	Repair all standard beams using second hand parts so far as practicable	Brake beam shop
3	Hammers, track-side	Repair by welding grooves when permissible under A. S. C. rules	Welding apparatus
3	Forgings, car	Manufacture large variety out of second hand or scrap material	Smith shop equipment
4	Keys, brake shoe	Manufacture from over accumulation of short length machine bolts	Brading hammers
5	Levers, brake	Straighten and return to service, and re-drilling	Smith shop equipment
6	Members, running board	Use for leveling or re-rigging and re-drilling	Welding and smith shop equipment
7	Pins, old axle	Repair by welding process or straighten	Smith shop equipment
8	Brks, broken car-steel, copper and knuckle	Can be used for making hand chisels	Smith shop equipment
9	Flanks, spring	Splice if practicable	Smith shop equipment

- 2 Brass foundry cleanups should be carefully watched and under no circumstances thrown on the dump.
- 3 Copper ferrules should be removed from scrap flues before being turned over to the State Department.
- 4 A satisfactory babbitt can be manufactured from various metals accumulated in scrap yards or reclamation plants.
- 5 Aluminum letters or figures should not be permitted to get away in the scrap, but used for local consumption.

CLASS 15

- High speed chips, borings, etc., should be properly taken care of, as this scrap brings high prices.
- New galvanized iron should not be used where old metallic car roofing will answer as well.
- Short pieces of rounds accumulated at shear or elsewhere should be periodically cleaned up and made into bolts.

CLASS 16

- Secondhand sheets from coal chutes and similar places can be used in manufacture of ash pans, steel car work, etc.
- Old material should be used as far as possible for rough welding work in preference to new welding iron or new rods.

CLASS 17

- Old axles or piston rods can be manufactured into crank pins, knuckle joint pins, wrist pins, etc.
- Old locomotive driving axles can be manufactured into locomotive piston rods and similar forgings.

- Complete trucks should not be permitted to accumulate. They should be dismantled and component parts utilized when no other use can be found for them.

- Keys, brake shoe, can be manufactured to advantage from over accumulation of short length machine bolts, with the use of the hammer.

CLASS 19

- Locomotive brake shoes, either new or secondhand, with broken end lugs, should not be picked out of the scrap.
- Standard dope cup plugs should be kept out of the scrap. Those picked up by supply train should not be placed in the scrap car.
- Solid piston heads can be reclaimed by building up with bronze.
- Steel crank pin collars with worn threads can be turned down, built up again and threads turned to original size.
- Pressed steel cylinder head casings, valves, head casings, cylinder heads and stud parts as are sometimes lost on road to be picked up by supply train should be kept out of the scrap.
- Serviceable or repairable parts of driving box lubricators should be kept out of the scrap.

CLASS 20

- Scrap accumulation should be carefully watched for serviceable oil boxes.
- The matter of oxwelding oil boxes or pedestals should be carefully watched, as the works is liable to be done at a considerable loss.
- Thick car brake shoes with steel backs with broken eyes should be kept out of the scrap with the view of welding on eyes.
- Thimbles or packing blocks should be promptly removed from broken yokes and placed in stock.
- See Class 50 for tentative definition for serviceable car or locomotive brake shoes.
- Couplers or knuckles can not be oxwelded for cracks or fractures, but no standard articles should be scrapped on account of being worn.
- Broken knuckle pins, 1 1/2 inch and 1 3/4 inch, not shorter than 5 1/2 inches, can be used for spring hanger pins.
- Steel knuckle pins can be used in the manufacture of chisels.
- The question of increasing size of shank and butt on couplers by welding on plates or pieces of iron is for comment.
- Coupler parts other than knuckles should be picked out of the scrap with the idea of welding worn parts.
- Iron knuckle pins, 1 1/4 inch, 1 3/8 inch, 1 1/2 inch, 1 5/8 inch, can be manufactured from old rods or bolts.

ITEM NO.	CLASSIFICATION AND DESCRIPTION	OPERATION	EQUIPMENT REQUIRED
Class 18 -Continued-			
10	Rods, brake, with serviceable jaws	Weld on rods	Smith shop equipment
11	Rod, bottom connection	Straighten if bent	Smith shop equipment
12	Steps, sill	Can be manufactured out of round iron in preference to flat if surplus round iron on hand	Smith shop equipment
13	Trucks, complete	Dismantle and utilize component parts when can be used for no other purpose	Nothing special
Class 19			
1	Casing, cylinder head	When bent, straighten	Smith shop equipment
2	Collars, crank pin	When threads are worn, turn down, build up by welding process and turn to original size	Welding and machine shop equipment
3	Heads, piston	Half sole with bronze mixture	Welding apparatus
Class 30			
1	Bases, oil or pedestal	When worn, build up by welding process if practicable	Welding apparatus
2	Couplers	Straighten bent shanks	Smith shop equipment
3	Couplers	Change size of butt by adding plates or ribs	Welding apparatus
4	Coupler parts—other than knuckle	Build up worn parts by welding process	Welding apparatus
5	Knuckles, couplers	Build up worn surface by welding process	Welding apparatus
6	Lever, release rigging	If bent, straighten	Smith shop equipment
7	Pins, broken knuckle	If long enough, use for spring hanger pins	Smith shop equipment
8	Pins, carbon steel knuckle	Use in manufacture of chisels	Smith shop equipment
9	Roofing, old car	Reshape and use as roofs	Tin shop equipment
10	Roofing, brick car	Use for various buckets, oil cans, down spout, flashing, decking on bridges, building roofs and similar purposes	Tin shop equipment
11	Shoes, brake, with steel back	If of considerable thickness, save and weld on broken eye	Welding apparatus
Class 31			
1	Bearings, journal	Reline	Rabbit shop equipment
2	Bearings, journal	Slight boring in patent boring machine	Boring machine
3	Bells, locomotive	When cracked, repair by welding	Welding apparatus
Class 32			
1	Cocks, angle and cut-out	Repair and regind	Grinding machine and lathe
2	Gaskets, steam valve and brake cylinder	Reclaim	Wire brush, castor oil, fallow and beeswax, or similar process
3	Glasses, air pump lubricator	Clean and polish	Vat and buffing wheel
4	Heads, air and steam piston	Turn down to smaller diameter	Machine shop equipment
Class 33			
1	Bases, sand hose strainer	Build up stripped threads by welding and re-thread	Welding apparatus
2	Caps, sand blast	Fill worn holes by welding process	Welding apparatus
3	Discs, bulleye lubricator or hanger	Clean and polish	Vat and buffing wheel
4	Glasses, water gauge	Clean and regind	Vat and grinding machine
5	Stoker material	Reclaim or repair	Nothing special

- Locomotive piston rods should never be disposed of as scrap, as they can be used to advantage in the manufacturing of pins and similar items.
- Any practicable scheme for reclaiming knuckle joint pins is a subject for debate.
- Sufficient scrap knuckle joint pins should always be retained for the manufacture of smaller pins and avoid unnecessary labor in turning down axle or piston rod steel.
- Worn locomotive draw bar pins can be used for driver brake pins, trailer equalizer and spring hanger pins; can also be hammered out and used in the manufacture of brake levers and similar forgings.

CLASS 18

- Care should be used before scrapping any brake levers if they can be repunched to standard size.
- Sill steps can be manufactured out of round iron if desired, to use up old material in preference to new flat iron.
- Brake rods with serviceable jaws should not get away in the scrap.
- Brake staffs of standard dimensions should not be disposed of as scrap.
- Broken draw bar yokes with thimbles attached should not get away in the scrap until the thimbles have been removed.
- A large variety of car forgings in this class can be manufactured from scrap or secondhand material.
- Polsters, truck side frames and similar parts which can be properly welded should not be disposed of as scrap.
- The various M. C. B. brake members should be kept out of the scrap with the idea of repairing and putting back into service.
- Care should be used to not scrap any serviceable carlines.
- Bottom connection rods should not be scrapped unless broken, as these can be straightened.
- Running board members should not be scrapped unless beyond welding or splicing.
- Passenger brake beams for repairs and serviceable or repairable parts should be kept out of the scrap.

ITEM NO.	CLASSIFICATION AND DESCRIPTION	OPERATION	EQUIPMENT REQUIRED
Class 34			
1	Canvas	Old pieces can be used for patching Carpets, old	Upholstering shop
2	Curtains, old vestibule	Use in manufacture of engine cushions and engine cushions	Upholstering shop
4	Hair, second hand	Clean and use over again in cushion seats, etc.	Nothing special
5	Linoleum, old	Use for patching	Nothing special
6	Moss, second hand	Clean and use over again in cushion seats, etc.	Nothing special
7	Flush, old	Use for patching	Upholstering shop
8	Springs, seat, old	Use in manufacture of cushions, seats, etc.	Nothing special
9	Strip, metallic weather	Purpose of asbestos metal. Do not throw on the dump	Nothing special
10	Tail gates, passenger car	Repair	Nothing special
Class 35			
1	Bearings, ball	Electric headlight or train lighting	Done by manufacturer
2	Electric headlight paste	Regrind	Nothing special
Class 37			
1	Sacks, charcoal	Have a return value and should be reclaimed	
Class 38			
1	Brick, fire	When removed from stationary boilers, use for patching in blacksmith shop. Can also be used as fire clay.	
2	Crucibles, old	Have a market value. Save and report for sale.	
Class 39			
1	Axle, scrap	Upset and use for smaller axle	Smith shop equipment
2	Axle, scrap	Turn down larger axles to smaller sizes	Lathe
3	Axle, worn outside collars	Build up by welding process	Welding apparatus
4	Axle, scrap	Work over and use in large variety of forgings, principal items being piston rods, crank pins, knuckle joint pins, follower plates, etc.	Smith shop equipment
5	Wheels, cast iron	Sid flat. Grind to standard dimensions	Wheel grinding machine
6	Wheels, rolled steel	Build up by electric weld	Electric welder
Class 30			
1	Doors, grain	Ordinary repairs	Nothing special
2	Siding, old car	Utilize for inside of engine houses or on home cars or in manufacture of temporary coal doors	Nothing special
Class 51			
1	Tools, cutting	Weld high speed steel on carbon steel for cutting edge	Smith shop equipment

- Lever for patent release rigging can be straightened and nothing but broken levers should remain in the scrap.
- Old metallic roofs should never be disposed of as scrap or thrown on the dump.
- Care should be used to recover all usable oil box lids and parts.
- Miscellaneous parts of friction draft gears easily find their way to the scrap dock, and should be recovered.

CLASS 21

- Many journal bearings arriving in scrap yards could go back into service by slight skinning on proper machine.
- Numbers of brass washout plugs can easily get into the iron scrap and should be watched.
- Cracked locomotive bells can easily be welded.

CLASS 25

1. Air power and leather gaskets not fit for reclamation should be kept at their original value.
2. Tire valves and brake cylinder gaskets or leathers can be reclaimed by the use of castor oil, tallow and beeswax.
3. Any feasible scheme for reclaiming burnt air hose is open for comment.
4. Air and steam piston heads can be turned down to smaller diameters.
5. Small air pump piston rods made of high grade steel should be kept at the scrap.
6. Tire valves should always be removed from broken or scrap cylinders and reservoirs.

13. Old vestibule curtains should not be thrown in the scrap. They can be used in the manufacture of engine cushions and caboose curtains.
14. Couplings on Pintsch gas filling hose should not be scrapped with the hose.
15. Care should be used in scrapping any coach hardware. Parts of a broken article will often work in with another article requiring repairs.
16. Metallic bunks are always repairable and should not be scrapped for minor defects.
17. Any canvas fit for patching or for use in cushions should not be disposed as scrap.
18. Tin shades should be used on caboose lamps in preference to opal.

CLASS 25

1. Old style steam and water glass lamps should be changed over to electric instead of ordering electric lamps.
2. Ball bearings for electric headlights or train lighting should be taken care of with the idea that they can be reground.
3. Exchange arrangements should be enforced on incandescent lamps, and inspection made of lamps turned back in exchange.
4. Electric headlight parts should not be left in the scrap unless obviously useless; headlight shafts can be welded.

CLASS 27

1. Charcoal sacks have a return value and should be properly taken care of.

CLASS 28

1. Old crucibles should never be thrown on the dump, but kept with scrap accumulation and reported for sale in regular manner.
2. Standard fire brick removed from stationary boiler locomotives can be used for patching purposes in blacksmith shops and ground for use as fire clay.

Item No.	Classification and Description	Operation	Equipment Required
Class 36			
1	Base, smoke jack	Manufacture from old car roofing	Tin shop equipment.
2	Curtains, caboose	Renovate and reuse	Nothing special
3	Flags, signal	Renovate, color flags and reuse	Ordinary laundry
4	Glass, colored	Has a market value. Hold and report for sale	..
5	Goggles, safety	Repaired. Apply new parts needed	Nothing special
6	Lamps, various	Repaired	Tin shop equipment
7	Lanterns, hand	Repaired and re-stained	Tin shop equipment
8	Lenses, wind	Has a market value. Hold and report for sale	..
9	Replacers, car	If too low, build up by welding process to standard height	Welding apparatus
10	Tinware	Manufacture large variety from old metallic roofing. Tin and powder cans make good drop buckets	Tin shop equipment
Class 37			
1	Babbitt, from old reduced, waste packing	Burn old packing in order to reclaim babbitt	Nothing special
2	Compu-rod, driving journal	Clean by boiling. Add necessary ingredients and re-lap	Ordinary press
3	Compu-rod, driving journal	Clean by scraping or other process	Ordinary press
4	Oil, lubricating	Re-claim by filtering process	Necessary filters
5	Packing, journal box	Renovate and reuse	Steam heated tank, necessary filters, etc.
Class 43			
1	Fittings, pipe	Remove all serviceable fittings from old pipe, and protect with coat of oil	Vise, vat, etc.
2	Nipples, pipe	Cut from second hand pipe	Simple cutting machine
3	Flanges, air and joint	Pick out various parts and re-assemble	..
4	Valves, Globe and angle	Repair	Nothing special
Class 45			
1	Checks, door	Repair by using parts of old checks	..
2	Files, over finish	Save for resutting	..
3	Hammers, engineers	Manufacture out of scrap locomotive tire steel	Smith shop equipment
4	Wrenches, alligator	Recut teeth and temper	Nothing special
5	Wrenches, screw	Repair by using old parts so far as practicable	Nothing special
Class 46			
1	Belling, old rubber or leather	Use in manufacture of gaskets	Punch and die
2	Boots, rubber	Repair	Cobbler outfit
3	Couplings, steam and dynamo	When worn, build up by welding process	Welding apparatus
4	Gaskets, air hose	Unless broken or chipped, repair and apply gasket to make original height	Nothing special
5	Gaskets, tank hose	Manufacture from scrap air brake hose	Punch and die
6	Hose, air, steam and signal	Strip and re-join	Stripping and re-joining machine
7	Lagging, M & G boiler	Break or grind up, form into slabs or use to mortar shape	Grinding machine, forms, dry kiln, etc.

7. Scrap valve stems made of high grade steel, pointed and equipped with wooden handle, make a very good screw driver.
8. Very few articles of air brake material should finally land in the scrap. Parts of broken articles can always be utilized in repairs of others.
9. Parts of air valves fit for repairs of other gauges should never reach the scrap dock.
10. Air pump lubricator glasses not cracked, chipped or broken, can be cleaned and used over again.

CLASS 23

1. Dies from ball's eye lubricators or flange oilers, not badly chipped or cracked, should be picked out and re-sharpened.
2. Old water gauge glasses or discs can be reground.
3. Small light cases with small seal holes should be picked out of the scrap, as they can be easily welded.
4. Non-ferrous stoker material of any description should be disposed of for the scrap, unless absolutely beyond repairs or reclamation.

CLASS 4

1. Old scrap should not be disposed of as scrap. It can be used for bolts, patches, nuts and similar purposes.
2. Scrap should be used in wrapping any steam heat parts, as there is a saving in re-lamination and re-rolling of such items.
3. Old gas tanks not fit for use with gas should be held out for storage for use as a gas tank.
4. Worn out parts should always be repaired and reissued.
5. Scrap should never be thrown on the dump.
6. Scrap should be used in scrapping lighting material of any kind, as it is good for repairs or reclamation of such parts.
7. Scrap should be taken in pieces large enough for patching should not be broken up all over on the dump.
8. Scrapable mass from cushions should be saved for cleaning and re-rolling.
9. Each curtain rollers should not be thrown in the scrap.
10. Second and plush should never be sold as scrap, but can be used for other purposes.
11. Second hand coil seat springs should invariably be saved for use over again.
12. Old metal weather strap, if beyond use, should be disposed of as scrap and thrown on the dump.

Class 47		
1	Cans, empty carbide	Make various receptacles
2	Kegs white lead, metal	Manufacture into paint buckets and similar containers
3	Paint, old	Scrapping from barrels and other containers
4	Glass, colored	Broken or unbroken, has a market value. Report for sale

CLASS 48

1	Paper, scrap	Baled and sold	Paper baler
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CLASS 50

1	Forizes and turnings, brass	Remove parts of iron, steel or babbitt	Magnetic separator or screen
2	Firebox or boiler steel scrap	Use for running boards at stations	..
3	Iron, scrap, various	Use for large number of miscellaneous forgings	Smith shop equipment
4	Staybolts, old, lined	Retain, patle and clean, pile in furnace and use for forgings of various kinds	Smith shop equipment

CLASS 29

1. Small car axles can be provided by utilizing large axles, either by upsetting or turning down.
2. Worn outside collar on car axle can be built up by welding.
3. Flat spots can be welded on rolled steel wheels and tires.

CLASS 30

1. Attention should be paid to cuttings, etc., from planing mills and other accumulations or short pieces of lumber.
2. Ordinarily car stakes should never be manufactured out of new material.
3. It is possible in many cases to use secondhand siding for inside roofing.
4. Grain doors fit for repairs and use with grain should be properly taken care of.

CLASS 31

1. It is a recognized practice to weld a small piece of high speed steel on carbon steel for various cutting tools.

CLASS 36

1. Smoke jack bases and similar parts should as a general proposition be manufactured out of old metal car roofing.
2. Scrap burlap fit for the use in grain cars should never be disposed of as scrap.
3. Exchange arrangement should be enforced on caboose curtains, as these can be renovated and used over again.
4. Old brooms turned like in exchange should not be burned or thrown on the dump. They can be issued for use on locomotives.
5. No tinware of any kind should get on the dump unless absolutely beyond repairs or reclaiming.
6. Exchange arrangement should be enforced on signal flags of all colors. Cotton flags can be renovated and used over again.
7. Welded ware can best be reclaimed by the old soldering process.
8. A large line of tinware can be manufactured from old car roofing.
9. No burners of any kind should be sold as scrap, as practically all can be reclaimed.
10. Cast steel replacers which are too low for standard rail can be built up by the oxwell process.
11. Cooler hose for hot boxes should be supplied from scrap hose reclaimed from welding equipment.
12. Fire hose couplings should invariably be cut from fire hose and not permitted to get in the scrap with the hose.
13. Colored lenses and colored glasses should never be thrown on the dump, as it has a scrap value whether broken or unbroken.
14. Old pressed steel working frogs should not be scrapped unless badly broken or distorted.
15. No lamps of any kind should be thrown on the dump or disposed of as scrap unless beyond repair. The serviceable parts should be removed.
16. Cab arm rest should not be thrown on the dump.
17. Large numbers of train indicator numbers are blown out and picked up on the right of way. These should be properly taken care of.
18. Wooden flag staffs fit for further use should not be improperly disposed of.
19. No hot box cooler parts which are fit for repairs of other coolers should get in the scrap.
20. Link washers, slash bars and clinker hooks should, if practicable, be repaired at local shops to save handling.

21. No serviceable switch chains or parts of same should get away in the scrap.
22. Effort should be made to recover as many paper car lines as practicable. Likewise such coverage paper as is not torn or soiled.
23. Old bottles and jugs have a value and should not be thrown on the dump.
24. Buckets and dope cans can be made from empty powder cans.
25. Old cushions should be preserved and sent back to the upholstering shop.

CLASS 37

1. Old oil shipping drums beyond repairs and not fit for water barrels can be used for trash burner by removing the head and cutting a draft door at the base.
2. The matter of local reclamation of old waste calls for constant attention on the part of all concerned.
3. Wrappings from waste bales can be used in grain cars.
4. Waste used for wiping should not be mixed with journal box waste.
5. Wiping waste although not reclaimable, should not be thrown on the dump. It can be taken care of and used for lighting fires.
6. Empty carboys should be carefully handled, as they have a return value.
7. Driving journal compound should not be thrown on the dump. It can be cleaned and reused.
8. Car oil sediment can in many cases be used in place of car oil.
9. Use of oil filters is an important proposition and should receive attention of all concerned.
10. The use of agitators in oil storage tanks is a subject for comment.

CLASS 43

1. Serviceable fittings should invariably be removed from scrap pipe.
2. Globe and angle valves should never get into the scrap, as they can be easily repaired.
3. Nipples should invariably be cut from old pipe.
4. Kewanee unions or similar unions or parts should not be scrapped until properly inspected, with the idea of reassembling and returning to stock.

CLASS 44

1. Wire reels have a return value and should be properly taken care of.
2. Carbon filament lamps should always be used where possible in places not requiring a higher priced lamp.

CLASS 45

1. No files fit for recutting should get in the scrap.
2. Steel knuckle pins should not be disposed of as scrap. They can be used in the manufacture of chisels.
3. Old files over six inches should not be saved for recutting.
4. Alligator wrenches, except when broken in the jaw, should be kept out of the scrap.
5. Engineers' hammers can be manufactured out of scrap tire steel. Door checks, unless absolutely beyond repairs, should not be put in the scrap. Parts of same fit for repairs of other checks should be retained.
7. Care should be used in scrapping latches or locks of any kind as quite often the lock or latch has parts which can be used in repairs of other articles.
8. Cellar keys should be kept out of the scrap.

CLASS 46

1. Steam hose gaskets, unless broken or badly chipped, can be refaced and by the application of a thin gasket can go back into service.
2. Worn steam and dynamo hose couplings can be built up by oxweld process.
3. Old asbestos removed from locomotives should never be thrown on the dump. It can be ground or broken up and used over again, either by forming into slabs or by using in mortar form.
4. Old rubber or leather belting and rubber cloth in pieces large enough for manufacture of gaskets should not be disposed of as scrap.
5. Scrap rubber gaskets of all kinds should be kept picked up for their scrap value.
6. Second-hand hose should invariably be used in place of new where there is no "resure" involved.
7. No old rubber matting should be disposed of as scrap. It can be used on scale form.
8. Scrap rope can be used for tying up bundles, etc.
9. Tank hose gaskets can be manufactured from scrap air brake hose and the same machine used for punching rubber and leather gaskets.
10. Rubber boots should not be disposed of as scrap, as they can be reclaimed by cobblers' outfit.

CLASS 47

1. Paint buckets can be manufactured from old white lead containers.
2. Colored glass, broken or unbroken, has a value and should not be thrown away.
3. Soda ash sacks have a return value and should be properly taken care of.
4. At points where acetylene gas is manufactured the refuse can be used to advantage in painting around the plant where white is desired.

CLASS 50

1. Fire box or boiler steel suitable for running boards should not be sold as scrap.
2. Hoops from waste bales will grade as Light sheet No. 1.
3. Balbit from old waste should be properly taken care of by burning the waste and saving the metal.
4. Old rubber belting should not be disposed of as scrap, as it can be used in the manufacture of gaskets or for platforms on scales or runways of elevators.
5. Old style rubber fire hose should not be disposed of as scrap; it can be used in the manufacture of gaskets.
6. Brass foundry ashes have a value and should never be thrown on the dump.
7. No. 2 sheet scrap should be considered in connection with rip-rap purposes, particularly at times when this scrap is very low in price.
8. Destroyed steel cars should be disposed of without excessive cutting.
9. Do not scrap engine brake shoes unless the lug is broken or more than 50 per cent of the flangeway is worn off, for if the shoe is less than 1/2 inch thick in its thinnest part or if it is badly shelled out on the braking face or shows irregular wear, which would interfere with the hang on the wheel.
10. Balbit should never be sold in the open market.
11. Do not scrap any car brake shoes which are 3/8 inch or over in thinnest part, providing that the eye and the steel back are intact, that there are no cracks on the braking face running lengthwise on the shoe and no large shelled out on the braking face.
12. Lined iron such as staybolts, regardless of length, braces, sling stays and similar lined iron can be piled and hammered into billets for forging work.

13. Waste paper should be watched as to cost of bailing, etc., as it sometimes does not pay to expend much labor on this article.

Discussion

J. C. Kirk (C. R. I. & P.):—If all of the railroads would reclaim all the different items that the committee has listed, the subject of reclamation would be very well taken care of. The cost of these different items should be watched constantly and the material should be tested. Then we can be sure that we are not wasting money by reclaiming material which should be scrapped.

I would like to refer also to the subject of welding frogs without removing them from the tracks. Do you weld before they are worn out, or do you simply weld when they are worn only slightly?

O. Nelson (U. P.):—This is determined largely by the roadmaster and the district roadmaster. The work has been very gratifying; in fact, we have run across cases where the claim is made that a built-up frog stands up better than new ones. On some roads they are regular floating gangs which cover the various divisions all the year around.

Mr. McGilligan (S. P.):—The Maintenance of Way Department on the S. P. builds up frogs, tracks and switch points. Where the rail is being superseded and we supply our requirements by reclamation.

R. M. Blackburn (C. & N. W.):—On the North-western track welding is done by the maintenance of way forces. On this reclamation work, I should like to ask if you take credit for the savings effected.

O. Nelson (U. P.):—It is handled differently on different railroads. On the Union Pacific we do. The information I have from the Southern Pacific shows their average cost for building up switch points was \$5.15, and building up a 75-lb. frog, \$24.46. The figures reached on the various roads on this work, running from \$5 to \$8 on the switch joints and \$20 to \$25 on the frogs, will give some idea of costs and savings.

Enough care cannot be taken to see that all material reclaimed is absolutely in serviceable condition before it is used. In regard to the cost of reclaiming, we have recommended for adoption this blank, which should be carried out rigidly and studied very thoroughly as to whether you are saving or losing money.

Mr. Wilton (B. & O.):—We have built up frog and switch points only on branch lines, but at Martinsburg we also repair motor cars, switch lamps, and all that class of material.

O. Nelson (U. P.):—Built-up frogs are standing up well. When we first started some difficulty was experienced in getting the right sort of steel. After six months of experimenting the right temper was obtained, and since then our frogs have been standing up splendidly. We are not, however, building up frog and switch points on our high speed main line tracks; the practice is confined to our branch roads.

J. G. Stuart (C. B. & Q.):—The real value of these frogs and rails after they are repaired has not been emphasized duly. On the Burlington we have a unique position in our stores department, inasmuch as we have charge of the frog and switch points as well as the rail end of it.

Mr. Mack (C. B. & Q.):—We have tested built-up frogs against new frogs under similar traffic conditions, with the result that the properly repaired or properly welded frog stands up in service fully as well as a new frog. We are of the opinion that in the majority of cases it is more economical to repair the frog out of the track. Better work is obtained when it is not done under traffic conditions. We also believe that not only is the quality of the work better when a frog is repaired out of the track, as compared with work done while in

the track. There are also certain costs incident to making the repairs in the track that are saved by repairing out of the track. We do not attempt to bring all frogs into a certain central point; we have established track repair shops at certain strategic points on the line; at our larger terminals. So far as possible we make them one-man shops. The welder, with a simple overhead hoist, can unload a frog from a car and also lift it back. That avoids the expense of a gang of men going to the shop to load or unload a frog. It seems to me that the big thing about reclaiming track frogs is keeping the frog in serviceable shape and condition while it is in the track. If bolts are permitted to become loose or to remain loose while the frog is in service, or if broken bolts are not renewed, the filler of the frog soon eats out and it cannot be repaired or tightened again so that it will remain tight. A beginning should be made with track forces, to keep the tracks and the frogs in the tracks in the proper condition. The frogs should be repaired before the points are beaten down and demolished and the rails cut to pieces. If that is done, enough will be made on repair of tracks, to make a good return on the investment.

A. W. Munster (B. & M.)—Except as a matter of education and information, I do not see where the service of supply has anything to do with the repair of frogs and tracks.

H. H. Loughton (Southern)—Some years ago, when we adopted oxyacetylene welding, we sent our switches and frogs to two points on the road for repair. The work was satisfactory except for the switch points. We have been using reclaimed switches and frogs on branch lines and in terminals for 10 years. About three or four years ago the engineering department and the maintenance of way department analyzed their costs and our costs, and they convinced me that 75 per cent of this repairing could be done in the track, and money saved, so we assigned them an operator and a car equipped with all the necessary tools and facilities. Each division now has a helper and an operator, who in most cases, were taken from the store department or shop, the expense being carried by the above departments. Each superintendent feels satisfied greater economy is obtained by not sending the work to the stores department.

J. G. Stuart (C. B. & Q.)—The stores department should not be sent out on the line. We have been doing this work at our reclamation plants. As soon as the practice is really developed, I think it should be sent to the department concerned. We have the talent for developing, and after that the work belongs to the maintenance of way department.

A. A. Goodchild (C. P. R.)—One item which to me has been a rather important one is the matter of cast iron wheels. I have corresponded with three or four of our general storekeepers, and the amount of money involved seems to me well worthy of our consideration. We used about 75,000 wheels on the Canadian Pacific and an estimate was made that 10 per cent or 20 per cent of the wheels removed could be reground and put into service again. Can we not have a special committee on reclamation work. I believe the subject is well worth the work of a special committee acting in conjunction with the mechanical department. Some of the roads doing this work, include the Chesapeake & Ohio, the Northern Pacific, and the Southern Pacific. The amount of money involved, should command our attention.

O. Nelson (U. P.)—Several roads are making it a regular practice to reground wheels. It is simply a matter of opinion among the mechanical men as to the saving feature of doing the work. Those who have

been doing it claim that large savings have been effected and that a wheel is better after it has been reground. They even claim that the ground wheel is less liable to cause hot-box than a new wheel, as it is truer and runs more smoothly.

C. D. Young (Penna.)—Of all our material in stores, 25 per cent is reclaimed material. I am of the opinion that in reclaiming material better results will be obtained by having all reclamation work done in a shop which has the proper equipment to do the work, that is, in the regular manufacturing shop. The independent reclaiming shops are not generally as well equipped as the regular shops. Therefore, although the committee has offered an exhibit of what might be possible in the way of reclamation plants, I believe that better results and lower costs will be had if we center all our manufacturing at our manufacturing plants. It is the duty of the stores department to select from the scrap, that which is to be reclaimed, and they then should turn it over to the process shops for remaking.

Section 29, offers three suggestions: Small car axles can be provided by utilizing large axles either by upsetting or turning down. I think before we offer suggestions of this kind to our Stores people, they should be referred to the proper committee of the Mechanical Section. The practical suggestion in No. 1 is not approved by the Mechanical Section. It is similarly the case with sections 2 and 3, namely: (2) Worn outside collar on car axles can be built up by welding; and (3) Flat spots can be welded on rolled steel wheels and tiers.

These two subjects are still mooted in the Mechanical Section. The principal of welding collars has been done by some roads and they have had trouble with it, and, therefore, I think we should go slow in offering to our stores people the suggestion that this should be done.

Vice President Reed—Early in my Railroad experience I worked for a man whom I came to revere. He said to me one day: "Frank in going through life, don't fool the other fellow unless it becomes absolutely necessary; but under no circumstances fool yourself." We should not do what the mechanical or engineering departments are not posted on or we may be doing something that is wrong. I believe a large number of railroads today are dismantling and disposing of a lot of old equipment; some of them are turning them over to wrecking companies, to wreck them at a certain price per car, or they turn it over at a certain price per car. Some of those cars moved a long distance to get to these scrap yards and I understand that there is no effect being made on the part of the railroads that sell those cars to get the good material back. We can accomplish a great deal in that direction and save a lot of money for our company by watching this carefully.

Mr. Jones—On page five, classification I-B, article 9, track spikes, quick acting power hammer. We have discarded the hammer on the New York Central and have developed a machine for straightening track spikes. We are saving \$20 a ton, actual figures, after adding one hundred percent overhead. We are actually doing the work.

Mr. Hyatt—The one advantage of reclaiming by the stores department is that they are in a position to know what there is a demand for. There are a great many items mentioned here that it is possible to reclaim, but it may not be to a particular road's profit to reclaim. I think the man at the head of the reclamation should know the requirements, what is needed and take that into consideration for the entire railroad

made in the shops, and a space nearby such bins should be reserved for the heavy pieces. In each case the bins should be located as near as possible to the loading track in order to save extra handling. By the use of the bins inspection can readily be made by the men designated to look over the so-called scrap, in order to take therefrom good serviceable material or material that could be made serviceable with little labor or expense.

At the larger shops a tractor or power truck, with trailers, when not busy otherwise may be used to pick up the old material, and by having a loading platform with incline the gathered loads may be delivered to a car for shipment to the scrap yard. Where the accumulation is great enough the material may be partly sorted as it is being loaded without great expense, and the heavier scrap be kept together, as should also the borings and turnings.

Where the scrap yard and large shops are located at the same point, cars not suitable for road use could be properly placarded and placed in service between the loading platforms and scrap yard.

Material that is being returned for inspection and possible reclamation should be marked plainly with paint, and the consignor

imum tonnage and foreign line cars traveling in the direction of home should be given preference in this loading, care being taken also that there is no unnecessary delay in handling the equipment, as the per diem charge is a very large item of expense.

The largest tonnage is eventually sold as scrap (unless the reclamation plant is very extensive) and consequently the yard should be located at an advantageous point for disposal through sale, to avoid back haul.

The yard should have facilities for handling scrap and preparing it for the various classifications. Shears of proper size should be provided, and if impossible to have more than one, it should be large enough to cut a 6-in. axle and thus be able to care for what scrap may come in.

Docks are recommended, and to equip them properly a gantry-type crane is superior to the locomotive crane. A sketch of the dock at Silvis, Illinois (Chicago, Rock Island & Pacific), is shown (Exhibit A), and it will be noted that the storage bins are adjacent to the sorting bins. The docks are made of old car timbers tied together and filled in with cinders, and when properly constructed, should last for years. If any trucking is contemplated or

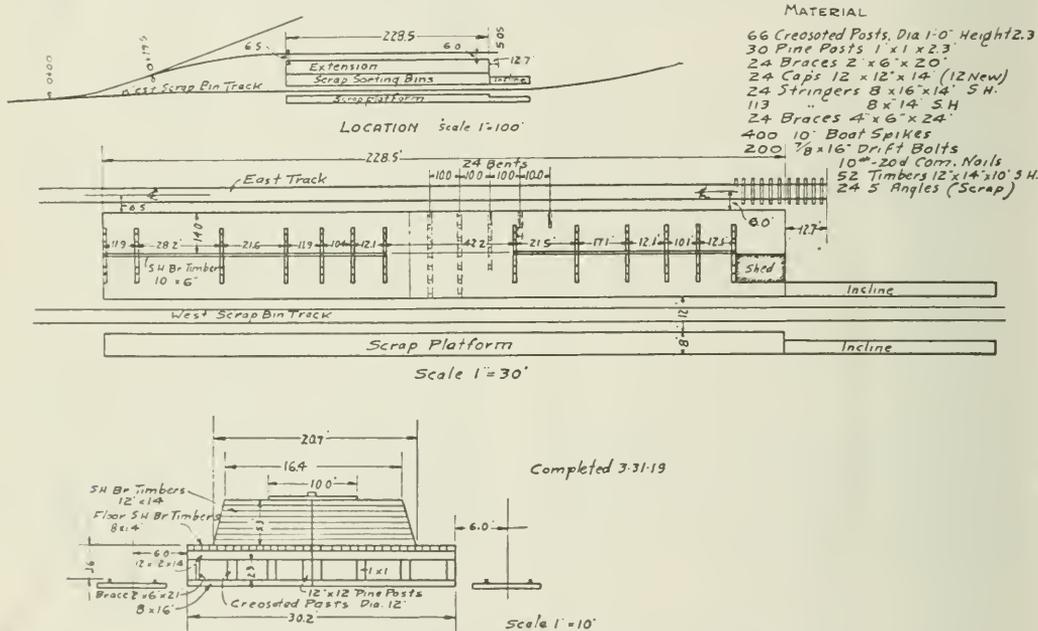


Exhibit B—Plan of Relatively Smaller Kansas City Southern Scrap Dock

should write the officer in charge of the scrap dock giving the car number, waybill reference and approximate location of the material in the car so it will not be overlooked, getting the information to destination before car arrives. Any items that have been inspected at the point of origin and adjustment allowed should be plainly marked or painted "Scrap" so there will be no delay or double handling at the scrap yard.

It often happens that machinery is scrapped that may be placed in working condition and either used in the reclamation plant or sold to second-hand machinery dealers. All parts should be carefully inspected and missing or broken parts reported so that it may be replaced for inspection at destination with a minimum of delay.

The best method of gathering scrap from points that do not accumulate in earload lots is by means of the supply train, as the trip are periodical and the crew members familiar with the scrap on the different divisions and is thus able partly to sort it. When necessary care for old material any defects can be noted and the scrap held for inspection at the general store. When a car is loaded it should be returned and forwarded direct, and any empty cars should be returned to the supply train, thus not delaying a load.

At every point, especially scrap yard should be loaded to a max-

imum tonnage and foreign line cars traveling in the direction of home should be given preference in this loading, care being taken so that heavier loads may be handled.

The general scrap dock is equipped with three gantry-type cranes, two of ten-ton capacity and one of four-ton capacity. These cranes are equipped with electric magnets 52 in., 60 in. and 62 in. The claims for superiority over the locomotive crane are greater speed, larger loads and elimination of delays incident to switching. The docks are 1,476 ft. long and the cranes can reach every part of the dock, so if necessary to move a car the magnet can be dropped on its floor and the crane can then haul it to the new position.

The crane magnet unloads the scrap, the sorting is done by hand, and from the sorting bins the crane again picks up the sorted scrap for transfer to the storage bin. These are so located that cars can be spotted without conflicting with the unloading.

The work by hand has been reduced to actual sorting only and the movement of scrap by truck or wheelbarrow has been entirely eliminated.

The scrap rail is handled in the maintenance of way yard by a five-ton gantry crane equipped with magnet and controlled by one crane operator and one crane director. The magnet is 18 in. in

diameter, which permits the handling of one rail at a time, allowing inspection by the director as the unloading is being done.

Rail can be sorted by spotting cars for No. 1 and No. 3 rail at each end of the unloading car, and the No. 2 and No. 4 rail can be handled to the bins, the serviceable rail being placed at one side for inspection. At the Santa Fe yard, where the rail is handled almost entirely by a locomotive crane, one man in the car sorts the different classes before it is unloaded.

A smaller scrap dock is shown (Exhibit B) of the Kansas City Southern, approximately 228 ft. long and 30 ft. wide.

The center of the dock, about 42 ft., is reserved for an unloading and sorting bin. The dock approaches and platforms are equipped with rails set to standard gauge and an electric motor and hoist of sufficient capacity to pull a loaded push car of from two to four tons in weight is properly located, and as scrap is delivered from the shops it is pulled up and sorted into the bins directly from the cars as loaded by the shops, thus saving double handling. At the sorting bins there are two No. 5 electrically driven Canton alligator shears for disposing of larger pieces.

Material fit for reclaiming is placed on the second-hand material platform just west of the scrap dock, thus removing it from the scrap handling crew.

The two methods of gathering scrap are by means of push cars heavily built to hold about four tons, and "yard cars," old equipment stripped and fitted with 18-in. side boards to facilitate loading, these latter cars being placed at repair tracks, etc.

At this plant all scrap is handled by hand labor on docks, except bolsters, steel underframes, boilers, etc., this heavier material being handled on the ground by the use of a wrecking crane. There has been no difficulty in handling scrap in this manner, though the work may be delayed if the wrecker is being operated elsewhere.

The Oregon Short Line has two scrap docks, one at Pocatello, Idaho, fully equipped, the other at Salt Lake City, this latter limited to certain grades of scrap, all other grades being moved to the central sorting dock; this to accommodate market conditions.

The Denver & Rio Grande Western has two main docks also, one at Salt Lake City, the other at Pueblo. Where the tonnage warrants, loaded cars are shipped direct from shops to the customer, i. e., the Colorado Fuel & Iron Company, and their classification is greatly simplified in so doing.

Special bins are provided for borings and turnings, and considerable saving is claimed through the use of old fire boxes cut down and conveniently placed, which, when filled with scrap, are picked up by locomotive cranes and moved direct to the scrap docks.

The Santa Fe has one Brown hoist and four Industrial cranes, steam driven and equipped with electric generator and magnet, size 42 in., and is not now using docks. Its officials prefer the locomotive cranes to the gantry, as at the reclamation plant there is coal storage space and the locomotive cranes are equipped with buckets which unload or reload promptly and at a minimum expense. Twenty-five thousand tons of coal were handled during 1921. When not handling coal, cinders or sand, these cranes are used for unloading heavy material with chains, and they also do the switching when a switch engine is not handy, and have been used in construction work and in setting machinery.

The reclamation plant yard (about 250 acres) is wired and has water plugs conveniently placed so that the cranes can recharge and take water with very little delay. Coal bins are placed at loading and unloading tracks so that no time is lost in getting coal.

The scrap passes over a track scale on entering the yard, and is placed just south of the rolling mill and unloaded on the ground. The cars are then cleaned as they are being moved to the scale, and are again weighed light and if improperly stenciled this is corrected, an American Railway Association charge being made for this service where time limit has expired. This time limit is shorter on Santa Fe equipment than allowed under American Railway Association rules, and is covered by Transportation Light Weight Circular No. 29, as issued by the superintendent of transportation. No claims for shortage are allowed.

The sorters handle the pile from all sides, the serviceable material men who are experts in their line working with the scrap handlers to see that nothing goes in the scrap for sale that can be used or made useful. The scrap is wheeled to the various classified piles on old boiler plate runways by laborers.

All flat and round bar is sorted and kept separately to be sent to the rolling mill, where it is rolled into finished iron, which process gives a much better finished bar than if all No. 1 and No. 2

wrought were used, as was the custom formerly at outside mills.

The sorted piles are placed beside the loading track and loaded as the tonnage accumulates, so they are never high enough to cause extra labor. The tracks for unloading and for loading are parallel and are 500 ft. apart.

The scrap for sale is reported to the purchasing agent twice a month. By this method the accumulation is kept down and handling cost reduced. Certain classes of scrap, such as cast iron, brake shoes, and rail, are sold in the West. Wheels are handled direct from the shops, and the movement of empty home-bound foreign cars is used to carry the scrap to Chicago.

A portable overhead crane, known as the Aveling unloader, is claimed to have many advantages, as it moves on a track by its own power, and the magnet or clam shell passes through the framework, covering four tracks. It may be used for handling scrap, loading and storing coal, transferring loads from bad order cars, etc., and it does not require coal or water.

While gantry or locomotive cranes are not available the docks are still preferable, as heavy loads are more easily handled when they are level with the car platform.

Scrap as received from the line should be weighed in over the track scale, set on the unloading track, and immediately released. Where the car is clean and needs no repairs it may be reloaded immediately, thus making the service continuous.

Cars should not be loaded until they have been cleaned and light weighed, this to avoid possible claims for shortages, as stencil tare weights are not sufficiently accurate on which to base a refusal of short weight claims.

It is well to call attention to:

The practice of light loading cars. A maximum load tends toward economy in operation.

Proper repairs to cars to prevent loss.

Proper blocking of rail, wheels, etc., to prevent damage to equipment, shifting of loads, and consequent switching back to the yard for rehandling.

Thorough cleaning and light weighing of cars to prevent loss through claims.

Periodical inspection, cleaning and test of scales for the same reason.

Continuous movement of scrap in its destination.

Sale in advance on estimate of accumulation to keep the yard clear of material.

Immediate report of car numbers, weights, class of material, and forwarding of waybill to enable prompt collection for and disposal of loaded cars.

Prompt release of empty cars to avoid per diem charges.

Proper inspection of facilities so that needed overhauling may prevent a breakdown at an inopportune time.

A co-operation throughout all departments, from the section foreman and track gang up, to the end that a thorough knowledge that the main intention of scrap clean-up "Saving is earning" is understood.

CLASSIFICATION

In regard to the scrap iron and steel classifications, the committee's report at the last annual meeting held in Chicago, June 9 to 11, 1921, was further modified during the past year through discussion of several items that apparently conflicted and attention was called by members of the committee to the fact that while in general the classification as presented could be adopted, local conditions must govern various items.

It was proposed to include an item of shoveling steel, a classification that would take care of all small pieces of steel scrap such as tools and tool-steel, tie plates, number two wrought (when a road could not accumulate a carload), etc.

Prices were checked on tools and tool-steel, and it was found that there were times when this item commanded a premium.

Attention was called to the inclusion of punchings and clippings in Item 14, Bustling No. 1, and Item 31, heavy melting steel, and it was shown that the eastern mills would accept Item 31, heavy melting steel, with this material, whereas the western mills would reject cars containing it, and also that the inclusion of the clause, "No piece-weighing less than ten pounds," in Item 31 would eliminate this trouble for the western shipments and that the classification of shoveling steel would cover the small steel.

Item 28, flues and pipe. It was suggested that the words, "Free from galvanized material" be included.

Item 33, iron rail. The dealers present at the meeting reported that the consumers' classification called for 50 pounds and heavier,

and it was suggested that the matter be taken up with the rolling mills and an endeavor made to have them agree to lower their weight to 40 pounds.

Item 35, rail steel. Question of inserting a clause, "Badly worn flanges," was not passed on.

The question of inserting Items 42A, "Sheets from steel cars cut apart," and 43A, "Car roof sheets," is covered by the insertion of a note after Item 60 as follows:

"Where a full carload of a special item that is included or could be included or mixed with other scrap is accumulated it should be reported separately and sold separately."

A suggested correction in the terms of sale was discussed and this clause was proposed:

"Shipment will ordinarily be made within thirty days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within thirty days, prevented by causes beyond our control, notification of our inability to make shipment and the reasons for same should be communicated to the buyer, when he may, at his option, cancel the balance due. If the buyer does not immediately exercise this option, the contract remains binding to both parties."

No action was taken as to adoption of this clause as the old terms of sale specified forty-five days. The dealers at the meeting favored its adoption.

The Committee report is signed by: M. J. Collins (Chairman), Atchison, Topeka & Santa Fe, Chicago; L. V. Guild, Oregon Short Line, Salt Lake City, Utah; W. B. Hall, Denver & Rio Grande, Burnham, Denver, Col.; J. R. Haynes, Chicago, Burlington & Quincy, Chicago; C. H. Hoainville, Atchison, Topeka & Santa Fe, Chicago; W. F. Huneke, Chicago, Burlington & Quincy, Platts-mouth, Neb.; W. F. Jones, New York Central (East), West Albany, N. Y.; J. C. Kirk, Chicago, Rock Island & Pacific, Silvis, Ill.; A. W. Munster, Boston & Maine, Boston, Mass.; C. B. Hall, Pennsylvania System, Philadelphia, Pa. and S. B. Wight (chairman ex-officio), New York Central Lines, New York, N. Y.

APPENDIX

SCRAP CLASSIFICATION

Terms of Sale

Please quote on this sheet price per unit specified on the following scrap materials. This scrap will be sold f. o. b. any point on our lines. Show in your bid tonnage and delivery point desired.

Sealed bids for this scrap, to receive consideration, must be in this office by 12 o'clock noon on..... and remain in effect until 12 o'clock noon on.....

Envelopes containing bids should be marked in lower left-hand corner "Bid on Scrap," and no change in your quotation will be permitted after that time.

The right to accept or reject part or all of your bid is reserved. If accepted, the following terms and conditions will govern, and will be made a part of the transaction.

Shipment

Final shipping directions must be furnished within five (5) days from date of award. When shipping directions for material are not furnished within five (5) days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.

Shipment will ordinarily be made within thirty days (30) days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within forty-five (45) days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within ten days thereafter.

Current tariff switching charges will be made for delivery to connecting line.

Terms

Sight draft attached to bill of lading, or certified check before cars delivered. Our classification and track scale weights at point of loading to govern.

Please send your shipping directions to conform with above terms of sale.

Classification of Scrap Iron and Steel

(Quote price per net ton of 2,000 lb.)

Item No.

1. Arch Bars and Transoms, Iron
2. Arch Bars and Transoms, Steel
3. Axles, Steel—Car and locomotive, 6 in. dia. and over at center
4. Axles, Steel—Car and locomotive, under 6 in. dia. at center.
5. Axles, Steel, Hollow Bored
6. Axles, Iron—Car and locomotive, all sizes.
7. Angle and Splice Bars—Steel angle bars and splice bars.
8. Angle and Splice Bars, Patented Joints Only
9. Angle Bars, Splices and Fish Plates, Iron
10. Boilers, Fire Boxes and Tanks, Uncut—All kinds, attached or separate. Specify whether with or without flues.
11. Boilers, Fire Boxes and Tanks, Cut Up—Iron or steel boiler or tank plate cut into sheets and rings (with or without stay bolts.)
12. Brake Beams, Uncut
13. Built Up Bolsters
14. Busheling, No. 1—Iron and soft steel pipes and flues (free from scales); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings; nothing to be over 8 in. long or wide, free from galvanized or tinned stock.
15. Cast, Railroad No. 1—Pieces weighing 150 lb. or less, includes new grates, new stove plate and clean cast-iron culvert, soil and water pipe, to be free from brake shoes and burnt grate frames, burnt stove plate and all other burnt castings.
16. Cast, Railroad, No. 2—Pieces weighing over 150 lb. but not more than 500 lb., otherwise same specifications as class No. 15.
17. Cast, Railroad No. 3—Pieces weighing over 500 lb.; includes cylinders and driving wheel centers, and all other castings; otherwise same specifications as Class No. 15.
18. Cast, Railroad No. 4—All kinds of burnt castings, including grate bars, grate frames and stove plate.
19. Cast, Iron Brake Shoes—All shoes with steel back or with steel or wrought-iron inserts, both driving and car. Excludes composition filled shoes.
20. Cast Iron Borings—Clean and free from all other metals, dirt and lumps.
21. Cast Steel, No. 1—Charging box size, 5 ft. and under, 18 in. wide; no piece weighing less than 10 lb. to be included.
22. Cast Steel, No. 2—Steel castings over 18 in. wide and over 5 ft. long, may include cast steel truck or body bolsters and cast steel locomotive frames.
23. Cast Steel Truck and Body Bolsters
24. Couplers and Knuckles, Steel and Steel nuckle Locks
25. Tools and Tool Steel—Worn out steel tools, tool steel, files, including old claw bars, pinch bars, spike mauls, track wrenches, picks, adzes, axes, chisels, drills, hammers, knuckle pins, punches, finger pins, bits, draft keys, bar steel, weighing under 10 lb. per piece.
26. Frogs and Switches, Uncut—Steel and iron frogs and switches, that have not been cut apart, exclusive of manganese material.
27. Flues, Tubes and Pipes, Wrought Iron and Steel No. 1—1-inch dia. and over, 2 ft. long and over, free from fittings, paint, galvanized or enameled, coiled or bent material.
28. Flues, Tubes and Pipes, Wrought Iron and Steel No. 2—Ungraded wrought-iron and steel flues, tubes and pipes, including fittings attached. Free from galvanized material.
29. Lined Iron and Steel—All kinds of material from interior of boilers (except flues which are encrusted with lime or corroded by the action of water) such as crown bars, crown bar bolts, stay bolts, etc.
30. Malleable—All malleable castings.
31. Melting Steel, Heavy No. 1—Charging box size, ¼-in. thick and over, and not over 18 in. wide, or over 5 ft. long, free of all attachments, may include chain, carbon tool steel, files, punchings and all other steel scrap that will come within the above dimensions, unless otherwise specified. No piece weighing less than ten lb.
32. Melting Steel, Heavy No. 2—All steel over 5 ft. long or over 18 in. wide.
33. Rail—Iron No. 1—Iron tee rail 3 ft. long and over, tee section 40 lb. per yard and over, free from frog, switch guard or crooked rail
34. Rail—Iron—Miscellaneous—All iron rail not otherwise speci-

- Item No.
- fied, including guard rails, switch points and frogs, when cut apart. Does not include frog fillers or plates.
35. *Rail—Steel No. 1*—Standard section steel tee rails, 50 lb. per yard and over, 5 ft. long and over. Free from badly bent and twisted rails, frog, switch and guard rails and rails with split heads and broken flanges.
- NOTE.—All rail suitable for relaying must be classified as Relaying Rail separate from all scrap rail.
36. *Rail—Steel No. 2*—Cropped rail ends under 3 ft. long, 50 lb. and over standard section.
37. *Rail—Steel No. 3*—3 ft. long and over, 50 lb. and over, standard section having split heads or ball of rail worn with wheel flanges, curved and bent rails free from frog, switch and guard rails.
38. *Rail Steel No. 4*—All sections of rail not coming under specifications of No. 1, 2 or 3 rail, including frogs, cut apart, guard rails and switch points. Does not include frog fillers or plates.
39. *Structural Wrought Iron—Cut Apart*—Wrought-iron, structural, and shapes from bridges, buildings and equipment cut apart and free from riveted material.
40. *Structural Wrought Iron—Uncut*—Wrought-iron, from bridges, structures and equipment, which has not been cut apart.
41. *Structural Steel—Uncut*—All steel, or steel mixed with iron, from bridges, structures and equipment that has not been cut apart; may include uncut bolsters, brake beams, steel trucks, underframes, channel bars, steel bridge plates, frog and crossing plates and other steel or similar character not included in No. 2 Heavy Melting Steel Class 32.
42. *Sheet Scrap No. 1*—Under $\frac{1}{4}$ -in. thick, consisting of cut stacks and stack netting, hoops, band iron and steel, pressed steel hand car wheels, scoops and shovels (free of wood), and wire rope; must be free from galvanized iron or tin, cushion and other similar springs and lime encrusted pipe and flues from boilers.
43. *Sheet Scrap No. 2 and Miscellaneous*—Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts, and any other iron or steel material not otherwise classified.
44. *Spring Steel No. 1*—Flat spring steel, including elliptical springs from which bands have been removed.
45. *Spring Steel No. 2*—All coils springs, made from steel $\frac{3}{16}$ -in. and over.
46. *Steel, Maganese*—To include all kinds of manganese; rail, frogs and switch points, cut or uncut.
47. *Steel, High Speed*—High speed steel turnings (butts and ends report separately).
48. *Tires No. 1*—All locomotive or car tires 36 in. and over inside diameter, smooth inside, not grooved for retaining rings or lipped.
49. *Tires No. 2*—All tires not included in Tires No. 1.
50. *Turnings and Drillings No. 1*—Wrought-iron and soft steel, clean, free from cast borings, brass, hard steel or other foreign metals, dirt or lumps.
51. *Turnings and Drillings No. 2*—From tires and other similar steel, including hard steel; clean, free from other metals, dirt and lumps.
52. *Turnings and Drillings—Mixed No. 1*—Wrought, cast and steel mixed, free from other metals, dirt and lumps.
53. *Turnings and Drillings—Mixed No. 2*—Wrought, cast and steel, mixed with brass and other metals, free from dirt and lumps.
54. *Wheels No. 1*—Includes all solid cast-iron car and locomotive wheels, no allowance for grease and dirt.
55. *Wheels No. 2*—Includes all kinds of built up or steel tired wheels. (Specify kind in offering.)
56. *Wheels No. 3*—Includes all solid rolled, forged or cast steel car and locomotive wheels. (Specify kind in offering.)
57. *Wrought—Railroad No. 1*—Clean wrought, pieces 6 in. long and over, flats to be $\frac{1}{4}$ -in. thick and over; rounds or squares $\frac{3}{4}$ -in. thick and over; to include bars, rods, chain; all to be free from riveted material.
- Item No.
58. *Wrought—Railroad No. 2*—All wrought, under 6 in. long, not specified under No. 1 Railroad Wrought; to include track spikes, bolts, nuts, rivets and lag screws.
59. *Wrought Iron Locomotive Frames or Mud Rings*—Includes all other large wrought-iron forgings.
60. *Destroyed Steel Cars and Locomotive Tenders*—Includes underframes and bodies of steel cars cut apart sufficiently to load—excludes trucks and cast steel underframes.
- NOTE.—Where a full carload of a special item that is included or could be included or mixed with other scrap is accumulated, it should be reported separately and sold separately.
- MISCELLANEOUS
61. *Aluminum*
62. *White Metal No. 1*—Including various mixtures of clean bearing or lining metals, such as babbitt, metallic packing, etc.
63. *White Metal No. 2*—All non-bearing white metals, such as lavatory basins, exclusive of aluminum.
64. *Barrels*—Specify kind and with or without heads. (Standard Classification.)
65. *Bags and Burlap*—Bagging, sacking and waste covering.
66. *Brass, No. 1*—Locomotive bearings metals, such as driving, crown and rod brass, free from white metals, excluding car and tender bearings.
67. *Brass, No. 2*—Steam metal brass, including valves and fittings—injector and lubricating bodies and parts, and check valves.
68. *Brass, No. 3*—Journal bearings free from babbitt.
69. *Brass, No. 4*—Brass or bronze borings, drillings and turnings.
70. *Brass, No. 5*—Yellow brass castings, to include coach trimmings, light brass, hose couplings, pipe tubes, etc.
71. *Copper Cable, Insulated*—Specify kind.
72. *Copper, No. 1*—Wire free from insulation, flue ferrules, pipe and tubes.
73. *Copper, No. 2*—Sheet copper, sheathing and roofing, free from paint and nails.
74. *Copper, No. 3*—Sheathing and roofing copper, with paint and nails.
75. *Copper, No. 4*—Battery copper.
76. *Copper, No. 5*—Dross and oxide. (Report separately.)
77. *Canvas*—(Specify whether new or old.)
78. *Carpet, Linoleum, Plush and Rags*—(Specify kind.)
79. *Lead*—Sheet, pipe, etc.
80. *Lead, Battery*.
81. *Lead, Battery Mud or Sediment*—(Specify wet or dry.)
82. *Leather Belting*—No. 1 leather belting, 6 in. wide and over; No. 2 leather belting, under 6 in. punchings and trimmings; No. 3 rubber belting, all kinds; No. 4, composition belting.
83. *Rubber, No. 1*—Air brake and signal hose, free from wire and fittings; rubber boots and shoes without leather soles, rubber aprons.
84. *Rubber, No. 2*—All other hose, such as steam, water, tank, pneumatic tool, and washout hose, free from wire and fittings.
85. *Rubber, No. 3*—Rubber lined fire hose.
86. *Rubber, No. 4*—All wire found and wire inserted hose, including oil and paint hose.
87. *Rubber, No. 5*—Rubber packing, gaskets, diaphragms, mating, step trends, etc.
88. *Rubber, No. 6*—Auto tires, solid and pneumatic, including tubes, free of fittings. (Specify material.)
89. *Rope—Manila* rope free from bow fenders.
90. *Tarrel Rope and Marlin*—Manila bow fenders, tarred rope and marlin. (Specify kind in offering.)
91. *Zinc, Battery or Sheet*—(Specify kind.)

The report was received and accepted as recommended practice.

STATEMENT SHOWING COST OF OPERATING SUPPLY TRAINS

	Monthly
Labor at Stores in loading Supply Train.....	\$500.00
Wages of Supply Train Storekeepers and Helpers.....	1,085.00
Personal expenses of Supply Train Storekeepers and Helpers and Store Department proportion of expense incident to performance of cook and living cars oper- ated in connection with Supply Trains.....	550.00
Charges from Transportation Department for wages of train and engine crews, round house expenses, and other incidental expenses; also fuel.....	4,700.00
Track laborers accompanying Supply Train.....	600.00
Total	\$7,435.00

STATEMENT SHOWING ESTIMATED COST OF HANDLING BY LOCAL FREIGHT MATERIAL NOT DELIVERED BY SUPPLY TRAIN

Estimated cost of overtime to local trains and engine crews if material was handled by local freight.....	\$3,280.00
Estimated cost of Local Freight Houses of handling, transferring and billing (on basis of 50 per cent of material passing through Freight Houses), at 57c. ton.....	1,681.00
Estimated loss account material damaged or lost in transit, etc. (using as a basis 3 per cent of material delivered)	420.00
Estimated cost of picking up scrap and cost of handling, sorting, etc., at Division Stores, before shipping to General Scrap Headquarters, also overtime to local Freight Train and Engine Crews.....	2,500.00
Approximate cost of packing, tagging, loading, way bill- ing, etc., at shipping stores.....	5,040.00
Stock on hand would have to be increased at all Division Stores approximately \$160,000, if each had to provide for their Division requirements. Interest on invest- ment at rate of 5 per cent per annum).....	800.00
Estimated value of additional track tools, hand, push and and velocipede cars, which would be required on Line if no regular exchange system was in effect, \$64,000. (Interest on investment at rate of 5 per cent per annum)	320.00
Estimated cost of motor car maintenance and operator for use of Watch Inspectors on monthly trip of watch inspection	255.00
Estimated cost of doing work by work train, such as distribution of ties, gravel, ice, sprinkling right-of-way with fuel oil, etc., which is now handled by Supply Train	1,125.00
Estimated cost of labor necessary to deliver material from Freight House to Section and Signal Tool Houses, B. & B. and Extra Gangs on Line, etc.....	3,600.00
Total	\$19,021.00

Appended hereto is recommended practice for the operation of Supply Trains.

15. A copy of this report has been sent to the Transportation Division of the American Railway Association, calling particular attention to the possibility of increasing car supply through the proposed methods of handling Company material.

16. In addition to the previous recommendations as to the operation of supply trains, it should be understood that on branches, or in territory where conditions do not warrant the operation of a train, the service should be modified and a regular supply car substituted—local supervision to determine frequency. Such car to be accompanied by proper stores officer.

17. It is recommended that the attached form, showing Service Performed by Supply Train, be made standard practice where supply train service is inaugurated.

18. It has been demonstrated that the supply train can be operated successfully in congested territory and is being effectively operated on an eight track railroad.

19. One of the important results of the supply train is the reduction of stocks on line: Rail (new and second-hand) and scrap; switch ties; track fittings; frogs; cattle guards; emergency stocks; charged out stocks; all unapplied material; scrap. Also results in better care of material; consolidation of all material; joints; tie plates, etc., on each section at tool houses for monthly inventory and check by supply train.

20. The supply train makes for good housekeeping on the property.

21. The Committee feels that figures should be produced showing comparison on various railroads between the cost of distributing supplies under the former system, with supply train.

but have not been successful in obtaining complete data on this feature.

22. The operation of the supply train is flexible, so that it can readily be adjusted to meet the requirements of a congested main line division, or a branch line with light traffic. As conditions change and demand for material falls off, the organization on a supply train can be reduced to one man, if necessary, and the disbursements reduced to such essential items as oil, switch and signal lamp supplies, etc. The saving in the distribution of oil alone by supply train as compared with the old method of distributing by local freight is worth the operation of a supply train regularly each month, and when business is light and purchases restricted there is even greater necessity of knowing what is disbursed along the road and gathering up surplus.

23. During the past year we have knowledge of three railroads that have installed supply trains, based on report of this Committee at our First Annual Meeting. The Committee has in its possession letters commenting on the efficiency and desirability of the service of the supply train for the information of any one desiring to review them.

Your Committee unanimously recommended the adoption of the following additional paragraphs to be added to our previous reports.

24. *Regular Schedule.*—To obtain the best results supply trains should be operated on a regular schedule each month or at other stated periods so that the men in the field will know positively when they will receive materials. During business depression when trains are curtailed and the men out on the line do not know when they are going to receive supplies, consequently they carry a considerable quantity in excess of requirements which leads to ex-

Exhibit B

STATEMENT SHOWING SERVICE PERFORMED BY SUPPLY TRAIN

	New Material Picked Up Account Work Discontinued or No Longer Needed	Tools, Equipment and Serviceable Material Picked Up and Brought In for Repairs.	Value of Scrap Material Recovered.	Total.
Year—1920.....	\$45,401.31	\$23,079.71	\$181,696.33	\$430,087.35
Year—1921.....	73,950.84	284,008.22	137,887.76	495,846.82
Year—1922—2 months'... Period, Jan. 1 to Feb. 28.	5,028.66	25,620.90	17,266.51	47,916.07

	Value of Material Delivered to Stores, Car Shops and Bank Houses	Value of Material Delivered to Others.	Total Value of Material Delivered by Supply Train.
Year—1920.....	\$321,713.72	\$1,255,173.08	\$1,577,056.80
Year—1921.....	484,933.62	1,388,405.31	1,873,338.93
Year—1922 2 months' period, Jan. 1 to Feb. 28.	45,966.75	226,838.19	272,804.94

travagant use of materials. This illustrates the necessity of regular operation of supply trains throughout the year and delivery of only the exact amount required for a stipulated period.

On railroads where a Supply Train is run in accordance with the plan outlined by the Committee, the use of such items as gasoline, lubricating oil for gasoline motor cars, spark plugs, axes and similar tools, coal for heating purposes, ice, electric light globes and stationary has been reduced so considerably as to cause lively interest of operating officials. It also often permits substitution of many items, thus avoiding the purchase of new materials.

25. *Elimination of Extra Switching and Overtime.*—Operating officials must soon give consideration to the delay to freight or peddler trains due to shipping materials by this method instead of by supply trains. When supplies are delivered by local freight, extra switching of cars is necessary for setting cars out at station. The delay incidental thereto means overtime to the train crews and must be taken into consideration in the cost of handling material by local freight service; overtime on locals means overtime for a crew of 6 men.

It is an everyday occurrence for a freight conductor to find shipments for points at the distant end of the line nearest the door, while those for the nearest stations are buried under masses of other materials that must be moved before delivery can be made.

The cost of a train crew waiting while this sorting process is going on is high. If a way-freight must lay at a station 45 minutes instead of ten minutes it is exceedingly expensive. This calls for systematic loading, but when company shipments are handled through two or three freight houses a condition like this will invariably follow.

Local train schedules are made primarily for commercial service, and in many instances, early morning, late afternoon, and night schedules are in effect. One purchasing agent, who formerly operated supply cars in local freight, stated to the committee that he knew of several stations and sections on the end of districts where agents and section foreman seldom ever saw the supply car, as invariably the local train handling the supply car was running all work so as to get in to a terminal and keep within the 16-hour limit. Material was thrown off by them on the run at night or carried in to the terminal and shipped back.

Cognizance must soon be taken of the waste and expenses not only of materials, but of other angles in the handling, shipping and delivering of material, which are sapping the finances of the railroads.

There is no reason why the supply train cannot eliminate all freight shipments except transfers between stores and emergency shipments. The entire demands of the Maintenance of Way Department can generally be taken care of by the supply train by 30-day delivery.

It is desired here to bring out the fact that the supply train, to get full economy, must get full utility—keep shipments off freight trains. This refers to switch ties, assembled jobs, tie plates, joints, bolts, spikes for rail laying jobs, frogs, switches and all the items incorporated in our previous report; work trains are thereby eliminated. This train must not be considered a supply outfit, consisting of an oil and tool car for light supplies. The committee has knowledge of one delivery by supply train of six cars of signal line poles, thus saving the expense of delivery by special work train.

26. Inspection.—The supply train facilitates inspections by officers who of necessity desire to keep in touch with matters on the line; such officers as Safety Agents, Claim Agents, Watch Inspectors, Water Service Foremen, Motor Car Repairmen, Scale Inspectors, Inspector Bureau of Explosives, Traveling Agents, Fire Inspectors, Sanitary Inspectors, Signal Engineers, Roadmasters, Trainmasters, Division Engineers, Assistant Superintendents and Superintendents.

27. Approval of Requisitions.—The supply train further abolishes the automatic approval of requisitions, which is a very important point, resulting in the heads of the various departments dictating to the individual what material is necessary to do his job, as compared with the old procedure of indiscriminately signing requisitions at headquarters for what the individual may assume he needs.

28. Investment in Unnecessary Stocks on Line.—Where supply trains do not operate, large mileage of the railroad is unsupervised from material sense, therefore unnecessary stocks are accumulated. It is suggested that comparison be made between the value of material carried in section houses, tool houses, roadmasters' headquarters, etc., on roads that do not operate supply train versus roads which do operate them. It will be found that value of such material on hand will be greater by far on the aforementioned roads.

29. Care of Article to be Repaired. The rough handling and frequent breakage and loss of articles handled by other methods than supply train is apparent—such items as markers, lanterns, tinware, etc. On supply train these articles are handled by experienced men, like articles are loaded together in specified cars and delivered to the actual shop where repaired, with a minimum of handling. It has been said with some truth that such material is more damaged by carelessness in handling than in actual use. When articles for repairs are shipped in pick-up cars they are often, if not always, destroyed by coming in contact with heavier material, lantern frames are broken, costly lenses in roadster and signal lamps destroyed.

Special appliances such as sleds, unloading mats and air crane are parts of the equipment of an up-to-date supply train, which insure delivery of material to the user in good condition.

30. Safety First.—The picking up of all dangerous tools at section tool houses and carefully inspecting all tools in use and carrying out of same, whether requested or not is a safety first measure which is made possible by the regular trip of supply train

Many a workman has lost an eye due to mashed head on a track chisel or maul. By lessening the number of handlings of material to get it to the point of use lessens the chances of hazard to the men, particularly in the handling of such heavy items as frogs, switches, switch ties, etc.

On some railroads safety meetings are held at terminals where supply trains tie up and safety supervisors and officers have an opportunity to meet the employees of that district. These meetings are bulletined in connection with supply train movements at terminals.

31. Picking Up of Scrap.—Another feature of unlooked for benefit and incentive in picking up scrap every 30 days was brought out recently where the railroad's maintenance expenditures are governed by monthly allowances. The roadmaster who turns in \$10,000.00 worth of scrap gets credit for that amount, and can therefore use it in labor or materials, whereas if this material laid on the line he would lose that much, which in fact amounts to additional appropriation for maintenance for that particular month.

32. Reducing of Correspondence.—Frequently material is shipped by local freight, baggage, etc., and considerable correspondence is necessary, particularly when material is delayed and it is necessary to trace the shipment by letter or telegram, or oftentimes wrong material is requisitioned or shipped. This is avoided when material is handled by a supply train.

33. Saving in Car Days.—The necessity of eliminating car days is vital, particularly in times of car shortage and when perishable and other commodities are to be moved within a short period of time. The supply train reduces the use of such equipment to the lowest possible minimum. The same applies on car days on scrap picked up by cars drifting from section to section when these are handled by local trains, because two car days are necessary in each section and the switching incidental thereto.

Car day saved in drifting cars of supplies, etc., when handled in Local Freight versus Supply Trains. The committee has actual knowledge of the following delays:

On one railroad it was found necessary to cancel the trip of the supply train over a certain division after the train was loaded. The material to be delivered was shipped by freight, which resulted in 19 extra car days on one carload alone. In another instance 23 days were lost on a single shipment made by local freight.

General

There are so many savings possible to the supply train and so many costs largely concealed in the movement of material by other methods, that this committee has not had time or opportunity as yet to develop all of these costs in such a way as to satisfactorily present them, but we have in mind the following—for instance, a railroad may accumulate on the line 15,000 tons of scrap per year; has it occurred to General Storekeepers, Purchasing Agents and executive officers that the reclaimable material lying out on the line, if at hand, repaired and reconditioned, would save the purchase of similar new material at double or possibly triple the cost? This undoubtedly amounts to a large sum when we consider that on a railroad now following reclamation methods, reclamation and salvage has been shown to be close to \$1,000,000 per year.

A question for this committee to consider is what percentage of the scrap material on the line is reclaimable; we must produce these figures to show concrete savings. The supply train covers the road every thirty days; under the old pick-up, catch-as-catch-can there must be double the amount of scrap and reclaimable material idle, which is not available or does not get the rapid turnover as with a supply train. Consequently it means greater deterioration and loss; in other words, the reclamation feature is retarded and in the meantime funds are expended for new material, when otherwise the money would be available for other uses.

In connection with the comparison of distributing material and supplies, by the old system of local freight, etc., vs. supply train, as recommended in paragraph 21 of Exhibit A, the Committee wishes to offer a suggestion for the benefit of roads not at present operating supply trains; in order to form comparison of cost between operating supply trains and delivering material by local freight, that each and every item entering into the cost of local freight delivery be enumerated, and cost compiled; for instance: cost of dravage of material to freight house; cost of handling; cost of billing; cost of unloading at destination; time expended in calling at freight station for material; cost of transporting scrap and old material back to headquarters, etc.

When local freight deliveries are made the investment in containers, drums, etc., for oils and other materials should be considered. *The supply train eliminates this investment.*

Attention is called to paragraph 17 in Exhibit A, recommending a form for service performed by supply train; as a matter of information we quote figures showing service performed by supply train on one railroad in accordance with that form—Exhibit B.

Recommended Practice For Operation Of Supply Trains

Accompanied by. The Supply Train should be accompanied by the Division Superintendents, Division Engineer, Signal or Assistant Signal Supervisor, Roadmasters, over their respective Districts, and Division Storekeeper.

The Division Officials use this train as a means of making regular inspection.

Requisitions. Requisitions for ordinary supply to be made up by the Roadmaster and others, and sent direct to the division Storekeeper for scrutiny as to proper description, etc., and they are then sent to the General Store from which Supply Trains operate.

It is not considered necessary to have Superintendent or Division Engineer's approval on these requisitions, inasmuch as they accompany the Supply Train, and the matter of what is to be furnished is investigated on the ground.

Requisitions for other Departments to be handled in a similar manner.

Any special requisitions, of course, should be properly approved.

Stocking of Trains. Supply Trains should be fully stocked to cover requirements, and carry some surplus to take care of such emergency requirements as have become necessary since the making of requisitions.

Filling of Requisitions on the Line. The night before starting each day's work, the Supply Train Storekeeper makes up unloading list by stations for the next day. This is made in triplicate, he retaining the original, one copy to his Helper, and the other copy to Division Storekeeper.

Between stations, Division Storekeeper checks over his copy of unloading list, determines the number and class of tools, etc., to be exchanged as well as the material which has been ordered.

On arrival at tool house, he immediately checks the amount of stock on hand, in most cases with the Roadmaster and quite frequently with the Division Superintendent and Division Engineer, and it is then determined whether or not the quantity ordered is over and above what is actually needed for 30-day period, or if the amount ordered should be increased. In either case the material decided upon is delivered and requisition is changed accordingly.

Exchange of Tools, etc. The exchange of tools and other exchangeable material to be watched very closely.

Track tools, in fact everything that can be exchanged, should be exchanged.

This system no doubt saves the railroad considerable money, as it eliminates abuses, also losses through theft, etc.

Oil Requirements. Schedules should be prepared whereby Division Storekeepers and Supply Train Storekeepers are in position to know just the quantity of illuminating and lubricating oils that will be required at the various points and by various departments, and no more than the schedule calls for to be delivered.

Picking Up of Scrap. All of the M. of W. Scrap accumulation to be collected and held at Section Headquarters for the Supply Train. The Signal, B. & B. Dept., Pumping Plant, Station Agencies, and others to handle scrap, obsolete, surplus and second-hand material in a similar manner.

Tools for Repairs. Tools for repairs are picked up by Supply Trains and brought into the Central Points, where all tools for the System are repaired.

The report is signed by: A. S. McKelligon, (Chairman), Southern Pacific Co., R. J. Elliot, Northern Pacific Ry.; J. E. Mahaney, Chesapeake & Ohio; J. P. Murphy, New York Central; J. L. Irish, Oregon-Washington R. R. & Navigation Co.; R. R. Jackson, Baltimore & Ohio; Wm. Shaw, Atchison, Topeka & Santa Fe; I. G. Morrison, Chicago, Burlington & Quincy; D. C. Curtis, (Chairman Ex Officio), Chicago, Milwaukee & St. Paul.

Moving pictures were shown in connection with this report there being no discussion.

Unit Piling of Materials and Numerical Numbering System

The action of this committee in making two distinct divisions of the subject under consideration will do much to prevent misunderstanding of just what is meant by Unit Piling of Materials and by a Numerical Numbering System. As clearly pointed out in the report, the first of these

factors is vital in the control of stores department stocks so as to maintain a minimum investment in all classes of material. The numerical numbering system greatly aids in grouping, readily locating, and accurately accounting for individual items.

FROM the large number of replies received in response to questionnaire, it is evident that the title of the subject is misunderstood, and it was therefore decided by the Committee to consider the same in two sections:

Section 1. Unit piling of materials, dealing strictly with a system of uniform piling, and storing of materials, including the application of markers, showing the individual or accumulative count in each tray, bin or pile.

Section 2. Numerical numbering system, dealing with the subject of a standard designation or numerical symbol for each item carried in stock.

Section 1—Unit Piling of Materials

The paramount idea in railroad storekeeping today should be the control of stocks and a minimum investment in all classes of material. To carry this idea to a successful conclusion, a standard practice of storing and caring for material and supplies must be adopted.

Control of stocks is based on accurate stock book records, governed entirely by proper count and correct averages of monthly consumption. To obtain an absolute inventory of each and

every item in stock, material must be piled to afford a ready count and also to bring about creditable decreases in cost of operation.

The committee therefore recommends the adoption of trays for the storing of material handled in shelving, which system permits the items to be piled in a neat, orderly and economical manner, provides a perpetual inventory and allows a ready inspection of such materials at all times. The trays to be equipped with numerical markers, showing the total number of items in a tray and the accumulative amounts in each tier of trays, these markers to be placed on all but the top or working tray.

It is further recommended that unit piling be followed out with every class of material. Lumber, castings, bars, sheets, pipe, flues, angle bars, tie plates, rail, etc., can be cared for in units, following as nearly as consistent tiers based on multiples of ten, placing between each tier a metal indicator showing the same accumulative count as used on trays in shelving.

The trays and markers can be made up entirely from scrap metal car roofing. The sheets are trimmed to size as needed, and layed out an inch or more longer and wider than the size required, to allow sufficient turn-up on all four sides.

The cost is negligible when compared with the labor previously used each month in removing and returning material to shelves, etc., in order to obtain a correct check and the expense of installation is many times offset by its advantages.

Conservation of storage space thereby reducing investment in additional racks and build ngs.

The only system whereby material can be accurately and quickly inventoried for requisitioning purposes.

It induces better care of material and will unquestionably bring about better control and is no small factor in prevention of damage and deterioration.

It saves time to those delivering material on account of being readily available, and obviates the necessity of digging out the items as is often the case with material improperly arranged.

It eliminates unnecessary rehandling, and the cost of unit piling is not as great as the promiscuous handling or piling of material in some other manner.

Finally, for the psychological effect material well-cared for has upon store employees and users.

Section 2—Numerical Numbering System

The committee wishes to submit for study and consideration the numerical numbering system of marking materials. The basis to be a standard designation or symbol number for each item carried in stock.

Nearly all railroads arrange material under different groups, and each group carries a designating number.

However, there are thousands of items under each group that could be identified in some manner to avoid confusion. Section storekeepers handling one line of material become specialists, but they can not be expected to personally supervise the loading, unloading and storing of each item as it is received or forwarded, and it is for this purpose that the numbering system is offered for thought.

Two numbers are shown, the first represents the section or group, and the second, the item or symbol number. Articles large enough to carry a number have the same stencilled on each

piece, small articles not large enough to carry a number are placed on shelving under labels showing description and symbol number. Price books and stock books show these numbers, and the same information is shown on all shop tickets, department invoices; and, in fact, on all documents handled through the store department pertaining to material issues and accounting.

The advantages to be derived are:

1. The prefix number enables the store forces to know under what group or section the material is carried.

2. The item or symbol number locates the record of the material and its proper place for storage.

3. The item or symbol number can be shown on shipping tickets so that helpers and truckers, who may not be familiar with the material, can select the correct material for filling a shipment and avoid delay.

4. The item or symbol number can be shown on shop tickets and when they are received in the office, the price clerk can readily locate the correct price shown by number, in price book.

While recognizing many good features in connection with this method, your committee does not feel justified in recommending it for adoption as a standard practice. We do feel, however, that it has sufficient merit to be worthy of further serious detail study, and it would be our recommendation, therefore, that the subject of numerical numbering system be referred to committee next year for further consideration.

The report is signed by J. L. Sullivan (chairman), Union Pacific, Omaha, Neb.; E. H. Landers, Cleveland, Cincinnati, Chicago and St. Louis, Beech Grove, Ind.; T. J. Hegeman, Chicago, Burlington and Quincy, Chicago; A. A. Taylor, Missouri Pacific, Little Rock, Ark.; F. E. Cragin, Los Angeles and Salt Lake, Los Angeles, Cal.; C. H. Thompson, Southern Pacific Co., Los Angeles, Cal.; V. N. Dawson, Baltimore & Ohio, Chicago Terminal, Chicago, and J. P. Murphy (chairman ex-officio), New York Central (West), Collinwood, Ohio.

This report was presented with lantern slides illustrating the different phases of the report.

Purchasing Agents' Office Records

The great number of transactions involved in buying the thousands of items which railroads use make it necessary to provide records which are as simple as possible and at the same time complete. Evidently it is sometimes difficult to harmonize these requirements, and the committee performs an important service in preparing forms for office records which represent the best practice based on the extensive experience of the members.

The work of the committee is complicated by the differences in methods used on various roads.

In view of these differences, the recommended forms are not always applicable, but they are valuable as a basis from which each road can develop records to suit its individual requirements.

One important form in which standardization is very desirable is the invoice furnished when supplies are shipped. Such a form has been prepared by this committee working with other organizations interested, both on the railroads and the manufacturers, and is submitted with the report.

ADDITIONAL by the title, the committee on Subject 12, Purchasing Agents' Office Records, is supposed to recommend forms in which data in purchasing agents' offices is to be prepared or assembled and consequently it is necessary, in some cases, to show wording or instructions. As it would be difficult to recommend wording that would be applicable to all railroad purchasing agent offices—because of different systems and methods of usage—all should understand that the wording as shown on these recommended forms is a suggestion to be used as a basis only.

It is the unanimous recommendation of this committee that the forms, copies of which are shown, be considered standard, in addition to the forms already recommended:

(The forms are numbered to indicate the number of the subject, viz.: American Railway Association, Division VI—Purchases and Stores, Subject No. 12, Form No. 1, etc.)

Form No. 12-10-1—Request for Bids on Scrap;

Form No. 12-10-3—Award for Scrap;

Form No. 12-4-a, 4-b and 4-c—Scrap Sale Order.

Description of Forms

Form No. 12-10-1—Request for Bids on Scrap: Size 8-in. by 10½-in. The terms of sale to be the same as recommended by the Committee on Subject 10, Scrap Classification, Handling and Sales.

Form No. 12-10-3—Award for Scrap: Size 8-in. by 10½-in. The terms of sale to be same as recommended by the Committee on Subject 10, Scrap Classification—Handling and Sales.

Form No. 12-4-a, 4-b and 4-c—Scrap Sale Order: Size 8-in. by 10½-in. It is recommended that the triplicate copy be retained

A. R. A. Y. P. S. 12-10-3

JOHN ODE
Purchasing Agent
SAMUEL SMITH
JOHN JONES
Asst. Purchasing Agents

NORTH AND SOUTH RAILROAD

OFFICE OF PURCHASING AGENT

_____ 19____

Gentlemen:

We award you the approximate tonnage of scrap material, at prices quoted by you on our list dated _____, as shown below:

TERMS AND CONDITIONS
(As recommended by Committee on Subject 10, Scrap Classification—Handling and Sales.)

CLASSIFICATION NO.	MATERIAL	TONNAGE	PRICE NET TON	DELIVERY POINT
	(See recommended 5" x 10 1/2")			

Please furnish shipping instructions by return mail.

Signed) _____
Purchasing Agent.

Form 12-10-3—Award for Scrap

in the purchasing agent's office, instead of the duplicate, although this may be handled by various railroads to suit their conditions.

It is also recommended that on railroads where the purchasing agent's office requires the information in column showing gross, tare and net weight, the copy retained by the purchasing agent's office be changed to suit the requirements.

Suggestions on Forms Previously Recommended

Form 12-7 and 7-a—Record of Purchases: (Adopted June, 1920.) Consideration was given to this form by the committee, and it was found that some roads were using a card form instead of the sheet, and it is recommended that it be left optional, with the railroads to use either a card or sheet form. It is also suggested that the sheets be numbered according to commodity, when additional sheets are necessary for the same commodity. Also that sheets be printed on both sides, if necessary. Size recommended 14-in. by 17-in.

General

The committee considered the advisability of recommending a requisition form, using as a basis the form adopted by Division VI, appearing in the Book of Rules for Railroad Stores Department Operation. Several representative general storekeepers were consulted, and the following result of the committee's investigations is given for information:

"1. The principal objection of the general storekeepers is to showing the quantity on hand, due and used monthly, claiming that this responsibility is theirs and that they are so closely in touch with the material requirements that they only should be held responsible.

"2. That if such information is shown it would likely be checked by some clerk in the purchasing agent's office who would have no knowledge of the use of material and might make changes in the quantities to be ordered that would result in serious delays to important work.

"3. That the information shown on the second sheet, or the storekeeper's sheet, is not sufficient and that additional records would have to be maintained, causing duplication of work.

"4. That the requisition form adopted by the American Railway Association, which is explained in the Book of Rules, known as Form No. 26, and the carbon copy, No. 26-A—retained by the storekeeper—carries a complete invoice record as desired by most roads.

"5. That instead of the committee adopting a new requisition form, its efforts should be confined to amending the present form, provided it is found revision is necessary."

Having given the matter considerable time and consideration, the committee recommends that the form adopted by the association be followed, because it is realized that this form carries all the information any railroad would desire, and that it is elastic as to its use; railroads not desiring all information could eliminate any portion not required.

The great trouble in arriving at a definite standard is because we have not all arrived at a uniform standard of storekeeping, and until the majority of railroads have reached this stage, it will be difficult to recommend a form that will be used extensively; the railroads are going to use a form that will meet their method of operations, regardless of the form the association might approve, and after going over Forms 26 and 26-A very carefully, keeping in mind the conditions as stated above, it is believed that nothing will be gained by recommending changes at this time.

For information, the reference relating to data on the requisition form, as shown in Part 2, Section 4 (h), American Railway Association Standard Book of Rules for Railroad Stores Department Operation, follows:

"(h) 'Data 1 to 5'

"1. On hand.—This to be filled in by taking actual inventory of the item at the time the inventory is taken. Broken packages

A. R. A. Y. P. S. 12-10-1

JOHN ODE,
Purchasing Agent
SAMUEL SMITH
JOHN JONES
Asst. Purchasing Agents

NORTH AND SOUTH RAILROAD

OFFICE OF PURCHASING AGENT

_____ 19____

Gentlemen.

TERMS OF SALE

(As recommended by Committee on Subject 10.)
Scrap Classification—Handling and Sales.

JOHN ODE,
Purchasing Agent

CLASSIFICATION OF SCRAP IRON AND STEEL
QUOTE PRICE PER NET TON

CLASSIFICATION NO.	DESCRIPTION	APPROXIMATE QUANTITY FOR SALE	APPROXIMATE QUANTITY DESIRED	PRICE	DELIVERY POINT OVER TRACKS
	(Classification as recommended by Purchases and Stores Division.)				
	(See recommended 8" x 10 1/2")				

(Back of Form 12-10-1)

CLASSIFICATION NO.	DESCRIPTION	APPROXIMATE QUANTITY FOR SALE	APPROXIMATE QUANTITY DESIRED	PRICE	DELIVERY POINT OVER TRACKS

The undersigned agree to pay prices named for each scrap material as may be awarded, subject to terms and conditions stated on reverse side of this form.

Date of bid _____
(Signature)

(Address)

Form 12-10-1—Request for Bids on Scrap

or small amounts of loose material may be estimated and such other material estimated as instructed by the general storekeeper.

"2. Quantity Due.—This is the sum of all unfilled requisitions and of the balances due on partially filled requisitions.

"3. Holding Requisitions for.—Will include all unfilled items on all requisitions for issue or transfer to other stores.

"4. Used Last.....Days.—(The number of days desired as a working basis can be filled in to suit the conditions the store

to work under.) This will be obtained from stock book by adding to the quantity ON HAND and DUE for the month... days before the date of the inventory the sum of all orders on the purchasing agent, other stores, mechanical or other departments, and from the total deduct the amount on hand and due at date; the result to be entered in space provided.

"5. Surplus.—On this line is to be shown the amount of material on hand which is in excess of the amount ordinarily carried for stock or any material which is in excess of the number of days supply instructed to be kept on hand by the general storekeeper."

Also Part 3, Section 2 (i), follows:

"(i) Data.—Such data as desired by the purchasing agent, such as 1 to 4, part 2, section 4 (h), may be shown. If it is desired to show estimated cost, this column may be divided and space provided for the estimated cost. In case it is desired to show date wanted, if this column is not used for other purposes, this information may be shown here. In case this column is used for other

06121 would be a requisition prepared in the month of June, account 12, first requisition. The second requisition for that account would be 06122. Ciphers are used where there are less than two numerals, for example, for the month of June, in account 6, the number would be 06061, and the second requisition would be 06062, etc. The first two numerals (or digits) indicate the month, the second two the account or classification, and after that the number of the requisition as prepared.

In addition to this, some of the railroads use letters, as symbols before the requisition number to indicate the store or requisitioning point. This system has been found to work very satisfactorily with purchasing agents' offices that file their orders by accounts rather than numerically or alphabetically; also where the requisitions are filed by accounts rather than numerically or by requisitioning points. Some of the railroads have even gone so far as to use the same number for their purchasing agent's order number.

Form 12-5 Invoice Form

As instructed at the 1921 business meeting, the committee has considered a standard invoice form, to be furnished by the sellers, in conjunction with the Railway Accounting Officers' Association and the National Association of Purchasing Agents. Representatives from these associations attended one of the committee's meetings and the form was thoroughly discussed, and it was de-

TRIPPLICATE A. R. A. V. P. S. 12-10 4c

JOHN DOE
Purchasing Agent
SAMUEL SMITH
JOHN JONES
Asst. Purchasing Agents

NORTH AND SOUTH RAILROAD
OFFICE OF PURCHASING AGENT

.....19....

Sale Order No.

The following material has been sold to

Date of Shipment	Car Number and Initial	Gross Weight	Tare Weight	Net Weight	Date of Shipment	Car Number and Initial	Gross Weight	Tare Weight	Net Weight

QUANTITY	MATERIAL	PRICE	F. O. B. POINT

Ship from _____
 Consign to _____
 Route via _____

JOHN DOE,
Purchasing Agent.

Date of Shipment	Car Number and Initial	Gross Weight	Tare Weight	Net Weight	Date of Shipment	Car Number and Initial	Gross Weight	Tare Weight	Net Weight

TRIPPLICATE to be placed in the hands of the party loading the material.

Form 12-10-4c—Scrap Sale Order

purposes, this information may be shown in the 'Description of Material' column. Where purchasing department requires requisition reference on which material is due, additional space may be left in data No. 2."

Numbering of Requisitions

While the committee understands thoroughly that they are supposed to confine their work to purchasing agents' office records, they did not think it out of order to call attention to the method of numbering requisitions used on some of the railroads whereby the classification or account number is shown so that when an inquiry is made of a purchasing agent's office for information in connection with a certain requisition, the classification or account being included by the number facilitates the location of papers, etc., in connection with same. As an illustration, requisition No.

DUPLICATE A. R. A. V. P. S. 12-10 4b

JOHN DOE
Purchasing Agent
SAMUEL SMITH
JOHN JONES
Asst. Purchasing Agents

NORTH AND SOUTH RAILROAD
OFFICE OF PURCHASING AGENT

.....19....

Sale Order No.

The following material has been sold to

BILL		Date B-L	Net Weight	Car Number and Initial	Amount	Date Received	Date Forwarded
Date	No						

QUANTITY	MATERIAL	PRICE	F. O. B. POINT

Ship from _____
 Consign to _____
 Route via _____

JOHN DOE,
Purchasing Agent.

BILL		Date B-L	Net Weight	Car Number and Initial	Amount	Date Received	Date Forwarded
Date	No						

Form 12-10-4b—Scrap Sale Order

ecided that a joint conference should be held with a number of representative dealers, the Cost Accountants' Association, the National Association of Purchasing Agents, Railway Accounting Officers' Association, National Lumber Manufacturers' Association, Window Envelope Manufacturers and others interested, in order to obtain a broad view of this important form and to arrive at a standard suitable for use by all concerned, and one which the railroads could adopt.

The chairman and assistant secretary attended this conference and a copy of the proposed form, marked "Seventh Tentative

Conventionalities

Harry W. Finnell comes to the conventions this year with a new title—that of general sales manager of the Kilbourne & Jacobs Manufacturing Company.

Jim Anthony, of the American Arch Company, had considerable difficulty navigating the pier on Tuesday, owing to the low visibility caused by the "fog."

F. L. Norton and R. C. Ferguson, New York; George L. Davis, St. Louis; E. S. Wortham, Chicago, and W. L. Jeffries, Jr., Richmond, compose the Scullin Steel Company delegates to the conventions this year.

Andrew C. Loudon, of The Superheater Company, is here from Montreal and attended the dance last evening in his own clothes. Fortunately Harry Oatley, his present room-mate, is considerably larger than Andrew.

The rain yesterday made the duties of H. E. Daniels, chairman, and the other members of the Transportation Committee heavy, but they saw that all convention visitors were just as well taken care of as circumstances permitted.

Speaking of coincidences, J. A. Droege, general superintendent of the New York division of the New York, New Haven & Hartford, drew badge No. 567 this year and in 1920. This is attested to by H. V. McKedy, who issued the badges.

The young ladies at the convention are having difficulty identifying A. W. Clokey, of the American Arch Company, on account of the presence of his double here this year. If they will pick the better dressed of the two they will be safe.

John Draney, crack engineer of the Lackawanna, is here for the M. M. program of the Mechanical Division. He has just been re-elected president of the Veterans' Association of the Lackawanna. Incidentally he will celebrate his 37th wedding anniversary while here.

T. H. Beacom, vice-president of the Rock Island, and Mrs. Beacom, joined the Rock Island crowd and spent the week-end at the conventions. Mr. Beacom reports crops and other business prospects in Rock Island territory excellent, and is getting ready for a busy fall and winter.

C. W. Galloway, vice-president of the Baltimore & Ohio, accompanied by Mrs. Galloway, spent the week-end in Atlantic City visiting with friends and looking over the exhibit. Mr. Galloway is enthusiastic over the large amount of business the Baltimore & Ohio is handling in spite of the coal strike.

H. C. Pearce, who came to the conventions in Atlantic City two years ago as general purchasing agent of the Seaboard Air Line, comes this year as director of purchases and stores of the Chesapeake & Ohio. Mr. Pearce is accompanied by Mrs. Pearce and their daughters, Misses Katherine and Marie.

S. B. Cooper, general engineer in charge of project work for the Westinghouse Electric & Manufacturing Company arrived last Monday. He has been with the Westinghouse Company since 1910 and has taken an active part in most of the railroad electrification projects handled by his company since that time.

James B. Regan, president of the Regan Safety Devices Company, came down from New York the latter part of the week for a visit at the convention and exhibit. J. Beaumont, vice-president and sales manager of the company, has been dividing his time between the conventions in Atlantic City and the Signal Division Convention at Spring Lake.

A great booster for 100 per cent. locomotive efficiency is H. F. Grewe, master mechanic of the Akron, Canton & Youngstown. Mr. Grewe is always on the lookout for anything new which will increase efficiency and recently placed an order with the Baldwin Locomotive Works for two Consolidation locomotives, fully equipped with all modern devices.

E. G. Gross, formerly master mechanic of the Central of Georgia, is looking over the exhibits this year in his new capacity as master mechanic and master car builder of the Western Railway of Alabama, Montgomery, Ala. Mr. Gross is president of the Southern & Southwestern Railroad Club, which has grown wonderfully under his skilful guidance.

F. I. Sivyer, formerly president of the Joliet Railway Supply Company, has arrived for a few days at the conventions. While he has retired from its presidency, Mr. Sivyer, in addition to extensive business interests of other kinds, still has a large interest in the Joliet Company. He is president of the Northwestern Malleable Company, and of the Sivyer Steel Castings Company.

The spirit of the "Times" is reflected in the act of Joseph Robinson, of Robinson Connector fame, in having caused a New York daily newspaper of that name to be laid at the hotel room doors of a considerable number of railway and railway supply men each morning during the convention. One of the splendid qualities that commend Mr. Robinson to his fellow man is his thoughtfulness for others.

E. E. Nash, who has resigned as vice-president and general manager of the Minneapolis & St. Louis to become western sales manager of the American Locomotive Company, with an office in Chicago, has arrived to attend the convention. Mr. Nash was in the railroad business for thirty-six years. He was on the Chicago & North Western until 1920, when he went to the Minneapolis & St. Louis.

J. D. Purcell, vice-president of the Dearborn Chemical Company, and president of the Boss Nut Company, has just returned from a visit of some weeks to England. While in London he held a meeting of all the representatives of the Dearborn Company in the various English colonies throughout the world. He arrived in New York late last week and came direct to the convention.

George L. Bourne, America's long distance commuter to England and the Continent, did manage to be on this side of the pond for the conventions. His travels have not been in vain, as may be observed from that little red contraption in the Superheater Company's booth—the exhaust injector. This device is in extensive use in foreign countries and the Superheater Company is introducing it to the American railways.

M. J. Powers, who has been superintendent of motive power of the Colorado Midland for the past four years, is attending the conventions this year. Mr. Powers is in the unique position of having found himself out of a job because of the fact that the railway has suspended operation. Before he went with the Colorado Midland Mr.

Powers was master mechanic of the Denver & Rio Grande at Denver for a period of 10 years.

When F. H. Clark and Robert F. Carr were becoming life-long friends as students together at the University of Illinois over thirty years ago, the "Carr Cup" had not been thought of. A few years ago Robert donated the cup to the McBarma Golf Club to go to the member making the best net score of the afternoon play, and last Saturday afternoon Frank won it. When Mr. Clark looks at it on the mantel at home it will revive many pleasant memories.

Rhys Morgan, who sang during the entertainment on Friday evening, is a pupil of Madame Del Vallera of New York and is one of the coming American tenors. He is well known to a number of Chicago railway supplymen and their friends. He was formerly a tenor soloist at the Central Church in Chicago, but is now studying exclusively for the grand opera. His production was very much appreciated and the convention was fortunate in this choice.

F. W. Edmunds, known to his friends as "Buckie" Edmunds, arrived with his wife Saturday from Spring Lake, where they attended the Railway Signal Association convention. Mr. Edmunds is secretary of the Signal Appliance Association and is attending the A. R. A. convention this year as a representative of the Sunbeam Electric Manufacturing Company. This is the 39th annual meeting which Mr. Edmunds has attended, and judging from his "pep" he is good for many more.

L. B. Sherman, usually one of the "old reliables" of *The Daily* staff, and Mrs. Sherman were unable to stay throughout the conventions. They went to Hanover, N. H., to attend the commencement exercises at Dartmouth College, from which their son, Booth, graduates this week. "Lu" is a convention veteran in more ways than one. He has been attending thirty years, and was secretary of the Railway Supply Manufacturers' Association in 1906, when the conventions were first held in Atlantic City.

Jack Schurch, of Manning, Maxwell & Moore, brings to the conventions this year an interesting story of a crane installation on Mr. Ford's railway, the Detroit, Toledo & Ironton. At the road's shops in Detroit it was desired to turn the locomotives in the shop, and due to the lack of space the crane department of Manning, Maxwell & Moore devised a rotating crane. It is of the traveling type with the trolley so arranged that it can be turned 90 degrees while under load, the capacity of the crane being 150 tons.

W. L. Robinson, president of the International Railway Fuel Association and superintendent of fuel and locomotive performance of the Baltimore & Ohio, arrived at the conventions Saturday evening with Mrs. Robinson and their eight-year old son, W. L. Robinson, Jr. Mr. Robinson in speaking of the coal situation, stated that the Baltimore & Ohio had not, up to the present time, confiscated a single carload of coal. Their storage piles are just about depleted and the Baltimore & Ohio is purchasing coal where it can obtain it, although it is of an inferior quality.

F. L. Wynne, manager railway equipment engineering department of the Westinghouse Electric & Manufacturing Company, well known to railroaders because of the active part he has taken in the electrification of the Chicago, Milwaukee & St. Paul, the Norfolk and Western,

the Pennsylvania and the Chilean State Railways, arrived Sunday to remain until the end of the convention. Mr. Wynne is a graduate of Bethany College and Ohio State University and since 1902 has been continuously connected with the electrification work done by the Westinghouse Company.

As a rule the heads of the mechanical department of all the important railroads are familiar figures at the conventions. One of the exceptions is F. H. Hardin, chief engineer of motive power of the New York Central, who had hardly been heard on the floor until yesterday, when he presented the reports of two of the sub-committees on locomotive construction. Mr. Hardin's railroad experience has been gained entirely on the New York Central Lines, his first position being that of machinist. He recently took an important part in the hearings on repair contracts before the Interstate Commerce Commission.

Le Grand Parish has one big hobby at the convention this year—the new Michigan Central locomotive 8000 which was delivered to that road by the Lima Locomotive Works about three weeks ago. This engine is one of the greatest advances in locomotive design and construction that has taken place for many years. It is equipped with all of the tried efficiency devices; all of the auxiliaries operate on superheated steam and there are many other features entirely new to American locomotive practice. Mr. Parish has several photographs showing all manner of views of the engine and he has been kept fully occupied showing them to his many curious friends.

We all miss the genial smile and glad hand of Scott H. Blewett, of the American Car & Foundry Company, king of the "old timers." Those of us whose memories go back to the conventions of 25 years or more ago recall the splendid work he did in helping to form the present Railway Supply Manufacturer's Association, of which he was the fourth president, and in helping to guide it for several years thereafter. As a matter of fact, up to and including the last convention his counsel was sought much as the young man goes to his daddy for advice at critical stages of his career. Fortunately, however, Mr. Blewett is not ill; but he recently suffered a severe loss through the death of his brother Ben and did not feel equal to making the trip from St. Louis to Atlantic City. With the thoughtfulness that is so characteristic of the man, Mr. Blewett sends his greetings to all those here with whom he is acquainted, and expresses the wish and hope that there may be an old time reunion a year hence.

W. H. Fetner, superintendent motive power of the Central of Georgia, reports some extraordinary savings in fuel consumption on his road. During the month of May, last, all divisions made a saving of 43.9 per cent. in freight service, based on the pounds of coal per 1,000 gross ton-miles; 5.7 per cent. in passenger service, based on pounds of coal per passenger train-mile; and 30.8 per cent. in switching service, based on pounds of coal per switching locomotive-mile, as compared with the same month in 1920, making a general average saving in all classes of service of 22.4 per cent., which in money meant \$32,678 to that road. The firemen on the switching engines keep a record of the number of scoops used per hour and they are anxious to improve their service. Local firemen's fuel saving committees hold meetings at every roundhouse terminal to discuss ways and means of saving coal. Frequently the brakemen are invited to these meetings, and discuss methods by which they too may assist in promoting fuel economy. It is by such co-operation that real fuel economy can be obtained.

Second Session of the Air Brake Association

Illustrated Papers on Auxiliary Devices and U-C Brake Were Presented

THE SECOND SESSION of the Air Brake Association was convened at Haddon Hall on Tuesday, June 20, 1922, at 10.00 a.m., with a large attendance. After the opening notices and usual routine business had been attended to, F. W. Brazier, assistant to the general superintendent of rolling stock, New York Central, made a brief address. Mr. Brazier has for years taken a keen interest in the Air Brake Association and has rendered considerable assistance in carrying on its committee work and investigations.

Remarks by F. M. Brazier

Mr. Brazier called attention to the fact that he had come up through the ranks to the highest position in the car department of the New York Central. This he attributed to always doing more work than he was actually paid for and not devoting his main attention to seeking for a promotion.

Attention was directed to the valuable educational work of the Air Brake Association, work that can be carried out in no other way. In this respect the association differs from the M. C. B. Association, whose work has been largely of a legislative character. Unfortunately many railroads do not yet maintain their air brakes in the effective condition that they should, which indicates the need of a continuance of the good work which the association has always carried on. By greater co-operation and support of higher officers, far more might be accomplished to the great advantage of all railroads. The interest and sacrifice which many members of the association show by attending the annual meetings on their own time and at their own expense is something that they would not be called upon to do, if the importance of these meetings was better understood and the great savings which could be secured by putting into effect the practices brought out in the association meetings, were realized.

Air-Operated Auxiliary Devices

The first subject taken up was the committee report on auxiliary devices, presented to the executive committee in 1921. The report, in the absence of C. H. Weaver (New York Central), chairman, was read by C. B. Miles (Big Four), following which R. E. Miller (Westinghouse Air Brake Company), showed and explained lantern slides of the various diagrams and charts used in the report.

This committee, which was appointed subsequent to the meeting of the association in Cleveland, May, 1918, presented preliminary reports in 1919 and 1920 and a complete report to the executive committee in 1921. An abstract of this report was given in the *Railway Mechanical Engineer*, August, 1921, page 484.

The object of the work done by the committee was to obtain information concerning the air consumption of various locomotive auxiliary devices other than those belonging to the air brake, such as air-operated fire doors, bell ringers, cylinder cocks, reverse gears, sanders, water cocks, coal pushers, etc.; to establish and follow up a code of tests for such devices; to devise a convenient system for recording and reporting a maintenance program from the standpoint of cost and benefits received; and to obtain data as to costs and factors involved in such a maintenance program. In the work

carried on; auxiliary devices for both steam and electric locomotives were given consideration.

Several forms for test reports were presented and instructions given relative to their use. Information was given in regard to the number of various auxiliary devices in service, the average number of times each are used per day, the length of time in service, the quantity of air consumed and the money value of this air. The value of the savings which might be effected by reducing the air consumption to the limits established by the code was calculated, and the possibilities were shown to be vastly greater than commonly realized. A convenient method for applying condemning limits to tests of auxiliary devices was described, together with a test code. The report closed with conclusions and recommendations which were clearly stated.

The maintenance programs which were reported according to the plan show results that would be hard to credit if it were not possible to check up the records by comparison. The tremendous margin for economy is more evident than it has been in any of the data submitted previously by this committee. The yearly saving of more than \$45,000 for a railroad system that uses less than 1,000 locomotives is remarkable. Of course, this value is based on cost of testing and repairing all auxiliary devices at least once a year. It might be possible that the average need of repairs would prove to be more than once a year for each device. In such event, the savings figures would be reduced by the increased cost of repairs, but this reduction would not seriously affect the margin of saving. The figures show that the frequency of repairs could be increased to four times a year or once every three months for each device and still permit a saving of more than \$36,000. It should be borne in mind that this saving does not take into account the large benefits derived in the way of more reliable and efficient auxiliary device operation. Locomotive failures and expensive delays are frequently chargeable to auxiliary devices when the latter are poorly maintained.

Standing tests show that the average condition of auxiliary devices on steam locomotives is far below the standard that should and can be maintained. Figures obtained from tests made last year are not much different from those presented in previous reports and they confirm all the original conclusions.

The electric locomotive auxiliary device tests indicate that many of these devices use much more air than should be required for the functions they perform. The consistently low minimum values of the air consumption rate found on most types of devices show that their condition is about on a par with that of auxiliary devices on steam locomotives. It will be noted that very high rates of air consumption were observed for some of the devices; in fact, the larger of these values is much in excess of anything experienced in tests made on steam locomotives. The average rate for alarm whistles is more than 500 cu. ft. per minute, and the maximum on one whistle was as high as 1,180 cu. ft. per minute, or about 25 times the nominal capacity of the C-60 compressor commonly used on electric locomotives. This rate is equivalent to an orifice $\frac{3}{4}$ in. in diameter and no doubt this whistle is like the one made famous by Mark Twain.

The report, which is one of the most valuable ever presented before the association, was signed by C. H. Weaver (New York Central); C. B. Miles (Big Four); W. W. White (Michigan Central) and R. E. Miller (Westinghouse Air Brake Company).

Address by Frank McManamy

The convention was addressed by Frank McManamy, manager department of equipment, United States Railroad Administration. Mr. McManamy spoke of the especial interest which he had always taken in the affairs of the Air Brake Association, referring particularly to the relations which had existed during the period of federal control. He dwelt on the importance of the air brake to railroads, the one device of which every one having to do with railroad operation must have a reasonable working knowledge. This fact, he stated, placed the air brake on a par with the standard operating rules. It was his opinion that the Air Brake Association should be held responsible for the standard rules governing the maintenance and operation of air brakes.

The opinion was expressed that the air brake man was not aggressive enough in the matter of bringing his needs to the attention of operating officials. He reminded the men present of the fact that although chronic kicking was not the best thing either for a man or for an organization, it was the "squeaking wheel that got the grease."

The air brake man must have the faculty of successfully dealing with men, not only men who are under him, but with men who are above him in rank.

U-C Brake

An interesting illustrated, descriptive talk on the U-C brake was presented by J. C. McCune on behalf of the Manhattan Air Brake Club. In addition to the use of lantern slides, moving picture films showing the operation of the U-12 universal valve were also displayed. The talk took up the steps which led to the development and design of the U-C valve, not only the steps immediately following the Lake Shore tests in 1919, but also the earlier progress in air brake evolution. The operation of the valve was well covered, as would not have been possible without the use of lantern slides.

Following this a number of slides and moving pictures were thrown on the screen by P. O. Warren, of the Picture Service Corporation, Chicago. The pictures shown were of gasoline engines, carburetors, refrigerating machines, etc. They were first prepared and used effectively during the war in educating men undertaking new lines of work. Since then they have been found useful by a number of manufacturing concerns in the training of apprentices and workmen.

Air Brake Appliance Association

The following members of the Air Brake Appliance Association have exhibits at Hadlon Hall. This is in addition to space on the pier occupied by them and by various other firms manufacturing air brake appliances.

Ashton Valve Company, Barco Manufacturing Company, Clark Company, Crane Company, Joseph Dixon Crucible Company, J. B. Ford Company, Johns-Manville, Inc., The Leslie Company, Harry A. Montgomery, New York & New Jersey Lubricating Company, Pilot Packing Company, Railway Review, Simmons-Boardman Publishing Company (*Railway Age*, Railway Mechanical Engineer, Railway Electrical Engineer, Railway Signal Engineer and Railway Maintenance Engineer) and Westinghouse Air Brake Company.

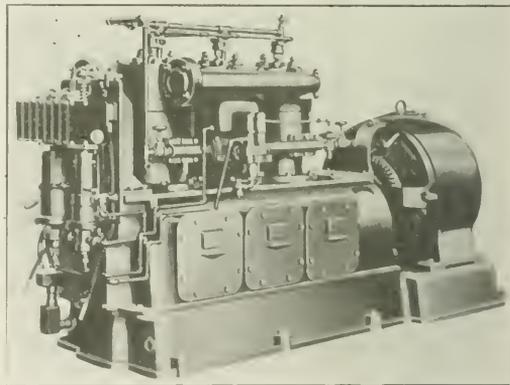
New Devices Among the Exhibits

Westinghouse 3VS Motor-Driven Air Compressors

THE WESTINGHOUSE-NATIONAL 3VS motor-driven air compressor, exhibited by the Westinghouse Air Brake Company, Pittsburgh, Pa., is especially suited for railroad work—to supply air for yard charging plants, signal operation, and for general shop use. It is designed for continuous operation, having water jacketed cylinders and cylinder heads, with forced water circulation. Various sizes are available to suit the volume of air and pressure desired. The compressor is driven by a direct or alternating current motor which may be wound to suit a great variety of voltage and current conditions.

The outfit is very compact, as the compressor, motor, and control system form one complete self-contained unit. It is of the single stage, single-acting type with three vertical air cylinders. Placing the cylinders vertically eliminates uneven wear on the piston and cylinder walls, reduces vibration to a minimum and assures quiet operation. All parts are carefully made of the best materials, and liberally proportioned to withstand long usage. Adequate and positive lubrication for all working parts is provided automatically.

The automatic control is a distinctive feature of importance. It starts and stops the compressor when the minimum and maximum pressures have been reached in the storage reservoir, so that the current consumed is in proportion to the air used, and the outfit does not require



3VS Direct Current Motor-Driven Air Compressor

constant attention by an operator; it unloads the compressor during the accelerating period; it restricts the flow of current to that actually required to accelerate the compressor (unloaded) in the shortest time possible without exceeding full load running current; it restricts the use of cooling water to the operating period; it protects poly-phase motors from single-phase operation by means of an underspeed release device; it obviates the necessity for the use of a circuit breaker or any protective device other than fuses; it prevents starting of the compressor if there is insufficient oil supply in the crank case. By virtue of the complete automatic control, the most satisfactory and economical operation of the compressor is assured.

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THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

Only a few years ago pulverized coal was hailed as the solution of the railroad fuel problem. A number of tests were made, some of which were fairly successful, but the main fact brought out was that existing designs of locomotives are not adapted for satisfactory operation with such fuel. At present pulverized coal is practically a dead issue insofar as the railroads are concerned. It is quite possible that the initial failure of the system will retard its adoption where it might effect considerable economies. Recent investigations have developed improved methods of burning powdered coal and the highest boiler efficiency ever recorded was obtained in a plant using such fuel. Railroads should certainly consider its use in stationary plants; in one case that was investigated not long ago it was found that by using pulverized fuel in a railroad power house, the cost of operation

could be reduced with a saving of about \$30,000 in the initial expenditure as compared with hand or stoker firing. Pulverized coal is not a specific, but it is no doubt the cheapest fuel under certain conditions. Its use in stationary plants may develop further improvements and point the way for further applications in locomotive service.

Both F. W. Brazier and C. D. Young made some excellent suggestions in their discussions at the Purchases and Stores meeting Tuesday morning. Both referred in particular to Liaison Sections Between A. R. A. consultations which would prove profitable between Division V and Division VI. Take for instance the recommended practices for the Reclamation of Material as developed by Division VI. Mr. Young pointed out items in the committee report which were at variance with ideas that have already been expressed by Division V. Would it not be advisable in developing any such reports to confer with either the secretaries or specially appointed representatives of the various sections of the A. R. A. on matters in which there is community of interest? By doing so far more workable practices would be evolved and the greatest good would result from the expert work performed by all divisions of the American Railway Association.

It is plain, everyday economics to insure that no expenditures be made unless the result obtained from that expenditure is a return in excess of the cost. Furthermore, it is false economy to do things yourself which can be done more cheaply by others. These principles hold in the reclamation of material, as in everything else. They are perhaps more difficult of application because of the innumerable phases of the work that must be considered. The reclamation department must not do work which can be done better and more cheaply by other departments, simply for the sake of making a showing. The most careful scrutiny should be given to every article reclaimed. This not only applies to the cost of doing the work, but also to the service that is to be rendered after the work is done. We have heard stories told by railway men of how they "put it over" another department. Anything of this sort shows that a man has not a broad vision, or real appreciation of the responsibility to the railway by which he is employed.

There are 16 officers and executive committee members of the Mechanical Division. The terms of the officers run for two years. In the normal course of events, after a motive power department officer has reached a position of sufficient influence in the field to be a suitable candidate for membership on the General Committee, he must pass through 32 years of service before he is advanced to the position of chairman, except as breaks in the ranks of the committee through death or retirement from the service operate in his favor. Thus, the younger and more active members of the Division have very restricted opportunity to exert a real influence in its affairs. The action of the Resolutions Committee in presenting, and the members in adopting, a resolution at the closing session of the convention on Wednesday, recommending a change

in the tenure of office of the chairman and vice-chairman from two years to one year, is likely to have an important bearing on the future welfare of the Division. The proposed change will have no detrimental effect on the continuity of policy of the Division, while the enlarged opportunity for active influence in the affairs of the organization by the younger men will tend to keep it in step with progress in the motive power and equipment field.

In the discussion of reclamation at the convention of the Purchases and Stores Division the recommendation was repeated several times that all the work of reclaiming material be under the jurisdiction of the stores department. The principal arguments in favor of this arrangement are that

Should Reclamation Be Centralized?

the stores department knows what material is required and that reclamation work is given special attention if it is concentrated in that department. In general, the conclusion reached by the purchasing and stores officers is sound. The advantages of a general reclamation plant for all classes of material is evident, but under certain conditions there may be considerable saving by doing the work in the mechanical or maintenance departments. Oftentimes facilities are available in the shops to handle the same work that would be done in a special reclamation plant. In such a case centralizing the reclamation work would involve a duplication that would not be economical. Spring reclamation is a typical example. The remaking of springs is an important part of the blacksmith work in locomotive shops and there seems no valid reason why the shop equipment and the experienced shop forces should not be utilized for spring reclamation, which requires considerable skill and technical knowledge if it is to be handled properly.

While overhead traveling cranes have been installed in a few enginehouses and while the Whiting hoist has achieved a well deserved popularity handling heavy repairs, in others it is essential that all enginehouses be provided with an adequate number of drop pits, especially engine truck and tender wheel drop pits. These are relatively inexpensive and save a large amount of time. As a rule, engine truck drop pits are placed near the end of the pit furthest from the turntable. This means that if a pair of tender wheels must be changed it is necessary to turn the locomotive. Even then only the No. 3 and 4 wheels can be changed since the engine will not back in far enough to get No. 1 and 2 wheels over the drop pit. The result is that the tender must be entirely disconnected from the locomotive when a defect develops involving a change of tender wheels No. 1 or 2. The same argument also applies to trailer wheels; the relatively small investment required for tender drop pits properly located is justified by the reduced locomotive delays. In passing, a word may also be said in favor of depressed rails with inserted rail sections. A depression of 4 or 5 in. in a length of 5 ft. is usually sufficient and is a great time-saver for changing springs and spring rigging on any part of a locomotive without using jacks. In changing tires also, blocks can be put between the binders and driving boxes holding the wheels clear of the rail when over the depression. It is easy to heat the tires and shim them. It is said that with a proper understanding of how to do the job an engine truck spring can be changed, using the depressed track without jacks, in about 15 min.

It is obvious that one of the most important functions of the engine terminal is to provide adequate inspection of locomotives. Wherever space is available and other conditions do not interfere inspection pits should be provided ahead of the ash pits, water standpipes and coaling station. These

Locomotive Inspection at Terminals

pits should be covered so that the inspectors will be protected from the weather in localities subject to severe weather conditions. The difficulty of making a careful inspection of any piece of machinery in a snow, rain, or sleet storm is self-evident. It has been found expedient to provide one or more helpers to accompany the inspector and perform certain minor repair jobs, such as tightening nuts, applying cotters, etc., as this work is discovered. This method assures that the work is done promptly and in addition the paper work of reporting the defect is eliminated and the time of some roundhouse man, who would ordinarily take the report and look up the job, is saved. The inspector reports what he finds and this work is in addition to that reported by the engineman. It is essential that the inspector make a note of any defective or broken parts which will need removal and renewal so that the storekeeper can be notified at once and have this material on hand promptly, thus reducing locomotive delays. The condition of a boiler front end is of vital importance and at the time of the monthly washout it has been found good practice to have an inspector examine carefully the spark arrester, steam pipes, exhaust base, nozzle tip, blower connection, etc. The roundhouse foreman is therefore safe in assuming that the front end of that particular locomotive, if reported in good condition, will be good for at least 30 days. Violation of I. C. C. safety regulations should also be watched for by an inspector responsible for this part of the work.

A foreman who had been a railroader all his life recently went into an entirely different business. Incidentally, his progress in this new line of work indicates that he has ability as an executive, as well as a thorough understanding of up-to-date shop practices and methods. Asked why he had left railroad service, he said that he was tired of being "bawled out;" indeed he felt that he could not continue to maintain his self-respect and remain as a foreman in a large shop on an important railroad. When our country was forced to speed up production under war conditions it was necessary to recruit many foremen in the industries. It was quickly found that not only these new men, but the older foreman in the service, could not meet the new conditions without additional instruction and training. Foremanship courses were developed and put into operation in a considerable number of industrial plants. In a report made by the Committee on Foremen at the 1921 meeting of the National Association of Corporation Training, the statement was made that certain definite results were obtained from these foremanship courses in some of the plants; these were enumerated as follows: Improvement in the morale of the foremen and workmen; more efficient handling of standard practice and the development of better production methods; increased quantity and improved quality of production; latent capabilities of men were discovered that aided in solving more intelligently the plant personnel problems; increased intelligence in the supervisory force by personal development. The report specifically states that these are not estimated results, but ones which were actually secured. Railroad organizations generally have not promoted courses of this type. Here is one place where

Stop "Bawling Them Out"

distinct economies are possible without an unreasonable expenditure—and moreover an appreciation of these things will stop the “bawling out” process and hold the better class of men in railroad service.

When a new device for use on railroads is conceived there is often great difficulty in finding opportunities for testing it out and developing it. Inventors,

A Co-operative Laboratory

railway supply concerns and the railroads themselves have expended millions upon millions of dollars in developing and improving such devices and appliances. In some cases devices have been tried out which were essentially wrong in principle and could never be made commercially practicable; often, if there had been a central clearing house or laboratory, the inventors or developers of these devices could have been saved from the useless expenditure of much energy and money. Then, again, a meritorious device is sometimes conceived but is finally discarded because it is not put into the right hands and has not had any real opportunity for development or demonstration. These “lost” devices form a monument to the lack of a clearing house or laboratory which should have been established long ago by the railroads, strictly in their own selfish interests. It has been suggested that if such a laboratory were established under the direction of the American Railway Association, or failing that, under a group of strong roads, meritorious devices could be developed and approved and inferior ones could be discarded and the railroads would pay out only a small percentage of the amount of money that they are paying today in testing out and improving these appliances in a haphazard fashion. Unfortunately, the larger number of roads, including practically all of the small ones, today have no facilities for investigating these matters thoroughly and many of them in their efforts to improve themselves are trying out devices that will never make good. This comment is presented to strengthen, not to detract from, the editorial comment in Friday's *Daily*, entitled “How to Successfully Avoid Progress.” It is not the intention to discourage the developing and testing out of new appliances, but rather to put the whole thing on a reasonable and scientific basis so that devices of merit can be developed quickly and thoroughly with the least expenditure to the railroads at large.

During the period of federal control and that immediately following the railroads had no opportunity of employing or training special apprentices. The doors of the railroads, so far as the locomotive or car departments were concerned, were practically closed against the college man.

Special Apprentices

The absence of any provision for the employment or training of these men acted as effectively as a bar against them as though a definite ban had been placed against them. This ban has now been lifted. While it is not clear why the age limits of 18 to 26 were set, or why the course was made of four instead of three years' duration, still the rule of the Railroad Labor Board is on the whole a good one and permits those railroads who so desire to give these men a thorough practical training. For three years they may be assigned to any work the management desires, may be moved from one class of work to another, from the work of one trade to that of another at the discretion of the management without any of the restrictions of the classification of work of the different shop crafts. This permits of a wide and varied training for these men suffi-

cient to broaden them out and give them a general knowledge of the various classes of work with which a foreman or other executive should be familiar. At the close of the three-year course he must work another year at some one trade of his choosing, after which he is eligible for employment as a craftsman in that trade and may work as a mechanic in that craft until such time as he proves his fitness for promotion and the management feels justified in placing him in a position of minor foremanship. Meanwhile he will be found to be a very valuable man for staff duties or other special work. No special favors are asked for him over the regular apprentice or other shop employe. He is not to take any man's place or deprive any one else of the right to promotion. All that is asked is that he be given suitable training and the right of fair and just competition wherein he may prove his worth. It would seem an opportune time for the railroads to try out a number of these technical graduates, but it will be useless to go into the matter unless arrangements are made to give them proper training.

The paper entitled “Wastes in Air Brake Service” presented by Prof. S. W. Dudley before the Air Brake Association and printed in the *Daily Railway Age*, June 20, 1922, contained much that might be read with interest and profit by railroad men who are not directly connected with air brake

Avoidable Air Brake Wastes

work. One of the most easily detected wastes in air brake service is that due to unnecessary leakage of compressed air from pipe joints, hose and couplings, unions, valve sets, brake cylinder packing, etc. This can be avoided, or at least greatly reduced, provided those responsible are willing to pay the price—and the returns will be large. As an example of what may be done if there is a sufficient and well recognized incentive, examples were cited of conditions found in Europe, where practically no leakage was tolerated. This was brought about largely by the high cost of locomotive coal and a recognition of the fact that it takes considerable coal to generate the steam used by an air compressor. It is doubtful if a single instance of such a high degree of tightness could be found on any American railroad. Possibly the balance between costs for labor and coal would not warrant the general adoption of quite so high a standard. The tendency of Americans, whether railway mechanical men or not, is to maintain an attitude of blindness in regard to things that do not personally annoy them. We therefore overlook and fail to take any steps to overcome wastes which could be easily recognized and corrected if we were so disposed. As an illustration, we notice the hiss caused by an air leak and although it may be our business to attend to maintenance matters, it does not annoy us sufficiently to cause us to have it stopped, despite the fact that we well know—if we but stop to think—that air in the compressed state is far from being inexpensive. Another source of waste, by no means confined to air brake work, is caused by the lack of proper facilities for doing work economically. A good man equipped with a hammer, cold chisel, file, and a monkey wrench or pipe tongs, can do considerable work in a day, but in far too many cases no other facilities are provided, although labor costs could be reduced greatly by a small investment in equipment. Other wastes are the careless use of material, drawing out more material than necessary, or drawing new spare parts when the old ones could be repaired at small expense and be used again. A spirit of indifference to the wastes which are going on all around us results in an extravagance that is typical of the spirit of the past and not of the future.

The ability to use the large locomotives now commonly employed for handling high tonnage freight trains was made possible largely by the development of the mechanical stoker, for until stokers were applied it was not possible to realize the full capacity of such power. In the development of the stoker, attention was at first directed toward the increase in capacity that might be obtained for stoker fired locomotives, irrespective of the relative efficiency of the stoker and the hand fireman. Several types of mechanical stokers have now been brought to such a high degree of development that there is no question about their reliability. The thought was commonly entertained at first that with stokers mechanically perfected they could be operated easily by anyone. However, it is now quite generally recognized that just as much intelligence on the part of both the fireman and the engineman is required to operate a stoker fired locomotive as was ever required for a hand fired locomotive. The manual labor is lessened but the results obtained will still depend upon the amount of skill and judgment displayed by the operator. The tonnage hauling capacity of a locomotive is easily determined but the efficiency of the boiler in the production of steam is not so readily ascertained and there is a feeling among some railroad men that capacity has been secured at the expense of efficiency. No report was submitted this year by the committee on mechanical stokers, but it is hoped that it will be able to carry on a series of tests in the near future which will enable it to submit at the next convention facts in regard to the relative efficiency of hand and stoker firing. This would be an important and welcome addition to previous reports.

The report of the Committee on Specifications and Tests for Materials reflects considerable reluctance on the part of the railroads to make extensive use of heat treated steels. There are at least two good reasons for the slow progress which has so far been made in the use of this class of materials for locomotive forgings. First it has been found that these steels are very sensitive to slight variations in the physical treatment to which they are subjected in the shops. The slight localization of stress resulting from a tool mark or surface scratch has been sufficient to start the development of detail fractures. Changes of section with sharp corners or fillets of small radius have had similar results. This sensitiveness to slight variations in the physical condition of the metal and a similar tendency of heat treatment to exaggerate the effects of segregation in the chemical composition of the metal tend to reduce the life of heat treated parts which are subjected to vibrations and heavy reversals of stress, if full advantage is taken of the increased elastic limit in proportioning the parts. Considerable doubt, therefore, remains in the minds of many railroad officers as to the safety of reducing the weight of parts as far as the physical properties of the material would seem to make possible. Second, few railroads are equipped with the facilities necessary to work heat treated material and restore it to its original condition. This does not apply to so great an extent in the case of axles and crank pins as in the case of rods, which frequently require straightening. But axles and crank pins, after they have been removed from service, are usually worked up into some other usable form. Here it becomes necessary to subject the material to heat in the shop and there are not many railroad forge shops equipped with the facilities or with the knowledge of the materials they are dealing with, necessary properly to control the temperatures in such operations. These considerations

The Use of Heat Treated Steel

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suggest that the possibilities are greater for any alloy steel, the working properties of which are developed by a simple annealing process, than for those steels which require treatment by the quenching and tempering process.

R. S. M. A. Committee Appointments

CHARLES W. BEAVER, the newly elected president of the Railway Supply Manufacturers' Association, announced the following committee appointments before leaving Atlantic City:

Exhibit Committee: W. H. S. Bateman, chairman, The Parkesburg Iron Company; S. H. Campbell, Western Railway Equipment Company; George W. Denyven, George W. Denyven & Co.; G. E. Ryder, The Superheater Company; and George T. Johnson, Buckeye Steel Castings Company.

Finance Committee: John M. Gillespie, chairman, Lockhart Iron & Steel Company.

By-Laws Committee: George L. Morton, chairman, Galena Signal Oil Company; L. B. Sherman, *Railway Age*; and Charles C. Castle, National Railway Appliance Company.

Hotel Committee: W. K. Krepps, chairman, Crucible Steel Company; and Charles C. Castle.

Badge Committee: L. B. Sherman, chairman; and T. D. Kingsley, S. F. Bowser & Co.

Entertainment Committee: C. W. Floyd Coffin, chairman, Franklin Railway Supply Company.

Enrollment Committee: F. H. Smith, chairman, Gold Car Heating & Lighting Company.

Transportation Committee: H. E. Daniels, chairman, West Disinfecting Company.

Canadian Representative on R. S. M. A. Executive Committee

THE RAILWAY Supply Manufacturers' Association has decided to add another member to its executive committee representing what will be known as the Eighth District, including all of Canada. That country has never been officially represented on the executive committee, although the supply interests from that country have always participated cordially and heartily in the work of the organization.

Arthur Allen, vice-president of the Holden Company, Ltd., has been elected as the Canadian representative for a term of three years.

Record-Breaking Registration

THE FINAL comparative figures for the registration at the 1922 and 1920 conventions are surprising in many respects. The total registration is considerably larger this year than two years ago. There were fewer supply men and supply ladies at the meetings this year, but this decrease was more than offset by the increase in the number of railroad men and their families who were registered. There were 2,339 railroad men registered this year as against 2,024 last year. It is interesting to note that the total number of railroad men and the total number of supply men were almost identical this year.

Div. V—M. and M. C. R.	1,222	1,920
Div. VI—Pur. and Stores	1,008	875
Special guests	381	364
Supply men	947	785
Railroad men	2,304	2,578
Railroad ladies	1036	798
Supply ladies	575	676
Total	6,254	6,073



American Railway Association—Division V—Mechanical

Report on Design and Maintenance of Locomotive Boilers Brought Lengthy Discussion

Chairman Coleman called the meeting to order at 10 a.m.

Design and Maintenance of Locomotive Boilers

In an interesting comparison of the radial stay and Belpaire types of boiler construction, the committee draws the conclusion that for a given diameter of boiler shell the Belpaire type has the following advantages: (1) greater steam storage space; (2) greater steam disengaging surface; (3) greater firebox heating surface; (4) greater number of tubes, and (5) all vertical stays of uniform length.

The committee has done considerable work in canvassing the dry pipe situation with a view to determining the possibility of substituting commercial pipe sections for the special sections now frequently specified and presents a table of proposed commercial sizes to meet this condition.

The committee makes the following definite recommendations: 1. Buttonhead staybolts be adopted as recommended practice for crown sheets in other than oil-fired boilers; 2. The proposed pipe sizes be adopted as recommended practice for dry pipes in designing new boilers; 3. The practice of autogenous cutting and welding be further developed; 4. Hot water washout systems be adopted as recommended practice in washing and testing of locomotive boilers; 5. The installation of water treating plants be generally adopted in the bad water districts; 6. Improvement be made in the usual form of tapered screw washout plugs.

Design

THERE ARE TWO general styles of locomotive boilers at present being applied to locomotives in this country, the Belpaire and the radial stay.

The radial stay type of boiler was preceded in use by the crown bar type. As the demand for larger boilers and higher pressure took place, the weight of bracing necessary to support the crown sheet became excessive, increasing the difficulty in washing out and keeping the crown clear of sediment, due to the obstruction of crown bars.

In the earlier style of radial type the crown sheets were so much arched that it was possible to apply only two center rows of radial stays with buttonheads to bear squarely against the under side of the crown sheet, and the angle of the stays was such that the heads of the outer rows would not bear squarely against the under side of the crown; the end through the outer shell was at such an angle

that it was impossible to get a continuous full thread fit within the thickness of the shell sheet, resulting in leaky staybolts.

In the later designs of radial stay fireboxes the crown sheet was very much flattened, permitting the application of buttonhead stays to approximately the full width of the crown. In the first design of radial stay fireboxes, in order to get the number of flues to correspond with those used in equal size crown bar boilers, the crown was carried higher than in the crown bar boiler, resulting in restricted steam space. In flattening the crown sheet, the steam storage space was increased, but the firebox heating surface reduced as compared with the earlier designs.

In the Belpaire type, the outside and inside firebox sheets are arranged with the surfaces of sheets practically parallel, permitting the application of braces at right angles to the plate supported, thus giving maximum fit for the threads of the stays or sleeves in the sheets and enabling the use of buttonhead stays through the full width of the crown.

to the barrel of the boiler. Autogenous welding should not be permitted on any part of a locomotive boiler that is wholly in tension under working conditions; this includes arch and water bar tubes.

Water Treatment

An important factor in the cost of boiler maintenance is the quality of water used, and we can not emphasize too strongly the desirability of furnishing the best possible, by which we mean water free from suspended matter, corrosive and scale-forming substances and as low as may be in alkaline salts.

Scale and corrosion greatly diminish the life of a boiler, which with the expense of repairs is largely dependent on the amount of impurities in the feed water. In districts where good water is available, flues and sheets readily last the legal limit, but when water high in scale-forming substances is used the life of the flues is reduced to less than one year. In this latter case frequent

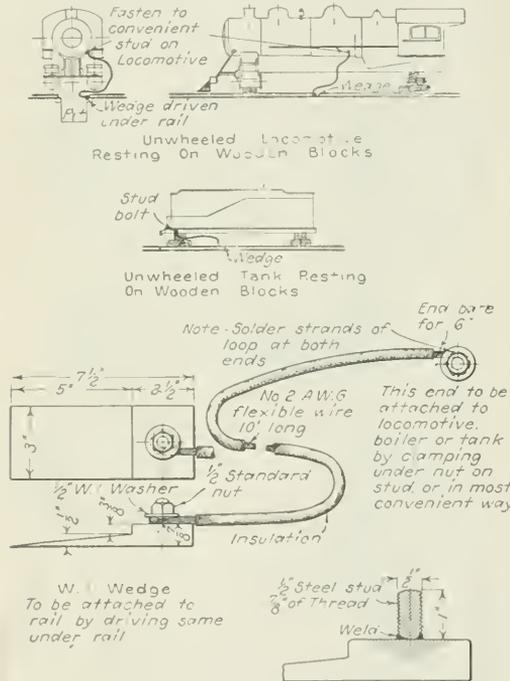


Fig. 4—Ground Cable and Its Use

work is necessary, sheets leak around flues and bolts and the repeated working and caulking and the hammering in the effort to remove scale, keep the locomotives in shop a large part of the time and result in premature failure and relocation to the back shop for classified repairs.

When natural waters of good quality are not available, those of poorer quality should be given treatment to improve them and economy should be given to the conclusion that the effectual way to prevent the deterioration of rails is to remove the impurities in the feed water and operate plants, before the water is introduced into the boiler. The results of such pre-treatment are well known and it is not necessary to quote figures here, but it may be noted that the installation of treating plants in hard water districts, costs an investment that will show a big return in reducing the cost, not only of boiler maintenance, but also of general operation.

The committee strongly urges the serious consideration by the railroad management, the installation of water treating plants.

Circulation

The committee urges the careful consideration of the design of boilers to the end of perfecting circulation of water.

Feed Water Heaters

The Committee is of the opinion that attention should be given to the further development of feed water heaters in order to effect more economical operation of locomotives.

Boiler Wash-Out and Fill Systems

The cost of boiler maintenance can be very materially kept down and the maximum efficiency of the boiler more nearly obtained by the consistent use of hot water washout and fill systems. In the use of hot water, in order to be effective for the loosening of scale and washing out mud from the interior of the boiler, it should be under a pressure of about 120 lb. per sq. in., and at a temperature of about 150 deg. F. This force and temperature will quite effectively remove scale and clean the boiler.

There are three general types of washout and fill systems in use

1. The ejector type, in which washout water is slightly heated and placed under pressure by injecting steam into it through a suitably designed nozzle. This is the simplest and least expensive type, but appears to be the least desirable.

2. The pump and heater system, where the water is heated in an open or closed heater, distributed through a pipe line in the engine house and forced under a pressure of about 130 lb. into the locomotive through a hose and nozzle. This type is fairly effective and can be installed without violating any patent rights. For a medium sized terminal, such a system with two water tanks, one washout and one filling pump and two pipe lines into the engine house, will afford washout water at 150 deg., and filling water at 200 deg. F. at a small operating expense. Where exhaust steam is available for heating water, this type is an excellent one for a medium sized terminal.

3. The blow-back type, where the steam blown off the locomotive is utilized to heat the wash and filling water. Such systems which also provide for the automatic tempering of the water used in washing out and the use of a circulating line to keep the water always hot in the engine house lines, are protected by patents. This system is the most effective one, and provides washout water at all times of the proper temperature, and reused water and steam blown off from the locomotive instead of wasting it.

The committee earnestly urges upon the management of the railroads the importance of installing hot water washout and fill systems, thereby effecting economies and efficiency with little expenditure of capital.

The report is signed by: G. H. Emerson (Chairman), B. & O.; C. B. Young, C. B. & Q.; A. W. Gibbs, Penn. System; J. Chitley, N. Y. C.; R. W. Bell, Illinois Central; W. H. Wilson, Northern Pacific; W. W. Lemen, D. & R. G. W.; R. J. Williams, Pere Marquette; J. Snowden Bell, and Gen. L. Bourne, Superheater Company.

Discussion

In the absence of Mr. Emerson, the report was presented by O. C. Cromwell (B. & O.), who said at the conclusion: Since the preparation of the report there have been some improvements made in the design of locomotives along the lines brought out by the committee. Locomotive No. 8000 has been recently put in operation on the Michigan Central with quite a number of the features mentioned. The circulation is improved by introducing a large radius corner in the back mud ring. This allows a free entry of the water and should increase the circulation.

The throttle valve is located in the smoke box, so as to control the steam after it has left the superheater. By that means you keep the superheater units under steam at all times which should afford protection and give a short steam area between the throttle and the cylinder. The outside by-pass is fully under control.

These features show that the mechanical world is interesting the railroads in the matter of boiler design. The railroads realize the importance of bringing about improved circulation and steam generating qualities; also more economical use of the steam.

As to circulation you know that there are a number of

circulating devices in the market but as they are patented, no specific mention is made of them in the report. They all tend to improve the circulation and I believe there are going to be further improvements in that direction. Feed water heaters are coming to the fore quite rapidly, a number of different designs having been tried out which no doubt in a short time will indicate the direction in which this very much sought-for device will be developed.

H. H. Lanning (Santa Fe): The committee has recommended that button-head staybolts be adopted as standard practice for crown sheets of other than oil fired boilers. On railroads which operate both coal and oil burning locomotives, it is desirable to equip all locomotives with a type of crown stay that will give satisfactory service with either of these fuels, as it is inconvenient and expensive to renew all of the crown stays in a firebox when the locomotive is changed from coal to oil or vice versa. This change is frequently necessary as a result of transfer of locomotives or changes in the relative prices of oil and coal.

The service conditions on an oil burner are more severe than on a coal burner and it is to be expected that a railroad which has both coal and oil burning locomotives should adopt for all locomotives the type of crown stay which gives best service with oil; namely, one having an upset taper threaded head on the firebox end. These bolts are applied with the small end of the taper toward the water side of the crown sheet. The taper is usually about 1 1/2 in. in 12 in. and, after being screwed into place the firebox ends of the bolts are cut off and riveted over.

Radial stays and crown bar bolts of this type were developed on oil burning locomotives in bad water territory as a means of overcoming very serious trouble experienced with crown sheets of the button head type. They have been in successful and extensive use under these severe conditions for 15 years or more.

When subjected to the extreme heat of an oil fire or to a very hot coal fire in a locomotive using bad scale forming water, the round heads of the button head bolts became overheated and gave trouble. The head of the bolt presents an enlarged area to absorb heat from the fire and a large part of the heat thus absorbed must be transmitted to the crown sheet through an intervening layer of dirt and scale and to the water, through an accumulation of mud or scale adhering to the bolt and to the sheet. The result is that, in an oil burning engine and sometimes in the hottest part of the firebox on a coal burner, the button heads become overheated and leak.

The taper head type of crown stay presents a smaller area to the fire and does not absorb so much heat. The contact between the bolt and the sheet is more intimate and the transference of heat from the bolt through the sheet to the water takes place with less interference. The taper head bolt has a further advantage that in case it does show a tendency to leak, it can be restored to a perfectly tight condition by a small amount of hammering.

On coal burning locomotives using certain kinds of coal the taper head radial stay accumulates practically no honeycomb or clinker, while under the same conditions crown stays of the button head type would collect considerable quantities of this material.

Fifteen years or more experience with crown stays of the taper head type in oil burning service and about seven years experience with this type of stay bolt in coal burning service on a railroad, having over 2100 locomotives, has demonstrated that the taper head crown is fully as safe under favorable conditions and is safer under conditions of extreme firebox temperatures than the button head type of crown stay. Taper head bolts have also been found to give better and more satisfactory

service than button head stays on coal burning locomotives as well as on oil burners.

I feel that the committee should be requested to give consideration to crown stays of the taper head type for both oil and coal burning locomotives and include this type of stay among those recommended for adoption by this body.

C. A. Sely: I was under the impression that the success of the taper head radial as developed for oil burners would set the pace for its use in coal burners as well, because of its manifest advantages in cost, application and maintenance. The great difficulty in making the thread of a buttonhead bolt fit tight in the sheet simultaneously with a fit of the button against the sheet leads to much imperfect work and subsequent leakage and caulking that strains the section under the head. The heating of the projecting head tends to break the caulking joint and has an affinity for some products of combustion that form clinker.

That I am not alone in my opinion was shown by the 1921 report of the Master Boiler Makers' Association which strongly endorsed the taper head radial for all classes of service after making tests and comparing results of service. The Boiler Makers at their recent convention of 1922 supported the report of the committee.

In the interest of economy of material and reduction of boiler weight at the most advantageous point I would question the body diameters as shown in this report. The I. C. C. rule for 7,500 lb. maximum stress of stays applies to radials as well as water space stays and this figure is supported in the Boiler Code of the A. S. M. E. With 4 in. by 4 in. spacing the diameters named would carry 281.8 lb. for 15/16 in.; 323.5 lb. for 7/8 in. and 368 lb. for the 1 in. body, all of which seems excessive.

In his opening address at this convention, Chairman Tollerton forcefully urged consideration of fuel savings and other economies in operation, and in line with this the committee urges careful consideration of the design of boilers to the end of perfecting circulation of water. Just what and why is this circulation? A brief definition would be the movement of boiler water in its conversion to steam, and the perfecting called for is an implication that the present designs and state of the art not perfect and need further consideration.

It is obvious that the circulation should be sufficient to do two things; to serve as a wiper-off and carrier of the steam bubbles as formed on the heating surfaces for prompt discharge into the steam space, so that the full value of these surfaces may be realized; also to so mingle and mix the boiler water as to have no extremes of temperature. The maintenance of a relatively large volume of highly and uniformly heated water will promote reduction in maintenance and increase the effectiveness in operation.

The arch tube came as a life saver when boilers were assuming lengths to accommodate wheel arrangements necessary for development of increased traction, and wonderfully stimulated the circulation of the increased volume of water. Its very extended use has certified to the correctness of the theory that getting close to the source, taking advantage of initial conditions, is the proper method of solving this important problem. What might have been regarded as an incidental advantage, aside from the use of the tubes as brick arch supports was, in my belief, the most important factor, not only in the use of the tube but due to the tube being in the firebox and directly subject to the only motive power which can promote circulation aside from outside mechanical means.

For the actual production of steam, the firebox of the locomotive is a very vital feature in its arrangement and proportions. Each square foot of its surface is five or

more times as valuable as flue heating surface, for the simple reason that there is conduction and radiation of heat from the combustion of the fuel imparted to all parts of the firebox, but these combustible gases are extinguished on entering the flues with a reduction of temperature below the point of ignition. There is now no radiant heat, simply that of convection or rubbing of the flue surfaces by hot gases, and notwithstanding the short travel through thin walls of the tubes as compared with firebox plate thicknesses, the results are not high in evaporative efficiency, particularly at the forward ends of long flues.

To obtain a further increase of circulation, as desired by this committee, let me call your attention to a device which has been through some years of development—an American invention, of which mention was made at the recent convention of the International Railway Fuel Association as follows:

"Results of tests conducted during the last four years on a number of railroads demonstrate that this device has passed the experimental stage and will probably be one of the standard fixtures in the locomotive of the future, as is the arch tube at the present time."

The Thermic Syphon is fulfilling the requirement of the committee for a circulating medium of adequate promise. It is a further development of the arch tube principle, serving as an arch support and its capacity for increasing the water circulation is shown by the fact that the throat connection of two syphons has a waterway approximately three times as large as four 3 in. tubes; that the upper or discharge openings in the crown sheet are 3 in. wide by such a length as to give approximately ten times the areas of the lower connections, providing a quiet release of the upward circulation, and a direct upward path for steam bubbles, without chance for pocketing which would permit incrustation. The entire outer surface of the syphons are additional heating surface of highest value, due to their location in the hottest zone of the firebox, and by the generally increased water circulation effect of the syphon, the heating surfaces of the fireboxes and flues will be further stimulated to higher evaporative effect, facilitating deposit of boiler feed impurities to convenient washout points. Each syphon is in effect a double plate girder, longitudinally strengthening the crown sheet, dividing the stream of gases for more favorable absorption of radiant heat and subdividing crown sheet into limited zones, and preventing boiler explosions. This is proved in two cases of extreme low water.

Tests of syphon engines as against like engines not so equipped show coal savings running from 14 to 25 per cent per thousand ton miles; on oil burners 8 to 10 per cent.

J. A. Pilcher (N. & W.): I wish to speak simply with reference to Fig. 8, referring to crown stays and heads, reinforcing what has been said by the two previous speakers. We have eliminated the button head stay bolts in favor of stays with a large taper. Our boiler repair people have found it entirely advantageous and I was wondering just how far the committee investigated this particular feature of boiler construction before making their recommendation for the use of the button head stay throughout the firebox crown. I also notice the very decided recommendation of the crown sheet of the Belpaire type. On the road with which I was connected in the early days they used the Belpaire, but for some reason they deserted it. I wonder why? They have found many good points. I wonder if there are any bad points explaining why this type has not been more generally used.

I. Snowden Bell. Mr. Seley has given us a very interesting statement and a valuable one. I think there is nothing to be got out of it from in the least degree. There

are one or two questions, however, I would like to ask. One is a good deal a matter of personal curiosity, I may say. He has referred to this device called the thermic syphon. I would like to know why they call that thing a syphon. As far as I understand it, it has not any syphonic action whatever. There is nothing resembling a syphon present there. I have no doubt that the results of tests will show that the advantages derived from an increase of firebox heating surface secure probably a better circulation with that device, but I do not know why that should happen any more than it would with the old style water legs that were introduced in 1837 in the British practice by McConnell and others. This, as I understand it, is simply a water leg or rather two water legs. They get an increase of fire box surface, the value of which we all know but you would get it with any longitudinal water wall in your firebox and so far as the circulation is concerned, I cannot see why the circulation of that device would be better than the improved circulation obtained by an ordinary mid-felloe or longitudinal water wall in the firebox. (That is what I would like to hear from Mr. Seley, if he can explain.)

H. T. Bentley: I was very surprised when I read the report of the Committee on this button-head staybolt, because I thought it was a thing of the past. For years we were having lots of trouble in oil burning service with button-head staybolts and we looked around to see what could be done to overcome that trouble. By going to the taper head our difficulties were entirely overcome and we thought if it was a good thing in oil-burning locomotives, it was not a bad thing in any other service. About 5 or 6 years ago we made it our standard and since then we have been entirely satisfied with the results obtained. The conclusions of the committee generally are in accordance with my idea of things, particularly in regard to the hot water washing out. It is unfortunate that financial conditions have prevented the extension of hot water washout plants, but apparently very little has been done in the last few years. I am also in favor of the installation of water treating plants. I think everybody will agree that there is always a difficulty, when business is good, in getting boiler makers. If you can get a supply of water that overcomes the necessity of using so many boiler makers, it is certainly a move in the right direction and I am sorry that conditions have been such that little has been done in treating water to save work in the boiler shop.

I know of some railroads which, unless something is done and done very quickly, will have to enlarge their boiler shops and put in more machinery and tools for handling boilers. It seems to me that we are a little short-sighted when we do not prevent the disease rather than to try to cure it after it has developed.

C. F. Giles (L. & N.): I note in the committee's report under the caption of water treatment that they strongly urge the serious consideration by the railroad managements of the installation of water treating plants. They make no mention of a practice in effect on a number of railroads of using the internal treatment. We all know that the installation of a water treating plant is a very expensive proposition and must necessarily be confined to a point where they are troubled with bad water. If they have bad water at more than one point on a division, they must necessarily install water treating plants at every point where the water is bad.

It is a well known fact that the water on a division, or a series of divisions running out of a given terminal, can be analyzed and proper chemical preparations will take care of the water as a whole, avoiding treatment of the water at each particular point. The internal

treatment is being practiced on a great many railroads. We have made some experiments with it ourselves with splendid results. It is a much less expensive way of taking care of bad water in some cases than the wayside treating plants. Besides that, at times when the water is exceedingly bad resulting in foaming, you may necessarily have to resort to the internal treatment to overcome the external treatment of water. In my opinion the committee should during the next year give some consideration to the internal treatment of water.

J. Snoden Bell: I would like to ask whether there is anyone present, who knows about the application to the Lima locomotive of a throttle valve between the superheater and the cylinders. It was the consensus of opinion of the Committee that that was a proper location for the throttle valve, but I would like to know if any other road has made a similar application, and if so, with what results.

C. E. Fuller (V. P.): There seems to be a difference of opinion here this morning. It is said that doctors never agree and I think in this case we are not agreeing.

The committee has recommended the adoption of button-head stays and I can fully endorse the Committee's recommendation from the results actually gained through experience in operating locomotives with button head stays. I have not had experience operating locomotives with oil and I appreciate the difficulties that might be encountered in such cases, but it is my opinion that the question of button-head stays, versus tapered, driven stays for the crown sheet is a matter of local conditions more than anything else.

We have had no trouble with button-head stays; that is, our standard form of stay. We have used them for years and if they are properly applied and maintained there is no trouble.

We do not have to resort to any caulking of the button-head stays. I am inclined to the opinion that those who have had trouble with the button-head stay have not arrived at the cause of the trouble by a proper inspection.

Mention is made of the button-head stay collecting scale and mud. It will do this. The committee, of which I am not a member, states that the bombarding of sheets to loosen the scale puts the locomotive into the shops for repairs quite frequently. I do not believe that there is any road which has done more bombarding than we have; I think that we were the original bombardiers of crown sheets. We have many locomotives in certain sections, where we would otherwise burn the crown sheet out in less than a year, but if they are bombarded, properly and frequently, there will not be any trouble. We have been doing it for years but with the proper tools and in the proper way and have been able to keep staybolts fairly free from mud even in a bad water district.

The committee in this report also mentions the treating of water. Before water is treated, it should be very carefully analyzed and an effort made to determine what is wrong with it; we have waters which are of such a character that they will not stand treatment; that is, in the tank. The condition of water requires careful study and I do not believe that the experience of any one railroad will be of much value with regard to treating of water on another road.

If I were selling water treating plants, I would probably tell you to treat your water but what I would personally advise is to investigate the matter and discover what is really the difficulty. There is no cure for all ills. When you find out what is the matter, you are in a better position to proceed to the question of water treatment. Then you can handle the subject of water treatment in the most intelligent way.

We can afford to spend a large amount of money to

get good water and if we can get it, with or without any kind of treatment, we can close up our boiler shops to a very large extent and will have successful locomotive operation.

In the case of certain waters on our road, we have to put castor oil compounds in the water in order to keep the water down. We have our troubles keeping it in the boiler. We could not treat that water if we wanted to.

W. F. Kiesel, Jr. (Pcon.): I would like to add something in connection with the button-head stays. We have used them for many years and we find them the safest stay to use. An engineer may at times disregard the condition of the water in his boiler and there will actually be low water in the boiler. The button-head stay, under such conditions, is the safest.

In the case of wagon-top boilers, objection is made to the use of the button-head stay because the stays will not go in at an angle and you cannot make a square seat very readily, but even in the wagon-top boilers the 3 or 4 rows in the center may be made of button-head stays to good advantage.

Mr. Pilcher asked what the advantages of the Belpaire boiler are: The committee recommended a Belpaire boiler and although I am not on the committee, I can readily see why—because the stays are normal to the sheet. You can use a stay with a head or you can use a stay such as proposed by some of these other members; furthermore, it is a more flexible job and expansion and contraction will put less stress in the sheets. Also you know more definitely what the stresses in the sheets are. It, of course, requires more time and the builders will be opposed to it on account of the increased cost of dies, but the Belpaire boiler is considered the safest both in Europe and in this country.

R. D. Hawkins: (A. C. L.): The button-head staybolt does not seem to have very many friends here. While on the Atlantic Coast Line where we have used the taper head stay for many years I had experience with the Belpaire type of firebox. It is very easy to apply button-head stays and I must say that I favor button-head staybolts in this class of boiler. We are having some very satisfactory results with a taper stay but I do not like to see the committee turned down entirely on its recommendations of the button head. I have also had some experience with button-head staybolts in oil burning engines. We had some difficulty where we used large heads and the heads started to burn. In this case we made a hollow tool and kept the button heads smoothed off thus getting very satisfactory results, even with oil.

C. E. Chambers: I have had experience for 20 years, at least, with button-head staybolts or crown bolts. With locomotives built recently we went to the use of the taper-head crown bolt, but not because of any trouble of leakage or being unable to keep button-head bolts tight. There was one reason that prompted me to do this. Possibly somebody else in the room has had a similar experience. We had a great many crown sheets equipped with button-head crown bolts which, while the sheets looked perfectly good, were badly grooved around the head of the bolt. Water conditions could not be blamed so I thought perhaps the heads of the bolts became overheated, or that the circulation from the water did not protect the sheet at that point as thoroughly as it would without the button-heads. That was really what prompted me to go to the taper crown bolts.

A. W. Kelly (National Tube Company): I just want to say a few words in connection with the dry pipes. We have had a great deal of trouble with the railroads because of filling orders for dry pipes as mentioned in No. 1 and No. 2. Many different orders come in and that

means we have to change rolls, causing delays. Often-times we have had to substitute seamless dry pipe which costs more money. I think the committee's recommendations are right. They will allow the tube manufacturers to carry standard sizes of pipes in stock, so there won't be any delayed deliveries.

Mr. Seley: I would like to answer Mr. Bell's objection to the term "syphon." I rather think there is a syphon there. It may be inverted from the ordinary syphon; it may be upside down, but it seems to me there is a distinct analogy in that term. The water from the boiler barrel being drawn there by its greater weight displaces the lighter water forms a syphon and assists in the circulation.

As regards the water leg idea, I haven't any reason to doubt that any water leg of the same heating surface measurement would be just as effective, but in the design which is under discussion, these are most advantageously arranged for meeting the direction of the flow. I think that the failure of most of these devices formerly used have been in the manner of making the connection to the sheets.

W. L. Robinson (B. & O.): It is very pleasing to note in the committee's conclusions that they have included items No. 4 and No. 5, which will bring about some fruitful results for something besides reduction of maintenance of equipment expenses. We ought to think about the C. T. saving obtained through carrying out recommendations No. 4 and 5, and increase the boiler washing periods from two or three days in certain districts to 10 or 20 days; also holding the fires longer, instead of knocking them out every trip for boiler wash or boiler work. The cost of fuel is a C. T. expense and so is roundhouse labor, boiler washing, etc. Your C. T. ratio may be affected two or three points by possible saving in fuel. If you have hot water washout systems and water treatment it means a saving in C. T. expenses. I want to bring out the possibility of making savings in the C. T. expenses as well as the M. of E. expenses.

J. Krutt-schnitt (So. P.): Apropos of feed water purification, there is a piece of apparatus in use on the government railroads in Hungary which is located on top of the boiler and its purpose is to purify the water. If there is anybody here who is informed respecting that I think the rest of us would like to hear him tell what he knows about it.

Mr. Greenough: I am very sorry I haven't anything on that of an official nature at all, but it is probable that the location of those feed water heaters has had some influence on some of the feed water heaters recently applied by the Locomotive Feed Water Company. The apparatus referred to is, I understand, a purifier and the apparatus made in this country is a feed water heater. I have not heard what the results of the purifier in Hungary amounted to.

Chairman Coleman: This is a very important paper, gentlemen, and in order for the committee to make some standard recommendation to you they must have the experience of all of the railways in the country. You are all operating your boilers under different conditions and the number of conditions change the committee must get an expression from each one of you. There is a great responsibility before you now in trying to economize in the operation of locomotives. The slogan is economy and efficiency and in order for your committee to draw up these papers and present them to you in an intelligent manner, covering the entire continent, they must have your experience.

Mr. Brooks: You are operating locomotives in the Canadian West coast in the most extreme climatic conditions. (The committee would like to know your experience.

C. E. Brooks: I hesitated to say anything about our experiences because they are evidently so diametrically opposite to the experiences of many others who have spoken here today. The first two speakers indicated that the button-head crown bolts had been abandoned for the reason that it could not be used with oil and that in order to standardize with one type of crown bolt for both coal and oil burning locomotives, it would be advisable to go to the sharp tapered type of crown bolt, which was mentioned. When we started oil burning about 8 years ago, we had the idea, gathered from various oil burning roads in the southern part of the country, that we had to have the tapered type of crown bolt. We installed this type of crown bolt in a large number of locomotives and our intention was to spread the use of this type of bolt throughout the coal-burning areas as well. The net result of the thing is that two years ago we had to abandon the tapered crown bolt and we are now using from coast to coast button-head bolts; not button-head, unfortunately, as per the recommendation of the committee, but with parallel thread button-heads. The reason we went to the use of parallel thread button-head bolt was that a tapered crown bolt of any kind can be made test proof without really being a good job; that is, it will meet a water test, whereas the parallel-thread crown bolt must be a fit in the thread in order to pass the water test of either the railroad shops or the manufacturers.

The second disadvantage that we found in the quick tapered crown bolt was the mechanical features in connection with the application of the bolt. That is the different type and sizes of taps required and the difficulties of aligning the thread in any way between the inner and the outer sheet. The next disadvantage that we found was that the large water area of the quick tapered crown bolt gave much greater possibilities for scale accumulation than the smaller diameter button-head type bolt.

The next disadvantage that we found was in cases of low water. We have some very remarkable photographs of cases of low water in the bad water districts of Saskatchewan where an entire firebox had pulled off the quick tapered bolts and simply turned the backs down in the form of a little ring, pulling off without destroying the bolt and without even rupturing the sheet, for the simple reason that, as the sheet started to corrugate, it lifted the thread. It got no support from the thread whatever and had nothing but the back. The photograph even showed the perfect thread on the quick taper. The reason for this is, we think, a succession of overheating of these bolts, due to what might be called ordinary low water conditions. That is, a condition where a man was working with water very low, as we do in certain areas, and was possibly caught a little. The bolt consequently was hammered up a little and in hammering on the back of a quick tapered bolt, your whole action is not an up-setting action. It is an action that destroys the thread in the sheet; that is, loosens it up and you depend upon nothing but the taper of the bolt to hold your sheet.

Now, with regard to two or three of the other items which have been mentioned here. We are not a Belpaire boiler road, but we are very much interested in the recommendations of this committee. We intend to be a Belpaire boiler road, as far as the big power is concerned, for the simple reason that the radial stay boiler, when we get into the large diameters and near our clearance limits, does not have the steam space for handling our light water. We figure we can get this from the Belpaire type of boiler and I believe it is going to be our standard throughout.

Regarding hot water washout systems, we are opposed to ordinary practice, to such an extent that I do not like

to mention it at this late hour. We are a cold water wash-out road, and furthermore we intend to be, in the bad water districts, cold water absolutely. The reason for that is that we believe the hot water washout system is, very often, hot water in name only. We cool our boilers down and know that they are cool; then wash them with water that the men can handle and wash them under conditions that give our men a possibility to inspect the boiler. At the same time, we figure that in reducing the temperature of the boiler we have some chance of keeping the scale accumulation in a condition where water pressure will remove it.

I have heard it mentioned today that item No. 5 is probably the greatest improvement that could be made. We are opposed to that, too, and for this reason: We believe that the solution of boiler trouble is by not using bad water. I can tell you of one case (and probably our friends south of the line can tell you of a great many more) where we were using terminal water in one of our busiest terminals than ran 25 grains of encrusted solids to the gallon. We abandoned that water which was well water, and by heavy expenditure it is true, we have impounded storage of 300,000,000 gallons of surface water, reducing our encrusting solids to probably 15 per cent of what they were in the well water. We intend to follow that principle of impounding water absolutely, abandoning wells and figuring on well water supply as a last resort.

Chairman Coleman: Mr. Wanamaker?

E. Wanamaker (Rock Island): I do not think I am in a position to make any remarks but I have been a very interested listener. Some years ago we began to study the water supply on the Rock Island and water treatment in connection with our fire box maintenance work. I am inclined to agree with Mr. Brooks and with the gentleman who spoke preceding him. If it is possible to secure a good water supply you have reached the ideal solution. In a few instances, at a considerable expenditure, we were able to do that; in others it was practically impossible. Then it became a question of treatment and we found then that we had mistreated more water than we had treated. Furthermore, when we treated the water situation at one water point, it made more trouble with the water supply at some other point, due to the fact that you take your water supply from various points. We have started a progressive or systematic method of handling our locomotive feed water supply in an endeavor to secure uniformity. By so doing, we have greatly decreased our M. of E. in many instances, and at the same time, reduced the C. T. charges, making an indirect saving in that respect.

As regards the hot water washout and fill up system, no doubt Mr. Brooks' statement is very true. If you have sufficient motive power to permit such practice in times of heavy business. In our case we have been able so to do and we feel that the hot water washout and fill up systems, when properly used and supervised, results in a tremendous saving in C. T. charges as well as M. of E. Occasionally we get a letter from somebody wanting to know how much money we have saved in our boiler washing practice. Of course our boiler washing increased the cost of washing boilers. The biggest saving that we made was in the increased number of engine hours in the service.

With regard to the locomotive syphon, we have had very good success. I think that the reserve factor, at least on a railroad such as the Rock Island where we have many short hills, has enabled us to take a heavier train over the divisions, and not only keep up our schedule, but make up time that was lost. Sometimes on a division run of 165 miles, we could make up 24 or 30 minutes with heavy trains. It seems that our savings have to be predicated on the efficient and economic handling of the train,

rather than based on the locomotive alone. I believe that one reason for our fair success with the locomotive syphon has been that we spent a great deal of time and effort designing the method for welding or attaching syphons in the firebox.

Chairman Coleman: Mr. Oatley, will you please come forward?

H. B. Oatley (Superheater Company): The question has been raised as to the Hungarian Railway locomotive with a purifier. I happen to have a little information on that. I do not know that it will supplement a great deal the article that appeared recently in the *Railway Age*. It is merely a large chamber (barrel-shaped) on top of the boiler, into which the water is forced from a feed water heater. In the event there is no feed water heater the water is forced there and allowed to settle. In other words, the velocity is decreased and any precipitant is allowed to settle in this purifier and be blown off. In other words it is an adjunct to a feed water heating system and a protection to the boiler. I think that purifier is little if any different from one developed in this country some years ago by two of the locomotive builders. You recall that a good many boilers of the large Mallet engines were built in what might be called two parts. Water was forced into the forward portion and from there into the main portion of the boiler. The heating of the water in that forward section where the circulation was relatively slow permitted settling of the precipitant. The water going from there to the boiler was relatively clean. In other words, it localized whatever harmful action there was from the solids and, to a large extent, saved the boiler.

The other form to which I refer was where a partition tube plate, a third tube plate if you please, was located about six feet back from the forward tube plate in the boiler, the water from the injector being delivered into this forward section. A similar action took place there and the relatively clean water was allowed to pass through or over the plates into the main portion of the boiler. I believe there will be further developments of the idea.

Mr. Fuller: I move that the report be accepted, the committee continued, and the recommendations referred to letter ballot. (*The motion was carried.*)

Chairman Coleman: Next will be the report of the Committee on Resolutions.

Mr. Chambers: Mr. Chairman and members: "RESOLVED, That the officers of the Mechanical Division of the American Railway Association should be elected annually instead of every two years, in order that a greater number of members may enjoy the honor of being officers of the Division."

I might say that this resolution was offered two years ago and passed on the floor, and possibly by reason of our not being entirely out of war yet, it was not put into effect. I am offering this resolution, not without the knowledge of the chairman, but fully with his assent. There are other reasons. The duties are numerous, and for any one road to spare its head officer, which he usually is, for a continuous period of two years, to take care of this work is many times a hardship.

Chairman Coleman: I hope you will pass the resolution. There are a lot of men who are deserving of the honor of being your executive officer and in order to give the younger men an opportunity to come to the front, I would like to have you pass this resolution.

(*The resolution was adopted.*)

Mr. Chambers also presented the following resolution: WHEREAS, the Railway Supplymen's Association have this year brought to us the largest and best display of exhibits ever presented, and have carried to a successful

conclusion a splendid program of entertainment for the members of the Division, their families and friends, and enrollment has been carried out in a very satisfactory manner;

WHEREAS, the Atlantic City Hotel Men's Association has, as usual, provided for our welfare and comfort in a manner that is without criticism;

WHEREAS, we have been inspired by the action of the Executive Committee of the American Railway Association, which has done so much to spur us on to better things;

WHEREAS, The Committee in charge of the various reports have done careful and painstaking work in the preparation and presentation of their papers;

WHEREAS, the meetings have been ably planned and guided by the officers and special thanks are due to the indefatigable secretary for the manner in which he has carried out the arduous duties of his office to the entire satisfaction of the members of the Association,

BE IT RESOLVED, that the appreciation of the members of the Mechanical Division be extended to the Railway Supply Men's Association, for preparing the wonderfully educational exhibits, taking care of the enrollment and providing for our entertainment. Also to the Atlantic City Hotel Men's Association, the management of Young's Million Dollar Pier, the Executive Committee of the American Railway Association, the officers of the Mechanical Division, the members of the various committees preparing the reports, the retiring officers, the Secretary, to the mechanical press, and particularly to the *Railway Age* for the prompt reports and issuance of that periodical.

The report was signed by C. E. Chambers (Chairman), H. T. Bentley and F. W. Brazier.

Mr. Tollerton I move its adoption.

(*On motion, the resolution was adopted.*)

Chairman Coleman: We would like to call on S. O. Dunn, Editor of the *Railway Age*.

Mr. Dunn: Mr. Chairman, gentlemen, and the retiring Chairman, Mr. Tollerton. It is a great pleasure and honor to be invited to present to the retiring chairman, his Past Chairman's badge. We have been acquainted for a good many years. We have met on many different occasions, and I have had occasion to ask many favors of him in his official railway capacity, and I have never asked one yet which was not most readily granted; not only granted, but granted in a manner that made it a pleasure to accept the favor.

We have worked together in times and periods which were very trying, not only to the country, but particularly to those who were serving on or connected with certain committees. I shall not soon forget the time spent in those negotiations. I had the opportunity to observe your retiring chairman under most trying conditions, and I have no doubt I shall always find him as he has always been here—courteous, self-contained, and ready for work.

Mr. Tollerton and I have been very good friends for a long time. I know something about his career. You gentlemen also know that his career has been one of those typical American careers, which always have been and always should be a great inspiration to the youth of this country. He began his railway career as a machinist apprentice when he was a very young man. He was a fireman and a foreman. At 26 years of age he was a master mechanic, and at 42 years of age he was the mechanical superintendent of a railroad system of 8,000 miles.

A man's achievements should be judged, not merely by how he goes, but by how far he goes. No man has risen in that short period to all the ranks of the mechanical department of a great railroad system, without having those essential qualities of energy, of courage, of fidelity to

duty, and ability that are essential to a really successful career. But in addition to this he has been honored by his associates in this organization—the greatest organization of its kind in the world—by the bestowal upon him of the highest offices in its power to grant. I believe he has directed your work and presided over your deliberations for a longer period than any other man. He has been your chairman during one of the most remarkable and trying periods in the history of the railroads of the United States and I am sure that there is no one here who will question the tact, the energy, the courage, and the ability with which he has performed his duties under these trying conditions.

Now he passes into the ranks of the elder statesmen. There is an old saying, "Old men for counsel and young men for war." I think that the reference to old men here means not so much years, as it does experience. It means experienced men for counsel and young men for war, because young men have more energy and courage than old men and a want of caution which, perhaps in some cases, is a good quality. But youth always needs guidance and encouragement and I am sure as one of the elder statesmen of this association, sir, that you will in the future, as you have in the past, use your influence to help in the education of the younger men. You will encourage them to participate in the active proceedings of this organization, to do their work as you have done yours, in order that the next generation of railway officers may be equal to that of which you are a member.

It is a great pleasure and honor for me to have the opportunity to pin upon you this past president's badge which has been presented to so many of your predecessors and which is an insignia of a higher honor than many we saw when we were traveling together on the other side.

Mr. Tollerton: It is always very pleasant to hear nice things said about us. It is a great honor and I appreciate it fully, but it has also been a great pleasure to preside over this wonderful organization.

I want to wish for it all the prosperity in the world, and for each and every individual member, long life, good health and happiness. I thank you.

(*On motion the meeting then adjourned.*)

Brakes on Track Exhibit

ONE OF THE track exhibits this year is the 120-ton capacity car taken from regular service on the Virginian Railway. This car is one of a lot of 1,000 built about two years ago and is equipped with the Westinghouse "empty and load brake" which, when operated in load position, develops a braking ratio of 40 per cent of the total gross weight of the loaded car. This car has been in regular everyday service since it was built and the original brake shoes applied by the car builders are still in service after making 10,000 miles. As yet they show little wear, notwithstanding the heavy braking required under the severe traffic conditions. This small brake shoe wear is no doubt largely contributed to by the use of the elasp brake, which distributes the heavy brake shoe load. It is anticipated that the life of the brake shoes on these cars will be at least 40,000 car miles, which will contribute to a very material saving in brake shoes and in the labor of their replacement and piston travel adjustment. One of the trucks, which is of the six-wheel type, has been run out from under the car in order that it may be inspected easily.

Another device which will be of interest to air brake men is the Minich super-safety hand brake applied to one of the Philadelphia & Reading hopper bottom coal cars.



Division VI—Purchases and Stores—American Railway Ass'n

Reports on Special Subjects Covering Sinking Fund for Deterioration, Obsolescence, etc.;
Office Routine; Stationery and Educating Employees

The chairman called the meeting to order at 9:30.

Report on Forest Products

W. A. Summerhays (Ill. Cent.), chairman, made a report of progress saying: The committee had three meetings during the year and engaged in general discussion of the conditions as pertaining to its work and reviewed the work of the past committees. It desires to report progress in this connection, with the addition of the following:

The committee having in mind conservation of lumber and the need of procuring and furnishing the right quality and size of Forest Products for the right use has given study to the question of specifications. The present lumber specifications in effect in the Engineering and Mechanical Divisions are not adequate and the work of revising them is underway. This will be handled by a joint committee appointed by the Board of Directors, representing the Engineering, Mechanical and Purchases and Stores Divisions.

That this work is timely is evidenced by the work recently

undertaken at the invitation of the Secretary of Commerce, Mr. Hoover, by the Lumber Manufacturing & Distributing Associations. Representatives of all the leading associations of producers, wholesalers and consumers of lumber met at Washington May 22 to 25 of this year for a discussion as to the standardization and simplification of names and descriptions of grades and in the sizes of the forest products.

It is the intention to invite the manufacturers, dealers and users of forest products to co-operate in this matter. It is expected that the American Railway Association committee, above referred to, will follow the general plan as outlined; arrive at a standard of grades and sizes suitable for all kinds of lumber and all railroad purposes. The members of Division VI are urged to support this movement in the lumber trade.

(The report of the committee was accepted and the committee was continued.)

The Need of a Sinking Fund to Care for Losses Incidental to the Handling, Use and Distribution of Materials

By H. H. Laughton

Assistant to Vice-President (Operation) Southern Railway.

FOR MANY YEARS it has been known by most experienced and practical supply officers that there should be some definite, systematic and approved plan provided for currently disposing of losses that are incidental to the handling of materials and supplies such as, shortages, deterioration, obsolescence, variation in prices, etc. It is fully recognized and thoroughly understood that shortages are inevitable, if inventories are correctly and honestly taken, for the following reasons:

1. All material received on a railroad must be charged, either directly to stock or to some other specific account.

2. A certain percentage of material becomes obsolete each year, due to various causes, the chief of which are changes in equipment or designs, discontinuance or restriction in the use of certain classes of equipment and appliances.

3. A proportion of all material carried as stock deteriorates annually due to a considerable quantity, particularly lumber, cast-

ings, etc., being carried in the open and exposed to climatic conditions.

4. When material is used and not reported by the using departments it necessarily creates a shortage.

5. Failure periodically to revise the price book to actual price conditions.

We believe the above few, (but not by any means all) examples are convincing of the necessity for the creation of a fund or suspense account to take care of the depreciation and losses in assets as reflected by materials and supplies, and to dispose of such losses currently. The plan we offer is to first establish a fixed percentage at which all second hand usable material, with such exceptions as are always necessary to properly make effective any plan, shall be taken into the assets of the company at a fixed percentage of the current market price, which percentage should produce a low minimum value for all such second hand material.

When such material is issued, it should be charged out at current market prices applicable. The difference between the second hand price, as agreed, and the new price applied, will provide a credit balance for such a fund to be known as "Suspense-Inventory Adjustment." Against this fund should be charged as developed:

1. The difference between the value of material as represented by the book or ledger value, either for sale or salvage.

2. The difference between the book value of any item and its value for actual use by the railroad.

3. All shortages due to material having been issued and not reported.

Each one of these items should be separately investigated from time to time and all of the actual facts developed.

After approval by the proper authority, the fund should be

charged by the chief accounting officer (who should have control of the account) and the stock account duly credited, with all such shortages or differences.

This method will permit the comptroller to close and distribute periodically these balances whenever desired, instead of making adjustments through operating expenses at various inventory periods.

The entire plan has for its purpose the establishment of a means by which the supply officer can handle his business in a systematic business-like way, with the knowledge that his purpose is to, as accurately as he can, provide, distribute and account for all materials, with the means of honestly, openly and clearly setting forth all losses incidental to the proper conduct of the business.

Discussion

The Chairman: Is it your idea, Mr. Pearce, that you should have an account against which you should write off depreciation?

Mr. Pearce: Yes.

The Chairman: In other words, instead of having the inventory adjusted or charged direct to primary account you want the Obsolescence Account to take care of that offered by the management.

Mr. Pearce: Every item adjusted on its merits.

The Chairman: You will support that?

Mr. Pearce: Precisely. I move that the recommendation be accepted and a committee appointed to further examine and develop it.

(The motion was seconded and carried.)

Office Organization in Purchasing and Stores Departments

By E. W. Thornley

Assistant Purchasing Agent, Baltimore & Ohio.

The activities of the purchasing and stores Departments involve a great amount of clerical work which is burdensome unless thoroughly systematized. In his paper Mr. Thornley has considered the importance of the subdivision of the office organization of these departments into bureaus, each covering one of the major sections of the work.

The greater part of the paper deals with the

purchasing department. The organization is outlined in a concise and logical manner and the duties of each of the bureaus are defined. While the plan outlined may not be applicable under all circumstances, it is sufficiently flexible to meet the requirements of the store and purchasing department officers of the larger railroads and the same general scheme should give good results on any road whether large or small.

THE STORES DEPARTMENT should be in charge of a general storekeeper who should be responsible for the custody, care and distribution of all materials not actually in use, as well as for the quantities of materials on hand, including scrap and second-hand material.

The office organization of the general storekeeper must depend entirely upon the practices pursued by the individual roads. On some of the smaller roads practically all of the accounting for materials is handled in the office of the general storekeeper. On the larger roads the practice generally in effect is to have the accounting handled by division or district stores. For this reason the office organization of a small road sometimes exceeds the organization of a much larger road. The general storekeeper's office organization on a trunk line system, which has worked out satisfactorily for a number of years, is divided as follows: Accounting Bureau, Requisition Bureau, Scrap Sales Bureau, Mail Box Bureau and Filing Bureau.

The employees of these bureaus all report to the chief clerk. The chief clerk handles the ordinary run of correspondence of the department while the assistant chief clerk handles

routine correspondence and the following defined subjects: The return of and credit for empty containers. Material for repairs to cars on foreign lines. Miscellaneous orders for material from outside concerns—excluding scrap.

It has been found desirable to maintain a complete record of all oil drums, cement sacks, gas and oxygen cylinders and containers of like character belonging to shippers, this to insure their prompt return, thereby avoiding rental charges and charges for losses owing to inability to return. Such a record will, if installed on any road handling a very large number of empty containers, result in a considerable saving.

Accounting Bureau

This bureau prepares cost data sheets, statements showing the cost of handling, audits pay rolls of the division store, prepares the consolidated stock balance sheet and answers inquiries pertaining to accounting matters. The preparation of the consolidated stock balance sheet in the office of the general storekeeper insures a prompt handling and keeps the general storekeeper in touch with all current stock balances. While the consolidated stock

book may enable the general storekeeper to determine the units of the various classes of materials on hand, he is also responsible for the money investment, and should, therefore, be equally well posted on this feature.

The practice in connection with the methods above referred to is followed on a road where the charges to primary accounts are handled on the division and the work of the accounting bureau in question deals with the accounting for physical units.

Requisition Bureau

This bureau handles all requisitions, makes transfers of surplus stocks, verifies blue prints and specification references, maintains a blue print and specification file and handles the standard stock book. All changes in blue prints or specifications are reported to the general storekeeper promptly; this enables the requisition bureau to issue corrections to the division storekeeper, thereby avoiding the possibility of purchasing materials about to become obsolete. All instructions issued by other departments affecting the distribution of material or changes in designs or blue prints, are referred to the general storekeeper for his comments and approval and when the instructions are issued they are issued as joint mechanical or maintenance of way and stores department circulars of instructions. On some roads all surplus is transferred from a consolidated stock book while other roads use a regular form provided for reporting surplus material. Either form may be handled successfully, local conditions must necessarily govern.

One advantageous practice that has been pursued for a number of years is to have the storekeeper forward to the general storekeeper a copy of every requisition prepared. In many instances it is found material is required before the original requisition reaches the general storekeeper and, owing to the fact that a copy is on file in his office, orders may be placed in advance of the receipt of the original requisition without fear of duplication or the placing of orders for improper material. Another purpose to which this copy of the requisition has been put is to make all changes necessary in connection with cancellations, reductions, transfers, changes in blue prints or specification reference on the duplicate as well as the original copy. When the original requisition is forwarded to the purchasing department or to the general storehouse from which the material is to be transferred, the copy is returned to the originating storekeeper so that his records may be changed to agree with the original requisition. This system, if pursued, will eliminate much correspondence. Another time saving feature is to take a record of all requisitions. By referring to this record, the general storekeeper is enabled at all times to locate any requisition from any station on the road.

Scrap Sales Bureau

The practice of having shipping orders, sales bills and correspondence pertaining to the sales of scrap handled by one desk has been found advantageous. As all correspondence regarding shortages in weights, improper grading, changes in shipping instructions, etc., usually reach the general storekeeper he must maintain a record of such shipments, and special card index forms have been provided for that purpose. These forms show all information as to dates of shipments, weights, etc., and claims allowed or refused, thereby insuring against duplication of claims. The general storekeeper can at any time by examination of the open cars determine the amount of scrap unshipped on sales certificates and takes the necessary action to close out. The closed cars are filed in numerical order and provide a ready reference for his information. Copies of all sales bills are kept on file in the office of the general storekeeper, thereby avoiding much unnecessary correspondence in connection with the collection, etc., on materials shipped to outside concerns and individuals.

Mailing Bureau

The mailing bureau takes care of all incoming and outgoing mail, telegrams and requisitions to be forwarded to various parties for whom intended.

Filing Bureau

The filing bureau takes care of all filing of correspondence, as well as statements.

Purchasing Department

The purchasing department should be in charge of a general purchasing agent or purchasing agent who should buy all materials and supplies of every description required for use by the railroad,

including new equipment, and should sell all scrap, obsolete and surplus materials, including retired equipment. That officer may be assisted by a buying corps, generally referred to as assistant purchasing agent, lumber agent, stationery agent, etc., to whom the purchase of certain material subjects are assigned. The general purchasing agent, or purchasing agent, decides upon the buying policies, and has general supervision over the work of the organization; individual buyers purchasing certain classes of materials as selected by him, the subjects assigned to each being, as far as practical, according to stores department material classification accounts.

Office Organization of the Purchasing Department

The purchasing department office organization may be divided into bureaus, under the supervision of chief clerk, the bureaus being designated as follows: Order Bureau, Price Record Bureau, Voucher Bureau, Correspondent Bureau, Statistical Bureau, Filing Bureau, Miscellaneous Sales Bureau, Mailing Bureau and Freight Sales Agency.

The detail of the organization should, of course, be regulated to meet the requirements of individual railroads, but one as outlined above has proven particularly efficient on a trunk line system.

Receipt of Requisition

The routine of the office begins with the receipt of a properly approved requisition transmitted through the office of the general storekeeper. To facilitate the handling in both the stores and purchasing departments, individual requisitions are so prepared as to contain only such items of material as are properly grouped under one material classification account. Requisitions of each classification account are originated on specified dates, so that all such requisitions for one kind of material are received in the office of the general storekeeper on approximately the same day. In this way, the requisitions may all be checked at the same time with the master stock books or surplus reports and, after transferring any material available in stock, they are then forwarded to the purchasing department. By so handling, requisitions from all stations, for the requirements of one class of material reach the purchasing department at the same time, so that negotiations may be opened for the purchase of a month's supply or more of material in a given class, thereby minimizing the work of this department and making it possible to take advantage of quantity purchases, etc. Upon receipt of the requisitions in the purchasing department, and after record has been taken of their numbers, date of receipt, etc., in a form provided for that purpose, they are distributed to the respective buyers, who, in turn, indicate in the column provided, the name of the firm on whom the order is to be drawn, terms of purchase, etc., for such items that price arrangements permit, marking the remain of items "B" (for blank) and then forward to the order bureau where orders are prepared. The order numbers are marked on the requisitions, which are then filed in station and numerical order in a loose leaf binder, and thereby become an index to the orders.

Preparation of Purchase Orders

After the requisitions are properly disposed of, the next form handled is that of "purchase orders." Orders are prepared in triplicate for distribution at the proper time, as follows:

- 1—The original to the seller.
 - 2—The duplicate for the information of the engineer of tests. This is used by him in arranging the work of his department in following up the tests which are to be made at point of manufacture or destination, as the case may be.
 - 3—The triplicate for the division storekeeper originating the requisition. This is used by him in the hurrying of material, that is, where the order has been placed. In urging delivery, reference is made to the order number as well as the requisition number. The storekeeper is not permitted to hurry material direct on the shipper.
 - 4—The quadruplicate for the purchasing department's statistical bureau. This is used for compiling information as to the value of materials ordered for the information of the general purchasing agent or purchasing agent.
 - 5—The quintuplicate for the purchasing department's price record bureau.
- The orders, after proper preparation, are distributed to the respective buyers. Orders which are complete in all details are checked as to accuracy, and, after being approved by the general

purchasing agent or purchasing agent, are dated by the means of a rubber dater, and distributed as previously outlined. Inquiries are then gotten out on the orders which have been prepared in blank covering material on which no price agreement is effective and which is to be purchased on competitive bids. The order is then placed with the inquiry in the open file until the closing date, when the quotations are tabulated and at which time the order is completed by entry of name of firm with whom the business is to be placed, on what terms, etc., and then released through the regular routine. The quintuplicate, or office copy of the order, is placed numerically in a loose leaf binder as an open file, and, as invoices are received shipments are recorded thereon. After all of the material, appearing on the individual order, has been shipped, it is removed from the "open file" and placed in another loose leaf book, commonly referred to as the "completed file," where it is retained until one thousand orders are accumulated in successive numerical order at which time they are removed and are bound as a permanent record.

Price Bureau

Closely connected with orders, in fact, a direct outcome thereof, are the duties assigned to those employed in the price bureau. The work in this department is sub-divided along material classification lines, i. e., the individual price clerk handles only certain accounts, and thereby becomes more or less of a specialist in the class assigned to him. The duties incumbent upon positions in this bureau, are:

1—Tabulation of the quotations received in response to inquiries.

2—Posting of invoices received on the quintuplicate copy of the original purchase order, showing the date of shipments and quantities forwarded. This permits of knowledge at all times of the status of orders placed.

3—Checking of invoices for correctness of price, terms of purchase, etc., and the recording of them in what are termed the price books. The price books are loose leaf ledgers in which are two distinctive styles of sheets. The one form is used for recording accepted prices taken from contracts and tabulations from which awards have been made. On the other form an entry is made of the material bought showing date of order; date of invoice; quantity of material covered by the invoice; unit price; total amount of invoice, etc. These books are arranged in alphabetical order, and permit of records being taken of separate items or groups of materials purchased. For example if space were provided for boiler tubes, the first sheet of this subject would be for prices, following which would be pages necessary for entering a complete record of shipments of boiler tubes.

4—Where incorrect information is given on the invoice by the shipper, such as to the price, terms, etc., they are returned to him by the price clerk for correction. This is handled through the means of a printed form of circular letter in order to expedite the handling. A record of this transaction is kept to insure that discounts or delayed payments brought about by these errors on the part of the firm, are not charged against the railroad.

Voucher Bureau

The voucher bureau next handles the purchase invoice after same has passed from the price bureau into the voucher bureau, it is recorded in the "voucher ledger" according to firm's name, and is then listed to the division storkeeper for approval as to the receipt of materials, etc. The original purchase invoice, in most cases, can be handled promptly upon receipt in the office of the division storkeeper, due to the fact that the shipper forwards a duplicate copy thereof to him on the date that the original is mailed to the purchasing department, and this permits the division storkeeper to have all verifications ready on his duplicate copy for comparison with the original when received. After the division storkeeper makes proper certification on the face of the original invoice as to the receipt of the materials, and supports same with freight bills, and, where necessary with copies of inspection reports of the test bureau, he re-lists same to the purchasing department and transmits them thru the office of the general storkeeper. Upon their arrival in the voucher bureau, they are again checked with the ledger as to their return, and are then filed in alphabetical and firm order. At regular intervals throughout the month vouchers are prepared in duplicate to cover their payment. Invoices carrying cash discounts are, of course, vouchered in time to avail of the discount, while those carrying discounts are vouchered at stated intervals through

out the month. All vouchers are transmitted to the treasurer through the office of the auditor. Another duty assigned to the voucher bureau is that of handling all correspondence pertaining to accounts, such as, delayed payments; verifications of the correctness of the monthly statements submitted by the shippers, etc.

Correspondence Bureau

The work assigned to this bureau consists of:

1—Hurry delivery of materials.

2—Following up orders for shipments that are not made within the specified time agreed to when orders are placed.

3—Tracing shipments delayed enroute.

4—Supplying additional information on orders placed.

5—Furnishing blue prints, specifications, etc.

The greater portion or the time of the employees in this bureau is devoted to the hurrying of shipments and following up of the orders on which shipments are delinquent. The subjects assigned are according to the store department material classification, and, generally speaking, are in the same order as are handled by the individual buyers, that is, each individual buyer is supported with a correspondence clerk, this being done to insure greater efficiency. Where there is any marked trouble or delay experienced in the making of shipments, or, where a concern is generally slow in making deliveries, the information is transmitted to the respective buyers which enables them to take necessary action to insure that the terms of purchase are complied with, and, as a guidance in the award of future business.

Statistical Bureau

All office statistics are compiled in this bureau. They consist of:

1—Preparation of information as to the quantities of the more important items purchased, together with the total and unit cost thereof.

2—Preparation of reports for the Interstate Commerce Commission and other governmental bodies.

3—Recording of time of the employees in the department and the preparation of pay-rolls.

4—Following up of contracts to insure that all provisions thereof are met.

Filing Bureau

The work assigned to this bureau is similar to that found in all well regulated offices, and, generally speaking, consists of the proper filing of correspondence, reports, etc., in which the "cross index" system is used.

Miscellaneous Sales Bureau

This bureau handles all matters pertaining to the disposition of scrap, obsolete and surplus materials. In it is handled the preparation of the form soliciting bids; the tabulation of offers received, the preparation of sales certificates and the proper recording of all transactions from that date.

Mailing Bureau

The duties of the employees of this bureau are self-explanatory. They receive all incoming mail, as well as telegrams, mailgrams, etc., and distribute same to the proper recipients. It is also their duty to look after the forwarding of all outgoing mail, orders, etc.

It is to the representatives of this bureau that commercial salesmen, etc., present themselves when desirous of interviewing the general purchasing agent or purchasing agent, as well as the members of his buying staff, and it is felt that these employees can go a long way towards creating a friendly feeling between buyers and sellers. It is commonly known that, where friendly relations exist between the railroad buyers and members of commercial houses, the former are given the advantage of special opportunities whenever the commercial representatives have them to offer. If the reception clerk can greet a visitor by name it tends to create a friendly feeling and it is thought that such employees should be impressed with the desirability of remembering faces to the greatest possible extent in order that they may so greet representatives who, in turn, generally live up to the cordial greeting.

Freight Sales Agency

A freight sales agency, in charge of a freight sales agent, under the supervision of the general purchasing agent, has been found to be the best means of disposing of all over, damaged and refused

freight shipments, except perishable freight. This material is disposed of, in the majority of cases, through competitive bidding. The old practice of accumulating freight at warehouses at various points on the railroad, and selling at public auction at stated intervals throughout the year, is not nearly so satisfactory as concentrating the freight and selling it through the medium of an agency. The principal advantages obtained are three-fold. They are:

- 1—Better accounting for refused and unclaimed freight.
- 2—Greater returns are received due to the higher prices obtained.
- 3—Increased efficiency in handling to prevent further damage and deterioration.

When the shipments are received at the freight sales agency, each individual item is numbered and a record taken in a loose leaf book, giving a general description of the commodity and its condition, way-bill reference, forwarding station, and where possible, the name of the consignor and consignee, and the town or city from which originally shipped. A copy of this report is forwarded to the general freight claim agent for his information and record, and, in a great many instances he is enabled to reconcile claims and have shipments returned to the owner, and cancel the claim. The shipments, when received, are unpacked, put in presentable shelves to permit of a ready examination. This arrangement is carried out along lines similar to the sectional arrangements at our storehouses, in that certain places are assigned for handling freight of particular classes. When over-shipments are received, and especially when the freight is in good condition, such as household goods, etc., for which a large number of claims are usually filed, the same are withheld from sale until every effort is exhausted by the general freight claim agent to locate the owner. A card index file is kept showing the names and addresses of purchasers of various commodities, and when shipments are ready to be sold, a notice is sent them showing the sales number and description of the items, inviting inspection and their best offer. When bids have been received, they are tabulated and award made to the highest bidder. By this method of handling, the possibility of forming pools for buying at ridiculously low prices, as is often done at public auction sales, can be reduced to a minimum.

Discussion

W. F. Jones (N. Y. C.): In numbering requisitions, we supplement the Purchasing Agent's numbers with classification numbers. In other words, when ordering material under classification 45, the number of the requisition would be "6-45-1," "6" being the Purchasing Agent's number; "45" the classification number; and "1" the page number. All invoices are filed in my office according to classification number; and when the requisitions are finally filed in the purchasing agent's department they are filed according to classification number. Then when the purchasing agent calls for them, to get up statistics in regard to any particular item, he has the requisitions all to-

gether under that classification. In regard to "Separation of Purchase Orders," Item No. 3, those are delivered every two or three days, or every week. The purchasing department has prepared blanks which are signed by the purchasing agent. Every division storekeeper has a supply of these blanks and when he gets material he traces it directly on the number which he gave to the order and sends a copy to the purchasing agent. The reply goes direct to the purchasing agent, and when he makes any comments he sends copies to the general storekeeper.

Vice-President Reed: Is the organization based on the governmental organization at Washington?

E. W. Thornley (B. & O.): No; the form, or 90 per cent of it, is being used on the Baltimore and Ohio today.

Vice-Chairman Reed: About two years ago we made an investigation on the Rock Island with reference to the heavy losses incident to the leakage of paint, which is shipped in wooden barrels. We found the amount to be between \$15,000 and \$18,000 per year. The Rock Island runs from Oklahoma and Texas to Minneapolis and St. Paul. We found that while we would not lose much paint in Minnesota, considerable quantities would be lost in Texas. At the suggestion of the paint manufacturers, we adopted the "one-time" shipping container. This is a steel drum, made of light gage sheets, costs about \$3.00 or \$3.50, and does not break open when handled. The head of the drum is about 12 or 14 in. in diameter and is put on with set screws and a gasket, which can be taken off. After the paint is taken out the drum can be used as a water barrel or fire barrel and for the shipment of crude oil, fuel oil, and items of that kind on the railroad.

H. H. Loughton (Southern): Is this loss and damage taken into the stock account?

E. W. Thornley (B. & O.): No. The records are turned over to the general freight claim agent; we act as his agent.

The Chairman: Approximately how many clerks would be required in the purchasing office of a large road to handle an organization the size you outlined?

Mr. Thornley: I think we have approximately 37 clerks in our organization. That includes purchasing organization, lumber agent's office, and freight sales agent.

J. C. Kirk (C. R. I. & P.): Some of our paint comes in five gallon cans which have a pressed lid. We are able to reclaim these cans and make dope pails out of them.

A. A. Goodchild (C. P.): We make all shipments in five-gallon oil cans.

Possible Economies in the Stationery Store

By B. C. Tobey

General Storekeeper, Lehigh Valley.

THE WHOLE PRODUCT of the stores department is economy. It can produce nothing else. It is absolutely essential that we all, both individually and collectively, show that we are interested in this question.

It is generally conceded that stationery should be handled as a part of the general stores organization and be placed under the direct jurisdiction of the general storekeeper, and that handling of stationery as a separate stock, with a stationery storekeeper in charge, should be done at general storehouses wherever they are centrally or conveniently located, as when so arranged there is a complete organization on the ground for ordering, receiving, storing, distributing and accounting for material and supplies that can be utilized to the best advantage from day to day, as the work demands, at a minimum of expense.

All railroads should have a stationery committee and have as

its chairman a direct representative of the chief executive officer, the balance of the committee to include the stationery storekeeper and representatives of using departments.

The first and most important thing to do, is to adopt "standards"—whether it be pencils, ink, pens, books or blanks—and one of the most important of these is quality of paper to be used. Impress upon all concerned that paper "grows" in standard sizes only and that all reports, blanks and books should be made of a size to cut without waste from these sizes. This committee should designate the kinds and quality of all standard stationery, office supplies and mechanical appliances. No changes in existing forms or no new forms should be introduced without the approval of this committee. Standardization of forms permits ordering in quantity with the consequent reductions in costs.

In ordering a new form, the paper, weight and quality ought

ways to be considered. Unless a form is of an important character requiring a high grade of paper, cheap white chemical manila stock should be used, and it will be found that light weight stock serves in most cases. Colored paper should never be used unless absolutely required for some specific purpose, it being more expensive and difficult to get.

Whenever possible to do so, forms should be printed on the back of printed forms which have become obsolete. Black ink should be used, as it is the cheapest kind obtained.

Probably the largest saving to be made in the operation of a stationery store is by printing a large portion of the small and simple forms locally. It will be found that fully 80 per cent of the forms used on a railroad can be printed "at home" at a saving. I do not consider that it would be economical to operate a complete equipped printing plant, or one that would be of sufficient capacity to print all the forms used, for usually a certain class of work is required, which can only be accomplished by the highest grade of skilled printers and machines. In operating a printing plant the main object is to have such facilities and labor as to keep it busy continually and let the overflow go out.

It is estimated by most roads that they are saving anywhere from 20 per cent to 50 per cent over printers' costs by doing this work themselves. The printing organization, whether it consists of one or a half dozen machines, should be given the same opportunity to bid on work to be done as commercial printers and no partiality should be shown. It will be found that there is plenty of work that can be handled by your own printing establishment at a saving to keep it running all of the time. You can also better control and keep your stationery stock balance at a minimum and give better service when printing a part of your own forms.

Multigraph equipment is being used by most of the roads and it is my personal opinion that there is room for from one to four or five such machines on every road where it is not found desirable to install complete printing plants. It can be purchased complete for about \$1,000. It has a normal capacity of 4,800 impressions per hour, size 8½ in. by 14 in. and under, and can be operated by comparatively cheap help, while a job press of a similar size would cost about \$3,000, having a normal capacity of but 2,400 impressions per hour and requiring skilled pressmen or compositors at union labor rates. Beyond runs of 100,000 it will undoubtedly be cheaper to give the work to a printer.

Every up-to-date stationery store should have a power paper cutter and a padding machine so as to be able to cut up all the obsolete forms and other blanks for figuring tabs and second sheets. There is a large amount of plain paper used on a railroad and if you buy it cut the printer will charge at least one-half cent per pound and possibly more for the cutting. With your own cutter you can cut it for one-quarter of that. This paper cutter can also be used in cutting carbon paper, cardboard, blotters, oilboards, mimeograph cloths, etc.

A few roads also make a practice of furnishing plates to printers, but do not believe there is much money saved in following this plan, as the printing market is always highly competitive and regular printers figure to distribute the cost of the plates over a period of a year or more. We are always, therefore, assured of the best prices on account of the competitive feature involved.

On one or two large systems "Duplicating Bureaus" have been established which have been very successful. The idea is to have all of the duplicating machines in the various offices placed in one office and the work consolidated. It was found that machines released were of all sizes and makes and a large number could be disposed of by sale or turned in for new up-to-date machines so that the initial cost was but very little. It would be difficult to determine the amount of labor saved since part time work was employed in all of the different offices in doing duplicating work and the operators doing this part time work expended a great deal more time than was necessary, due to the fact that the work always has to make ready the machine for a little run and then lock it up and set aside when the little job was completed.

I have also found that some ten railroads are maintaining their own typewriter repairmen or shops and are apparently saving considerable money. The equipment necessary consists of but a few benches or working tables on which the typewriters are placed so they can be worked on from all sides to good advantage, so that the repair man, a two-part laundry tray, one part for rollers, another for type, or basket for cleaning the machines and

parts and the other part for washing—some shelving and drawers for machines and parts, and a kit of tools, all of which will cost not much over one hundred dollars. The full kit of tools should be bought from the typewriter company, as they have the best tools adapted for that purpose. Most roads figure that they are saving from 20 per cent to 35 per cent over the cost of having this work done by typewriter companies. In addition, machines are kept in much better condition than when the work was done outside.

One railroad company reports that during the year 1920, as many as 8,095 typewriters were overhauled, repaired or inspected at an average cost of \$6.99 for overhauling, \$2.60 for light repairs and \$1.31 for adjusting and inspecting. Another road reports they repaired 456 machines at an average cost of \$9.53 as compared with \$15 per machine formerly repaired by the dealers or a saving of \$5.47 per machine repaired, a total of \$2,494.32. Still another company reports that during the year 1921, with one repairman, who is paid \$150 per month and an outfit costing \$184, they repaired and adjusted 1,244 typewriters at an average cost of \$2.10 each, or a saving of \$1,702.04 over the estimated cost of having the work done outside.

One road reports that it is making its own typewriter ribbons at a cost of less than half what good ribbons can be bought for. It is not economy to buy poor ribbons at any price. The equipment costs about \$150. The tape, best English imported, costs about \$2 per roll of approximately 150 yards and the ink costs \$2.50 per tube for record ink and \$3 per tube for black copying blue.

You can make ribbons light inked, medium light, medium heavy and heavy. The spools and boxes can be used over and over again, thus saving the purchase of any new spools or boxes.

Where the consumption of typewriter oil warrants the ordering of large quantities it will be found that quite a saving can be made by purchasing it in five gallon lots and bottling at the stationery store instead of sending out in can containers. Bottles used in shipping are Edison Battery Oil Bottles.

A majority of the roads canvassed report that they are using ink tablets or powders instead of fluid ink and thus saving anywhere from 40 per cent to 80 per cent on their ink bills. This ink is equal to fluid ink and is just as permanent. It overcomes the bad feature of shipping ink in bottles to the different offices on the road by train service, where they are frequently broken and quite likely to cause damage suits by spoiling baggage.

One road reports that they are saving \$450 per year by making their own supply of mucilage. The mucilage is made of Gum Arabic and Benzoate of Soda. The Gum Arabic is purchased in twenty-five pound lots together with one pound of Benzoate of Soda. The Gum Arabic is powdered at the Storehouse and Benzoate of Soda mixed with it and sent out in envelopes. One of these envelopes costs about seven cents and makes a quart of mucilage.

Another road reports that for the past year or two they have been maintaining a stock of carbon paper which they have been aging, that is, drying it out somewhat so that it will not be green when shipped out for use. They found that in nearly all cases companies that furnish this commodity ship it green and if used in that condition it is practically impossible to obtain maximum service.

One Stationery Storekeeper reports that on his road stamp pads are manufactured at an annual saving of \$172. On the same road mimeograph cloths are manufactured at an annual saving of \$70.

Stencil paper liquid moistener is also manufactured at a saving of \$153 per year.

Binders received at the stationery store with old scrap paper to be sold, reused or destroyed should be salvaged. One road reports saving \$3,852 on this one item in 1921.

Where stationery is not delivered by supply train or car it will pay to ship in specially constructed cases of two sizes, the larger case measuring about 30 in. by 48 in. by 24 in., and the smaller case just one-half as long.

Some of the possible economies mentioned represent but little money but, in the aggregate they amount to considerable and they have a tendency to keep everyone on the alert or lookout for waste and it is surprising how much moral effect it has on the employees.

(The report was accepted.)

Educating Employees of the Stores Department

By A. S. McKelligon

General Storekeeper, Southern Pacific.

IT is often stated that an executive or administrative officer need know little about the details of the business. This does not apply to the stores department. Officers or department heads should be selected from men who have gone through the mill and obtained their experience first hand, and who have shown zeal, loyalty and proficiency. The absence of this practice has been the cause of unnecessary investments in materials and enormous losses in obsolescence.

It was once considered in some quarters, and happily that day is now past, that anyone could be a storekeeper or run the stores; that it did not take any particular talent or experience.

Our help usually comes to us through recommendations of employees already in the service or from sons or daughters of employees at present in the service. Such young men and women after having the necessary school education are the best of raw material. Unfortunately in the past too many boys have wanted to immediately tackle white collar jobs; it is well and important that they have office experience, but the actual handling of the material should come first. They should start as laborers, truckers, helpers or in the stores delivery. It is important that we show interest in the work of those in the organization; we should make repeated inspections and make this in every detail. Those whom we are training soon learn whether or not the one in charge passes over certain things; it is simply a matter of continual supervision, and if supervision lets down slackness creeps in.

These employees on entering the service, no matter what the job may be, how small, should be given a general talk by the foreman in charge, or by the storekeeper, and impress upon him the importance of the work that is being carried on; the value of material stored within the storehouse and that which he comes in contact with, and in which he has a certain responsibility.

An important thing to impress upon them is to stick to the job if they once make a start. The prime essential is that one must like his work. If he does not, it is best that he choose some other line before he has gone too far. No man can hope to succeed if he takes just a passing interest in his work. Arouse their enthusiasm and once you get this aroused, never let it flag. This is done by paying proper interest to the employee's work. When you have promotions make them from your own organization; beware of importations; it is the quickest way to play hob with your organization. In saying this, it is assumed, that you have a trained man at hand. One must always know and feel that he is preparing himself for something better. Success cannot be developed in any man who has only a blank wall to look forward to; he must see an avenue of opportunity open ahead. It is the clear open road that leads to success—the blocked pathway to discouragement. Consider merit and efficiency, together, of course, with loyalty. Arouse this by frequent meetings, local as well as general; encourage suggestions; dictatorial arbitrary methods fail to bring out the best in the men. Encouragement and a friendly pat on the back will do more for most boys than a lecture, and above all, beware of the condition of waiting for some one to die. In touch-

ing on this, will quote in part from an editorial on this subject in the *Railway Age* dated May 13, 1922, entitled "Waiting for Someone to Die."

"The expression 'Waiting for Someone to Die' is not a particularly pleasant one, yet it is often heard among railway men in reference to the possibilities of promotion. It is not, however, with the advancement of individuals that this expression has been most strongly impressed upon us, but rather with the advancement of railroading itself. Now and then there are railway officers who, because of their beliefs, prejudices, misinformation, personal animosities and other reasons, are blocking the adoption of something of proved benefit."

To adapt this principle to our business we must be ready to adopt modern storekeeping methods as advocated by this section. Go back home from the conventions and really put some of the recommended practices to work, and while educating our employees be ready to learn yourself. We must visit the other fellow and see what he is doing, and just because it is someone else's idea or because it does not conform to the methods in vogue on our railroad, or of some old practice in effect for years, do not condemn the plan; give it your concern, and if you do adopt it when the occasion arises and in fairness to your neighbor's railroad, give the credit where it is due.

The initiative of the employee should be allowed to roam. Take the check rein off, but hold them up to the bit; train them to be thorough; there is no more satisfaction than having a man who is thorough. Employees should know the why and wherefore of instructions, or why a certain thing is done. You will have the aid of those down the line in carrying out an order that is intelligent to them and they know the reason therefore. It is well in the education of our employees and ourselves to compile analytical statements for comparison purposes. Make them compete, or at least get in step with the other fellow. Fair and honest team competition means progress. I have said "team" competition as individual competition breaks up the team and disrupts the family.

Fair and just treatment must be accorded to all, but our pupils must be made to understand that just treatment and fairness is due the company and department. There is a happy medium between the strict martinet style and the indulgent one. They must be taught and it must be reiterated that the various departments are organized only to carry on efficiently the different work assigned to them so that the railroad as a whole will function with the least friction—department lines must be broken down at any time and anywhere for the good of the railroad. There is only one ultimate object for which we are striving—to produce the best transportation and service at the least cost. If you train men along these lines, when stress comes to your department or railroad, when you as one unit must surmount some obstacle, you will be surrounded by a band of loyal co-workers who will fight with you and for you in such perplexities and hardship. When you must drive to get as nearly as possible something out of nothing, you will have a team and team work which will bring this as nearly to an accomplishment as possible so to do.

Fuel Conservation Joint Committee

THE Joint Committee on Fuel Conservation, consisting of seven representatives each from the Operating, Mechanical and Purchases and Stores Divisions, held its first meeting at New York City, January 6, 1921.

Wm. Schlafe, mechanical manager, Erie Railroad, was elected chairman. The representatives of the three Divisions constituting the Joint Committee elected Vice-Chairmen as follows: Operating Division, W. M. Jeffers, General Manager, Union Pacific; Mechanical Division, Wm. Schlafe, Mechanical Manager, Erie; Purchases and Stores Division, Saml. Porcher, General Purchasing Agent, Pennsylvania System.

Under the plan of organization as adopted for the Joint Com-

mittee, the Chairman and Vice-Chairman constitute a Committee of Direction. The office of the Secretary of the Mechanical Division, at Chicago, was designated as official headquarters of the Joint Committee.

The Joint Committee decided for the present to confine its activities to the following subjects:

1. Organization for Fuel Conservation, having in mind cooperation of various departments and employees.
2. Inspection of Fuel at source of supply and preparation of a fuel schedule or specification.
3. Statistics.
4. Methods of Conservation—Mechanical and Otherwise.

Meetings of the Committee were held January 6, 1921; March 29 to 30, 1921; September 7, 1921.

Discussion

The above report was read by Samuel Porcher (General Storekeeper, Penna.), chairman of the committee, who also added the following comments: Some explanation is necessary. Fuel is a very important item of railroad expense, perhaps 30 or 35 per cent. In addition to the A. R. A. many other associations give the question of fuel consumption a great deal of attention. The American Society for Testing Materials and the Association of International Railway Fuel Associations have been concerned with this subject for a number of years. From the standpoint of Purchases and Stores, and in my connection with this Joint Committee of the A. R. A., I have done what I could to bring forward the conservation of fuel. I presented to the Joint Committee at one time, in March, 1921, what I call some aspects of the Purchase of Fuel which relates closely to, or determine altogether, its conservation. They are as follows:

1. There should be a clear statement of the kinds and grades and the qualities of coal or oil to be purchased so as to insure the acquisition and receipt of fuel which is best suited for the purpose.

2. There should be a definition of the standard of quality—specifications—B. t. u., ash, preparation, size, inspection, and for oil, the gravity, etc.

3. There should be careful selection of the sources of supply. The mines or wells should be examined by competent persons to determine whether their product, the coal itself or its preparation, or the oil will be delivered in conformity with the standard of quality.

4. The product of a designated mine or oil field should be purchased rather than a commercial or pool grade.

5. There should be the stocking or storing of a certain part of the annual requirements when prices are favorable and delivery abundant or easy, and the use of that stored fuel when conditions are reversed.

6. If the coal supply is derived from mines on the line of the road and is used at many different points and if a large supply is not carried in storage at a few points, orders should be placed with the producers so that distribution can be done with the shortest haul and the most easily maintained communication.

7. An ample supply of cars should be furnished.

8. The management of purchases should be put in hands of a capable purchasing agent or fuel agent with a competent organization.

9. There should be co-ordination of that buying organization and the operating, traffic and transportation branches.

10. Conservation is understood to relate to the kinds of fuel and their proper and most economical use rather than to the price at which fuel may be had; the lowest priced fuel per ton or barrel for oil might not bring the best return per dollar expended, and therefore, in this analysis prices are not taken into consideration beyond the making them a factor in the determination of the problem commensurate with the other factors consequent upon them.

(It was moved and seconded that the report of the committee be accepted as read and that Mr. Porcher be continued as representative of Division VI on the Joint Committee.)

Report of Memorial Committee

It is with deep regret we have to announce the death of the following members of this association since our last meeting:

- I. H. Collins, Southern Pacific Co., Los Angeles, Cal.
- Chas. P. Jennings, Bingham & Garfield, San Francisco, Cal.
- O. C. Wakefield, Northern Pacific, St. Paul, Minn.
- V. J. Angier, Baltimore & Ohio, Balt., Md.

Realizing the loss to the Association and to the families and friends, *Be it resolved* that we, the members of the American Railway Association, Division VI, Purchases and Stores, express our sympathy with the families of each member and their friends: *And further resolved*, that this resolution be printed in the minutes of the Association and the Secretary be instructed to forward a copy to the relatives of each of the departed.

Report of the Committee on Resolutions

After an absence of two years from Atlantic City, we return and receive the same cordial welcome from her citizens, through their distinguished Mayor, Mr. Edward Bader.

We are also honored with the presence of the representatives of the Railway Age, Railway Purchase and Stores, and other prominent guests and distinguished visitors.

In acknowledgement of such, it is the desire that a public expression of our appreciation be tendered.

Therefore, be it resolved—That a vote of thanks be extended to these gentlemen, and to our President and his staff, together with the members of our executive committee, together with the various standing committees, for their very able and efficient services in our behalf; and that the same vote be extended to cover the efforts of the New York Central and Southern Pacific representatives for their portrayal of Supply Train and Unit System of Filing:

And be it further resolved: That we are highly honored by the presence of Vice-President Elisha Lee of the Pennsylvania Railroad and Mr. Wise from Washington, and that a vote of thanks be extended to them for their very instructive addresses; and

Be it further resolved: That we express our appreciation to the management of the Traymore Hotel for their reception and cordial treatment extended to our Division while in their midst.

Resignation of J. P. Murphy

J. G. Stewart: The general committee has received the resignation of J. P. Murphy, as secretary. Mr. Murphy has been to our association almost as a father. I believe at every meeting we have had Mr. Murphy has been present and in every way getting into it and working. I am almost certain, although not entirely so, that he was the leading spirit in suggestion in an association of this kind. I am almost certain that, except for the efforts Mr. Murphy put forth, not always pleasant ones, but nevertheless always enthusiastically given by him, this organization would never have existed.

I would like to offer this resolution to our meeting today:

"It is with sincere regret that we received the resignation of J. P. Murphy, as secretary of Division No. VI, Purchases and Stores, and in accepting this resignation, we are not unmindful of the valued service and great sacrifice Mr. Murphy has rendered for the success of the Railway Storekeeper's Association and Division VI of the Purchases and Stores of the A. R. A., and it is only at his own request and urgent desire that this association accepts his resignation."

(A standing vote was taken and the secretary directed to see that Mr. Murphy received a copy of the resolution, and also to send copies to the N. Y. Central officials.)

Election of Officers

The following members to the General Committee were elected for 1923.

General Committee for two-year term, expiring June, 1924.

Chairman—F. D. Reed, Vice-Pres. C. R. I & P.

Vice-Chairman—U. K. Hall, Supv. of Stores U. P.

Exp. 1924.

R. C. Vaughan, Vice-Pres. Canadian National Railways.

R. J. Elliott, Pur. Agent Northern Pacific.

H. H. Loughton, Asst. to Vice-Pres. Southern.

W. G. Phelps, Pur. Agent Pennsylvania.

Wm. Davidson*, General Storekeeper Illinois Central.

C. D. Young, general supervisor of Stores Penna.

J. G. W. Stewart, General Storekeeper C. B. & Q. Expiring 1923.

J. F. Marshall, Pur. Agent C. & A.

*Mr. Davidson—J. F. Marshall to fill out the unexpired term of U. K. Hall.

Nominating Committee

In accordance with Section 4 (g) of the Rules of Order, the following members were elected members of the Committee on Nominations during the ensuing year:

F. A. Bushnell, Purchasing Agent Great Northern.

J. G. Stuart, General Storekeeper Chicago, Burlington & Quincy.

O. Nelson, General Storekeeper Union Pacific.

H. P. McQuilkin, General Storekeeper Baltimore & Ohio.

G. A. Secor, General Storekeeper Chicago & Alton.

(The Division VI was adjourned.)

**Registration, American
Railway Association
Division V—Mechanical**

- Burgert, Otto, Gen. Fore., Penn., Lloyd.
- Burns, R. C., Asst. Engr., Penn., Haddon Hall.
- Campbell, W. T., Vice Pres., N. Y. S. & West., Ambassador.
- Caton, S. W., M. C. B., N. M., Monticello.
- Chandler, C., Asst. Eng. of Bridg., I. C., Ambassador.
- Cherry, Jos., S. M. P., N. Y. C., Marlborough.
- Clark, J. C., Gen. Fore., P. R., Traymore.
- Collins, M. E., Gen. Car Fore., C. & O., Haddon Hall.
- Corbett, W. H., Div. M. M., M. C., St. Charles.
- Crawford, D. F., Past Pres., M. C. B. & M. M. assus., Brighton
- Creed, L. M., M. C., Sewell Valley.
- Cunningham, E. A., Eff. Eng., C. P., Ambassador.
- Cunningham, J. L., S. M. P., Penn., Ambassador.
- Currie, H. A., Asst. Elect. Engr., N. Y. C., Traymore.
- Davenport, J. E., Engr. Dpn. of Tests, N. Y. C., Marl.
- Elmer, Wm., Supt. Middle Div., Penn., Traymore.
- Falck, F. M., Gen. Mgr., P. & R.
- Farrell, A. J., Supt. Shamokin Div., P. & R.
- Foertsch Thos. A., Road. Fore. of Eng., P. & R.
- Gleason, M. A., M. M., B. & O., Osborn.
- Hallett, W. E., Gen. Mgr., Bangor & Aroostook, Marl.
- Hanlon, A. A., Asst. Train., P. & R.
- Harpert, H. L., Gen. Air Brake Insp., L. V. & H. R., Bothwell.
- Harris, H. E., Genl. Fore. Car Dept., N. C. & St. L., New England.
- Hassett, M. W., M. M., N. Y. C., Worthington.
- Hatch, F. G., Gen. Fore., B. & M., Y. M. C. A.
- Hawthorn, B. D., G. S. M. P., A. & L., Ambassador.
- Heinbach, Wilfred F. G. F., P. & R., Bosworth.
- Hendricks, L. W., M. S., Bangor & Aroostook, Haddon Hall.
- Hudson, H. H., Asst. Engr. Test., N. Y. N. H. & H., Strand.
- Hyatt, W. W., Supt. N. Y. Div., P. & R.
- Kelley, M. J., Supt. C. W. Pull. & S., DeVille.
- Kifer, H. W., Trav. Air Brake Insp., S. P., Princess.
- Lenzner, S., Sup. Pass. Frt. Dept., M. C.
- Levesque, G. F., M. M., Quebec Mont. & South., Princess.
- Lyons, T. F., Air Brake Insp., N. Y. C. West., Haddon Hall.
- McCarthy, A., Genl. Fore. Elect. Car Ltg., N. Y. C., Breakers.
- Maher, M. A., Agt. E. J. & E. R. R., Joliet, Ill. Chelsea.
- Mayer, F. E., Gen. Shop Insp., Penna.
- Miles, C. B., Air Brake Supt., Big S., Princess.
- Moist, H. J., Gen. Fore. Loco. Dept., R. F. & P., Marl.
- Muddell, J. L., Air Brake Instr., Penn.
- Musser, C. W., Con. Fore., Penn.
- Nicholas, R. H., Asst. M. C. R. R. of N. J., New Brady.
- Niemann, J. J., Rd. Fore. of Eng., Penn.
- O'Donnell, John, Genl. Fore., L. I., Chalfonte.
- O'Neill, Fred C., Air Brake Instr., C. C. & St., Princess.
- Ott, W. B., M. M., Penn., Seaside.
- Palmer, L. W., M. M., East Broad Top, Richmond.
- Ramage, J. C., Eng. of Tests, Southern, Chalfonte.
- Rausch, H. S., Genl. Fore., N. Y. C., Grand Atlantic.
- Reed, E. M., M. M., Penn., Craig Hall.
- Reilly, R. J., Genl. Agt., L. V.
- Riddell, Frank, Ch. Power Plant Insp., Penn., Marl.
- Robinson, J. J., M. M., Southern, Dennis.
- Rogers, F. M., Gen. Elect., Penn.
- Rudolph, J. R., Gen. Air Brake Insp., L. I., Haddon Hall.
- Smith, L. G., E. E., L. V.
- Stenson, W. G., Genl. Air Brake Insp., Can. Pac., New England.
- Steele, John H., M. M., P. & R., Wyoming.
- Stubbins, W. T., Genl. Fore., Penna., Haddon Hall.
- Summer, E. S., M. P., Penn.
- Swope, B. M., Asst. M. M., Penn.
- Tutt, F. H., M. S., M. C., Traymore.
- Umpley, C. H., M. M., N. Y. C., Princess.
- Wynn, E. P., Sup. P. & S., P. & R. R.

Special Guests

- Ainsworth, N. J., Genl. Air Brake Insp., D. & R. G. W., Haddon Hall.
- Allison, Jos. L., Asst. For., P. & R.
- Allison, Mrs. Jos. L., Asst. For., P. & R.
- Appleton, W. H., Fore. Eng. House, Penna.
- Austin, J. B., Fore., Penn.
- Barr, B. T., Air Brake Insp.
- Beck, I. N., A. B. Fore., C. R. R. of N. J., Edison.
- Bell, F. E., R. F. of E., Virginian, Bothwell.
- Bensch, O. A., Air Brake Mach., L. I., Station Hotel.
- Berry, Ellis, Yard Cl., G. T., Merrimque.
- Bickel, Oliver A., Drafts. M. P. Dept., P. & R., Stanley.
- Bickley, W. H., Eng. Fore., Penn.
- Bliss, H. A., Genl. Air Brake Insp., B. & M., Bothwell.
- Brooks, L. W., Air Brake Fore., Erie, Holmhurst.
- Bommel, C. T., Sup. Maint. of Stand. B. & O., Schlitz.
- Booth, J. F., Air Brake Fore., C. & O., Haddon Hall.
- Boyer, Samuel D., C. C. to P. D., B. & O., Strand.
- Bowman, Bartlett W., Mach. Air Brake Asst., L. V., Princess.
- Bowlan, E. J., Fore. Penn., Brighton Apts.
- Bracken, J. L., Asst. Elec. Engr., New Haven.
- Brenchley, F. W., A. B. M., Erie, Wyoming Valley.
- Brooks, L. M., Sec. to Chief. Eng. M. P. & R. S., N. Y. C., Traymore.
- Brown, C. M., Air Brake Insp., Ga. & Fla., Breakers.
- Burke, J. A., Asst. Genl. Air Brake Co., A. T. & S. F., Haddon Hall.
- Burke, Thomas F., Air Brake Instr., Wheel. Tract, Princess.
- Byrnes, Lawrence V., Eng. P. & R.
- Caruthers, E. W., Supy. Draft., Penn.
- Cashman, Edw. A., Air Brake Insp., P. & R., Princess.
- Cavanaugh, Mrs. C. H., P. & R., Somerset.
- Clark, H. A., Genl. A. B. Insp., Minn. & St. Paul & S. S. M., Haddon Hall.
- Clegg, Thos., Air Brake Insp., Can. Nat., New England.
- Clinger, G. E., M. W. & S. Store. Penn., Blackstone.
- Conley, Bertus D., Fore. Mach., L. V., Belmont.
- Conley, Mr. J. H., Spec. Stat., L. & N. E.
- Cook, C., Retired Fore., M. P., Penn.
- Cox, Geo., Lead. Draft., N. Y. C.
- Coyle, G. W., Eng. B. & O., Lyric.
- Coyne, W. A., Fore. Air Brake Dept., N. Y. C., New England.
- Crain, Raymond, B. A. B. I., D. & W.
- Crawford, H. E., Stock, W. J. & Seashore, City res.
- Croft, Geo. W., Mach. A. T. & S. F., Princess.
- Crossen, Garfield, A. B. Fore., Ann Arbor, New England.
- Curley, W. M., Mach. Apprent. (A. B.), Sou. Y. M. C. A.
- Daley, F. M., A. B. F., Rutland, Wiltshire.
- Dalton, R. P., C. C. R. I. & P., Ambassador.
- Davies, W. H., Supt. Air Brakes, Washah, Haddon Hall.
- Davis, Daniel, Air Brk. Fore. D. & H. V., Wiltshire.
- Davis, Nellie M., Steno. P. R. R., De Ville.
- Davis, R. L., Engine House Fore., Penn., Shelburne.
- Davis, Wm. R., M. App., P. R. R., De Ville.
- Deal, Sr., Alonzo W., Air Brake Insp., P. & R. Youtie's Apt.
- Dean, B. C., Drafts. B. & M.
- Deilh, Richard W., Trav. Fore. N. Y. Div., P. & R., Newfield.
- Demarest, G. W., Insp. M. P., Penn. Lake Div., Hall Room.
- Deturek, F. D., Asst. Fore., P. & R., Arlington.
- Detweiler, Harvey B., Gov. Insp., S. A., Dixie.
- Detweiler, Neil L., Mech., P. R. R.
- Devine, W. J., Gen. Air Brake Instr., C. & N. W., New England.
- Doerr, H. C., Fore. Air Brake Dept., D. & I. R., Alamac.
- Dolan, Ed., Air Brake Instr., N. Y. C. & St. De Ville.
- Drumone, E. J., Engineer, B. & O., New England.
- Donagan, O. A., Genl., Stores Account. B. & M., Colonial.
- Donlon J. J., Asst. Fore. Md. Div., Penn.
- Dow, T. W., Genl. Air Brake Inso., Erie, Haddon Hall.
- Downs, Frederick W., Asst. Gen. Fore., P. R.
- Drayne, John, Eng. Lact. Traymore.
- Drye, A. C., Insp. G. A. B. G. T., Blackstone.
- Dunpell, E. E., Ret. R. F. of E., Penn.
- Durden, E. E., Fore. Air Brakes, Southern, New England.
- Earnshaw, Wm. T., Elect. Insp., Penn.
- Edmonds, C. G., Asst. Eng. House Fore., B. & O., New Hampshire.
- Edwards, N. F., Road Fore. of Eng., Penn., Llewlyn.
- Enright, Reeve, Ch. Hall.
- Ernst, Wm., Lead. Drafts., N. Y. C.
- Eshback, Harry W., Fore. P. & R.
- Esterly, Wm. D., Mech. Drafts., P. R., New England.
- Fackler, E. M., A. G. C. I., F. R. R.
- Fair, E. E., Eng., Washah, Chatham.
- Feeney, C. J., Asst. Fore., P. T. Div., Penn., Emmett House.
- Ferguson, Geo., Air Brake Distr., Penn.
- Filer, Jas., Ch. Eng., P. & R. R., Woodbridge.
- Fisher, C. A., Chief Train Disp., P. R., Strand.
- Fister, J. S., Eng. W. L. E., Haddon Hall.
- Foley, John, Forester, Penn., Traymore.
- Forner, Oscar, Asst. Road Fore. of Engines, C. R. R. of N. J., Brady House.
- Frank, C., Asst. Air Brake Insp., M. C. R. of N. J., Stanley.
- Freese, Harvey L., Asst. Fore. M. P. & R. B. P. & R., Jan.
- Frey, A. A., A. B. R. P. & S. B. N. E., Holmhurst.
- Fuller, H. L., T. E. & Asst. Genl. A. B. I. D. & R. G. W., Princess.
- Gall, H. J., J. Eng., Penn.
- Gallagher, Peter F., Fore., Boiler Maker, B. & O., Station.
- Garagthy, W. G., Air Brake Inst. B. & O., Breakers.
- Gardner, J. E., Air Brake Insp., Bothwell.
- Gillespie, P. D., Air Brake Insp., M. C. R. of N. J., Lyric.
- Gilmore, T. D., Air Brake Supt., Oregon Short Line, Haddon Hall.
- Glascock, Mrs. W. O., Terminal.
- Glascock, W. O., A. B. I., G. C. & S. F., Terminal.
- Glasgow, J. R., Foreman, Penn., Iroquois.
- Click, N. A., Air Brake Insp., Bangor & Aroostook, Haddon Hall.
- Goodfellow, J. W., R. H. Fore., Penn., Blackstone.
- Goodloe, J. T., Trav. Store., Southern, Breakers.
- Gomerley, Miss.
- Gossler, George S., Ret. Erect. Fore., P. & R.
- Graetz, N. R., Fore. Air Brakes, Southern, Breakers.
- Griffith, N. C., Fore. Elec. Tract., Penn.
- Griffiths David, Fore., Penn.

Division VI—Purchases and Stores

- Clay, W. J., A. G. S., P. R.
- Elder, S. M., Lum. Agt., B. & O., Strand.
- Justice, H. B., A. S., P. R. R., Avon Inn.

G...rs. B. W., Fore. P. T. Div., Penn.
 G...rch. S. E., A. B. M. P., S.
 Haag, Wm., Spec. Engr., N. Y. C. Morton.
 Haas, Frederick, Chf., P. & R.
 Haas, Mrs. Frederic, Chf., P. & R.
 Hales, Owen, Air Brake Fore., Detroit & Mac., New Belmont.
 Haley, Jr., G. D., Gang Fore., Penn. Alamac.
 Haley, M. J., Foreman, Penn.
 Hall, Samuel, Fore. Consp., P. & R.
 Hall, W. C., Eng., A. C., Lexington.
 Hammond, Mrs. W. O., Terminal.
 Hammond, W. O., A. B. F., G. C. & S. F., Terminal.
 Haran, F. J., Insp., Dist. Station System.
 Haran, Luke, Air Brake Mach., N. Y. O. & W. Avon Inn.
 Harding, J. W., Text Bk. Writer, J. C. S., Wiltshire.
 Harris, S. S., K., R. K. P., Brighton.
 Harp, L. B., Eng. Air Brake, B. & O., Allyn.
 Hartless, Byron Wm., C. A. Sso., Virginian.
 Hayes, Arthur A., Brake Assn., St. L. & San Fran.
 Heiser, Geo. W., Drafts., P. & R., Gage.
 Heist Floyd L., Transit, P. & R., Tahor.
 Hemminge, Albert P., Shop Insp., Penn.
 Hennick, G. L., Car Fore., B. & O., Silverside.
 Henry, F. C., Eng., Virginian, Princess.
 Herndon, W. D., A. B. Insp., Jacks Term., Staunton.
 Hibb, G. E., Asst. Road Fore., Penn., Seaside.
 Himan, J. M., Dist. Store, M. P., Breakers.
 Hitchen, B., Air Brake Insp., B. R. & T., New England.
 Hoffman, R. T., Eng., Penn.
 Houston, Francis R., Asst. Fore. Engrs., P. & R.
 Holmes, A. M., P. A., L. H. R., Haddon Hall.
 Holmstead, T. H., Eng., Penn.
 Hooper, W. G., Shop Fore. Md. Div., B. & O., Princess.
 Horton, Clarence, Fore. Instr., B. & O.
 Howe, John C., Asst. Fore., P. & R.
 Hubbard, J. A., Air Brake Repair, Penn., Princess.
 Hukill, W. S., Chf. Drafts., Md. Div., Penn.
 Hunt, T., Air Brake, P. & R., Breakers.
 Hummel, Albert M., Mach., P. & R., Princess.
 Hunter, J., Conductor, G. T., New England.
 Hunter, W. C., Air Brake Insp., Can. Natl. Rys., Haddon Hall.
 Ingham, C. J., Transactor, Chf. (P. D. H.), Penn.
 Jewell, L. A., Air Brake Suprv., Nickel Plate, Bothwell.
 Jex, W. A., Sup. Air Brake, J. & O. Cent. Sys., Princess.
 Johnson, V. E., Trav. Store, D. L. & W., Bothwell.
 Johnston, R. S., Foreman P. T., Penn.
 Joiner, T. N., Eng. Insp., Penn.
 Jones, J. Arabic, Air Brake Suprv., D. & H., Wiltshire.
 Jones, B. V., Asst. Fore. (Air Brake), P. & R., Station Hotel.
 Jones, Harvey L., Eng., Atlantic City.
 Jones, W. E., Foreman, Penn.
 Jost, J. William, M. P. & R. E. Dept., P. & R.
 Kalb, J. A., Train Lett. Insp., Penn.
 Kaley, C. W., Conductor, W. J. E., Bothwell.
 Kane, C. J., Gang Fore., Penn.
 Kaselan, E., Sup. of Piece Work, Erie, Princess.
 Kastla, Louis, Eng., B. & O., Bothwell.
 Keckeloth, F. J., Machine Fore., C. & N. W., Blackstone.
 Keller, Ralph B., Fore., P. & R.
 Kelley, Henry S., A. B. Insp., M. C., Princess.
 Kelley, H. S., E., Penn.
 Kelly, Philip M., Insp., M. P. Dept., C. R. R. of N. J.
 Kinney, E. A., Penn., Seaside.
 Kipatnick, W. H., Fore., Penn.
 Koch, Louise Miss.
 Koch, Philip Mrs.
 Koch, Philip, For. Eng. H., Atl. C. R.
 Koeling, U. H., Air Brake Insp., P. E.
 Kubn, I. C., Air Brake Mach., P. C. C. & St. L., Princess.
 Lamb, William N., Fore. Paint Shop, Penn.
 Langham, John N., C. & A., Blackstone.
 Langham, J. W., Store & Shop Acct., C. & A., Blackstone.
 Larkins, Mrs. Thos. A., Glohe.
 Larkins, Thms. A., Gen. Yard Mas., P. & R., Glohe.
 Lavelle, John, Air Brake Insp.
 Lawson, Albert E., Loco. Eng., G. T. Can., Avon Inn.
 Layton, J. L., Insp. P. & R. Dept., Penn.
 Leas, Mrs. Zieber J.
 Leas, Zieber J., Asst. For., P. & R.
 Leary, C. L., Genl. Supt. P. J. Div., Penn.
 Leung, Mass.
 Lenhart, Paul M., Sr. Comput. Val. Dept., P. & R., Gage Room.
 Leonard, W. W., Chf. Car Light. Supv., B. & O., Ressler.
 Lesure, H. K., Chf. Elec., Penn.
 Lumb, Wm., Mach., P. & R.
 Linton, C. N., C. P. D., P. & R.
 Llobel, Norman, Consult. Engr. Off., Penn., Haddon Hall.
 Livingston, Hugh J., Insp. Air Brakes, B. I., Bothwell.
 Loeffel, Mrs. Robert, P. & R., Phnt., Penn.
 Loomer, J. O., C. A. P. Insp., N. & W., Wiltshire.
 Lotz, Paul P., Mech. Apprent., Southern, Y. M. C. A.
 Lukens, H. A., Coal Agt., Penn.
 Lynch, G. H., Chf. Drafts., A. L., Haddon Hall.
 Lyons, George P., Asst. Fore. Dist. Phnt., Penn.
 Lyons, J. C., Genl. Erect. Fore., J. C. Princess.
 Mac Daniels, J. R., Genl. Air Brake Insp., V. P., Bothwell.
 Mac Donald, W. G., Fore., Penn., Monticello.
 Mac Rae, Albert, F. H., Santa Fe Mfg., Santa Fe, Breakers.
 Mac Aneeny, J. J., Air Brake Fore., N. & W., McKinley House.
 Mac Aneeny, J. C., Ch. H., R. Adm.
 Mac Aneeny, A. H., Mach., Penn., Boswell.
 Mac Aneeny, T. G., Ch. Supt. S. E., Penn.
 Mac Aneeny, F. F., Master Carp., Penn.
 Mac Aneeny, T., Air Brake Insp., M. G., New England.
 Mac Aneeny, I. S., Fore., Penn.
 Mac Aneeny, I. H., M. P., Wash., Haddon Hall.
 Mac Aneeny, N. N., N. T. Supt., Penn.
 Mac Aneeny, C. T., Supt. Air Brakes, M. K. & T., Princess.
 Mac Aneeny, J. F., Air Brake Suprv., B. & O., New Brn.
 Mac Aneeny, J. F., Air Brake Mach., L. & N. Y. M. C. A.
 Mac Aneeny, C. J., Genl. Insp., Penn.
 Mac Aneeny, J. E., Air Brake Insp., M. C., New England.
 Mac Aneeny, A. A., Tel. Lerr., Penn., Seaside.
 Mac Aneeny, A. B., C. & P. R.
 Mac Aneeny, J. C., Insp., Penn.
 Mac Aneeny, G. V., Insp., M. C., Bothwell.

McSweeney, P. E., Air Brake Fore., St. L. & San Fran., Haddon Hall
 McSweeney, Thos. J., Air Brake Instr., Penn.
 Madara, Wm. C., Asst. Fore., P. & R., Roberts.
 Mader, Geo. C., Asst. Fore., Penn.
 Mahaney, J. E., S. of S., C. & Alamac.
 Mais, Frank, C. F., P. R. R., Continental.
 Mann, E. Z., Air Brake Instr., A. C. L., Stanton.
 Mantes, C., Car Foreman, P. & R.
 Marnoy, Charles, Air Brake Fore., Southern, Osborne.
 Martin, John J., Round House Fore., C. R. R. of N. J., Edison.
 Massey, R. V., Elec. Insp., Pullman.
 Mathews, A. N., A. B. Fore., D. & H., Wiltshire.
 Matthews, W. H., Air Brake Instr., Penn.
 Mauger, John T., Fore., P. & R., Stevens.
 Maurer, Jas. P., Car Insp., P. & R., Emmet.
 Merrick, G. A., Ch. Drafts., N. Y. N. H. & H., Strand.
 Metz, Geo. R., Fore., Penn.
 Miller, C. H., Eng., Penn.
 Miller, Howard J., Asst. Fore., P. & R.
 Mills, G. S., Suprv. Supply Train, M. K. & T., Traymore.
 Minick, J. L., Asst. Engr., Penn.
 Montz, John B., Fore., P. T. Div., Penn., Emmett House.
 Moore, R. D., Spec. Insp., U. S. R. A.
 Moores, G. O., Asst. Engr., B. & O., Arlington.
 Morehead, W. S., Asst. S., Ill. Cent., Dennis.
 Morgan, H. H., Fore. Painter, C. of G., Osborn.
 Morrissey, T. A., Clerk Store, L. V., Princess.
 Muntz, J. H., Fore., P. T. Div., Penn.
 Murphy, James, Div. Pass. Agt., Penn., 1301 Pacific Ave.
 Murrin, C. H., Insp. Dept. of Mat., U. S. R. A., Biscayne.
 Murrin, P. J., Air Brake Ins., C. B. & G., New England.
 Murs, Robert F., Asst. Fore., P. & R.
 Mutter, John, Asst. Air Brake Instr., B. & L. E., St. Charles.
 Myer, Geo. R., Genl. Fore., Penn.
 Myers, J. J., Erect. Fore., Penn.
 Newman, F. C., Asst. Div. Store, Southern, Breakers.
 Nickols, C. H., Road Fore. of Engrs., L. V., Mansion.
 Nichols, W. G., Comm. Attach to Japanese Embassy.
 Noland, Geo. W., Conductor Fore., Penn. Princess.
 North, J. H., Chf. Clerk to V. P., L. & N. E.
 Norton, A. W., Equip. Pib. Engr., B. & O., Arlington.
 Norton, J. A., A. B. Ford, A. T. & S. E., Haddon Hall.
 Oberlander, Chas., Mach., B. & O., Marlborough.
 O'Brien, Miss Mary, Arnold.
 Oehse, D., Air Brake Fore., B. & O.
 O'Dea, J. T., Asst. to Pres. & P. A., P. & P. U. Ry., Ambassador
 O'Doherty, C. J., Div. Store, G. T., Chelsea.
 Olsen, Wm., Sup. Steam Pln., N. Y. C., Traymore.
 O'Neil, Bernard J., Car Insp., P. & R., Millburn Cottage.
 O'Neil, P. D.
 Otterstrum, Miss Marie, Bothwell.
 Overy, Bert, Air Brake Mach. Fore., I. C. R. R. (Clinton, Ill.) Senator.
 Parker, J. F., Gang Fore., Penn.
 Parkinson, W. S., Elect. Insp., Penn.
 Patchell, Robert E., Elect. M. P. & R. E. Dept., Atlantic City.
 Pearce, C. B., Rot. Asst. Eng. House Fore., Penn.
 Peoples, J. C., Shop Fore., Penn.
 Phillips, C. P., Asst Air Brake Insp. C. & O., Haddon Hall.
 Phillips, C. R., Fore., Md. Div., Penn.
 Phillips, J. H., Genl. Air Brake & Steam Insp., C. & N. W., New England.
 Plank, L. C., Insp., Penn.
 Polkinghorne, J. P., Air Brake, A. C. L., Stanton.
 Powers, C. E., Special Insp., B. & O.
 Prettyman, A. J., Fore. Elect., G. T. Co. N. C. R. R., Colonial
 Pribble, B. S., Chief Clerk, R. F. & P., Runnymede.
 Proud, N. G., Asst. Fore., Penn.
 Pugh, A. R., Gen. Air Brake Insp., Seaboard Air Line, Princess.
 Pugh, H. Loco. Insp., Can. Natl. Rys., Somerset.
 Rake, Rex, Can. Natl. Ry., Somerset.
 Ramp, C. K., Mach. B. & O., Haddon Hall.
 Reed, H. B., Genl. Fore., Pullman, Pullman Co.
 Rees, E. F., Fore. Car Insp., Penn., Princess.
 Rees, E. F., Fore. Car Insp., Penn.
 Renfry, C. N., Genl. Air Brake Insp., D. M. & N., Senator.
 Reusswig, E. J., Ch. Clerk to Supt. M. P. N. Y. C., Shulbourn.
 Rhoads, Webster S., Jr., S. M. P., B. F. & R., Marl
 Rice, Jere L., Insp. Safe, Dept., Lyria.
 Rickett, John P., Asst. Fore., P. R. R.
 Ripke, Frank J., Asst. Fore., Penn.
 Rissmiller, N. E., Fore., P. & R.
 Robbins, R. H., Air Brake, Penn., Haddon Hall.
 Robinson, T. N., Chf. Drafts., H. V., Traymore.
 Roberts, G. S., Shop Insp., Penn., Haddon Hall.
 Roderick, N. B., Suprv. Tools & Machinery, Erie, Breakers.
 Rodgers, C. J., Store, D. L. & W., Lexington.
 Rodgers, H. J., M. E., T. & N. D., Rita Carlton.
 Rogers, John L., M. E., Inter. Comm. Comm., Alamac.
 Roney, John, Asst. Train Mast., B. V., Elrit.
 Rose, N. W., E. F., Duluth & Iron Range, Rita.
 Roth, S. M., Fore. & Air Brake Ins., West Maryland.
 Router, W. H., Air B. For., I. C., Haddon Hall.
 Rule, G., Eng., B. & O., Lyria.
 Rutherford, S. A., Air Brake Instr., Walsh, Chalfont.
 Salzer, Glance, N. For. M. P. & R. R. R.
 Salzer, Mrs. Glance.
 Sanders, J. A., Engin., A. C. J., Bothwell.
 Saprunten, Chas., Asst. Gen. Fore., L. I. R. R.
 Sayler, H. B., Fore., Penn., Columbia.
 Schneider, J. M., Fore., Penn.
 Schrott, Bartley A., Fore. Eng. House, P. & R.
 Scott, J. R., Genl. Air Brake Instr., St. L. & S. F., Bothwell.
 Seckel, C. D., Sec. & Supt. M. P., B. & O., Chelsea.
 Seidell, Frank M., A. B. Insp., P. & R. Ry.
 Seidel, Wm. N., Asst. Supr. Rates, P. & R.
 Shea, J. A., Chf. Clk to Genl. S. K., N. Y. N. H. & H., Traymore.
 Shieff, F. B., Air Brake Insp., Southern, Breakers.
 Sherman, Frank, Air Brake Instr., L. & N., New England.
 Shibles, John A., Asst. H. Insp. of Loco., Inter. Comm. Com., Alamac.
 Siebert, Frank T., Gov. Insp., U. S. A., Dixie
 Slaughter, R. L., Eng. on East & West, Lines, B. & O., Bothwell.
 Slaughter, Mrs. S., Wiltshire.
 Slaughter, R. S., 1st. Pur. Dept., P. R. R., Wiltshire.
 Smith, C. W., Trav. Agt., Penn.
 Smith, Don V., Pass. F. Agt., P. & R.
 Smith, J. H., Ch. Drafts., C. R. R. of N. J.



Third Session Of The Air Brake Association

Presentation and Discussion of Report on Standard Practices Followed by Election

THE CLOSING SESSION of the Air Brake Association convention was held in Haddon Hall on Wednesday, June 21, 1922, President L. P. Streeter in the chair. After the meeting was opened, the president announced the appointment of the following Nominating Committee: T. W. Dow (Erie), William Clegg (Canadian National) and C. H. Knowlton (*Railway Age*).

Standard Practice

H. A. Clark (Soo Line), chairman of the committee on standard practice, presented the following changes and additions for consideration; these were taken up and acted upon paragraph by paragraph. All were accepted with little or no discussion except a few which were referred back to the committee for further consideration as noted.

Under heading "Air compressors," subheading "Repairs to air compressors," paragraph 2 changed to read: "Air compressors returned to the shop for repairs should be thoroughly cleaned in boiling lye or some other suitable chemical."

Under heading "Air compressors," subheading "Repairing and condemning," paragraphs 1 and 2 replaced by the following: "The caliper of the air and steam cylinders should be determined, and if worn $\frac{1}{16}$ in. or more from the diameters shown in the following table they must be rebored. When cylinders have been rebored to the sizes given in table, new piston heads and rings of increased diameter must be applied.

Kind of compressor	Cylinders to be rebored	Diameter new	Diameter after first rebore	Diameter after second or final rebore
		inches	inches	inches
9½-in. Air cylinder	Steam cylinder	9½	9⅝	9¾
9½-in. C C	High pressure steam cylinder	9½	9⅝	9¾
8½-in. C C	Low pressure air cylinder	8½	8⅝	8¾
8½-in. C C	Low pressure steam cylinder	14½	14⅝	14¾
	High pressure air cylinder	14½	14⅝	14¾
8½-in. C C	High pressure air cylinder	9	9⅝	9¾

Paragraph 4 changed to read as follows: "Piston rods with taper fit should be so arranged as to provide the standard draw, as follows, for different sizes of air compressors:"

Kind of compressor	Draw inches	Standard dimension between heads inches	Minimum dimension between heads inches
9½-in.	$\frac{7}{64}$	18- $\frac{11}{16}$	18- $\frac{47}{64}$
11-in.	$\frac{7}{32}$	21- $\frac{7}{16}$	21- $\frac{21}{64}$
8½-in.	$\frac{7}{32}$	22- $\frac{11}{16}$	22- $\frac{43}{64}$
10½-in.	$\frac{7}{32}$	22- $\frac{11}{16}$	22- $\frac{43}{64}$
No. 2	$\frac{7}{64}$	16- $\frac{5}{16}$	16- $\frac{9}{32}$
No. 3	$\frac{7}{32}$	21- $\frac{11}{32}$	21- $\frac{9}{16}$
No. 6	$\frac{7}{32}$	18- $\frac{23}{32}$	18- $\frac{11}{16}$

Paragraph 5, top of page 231 to be changed to No. 6 and read as follows: "Piston packing rings for air cylinders to be condemned when ring ends will not come together when placed in smallest part of cylinder."

Paragraph 14 changed to read: "All air valves, valve seats and cages to be of steel in all compressors."

Paragraph 15, first sentence changed to read: "In removing piston rod nuts, except castle nuts, they should be split off in line with the rod, to prevent wear and damage to rod threads and replaced with new beveled nuts that snugly fit threads on rod."

Paragraph 20 changed to read: "Piston packing rings for main valve to be condemned when ring ends do not come together when placed in their respective bushings."

Under heading "Brake valves," subheading "Cut-out cocks" to be changed to "Double heading cut-out cocks."

Heading "Distributing valves" to be changed to "Distributing valve and control valves."

Under heading "Gages," subheading "Type" to be changed to "Specifications."

Under heading "Retaining valves," paragraph 8. It is suggested that all retaining valves on vestibule passenger equipment cars be placed inside of the vestibule. (Referred back to committee for further consideration.)

Under heading "Triple valves," subheading "Cleaning and repairing," paragraph 5 changed to read: "Particular attention should be given the piston packing ring. It should have a neat fit in its groove in the piston and also in the triple piston bushing. Once removed from the piston, if distorted in any manner, it should be condemned. The fit of the packing ring in its groove and bushing and the condition of the bushing should be such as to insure the valve passing the prescribed test. New rings should be applied to the piston groove from the slide valve side and the opening should be placed in the top of cylinder while testing. When cleaning triple valves the

opening should be placed on the bottom cylinder. (The reference to application of piston ring to groove from slide valve side is added.)"

Paragraph 10 changed to read: "The cylinder cap gasket and check valve case gasket must be carefully examined and cleaned with a cloth but should not be scraped. In cleaning emergency valve seats no sharp instrument should be used that would possibly scratch or mar it. All flat seats should be re-machined to the standard half-round bearing. In re-machining emergency valve brass seats, they shall be parallel to and not to exceed $\frac{1}{64}$ in. below the finished outer surface as illustrated in drawing." (Drawing is added to make meaning more clear.)

Paragraph 15 changed to read: "Lubricate the seat and face of slide valve graduating valve with very fine high grade dry graphite prepared especially for the purpose, rubbing it thoroughly on the slide valve seat and slide valve face; also upper portion of bushing where slide valve spring bears. Endeavor to have as much as possible adhere to and fill up the pores of the brass, leaving a very thin coating of free graphite. The parts lubricated with dry graphite must be free from oil or grease." (First sentence changed by adding "very fine" and "prepared especially for the purpose" to bring out more clearly the grade of graphite to be used.)

Under heading "Brake cylinders," subheading "Cleaning and lubricating" paragraph 8 to be omitted. (This is covered in paragraph 7.)

Subheading "Brake pipe" part of paragraph 1 and paragraph 2 to be put in proper place.

Paragraph 7 changed to read: "Brake pipe on the rear of tender should be as per A. R. A. standards for cars. Brake pipe hose connection on engine should be on the left side of pilot when facing the front of engine, except where recessed pilot is used. Print shows recommended location for this type of pilot. (M. C. B. changed to A. R. A. and last sentence added.)" (In connection with this suggestion there was some discussion relating to A. R. A. standard locations and while some advocated adding a copy of the A. R. A. drawing it was not considered advisable to do so.)

Subheading "Retaining valve pipe" paragraph 4 changed to read: "All pipe used in connection with retaining valve should be wrought iron. (This eliminates the recommendation for using galvanized pipe and fittings on coal and refrigerator cars.)" (Referred back to committee.)

Paragraph 5, last word to be "pipe" instead of "type." Under heading "Foundation brake gear," subheading "brake power" paragraph 2 to be omitted. This is covered in paragraph 3 and table.

Table under paragraph 3 to have eighth item under brake cylinder pressure changed from 60 lb. to 50 lb.

Paragraph 11 to have "60 pounds" changed to "70 lb." in connection with empty and load brake.

Paragraph 12 to read: "Length and location of brake lever guides to be such as to provide for full take-up of slack by automatic slack adjuster and with 12-in. piston travel, without permitting levers to strike." (Eleven inch piston travel changed to twelve inch.)

Under heading "Air hose" paragraph 4. In connection with air brake hose coupling gages, it has been suggested that the Air Brake Association recommend to the A. R. A. that standard gages be designed for use with signal hose couplings. (Announcement made that this has already been taken up and adopted.)

Paragraph 5 to be added. "Gaskets should be purchased in accord with A. R. A. standards."

Under heading "Dummy couplings," paragraph 1 changed to read: "Passenger equipment cars, also coal and locomotives to be equipped with dummy couplings for the brake pipe and signal pipe hose; they to

be suspended with a chain of liberal length to prevent kinking of the hose and not to exceed 15 inches from center line of car on opposite side to that of brake pipe. (The change consists in limiting the distance away from center line of draw-bar to prevent going to the extreme in location that will necessitate an excessive length of chain.)"

Under heading "Hand brake power" paragraph 1 changed to read: "With the foundation brake so arranged as to give a braking power of not less than 80 per cent based on a 50 lb. cylinder pressure, the hand brake shall be so proportioned that a force of 125 lb. applied 3 in. from outer end of hand brake ratchet lever will develop the equivalent at the brake cylinder piston, of the cylinder value at 30 lb. pressure per square inch."

Paragraph 4 changed to read: "With the body and truck levers properly proportioned for 60 per cent braking power based on a 50 lb. cylinder pressure, the hand brake leverage between brake staff and cylinder shall be so proportioned that a force of 125 lb. at the rim of the brake wheel or 3 in. from outer end of hand brake ratchet lever will develop a pull at the brake cylinder piston of not less than 2,500 lb. and 3,950 lb. respectively for cars having 8 in. and 10 in. cylinders. This will insure a minimum hand brake power at the shoes of 60 per cent of the empty car weight." (This is the A. R. A. requirement for tank cars, and the suggestion was made in order to extend this to cover all cars. Referred back to committee as the subject is now under consideration by A. R. A.)

All places where M. C. B. rules are referred to should be changed to A. R. A.

The report was signed by the following committee: H. A. Clark (Soo Line), chairman; C. N. Remfry (Duluth, Missabe & Northern); F. J. Barry (New York, Ontario & Western); T. W. Dow (Erie); R. C. Burns (Pennsylvania), Committee.

Business and Election of Officers

The committee previously appointed presented the following nominations. The election which followed was unanimous. President, Mark Purcell (Northern Pacific); first vice-president, George H. Wood (Atchison, Topeka & Santa Fe); second vice-president, Charles M. Kidd (Norfolk & Western); third vice-president, R. C. Burns (Pennsylvania); secretary, F. M. Nellis (Westinghouse Air Brake Company); treasurer, Otto Best (Nathan Manufacturing Company).

The election of Mr. Burns to the office of third vice-president left a vacancy on the executive committee, which was filled by the selection of Harry Flynn (Delaware & Hudson).

Following the election speeches were made by the incoming officers. Secretary Nellis spoke of the increase in interest which followed the announcement of the decision to hold a convention this year. He told the members that steps toward amalgamation of the Air Brake Association with the A. R. A. had been given up but that the suggestion had resulted in a hearty co-operation which would be of help to the association. It is not the desire or intention to establish a regular practice of holding the annual conventions at Atlantic City in conjunction with the Mechanical Division, although this will probably be done from time to time. Other conventions will be held in different sections of the country as has been the practice in the past. There has also been considerable agitation on the part of some looking toward the selection of Chicago as a permanent place of meeting, but that also has been given up. There is a growing realization on the part of mechanical officers of the importance of the work of the Air Brake Association which is very encouraging.

After a number of resolutions had been passed, the twenty-ninth convention was adjourned at 12.30 p.m., to meet at Denver, the first Tuesday in May, 1923.

Conventionalities

E. B. Leigh, president of the Chicago Railway Equipment Company, has been attending the conventions as usual. As all who know him are aware, Mr. Leigh takes a very active interest in the work of organizations which are trying to improve industrial conditions, and especially railway conditions. Besides having always been one of the leaders in the Railway Business Association, he represents the National Association of Manufacturers on the National Industrial Conference Board, whose research work regarding labor matters especially, has been among the most important ever done in this country.

The Santa Fe crowd are surely a hard working bunch. Mr. Purcell hardly allows them time to eat their noon-day luncheons. Sharp at 2:30 they assemble at the entrance to the pier and for the next four or five hours they are kept busy studying the merits of the various devices in the exhibit and comparing notes. In addition to Mr. Purcell, who has just been elected vice-chairman of the General Committee of Division V, there are present this year J. E. McQuillen, mechanical superintendent, Galveston, Tex.; J. H. McGroff, mechanical superintendent, Ft. Madison, Iowa; C. T. Ripley, general mechanical engineer, Chicago; E. E. Chapman, engineer of tests, Topeka; H. H. Lanning, mechanical engineer, Topeka, Kan.; J. K. Nimmo, master mechanic, Arkansas City, Kan.; W. R. Harrison, master mechanic, Chanute, Kan.; M. J. Drury, supervisor of packing, Topeka, Kan., and F. W. Thomas, supervisor of apprentices, Topeka.

W. D. Duke, general manager of the Richmond, Fredericksburg & Potomac, announces that his railway made an appropriation last week of \$1,250,000 for a program of additions and betterments to be carried out during the next year and a half. Almost \$1,000,000 of this amount will be used in constructing a new engine terminal at Richmond. Most of the rest will be spent on a coaling station and a hold yard for the reconsignment of cars in connection with the Potomac yard at Washington, D. C. The R. F. & P. handles a very large perishable business and needs more yard room at Washington for cars of this freight that are reconsigned. The road is moving an extraordinarily large business. Its freight traffic in May was the largest in any month of its entire history. Mr. Duke is accompanied to the conventions by Mrs. Duke and their little daughter, Jane, who yesterday celebrated her sixth birthday. They expect to meet here their son, who is on his way to the Pacific Coast.

Mr. and Mrs. Walter B. Leach were joined in Atlantic City yesterday by their two sons, Barton (W. B., Jr.) and Gordon. Mr. Leach must leave on business at once, but the young men will spend a few days here with their mother. They will then go to New York and sail for Europe, where Barton will spend some time studying at the University of Grenoble and at the Sorbonne. Barton is a Harvard graduate and is now studying law at the Harvard Law School. He has had an unusually brilliant college career and during the last year, in addition to carrying on studies which would have given an ordinary young man plenty to do, he taught a class in international law. Barton has studied in France before, but this will be Gordon's first trip to Europe. His friends will follow his future career with great interest and high expectations.

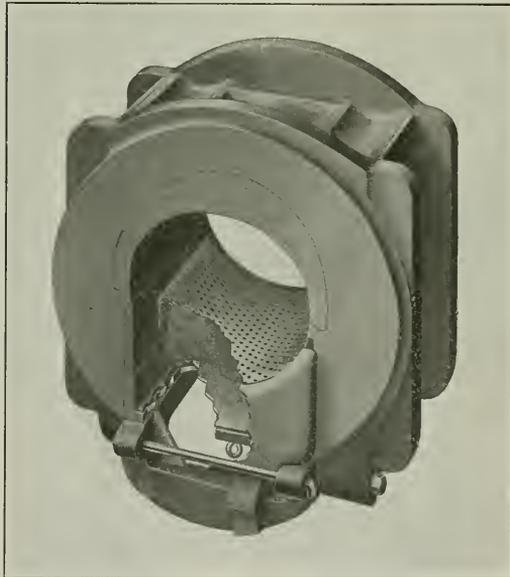
New Devices Among the Exhibits

A Spreader for Driving Boxes

THE ORDINARY DESIGN of locomotive driving box often causes trouble in the roundhouse because the lower ends close in and clamp the cellar so tightly that it is difficult to remove. In order to overcome this drawback, the Franklin Railway Supply Company, New York, has developed a driving box spreader which keeps the cellar free at all times and also secures several other advantages.

The arrangement of a box equipped with the spreader is shown in the photograph. It comprises a steel casting between the lugs of the box, on which the cellar rests, a plate closing the opening at the end of the box, and a pin holding the end plate in position.

To repack the box it is only necessary to take out the pin and remove the end plate, and the cellar being free



Driving Box Fitted with Spreader

can easily be withdrawn. When a new grease cake has been applied, the pin which normally holds the end plate in position is inserted through the indicators to pull the cake and the perforated plate to the bottom of the cellar. After the cellar has been inserted, this pin is withdrawn and again applied to the end plate. The fact that this pin is used for both purposes insures that it will not be left in the cellar and prevent the grease cake from feeding when the locomotive is in operation.

The end plate is held in position vertically by lugs resting on the spreader. The lugs on the two sides of the plate are placed at different heights so that by reversing the plate can be raised to compensate for wear in the

driving box crown brass. The end plate also performs an important function in preventing the weight of the wheel and axle coming on the grease cellar when the locomotive is jacked up.

Train Lighting Equipment

THE GREATER PART of the equipment being exhibited by the Safety Car Heating & Lighting Company consists of new products. Among them are a lead storage battery for car lighting, an electric water heater, an improved electric water cooler, a fan motor which can be used interchangeably on all fans made by the Safety Company, an improved belt fastener of the Walker type, a line of fractional horsepower motors and several new types of lighting units.

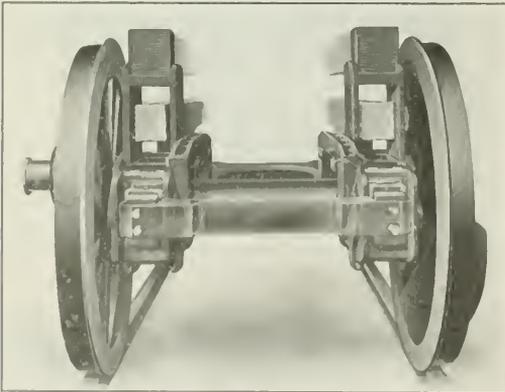
The form of plate construction used in the battery is an innovation, and provision is made for flushing batteries and taking specific gravity readings without removing the crates from the battery boxes. Car lighting units are mounted in a trellis over the booth which is built according to dimensions used for Pennsylvania coaches.

New Design of Woodward

Lateral Motion Box

ONE OF THE SERIOUS disadvantages of locomotives with long, rigid wheel base is the rapid wear of tires which occurs when such equipment is operated on tracks with sharp curves. The Woodward driving box, which permits lateral motion against a constant resistance, has overcome this difficulty and has been an important factor in making the 2-10-2 type locomotive a practical operating unit. The original design of this device added considerably to the weight of the wheels to which it was applied. This disadvantage has been eliminated in the latest design, which is illustrated in the phantom view.

The new design of lateral motion box utilizes a unique principle for obtaining the constant resistance. The shoe and wedge fits in the boxes have lateral freedom, each



Phantom View of Lateral Motion Driving Box

moving independently. Spanning the inside top edge of the box is a bell crank which is fulcrumed on the box. The inner member of the spring saddle rests on one arm of the bell crank, while the other arms extend downward and engage flanges on transverse braces between the frames. When the driving wheel is moved inward the

force coming on the driving box is transmitted to the arms of the bell crank and as these arms are brought closer to the driving box the saddle is raised, thus causing a constant force to be exerted on the bell crank, tending to restore the box to its normal condition. This design has the advantage of extreme simplicity and also effects an important saving in weight.

Change in Unit Safety Bar

A DESIGN OF Unit safety bar shown this year by the Franklin Railway Supply Company, New York, embodies some changes which experience has shown to be of marked advantage and which have so reduced the space occupied that sufficient clearance has been secured to permit the installation of the locomotive booster without interference. Instead of using the pin itself for the connection to the Unit bar, the auxiliary pocket in the engine draw-casting has been modified so that it forms a boss around the pin, while the eye of the Unit bar has been enlarged to pass over this boss instead of being drilled out only to the pin size. This has materially shortened the pin and resulted in a neat compact and durable arrangement.

Street Locomotive Starter

CLEMENT F. STREET has been working for the past two or three years on a locomotive starter, and although the machine is still in an experimental stage he has one on exhibition. The machine consists essentially of a heavy cast steel ratchet wheel keyed on the trailer truck or tender axle and driven through a spring ratchet by a steam cylinder which is carried on the truck frame. The machine is designed to act as a starter only and to be cut out as soon as the locomotive is under way. It is believed that its use will enable a locomotive to start, without taking slack, any train it can haul and therefore reduce to a minimum break-in-tows on freight trains and eliminate starting shocks to passenger trains.

Trap Door Spring Testing Device

THE O. M. EDWARDS CO., INC., Syracuse, N. Y., is showing a vestibule trap door spring testing machine which is in regular use at its factory. The first spring broke after 93,928 operations which is equivalent to operating a trap door 20 times a day for approximately 13 years. The second spring now being tested was placed in the testing machine on Friday, June 16, and has run over 112,000 operations without breaking.

Flanged Locomotive Tank

A DEVICE that is attracting considerable interest in Space 628 is the Ralo-Aemie flanged locomotive tank. Among the distinctive features of this tank are the elimination of the rectangular tank, with a proportional reduction in the liability of leakage; also the bottom flanges are vertical and the rivets used are readily accessible from the inside of the tank and therefore it is not necessary to jack up the cistern from the frame when they need attention. This flanged bottom construction is also a factor in reinforcing the bottom plates as contrasted with the overlapping seams. Further there is a considerable saving in the abolishment of angle iron bars as well as the rivets mentioned.

MINER

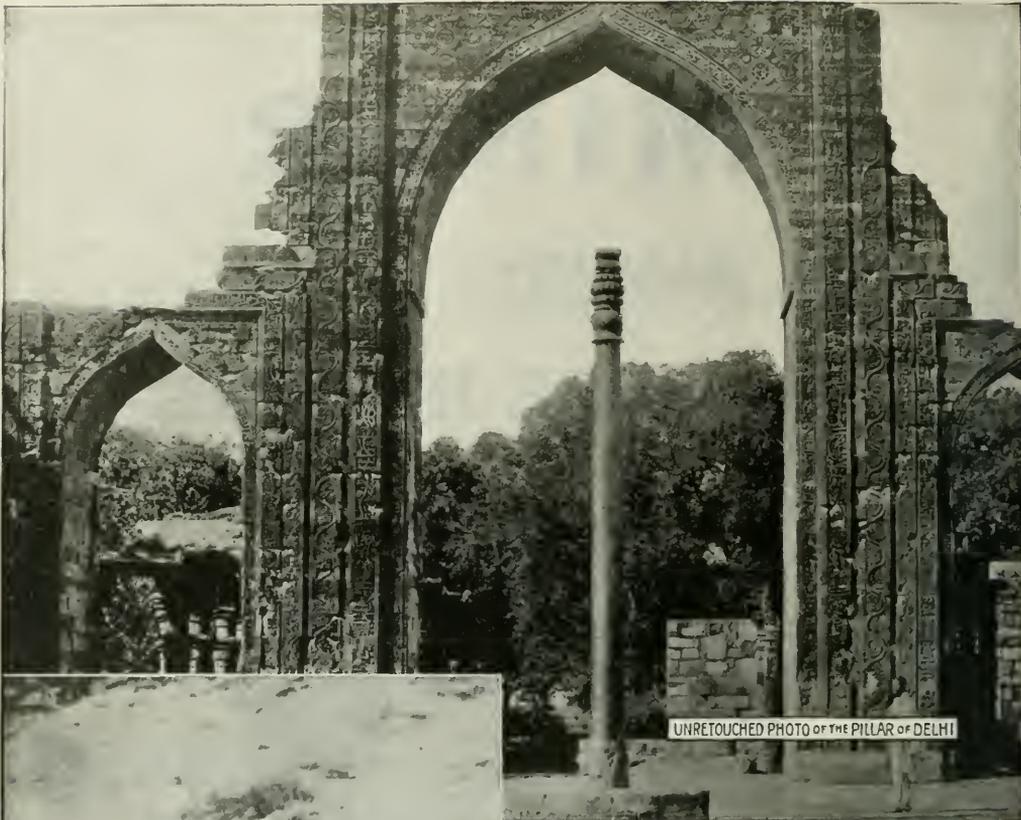
BALANCED

SIDE BEARING

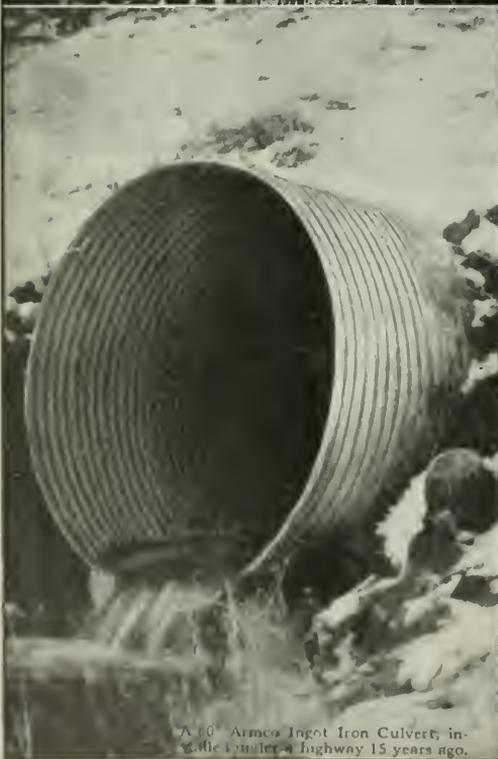


STRONG AND DURABLE
IN USE ON THOUSANDS OF CARS

W. H. MINER, CHICAGO



UNRETOUCHED PHOTO OF THE PILLAR OF DELHI



A 10' Armco Ingot Iron Culvert, in place under a highway 15 years ago.

Enduring—because made of PURE Iron

For sixteen centuries the iron pillar at Delhi has looked down unchanged on changing civilizations.

Torrential rains and scorching Indian suns have failed to mar this age-old structure. The material is *pure* iron—the impurities hammered out laboriously, minute quantities at a time, by the ancient Hindus.

The modern counterpart of this ancient iron is Armco Ingot Iron, possessing the same purity, and promising equal permanence. Already hundreds of

ARMCO CULVERTS

like the one pictured have been under our highways and railroads for a generation and show scarcely a sign of use.

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.
215 NORTH MICHIGAN AVE., CHICAGO



Railway Age

Vol. 72 June 24, 1922 No. 25



Passenger Train on the Benguela Railroad, Angola (Southern Africa)

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GENERAL NEWS DEPARTMENT 1747

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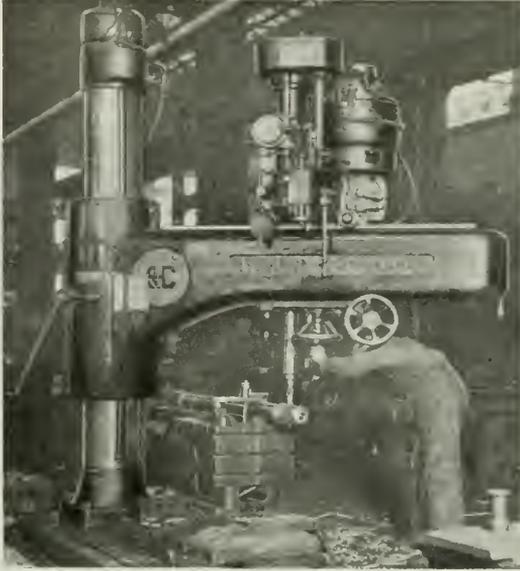
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WE GUARANTEE, that of this issue 9,100 copies were printed; that of these 9,100 copies 8,133 were mailed to regular paid subscribers, 57 were provided for counter and news company sales, 305 were mailed to advertisers, 22 were mailed to employees and correspondents and 583 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 227,920, an average of 9,117 copies a week.



“We Halved the Time With This Radial”

“In several instances, the Ryerson-Conradson Radial has cut our previous drilling time in half.” —*General Foreman.*

Such remarkable performance is made possible by concentrating in this radial the most modern developments of machine tool design.

Twin motor drive, absence of troublesome bevel gearing, box construction of the drilling arm, and handy location of controls throughout are a few of the special features that permit driving the drill without damage to the machine or fatigue to the workman.

The Ryerson-Conradson Radial is particularly suited to help those railroad shops laboring under the handicap of limited machine tool capacity.



Our Bulletin 4,001 tells how bevel gears were eliminated. Ask for your copy.

JOSEPH T. RYERSON & SON

Established 1842

Incorporated 1888

PLANTS CHICAGO ST. LOUIS DETROIT BUFFALO NEW YORK
OFFICES MINNEAPOLIS MILWAUKEE DENVER HOUSTON SAN FRANCISCO

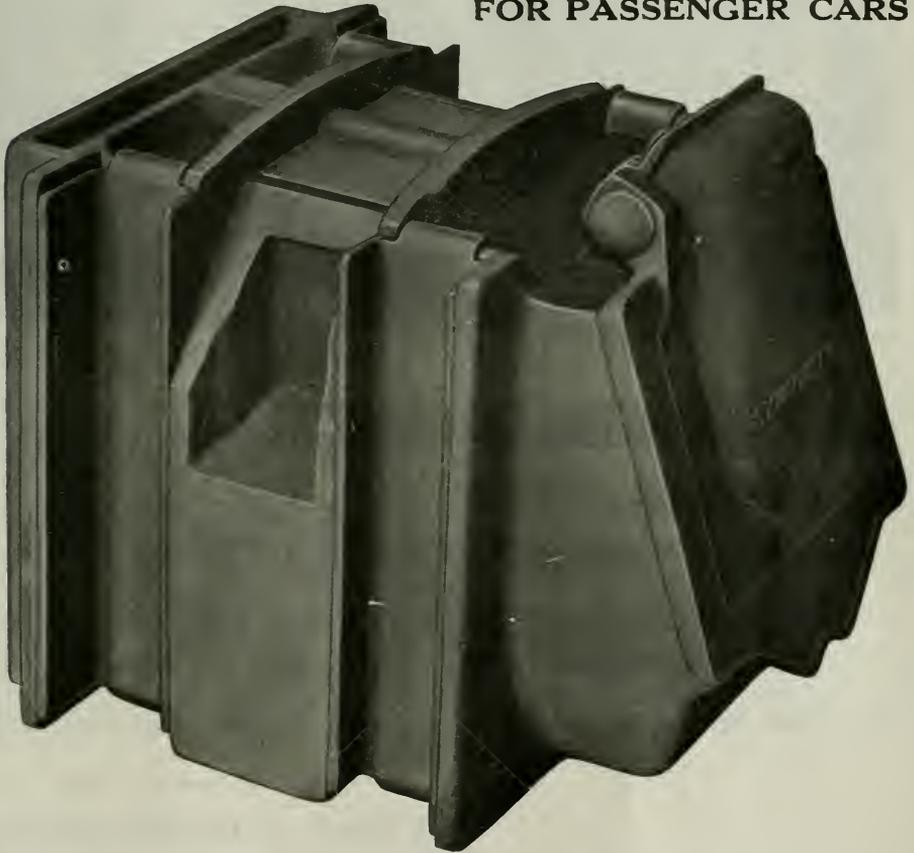
RYERSON MACHINERY

SYMINGTON

MALLEABLE IRON

JOURNAL BOX

FOR PASSENGER CARS



WITH PATENTED RENEWABLE PRESSED STEEL
PEDESTAL WAY LINERS

THE T. H. SYMINGTON COMPANY

Manufacturers of Journal Boxes and Draft Gear Attachments

NEW YORK

CHICAGO

BALTIMORE

ST. PAUL

ROCHESTER



Whiting Four-Jack Locomotive Hoist, Capacity 200 tons. View shows hoist in operation removing a single pair of drivers. In shops of Baltimore & Ohio R. R., Garrett, Ind.

Install a Whiting Locomotive Hoist^{*}

for Economy:

It is possible to save from \$14,000 to \$36,000 per year in unwheeling and re-wheeling locomotives, depending on the number handled.

for Safety:

Locomotive is squarely supported on steel beams and held perfectly level in raising or lowering. Wheels remain on track level—no dropping.

for Convenience:

Hoist is always ready and is adjustable to different sizes of locomotives.

for Speed:

The Whiting Hoist will do in a half hour what takes many hours on a drop pit.

Send for our new Catalog No. 160

WHITING CORPORATION

15603 Lathrop Ave., Harvey, Ill. (Chicago Suburb)

(formerly Whiting Foundry Equipment Co.)

Representatives in 25 Principal Cities

^{*}Patented: Feb. 3, 1914
June 16, 1914
March 28, 1916
Sept. 2, 1919

WHITING CRANES
FOUNDRY EQUIPMENT
RAILWAY SPECIALTIES



From Start to Finish

From its initial installation, through such maintenance as may be required to preserve it in perfect working condition, to the operation which insures the safety of trains while at the same time it expedites traffic, the absence of complication is an outstanding feature of the Miller Train Control.

Installation—One mechanic and a helper install the system in 8 hours. Locomotive need not be held out of service.

Maintenance—No specially trained forces are required for maintenance of engine or track equipment. Actual figures from railroad records covering costs of maintenance for five years are obtainable.

Expedition of Traffic—Undesirable stops at undetermined points due to the action of the train control system are impossible.

STAUNTON, VA.

Miller Train Control

DANVILLE, ILL.

C A M Steel

FOR FREIGHT



MIDVALE STEEL AND CAMBRIA STEEL

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Detroit
New York

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS **CONSTEED** CONSOLIDATED STEEL CORPORATION
25 BROADWAY, NEW YORK, U.S.A.

BRIA

Cars

SERVICE

THE illustration shows the first car turned out in the Cambria car shops that is equipped with the new Symington wrought steel side frames.

The new Symington wrought steel side frame is made from a single piece of steel plate in the car shops of the Cambria Steel Company. It has all of the good points of the cast steel frame and at the same time is lighter and stronger. There is also a marked superiority to other types of pressed steel side frames because it is made in one piece and there are no parts to work loose.

ORDNANCE COMPANY

L COMPANY

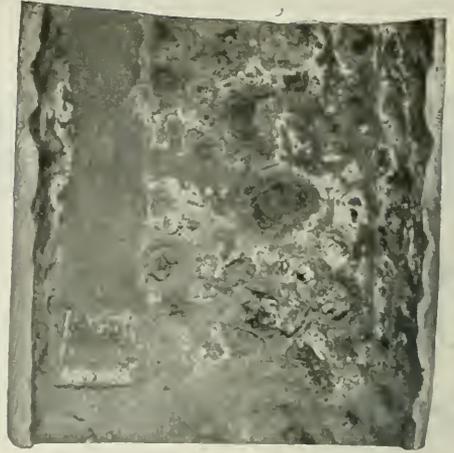
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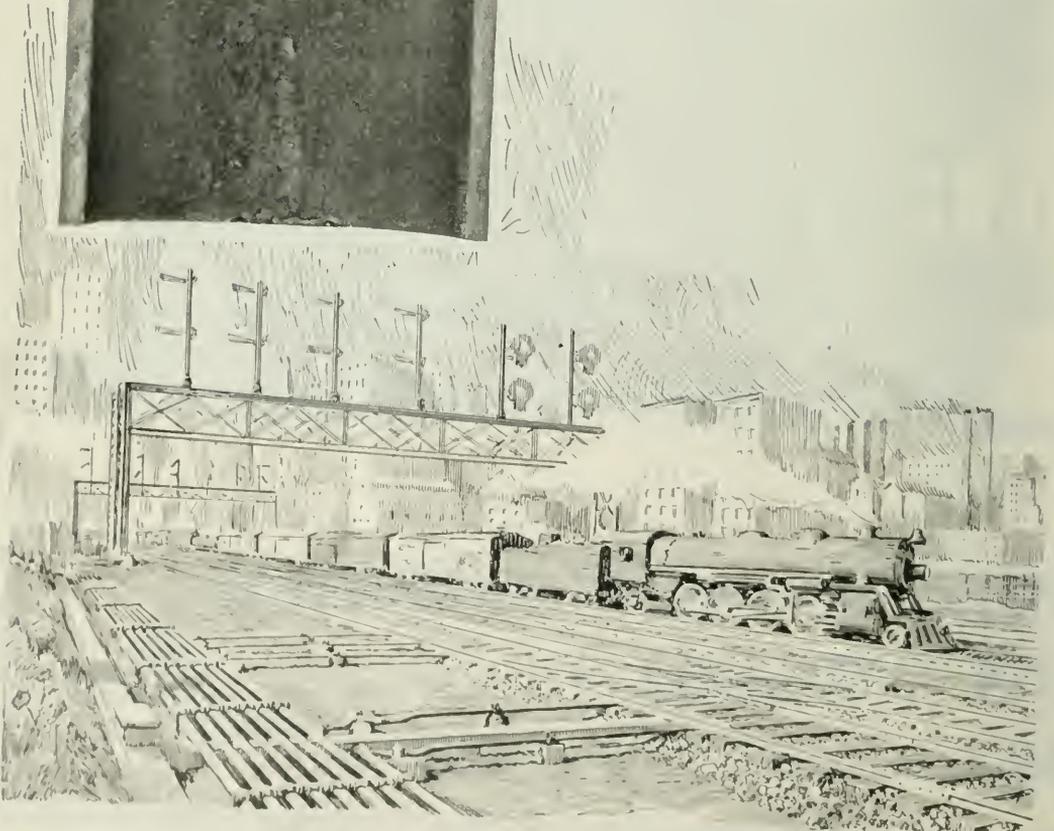
Philadelphia, Pa.

Philadelphia
Pittsburgh
San Francisco
Salt Lake City
Seattle
St. Louis
Washington, D. C.

*Below
Reading Genuine Wrought
Iron Pipe in Service
for 22 years*



*Above
Steel Pipe 8 years
in Service*



A Camera Shows Why Great Railroads Measure Pipe Value in Terms of Endurance

These unretouched photographs prove conclusively why Reading Wrought Iron Pipe saves thousands of dollars annually for many of America's most highly organized and efficiently conducted railway systems.

Both shipments of pipe *looked* the same when the order was placed. Both were installed with a like amount of labor at the same wage rate, and both were used under similar conditions. Yet the steel pipe is ready for the scrap heap at the end of the eighth year, while the original condition of the Reading Wrought Iron Pipe is practically unchanged after *twenty-two years* of continuous, unfailing service.

Genuine Reading Wrought Iron Pipe with a life two to three times that of steel—represents the utmost in conservation, safety and operating efficiency in steam, heat, air and ammonia lines. The siliceous slag content keeps it in service years after corrosion has ended the usefulness of pipe which was bought on a basis of price alone. The fibrous structure ensures successful resistance to sudden shocks and strenuous strains that steel cannot withstand. And superior threading qualities mean tight, trustworthy joints.

Sixty-four years ago, the Reading Iron Company began the manufacture of genuine hand-puddled wrought iron pipe and tubing. Since 1849 Reading Wrought Iron Pipe has been the logical choice of those who test pipe side by side and make careful comparisons.

READING IRON COMPANY

Reading, Pa.

Largest Producers of Wrought Iron Pipe in the World

BOSTON
NEW YORK
PHILADELPHIA

BALTIMORE
PITTSBURGH
CINCINNATI

CHICAGO
FORT WORTH
LOS ANGELES



READING

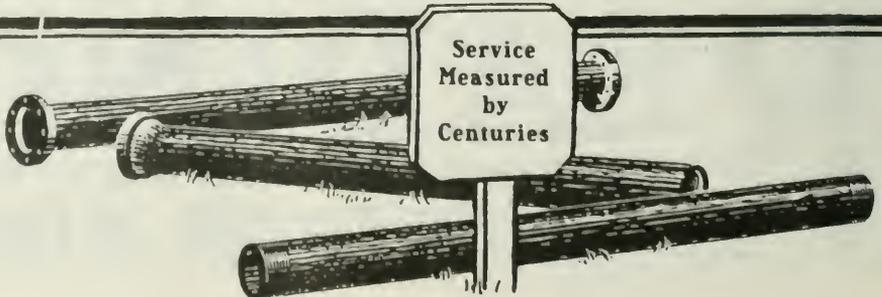
GUARANTEED GENUINE

WROUGHT IRON PIPE



"Pipe and the Public Welfare"
—an illustrated cloth-bound
book, will be sent to any rail-
road executive who asks for it

CAST IRON PIPE



Within the Memory of Man Cast Iron has Never been Destroyed by Rust

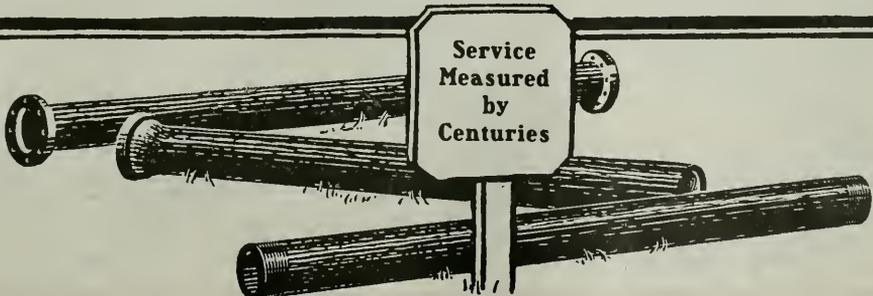
Cast Iron rusts only on the surface. It thus seals itself against further deterioration.

Because the first cost of cast iron pipe is the last, it is the standard pipe for water and gas mains. And its wonderful record in the solution of unusual industrial problems—its resistance to various acids, alkalis, etc.—makes it important for any business executive to know its value.

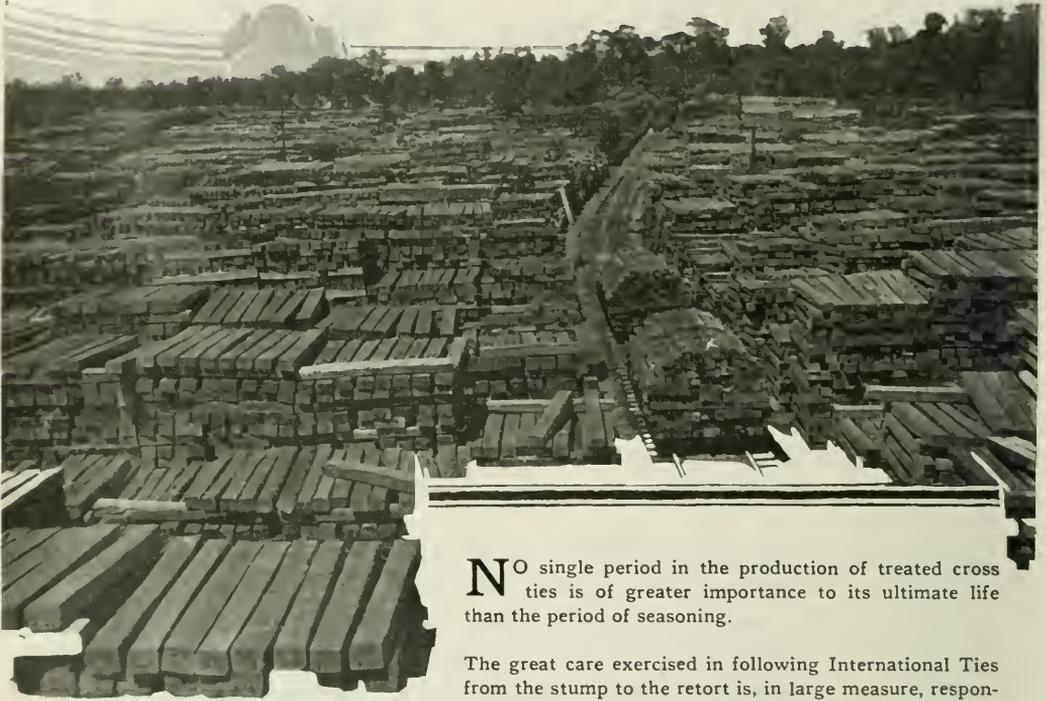
If you have children, remember that their safety depends on the pipes that carry your water. If you are a taxpayer, remember that when cast iron mains are laid in your street, you will never see them torn up for repairs; and if you use pipe in your business, remember that “the service of cast iron pipe is measured by *centuries*.”

THE CAST IRON PIPE PUBLICITY BUREAU, ERIE & ST. CLAIR STS., CHICAGO

CAST IRON PIPE



Acres of Graded Ties



*Every International Tie is a
Sound Tie*



*The tie that lasts
longest
is least expensive*

NO single period in the production of treated cross ties is of greater importance to its ultimate life than the period of seasoning.

The great care exercised in following International Ties from the stump to the retort is, in large measure, responsible for the soundness, uniformity, and high quality of International Products. The ties are removed quickly from the decay producing conditions of the woods, transported to the railway right of way where they are inspected, graded and shipped quickly to the plant for seasoning.

The one hundred twenty acres of ground, free from all vegetation, and a seasoning capacity of two and a half million ties of our Texarkana Plant is representative of International tie service.

Our methods are adapted to promote early seasoning with minimum danger of decay. All International ties are seasoned under the immediate supervision of trained men who are thoroughly familiar with the characteristics of the timber in this territory.

International Creosoting & Construction Co.

General Office—Galveston, Tex.

Plants: Texarkana, Texas

Beaumont, Texas

Galveston, Texas

CENTURY WOOD PRESERVATION

"A SERVICE FOR RAILROADS"

*Oak Tie Adzed
and Bored*

Century Treated Cross Ties

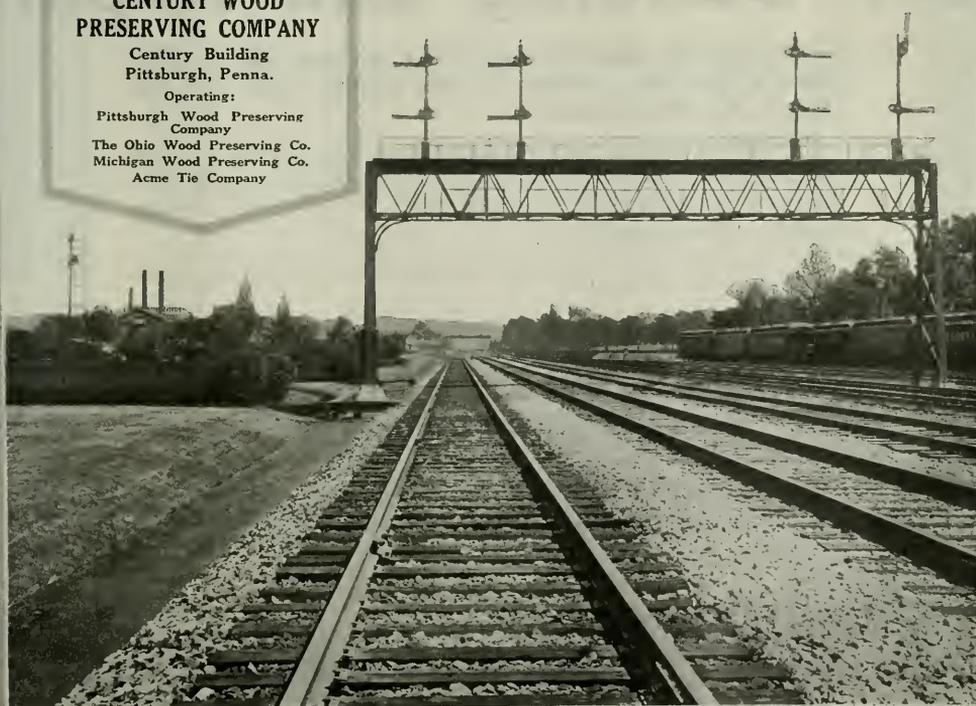
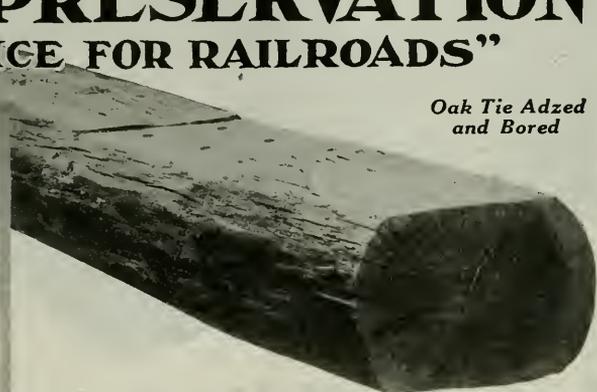
are thoroughly and effectively treated in well designed, conveniently located plants that are equipped for using any of the recognized standard treating processes. Leading railroads in all parts of the country have found CENTURY Treating Service highly satisfactory and very economical.

How can we serve you?

CENTURY WOOD PRESERVING COMPANY

Century Building
Pittsburgh, Penna.

Operating:
Pittsburgh Wood Preserving
Company
The Ohio Wood Preserving Co.
Michigan Wood Preserving Co.
Acme Tie Company





Car Building and Repair

In one car shop a man drove an average of 1500 rivets a day for a period of one month with a "Little David" No. 60 Hammer.

"Little David" riveting hammers drive rivets at a fast rate and there are no delays. They do the work more quickly, require little air and have 20% lower average maintenance costs.

"Little David" hammers stand up under hard continuous service.

"Little David" Air Drills for reaming, drilling, etc., are just as durable and efficient. They have 30% less parts in their construction than any similar tool. The simplicity of design avoids complicated parts which would cause troubles and costly repairs.

INGERSOLL-RAND COMPANY, 11 Broadway, New York

Offices in all large cities

Ingersoll-Rand



A flood of oil

Reports issued by the U. S. Geological Survey show that approximately 200 million barrels of crude oil are now stored in the United States. But of this vast storage less than 3 per cent consists of the oil classified as "high grade."

The tests and experiments of many years have shown that only the lubricants secured from the high grade crudes are suited by basic strength and vitality to lubricate successfully the rolling stock of railroads. The ordinary grades invariably break down under the strains of the work required.

For over fifty years Galena Oils have given proof of their exceptional quality—of their ability to outwear any other lubricants. They show superior lubricating power by greater mileage and in the protection and preservation of bearing parts. The lessened friction noticeable with their use results in conservation of power—fuel saving.

Galena Oils are the products of specialists, the perfection of exhaustive study and wide experience. Every gallon carries the guarantee of this company to deliver faithful and satisfactory service. Their exceptional records of efficiency on the representative railroads of the United States, Canada, Europe and South America have made them the accepted standard for railway lubrication throughout the world.

*"Galena Quality Is Our
Bond and Your Security!"*

2



Galena-Signal Oil Company

New York ◊ Franklin, Pa. ◊ Chicago
and offices in principal cities



The Romance of Cement

This is the Age of Cement.

Towering skyscrapers, impossible without Cement, house hundreds of thousands of workers.

Great bridges and viaducts of Concrete span rivers and valleys.

Miles and miles of Concrete Highways are flung across the land.

Huge Concrete Dams harness mountain torrents, supplying millions of horse-power to industry.



Portland Cement is not merely pulverized rock; it is a manufactured product requiring numerous distinct and varied mechanical and chemical operations for its production.

Safety requires that it be made properly and put upon the market in perfect condition.



Cement, an almost impalpable powder, when mixed with sand, broken stone, and water, quickly causes the combined materials to become solid Concrete with a hardness like native granite.



Portland Cement manufacturers not only maintain their own laboratories, but through the Portland Cement Association cooperate for the conduct of research and tests requiring extensive laboratories. The results of these studies are placed at the disposal of the public.

Individual companies have their trained staffs of chemists and engineers.

In addition, the industry as represented by these individual companies cooperatively maintains 200 trained engineers in different parts of the country, to show the public how to use Cement most economically and efficiently.

The aim of the industry is to provide a product meeting the highest possible requirements, and to place at the service of the public its nation-wide facilities for furthering building and industrial activities.

PORTLAND CEMENT ASSOCIATION

111 West Washington Street
CHICAGO

TO FURTHER THE INTERESTS OF CEMENT USERS



RAILROAD LUBRICATION

Who lubricates this road?

On the "A" Division of 489 miles, 170 Red Ball Fast Perishable trains were handled during May, 1922, of which number 168 were on time, or 98%.

On the "B" Division of 422 miles, they had two hot boxes in May, both of which were on foreign cars.

On the "A" Division they handled 28,771 loads and 14,104 empties, total 42,875 cars during month of May—no hot boxes.

On the "A" Division 622 passenger trains were operated during May, 94.4% of which were on time.

This line uses

The Best Railway Lubricants and Service

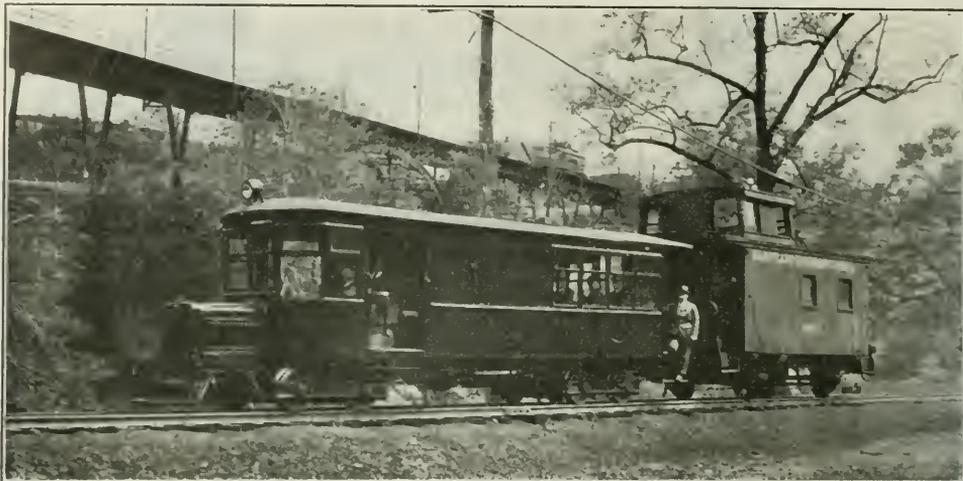


THE TEXAS COMPANY
RAILWAY TRAFFIC & SALES DEPARTMENT
New York · Chicago · Atlanta · Houston



St. Louis, New Orleans, Dallas, Cleveland, Los Angeles, St. Paul

THERE IS A TEXACO LUBRICANT FOR EVERY PURPOSE



Small type Motor Coach trailing 20,000 lb. caboose up a four (4) mile 2.86 per cent grade on trial trip on the M. & P. R. R. out of Baltimore.

Gasoline-Driven Railway Equipment

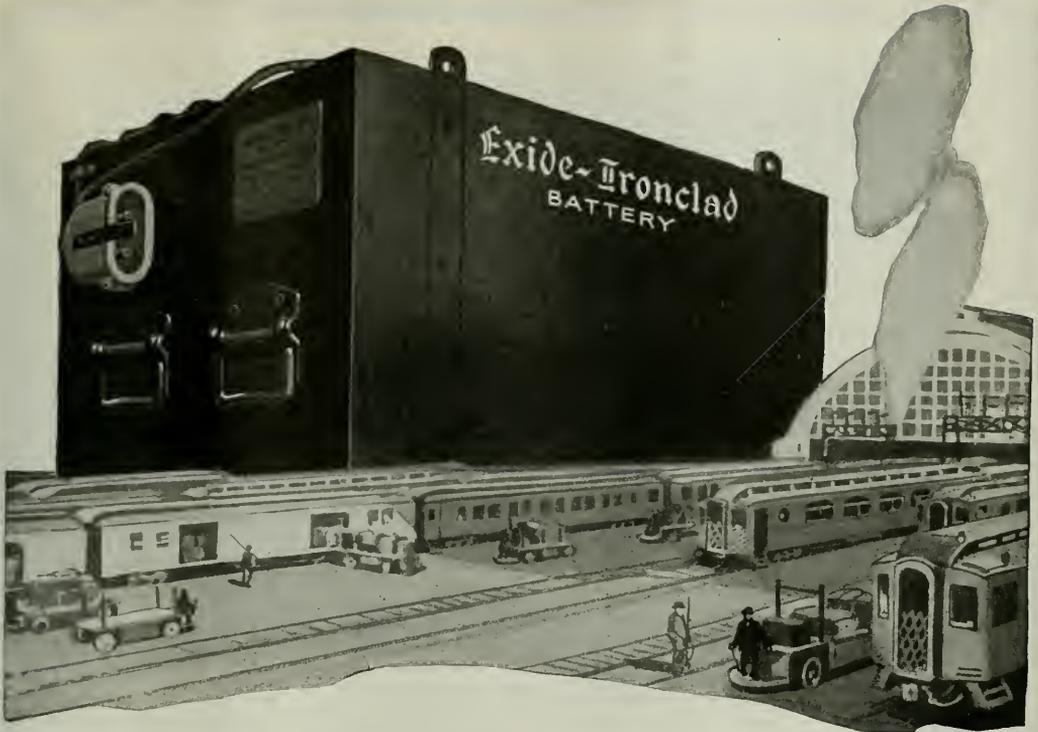
PERFORMANCE, not theory, is what counts in the final analysis.

THE results secured by the combination of standard railway construction, with proven units of the automotive field, are amazing. When driving on all eight wheels our equipment has 100% of its weight on the driving wheels. This gives extraordinary traction. When using but four wheels as drivers our equipment can exert over twice the tractive effort, in proportion to weight of the average steam locomotive — plenty of surplus to pull one or more trailer coaches.

THE RUSSELL COMPANY

AUTOMOTIVE RAILWAY EQUIPMENT

KENOSHA, WISCONSIN



More tonnage with the same equipment

How much your industrial trucks and tractors save you is after all a matter of tonnage. You move so many tons at such and such a cost.

But without increasing your cost, you may be able to increase your tonnage. With the Exide-Ironclad Battery, trucks move heavier loads and move them more rapidly. Note the four qualities of the Exide-Ironclad which are essential for freight-handling service:

- 1—**Reserve Power.** Exide-Ironclads deliver increasing power up to twenty times the normal rate of discharge, giving reserve power for steep grades and heavy loads.
- 2—**Sustained Power.** Voltage remains high throughout the entire discharge, which means power and high speed all day long.
- 3—**Ruggedness.** The Exide-Ironclad, built to stand severe service, is a brute for rough work.
- 4—**Low cost per ton.** First cost plus upkeep, divided by tons hauled, gives a surprisingly low cost per ton.

Tear out this page, give it to your stenographer, and tell her to write today for a copy of our *free* booklet, "Facts for Consideration in *Selecting a Battery* for Industrial Truck and Tractor Service."

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia

Branches in Seventeen Cities

Manufactured in Canada by Exide Batteries of Canada, Limited
133-157 Dufferin St., Toronto

Exide

IRONCLAD BATTERIES

Where do Maintenance Costs Originate?

Except for the purchase price, few buyers know what they pay for a shipment of nuts.

Yet in locomotive maintenance, the purchase price of a nut may be only a fractional part of its cost. You keep on paying for it long after it has gone to the scrap heap.

Count the number of times in a year an engine is laid up for repairs—and note how frequently you can trace the trouble to a worn or defective nut.

It is then that you begin to get a real line on what these little pieces of metal are costing you.

You may save a small sum on the original price, only to pay it out many times over in premature breakdown, labor, time—a locomotive out of service.

That is hardly the sort of "economy" you reckon on when you decide in favor of hot pressed nuts. That such nuts represent a "saving" is a delusion that is costing a

hundredfold their price in multiplied maintenance charges.

When you buy nuts you buy a certain amount of utility. And when hot pressed nuts, with their inevitable burrs, scale-filled threads, inaccurate fit and irregular shape, give nothing but a short and troubled career in return for your investment, they do more than rob you of the service you pay for—they run up a recurring overhaul and replacement charge by their unflinching tendency to work loose and wear out.

These things never happen with Empire Cold Punched Nuts. Once an Empire Nut is put in place it stays there for the life of the engine, or for the life of the part it is on.

Empire Nuts are made by the originators of the cold punching and cold heading processes for the manufacture of steel nuts and steel bolts. They are produced on a new type

of automatic nut machine that cold punches, chamfers, trims, retrims and burnishes in one operation—steps that in any other plant require five separate machines. By this method a uniformity of precision is attained that is not possible with any other process—for tolerances are not disturbed by a multiplicity of set-ups and constant handling.

Empire Nuts are guaranteed free from flaws. They are guaranteed to fit. They are guaranteed never to strip their threads or fracture. They have no burrs. They have no scale. They are semi-finished to insure flush, smooth, clean contact. Their threads gauge to within .003 in.

Empire Nuts reduce maintenance charges to so low a level, as contrasted with the cost arising from the use of hot pressed nuts, that the net saving repays you a hundred times over for their slightly higher purchase price.



RUSSELL, BURDSALL & WARD

BOLT & NUT COMPANY

PORT CHESTER, N.Y.

FEMBERWICK, CONN. - CHICAGO - SAN FRANCISCO - ROCK FALLS, ILL.

Makers of Bolts, Nuts and Rivets Since 1849



Santa Fe Buys StefcO

Ready-to-Erect Structural Steel Buildings

RAILROADS are fast turning to the use of STEFCO ready-built steel buildings because of their economy and adaptability as has already been demonstrated in other fields. The recent purchase of nine STEFCO buildings by the Santa Fe for use at various points on its system from Chicago to California is a recognition of the merits of this type of industrial building.

Designed along strict engineering lines, adaptable to every industrial use to which one story factory construction is suited, built in the largest units possible for convenient handling, easily and quickly expanded to meet future growth, STEFCO buildings are recognized by their hundreds of users throughout this country and abroad as a permanent, substantial, fire resisting and satisfactory substitute for all other forms of building construction.

Strength and Simplicity

STEFco buildings are designed around their two

outstanding features, strength and simplicity. The Fink type truss and sidewall frames are of structural steel angles, hot riveted throughout. The roof and sidewall covering are corrugated sheet steel galvanized to resist rust. STEFCO buildings throughout are composed of standardized units, which, in case of damage, can be replaced at once from the average railway storehouse stock without having to send away for some special design peculiar to a single manufacturer.

Ease of Erection

STEFco buildings are thoroughly standardized and are 90% finished leaving the STEFCO factory. The other 10%, erection, is so simple that the ordinary section foreman and crew can do the work. Trusses up to 40 ft. single span are shipped complete and the other sections are built in the largest units possible for convenient handling. The only field work above the founda-

tion is to bolt the wall sections together, on top of which the trusses are also bolted, apply the roof sheets and the building is ready for use.

40% Cost Saving

STEFco buildings show a saving of 40% or more over similar buildings of brick or concrete, relieve the purchaser of all engineering costs and delays and eliminate entirely the fire hazards of wood construction.

Free Advisory Service

The STEFCO engineering department is composed of recognized experts in building design and manufacture. Their experience and advice are at your disposal without charge. Utilize this service in securing an estimate on such buildings as you may need. Just indicate the purpose for which the building is to be used, the length, width, height and door and window arrangement and a comprehensive quotation will follow.

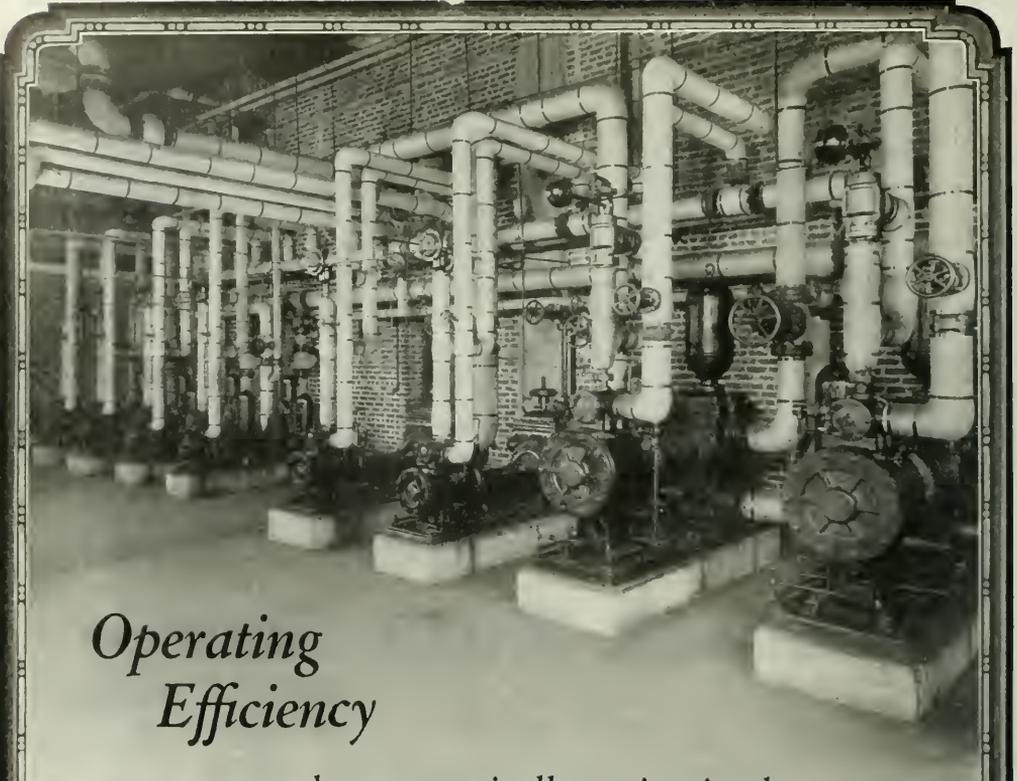


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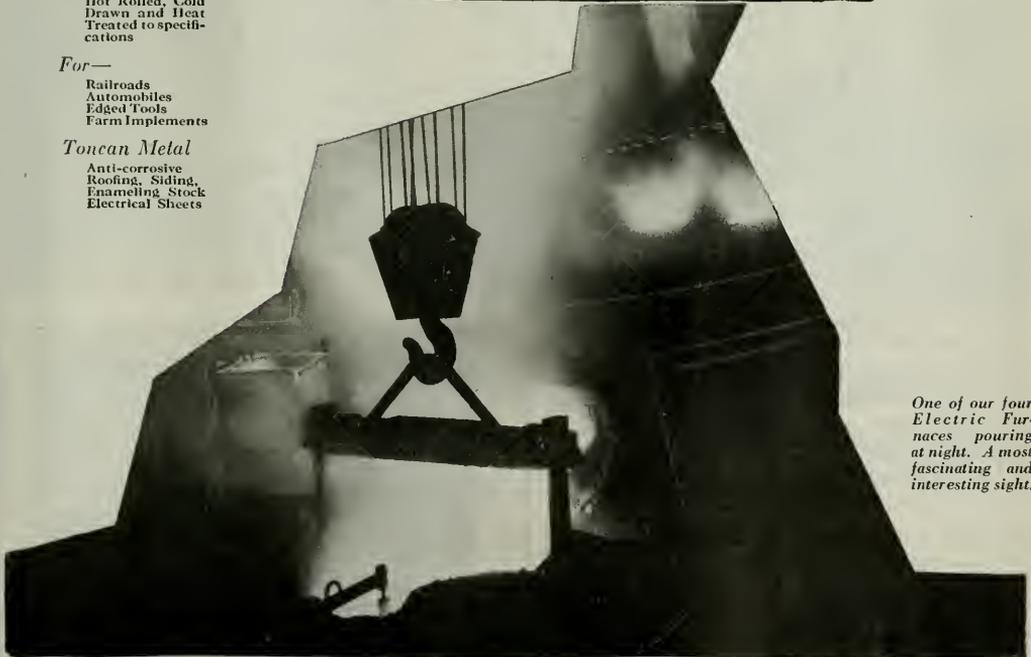
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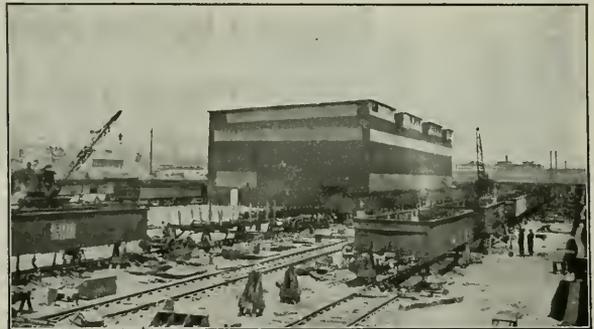


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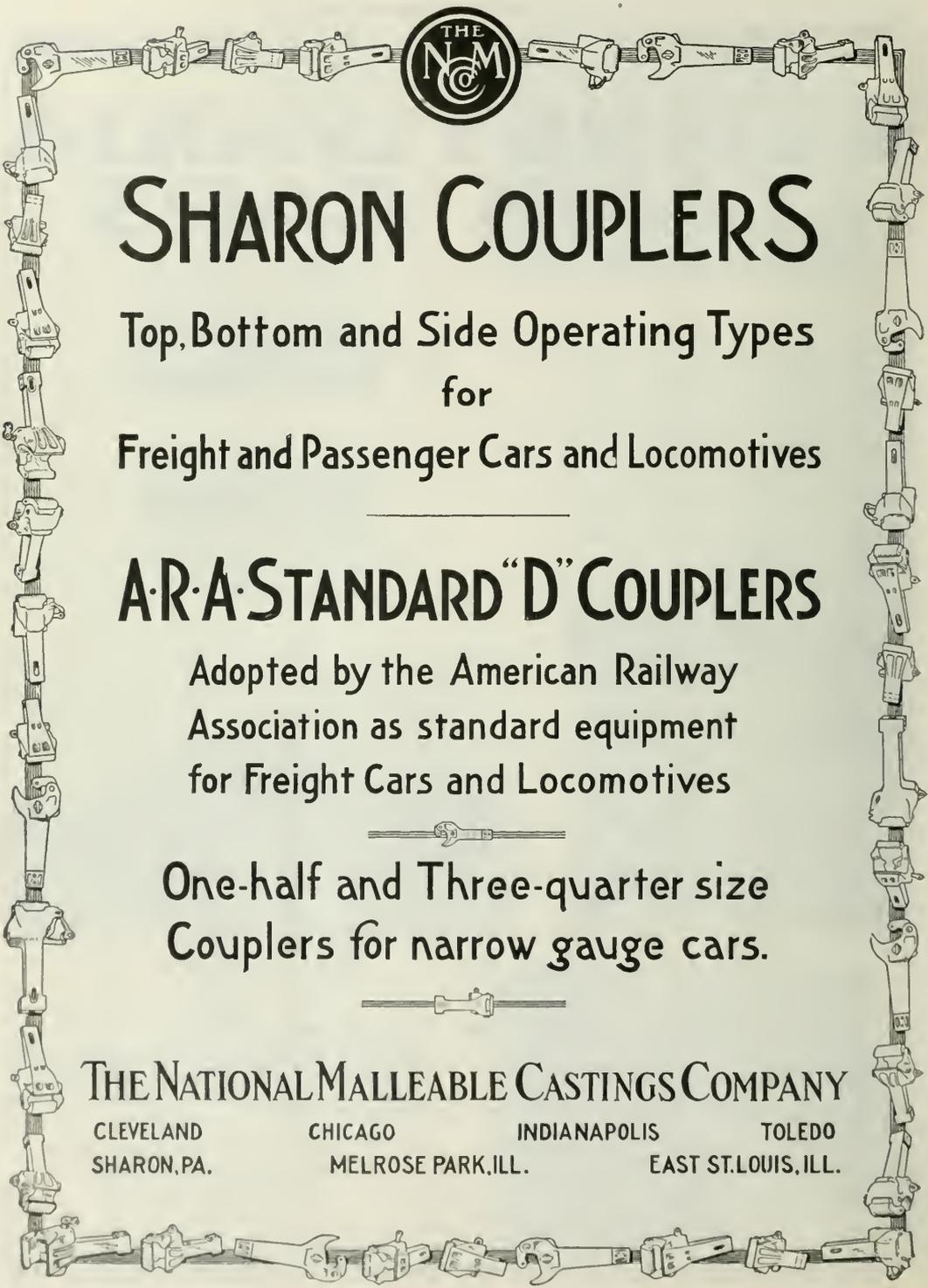
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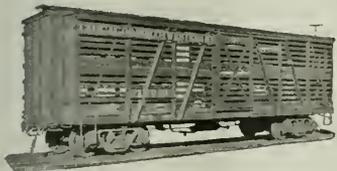
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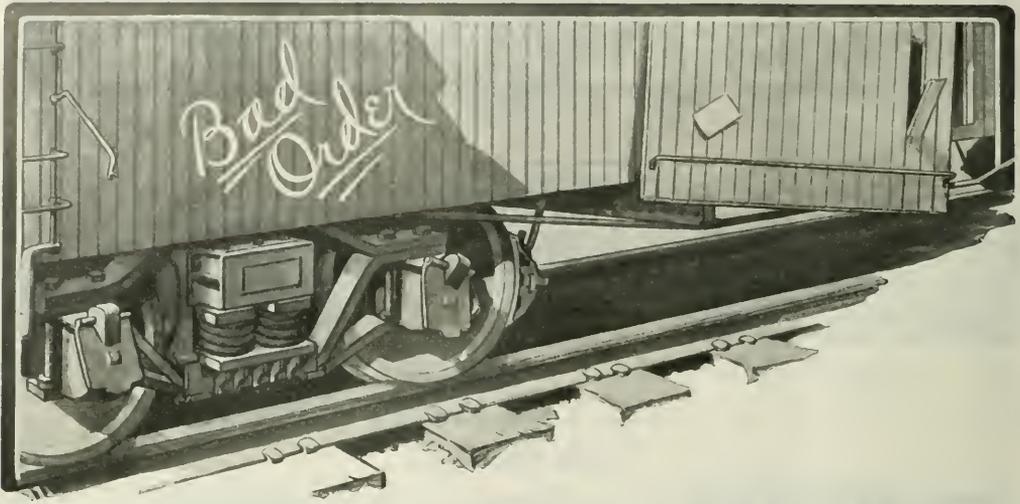
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Repair parts of Certified Malleable meet the most severe and exacting requirements of railroading. They have great tensile strength, high elastic limit and toughness to resist shocks, strains and the wear and tear always present in railway service.

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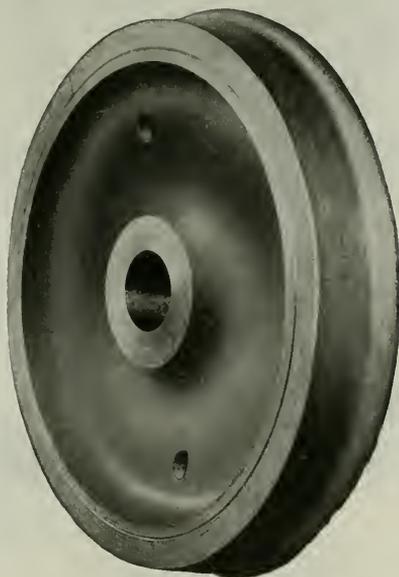
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Marion, O.
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Bulletin No. 3

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No two manufacturers can make Forgings in exactly the same way....

This difference allows a latitude of choice....It means that purchasers must differ in their judgment as to what is actually the best....

In recognition of this fact, the Standard Steel Works Forgings are sold on a new basis....They are offered only where it is agreed that "Comparison Measurements" are such as to measure the true difference in values....

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Close-Fitting Shirts

"Close is my shirt, but closer is my skin."

An old proverb, but it fits the case of a box car roof as if it were made for it.

The shirt, in its primary use, is for weather protection.

The closer it adheres to the body, the more work the movements of the body make for shirtmakers and the sooner it loses its protective integrity.

The car roof weatherproof covering rigidly attached to the body of the car soon loses its protective value because of car movements. This makes work for car repairers.

HUTCHINS ALL-STEEL FLEXIBLE ROOFS

(Dry Lading Roofs)

are like a comfortably fitting shirt; yielding to the movements of the body and not liable to be torn by them.

HUTCHINS CAR ROOFING COMPANY
DETROIT MICHIGAN



EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

The recent appointment of a man whose training had been primarily in engineering as auditor of capital expenditures points definitely to the closer relation between engineering and accounting at the present time. This situation has been brought about by the greater attention which is being given to accounting on the railroads, and particularly by the employment of large forces of engineers on the federal valuation, but whether the work at hand concerns valuation or routine construction or maintenance, we find that the engineer must learn more about accounting, while the accountant has need of a better knowledge of engineering. The work of neither can be done without some knowledge of the other's problems.

Improve Your Knowledge of Accounting

This fact was first driven home in connection with valuation and this led to the creation of such positions as engineer accountant. To advance an engineer to higher accounting positions is but another step. However, whether or not an engineer has any ambitions in the direction of the accounting department, he owes it to himself to extend his knowledge of accounting because of the intimate relation it has to the administration of the work under his direction, no matter what that may be.

The new bureaus created by the Interstate Commerce Commission after the enlargement of its duties by the transportation act have proved stepping stones to higher positions lately for three former railroad officials who had left their roads to serve with the commission during the organization period of the commission's new activities. Col. F. G. Robbins, formerly general superintendent of the Erie, who was appointed director of the commission's new Bureau of Service in 1920, has recently resigned and been elected a vice-president of the Chicago & Erie at Chicago. Col. W. A. Colston, who was formerly general solicitor of the Louisville & Nashville, and was made director of the Bureau of Finance, organized by the commission in 1920, to handle matters pertaining to the commission's regulation of security issues, the six months' guaranty and similar matters, also resigned recently to become vice-president and general counsel of the Nickel Plate. Also, Guy J. Bunting, who left the Chicago, Milwaukee & St. Paul as assistant general auditor in 1920 to become assistant director of the Bureau of Finance, has now left the commission's service and has been appointed comptroller of the Illinois Central.

I. C. C. Bureaus Stepping-Stones to Advancement

The drastic readjustments in service which the railways are frequently called upon to make with little or no warning are illustrated by the almost complete rerouting of coal traffic following the closing of the union mines on April 1, and the greatly increased activity of the non-union mines which have continued to operate principally in West Virginia and Kentucky. It has been the experience of practically all of

Meeting a Rerouting of Traffic

the roads serving these areas that all records for the shipment of coal have been broken. As an instance the Louisville & Nashville, which serves the mines in eastern Kentucky, has been called upon to handle 50 per cent more coal than ever before. Similarly the Cincinnati-Toledo line of the Baltimore & Ohio, which carries much of this coal to Lake Erie ports, is now handling more traffic than during the period of the heaviest traffic of the war. Probably more interesting is the experience of the Illinois Central's Evansville, Ind., branch. This line normally operates a couple of freight trains in each direction daily; with the advent of the coal strike it was called upon suddenly to handle ten times that traffic. That no complaints are being heard regarding congestion and lack of service indicates that the railways are meeting this sudden dislocation and rearrangement of traffic satisfactorily. In fact, difficult as this situation has been, it is typical of the constant shifting in traffic which the roads face almost daily.

The A.R.A. freight car loading report for the week ended on June 10 is again an interesting one, showing a total of 846,002 cars or only 33 less than were loaded in the last week before the coal strike, which showed the heaviest figures for any week this year. In spite of the decrease in coal loading the report shows an increase of 58,719 cars as compared with the corresponding week a year ago, although a reduction of 84,974 as compared with 1920, but a normal amount of coal traffic would have brought the total loading above that reported for the corresponding week of the record year 1920, which was 930,000. This figure was not attained in any week of 1921 until the middle of October. In spite of the coal strike the curve showing the loading this year is running about halfway between those for 1920 and 1921. There seems to have been little of the expected scramble for coal during the period of the strike thus far but it is certain that there will be a heavy demand for it before long and a settlement of the strike would soon create a need for the cars which are now included in the surplus reports as well as for many of those in the bad order list, which numbered 340,000 on June 1, or 15 per cent, as compared with 14.7 per cent only 15 days before.

Large Increase in Freight Car Loading

The entrance of the Pennsylvania into Detroit, described elsewhere in this issue, has been accomplished by methods that bear little similarity to those which prevailed in the old days of cut-throat competition. There is little resemblance to such projects as the Pennsylvania's entrance into New York, the Canadian Northern tunnel under Mt. Royal at Montreal or the ill-fated Pittsburgh project of the Wabash. In each of these cases the plan was projected independent of any other carrier. At New York, it is true, that the obstacles were primarily physical, but at Pittsburgh and at Montreal inability to secure running rights over one of the natural routes already occupied by other railroads led to the

Development by Co-operation

Development by Co-operation

development of less favorable locations at enormous expenditures. At Detroit the Pennsylvania has avoided the enormous outlay for an independent route by securing trackage rights from other roads and thereby restricting its capital expenditures to the development of independent terminal facilities and a 20-mile cutoff in open country. This manner of approaching the terminal problem is in keeping with the tendencies of the times—the joint operation of terminal routings to the end of a more effective utilization of the available facilities. It is true that in the case in point the roads involved are essentially non-competing so that the negotiations were greatly simplified. Nevertheless, the public is demanding that the development of railway properties in large cities shall gradually tend toward a more co-operative utilization as a means of reducing the capital charge against every ton of freight and every passenger carried.

A complete block system is one in which there are automatic signals for all main line movements, with every switch operated from a tower. (Manual

Different Kinds of Block Systems

Signals are, theoretically, as safe as automatic, but extended comparisons have shown fewer false clear indications under the automatic system.)

“Nearly complete” would be a fair description of an automatic system with all hand-thrown switches properly equipped with indicators. A system without indicators at switches would constitute another class. The manual system with the hand-thrown switches protected by distant signals constitutes still another. The reports on the recent collisions at Camps, Tex.; Woodmont, Pa.; Warner, Tex., and Welch, Mont., suggest other classifications, with varying degrees of part-way protection, down to no space interval at all, as at Plains, Kansas, (*Railway Age*, June 10, page 1332). The term “complete block system” is a misnomer to the extent that permissive signaling is allowed, except in clear weather, on short sections, where there are few curves in the line. Of the 63,000 miles of road reported to the Interstate Commerce Commission as operated by the manual block system (with presumably a small proportion of sections less than three miles long) a total length of only 5,121 miles appears in the column “permissive signaling for bidden”; and on a length of 46,326 miles the rule to stop absolutely at a stop signal is relaxed at passenger stations. On 16,909 miles (single track) the block signal rules are depended on for rear-end protection only. These facts concerning our country-wide practice should tend to make everybody cautious in boasting about mileage figures. Every enterprising operating officer aims, of course, to have a complete block system as soon as he can find the necessary money; but pending that millennial accomplishment the lessons of the last seven collisions reported by Mr. Borland call for strenuous efforts, in innumerable directions, looking to the cure of the weaknesses which the lessons expose.

The railroad news-gatherer or editor has to be on his guard against involuntary self-deception. Things new and good in the railroad field are brought to his

Neatness in Handling Oil

attention, without effort on his part; but to see the old and bad he must go out and survey the field; and he must not present a distorted picture,

showing the general situation better than it actually is. A new locomotive or signal tower is the subject of a special invitation to inspect, but if there is a slovenly back-shop or a disgraceful freight house that would afford him the topic for a useful lecture, which would be good for his readers, he

must go and hunt it up. This thought has been suggested by reading the rules for the care of oil lamps which are printed in this issue, in the report of the annual meeting of the signal engineers. A second thought is that careful attention to these rules is needed in other places than signal cabins—and that is the reason that they are published here. A dirty oil room is a far too familiar sight at passenger and freight stations, yard offices, crossing shanties, section houses, and other places. Where such conditions are very bad the fire insurance inspectors can be depended on to call attention to them; and if the inspectors do their full duty they will see to necessary corrections; but the point is mentioned here as a plea for the enforcement of neatness at such places regardless of the insurance inspector. Do not wait for him; nor for the safety-first committee to make a “suggestion.” Ask the general passenger agent to “suggest” how many times he has had to apologize to passengers for the existence of offensive sights, greeting their eyes at many places, which are due to shiftlessness and laziness in handling oil. When it comes to details, these lamp rules may be open to criticism here and there. The first rule, No. 1601, is printed on page 44; is repeated on page 46 as a question in an examination paper and again, on page 47 as an answer to the question. That amount of paper and ink might well have been spent on something to give a little “punch” to so important a rule.

Because of the numerous differences of opinion which prevail between the producers and the consumers of lumber

The Railways Should Be Represented

products, a conference of representatives of both parties was called by Herbert Hoover, secretary of the Department of Commerce, at Washington during the week of May 22. At this

conference plans were formulated for the more general standardization of grades and dimensions to promote economy of manufacture and particularly to insure to the consumer that he secures the material which he desires. The railways have not escaped participation in the controversies which have led up to this conference, for they are among the largest consumers of timber products and they have long been criticized by the lumber producers for their manner of purchasing this material. The roads were therefore invited to participate in this conference and to present their position in this special controversy as well as in those common to the lumber industry. Railway uses for timber fall into three general classes: construction timbers, tie and switch timbers and car materials. It is to be regretted that the railways did not arrange for adequate representation at this conference by a sufficient number of men to insure familiarity with all of these uses. The result is that the needs of the railways were not presented in the thorough manner in which they should have been. Since it is the expressed intention of Secretary Hoover that this work shall proceed to a conclusion, it is to be hoped that the railways will realize the importance of the subject sufficiently to study their lumber requirements in sufficient detail so that they can defend their standards or revise them to agree with American manufacturing conditions as their investigation warrants. Timber purchases constitute so large a drain upon railway revenues and the roads have been subjected to criticism regarding their purchasing methods for so long that they owe it to themselves to investigate the subject in detail in order to satisfy themselves that they are buying the materials most suited to their needs; that they are buying these materials in the sizes which are most economical in the light of their requirements and present manufacturing conditions and that they are getting the materials of the grades and sizes that they specify. As a large consumer of lumber the railways have much to gain from taking part in these conferences,

and it is to be hoped that they will organize promptly to participate with lumber producers and others in the investigations which are now being inaugurated.

It is related in an old fable that an ingenious driver hastened the motion of his not overly ambitious steed by dangling a wisp of hay ahead of the animal. By this simple expedient he was able to accomplish what he could not attain by club or whip. Some operating officers are now applying the moral of this story to the employees under their direction with equally satisfactory results. The tendency of the labor organizations in negotiating agreements with the roads in recent years has been to extend the work by introducing complications which in effect add to the number of men employed. As an illustration, the present agreement with the men in train service provides an incentive for the crews to loiter on the road to the point where overtime is earned, thereby increasing their income. Such a condition cannot be expected to do other than to slow down the movement of traffic, the result of which is reflected not only in the added wage cost but to an even greater extent in the decreased capacity of the line and the reduced use of equipment and other facilities. To overcome this by discipline and supervision is difficult and to a large extent impossible, for much of the responsibility for the movement of trains must be left to the crews in charge. However, a way out of the dilemma is to offer a counter incentive which is stronger than the first one. Such an expedient was referred to editorially in these columns a few weeks ago where reference was made to an arrangement which has been perfected on several divisions of one road for return trains to be made ready for crews who have made runs to the away-from-home terminal in less than eight hours so that they can avoid being tied up at this terminal and have double the normal layover at home. This simple expedient reduced the average time of trains over one division from 11 hours to approximately 7 hours. This same result was accomplished in a large classification yard by offering to allow the switching crews to go home after they had completed work which formerly required 10 or 11 hours, the men speeding up their work to the point where the trains were made up and started on their way three hours earlier than formerly. The application of measures such as these will enlist the co-operation of the men in many instances and secure results which are mutually beneficial without additional expense.

Will They Strike for an "Economic Impossibility?"

THE STATEMENTS which are being issued by labor leaders regarding the wage reductions recently authorized by the Railroad Labor Board are extraordinary examples of brazen impudence. We refer to the dissenting opinions signed by Messrs. Wharton and Phillips, labor members of the board, as well as to the utterances of B. M. Jewell and other heads of the labor organizations. They are attempting to mislead the public and incite their followers to strike by as bold misrepresentations as ever were put in circulation.

For the employees whose wages are to be reduced to strike would not be a technical violation of the Transportation Act, but it would constitute a complete disregard of the Labor Board's findings of fact and principle and an open defiance of it. To shift from themselves the odium that they would incur by bringing on a strike, if the public understood the facts, the labor leaders, including the two labor members of

the board mentioned, are brazenly attempting to make the public and employees believe the majority of the board themselves have violated the provisions of the Transportation Act.

The law requires the board, in fixing wages, to consider, among other things, the cost of living. The labor leaders, in the hearings before the board, contended that the board should establish an average wage on which an "average family of five" could live in comfort and decency. They contended that this average wage is \$2,637. Because the board did not give this average wage they now denounce it as having violated the law by disregarding the provision regarding the cost of living and as having ignored the "claims of humanity."

This reasoning could be properly branded as approaching the idiotic if it did not constitute propaganda dangerous to the peace of the country. What are the facts? The law provides that the board, in fixing railway wages, shall consider *the wages paid in other industries for similar work* as well as the cost of living and other relevant considerations.

For the board to fix in the railroad industry such wages as the labor leaders demand would be to fix wages averaging probably three times as much as those being paid for similar work in other industries. The labor leaders answer that as high wages ought to be paid in other industries as they demand for railway employees. *But they are not*; and it is as plain as a pikestaff that for the Labor Board in fixing railway wages to disregard the fact that they are not would be for it really to violate the provisions of the law. Furthermore, the labor leaders, in demanding the payment of an average wage of \$2,637 in all industries are, as the majority of the board well said, "propounding an economic impossibility." The payment of such an average wage in all the industries of the United States would cost at least one-half more than the largest total amount that all the industries of the United States ever produced in any year. It is very unfortunate that industry never has been able, and never will be able without a great increase in the efficiency of management and of employees, to produce enough to pay the labor leaders' "minimum average comfort and decency wage," but it is a fact which never has been disputed and which is indisputable that industry never has been able to; and therefore it is just as sane for the labor leaders now to cry aloud for such a wage as for a child to cry for the moon.

The cold fact is that, under the plain provisions of the Transportation Act, interpreted in accordance with its obvious intent, the labor leaders knew that they could not make a case against the reduction of railway wages. They knew they could not show that, measured by the wages paid in other industries, the "cost of living," as that standard always has been understood and applied, and the other standards set up by the Transportation Act, the existing wages of railway employees should be maintained. Therefore, for purposes of propaganda, and probably with no expectation of gaining anything for their followers by doing so, they set up as the standard of reasonableness of wages, a purely fictitious and economically impossible standard of their own; and now they are trying to provoke a strike by appealing from the standard established by the law to the standard invented by themselves and which, by childishly sophistical reasoning they are trying to read into the law. They are threatening the people of the United States with, and are trying to lead their followers into, a great strike that would be equally disastrous to employees and public, to vindicate a theory of wages which they themselves know as well as anybody, is, under present conditions, merely the baseless fabric of a vision.

The situation strikingly illustrates the fact that the main trouble with many railway labor unions, as well as many other labor unions, is their reckless, irresponsible and incompetent leadership. Their leaders did not in the recent wage case present their case to the Labor Board on its merits

properly supported by evidence which was relevant and material under the actual provisions of the Transportation Act, and now they are trying to discredit the Labor Board and bring about a strike because they lost a case which they never reasonably and adequately presented. Such labor leadership is a menace to the peace and welfare of the country, but it is a still worse menace to the welfare of the members of the labor unions.

Is a "Car Shortage" Coming?

IT IS TIME to raise very seriously the question whether the railways are not approaching another period of congestion of traffic and "shortage of cars."

On May 31 the number of idle freight cars was 504,702. Of these 305,198 were cars in serviceable condition. These statistics do not indicate any danger of a shortage of equipment. But let us consider some other facts. The number of cars loaded with freight in the week ended May 28 was 821,121. The number of cars loaded with coal was 74,241 less than in the same week of 1921 and 83,242 less than in the same week of 1920. If coal loadings had been normal the total number of cars loaded would have been approximately 900,000.

With the small number of cars of coal moved, the railways handled their freight business in the week mentioned without any difficulty. If, however, the roads had had to handle, say, 100,000 car loads more, the conditions would have been quite different. The movement of these additional cars would have greatly increased the demands upon their locomotive power and their terminals, and would have tended to slow down the movement of all cars handled under load. Whatever slows down the average movement of cars actually in service reduces the supply of cars in proportion to the demand. It is much easier to handle 800,000 loads a week without delays and congestions than to handle 900,000 without delays and congestions.

It is but a matter of time until the coal strike will be settled, after which, owing to the depletion of coal stocks, the railways undoubtedly will be called on to move at least 100,000 loads of coal weekly more than they are moving. Experience in the fall of 1919 and again in 1920 showed that with the facilities then available it was extremely difficult for them to handle more than 1,000,000 carloads of all freight weekly. Doubtless they can handle a larger amount of freight now than they could then; but the increase in their capacity has been relatively small.

It is evident, therefore, that a large increase of coal shipments and a continuance of the increase of other traffic would soon tax them to their capacity. But will other traffic continue to increase?

There are strong reasons for believing it will. First, crop prospects, especially in the west, are unusually good. Second, building operations are growing throughout the country. Third, there are many signs that the stocks that most manufacturers and merchants have on hand are low, and that as the signs of returning prosperity become more numerous and convincing the demand for the raw materials of manufacture, as well as for finished products, will grow rapidly.

All these conditions indicate that traffic other than coal will continue to increase. In other words, it would appear that the only thing needed to give the railways a business that will break all records is a settlement of the coal strike.

If this is the case, the only possible way to avoid car shortages and congestions within a few months are, first, to speed up the repairs of all equipment that is not in serviceable condition; secondly, to speed up the construction of new equipment and railway improvement work already ordered; and, third, to begin an effective campaign to secure the most efficient utilization possible of all available railway facilities.

During the period of business depression shippers have been allowed to reduce the tonnage loaded per car. Efforts should be begun at once to secure heavier loading of cars and to reduce the time used in loading and unloading. The railway managements should prepare to intensify supervision of the movement of cars to prevent all unnecessary delays at stations or in yards. Every feasible plan for increasing the average mileage traveled daily by locomotives should be put into effect.

In 1920 the greatest transportation difficulties in history were met and overcome by the co-operation of the railways through the American Railway Association and by the efforts of the individual managements. The lessons learned then should be remembered and the methods used then should be revived. It may be the heavy business that now seems probable will not develop. It would be far better to make preparations for it and not have it come than to have it come and catch the railways unprepared.

The Automatic Train Control Order

THE INTERSTATE Commerce Commission has confirmed its train control order substantially as it was first published, last January. The date is made six months later, but otherwise it is left in about the original terms; the desired clause permitting engineers to prevent the operation of an automatic stop while the train is in motion is not included.

The order is dated June 13; order No. 13,413. It requires 49 railroads to make installations of automatic train control "on at least one full passenger-locomotive division," between the cities named in the order, the work to be completed by January 1, 1925.

Some of the outstanding features of the order are (1) its extensive and drastic application; (2) the short extension of time allowed for testing devices not yet developed; (3) the elimination of the permissive release feature of the automatic stop; (4) the provision whereby roads so desiring may make installations of train control without the use of visual roadside signals; and (5) the lack of consideration for roads which are planning to install visual signals extensively. This last comment might be broadened to include costly improvements of all kinds, for a main issue with the railroad manager is the distribution, over a practicable period of time, of his heavy expenditures, of which signaling constitutes only one feature. To put in a single class the road which is now spending a million dollars for signals and those roads which have no large work of that kind in hand seems a very crude arrangement, to say the least.

The specifications are identical with those of the tentative order, as are the carriers listed, except that for the St. Louis-San Francisco the tentative order specified the line from St. Louis, Mo., to Springfield, while the final order says between Springfield, Mo., and Tulsa, Okla.

The Commission says that the Transportation Act, 1920, places upon it "the duty, after investigation, of ordering the roads, or any of them, to install automatic train stops or train control devices or other safety devices." The law does not use the word "duty;" it is permissive; but the commissioners evidently predicate their interpretation (that a duty is imposed) on their statement that the result of investigations and the recognized need constituted the reason why Congress inserted section 26 in the Transportation Act. In other words, Congress says that they may order automatic stops; and they change this to *will order* automatic stops on the strength of their finding that there is a need. There would be far greater satisfaction with the present situation if this finding—involving expenditures of many millions—had been based on a well-reasoned and scientific report, prepared by eminent engineers, instead of on a series of compromises and half-truths backed by no names except those

of eleven commissioners, no one of whom is an engineer.

The principle of automatic train control—at least on lines of heavy traffic—should be valuable, properly used; for the subway lines have proved it; and as passenger lines become more congested it is an element in increasing capacity, if complete safety is to be attained. But train control, like any other development, should grow gradually, and an order as drastic as this one is not reasonably calculated to serve the purpose intended which, as we view it, is the putting an end to the period of discussion. It is questionable whether this order will serve the purpose aimed at by the Commission. Apparently some roads will actually defer intended installations of automatic signals because of the probable cost of complying with the present order. The extension of time allowed to test out new devices is entirely inadequate, as may be seen by the time which has been taken by prominent experimenters. A road which, for example, desires to await the final reports of the experiments now being made on the New York Central, the Delaware, Lackawanna & Western, the Pere Marquette, the Rock Island and the Pennsylvania, and which wishes to decide its course before next January, is in a perplexing quandary.

Forty-nine—or even 29—costly experiments to test less than a dozen systems cannot be called other than reckless extravagance. It has to be admitted, however, that unless the government were to build or buy several hundred miles of railroad on which to make experiments, the establishment and execution of a workable plan, in place of the 49-fold scheme, would call for constructive engineering and constructive statesmanship of a high order. But these are two qualities which the commissioners seem not to appreciate in this connection.

The Valuation Amendment

COMPARATIVELY LITTLE attention has been devoted in the press to the fact that Congress has just passed and the President now has before him for signature bill, S. 539, amending the railroad valuation act of 1913 so that the Interstate Commerce Commission will not be required to include in its valuation reports a figure representing what it would cost a railroad to reacquire its right of way and other lands if the railroad were to be reproduced under present conditions. What has been published has generally been of the erroneous character displayed in campaign statements of Congressmen seeking re-election that the bill will reduce the valuation of the roads on which freight rates are to be based by amounts ranging from three to six billions. Many of the Congressmen who voted for the bill were doubtless as ignorant of its purpose as was Representative Campbell, chairman of the rules committee of the House, who in introducing a rule for the debate on the bill said that it “provides in substance that in the re-valuation of the railways the value of the real estate used by the roads for depot and other purposes may not be taken into consideration.”

Many of them would have been willing to vote even for that kind of bill and we hope their constituents may in some way be able to call them to account when they learn that the billions to be saved had long ago been left in the discard by the commission.

As a matter of fact, all that has happened is that Congress has directed the commission that it need not even go to the trouble of finding one of the evidentiary facts which represents part of the cost of building a railroad and that having reported that fact in the case of over 200 roads and collected most of the data referring to it for the other roads during the past year and a half, it may throw it away or file it away against the time when some court may order it used again.

The bill amends the valuation law by inserting, in the paragraph directing the commission to report as to each piece of property the original cost, the cost of reproduction new and the cost of reproduction less depreciation, the words “other than land,” so that it need not report the cost of reproduction of land. Then it strikes out of the paragraph directing a report on the original cost and present value of land the words “and separately the original and present cost of condemnation and damages or of purchase in excess of such original cost or present value.”

Until directed to do so by the Supreme Court in its decision in the mandamus proceeding brought by the Kansas City Southern in May, 1920, the commission had declined to comply with this direction of the law on the ground that it involved a consideration by it of matters beyond the possibility of “rational determination,” calling for “inadmissible assumptions” and “impossible hypotheses,” and that under the Supreme Court’s decision in the Minnesota rate case the information was of no value if collected. The assumption and hypothesis which the commission was so reluctant to accept was that if the railroads were to be reproduced today, or even if a new railroad were to be built under present conditions, it would in most cases cost to acquire the necessary land a sum so enormous as to be difficult of conservative estimate. The court held, however, that the conclusion of the commission was erroneous and directed it to comply with the statute as written. The commission then asked Congress to change the law but during the delay in getting action on the bill it has gone ahead and done what it had previously declared impossible. The late director of the valuation bureau, C. A. Prouty, said on February 7, 1921, that “the result in the very nature of things is an average estimate, but within the limitations fixed by those terms it will be accurate;” and that the work was then about one-half done and should be completed in from a year to a year and one-half.

The commission issued supplemental reports as to the roads on which tentative valuations had already been served and in the reports since issued it has inserted an item for what it calls the “excess cost” of land, arrived at by applying to the value of adjacent land, according to a zone system, a multiple ranging from 55 per cent for highly developed residential property to 200 per cent for low grade land. In 198 tentative valuations the total present value of lands amounted to \$156,345,283 and the total excess cost of acquisition to \$121,167,073, or 77½ per cent of the present value; but analysis indicates that in taking into consideration the various factors from which it evolves a so-called “final value” little or no weight has been attributed to the cost of acquisition.

One of the principal grounds on which the commission urged that this requirement be omitted from the act was that it would save the expense, estimated by Judge Prouty at approximately \$300,000 a year, of doing a “vain thing,” but a large part of the work has now been done and apparently the commission has made no practical use of it.

The railroads, in opposing the bill, urged that even though the commission disregarded this item of evidence the amendment was an attempt to settle a judicial question by legislation because it would strike out an element of value in the property of common carriers which always has been recognized in the common law; and that if the commission makes a valuation without considering that element much delay might be caused by a court order requiring that it be taken into account.

The chief appeal to members of Congress in the proposed legislation doubtless lay in the argument advanced on behalf of the state railroad commissioners that approximately 12½ per cent, or \$2,000,000,000, of the \$18,900,000,000 adopted as a tentative valuation by the commission in 1920, represents land and that the railroads might succeed in getting a

multiple of 2 or 3 applied to this and thereby add \$4,000,000,000 to \$6,000,000,000 to the value used as a basis for the rate of return.

Of course, if the courts decide that something should be included in the value to represent what it would cost to acquire land it will eventually be included whether or not Congress or the commission thinks it should be; but as long as the commission and Congress may fix the rate of return (above the limit of confiscation) and as long as the commission may estimate the rates, traffic and expenses that will produce a given return for the future, it would seem that the only practical benefit of the bill just passed will be that derived from its possibilities as a source of campaign literature.

New Books

Railway Accounting Procedure, 1922 Edition. Edited by E. R. Woodson. Published by the Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. 6 by 9 in.; 468 pages. Bound in cloth. Price \$1.00.

This is the 1922 edition of the book published formerly under the name of the R. A. O. A. Synopsis. It does not differ materially from the editions of other years with the exception that it is larger and covers a considerably increased number of subjects. The editing has been changed also to some extent so that the publication has somewhat more the character of a book on the subject with which it deals rather than that of a synopsis only. The present book contains 468 pages; the 1921 R. A. O. A. Synopsis contained 400; that of 1920 but 228. In these years there has been no change in the plan; the increase in size results from the amount of work which this busy association has succeeded in accomplishing. Under these conditions and considering in general that the association has discussed so many subjects and its activities have been so extensive, the word "Synopsis" is no longer sufficiently broad or inclusive to cover the amount of material presented. The new name, "Railway Accounting Procedure," is more appropriate.

The Railway Accounting Officers' Association does its work largely through committees. A subject, when it is presented on the floor of the annual meeting, has therefore received a large amount of discussion in the committee and whatever action the association may take, is taken with that in mind. The book, under whatever name it may be known, "Railway Accounting Procedure," or "R. A. O. A. Synopsis," is a compendium of the findings of these committees as they have been discussed and accepted by the association for a period of years. Every subject in the book, therefore, is authoritative and represents the best thought of the association as to what should be considered standard practice in railway accounting. The book makes no presumption to be a treatise on the theory of railway accounting but deals only, as the name indicates, with matters of procedure. The value of a book of this kind hardly needs comment, particularly in view of the great amount of detail which is embodied in the work of compiling the accounts of a railway system. The best comment that can be made is that the book is indispensable.

The book is well arranged. It is divided into sections, these being headed as follows: freight, overcharge claim rules, passenger and disbursement. In the freight, passenger and disbursement sections there are presented first the mandatory rules, the rules that are recommendatory only, and finally, the standard forms, to which the R. A. O. A. has given a great amount of attention. The overcharge and agency relief claim rules are mandatory. There is also a section devoted to terminal accounting. Each section is carefully indexed.

Letters to the Editor

Outside Locomotive Repairs

LONDON, Eng.

TO THE EDITOR:

I submit that no one should be surprised that a majority of the Interstate Commerce Commission has censured the Pennsylvania and the New York Central for their failure to forecast the future when they employed outside agencies to repair their locomotive equipment.

It is true, though the commission does not in the report that I have seen notice the fact, that the railways erred in company with most of the great business firms, not only in America but in England, who laid in large stocks and increased their output capacity at top prices under the impression that the boom would last longer than in fact it did. It is true, too, that in coming to their decision the companies postponed the interest of their shareholders in economy to the interest of the public in efficient transport, and that if they had taken the cautious line and events had turned out differently, the Interstate Commerce Commission would have been prompt to rebuke them for failing to live up to their responsibility as a public utility undertaking. But the fact remains that the railway men did guess wrong.

Heretofore the railroads have guessed right, and the Interstate Commerce Commission wrong. I well remember, for I was in Washington at the time, the rates advance cases in 1911. It was then up to the commission to do the guessing. It prophesied that the cost of supplies would not much advance, and that wages would not much increase. Three years later it admitted in effect that they had been wrong in 1911. It said that the price of coal had increased 7.7 per cent and transportation wages 9.02 per cent. But again it refused to permit any substantial increase in rates. It thought the country was recovering from another period of depression. It said, in answer to the claim of the railroad officers who had testified, that they "would encounter great difficulty in renewing their maturing short term notes and other obligations"; that "subsequent developments have shown that there was little evidence for any such view With the growing ease in the money markets this difficulty has largely disappeared." This decision was given on July 29, 1914. Three days afterwards the Great War began.

As the result of these two erroneous forecasts of the Interstate Commerce Commission the railroads had to face the tremendous strain of the war period with plant and equipment barely adequate for normal needs. According to the commission report, the Pennsylvania and the New York Central spent unnecessarily, owing to this erroneous forecast, some \$6,000,000 of their shareholders' money. It would be interesting if someone would estimate what the erroneous forecasts of the commission in 1911 and 1914 cost the American shipper in the years from 1915 to 1920.

Again, a year ago, the commission was required by Congress to make a forecast. It was instructed to fix such rates as would produce for the railroads a net return of not less than 5½ per cent. The rates it actually fixed produced about three per cent. Not a very accurate forecast! But for this, of course, no fair-minded man will blame the commission. The sudden and unexpected slump upset its calculations, just as it has upset those of the executives of the Pennsylvania and the New York Central. But I think it was only human nature that a majority of the commissioners should have felt that the commission's record as a prophet being what it was, it could not afford to neglect an opportunity of pointing out that even the railroads do not always guess right.

W. M. ACWORTH.

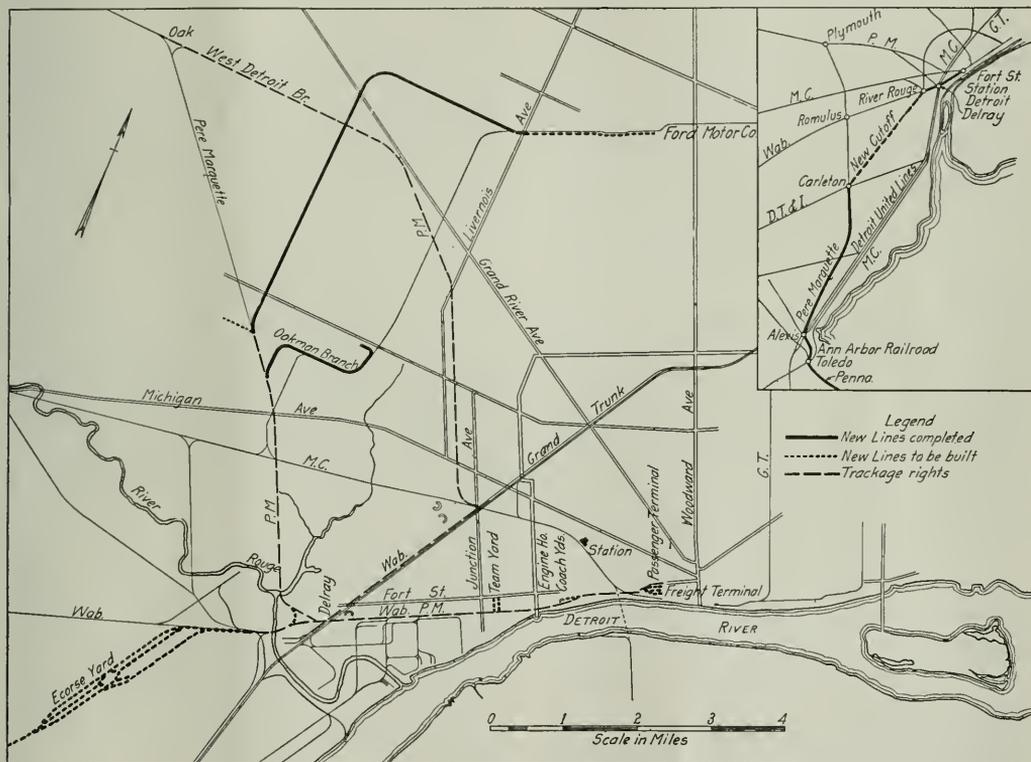
Pennsylvania to Complete Entrance Into Detroit

Project Includes a Local Freight Terminal, Classification Yard and 25 Miles of New Line

IT IS NOT OFTEN in these days that a railroad secures entrance into a great city where it has had no previous connections, yet a project of this kind is now being carried out by the Pennsylvania System with respect to the city of Detroit. Construction work completed or authorized, together with arrangements for using the facilities of other roads will afford the Pennsylvania convenient access to passenger and freight terminals in the heart of that city with switching connections to a large portion of the principal in-

troit Railroad. Of the total distance of 54 miles from the end of the Pennsylvania tracks in Toledo to the Fort Street station at Detroit, 20 miles will be new line, the rest of the distance will be covered on tracks of other roads.

The route of the Pennsylvania-Detroit Railroad begins at Toledo with the use of the Ann Arbor tracks from a junction with the Pennsylvania to a connection with the Pere Marquette at Alexis, a distance of 4.37 miles. The Ann Arbor will build a second track for this distance and reduce the



Map of the Detroit Terminals with Small Insert of the Toledo-Detroit Routing

industries. The plans for the Pennsylvania's entrance to Detroit and preliminary negotiations were undertaken several years ago, but the project remained dormant during the period of government control and the depression which followed its close. Work has been resumed within the last few weeks following an announcement made recently by President Samuel Rea before the Detroit Board of Commerce in which he outlined the present status of the project and the plans for the immediate future.

Physically, the Detroit entrance comprises an extension of the Toledo division of the Northwestern region of the Pennsylvania from Toledo to Detroit, but the project is being conducted by a separate corporation, the Pennsylvania-De-

troit Railroad. From Alexis, the Pennsylvania has acquired trackage rights over the Pere Marquette's double-track line for a distance of 25.33 miles to Carleton. From this point to a junction with the Wabash at River Rouge, the Pennsylvania has purchased right of way and is now constructing a new single-track line, 20 miles long on which it will provide a second track as soon as the traffic requires. The contract with the Pere Marquette provides that the latter road will have the privilege of using this new line under the same terms as the Pennsylvania will use the Pere Marquette facilities between Alexis and Carleton. From River Rouge, the Pennsylvania has running rights over the double-track line of the Wabash for a mile to Delray,

the junction with the tracks of the Detroit Union Railroad Depot & Station Company, leased jointly by the Pere Marquette and the Wabash. The Pennsylvania has acquired joint running and industrial rights over this line for a distance of 3.22 miles to a connection with the tracks of the Fort Street Union Depot Company. Joint use of this property has also been acquired by the Pennsylvania for entrance to and joint use of the passenger terminal at the corner of Third and Fort streets, within one-half mile of the Detroit city hall.

The route above described comprises the main entrance of the Pennsylvania into the city. Traffic over this line will be developed primarily through the operation of local freight houses and a team yard, on a location immediately adjacent to the Fort street passenger station. The Pennsylvania has acquired all the property bounded by Congress, Larned, Third and Eighth streets, as a site for inbound and outbound freight houses and team tracks. The inbound house will be placed along Congress street, with a width of 80 ft. and a length of 1,080 ft. while the outbound house will be constructed along Larned street, with a width of 67 ft. and a length of 650 ft. The freight houses will be of a two level type with street vehicle space on the street level and tracks on the second floor for a convenient connection with the elevated viaduct entrance to the station. The plans for the inbound freight house also provide for three storage floors above the track floor. Four team tracks will be laid between the two freight houses on the second floor level with a capacity of 90 cars and an inclined approach from Second avenue, across Third avenue. It is expected to build the outbound house this year and use it for both inbound and outbound freight until the traffic warrants the construction of the second building.

The proper handling of the freight business to be developed in Detroit will require facilities for the adequate classification of freight entering and leaving the city. For this purpose, the Pennsylvania has purchased a 300 acre tract just south of the connection with the Wabash at River Rouge for the construction of a large classification yard to be known as the "Ecorse" yard. Plans have been prepared for the development of this area with a yard having an ultimate capacity of 12,000 cars. The immediate construction on this area will be adequate for about 1,100 cars. It is also expected to provide space in this tract for a modern engine terminal but for the present only a temporary wooden house of about three stalls will be provided, it being the intention to run locomotives from Toledo to Detroit and return without the necessity for housing them at Detroit.

The increased utilization of the Fort Street station incident to the inclusion of the Pennsylvania calls for more elaborate round house and coach yard facilities than are now available near the station. To take care of this deficiency the Pennsylvania has purchased 4.6 acres of land adjacent to the present Pere Marquette round house and coach yard, with arrangements whereby the present facilities will be replaced by a new plant to be constructed by the Pere Marquette for the joint use of that road and the Pennsylvania.

In addition to provision for an entrance line and terminals other developments have been made within the city for the purpose of securing ready access to the more important industrial districts. To this end, the Pennsylvania has acquired joint use of all of the Pere Marquette and Wabash tracks within the Detroit industrial terminal area east of the River Rouge, including the Pere Marquette tracks from Delray to a point 1.14 miles north of Michigan avenue, a total distance of 4.57 miles and also of the West Detroit branch of the Pere Marquette from Oak to a junction with the Grand Trunk at Junction avenue, a distance of 8.47 miles. Joint use has also been acquired of the Wabash tracks from Delray to Junction avenue, a distance of 2.63 miles.

Perhaps the most comprehensive feature of the plan has been the development of a belt line, partly by the use of Pere Marquette tracks and partly by the construction of a new line to the north and west, largely through undeveloped industrial property to Livernois avenue, a distance of 6 miles from the junction with the Pere Marquette.

A number of new industries have already located on this line in the vicinity of the Grand River avenue crossing. The Pennsylvania has also constructed a 1½-mile branch from the Pere Marquette to the new plants of the Paige Detroit Motor Company, the Detroit Seamless Tube Company, and other industries. The Pennsylvania has also acquired the right of way for some other branches and has agreed with the Wabash and the Pere Marquette to construct such extensions and improvements for the joint use of the three railroads until expenditures for this purpose are equal to one-half the valuation placed on all the Pere Marquette and Wabash Terminal tracks on which the Pennsylvania has acquired joint use.

Another local development is the provision for a supplementary team yard, on property adjacent to the Detroit Union Depot and Station Company tracks. The Pennsylvania has obtained joint use of all industrial connections on this line and also the yard of the Wabash at Ferdinand street, but supplementing this, purchase has been made of 10 acres along Fort street between Summit and McKinstry street, to be used for the construction of team tracks with an ultimate capacity of 250 cars. Immediate construction on this site will provide for 95 cars.

Development in Progress for Some Time

The Pennsylvania's entrance into Detroit was started several years ago and considerable progress has already been made. In addition to the construction of the belt line to Livernois avenue, referred to above, considerable work was done on the construction of the Carleton-River Rouge line. In 1918 construction was carried for a distance of 4½ miles from the south end to a bridge over the Huron river which is the largest structure on the line. Some work was also done on the construction of the bridge over this stream which, when completed will consist of four 40-ft. arches. The masonry work was also completed for a bridge under the hump of the Ecorse yard and for a culvert under the tracks at the same point.

This work has now been resumed. A contract has been awarded to Illif Brothers of London, Ohio, for the completion of the grading from the south end of the line to the Huron River bridge, about 15,000 cu. yd. and for the completion of the bridge. A second contract has been awarded to Ferguson & Edmundson of Pittsburgh, Pa., for the remaining portion of the grading to River Rouge and for the completion of the yard. This will involve a total of 350,000 cu. yds. of earth work. The American Bridge Company has been awarded the contract for the steel bridge required at the hump which will carry five tracks.

Following the end of government control, and pending the completion of the Carleton-River Rouge line, the Pennsylvania entered into a supplementary agreement with the Pere Marquette and the Wabash for the use of the tracks of these two roads for passenger service from Toledo to Detroit and this service is now being maintained. The present routing for the Pennsylvania trains is as outlined above under the permanent agreements except that instead of running over the cutoff line now being constructed, the trains run over the Pere Marquette to a junction with the Wabash at Romulus and thence over the latter road to Delray. This arrangement will terminate as soon as the new line is completed.

The various construction projects involved in the general plan for the Detroit Terminal of the Pennsylvania are being developed under the direction of B. V. Somerville, chief engineer of the Pennsylvania Detroit Railroad, Detroit, Mich.

Wage Cut Order Induces Bitter Controversy

Dissenting and Supporting Opinions in Labor Board's Latest Decision Indicate Trouble Ahead

REDUCTIONS IN the rates of pay of clerical and station forces, stationary engine and boiler room employees, signal department employees and miscellaneous employees not specifically included in any one of these groups were ordered by the Railroad Labor Board on June 17, to become effective July 1. The schedule of decreases as promulgated by the Board was given in last week's *Railway Age*, page 1504. New rates for telephone switchboard operators of \$85 a month with provisions for the maintenance of existing higher rates were also announced by the Board, but inadvertently omitted in the schedule given in the *Railway Age* last week.

In discussing the new rates of pay the Board, in its decision, said in part:

After careful consideration of the evidence submitted, the Labor Board is of the opinion that the nature of the work and the responsibility of train dispatchers to the carriers and to the public, coupled with due consideration of the other factors set out in the Transportation Act, are such as to warrant the maintenance of the present rates. Of the 134 carriers covered by this decision only 26 are asking reductions in pay for the train dispatchers.

There are only four carriers asking for a reduction in the compensation of dining car stewards, and, after full consideration of the law and the evidence bearing on the matter, the Board has concluded that the present rate on these carriers should not be reduced.

For similar reasons, no reduction is made in the pay of the employees represented by the Marine Culinary Workers' Association of California.

In the case of the floating equipment employees, disputes are before the Labor Board from only four carriers, and these affect only a portion of the entire class. Presumably, the other carriers which have employees of this class have reached a satisfactory wage agreement with such employees. The Board has, therefore, remanded these disputes to the four carriers and the employees in question in order that further negotiations may be had and, if possible, an agreement reached.

It will be noted that telephone switchboard operators, previously shown in Section 5 of Article II (Decisions Nos. 2 and 147), are now placed in a separate section. It was the continuation of a mistake originating during Federal control which placed these employees in said section. As this mistaken location of telephone switchboard operators gave them a smaller increase under Decision No. 2 and a larger decrease under Decision No. 147 than many of the clerks received, the Board has, to a certain extent, created an offset by fixing the minimum wage at \$85 per month, with the understanding that the wages of switchboard operators that may be higher than that amount are not to be reduced.

The reduction made for clerical employees are lighter than for some other classes, because this class suffered considerable loss as a result of certain changes in their rules and because they have never been highly paid compared with other classes. It will be noted that a greater reduction has been fixed by the Board for clerks with experience of one year and less than two, than for clerks with experience of two years or more. The reason for this is that the majority of junior clerks are beginners and apprentices and have not as yet assumed family responsibilities, and many of them are still living with their parents.

Common labor in and around stations, storehouses and warehouses was reduced one cent less than similar labor in the maintenance of way department because a much greater percentage of this class live in large towns and cities, and consequently incur a higher cost of living. Moreover, many of the common laborers in the maintenance of way department are furnished living quarters by the carriers free of charge or at a low rate.

In the light of all the facts the Labor Board is of the opinion that there should be no reduction in the rates of the supervisory forces of the signal department employees, but that their duties and responsibilities are of such character as to warrant the present rates.

In deciding upon the reductions of employees of the signal department covered by Sections 2, 3 and 4, Article IX of Decision No. 147, due consideration was given to the similarity of these employees and the shop crafts, but a smaller reduction was con-

sidered advisable in the case of the signal department employees because their rule as to the payment of punitive overtime is much less favorable than that of the shop employees.

Labor Board Discusses the Problem of Wage Fixing

Under the heading of "General Observations" the Board appended a discussion of the present labor situation and the conditions under which wage fixing must, of necessity, be carried on. After citing Section 307 of the Transportation Act, containing the seven relevant factors which should be considered in fixing just and reasonable wage scales for railway employees, the Board said in part:

Besides the specific elements or factors mentioned, the Act provides that the Board in determining wages shall consider "other relevant circumstances." Referring to this language, "other relevant circumstances," the Board in Decision No. 2 said:

"This, it understands, comprehends, among other things, the effect the action of this Board may have on other wages and industries, on production generally, the relation of railroad wages to the aggregate of transportation costs and requirements for betterments, together with the burden on the entire people of railroad transportation charges."

The consideration of all these matters presents, and has presented ever since the Government handed the roads back to private management, the most complex labor problem ever imposed upon a public tribunal.

The artificial conditions that had been built up during the war around every business and industry in this country were particularly accentuated in the case of the railroads by reason of their tremendous importance in the conduct of our country's military operations, which resulted in federal control. The difficult problems inherited from the war period by every industry were enormously multiplied and magnified in connection with railway transportation. The labor problems of this industry were more complicated than those of any other industry and involved vastly more to the public.

In this post-war period of readjustment, with its fluctuating conditions, its inflated and profiteering prices, its high cost of living, and its extravagance and wastefulness, the readjustment of wages for two million men in the country's most essential industry has been a task of appalling magnitude.

Add to these conditions the pressure of an unsettled, discontented, and sometimes misinformed public sentiment, harassed by high freight rates, the vigorous and insistent appeals of the railroads for financial help, and the zealous desire of powerful labor organizations to protect what they conceived to be the rightful interests of the employees, and the task has not been diminished.

Surrounded by such abnormal conditions, the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in the same undisturbed and uncomplicated manner as would have been possible in normal times. And, yet, the wisdom and justice of settling these questions by adjudication rather than by industrial war have been demonstrated, both from the standpoint of the parties and the public. While it can not be said that no mistakes have been made in the awards handed down by the Labor Board, a substantial degree of social and economic justice has been attained and that without the enormous loss and suffering to the carriers, the employees, and the people at large, necessarily resultant from settlements by force.

The extreme utterance of partisan bias to the effect that the Board does not give full consideration to the evidence submitted to it would be discouraging were it not for knowledge of the fact that such utterances evince merely a spasmodic relapse into the old system of bluff and bluster that entered so largely into the adjustment of railway labor disputes before adjudication supplanted force.

The Labor Board cannot venture too far into the realms of economic prophecy, but it is generally conceded to be fairly plain and certain that our country has entered upon an era of gradually increasing business prosperity which will be liberally shared by the carriers. That the carriers shall have a fair opportunity to profit by the revival of business in order that they may expand their facilities is absolutely indispensable to their efficient service to the American public. Their unpreparedness now to cope with any greatly increased traffic is notorious. Every facility of rail-

way transportation has been skimmed for the last several years, and, as to mileage, there has been an actual decrease instead of an increase.

This statement, in the connection used, must not be misconstrued to mean that the employees should be called upon to bear the cost of railway rehabilitation, improved service and reduced rates. It simply means that it is only patriotic common sense and justice that every citizen, including the railway employee, should co-operate in a cordial spirit, should bear and forbear, until the carriers are back on their feet.

When this accomplishment is safely under way, it will then be possible for the Railroad Labor Board to give increased consideration to all the intricate details incident to the scientific adjustment of the living and saving wage, with enlarged freedom from the complications of the "relevant circumstances" of the abnormal period which is now approaching its end.

Labor Is Not a Commodity

In this connection it should be said that the Labor Board has never adopted the theory that human labor is a commodity to be bought and sold upon the market, and, consequently, to be reduced to starvation wages during periods of depression and unemployment. On the other hand, it is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital.

That the Board has never fixed wages upon a commodity basis has been amply demonstrated during the past year by the ease with which the carriers have obtained labor under the contract system for less than the wage established by Decision No. 147.

In this connection it must be remembered that the carriers are at liberty to pay to any class of employees a higher wage than that fixed by this Board whenever the so-called labor market compels, provided, as the Act states, that such wage does not result in increased rates to the public.

The Purchasing Power of Railway Employee's Wages

The average hourly earnings and their purchasing power as applied to certain classes of employees covered by this decision, are shown in the following tables:

Table headings	Time for which figures are shown or comparisons made.	Clerks (Group 1, Secs. 1 and 2).	Common labor, station stores (Group 1, Sec. 9).	Signalmen, maintainers and assistants (Group III, Sec. 3).	Stationary firemen and oilers (Group II, Sec. 2).
Average hourly rates..	Dec., 1917.....	34.5c.	22.3c.	32.8c.	21.8c.
	Jan., 1920.....	54.5c.	43.6c.	64.3c.	46.6c.
	May, 1920.....	67.5c.	52.1c.	77.3c.	59.6c.
	July, 1921.....	61.5c.	43.6c.	69.3c.	51.6c.
	Under this Dn.	58.5c.	39.6c.	64.3c.	49.6c.
Percentage increase in average hourly rates over Dec., 1917.....	Jan., 1920.....	58.0%	95.5%	96.0%	113.8%
	May, 1920.....	95.7%	133.6%	135.7%	173.4%
	July, 1921.....	78.3%	95.5%	111.3%	136.7%
	Under this Dn.	69.6%	77.6%	96.0%	127.5%
Increase in cost of living over Dec., 1917.....	Jan., 1920.....		40.0%		
	May, 1920.....		52.0%		
	July, 1921.....		26.7%		
	Mar., 1922*.....		17.2%		
Percentage increase in purchasing power of earnings of subsequent dates compared with Dec., 1917.....	Jan., 1920.....	12.9%	39.6%	40.0%	52.7%
	May, 1920.....	28.8%	53.7%	55.1%	79.9%
	July, 1921.....	40.7%	54.3%	66.8%	86.8%
	Under this Dn.	44.7%	51.5%	67.2%	94.1%
Decrease in hourly rates under present decision compared with Decision No. 2.....		9.0c.	12.5c.	13.0c.	10.0c.
Percentage increase in purchasing power of present earnings compared with those under Decision No. 2.....		12.3%	-1.4%	7.8%	7.9%

* Decrease
* Latest available Government data.

Owing to the manner in which the carriers were required to render their reports to the Interstate Commerce Commission during December, 1917, in which wage data covering heterogeneous classes of employees were grouped rather than separated in accordance with their duties, responsibilities, experience, et cetera, it is impossible to obtain actual figures from which average hourly rates for the above classes could be computed. The figures shown above for December, 1917 are therefore approximations, although assumed to be very close approximations. For this same reason it is impossible to separate the average rates of clerks between those in Section 1 and Section 2 (a), and the rates shown above are the averages for all clerks in these two classes.

The average rate for common labor for December, 1917, is per-

haps a little high due to the fact that the carriers reported all station service employees in one group, and the rate shown herein for December, 1917, is the average for the group.

The foregoing table prepared by the statistical force of the Labor Board is based on the cost-of-living figures issued by the United States Department of Labor.

These figures show that applying the wages fixed by this decision to the present cost of living, the purchasing power of the hourly wage of the respective classes here named has increased over the purchasing power of the hourly wage of December, 1917 (prior to federal control), as follows:

	Per cent
Clerks	44.7
Common labor, around stations, etc.....	51.5
Signalmen (maintainers and assistants).....	67.2
Stationary firemen and engine room oilers.....	94.1

The table also shows that with one slight exception the purchasing power of the hourly wage of each class of these employees is greater under the present decision than it was under Decision No. 2 which granted the 22 per cent increase.

The Attitude of the Board Toward Budgets

The Labor Board has given careful consideration to the testimony bearing upon family budgets and standards of living. That existing standards will not be lowered by this decision is shown with substantial satisfaction by the above statistics.

This matter of living standards constitutes an interesting and important study, but much that is said on the subject is highly theoretical and of but little value.

When the Railway Employees' Department presents figures to show that the sum of \$2,636.97 is necessary for the minimum comfort budget of the average family, it has propounded an economic impossibility.

It is stated upon authority that the total income of the people of the United States is now but little more than \$40,000,000,000. If the 25,000,000 families of this country were expending for living costs the sum of \$2,600 each, it would total \$65,000,000,000 which would be \$25,000,000,000 in excess of the country's total income.

Of course, living costs can not be standardized any more than men can be standardized. One man will consume his income and find himself continually in debt while another man with the same income and under identical conditions will live in equal comfort and accumulate savings. In this connection, it can hardly be considered a digression or a gratuitous preaching to say that one of the principal troubles with the people of this country today is the abandonment of the old-fashioned ideas of thrift and economy and the indulgence in wastefulness and extravagance. These loose habits of living were acquired during the inflated period engendered by the war and, like many other ills of similar origin, are slow to depart. Increased expenses do not always mean a higher standard of living nor do diminished expenses necessarily mean a lower standard of living.

In the settlement of these questions, it is the profound desire of the Labor Board to do justice to the parties directly concerned, placing the human and social consideration above the purely economic, and, finally, to establish wages and conditions that will largely meet the hopes and aspirations of the employees, that will prove satisfactory to the carriers, and that will impose no unnecessary burdens on the public. This is not a Utopian conception in America.

Two Labor Members Append

Bitter Dissenting Opinion

A dissenting opinion signed by A. O. Wharton and Albert Phillips, two of the three labor representatives on the Board was attached to the decision and contained a bitter denunciation of the majority's decision.

Unlike previous dissenting opinions in the recent controversy over wage reductions, this opinion was not signed by W. L. McMenimen, the third member of the labor group on the Board. The reason given at the Board's headquarters in Chicago is that Mr. McMenimen left for the east on official business prior to the time this dissenting opinion was written.

Mr. Wharton and Mr. Phillips outlined five specific reasons for their dissent as follows:

1. The bases upon which the decision rests are not in themselves sufficient to justify the action taken. The Labor Board has gone into considerations which affect the issues only indirectly, if at all, and has ventured upon ground which indicates a very free interpretation of the "other relevant circumstances" provision in the Transportation Act. It has considered the effect of its decisions upon wages in other industries, extending its own "sphere

of influence" beyond the transportation industry. It has taken into consideration that part of the duties of the Interstate Commerce Commission which has to do with railway profits, and the need for railway expansion. It has considered the effect of rates charged shippers, and then decided what wages should be paid the railway workers.

2. The reasons offered for the decisions not only go far beyond the provisions of the Transportation Act, but they also deny the validity of one of the specific provisions contained in the Act. The cost of living is brushed aside, because the only basis upon which it can be computed is a more or less hypothetical budget. If the introduction of external considerations is difficult to justify, then the exclusion of a vital section of the law under which the Board operates is a matter calling for most expert casuistry. The condemnation of the use of cost-of-living budgets amounts to a rejection of a method found practical by other governmental agencies, and a fundamental disagreement with the United States Department of Labor.

3. The wages as now fixed do not insure the continuance of previous standards of living. The statement that the wages constitute an improvement over 1917 does not take into account the very low standards then prevailing, nor the much higher standards of earlier and later periods. It selects the year which, of all those for which data is available, puts the workers' standard at the lowest point. The use of 1917 figures to justify new reductions is neither just nor reasonable.

4. The basing of wages upon rates paid in outside industries, one of the "relevant circumstances" referred to in the Transportation Act, does not provide reason for the reductions made by the Board at this time. Insofar as any evidence was introduced into the hearings upon this point, especially with reference to employees covered in Group I of Article I, it seemed rather to call for a wage increase than a decrease.

5. The wages fixed by the majority decision are such as to condemn these railway workers to lives of extreme poverty. It is too much, perhaps, to expect that the full meaning of this action should be clear to men not in close contact with the workers. It may be asking too much to urge that human life is in a class by itself, not to be listed indifferently among the costs of transportation. But certainly it may be fairly and rightfully expected that the social cost of poverty is enough to induce a public body to proceed most cautiously in reducing the standards by which the workers must live. The wages most recently determined are in some cases less than 50 per cent of the amount needed for a fair standard of living. Maintenance and expansion costs of the railways must be paid, and with the "cordial" and "patriotic" co-operation of the workers; the "maintenance costs" of the workers are considered "theoretical," when they are considered at all. Such is the basis for the series of wage decisions now being made.

The Case Against the Majority Decision

There followed a 35-page argument in support of these contentions, the extreme length of this material making its reproduction here impossible. However, the character of the statements made and the tone of the whole opinion is illustrated in the following excerpts which have been taken from it:

The lack of any statement which might indicate that human beings are to live narrower lives by virtue of the decision handed down, is a clear indication that the majority has taken over the typical employer's approach to the problems of the working man. Despite the magnanimous statement that human labor is not a commodity, there seems to be very little basis for saying that it has not been so considered. Lengthy statements dealing with transportation costs, economic laws, "the vastness of the problem," and "fair opportunity to profit," can mean but little to the worker faced with the necessity of providing food and clothing for his family. If American workers are entitled to "life, liberty and the pursuit of happiness," it should surely be part of the responsibility of government to patriotically insure that the pursuit shall not be carried on at a hopelessly long distance.

It is said that "every facility of railway transportation has been skimped for the last several years," and it should not be thought facetious to remark here that if the railway workers had been given the generous consideration accorded those facilities, something of the skimming going on under thousands of American roofs might have been eliminated.

We have already pointed out, in the dissenting opinions in the maintenance of way and shop crafts cases, that by any standard ever set up the wages fixed by the Railroad Labor Board are insufficient; that is as true of the rates set in the latest decision. The workers will be forced, in the event that these decisions stand, to exist on a level even lower than the "slave-owners' standard." When human beings were considered chattels, they were cared for well enough to prevent physical deterioration. The food and clothing now allowed to the workers will not pro-

vide enough of the basic necessities of life to keep up health and strength. The slave-owner had an investment, and his business judgment urged the advisability of preventing its depreciation. There is no such limit to the employer today; now workers are always available to take the place of those broken by the combined pressure of over-work and under-nourishment. Human depreciation does not find its way into the railroad balance sheet.

Human Factors in Wage Decisions

The vital question in wage determination has again been ignored in the decisions now rendered. The Railroad Labor Board is not a profit-regulating body, nor a tariff-fixing body; it has not to deal with abstract considerations of commodity schedules or the earning power of an over-capitalized road. Wage-fixing has to deal with human values, with the lives of men, women and children. The power to set wages is the power to shape the life of the worker affected.

No other "relevant circumstance" can be greater than this. Human life must be given precedence over every other consideration. A body charged by the government with the responsibility of wage fixing should have as its primary standard the relation of its action to the lives of the workers concerned.

To explain a wage cut on the plea that workers in other, and unregulated, industries are as poverty stricken, is matched only by the excuse that at one time in the past the workers concerned have led a more precarious existence than that now prescribed. Neither of these reasons can even partially absolve the Board for its failure to consider the living conditions it has set for the railway employees.

The decision of the Labor Board has not only these humanitarian aspects; it is not only the demands of justice and humanity, sufficient though they should be, that condemn the utterly inadequate standards set for the workers. If a proper respect for human life were not in itself enough to motivate the fixing of a living wage for the railway employees, then, at least, a wise public policy, based on the measurable effects of poverty, should have dictated a standard higher than the one established. Some public officials are passing laws to punish and restrain criminals; other public officials are fixing wages that must multiply crime. Public health organizations try to eliminate disease; wage fixing bodies lay down living conditions that mean overcrowding, under-nourishment, inadequate clothing—breaking down the power of the worker and his family to resist disease, and inevitably raising the mortality rate among the thousands of people affected. Clergymen, philanthropists, lawmakers and sociologists work with every means at hand to lessen child labor; the Railroad Labor Board fixes the wage of the parents at a point where the children must be taken from school and must themselves seek employment. One section of society works through every available agency to remedy social conditions; another, supposedly responsible to the same influence, compounds the evils growing out of the poverty of the wage earners.

Majority Admit Inability to Give Just Wage

As pointed out by President Willard of the Baltimore & Ohio in the words which we embodied in our previous minority opinion, the Transportation Act aimed to substitute for the strike such just and reasonable wages as would render resort to a strike unnecessary. If this tribunal, created to determine such wages, admits that under existing circumstances it cannot fulfill this function, obviously, the employees must use such power as they have to influence the labor market, which is henceforth to be the determining factor in their wages. The majority state clearly that—

"... the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in the same undisturbed and uncomplicated manner as would have been possible in normal times."

Such statement is an admission on the part of the majority that they have been unable to separate themselves from the partisan struggle long enough to perform the function for which they were appointed and consequently it tends to absolve the employees from any limitations which the existence of a judicial board was intended to impose. As a matter of fact, the Labor Board has had nearly two years in which to make such studies as we feel to be essential to the establishment of the just and reasonable wages required by the Transportation Act.

The correctness or incorrectness of the deduction of the majority as to the present conditions of the carriers or as to their crying need for profits is unimportant because the whole matter is irrelevant to the consideration of just and reasonable human standards, which, according to Senator Cummins, is the special function of the Labor Board.

The majority attempt to avoid the implication of their announced basic consideration by the comment:

"This statement, in the connection used, must not be misunderstood to mean that the employees should be called upon to bear the cost of railway rehabilitation, et cetera."

In order to harmonize the statement just quoted with the rates

if pay which will result from these decisions, the majority are forced to add a hasty qualification which amounts to a contradiction of the assertion. It is to the effect that the railway employees must—"bear and forbear, until the carriers are back on their feet."

Interpreted in terms of rates of pay awarded, this can mean nothing unless it means that railway employees must bear with unjust wages until the carriers are willing to admit they have secured the rehabilitation which they demanded.

The meaning of the majority is clarified by the statement which follows:

"When this accomplishment (the rehabilitation of the carrier) is safely under way, it will then be possible for the Railroad Labor Board to give increased consideration to all the intricate details incident to the scientific adjustment of the living and saving wage"

The employees may well consider this an ultimatum to the effect that justice to them and their families, a real consideration of their human needs, must await complete satisfaction to ownership. In their assertion the majority admit all that we have pointed out in our former opinions; they admit that they have not considered the matter on its merits, but have been driven along by the necessities of the carriers. And they have taken as the measure of those necessities, not a balanced view of the evidence offered by the parties to the case, but the extreme statements of one party in its propaganda.

At least, the vagueness is cleared. The public and the employees know that a full consideration of the merits of the case from the employees' standpoint must await the prior claim of increased profits demanded by the railroad owners. Any one viewing the rates of pay established for the great army of labor knows that such rates are practically the same as those paid in industries where labor is treated as a commodity. So the majority hasten to assert that "the Labor Board has never adopted the theory that human labor is a commodity." The majority, however, in the next sentence admits the influence of the market value of labor upon its decision by the statement that—"It is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital."

This in the opinion of the minority, is a very important qualification, for, in the first place, it places the livelihood of human families, the provisions for children who will form the coming generation, in the same impersonal category as profits. And in the second place it immediately sweeps away all the sentiment about identity of interest between employers and employees. This, the decision does, not only here, but throughout its entire text.

In other words, the employee will ask "what is it that is preventing me from receiving enough to support my family in decency?" He will look to the decision and answer "profits—the need of the railroad for profits." The economic laws which the majority feel to be so unchangeable are neither God-given nor man-made. They are simply a description of the way in which business and industry has worked to date, and it has worked out very badly for human life. The results appear in the high infant mortality rates in the majority of centers of industry.

These so-called economic laws create a situation in which the lowest wages for which the requisite skill and industry can be bought are considered good for capital and bad for labor. Hence, the struggle, which the majority decries, has been a mere expression of the so-called economic law, and it will continue unless adjudication by a scientific tribunal can adopt methods which will amount to establishing new laws. These new laws must mean a response to something other than manipulation by interests with varying degrees of control in the market.

Board Charged With Being Tool of Railroads

The majority give the carriers specific permission to adjust rates, as follows:

"In the opinion it must be remembered that the carriers are at liberty to pay an unlimited higher wage than that fixed by this Board, whenever the so-called labor market compels, provided, as the Act states, that such wage does not result in increased rates to the public."

Employees will take this as a permission to go out and get such wages as they can command. If they feel that they can command higher wages by withholding their services, either separately or in numbers, that will not be a strike against the order of the Board, it will merely be the carrying out of the Board's suggestion as to the method of wage adjustment about to come.

But the real conclusion from this statement, coming at the beginning of a new period of prosperity, will naturally be that the carriers had the Labor Board created to regulate labor during the critical period just coming to an end. Under its cover, they were able to carry through a program which would have been impossible without the practical prohibition of striking. Whenever the Board decided in favor of the employees, the roads either defied the Board or found some method of evasion.

The majority of the Board are then, in a thoroughly insecure position, when they must depend for justification of their decisions upon principles which either contradict the clear purpose of the Act under which the Labor Board is created or upon misin-

terpretation of fact. It is the opinion of the minority that such pitfalls could be avoided by a clear, sincere attempt to approach the problem of wages from the point of view of the humble worker who must spend his wages to support his family. Wage adjustment will be theoretical until statesmen appear with enough human sympathy to place themselves in the other fellow's position.

Majority Reply to Dissenting Opinion

A reply to the statement of the minority in the dissenting opinion was also appended to the decision. An abstract of this reply follows:

It is not incumbent upon the six members of the Board concurring in this decision to follow the minority into a partisan controversy which partakes more of the characteristics of impassioned advocacy than of calm adjudication.

Insofar as the dissenting opinion distorts the sentiments of the majority, misquotes their language and reflects upon their desire and disposition to do justice, we will refrain from comment. We prefer to believe that these improprieties crept into that part of the document which was drafted by the employees in the headquarters of the Railway Employees' Department of the American Federation of Labor, and that they were overlooked by the dissenting members. As an example of the looseness with which the statements of the decision were handled in the dissenting opinion, reference might be made to the following quotation from the dissent:

"In this decision, as in the preceding ones, the Labor Board announces that 'in its opinion' wages are still above those paid in outside industries."

As a matter of fact, the statement in question is not contained in this decision.

There is one feature of the dissenting argument, however, which is so unusual that it should not be passed over without notice, and that is the portion wherein the two dissenting members advise the employees to strike against the decision of the Board.

It is quite natural for the representatives of labor on the Board to resist all reductions in wages. This course is in harmony with the reductions in the year 1921, as well as those of the present year.

It is something new, however, for labor members of the Board to issue incendiary arguments to employees in favor of striking against a decision of the Board. The giving of advice of this kind has heretofore been left to outsiders, who were not under the official obligations imposed by the Transportation Act, the main purpose of which is to prevent railway strikes and protect the public from their dire effects.

One of the passages referred to is as follows:

"The Transportation Act aimed to substitute for the strike such just and reasonable wages as would render resort to a strike unnecessary. If this tribunal created to determine such wages admits that under existing circumstances it cannot fulfill this function, obviously, the employees must use such power as they have to influence the labor market, which is henceforth to be the determining factor in their wages."

That is to say, if the Board makes such admission, the employees must strike.

Then the dissenting members proceed to remove the "if" and to assert that the Board has made the admission which renders a strike necessary. After quoting a statement from the decision of the majority, which was separated from the context for the purpose, the dissenting opinion proceeds as follows:

"Such statement is an admission on the part of the majority that they have been unable to separate themselves from the partisan struggle long enough to perform the functions for which they were appointed, and consequently it tends to absolve the employees from any limitations which the existence of a judicial board was intended to impose."

Not only do the minority step down from the judicial position, which they occupy, to advise a strike, but they obviously distort and misconstrue the language of the majority in order to provide the condition which they pronounce a justification.

This is not the only place in the dissenting opinion where the suggestion is made to the employees to strike.

No Injustice to Employees

As a matter of fact, the entire dissenting opinion constitutes a strained and exaggerated effort to inflame the employees by the belief that they have been grossly outraged by this decision.

A fair statement of the facts will convince any disinterested man that no injustice has been done to these employees by the present decision, and that the decrease in their wages is conservative and is based upon the law and the evidence.

The Relevant Circumstances

In the decision, the majority quoted from Decision No. 2 what the Board there said in regard to the "relevant circumstances" referred to in the Transportation Act. No detailed comment was made on the quoted matter. The minority in their dissent savagely attack the statements so quoted from Decision No. 2, and, in effect, over-estimate any consideration that the majority may have

given any portion of it. And yet, the records of the Board show that the dissenting members voted for the adoption of the decision containing the language in regard to "relevant circumstances," and they did not seek to exclude it. This, be it remembered, was a decision increasing wages 22 per cent and the present minority were then of the majority. It would, therefore, appear that the relevant circumstances mentioned were to be considered by the present dissenting members in relation only to wage increases but not decreases.

The Purchasing Power of Wages

The dissenting members criticize the tables offered by the majority to show the trend of the purchasing power of the wages of the employees covered by this decision, on the ground that the year 1917, is an unfair year to adopt as a basis or starting point. The inference is rather plainly drawn that the selection of said year was the result of a deep and sinister design on the part of the majority. This suggestion is far-fetched, as the dissenters are well aware that the wage reports of this Board have begun with the year 1917, and both of them have twice concurred in this arrangement. It was therefore a natural course for the Board to make use of the wage series which it had prepared and published.

The minority suggest that either the year 1914 or 1915 should have been adopted as the basic year for these tables.

The year 1914 can not be safely adopted, because the carriers then reported their clerical forces in groups and classes different from the method since used, beginning with 1915. The use of the year 1914 as the basic year would admittedly require the making of an estimate, the accuracy of which would necessarily be doubtful. If the figures for the basic year were doubtful, then those for all subsequent years would be of uncertain accuracy and value. We will therefore adopt 1915, the other year pronounced satisfactory by the minority, and will demonstrate indisputably the changes that have taken place in the wages of these employees and in the purchasing power thereof, based upon the Bureau of Labor Statistics as to living costs.

The following table was prepared by the statistical force of this Board at the request of the minority and furnished to them, but does not seem to have suited their purpose, as it was not used. The increases in purchasing power of earnings under the present decision over 1915 are as follows:

PERCENTAGE OF INCREASE IN PURCHASING POWER OF EARNINGS UNDER PRESENT DECISION OVER 1915

(a) EMPLOYEES IN GROUP I.		Per cent
Supervisory clerks and clerks with experience of two years or more.....		4.1
Clerks with experience of one year and less than two years.....		4.2
Clerks with less than one year experience.....		1.1
Train and engine crew clerks, train announcers, gatemen, baggage and parcel room employees.....	15.0	
Office boys, messengers, chore boys and others under eighteen years.....	2.0	
Janitors, elevator operators, watchmen, employes assorting waybills etc.....	1.4	
Freight handlers and truckers.....	17.3	
Scalers, sealers and fruit and perishable inspectors.....	20.2	
Stowers, stevedores, callers or loaders, locators or coopers.....	22.9	

(b) EMPLOYEES IN GROUP II.		Per cent
Stationary engineers (steam).....	70.0	
Stationary firemen (steam).....	42.1	
Boiler room water tenders.....	25.9	
Engine room oilers.....	42.1	
Coal passers, boiler room.....	25.9	

(c) EMPLOYEES IN GROUP III.		Per cent
Leading maintainers, gang foremen and leading signalmen.....	5.0	
Signalmen, signal maintainers, assistant signal men and assistant signal maintainers.....	6.5	
Helpers.....	12.7	

The foregoing table is based on the flat daily rate.

The statistician of the Board has worked out a table based upon the Interstate Commerce Commission's reports of the average monthly earnings of all clerks from the year 1915 to the last six months of 1921 and has used hours worked by this class in the last six months of 1921 to determine a rate under the present decision. This table is given below. It is also tied up with the cost of living index number in order to reflect a trend of standard of living. From these figures it will be seen that the standard of living for all clerks under the rates prescribed by the present decision is 12.1 per cent above 1915:

COMPARISON OF LIVING COSTS AND WAGES OF RAILWAY CLERKS, 1915-1921, SHOWING CHANGES IN STANDARD OF LIVING.

Period	Average monthly earnings	Index number average earnings	Cost of living index number	Standard of living index number
Year 1915.....	69.36	100.0	100.0	100.0
Year 1916.....	73.55	106.0	112.5	94.2
Year 1917.....	77.65	111.9	135.5	82.6
Year 1918.....	102.60	147.9	165.9	89.1
Dec., 1919.....	114.59	165.2	189.6	87.1
Fourth quarter, 1920.....	145.91	210.4	190.7	110.3
Last 6 months, 1921.....	131.38	189.7	165.8	114.4
Last 6 months at new decision rates.....	123.45	178.0	*158.8	112.1

*March, 1922.

This 12.1 per cent increase in the standard of living of clerks in the last seven years, based on an increase in wages of 78 per cent and an increase in living costs of 58.8 per cent indicates remarkable progress. This class of employees should feel that their official representatives have rendered them notable service in the effectuation of this result. It certainly affords grounds for satisfaction and encouragement rather than for inflammatory appeals for strikes.

There is no class of labor covered by this decision to which the dissenting discussion of pauperized labor with its physical and social deterioration and its propagation of crime has any application.

Theoretical Living Standards

It appears that a portion of the employees covered herein have presented a family budget of \$2,636.97, and others have offered a family budget of \$2,133. The latter is presumably based on the budget set out in the December, 1919, Monthly Labor Review, published by the U. S. Bureau of Labor Statistics, as the dissenting opinion quotes at length from that publication the Bureau of Labor's explanation of the budget. This quotation is prefaced by the statement: "It (the budget) is described by the Bureau of Labor Statistics as follows." With this identification of the budget used, we desire to quote another passage from the same article as follows:

"This report presents the results of a study made by the United States Bureau of Labor Statistics to determine the cost of maintaining the family of a government employe in Washington at a level of health and decency."

Let the significant fact be noted that the budget is for a government employe in Washington and that, when Washington was the most conceded city in the United States with an abnormally high cost of living, as a result of the great temporary increase in population resulting from the war expansion of all governmental departments.

Whether the budget of \$2,133 is identical with that set out in said government publication as it purports on its face to be or whether it is one of the several other budgets heretofore submitted to the Board, the figures are practically the same as those in the government publication, the latter being \$2,288.25.

The dissenting members seem to have temporarily abandoned their budgets of \$2,636.97.

In the decision in this case, it was shown that this budget of \$2,636.97 if given to every family impartially would require a sum twenty-five billion dollars in excess of the total income of all the individuals and industries in the United States.

The budget of \$2,133 now relied upon is open to the same fatal criticism.

If the country's 25,000,000 families were guaranteed an income of \$2,133, the total income of the entire country would be exceeded by the sum of \$13,225,000,000.

In the fact of this absurdity, page after page of the dissenting opinion is devoted to an attack on the Board's decision upon the ground that the wages fixed for some of the employes do not reach the amount of this mythical, visionary budget. The advanced purchasing power of the railway employe's wage, the relative great increase of that wage, the improved social and economic condition of the employe are all ignored, and a vitriolic denunciation of the Board's decision is indulged in because every individual employe is not granted this impossible sum of money.

Let us see what would be the result of adopting either of these budget theories on the railroads and requiring that no employe should receive less than \$2,133, according to one contention, or less than \$2,636.97, according to the other. The following table throws light on this question:

Total revenue of roads, 1921.....	\$5,509,035,259
Increase in aggregate pay of employes if minimum wage, \$2,636.97, were paid on basis of Decision No. 147.....	1,834,778,865
Increase in aggregate pay of employes if minimum wage, \$2,133, were paid on basis of Decision No. 147.....	1,063,081,640

The net income of the carriers for two other years prior to the war was as follows:

1914.....	\$673,611,198
1915.....	697,185,309

It is quite obvious, that the net income of the roads for the years named, and, it may be added, for any other year in history, would have been consumed by the recognition of either of the above budgets, and the carriers would have shown a loss of hundreds of millions of dollars each year. The shortage would have had to be paid by some form of taxation on the public, presumably, freight rates, which would have added to the burdens of every individual in the country, rich and poor.

In this connection, it is interesting to note that the dissenting opinion finds fault with the majority decision, because it states that "it is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital."

The soundness of this axiomatic proposition is right well exemplified by the theory of the minority above discussed that no wage can be made so high as to constitute an unbearable burden on an industry. Because those concurring in the decision recog-

nize the existence of some of the old-fashioned economic laws quite familiar to the ordinary business man, those dissenting affect to believe that the majority place the consideration of profits above the welfare of the workers. This is a gratuitous assumption. This Board has never taken the position that the claims of the employees for a just and reasonable wage must await the prior demands for increased profits, nor does it take such position in this decision. It is a waste of time to make detailed defense to all these overdrawn and imaginative assertions.

It is well enough to remember, however, that the time will never come in this country or any other country when the ordinary rules of common sense and business, call them economic laws, if you wish, can be absolutely ignored in the conduct of any industry. The latest instance in which these laws have been thrown overboard and replaced by fine-spun socialistic theories, both in railway and other industries, is found in Russia, and the result there is not one that this country desires to emulate.

The minority are sowing some of the tiny seeds that have germinated and blossomed into industrial anarchy in Russia, when they make such statements as this: "They (the economic laws) are simply a description of the way in which business and industry has worked to date, and it has worked out very badly for human life."

It will be readily conceded that our social and industrial system has not invariably produced perfect results, but, upon the whole, it has demonstrated its superiority to every experimental substitute that has been offered. And the fact must not be overlooked that this great industrial republic has rewarded labor with its largest degree of liberty, prosperity and happiness. It will not to hold its minor imperfections so close to the eye as to obscure its benefits.

Permission to Adjust Rates

The dissenting opinion stated that the decision gives the carriers specific permission to adjust rates, because it says that the carriers are at liberty to pay higher wages than those fixed by the Labor Board.

The Board did nothing of the kind. It gave the carriers no permission to adjust rates. There is nothing in the Transportation Act that prevents a carrier from paying higher rates, unless such higher rates would result in increased rates to the public. The statute contemplates that the carrier would not have to coerce the employee into the acceptance of a higher rate. This does not mean that the Labor Board construes the Transportation Act to mean that the carrier may impose a lower rate on the employees or the employees impose a higher rate on the carrier.

The suggestion by the minority that the employees will take this as permission to "go out and get" such wages as they can command is entirely absurd. If they should do so, it would be the result of the minority's suggestion and not of the language of the decision.

Finally, let it be reiterated that the majority, in arriving at this decision, considered every phase of the evidence and provision of the Transportation Act, and that their minds rest easily upon the reasonableness and justice of their conclusions, in the light of all the circumstances and conditions shown to exist at this time.

Recent Developments Put Damper on Strike Talk

Although talk of a strike of those classes of railway employees whose wages have been reduced by the last three orders of the Labor Board still continues, several recent developments have tended to allay the enthusiasm for a strike at this time. The first of these developments came in the form of an announcement by E. H. Fitzgerald, president of the Brotherhood of Railway & Steamship Freight Handlers, Express and Station Employees that there would probably not be a general strike of the members of his organization. "We are not going to put out any general strike ballot," Mr. Fitzgerald was quoted as saying. "We have agreements with the Southern; the Chicago, Burlington & Quincy; the Chicago & Alton and a number of other roads regarding wages. They are that wages will be left to the Labor Board. There can be no strike on these roads. There will be no general strike ballot issued covering all of the remaining roads. Instead, the general committee of each road will ballot its road and the vote will be taken whether or not to strike on that particular road."

Such an attitude on the part of this organization, if consistently maintained, would greatly weaken the threatened strike of the employees covered by the Board's recent decision.

The second development of this character came in the form of a compilation of statements made by the leaders of the four train service brotherhoods each of whom declined to attend the meeting of rail and mine union chiefs at Cincinnati, Ohio, on June 20, to consider a "coalition" in line with the agreement adopted several months ago.

Another development of a similar nature comes in reports from Washington as to the government's attitude toward the threatened strike and which is covered more fully elsewhere in this issue.

B. M. Jewell, president of the railway employees' department of the American Federation of Labor, in a statement issued on June 17, charged that the Labor Board had assisted the railroads of the country in perfecting an anti-strike machine and that its recent decisions were "cleverly handed down to create a split between the employees essential to the daily operation of the railroads and the workers in less essential branches of railroad service.

"This was made plain through the fact that the decisions of the Board did not cut the pay of telegraphers, train dispatchers, signal foremen and foremen in some of the shop crafts," Mr. Jewell continued. "Not any of the employees required in the running of trains received a wage cut. The train service unions have not received a cut and cannot receive one before next fall if at all. Train dispatchers and telegraphers are needed for the running of trains. Certain classifications of clerks also escaped cuts. These clerks are needed in the running of trains.

"This makes it possible for the railroads to build an anti-strike machine to fight the unions, which are now balloting on the question of calling a strike. The railroads will be able to run their trains if a strike should be called by bringing about this split between the unions. The men who have received no wage cut cannot go out on a wage strike because they have no reason.

"The Board has arranged to take a vacation July 1, and will not be in a position to stop this fight as it did the strike threatened by the train service men last fall.

"More than anything else, the railroad men affected by wage cuts object to the line of reasoning advanced by the Board that the wage reductions were made necessary because the railroads cannot pay any more. Somebody is trying to force a walk out."

Mr. Jewell said he did not believe any power could intervene to stop the strike if it should be called because the unions have complied with all provisions of the law.

The situation pointed out by Mr. Jewell is acting as a damper on the enthusiasm of the men for a strike. However, the reasons given by Mr. Jewell for this situation, are obviously untrue and unfounded.

Labor Leaders Send Ultimatum to Labor Board

On April 18, the labor leaders attempted to justify their threatened strike in a letter addressed to the Labor Board. This letter charges that the Board has failed to meet the requirements of the Transportation Act, that it has invariably opposed labor in its decisions and that it has put railway employees on less than a "living wage."

After following very closely the arguments made in the dissenting opinion, quoted in part above, this ultimatum says:

"As the matter now stands there is no provision in the law providing for an appeal of any kind against a decision of your body however mistaken or unfair it may be. When, therefore, there occurs a miscarriage of justice of such colossal and permanent injury to railway labor as your decisions will bring about, the only means of remedy which the injured parties have is to reject your decisions.

"This procedure is perfectly legal. While it should only be used as a last resort our membership may decide it to be fully justified by your denial of elementary and long estab-

lished rights and by the seriousness of the situation which you have created.

"Your decisions have been submitted to a strike vote of our members and we are awaiting the result of their action. Should our members decide not to accept your decision, or in other words to strike, we shall sanction their action and advise you accordingly.

"We have therefore exhausted every possible way to secure a remedy for the unjust conditions which have resulted from the refusal of the railroads to comply to the law and from the failure of the Labor Board to safeguard and guarantee our rights under the law."

B. W. Hooper Predicts Peaceful

Settlement of Strike Crisis

Simultaneously with this ultimatum B. W. Hooper, chairman of the Board, issued a statement declaring that he was confident the present strike crisis could be bridged without a strike. He said in part:

The present situation is hopeful. There is no occasion for impatience upon the part of anybody. Neither rates nor wages are permanent, because the conditions upon which they are based are not permanent. I believe that the situation will be gradually cleared up, and that there is good reason to also believe that the railroads will remove one impediment to good feeling on the part of their employees by discontinuing the contract system regardless of their convictions as to its legality. This will go a long way toward the restoration of cordial relations.

Only Saturday the Board received a communication from the Southern Pacific giving notice that the labor contracts complained of by its employees had been done away with, and that the road had no intention to again resorting to the farming out of its labor. There are reasons to believe that this example will be speedily followed by other railroads. It is the unanimous judgment of the Wage Board that it should be. If the men are expected to respect the decisions of the Board, the managements must do the same thing. A fair-minded public will not stand for anything else.

Labor Board Replies to Labor Leaders' Ultimatum

Chairman Hooper of the Board, on June 20 replied to the ultimatum of the labor leaders, abstracted above, in part as follows:

It is to be presumed that you do not desire that the members of your organizations shall vote for a proposition that contains such possibilities of loss and detriment to themselves, upon a misunderstanding of the action and attitude of this Board. It is a fact, however, that your letter does manifest a strikingly distorted conception of what the Board has done and why it did it.

Let me call attention to a few statements in your letter. 1. Your statement that the Board's last decision "states openly that pressure of circumstances was such that the Board was unable to determine just and reasonable wages" is not correct. The decision contains no such statement and none that can be fairly so construed.

The decision recites at length the abnormal economic and industrial conditions of the post-war period, and then says:

Surrounded by such abnormal conditions, the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in the same undisturbed and uncomplicated manner as would have been possible in normal times.

This simple recognition of difficulties experienced by the whole world should not be twisted into an interpretation designed to mislead the men whose interests are most directly involved.

2. Your statement that this Board says that "the establishment of just wages for railway workers must await the complete satisfaction of ownership in the matter of rehabilitation and profits" is an inexcusable perversion of both the language and meaning of what the Board in fact said. A strike of railway employees, involving their wages, their employment and their welfare, based upon such misleading statements of this Board's sentiments and declarations would be unjust to the men and to the public.

3. The statement in the Board's decision "that labor can not be completely freed from the economic laws which likewise affect the earnings of capital" is so obviously sound that it will not be questioned any where this side of the kingdom of the Bolsheviks. And yet, you mention this as an occasion of offense.

Your construction of this as meaning "the treatment of labor as a commodity" is strained, especially so, in view of the fact that the Board, in the same paragraph, said:

It should be said that the Labor Board has never adopted the theory that human labor is a commodity, to be bought and sold upon the market, and, consequently to be reduced to starvation wages during periods of depression and unemployment.

4. Your statement that the Board "failed to take into consideration the principle that even the lowest paid railway employees, such as section men and laborers, should receive at least a living wage," is utterly baseless.

Your continual isolation and accentuation of the fact that a minimum rate of 23 cents an hour, \$1.84 a day, was established for section men, is entirely misleading, because it overlooks or suppresses so many connected facts, among which are the following:

1. The rate for section men ranges from 23 to 35 cents per hour.
2. A comparatively small number of them receive 23 cents per hour. A vast majority of them receive the higher rates. This is shown by the fact that the average rate per hour is 32.7 cents.
3. The 23 cent rate is found on a comparatively small number of divisions on a few roads in the South and Southwest. It is not even found on the Southern and Illinois Central which cut completely through the South.

4. Where this minimum rate is found, the cost of living is usually low, and the men, in many instances, are furnished free living quarters.

5. In 1915, this class of labor received an average hourly rate of 15 cents, and in 1917, an average hourly rate of 19.3 cents.

6. The hourly rate of this class of employees has therefore increased under the present decision, 69.4 per cent over 1917, and 118 per cent over 1915.

7. Based upon the cost of living, the purchasing power of the hourly wage of section men under the present decision is 44.5 per cent greater than it was in 1917, and 37.3 per cent over 1915.

8. If it be said that the 10 hour day prevailed in 1915, and the 8 hour day now, it may likewise be said that the man either gets the benefit of the extra two hours for his own purposes or, in many instances, he will now be permitted to work the two hours, since punitive overtime has been abolished for this class of employees for the ninth and tenth hour.

9. Even comparing the present 8 hour wage with the 10 hour wage of 1915, the purchasing power of the new wage is 9.8 per cent greater than that of 1915, and the man has, on top of this, the gift of two hours' time for other activities.

10. It must also be clearly understood that the 23 cent rate will exist only in a territory where the Railroad Administration after careful investigation, found a justification for and did establish a lesser rate than paid the same classes in the balance of the country, which condition has not been disturbed by decision of this Board.

In view of these facts, not one of which you can yourself dispute, there is no ground for the fierce assaults which you make upon the action of the Board in this matter.

For your information, I will say that I recently made some limited investigation, personally and on the ground, of the wages of common labor in one Southern state, and I found the new rate for section men appreciably higher than the rates being paid to similar labor in other employments.

It may also be noted just here that the average pay of section foremen under the new decision is 119.7 per cent higher than it was in 1915, and that the purchasing power of the section foreman's wage is 38.3 per cent greater than it was in 1915. His average hourly rate in 1915 was 23.3 cents, and, under the new decision it is 51.2 cents.

You do not enter into any discussion of the wages fixed by the Board for other classes of employees, but I reiterate here the statement demonstrated in the decisions of the Board that the purchasing power of these rates is very considerably larger than it was in 1917, just before Federal control, or than it was in the year you prefer to use as a base, 1915.

Surely the leaders of these railway labor organizations can not expect to win the approval of the people of the United States by a rigid, unyielding resistance to the inevitable process of re-adjustment which has been in progress for the past year. If the public is satisfied that the railway employees have been even more than fairly dealt with, by comparison with similar labor and in view of the conditions surrounding their work, there will be no demand that they shall be treated as absolutely immune from the operation of the economic processes through which everybody else must pass.

The fact can not be overlooked that the policy of the leaders of the employees seems to be to accept no reduction, however slight. For example, a strike vote is being submitted to the stationary engineers, firemen and oilers, whose wage under the new decision show an enormous increase over the compensation they received before the war. Notwithstanding the increased cost of living, the increase in the pay of these employees has been so great as to result in the following percentage of increase in the purchasing power of their wages under the present decision over 1915:

Stationary engineers	70%
Stationary firemen	42.1%
Engine room oilers	42.1%
Boiler room water tenders	25%
And coal passers, boiler room	25.9%

The increase of their actual daily wage under the new decision

over 1915 ranges from 100 per cent to 169.9 per cent. And yet there is submitted to them a strike ballot.

It is scarcely worth while to multiply these examples of the real meaning and effect of the Board's decisions of which you complain.

Let me say, before concluding, that the members of your organization have no occasion to reflect upon their official representatives in connection with the conduct of those wage disputes before our Board. The employees have been ably and loyally represented, and, in my humble judgment, have secured results that should be satisfactory to them. With the degree of friendly interest that I feel in these organizations and with the recognition that I accord to their great service to their membership, I am hopeful that they will not adopt a course that will surely prove disastrous to the organizations and unfortunate to the men composing them. It is regrettable that such a step is contemplated at a time when the country is just entering upon an era of more stable industrial conditions, that gives promise of an enlarged degree of prosperity to railway employees.

Loree Denies Lauck Charges

WASHINGTON, D. C.

TESTIFYING BEFORE THE Senate Interstate Commerce Committee on July 19, in connection with the railroad inquiry, L. F. Loree, president of the Delaware & Hudson, denied charges made before that committee by W. Jett Lauck, representing the railway unions, that there is an interlocking combination that controls the management, financing and operation of the principal railroads of the United States.

"In general," said Mr. Loree, "Mr. Lauck's testimony appears to me to be misleading, to contain many errors of fact and erroneous deductions, to be self-contradictory at many points and abundantly to contain intrinsic evidence that it is not worthy to be considered as a serious contribution to the elucidation of any railway problem."

Mr. Loree referred specifically to an exhibit filed by Mr. Lauck containing a list of 25 men, one of whom was Mr. Loree, who are alleged to link together 99 Class I railroads operating 211,280 miles, or 82 per cent of the country's steam transportation systems. The men designated in the list, Mr. Lauck testified, are, or have been, directors in the railroad corporations named in the exhibit.

"I most emphatically deny that I am a party, or ever have been a party, to any combination or understanding of any sort, express or implied, which tends or is intended to secure uniformity or concert in managing, financing or operating the railroads of the United States or any group of such railroads, unless the word 'group' is understood to mean a number of interrelated corporations, constituting one of the many separate and independent railway systems which are now frankly and openly under the control of a single interest. I am not, and never have been, the agent or representative of any such combination or understanding. I do not know of the existence of any such combination or understanding, now or in the past, and I believe that nothing of the kind exists or ever has existed in these United States. If this denial is not as comprehensive and categorical as it can be made, I should like to have the language necessary to perfect it brought to my attention, for it is my purpose, once and for all, to deny every statement, implication, suggestion and innuendo contained in the exhibit referred to and in the accompanying testimony or statement, except that the persons therein named are or have been officially connected with certain separate and independent railroads or systems of railroads.

"Considering the list of 25 men, I find that they are not men with joint or even common interests or financial or political or social affiliations. Intrinsicly considered, to those who know anything of their activities, it is absurd to suggest that the men in this list are bound together for any purpose whatever, or that their endeavors are united in any common purpose or project. They are all men who

have attained positions of responsibility in their vocations and who possess the confidence, each of them, separately and in his own rights, and by title of experience and things accomplished, of greater or smaller bodies of free Americans who are railroad stockholders."

Mr. Loree called attention to the fact that, under the transportation act, every individual who is willing to hold more than one position as either an officer or director of a railroad must first obtain the express sanction of the Interstate Commerce Commission, while the Clayton act also imposes further restrictions upon such railroad officials.

"I call attention to this merely to show that if the exhibit filed by Mr. Lauck represents the facts of today and if those facts are in any way subject to criticism, the situation is fully within the control of public authorities and no one can doubt that the constituted authority desires fully to meet its obligations," said Mr. Loree.

The witness said that the list of railroads contained in the exhibits is "misleading and made up in such a way as to lend itself to the illusory and false suggestion apparently to be conveyed." As an example, he called attention to the names appearing in the list of the Southern Railway, the Alabama Great Northern; Cincinnati, New Orleans & Texas Pacific; Mobile & Ohio; Georgia, Southern & Florida, and the New Orleans & Northeastern Railroad; all, he said, make up the Southern Railway's system, but the names are so widely scattered that their identity as a part of that system is obscured.

Only 52 Systems, Not 99

This is also true, Mr. Loree said, of many others in the list, with the result that instead of there being 99 separate railroads, there are only 52 actual systems represented in the exhibit.

Regarding the charge made by Mr. Lauck that because of "banker-management," the railroads have issued securities with par values in excess of the moneys realized and sold them for more than par, but for smaller premiums than might have been obtained, Mr. Loree said:

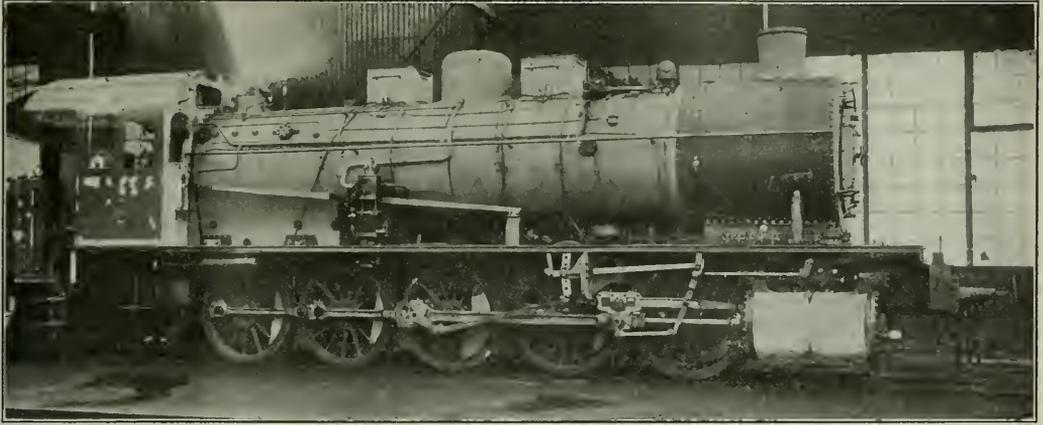
"There is no basis for the charge that securities are improvidently issued or that less is realized from their sale than should be realized. But if the charge is insisted upon, it may well be that the defense should be left to the public authorities who possess the power to regulate these matters. If the charge is warranted, these authorities are, in this respect inadequate for their duties or derelict in their performance. I do not concede they are vulnerable to either complaint."

Mr. Loree told the committee that the savings to be effected, as alleged by Mr. Lauck, from the installation of super-heaters and similar improvements on locomotives are very much overstated.

"In the hands of a careless engineman, the super-heater is little more than a supplementary and relatively inefficient boiler," said Mr. Loree. "To say the least, we must look to discipline and supervision quite as much as to the appliance itself for economic results."

"The sinister suggestions in regard to prices for equipment and other supplies, made by the witness, are without specifications or evidence," said Mr. Loree, referring to charges made by Mr. Lauck that the roads have paid excessive prices for supplies and equipment. "They consist of bald acquisitions or more cautious implications, and might very properly be dismissed without other response than a demand for evidence—names, places and dates.

"If anyone has been guilty as charged, he has violated his obligations to the owners of the property and can be compelled to make restitution. If such scandalous conduct is known to the person who made the charge, it is his duty to present the facts in such a way that proper action can be taken; if he does not know of such conduct, he should withdraw his charges."



Unaflow Freight Locomotive Built by A. Borsig, of Berlin, for the German State Railways

Recent Developments in the Unaflow Locomotive

Exhaust Ejector Effect Overcomes Handicap of High Compression and Reduces Size of Cylinders

THE RECIPROCATING steam engine has been freely criticized as an inefficient machine. During recent years turbines and internal combustion engines have displaced steam engines for many purposes, principally where economy of fuel is an important factor. In spite of the trend toward other types of prime movers, the reciprocating engine, with certain improvements, has retained its place in locomotive service due to the advantages of simplicity, reliability and large power output in relation to its size and weight. The steam engine has not been neglected by scientists and engineers and constant progress is still being made which will probably result in that type of engine holding its place for many years to come.

Characteristics of the Unaflow Engine

One of the recent developments in reciprocating steam engines which promises to add to the efficiency of the locomotive is the Stumpf unaflow cylinder arrangement. Briefly,

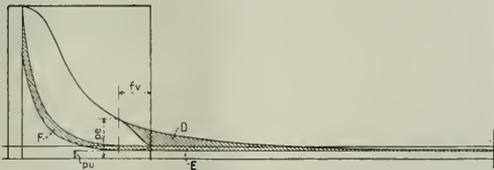


Fig. 1—Effect of Exhaust Ejector Action on Indicator Card

the unaflow engine consists of a piston of a length somewhat less than the stroke of the engine working in a cylinder of nearly twice the usual length. At the center of the cylinder is a row of exhaust ports which are uncovered by the piston at each end of the stroke. The admission of steam takes place as usual through valves and ports at the end of the cylinder. Thus the steam flows through each end of the cylinder in one direction only, which results in a considerable reduction in the losses due to heat transfer between the

steam and cylinder walls and a considerable economy in the use of steam.

Professor Stumpf, inventor of the Stumpf unaflow engine, has recently given attention to the design of locomotives and about 200 locomotives of this type are now operating in Europe. The Stumpf Unaflow Engine Company, Syracuse, N. Y., is now arranging for installations in this country.

The unaflow cylinder as ordinarily designed is best adapted to condensing engines. Compression occurs early in the stroke and the large amount of negative work is a disadvantage in getting the high mean effective pressure desired in locomotive service. This difficulty can be overcome by supplementary exhaust valves with some sacrifice of economy. Very short cut-off is desirable in a unaflow engine and this involves a large cylinder if the engine is to deliver an average piston thrust equivalent to that of the counterflow engine with its longer cut-off. The unusual length of the cylinder also complicates its application to the locomotive.

From the features already mentioned it is apparent that the design of the unaflow locomotive presents numerous difficulties but experience with locomotives of this type now in service indicates that the handicaps have been overcome and the unaflow now offers an opportunity for eliminating some of the losses which are common to the operation of other types of reciprocating engines.

The Exhaust Ejector Principle

One of the most important improvements in the latest design of unaflow locomotives lies in the application of the exhaust ejector principle. The method by which this is utilized to overcome the difficulties met in the design of the unaflow locomotive is illustrated in Fig. 1. A loss of area in the indicator diagram begins within the limits of the piston stroke due to the fact that the exhaust commences with a certain exhaust lead before the dead center is reached as shown at fv in Fig. 1, this loss increasing as the exhaust lead and terminal expansion pressure pe increase. For small exhaust lead and low terminal pressure, this loss is neg-

ligible and it is almost always insignificant when compared with the loss represented by the toe of the diagram, shown shaded at *D*. In the uniflow locomotive the energy represented by the area *D* has been utilized to reduce the pressure *p*₁ at which compression begins, with a consequent lowering of pressure throughout compression.

A smaller clearance volume may therefore be used thus diminishing the volume loss. The area regained on compression, shown shaded at *F*, is proportional to the shaded area *D*, or in other words, the higher the terminal expansion pressure, or the longer the cut-off, the lower will be the terminal compression pressure. This makes the use of a longer exhaust lead *f*₀ permissible since the loss area within the limits of the piston stroke now form a part of the toe of the diagram and cooperates in lowering the back pressure at the time compression begins. There is, therefore, no objection to making the exhaust lead large since by increasing

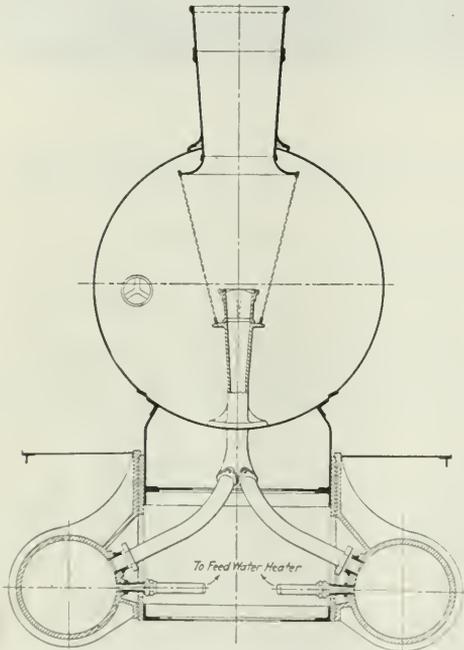


Fig. 2—Arrangement of Exhaust Passages and Nozzle

the duration of the exhaust the compression is shortened and the exhaust puffs are softened. If this is done the number of the exhaust ports at the center of the cylinder will be so far reduced that the exhaust belt ordinarily used in uniflow cylinders may be dispensed with and only one port remains which connects directly to the exhaust pipe. This also enables the piston and cylinder to be made considerably shorter.

The utilization of the energy represented in the toe of the diagram is based upon its conversion into kinetic energy by means of conical nozzles such as are commonly used in steam turbines. The general arrangement of the nozzles and passages is shown in Fig. 2. An engine having two cranks at right angles with an exhaust lead of 25 per cent will produce sufficient overlap of the exhaust period so that the exhaust of one cylinder begins before the other has ceased. If now the exhaust pipes are joined at acute angles, a jet ejector action is obtained. In order to obtain as high efficiency of ejector action as is practicable, friction losses must be

kept at a minimum. This necessitates careful proportioning of the exhaust passages, the exhaust nozzle and the stack.

A theoretical analysis of the ejector action indicates that 28 per cent of the energy ordinarily lost may be converted into useful work. The steam consumption also is improved, the saving varying from 12 per cent at 43 per cent cut-off to 0 at 14 per cent cut-off. The exhaust ejector effect also permits a considerable reduction of clearance volume, the decrease in a typical case being from 17 per cent to 11 per cent.

The reduction in back pressure obtained in actual service by the exhaust ejector action is clearly shown by the indicator cards in Fig. 3 and the diagram in Fig. 4 which shows the variation in the pressure in the exhaust pipe between the cylinder and junction during a complete revolution of the crank. It will be noted that the cylinder card shows the exhaust coinciding with the atmospheric line for a considerable distance and the card taken from the exhaust pipe shows that a vacuum as high as 7 lb. per sq. in. was formed at certain positions.

The extent to which the increase of the exhaust lead shortens the cylinder and piston is clearly shown in Fig. 5.

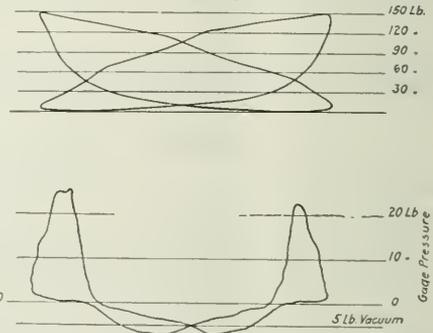


Fig. 3—Indicator Cards from Two Cylinder Uniflow Locomotive; Upper Card from Cylinder, Lower Card from Exhaust Pipe Between Cylinder and Junction. Cut Off 55 Percent, Speed 14 M.p.h. Steam Pressure 170 Lb. per Sq. In.

The long exhaust lead shortens the compression from 90 per cent to 70 per cent and reduces the clearance volume from 16.2 per cent to 13.6 per cent.

A German Uniflow Locomotive

The first locomotive in which the exhaust ejector principle was applied was a superheater freight locomotive of the German State Railways, built in 1920 by A. Borsig of Berlin, and illustrated at the beginning of this article. The main dimensions of the locomotive are as follows:

Cylinder bore.....	630 mm.	(24.8 in.)
Stroke.....	660 mm.	(26.0 in.)
Driving wheel diameter.....	1,400 mm.	(55.1 in.)
Maximum speed.....	60 km. per hour	(37.2 m.p.h.)
Steam pressure.....	12 at. gage	(177 lb. per sq. in.)
Grate area.....	2.62 sq. m.	(28.2 sq. ft.)
Boiler heating surface.....	149.65 sq. m.	(1,610 sq. ft.)
Superheater heating surface.....	53.00 sq. m.	(571 sq. ft.)
Total heating surface.....	202.65 sq. m.	(2,181 sq. ft.)
Feedwater heater surface.....	15.0 sq. m.	(162 sq. ft.)
Weight empty.....	65.5 tons	(144,200 lb.)
Service weight.....	72.0 tons	(158,700 lb.)

The cylinder of this locomotive is illustrated in Fig. 6. It is notable for its compactness, lightness and simplicity. This is in part due to the use of horizontal single-beat poppet valves which were employed for the first time on this locomotive. Piston valves have been used on some uniflow locomotives while others have double-beat poppet valves. The single-beat type of valve, although simple and perfectly steam tight, has so far not been favorably received because it requires a high lift and a large force to raise it. With the

high compression of the unafLOW engine, however, the pressure on the valve is balanced to a large extent and the high lift is obtained by arranging the cam roller between the valve and the fulcrum of the valve lever as shown in Fig. 7. The lift of the cam, which is 14 mm. (0.55 in.) radially, is thus increased to 24 mm. (0.95 in.) at the valve. For cut-offs up to 50 per cent, the effective inlet areas of the single-beat valve are equivalent to the areas of a standard piston valve of 220 mm. (8.67 in.) diameter. The fact that beyond this cut-off the valve area remains constant must be considered a further advantage. The small cam lift permits of a cam profile of very gentle curvature, thus insuring smooth lifting and seating of the valve. The whole cam mechanism is very substantially constructed and swinging

ent of the cam mechanism except for the tappet contact, and is free to follow any slight distortion of the cylinder casting.

When coasting, the valves may be lifted off their seats by compressed air admitted between small pistons formed on the valve tappets so that the rollers clear the cam. Special means for connecting the cylinder ends are therefore not required, and the relief valves ordinarily used to prevent high compression may be omitted, since the inlet valves act as such. They also relieve the high compression which may occur when the throttle is nearly closed. The automatic compression release device also may become superfluous since the late cut-offs at starting produce a strong exhaust ejector effect and the compression is therefore considerably shortened.

Attention may be drawn to the accessibility of the valves; for their renewal it is only necessary to take off the valve chest cover and disconnect the valve spring, the spring cap lock being a split spherical washer. Comparing this with the procedure of taking out an ordinary piston valve, the great simplification due to the single beat valve will be appreciated.

The driving parts and the Walschaert gear are the same as those used on counterflow locomotives. On account of its greater length the cylinder was moved forward 180 mm. (17.1 in.). The unafLOW cylinder is not heavier than the corresponding counterflow cylinder, since the piston valve chest with its large exhaust chamber as well as the tail rod and its guide are omitted. This allows the piston rod of 95 mm. (3.74 in.) diameter to be bored out to a diameter of 60 mm. (2.36 in.), thus also saving weight. The forged steel piston heads, which are only slightly dished, hold between them a cast iron supporting drum cast from a special

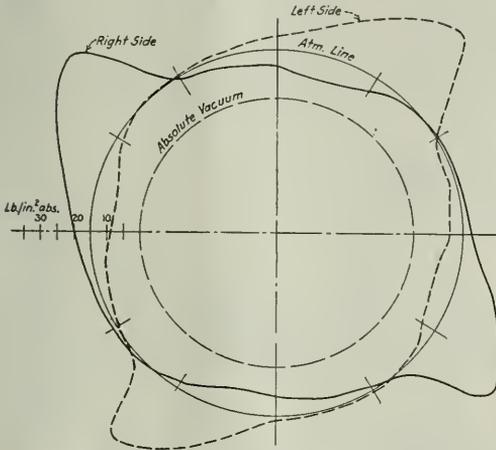


Fig. 4—Diagram Showing Pressure in Exhaust Pipe Through a Complete Revolution

levers were used instead of sliding parts wherever possible. It should therefore stand up well in service.

Details of Poppet Valves

The single beat valve is made of chrome-nickel steel and works on a removable steel seat expanded into the cylinder casting. If this seat should become damaged by scale or other foreign matter it can be easily resurfaced or renewed.

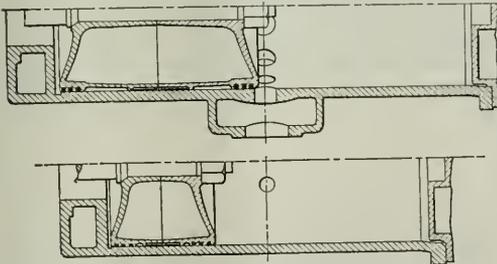


Fig. 5—Comparative Lengths of Cylinders for Exhaust Lead of 10 Percent and 30 Percent

The valve stem has a diameter of 25 mm. (0.99 in.) and is supplied with oil under pressure. The common center of gravity of the valve head and spring retainer is located at about the center of the guide so that good working conditions are assured. The valve stem, furthermore, is not exposed to the live steam, but to the varying pressure and temperature of the cylinder steam. It is entirely independ-

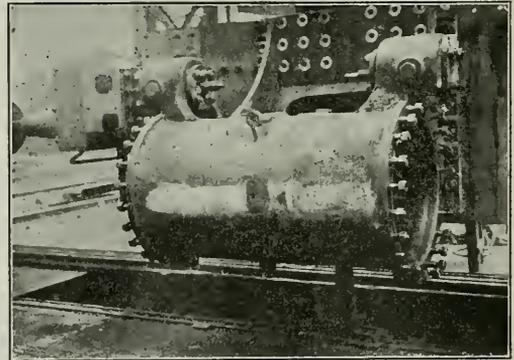


Fig. 6—The UnafLOW Cylinder with Poppet Valves Is Light and Simple

soft mixture, while the cylinder is made of a hard quality of cast iron. The supporting drum is turned smaller than the cylinder bore by 2.2 mm. (0.087 in.) on a length of 140 mm. (5.5 in.) at its middle, which allowance increases to 5 mm. (0.197 in.) towards the ends. Each piston head carries three rings. The greater part of the total clearance volume of 12 per cent is taken up by a linear clearance of 40 mm. (1.57 in.) between the piston and cylinder head, and this also results in very small harmful surfaces. The pressure oil feeds are arranged at the middle of the cylinder, where the temperature is lowest and little possibility of carbonizing exists. One feed is placed on top and one on each side of 45 deg. below the horizontal center line.

Steam Consumption of UnafLOW Locomotive

It is hoped that tests of these locomotives will soon be available and it is expected that they will show unusually high economy in the use of steam. The result of tests of

earlier type unaflow locomotives are available and justify the following conclusions: The unaflow locomotive shows better economy than the compound for small loads, while at higher loads its fuel consumption is higher than that of the latter. This can be easily explained by the effect of the long constant compression and the large clearance volume. The unaflow locomotive working with saturated steam shows in general a higher economy than the compound except for long cut-offs. Larger cylinders would be of advantage in this case. The superheater unaflow locomotive is at least on a par with the superheater compound, although even here the former has a slightly higher fuel consumption for heavy loads. Larger cylinders are, of course, more feasible with the unaflow system than with the compound engine.

Future Locomotive Development

In concluding the discussion of the locomotive in his recent book on the unaflow engine, Professor Stumpf makes the following observations on the probable future trend of locomotive design: "With the customary design of firebox,

to 4.75 at. (69.8 lb.) abs. and during a considerable part of the expansion moisture is therefore formed in the cylinder. This does not have much effect upon the economy of the unaflow engine, but is very detrimental to that of the counterflow cylinder where the moisture causes large surface losses.

"The practice with counterflow locomotives is therefore to use higher superheat with higher initial pressure. The increase in temperature, however, is the cause of many difficulties with piston valves and piston rod packings. Furthermore, the superheater elements must be shortened so that the flue gases do not exert a cooling effect upon the superheated steam. This in turn leads to a great number of superheater elements and inefficient utilization of space. The unaflow engine can of course be adapted to meet this condition in a better manner, since its design makes it more suitable for high temperatures than the customary counterflow cylinder with piston valves. On the other hand there is no necessity for using these high temperatures in the high pressure unaflow locomotive, since the unaflow action corrects the bad influence of moisture in the steam.

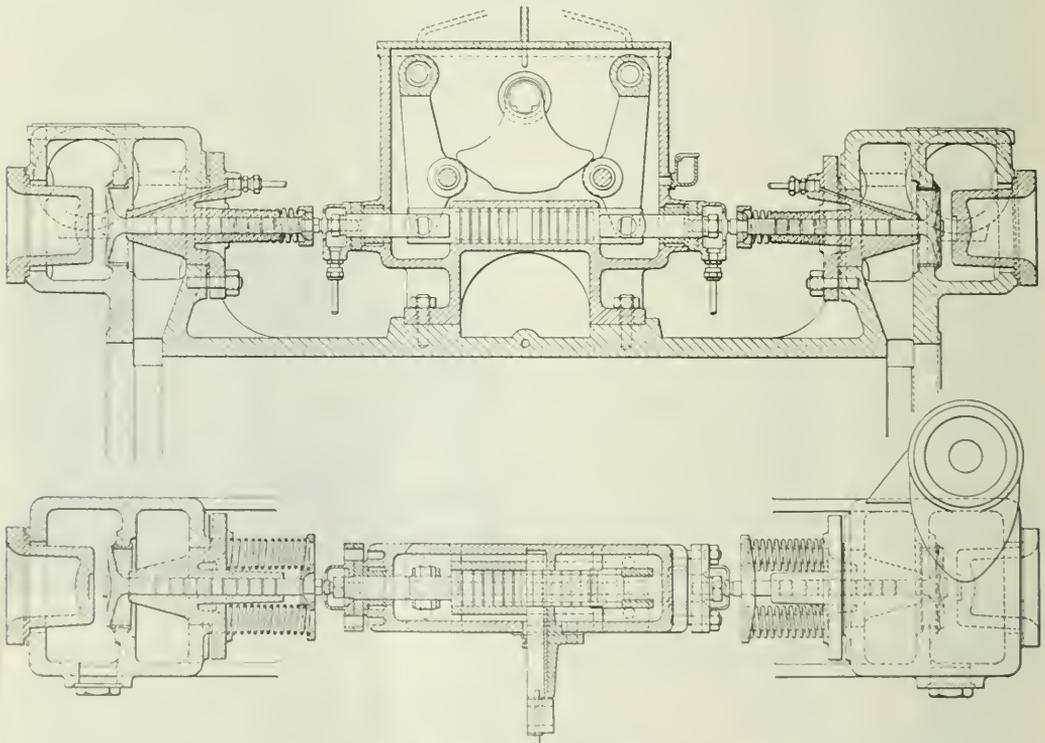


Fig. 7—Details of Poppet Valves and Lifting Mechanism

steam pressures up to 16 at. (235 lb.) gage are possible, although the number and size of the stays becomes excessive. For still higher pressures a different design of firebox would be necessary, such as for instance a box of the Brotan type, which permits of steam pressures of 20 at. (294 lb.) gage. By raising the steam pressure from 12 at. to 20 at. gage (176 lb. to 294 lb.), the amount of heat which can be converted into work increases from 116 to 146 cal. per 1 kg. steam. This represents a gain of about 26 per cent.

This remarkable result can only be attained by employing the unaflow principle, since the pressure at which the steam becomes saturated increases from 2.2 at. (32.4 lb.)

"The calculated gain of 26 per cent of the high pressure unaflow locomotive with exhaust ejector action will probably be exceeded in practice, since it does not include the benefit due to the single beat poppet valves, the reduction of the clearance volume to seven per cent, nor even the gain due to the unaflow principle itself.

"The future line of progress of the locomotive is therefore clear. It leads naturally from the two-cylinder to the three-cylinder engine with unaflow cylinders having small clearance volumes, to the use of single-beat poppet valves and the utilization of the ejector action of the exhaust, in combination with high pressures and modern superheat."

Hearing on Tentative Consolidation Plan

Railroads File Basic Information and Express Some Criticisms of Proposed Grouping

WASHINGTON, D. C.

THE HEARING on the Interstate Commerce Commission's tentative plan for the consolidation of the railroads into a limited number of systems, as it applies to the southeastern territory, was resumed before Commissioner Hall and Examiner Healy on June 15 after having been adjourned from April 24. It is to be followed by other hearings in various parts of the country. As a result of conferences between Commissioner Hall and a committee of railroad counsel appointed at the former hearing the roads were prepared with basic statistical data and information regarding the finances, traffic and operations of their properties which the commission desired as the foundation for its record and the work of preparing a complete consolidation plan, but there was evident some of the same reluctance on the part of many of the railroad officers who testified to make suggestions as to what roads they should be combined with, except as they had objections to offer to the grouping proposed in the tentative plan or as the tentative plan follows their present affiliations, as in the case of the Atlantic Coast line, Louisville & Nashville and Nashville, Chattanooga & St. Louis.

Illinois Central—Seaboard Air Line

SYSTEM No. 12—ILLINOIS CENTRAL-SEABOARD

Illinois Central
Yazoo & Mississippi Valley
Central of Georgia
Seaboard Air Line
Lynchburg, Va., to Durham, N. C., branch of Norfolk & Western
Gulf & Ship Island
Tennessee Central
Carolina, Clinchfield & Ohio

NOTES—Prof. Ripley recommends that a separate system be built around the Seaboard Air Line.

The Gulf & Ship Island is not included in any system by Prof. Ripley. The Carolina, Clinchfield & Ohio may be included in system No. 11, Atlantic Coast Line-Louisville & Nashville.

The first day of the hearing developed that the Illinois Central does not want to have the Seaboard Air Line combined with its system as proposed and the Seaboard also failed to see any advantage in the plan but expressed a preference to be let alone. C. H. Markham, president of the Illinois Central, was the first witness and began by filing and explaining to some extent 25 exhibits consisting of maps, charts and tables giving the basic information as to the plant and facilities of the Illinois Central and Central of Georgia, their traffic and interchange with other lines and their financial structure. Prof. W. Z. Ripley, of Harvard University, who prepared a report on which the commission's tentative plan was based, assisted the commissioner and examiner in bringing out facts for the record by questioning witnesses. He asked Mr. Markham whether the Illinois Central and the Frisco lines into Birmingham compete for Kansas City business. Mr. Markham replied that they do to some extent but he would rather not express an opinion as to whether the Frisco line should be given to the I. C.

After presenting the general data Mr. Markham took up a discussion of the tentative plan for System No. 12, taking into the Illinois Central, Yazoo & Mississippi Valley, Central of Georgia and Ocean Steamship Company of Savannah, Seaboard Air Line, the Lynchburg-Durham branch of the Norfolk & Western, the Carolina, Clinchfield & Ohio, the Gulf & Ship Island and the Tennessee Central. He said the Illinois Central does not favor the inclusion of the Seaboard Air Line and the Tennessee Central in its system and that it follows that it would exclude the Norfolk & Western branch and the C. C. & O. He then outlined the history of the development of the Illinois Central system, saying it is the only one of any size following the lines of longitude and

broadly speaking the only north and south trunk line in the country. It serves the great central valley and it has prospered by rigidly confining its activities to its natural territory, thereby contributing to the development of the territory, and the lines it has taken on have added strength to the main lines. The Yazoo & Mississippi Valley, he said, is an integral part of the Illinois Central and itself owns practically no freight cars, using those of the Illinois Central. The officers above general superintendent have jurisdiction over both. The Illinois Central has aided the development of the Yazoo & Mississippi Valley and consequently of western Mississippi and that road constitutes a second main track of favorable grade for the Illinois Central through business south of Memphis, practically a water grade level, while the Illinois Central runs through the foothills.

A separation of these two lines would lower the standard of service and increase the cost of operation of both lines. The Yazoo & Mississippi Valley has been brought to its present strength by the Illinois Central and they are so closely knit together that their separation would be detrimental to the public interest. Referring to the Tennessee Central, Mr. Markham said that the only thing that the Illinois Central could do with it would be to use it for an entrance to Nashville and the Illinois Central now has all the benefits of such an entrance through divisional arrangements without the responsibility of ownership. It had once given some consideration to the Tennessee Central and had decided it would not take it as a gift.

Seaboard Air Line Competitive

with Central of Georgia

Referring to the proposed consolidation with the Seaboard Air Line, Mr. Markham said that the latter forms a north and south line along the Atlantic coast, while the Illinois Central is 700 miles away. There is absolutely no identity of interest or opportunity to form new traffic routes that would benefit the railroads or the public and there seems no way of bringing these two properties any closer together than is now afforded by the connection at Birmingham. The Seaboard is very highly competitive with the Central of Georgia, which reaches every important point in the state except in the extreme southeast. The Atlantic Coast Line and the Southern are traffic connections on eastern business. Therefore, the Seaboard Air Line would add practically nothing to the Illinois Central or the Central of Georgia nor would benefits accrue to the Seaboard by combination with the Illinois Central. Such a consolidation would have the effect of abolishing competition and would not be in harmony with the law. In response to questions by Prof. Ripley, Mr. Markham said the Illinois Central is not looking for more lines, but if the Gulf & Ship Island is to be placed somewhere, probably the Illinois Central is a logical place for it, but he could not conceive of any possible conditions under which the Illinois Central and the Seaboard could profitably be put together. The Mississippi Central and the Gulf, Mobile & Northern, he said, belong together and if one should go to the Illinois Central, the other ought to. Commissioner Hall expressed an appreciation of the very clear form in which the Illinois Central exhibits had been prepared and said they would be very helpful.

Carolina, Clinchfield & Ohio

J. J. Champion, vice-president of the Carolina, Clinchfield & Ohio, filed statements containing the basic information

for his road, but declined to discuss where the road should be put in any consolidation scheme. He said it occupies a unique position and might fit into a number of other systems, such as the proposed systems Nos. 10, 11 or 12, or one of the systems north of the Ohio river. Commissioner Hall pressed him for an expression of opinion as to what should be done, assuming that some plan has to be made and that unless it were placed in the same system, the road could not be consolidated at all, but Mr. Campion would give no expression. He said the road's heaviest interchange is with the Southern Railway.

Vice-President Capps of Seaboard Air Line Testifies

C. R. Capps, vice-president in charge of traffic of the Seaboard Air Line, filed basic statements and in addition discussed the traffic situation to show that a combination of the Seaboard and the Illinois Central would not be beneficial. It would shorten no through routes, he said, except the mileage between Chicago and Atlanta, and it would lengthen the mileage of several existing routes. The Illinois Central would not give the Seaboard any more northern connections and the connections from the Virginia cities north might or might not be friendly. The two roads have not found it necessary to establish through traffic arrangements and there is no connection with the Illinois Central except at Birmingham, where the interchange amounted to less than 37,000 tons in 1921. Mr. Capps said the Seaboard is generally the short line in its territory and is less dependent on any one article of traffic than other southern lines. The effect of his statement was that the road feels it is sufficient unto itself and should be left alone. In reply to questions, he said that if the Georgia Southern & Florida were placed in System No. 10, the Southern, and the Atlanta, Birmingham & Atlantic placed in System No. 11, the Atlantic Coast Line, the result would be to give those two systems each two routes between Atlanta and Jacksonville and the Seaboard no route. Prof. Ripley said that it had been proposed to give the Atlanta, Birmingham & Atlantic to the Atlantic Coast Line because its present route to Jacksonville is very indirect.

Norfolk & Western Does Not Want to Lose Branch

N. D. Maher, president of the Norfolk & Western, made a brief statement regarding the proposal to cut off its line from Lynchburg to Durham and place it in the Illinois Central-Seaboard system and also its line from Roanoke to Winston-Salem and the Winston-Salem Southbound to be placed in the Atlantic Coast Line system. He said this would disrupt the route from Hagerstown to Winston-Salem, which had proved very valuable during the period of congestion when the routes through Potomac Yard were crowded, and that the result would be to limit competition and change the channels of traffic in this territory.

The Durham line, he said, is of great future importance to the Norfolk & Western.

Mr. Maher also submitted general information covering the Norfolk & Western, although the system which the tentative plan proposed to build up around the Norfolk & Western is not included in the southeastern territory. Prof. Ripley asked if it is not the disposition of the Hampton Roads lines to hold western traffic as far east as possible before turning it south and whether it would not be better to turn this traffic south at an earlier point. Mr. Maher said that the plan would require the Norfolk & Southern to interchange with the Southern at Lynchburg.

G. E. Butler, general freight agent of the Norfolk & Western, supplementing Mr. Maher's testimony, said that the proposed plan would have just the opposite effect of that suggested by Prof. Ripley in some instances. He said the public interest would be affected by closing the route from Hagerstown to Winston-Salem.

Atlantic Coast Line—Louisville & Nashville

SYSTEM NO. 11—ATLANTIC COAST LINE—LOUISVILLE & NASHVILLE

Atlantic Coast Line

Atlanta & West Point
Charleston & Western Carolina
Louisville & Nashville
Nashville, Chattanooga & St. Louis
Louisville, Henderson & St. Louis
Western Railway of Alabama
Richmond, Fredericksburg & Potomac
Norfolk Southern
Atlanta, Birmingham & Atlantic
Winston-Salem Southbound
Roanoke to Winston-Salem branch of Norfolk & Western
Florida East Coast
Carolina, Clinchfield & Ohio
Georgia & Florida
Gulf, Mobile & Northern
Mississippi Central

NOTES—Prof. Ripley recommends that the Richmond, Fredericksburg & Potomac and Florida East Coast retain their present status without inclusion in any system.

The Carolina, Clinchfield & Ohio may be included in system No. 12, Illinois Central-Seaboard. Prof. Ripley recommends inclusion in system No. 10, Southern.

The Gulf, Mobile & Northern and Mississippi Central are not specifically included in any system under Prof. Ripley's report.

George B. Elliott, vice-president and general counsel of the Atlantic Coast Line; W. L. Mapother, president of the Louisville & Nashville, and W. R. Cole, president of the Nashville, Chattanooga & St. Louis, expressed general approval of the plan which combined these roads in System No. 11, Atlantic Coast Line—Louisville & Nashville, including the Western Railway of Alabama; Richmond, Fredericksburg & Potomac; Norfolk Southern; Atlanta, Birmingham & Atlantic; Winston-Salem Southbound; Roanoke to Winston-Salem branch of the Norfolk & Western; Florida East Coast; Carolina, Clinchfield & Ohio; Georgia & Florida; Gulf, Mobile & Northern, and Mississippi Central. Mr. Elliott said that the attitude of the Atlantic Coast Line toward System No. 11 is that if these consolidations are going through and the proposed Systems Nos. 10 and 12 are to be made, the grouping for the Atlantic Coast Line is in the main satisfactory and what it would have suggested. He felt that the Richmond, Fredericksburg & Potomac should perhaps remain neutral, but if assigned to one system, it should properly go to the A. C. L. The A. C. L. would also be willing to accept the right to consolidate with the Norfolk Southern and it feels that the Carolina, Clinchfield & Ohio is properly allocated if given to the coast line. This would give access to coal over its own rails. Regarding the A. B. & A., he said that the Coast Line business to that section is largely over the Central of Georgia but if the Central of Georgia is to be linked up with the Seaboard Air Line, the A. B. & A. would aid the Coast Line in getting to Jacksonville. He also felt that the Florida East Coast is properly allocated to this system. This attitude, he said, is predicated on the possibility of making these consolidations on satisfactory terms. Probably, he said, the other roads and the public would demand that the Richmond, Fredericksburg & Potomac be kept open as a bridge line.

Mr. Cole said that if there is to be any consolidation, the Nashville, Chattanooga & St. Louis has been properly allocated in the plan. Prof. Ripley asked Mr. Mapother his opinion regarding the disposition of the A. B. & A., if the Seaboard Air Line and the Illinois Central remain separate. In that case "it ought to be scrapped," replied Mr. Mapother.

Do Not Need Independent Chicago Entrance

Prof. Ripley also brought out an expression from Mr. Mapother that the southeastern lines do not need an independent entrance to Chicago. A complete plan, he said, might wisely stop these lines with the Ohio river and he would have no objection to including the Chicago, Indianapolis & Louisville, now owned half by the Southern and half by the Louisville & Nashville, in the Baltimore & Ohio system, as proposed in the tentative plan.

George R. Loyall, president of the Norfolk Southern, expressed the opinion that the proposed consolidation of his

road with the Atlantic Coast Line would eliminate competition in a large part of the territory. He felt that the line has a function to perform and it is its desire to continue to develop along its own lines. Therefore, it would ask to be let alone for the present. Commissioner Hall asked whether he would propose that the Norfolk Southern be made a system by itself, to which Mr. Loyall replied only that he was not prepared to say where it properly belongs. He said perhaps it is more of a feeder to the Southern Railway than to any other system and its principal competitor is the Atlantic Coast Line.

Mr. Mapother took the stand again to discuss the Carolina, Clinchfield & Ohio, saying he thought its inclusion in System No. 11 is entirely proper and that it would prove highly desirable if the plan were carried out. It could be connected with the Louisville & Nashville by the construction of only 12 miles of new road and would afford an outlet to the Seaboard for coal from eastern Kentucky and a desirable route to the central west from Carolina territory. The management of the Louisville & Nashville has had such a plan in mind for several years.

Basic information for the Florida East Coast was submitted by W. G. Brown, roadway engineer, and T. W. Pomar, comptroller, but in response to requests for an expression regarding the allocation of this line, S. M. Loftin, general counsel, said that the road is now being operated by trustees under the will of the late H. M. Flagler, which expires next year, and the present trustees do not feel that they ought to express any opinion. The president and vice-president are among the trustees.

J. L. Edwards, assistant to the receiver of the Atlanta, Birmingham & Atlantic, submitted the general information for this road, and pointed out that the increase in population in this territory has been greater than that in the balance of the state. He said that under the Railroad Administration it was used in connection with the Louisville & Nashville and Nashville, Chattanooga & St. Louis as one of the routes for northbound fruits and vegetables.

H. H. Dean, general counsel of the Gainesville Midland, said that this road should be allocated to the Atlantic Coast Line or the Central of Georgia, but not to the Seaboard or the Southern. It connects with four systems which go into Georgia, but to link it with the Seaboard or Southern would eliminate competition.

Southern System

Data on behalf of the Southern Railway was submitted by L. E. Jeffries, vice-president and general counsel, and A. H. Plant, assistant to the president, but they declined to give any expression of opinion regarding the tentative plan. At the conclusion of their testimony, Frank Roberson, attorney general of Mississippi, asked Mr. Plant whether the commission should cut the Alabama & Vicksburg-Vicksburg, Shreveport & Pacific system at the Mississippi river. Mr. Plant said he had no opinion on this.

Mr. Roberson then introduced as a witness S. A. Witherpoon, special counsel for the state of Mississippi in the anti-trust suit against the Southern, who presented an alternative plan for a consolidation of the Seaboard Air Line, Nashville, Chattanooga & St. Louis, Mobile & Ohio, the Memphis-Birmingham division of the St. Louis-San Francisco, and the Chicago & Eastern Illinois or the Chicago, Burlington & Quincy, in order to afford a line to Chicago, as a competitor for the Illinois Central system. He also proposed to take away some of the east and west lines of the Southern system. He said that the Southern and the Illinois Central now have a monopoly in the state which it would be desirable to break up.

The basic information furnished by each road in response to a questionnaire sent out by the committee of counsel after conference with Commissioner Hall, calls for maps, a classi-

fication of the road and tracks, equipment and terminals, also detailed statements regarding the traffic, bases of fuel supply, results of operation, capital obligations, interest and other charges. At the request of Commissioner Hall there was added to this list maps and charts showing in detail inter-corporate relationships of the companies comprising the existing systems.

A. J. Maxwell and W. G. Womble of the North Carolina railroad commission and a number of shippers of that state objected to the proposed plan of cutting off the Lynchburg-Durham branch of the Norfolk & Western and placing it in the Illinois Central system. They also proposed that the Toledo & Ohio Central be added to the Norfolk & Western to give a line to the lakes. The hearing on the Southeastern district was concluded on June 20.

Annual Meeting of Signal Section at Spring Lake

THE SIGNAL SECTION of the American Railway Association held its annual meeting at Spring Lake, N. J., on June 14, 15 and 16; and a partial report of the doings of the meeting was given in last week's *Railway Age*, page 1479. The attendance, by the final day, rose to above 400.

The officers elected for the ensuing year were C. A. Christofferson (N. P.), chairman; B. T. Anderson (D. L. & W.), first vice-chairman; W. M. Vandersluis, engineering secretary, Illinois Central electrification committee, second vice-chairman. The secretary is H. S. Balliet, Grand Central Terminal, New York. Those elected to serve on the Committee of Direction for the three year term were A. H. Rudd (Pennsylvania), C. F. Stolz (C. C. C. & St. L.), C. H. Tillett (Grand Trunk), and F. B. Wiegand (N. Y. C.). T. S. Stevens (A. T. & S. F.), was elected to serve for two years. Those elected to the Committee on Nominations for next year were W. J. Eck (Southern), A. H. McKeen (U. P.), F. H. Buchanan (Pennsylvania), F. P. Patenall (B. & O.), and F. C. Stuart (E. J. & E.).

Economics of Railway Signaling

A special committee on this subject, B. T. Anderson, chairman, made a progress report on its assigned subject, the determination of the relative economic value of block signaling as a means of protecting and directing the movement of trains and for reducing the cost of train operation. The report gave an outline of the plan which the committee proposes to follow, which outline follows:

The purpose in making these studies is mainly to determine to what extent train operation can be improved by installing up-to-date systems of automatic block signals and interlocking on roads that are not now equipped with a block system and also on roads equipped with manual block.

The method to be followed in making a study is to prepare a statement comparing the results of train operation under the method in use with the results to be attained under the improved method.

Data sheets with explanatory notes for use in making this comparison accompany this report.

The following illustrates a typical case:

The road to be studied is assumed to be a single track division, 100 miles between terminals, operated under the manual block system; switches at passing sidings all hand operated. The block sections vary greatly in length as the block stations are located so that station agents also act as block signalmen. This arrangement of the block sections which is more or less typical of the manual block system is one of the causes of delay. Another cause of delay is the stops that trains must make entering and leaving passing sidings, over hand-operated switches.

The first step in the study is to tabulate one year's results under this method of operation. The figures to be entered on data sheet under present method. The next step is to prepare a plan for equipping this piece of road with an up-to-date system of

automatic block signals and interlocking. Block section lengths to be laid out for maximum operation, the important passing sidings to be equipped with interlocking with low voltage switch machines for the outlying switches. Where necessary, the passing sidings are to be re-arranged and re-located so as to avoid the delays due to badly arranged siding or sidings located without regard to the required time interval between them.

The test of the efficiency of the proposed plan will be the extent to which the plan will eliminate avoidable delays, and thereby increase the average speed of trains without increasing their maximum speed.

As the increase in average speed is the key to the situation, the improved facilities must be so planned that the avoidable delays of the present method of operation will be eliminated. When the average speed of freight trains under the proposed plan has been determined, it will then be possible to arrive at the figures for the proposed plan. If the average speed of freight trains under the proposed plan shows a marked increase over the present plan of operation, the improvement in train operation will, it is believed, be large enough to fully justify the cost of the improved facilities.

Care of Oil Lamps

Committee V—Maintenance Rules and Instructions, submitted a report covering rules for signal maintenance; examination papers on signal maintenance and rules for the care of switch and signal oil lamps. These were accepted for submission to letter ballot for inclusion in the Manual. The rules for the care of oil lamps follow:

- 1601. Cleanliness is of the most importance in the care of lamps.
- 1602. Lamp bodies must be kept clean and in repair; soot or dirt must be removed and all vents must be kept open so that draught will not be impaired.
- 1603. Lamp founts must be drained at least once a month to remove sediment or water.
- 1604. Oil drained from founts must be retained and may be used for cleaning purposes or for thinning black oil.
- 1605. Filler caps must be kept in place to prevent dirt from getting in the oil.
- 1606. Burners must be scraped, wiped clean and vents opened each time the lamps are filled. When fouled with oil, soot or incrustations, they may be dipped or boiled in a solution of lye, rinsed in clean water and thoroughly dried.
- 1607. Chimneys of long life burner lamps should be cleaned with dry waste or paper only. They should never be washed. Broken chimneys should be replaced promptly.
- 1608. Long time burners should be renewed every sixty days, as they accumulate dirt and gum oil which prevents the oil from flowing freely through them. Wicks must be of such length that at least 1 in. rests on bottom of fount.
- 1609. Lenses must be kept clean and bright, and if any are found cracked or broken they must be replaced promptly.
- 1610. Illuminating oils specified by the Company must be used. No attempt must be made to improve the quality by adding other oils. If unsatisfactory, make prompt report to.....
- 1611. Under no circumstances shall any other than illuminating oil be placed in receptacles provided for that purpose. Receptacles must be kept clean, closed against the entrance of dirt and moisture, and, unless designed for outside use, kept under cover.
- 1612. A space of $\frac{1}{8}$ in. must be left unfilled in founts for expansion and ventilation.
- 1613. When filling lamps in rainy weather, care must be taken to keep water out of the oil and from the wicks.
- 1614. Lamps equipped with long time burners must be inspected semi-weekly, or as instructed by..... crust removed from wicks and flame properly adjusted.
- 1615. Lamps equipped with one day burners must be cleaned, filled and flame adjusted daily.
- 1616. When lamps are lighted, the flame should be turned up to about one-half the height required to give full light and be allowed to burn until all parts become thoroughly warm, after which the flame may be adjusted to the proper height.
- 1617. Lamps must be placed and brackets so adjusted as to insure proper alignment with respect to spectacle and track.
- 1618. Lamps should be replaced on the same brackets to assure that proper alignment is maintained.

Joint Occupancy of Buildings

Committee III—Power Interlocking, presented a report on the joint occupancy of buildings for telegraph, telephone and signal apparatus. A survey has disclosed that in many cases where telegraph or telephone and signal apparatus is to be housed in the same tower or building, adequate provision has not been made for equally efficient installation, layout and location of the different classes of apparatus. The committee recommended that before plans are made for any new structure or alteration to an existing structure, due notice be given to the respective officers having charge of the installation, operation and maintenance of the different classes of apparatus, they to furnish full information as to the requirements.

The completed plans showing the location of telegraph, telephone and signal apparatus, pipes, ducts, outlets, en-

trances, doors, windows, etc., shall be submitted to the respective officers having charge of the installation, operation and maintenance of telegraph, telephone and signal apparatus for their approval. The provisions of this paragraph shall also apply where standard plans are used. Where plans submitted are not satisfactory the proper officers should confer and reach an agreement, if practicable.

This report elicited considerable discussion and finally was referred back to the committee. This committee also presented a specification for electric wiring for interlocking plants and one for the construction of underground conduit systems.

Reports of Other Committees

Committee XII—Contracts, submitted as its report a table of interlocking units and values which was accepted for submission to letter ballot.

Committee XI—Valuation, submitted forms for reporting material used and labor performed in construction, for submission to letter ballot and inclusion in the Manual. These forms have been prepared to meet the requirements of Valuation Order No. 3 of the Interstate Commerce Commission and also to provide for the allocation of costs for statistical purposes. These were ordered to letter ballot. The committee also submitted a table of average service life in years of the important units of the different types of signal installations and a construction program for signaling.

Committee VI—Standard Designs, submitted drawings for one-inch signal pipe and coupling; grooved trunking; built-up trunking; switch point drilling; switch adjustment-insulated; and highway crossing gate lamp. This committee also made a report regarding the best types of electric lamp for signal work.

Committee XVIII—D.C. Track Circuits, submitted methods of making d.c. track circuit tests for rail and ballast resistance with a form for a record and a report on the minimum limiting resistance allowable in series with track batteries which were accepted for submission to letter ballot.

Committee X—Signaling Practice, reported recent improvements in light signals, particularly the change in form of those on the Pennsylvania from four lights in a row to three. The Hall color light signal was described.

Committee IV—D.C. Automatic Block Signaling, submitted a report on requisites for circuits which after considerable discussion and some alteration was ordered submitted to letter ballot for inclusion in the Manual.

Committee II—Mechanical Interlocking, presented a long report made up of a number of specifications and drawings. The report contained the following specifications: concrete trunking; capping and support; compensation of pipe line; mechanical interlocking and paint and painting. An index for mechanical interlocking specifications was also presented as were three drawings, pertaining to instructions for applying compensation; a compensation chart and a crank chart, respectively. After brief discussion this report was accepted to be sent to letter ballot.

Committee VIII—A.C. Automatic Block Signaling, presented lists of requisites for the impregnation of coils applicable for coils for a.c. and d.c. signal systems; impregnating compound treatment for non-oil-proof electrical windings; impregnating compound treatment for partially oil-proof electrical windings; impregnating compound treatment of oil-proof electrical windings; and varnish treatment of electrical windings. All were accepted to be sent to letter ballot.

Curtailement of Activities

It was announced at the close of the meeting that by order of the board of directors the practice of holding sectional (district) meetings of the Section would be at once discontinued.

Chesapeake & Ohio Not Hurt by Coal Strike

Coal in 1921 75 Per Cent of Total Tonnage. Year's Result is 6.68 Per Cent on Stock

NORMALLY about 70 per cent of the tonnage of the Chesapeake & Ohio is bituminous coal. In 1921, because the decline in coal traffic was not as great proportionately as the decline in traffic generally, the percentage of bituminous coal to the total tonnage was 75 per cent. It would appear, therefore, that one of the most interesting factors in connection with the Chesapeake & Ohio at the present time is the effect that the coal strike may be having upon the road's welfare. The Chesapeake & Ohio serves both union and non-union fields. The total result, therefore, has been that the decline in traffic from the cessation of mining in the union mines has been balanced by an increase in the production of the non-union mines. The road, therefore, has not been hurt particularly by the coal strike but it has not had the expansion in coal traffic such as its neighbor carrier, the Norfolk & Western, has had the good fortune to experience. Putting this in the form of figures we find that the road's traffic in recent months has been running considerably ahead of its traffic in the corresponding months of 1921. Of course, it must be borne in mind that the early part of last year was a rather barren period for the Chesapeake & Ohio. Its coal loadings in March, 1921, averaged only about 6,000 weekly. In April they had improved so that they averaged slightly over 8,000, and in May, slightly over 10,000. The effect of the coal strike was first shown this year by the increased loadings in March, when the mines were rushing production in anticipation of the strike; in March the coal loadings averaged about 11,000 weekly. After the beginning of the strike there was a decline in traffic so that the loadings averaged only about 8,000 to 9,000 weekly. Since that time, however, they have gradually begun to increase to the extent that during the week ending May 27, the figure was 12,271. This shows what has been noted above that the coal strike has not severely hurt the C. & O., and it is apparent from the figures given that it is gradually bettering its position as the strike proceeds.

Great Improvement Over Last Year

The condition of the Chesapeake & Ohio today is very much different from what it was a year ago. In May last year the directors felt that conditions were so poor and the outlook so uncertain that it was best to defer action on the two per cent semi-annual dividend payable in June. There has been much comment about this action. The fact was, nevertheless, that the road at the time was producing some very poor earning statements. In the first four months of 1921 it had a net after rentals of only \$1,509,402. It improved its position materially in the later months of 1921 with the final result that for the year it earned a net on its stock of 6.68 per cent, but that this would be the case was not in evidence in May. To bring the thing up to date it should be noted that in the first four months of 1922 the road had a net after rentals of \$5,618,682, or that its poorest month this year, namely January, was considerably better than its best month in the first third of 1921. In fact, in February, 1921, the road reported a deficit.

The Chesapeake & Ohio's corporate net income for 1921 totaled \$4,192,601, or, as above noted, 6.68 per cent on its capital stock. This fact combined with what has been said about the 1922 earnings to date, would seem to indicate that the road has succeeded in overcoming the situation which confronted it in the early part of 1921, and this fact one would suggest to be the outstanding characteristic of the road's position at the present time. This, nevertheless, does

not change the fact that conditions in the early part of 1921 were bad. The annual report gives considerable attention to this and to the reasons why the dividend was deferred in May. It gives the additional fact that during May, 1921, the company had on hand over \$7,000,000 in unpaid vouchers past due for 60 days or more. The report says that under the circumstances the directors deemed it advisable to conserve the cash resources. Following a statement concerning the manner in which business picked up during the latter part of the year and concerning also the savings in operating expenses due to economies of one kind or another, it continues: "The directors of your company are keenly alive to the hardship to many of its stockholders resulting from any interruption in the regular payment of dividends, and the deferring of the dividend which would ordinarily have been paid in June was due only to their conviction that its payment at that time would have interfered with the ability of your company to meet promptly and adequately its obligations to its creditors and to the public. The period of deflation through which your company, in common with the industries of the country generally has been passing, has involved the necessity of substantial sacrifice by many, including the employees and the officers as well as the stockholders of your company."

The 1921 Results

The transportation operations of the Chesapeake & Ohio gave it in 1921 a net railway operating income, or net after rentals, of \$13,660,926 as compared with \$11,158,326 in 1920. In 1921 it had a decrease of freight revenues of 7 per cent, a decrease in total operating revenues of 7.2 per cent, and the expenses were decreased 14.3 per cent. The road operated at a ratio of 79.6 in 1921 as against 86.2 in 1920. The increase in net operating revenue (operating revenues less expenses) was 37.3 per cent.

The actual revenue tonnage carried in 1921 was 31,493,087 as compared with 40,838,116 in 1920, a decrease of 9,345,029 or 22.9 per cent. The bituminous coal tonnage in 1921 was 23,724,147 as compared with 28,625,615 tons in 1920; a decrease of 4,901,468, which, it will be noticed, was proportionately a much smaller decrease than was the case of the tonnage as a whole. The result was that bituminous coal tonnage which in 1920 made up 70.1 per cent of the total, in 1921 made up 75.33 per cent.

The operating revenues totaled in 1921 \$83,687,958 as compared with \$90,190,745 in 1920, a decrease of \$6,502,787. It is interesting in this connection to note that the ton-mile revenue in 1921 was 0.737 cents, an increase of 19.3 per cent over 1920. This explains the proportionately smaller decrease in revenues than in tonnage. The operating expenses for the year totaled \$66,603,077. This compared with \$77,744,521 in 1920, the reduction being \$11,141,444, or, as above noted, 14.3 per cent. The reduction in operating expenses included reductions of 5.3 per cent in maintenance of way, 18.5 per cent in maintenance of equipment, and 15.9 per cent in transportation.

Maintenance

Insofar as concerns the reduction in maintenance of way, it should be brought out that there were increases in the total charged to the primary accounts of ties, rails and other track material which partly compensated for the decreases in the other accounts. The Chesapeake & Ohio gives detailed information concerning the amount of material used in main-

tenance. It showed that in 1921 there were put in track for maintenance 1,085,047 ties as compared with 1,052,369 in 1920, an increase of 32,678. Not quite one-half of the new ties put in track were of white oak untreated, and most of the remainder were of mixed oak, cross-toted. The rail used in renewals in 1921 totaled 33,725 tons as compared with 12,814 tons in 1920, an increase of 20,911 tons. The larger part of the rail laid in 1921 was of 100-lb. section, the total being 21,197 tons. There were, however, also 8,050 tons of 130-lb. rail. At the end of the year, of the road's total main track mileage of 2,774, 1,325 was laid with 100-lb. rail and 58 miles with 130-lb. rail. These details concerning ties and rail will help give some idea of the Chesapeake & Ohio maintenance standards. With reference to ballast, the fact is brought out that the ballast used in existing tracks in 1921 totaled 626,034 yds. as compared with 891,058 yds. in 1920, a decrease of 265,024 yds. Considerably over half the ballast used in 1921 was of broken stone. With reference to the decrease in the amount of ballast used, the annual report points out that "Beginning 1921 careful survey was made of the ballast needed on the entire line, and while there was a decrease in the number of yards of ballast applied as compared with the previous year, our track has been fully maintained in equally as good condition as last year insofar as ballast is concerned." The general opinion would be that the reduction in expenses in 1921 was not due to any deviation from the maintenance standards of the road. One cannot, however, be so optimistic concerning the equipment maintenance. The total reduction in maintenance of equipment in 1921 as against 1920 was \$4,556,439, or 18.5 per cent. The larger part of this decrease was in freight car repairs, the actual reduction in that account being \$3,638,367. The result is shown in a percentage of bad-order cars as of May 15 of 16.3 per cent, which seems very much too high to be entirely satisfactory.

With reference to transportation, the interesting fact is brought out that in spite of the falling off in traffic which was experienced during the year, the average train load was decreased only from 1,131 tons to 1,090 and the revenue car load showed an actual increase from 39.1 to 39.3. This, of course, was partly due to the larger proportion of coal, but the final result was that the road did not suffer as sharp a decline in its train load as most other roads. The transportation ratio in 1921 was only 37.6, which seems unusually favorable for the conditions which were met in that year.

Big Improvement Program

It has been noted in these pages in previous reviews of this kind that one of the Chesapeake & Ohio's principal difficulties is the fact that it has expanded its feeders into the coal fields, somewhat faster, if anything, than its operating conditions could take care of to best advantage. This expansion was continued in 1921 and the mileage shows a slight increase over 1920. However, the road has been taking important measures to remedy the situation with which its expansion in recent years has caused it to be confronted. The list as given in the report concerning the improvements to terminals, etc., is an imposing one. With reference to this matter the report says, "The officers of your company have also prepared a comprehensive budget of additions, betterments and improvements which should be made during the next four years in order to adequately and economically accommodate the present day maximum volume of traffic, provide for anticipated growth and render its facilities more nearly equal to those of your principal competitors. The estimated capital charge for the work contemplated by this budget is about \$17,000,000, the expenditure of which will be spread over the next four years. Conditions at the present time are reasonably favorable for railroad financing and plans are now under consideration for providing at least a part of the total capital expenditure involved, announcement respecting

which will be made in due course." During 1921 the road carried out the following work: Line and grade revision on the Coal River district between St. Albans, W. Va., and Ferrell, 4.2 miles, including the elimination of a tunnel which work will permit the use of the road's heaviest equipment on this district; 9½ miles of second track on the Logan division; yard extensions at Gladstone, Va., Hinton, W. Va., St. Albans, W. Va., Ashland, Ky., etc.; new shop buildings, roundhouse and other terminal facilities at Clifton Forge, Va.; several 100-ft. turntables at various points. The report also says that work is now under construction and should be completed in 1922 of new yard tracks at Peach Creek, W. Va., and of the addition of seven 100-car tracks at Gladstone, Va. It also says that automatic train control is being installed between Charlottesville, Va., and Staunton, 40 miles, which work should be completed this year, and when completed, will give a continual section from Gordonsville, Va., to Staunton, about 61 miles. The Chesapeake & Ohio has also recently placed orders for a large number of freight and passenger cars.

The Hocking Valley's Place in the C. & O. System

THE HOCKING VALLEY, which the Chesapeake & Ohio controls through majority stock ownership, is in large measure a main line division of the parent company and as such it constitutes its western outlet to the lakes at Toledo. The importance of its position can be indicated in no better way than by pointing out that in 1921 the Hocking Valley dumped into vessels at Toledo 4,540,000 tons of coal, which total was considerably more than that dumped at any other railroad pier on Lake Erie; in fact, there was no other pier that dumped over 3,000,000 tons. By way of comparison it might be further noted that the Chesapeake & Ohio in 1921 dumped at Newport News 4,312,619 tons of coal.

The Hocking Valley's main line extends from Valley Crossing, just south of Columbus, to Toledo. The road has a number of branches serving mines in southern Ohio, but the larger part of this tonnage is received from connections, notably, from the parent company. Connection with the latter is made by means of the Chesapeake & Ohio Northern to Waverly, from which trackage rights are used over the Norfolk & Western to Valley Crossing. The Hocking Valley is a modern railroad equipped with facilities of a somewhat unusual sort. Its main line is laid with 100-lb. rail and plans are under way for the use of some rail of 130-lb. section. The line is entirely rock ballasted and tie plates are used on all soft wood ties. The road has large yards at each end of its main line and at Toledo it has two car dumping machines of a modern type. The road's traffic is primarily coal, in 1920 the percentage of coal to the total tonnage being 76 per cent and in 1921, 84 per cent. Taking advantage of these conditions, it uses heavy engines and its average train load which in 1921 was 1,471 revenue tons, is one of the highest in the country.

Manner of Operation

Coal from the Chesapeake & Ohio reaches the Hocking Valley rails at Columbus, or, to be more exact, at Parsons yard just south of Columbus. This yard is a joint yard with the Chesapeake & Ohio and the trains of that road run through from Huntington, W. Va. The yard at Parsons has a capacity of about 5,000 cars. From Parsons to Toledo is 128 miles and is operated as one engine district. Mallet and Santa Fe type locomotives are used, both types being given a summer rating of 5,500 tons. The grade northbound or against traffic is 0.3 per cent except for the helper grade from Ackerman to Powell, 7 miles, of 0.5 per cent, which

grade is operated by the use of helpers from Parsons yard for a total of 20 miles. The main yard at Toledo is Walbridge yard having a capacity of 5,000 cars in addition to which there is a dock yard of 2,000 cars. The piers have two dumping machines capable of handling the 70-ton and 100-ton cars which the Chesapeake & Ohio is at present using to considerable extent in its coal traffic. These piers compare very favorably with the facilities at Newport News and in fact they can be operated at higher speed because they work with the lake ore boats with wide hatches, which boats can be loaded with much greater ease than the ocean going vessels which are loaded at Hampton Roads. On this line there is some double track, the mileage of which is gradually being extended. Further, there are a number of sidings of 80 cars which have not yet been extended to hold 100 car trains.

The road is also confronted with the necessity of increasing its yard capacity at Toledo. During the war, or when the method of pooling coal was followed, there were 19 classifications. Now that the pooling has been abandoned the number of classifications has been increased to 81 with the result that the road has had to put in new tracks at both Walbridge and Toledo itself to take care of the additional work required.

Larger Part of Traffic Received from Connections

It was noted above that the Hocking Valley dumped at Toledo in 1921, 4,340,000 tons of coal. By way of showing the percentage of this tonnage which is received from connections it may be pointed out that of the total, 2,975,000 tons were received from the Chesapeake & Ohio, 800,000 tons from the Norfolk & Western and a sizable quantity from the Kanawha & Michigan. During 1921 the mines on the Hocking Valley did not play a heavy part in the lake traffic. All of these facts are of present interest because the Hocking Valley mines have been hit very severely by the coal strike. The loadings in April and May have been at a minimum whereas in the corresponding weeks of last year they averaged about 800 cars weekly. This, however, should not hurt the Hocking Valley as much as might otherwise be the case because of the fact that it is presumably receiving a heavy tonnage of coal from the Chesapeake & Ohio and Norfolk & Western.

The 1921 Results

The results of the Hocking Valley's operations in 1921 were very similar to those of its parent company. It also had a severe falling off in traffic in the first few months of 1921 and in May the directors of the company deferred the semi-annual dividend of two per cent just as it was deferred in the case of the parent company, the result, of course, being reflected in the corporate income account of the Chesapeake & Ohio because the larger share of the dividends would accrue to the parent company. The Hocking Valley's net railway operating income in 1921 was \$1,560,741 as compared with \$1,577,963 in 1920. Its corporate income was only \$14,306 as compared with \$345,796 in 1920; in other words, the dividend of two per cent which was paid towards the end of the year and which amounted to \$219,990 was paid from surplus and not from the year's results. By way of bringing the facts up to date it should be pointed out that the Hocking Valley at present is, like the parent company, in a very much better position than it was this time last year. For the first four months of 1922 it had a net after rentals of \$967,674 as compared with a deficit in the first four months of last year of \$635,225. For the first four months of this year it operated at a ratio of 68.5. The improvement this year over last year is further shown by the fact that the net ton-miles of freight (revenue and non-revenue) in the first three months of 1922 totaled 357,189,000 as compared with 223,249,000 in the first three months of 1921.

In 1921 as compared with 1920 the Hocking Valley had a decrease of 18.4 per cent in its freight revenues, a decrease of 17.6 in its total revenues, and it cut its operating expenses 27.4 per cent. For the year it operated at a ratio of 82.1 per cent, thereby reflecting the poor results of the first few months of the year. However, even this figure was an improvement over 1920 because in that year the operating ratio was 93.2. The improvement which the Hocking Valley carried out in 1921 was almost entirely due to its bituminous coal traffic. In 1920 it carried 11,567,594 tons of coal, which constituted 75.67 per cent of its total tonnage. The coal tonnage carried in 1921 was 10,781,334, a decrease of 786,260 tons from 1920. Because of the fact that the reduction in the tonnage of coal and coke was only 7.6 per cent whereas the reduction of other freight tonnage was 44.5 per cent, the percentage of coal tonnage in 1921 was 84.28 per cent. It is interesting in connection with what has been said above, that of the total coal tonnage carried in 1921—namely 10,781,334—8,209,614 was received from connections and only 2,571,720 originated on the Hocking Valley. The total tonnage of all commodities carried in 1921 was 12,793,175, of which 73.17 per cent was received from connections. The reduction from 1920 was 2,492,687, which figures out to 16.3 per cent. The freight revenues in 1921 were \$11,924,979 as compared with \$14,616,677 in 1920, a decrease of \$2,691,698. The total operating revenues were \$14,093,001 as compared with \$17,101,493 in 1920, a decrease of \$3,008,492. The total operating expenses in 1921 were \$11,572,394 as compared with \$15,941,435 in 1920, a reduction of \$4,369,040, or as above noted, 27.4 per cent. The reduction in maintenance of way expenses was 16.8 per cent; in maintenance of equipment, 24 per cent, and in transportation, 25.7. The road put in track approximately the same number of ties in 1921 as in 1920, the 1921 figure being 277,868. The new rail laid in 1921 totaled 7,024 tons (nearly all of 100-lb. weight), as compared with 3,596 tons in 1920. The ballast used, 14,179 yards, approximately all stone, compared with 23,777 yards in 1920. The reduction of 34.1 per cent in maintenance of equipment produced a similar result as that which was produced in the case of the parent company. The Hocking Valley had a bad-order car percentage on May 15 of 24 per cent, which is several times normal and which indicates that Hocking Valley operating expenses will have to include a considerable sum for car repairs.

At the end of 1921 the Hocking Valley reported 8.8 additional miles of second track, the additions this year being between Marion and Morral. There were also additional yard tracks at Toledo dock, Walbridge and Parsons, the mileage of trackage at Walbridge being increased 3.02. The road reported that its revenue train load in 1921 was 1,471 tons, a decrease of three per cent from 1920. The revenue tons per loaded car were reported at 45.5 tons which, like the average train load, is unusually high. The figure, however, was a decrease of 1.9 per cent from 1920. Some idea of the Hocking Valley operations will further be gained by the statement that its revenue tons one mile per mile of road, or traffic density, was in 1921, 4,485,562 and that even this high figure was a decrease of 20.4 per cent from 1920.

J. E. FAIRBANKS, general secretary of the American Railway Association, announces that, by a vote of the members of the association, the proposition, recently promulgated, to cancel car service rule 17 has been approved, to take effect July 1, 1922; also that the rule adopted May 17, 1911, relative to penalty payments for delay or diversion to private car lines, has been cancelled, effective July 1; also that changes in per diem rule 6, recommended in circular 2260, May 25, are approved, the amended rule to become effective on July 1. A change in per diem rule 15, paragraph c, also promulgated on May 25, has likewise been approved, to become effective on July 1.

Rail and Water Transportation Provisions in Ship Subsidy Bill

THE REVISED SHIP subsidy bill, as reported to the House on June 16, contains the following provisions relating to rail and water transportation:

SEC. 602. (a) It is hereby declared to be the policy of Congress to promote, encourage, and develop water transportation, service, and facilities in connection with the commerce of the United States, and to foster and preserve in full vigor both rail and water transportation, and the board and the commission are hereby severally authorized, empowered, and directed to co-operate to that end.

(b) The (Shipping) board and the (Interstate Commerce) commission are authorized and directed to create a joint board, selected from among their members, officers, and employees, to study the conditions and interrelations of rail and water traffic, and the principles and methods essential to accomplishing the policy declared in subdivision (a).

(c) The joint board shall appoint a secretary who shall keep minutes of its meetings, which minutes shall be furnished to the members of the board and of the commission. The joint board shall hold regular semimonthly and such additional meetings as may be necessary to transact properly its business.

(d) The joint board shall formulate and make such recommendations to the board and the commission, not inconsistent with law, pertaining to the interrelations of rail and water traffic, as it deems necessary to accomplish the policy declared in subdivision (a). The board shall make effective, by such means as are granted it by law, any such recommendation upon any matter within its jurisdiction, if such recommendation is approved by the board. The commission shall have a like duty as to any such recommendation upon any matter within its jurisdiction.

(e) None of the provisions of this section shall be construed to affect the power or jurisdiction of the commission, or to confer upon the board concurrent power or jurisdiction over any matter within the power or jurisdiction of the commission.

SEC. 603. Paragraph (4) of section 25 of the Interstate Commerce Act, as amended, is amended by adding at the end thereof a new sentence to read as follows: "In making rules and regulations prescribing the form of such through bills of lading, the commission shall adopt as the portion thereof governing the carriage of goods by water in foreign commerce such form as may be certified to the commission by the United States Shipping Board for such purpose."

SEC. 604. Paragraph (9) of section 5 of the Interstate Commerce Act, as amended, is amended by striking out the period at the end thereof and inserting in lieu thereof a colon and the following: "Provided, That the foregoing provisions of this paragraph shall not apply in any case where such common carrier by water or such vessel is engaged exclusively (a) in trade (other than with foreign contiguous territory) not included in the coastwise trade, or (b) in trade between ports in the United States and ports in the Philippine Islands."

SEC. 605. Section 15 of the Shipping Act, 1916, is amended to read as follows:

"Sec. 15. (a) That every common carrier by water, or other person subject to this act, shall file immediately with the board a true copy, or, if oral, a true and complete memorandum, of every agreement with another such carrier or other person subject to this act, or modification or cancellation thereof, to which it may be a party or conform in whole or in part, fixing or regulating transportation rates or fares; giving or receiving special rates, accommodations, or other special privileges or advantages; controlling, regulating, preventing, or destroying competition; pooling or apportioning earnings, losses, or traffic; allotting ports or restricting or otherwise regulating the number and character of sailings between ports; limiting or regulating in any way the volume or character of freight or passenger traffic to be carried; providing warehousing, docking, or other terminal facilities; providing that the one carrier shall act in any manner as agent or representative of the other carrier; or in any manner providing for an exclusive, preferential, or co-operative working arrangement.

"(b) Every common carrier by water shall file immediately with the board a true copy, or, if oral, a true and complete memorandum, of every agreement with a common carrier by railroad subject to the provisions of the Interstate Commerce Act, as amended, or modification or cancellation thereof, to which it may be a party or conform in whole or in part, relating to the interchange of freight or passengers, or the making of joint or through rates, or providing warehousing, docking, or other terminal facilities, or providing that the one carrier shall act in any manner as agent or representative of the other carrier, or in any manner providing for a preferential or working arrangement between the two carriers. In

all such cases the common carrier by railroad shall also have a like duty. The provisions of this subdivision shall apply only to agreements relating to passengers or property transported or to be transported to or from a foreign country or the Philippine Islands from or to a port or other place in the United States.

"(c) The term 'agreement' as used in this section includes understandings, conferences, and other arrangements.

"(d) The board may by order disapprove, cancel, or modify any agreement, or any modification or cancellation thereof, whether or not previously approved by it, that it finds to be unjustly discriminatory or unfair as between carriers, shippers, exporters, importers, or ports, or between exporters from the United States and their foreign competitors, or to operate to the detriment of the commerce of the United States, or to be in violation of law, or to be otherwise detrimental to the interest and welfare of the United States, and shall approve all other agreements, modifications, or cancellations.

"(e) Agreements existing at the time of the enactment of the Merchant Marine Act, 1922, shall be lawful until disapproved by the board. ***

"(f) All agreements, modifications, or cancellations, made after the enactment of the Merchant Marine Act, 1922, shall be lawful only when and as long as approved by the board, and before approval or after disapproval it shall be unlawful to carry out in whole or in part, directly or indirectly, any such agreement. ***

"(h) Whoever violates any provision of this section shall be liable to a penalty of \$1,000 for each day such violation continues, to be recovered by the United States in a civil action."

SEC. 606. Paragraph (d) of paragraph (13) of section 6 of the Interstate Commerce Act, as amended, is amended to read as follows:

"(d) If any carrier by railroad subject to this act enters into arrangements lawful under section 15 of the Shipping Act, 1916, as amended, with any carrier by water operating from a port in the United States to a foreign country, for the handling of through business between interior points of the United States and such foreign country, the commission may require such carrier by railroad to enter into similar arrangements with any or all other carriers by water operating from such port to the same foreign country, but such arrangements shall be subject to the provisions of section 15 of the Shipping Act, 1916, as amended."

SEC. 607. Section 28 of the Merchant Marine Act, 1920, is amended to read as follows:

"Sec. 28. (a) That no common carrier shall charge, collect, or receive, for transportation subject to the Interstate Commerce Act, as amended, of passengers or property, under any joint rate, fare, or charge, or under any export, import, or other proportional rate, fare, or charge, which is based in whole or in part on the fact that the passengers or property affected thereby are to be transported to, or have been transported from, any port in a possession or dependency of the United States, or in a foreign country, by a carrier by water in foreign commerce, any lower rate, fare, or charge than charged, collected, or received by it for the transportation of passengers, or of a like kind of property, for the same distance, in the same direction, and over the same route, in connection with commerce wholly within the United States, unless the vessel so transporting such passengers or property is, or unless it was at the time of such transportation by water, documented under the laws of the United States.

"(b) Whenever the board is of the opinion, however, that adequate shipping facilities to or from any port in a possession or dependency of the United States or a foreign country are not afforded by vessels so documented, it shall certify this fact to the Interstate Commerce Commission, and the commission shall, by order, suspend temporarily the operation of the provisions of this section with respect to the rates, fares, and charges for the transportation by rail of passengers and property transported from, or to be transported to, such ports.

"(c) Such suspension of operation of the provisions of this section shall be terminated upon 30 days' notice, given in accordance with the requirements of section 6 of the Interstate Commerce Act, as amended, by order of the commission whenever the board is of the opinion that adequate shipping facilities by such vessels to or from such ports are afforded and so certifies to the commission.

"(d) Whenever the board and the commission are both of opinion, and certify, that putting into effect or keeping in effect the provisions of this section will result in unjust discrimination between ports of the United States on commerce accustomed to move through such ports, or in materially changing the channels of transportation within the United States, or in unduly congesting one or more of the ports of the United States, the commission shall, by order, suspend the operation of said provisions until such time as it and the board reach a contrary conclusion in the premises, whereupon such suspension shall, by order, be terminated by the commission upon 30 days' notice as hereinbefore provided for the termination of other suspensions."

Train Control Ordered on Forty-Nine Roads

Tentative Order of January 10, to Which Roads Objected,
Made Permanent Without Important Change

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 15 made public an order, dated June 13, that the tentative order of January 10 directing the 49 railroads named therein to install automatic train stop or train control devices upon designated portions of their roads, should be entered, and that the installations prescribed should be completed by January 1, 1925. The list of railroads and, with two exceptions, the portions of road designated are the same as published in connection with the tentative order in the *Railway Age* of January 14, 1922, page 189. The points between which the Cincinnati, New Orleans & Texas Pacific is required to make the installation have been changed to Cincinnati and Chattanooga instead of Cincinnati and Knoxville; and in the case of the St. Louis-San Francisco Springfield, Mo., and Tulsa, Okla., are substituted for St. Louis and Springfield. The railroads are those having annual gross revenues of \$25,000,000 or over. It is required that the train control device be operated in connection with all road engines running on or over at least one full passenger locomotive division between the points designated.

The roads are required to submit to the commission complete and detailed plans and specifications for the installation of the devices prior to the installation, and each installation when completed will be subject to inspection by and the approval of the commission or any division thereof to which the matter may be referred.

The date for the completion of the installation is set six months beyond that named in the tentative order; and the time within which the roads are required to furnish plans of their block signal systems and lists showing the number and types of their locomotives is extended six months, or until January 1, 1923. The roads are directed to proceed without unnecessary delay to select and install the devices, and to file with the commission, on or before January 1, 1923, and on the first day of each month thereafter, full and complete reports of progress. However, the Pennsylvania and its controlled lines, and the Norfolk & Western, for good cause shown, are allowed until July 1, 1923. The Pennsylvania, however, will be required to file plans and reports beginning July 1, 1922, for the installation (now being made) upon its Lewistown division between Lewistown and Sunbury, Pa.

The specifications and requirements for the installation of automatic train stop or train control devices adopted by the commission and prescribed in its order are the same as those in the tentative order, omitting the permissive feature which was in the specifications of the A. R. A. committee. The order itself is substantially in the form of the tentative order, as to which the roads were given an opportunity to show cause at the hearings (in March) why it should not be put into effect.

For the benefit of systems including two or more of the roads specified the report says that those which may desire to adopt a device as standard on each of their roads may test the device on one road and during such test will not be expected to make the additional installations.

An abstract of the commission's report follows:

Report of the Commission

This is a proceeding under Section 26 of the interstate commerce act which authorizes us, after investigation, to prescribe the installation of automatic train-stop or train-control devices or other safety devices, upon the whole or any part of the railroad of any carrier by railroad subject to the act.

On January 10, 1922, we entered an order under which certain

specified carriers, were given an opportunity to show cause, if any, why an order should not be entered requiring the installation of automatic train-stop or train-control devices upon designated portions of their lines. Hearings have been had at which all the respondents, except nine, were represented by a general committee [C. E. Denney, chairman], and at which carriers individually presented data and arguments.

Respondents represented by the committee opposed generally the entry of an order at this time upon the grounds—*First*, that there has not been any automatic train-stop or train-control device developed to an extent which would justify the issuance of an order. *Second*, that the carriers have not had opportunity to make adequate service tests of devices which differ fundamentally in their principles of operation from those now installed and in operation under service conditions, which were referred to in our report. *Third*, that every reasonable effort is being made by the carriers to co-operate with the commission for the purpose of testing and developing devices which will best meet operating requirements. *Fourth*, that the order requires a much greater number of and more extensive installations than are warranted, in view of the present state of the art. *Fifth*, the costs of installation and maintenance of automatic train-stop or train-control devices are high and not within the present financial abilities of the roads. In connection with this objection it is contended that it should first be determined whether automatic train-stop or train-control devices will provide equal or greater additional safety for a specified expenditure than a like expenditure for automatic block signals, double track extensions, interlocking plants, additional steel equipment, under crossing and grade separation; most of which, it is urged, not only increase safety but increase the capacity of a railroad and produce economies in operation.

Supplementing the general objections special objections were raised by many carriers to the entry of an order requiring installations upon their respective lines. Proprietors and manufacturers of automatic train-control devices were also heard.

[Here follows a history of what the commission has done in this field since 1906, concluding with the opinions formed by the Block Signal and Train Control Board and the Bureau of Safety.] The conclusions reached as a result of the investigations conducted from 1906 to 1920 were that automatic control of trains is practicable; that the use of such devices is desirable as a means of increasing safety, and that the development of devices had reached a stage warranting the installation and use of such devices on a more extended scale. The results of these investigations, which had been reported by us year by year to the Congress, and the recognized need for some such device resulted in the inclusion in the transportation act, 1920, of a section which places upon us the duty, after investigation, of ordering the carriers or any of them to install upon the whole or any part of their lines automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by us.

Following the enactment of that section we were urged to order the installation of various automatic train-control devices. * * * In order to carry out the provisions of Section 26 in the most effective and expeditious manner, we invited the co-operation of the American Railway Association. A joint committee on automatic train control consisting of representatives of the signal section and the operating, engineering and mechanical divisions of that association was appointed in November, 1920. * * *

The essential safety function of any automatic train-stop device is to stop a train where a dangerous condition exists ahead of the train, when the engineer for any cause fails to take proper action to stop. Several types of apparatus have been designed to do this. Additional features have been introduced so as to afford speed control, whereby a train may be brought down automatically to a predetermined safe speed at certain fixed locations which are established with relation to the fixed signals of a block system.

In the most recent development of automatic train-control devices, continuous control is obtained whereby the engineer is not dependent upon indications received at fixed locations, but is immediately made aware of a change in condition ahead of his train and may act promptly to govern his train accordingly. * * *

Various Types Available

To secure the latest data pertaining to actual operations a questionnaire was sent in December, 1920, to all carriers request-

ing detailed information; and replies were received from the following eleven carriers upon the lines of which such devices are installed: Chicago & Eastern Illinois; Chicago, Rock Island & Pacific; Chesapeake & Ohio; Pennsylvania; Hudson & Manhattan; San Francisco-Oakland Terminal; Washington Water Power Company; Brooklyn Rapid Transit Company; Philadelphia Rapid Transit Company; Boston Elevated Railway; and Northwestern Elevated Railroad.

Observations have been made by the joint (A. R. A.) committee, in connection with our Bureau of Safety, of the performances of devices of the ramp type upon portions of the Chicago & Eastern Illinois in May, June and July, 1921, and for the months of February and March, 1922; upon the Chesapeake & Ohio from August 16, 1921, to March 31, 1922, and upon the Chicago, Rock Island & Pacific from May, 1921, to March 1, 1922. The joint committee has co-operated with us in making the observations and has rendered valuable aid.

Each road stated, in response to the questionnaire, that the device adequately met the operating requirements in the location where installed. As it was desired, however, to obtain more complete data, inspectors of the Bureau of Safety and of the joint committee were detailed to observe and report upon the operation of the devices. Data have been gathered upon the effect of the devices upon railroad operating conditions, upon problems of installation and maintenance upon an extended scale, upon installation and maintenance costs, and upon the revisions made or required in the devices.

The installation upon the Chicago & Eastern Illinois is upon 105.4 miles of double track from Danville to Yard Center, Ill. There are 174 signals and 175 ramps; 85 engines equipped, 47 passenger and 38 freight. The device has been in continuous service since November 1, 1914.

The installation upon the Chesapeake & Ohio is upon 21 miles of single track from Gordonsville to Charlottesville, Va. There are 67 signals, and 67 ramps; 37 engines equipped. The device was placed in service upon 7 miles of road in March, 1917, and upon 14 additional miles in June, 1919. An extension of this installation 40 miles, to Staunton, Va., is under construction and will probably be completed by August, 1922.

The installation upon the Chicago, Rock Island & Pacific is upon 22.4 miles of double track from Blue Island to Joliet, Ill. There are 34 signals and 34 ramps; 20 engines equipped. The device has been in service since March, 1920. This installation will be extended to Rock Island, Ill., a distance of 142 miles.

Record of Three Installations

The following is a summary of the facts observed, tallied for the three installations observed (The Rock Island, the C. & E. I. and the C. & O.):

Miles of road equipped.....	148.8
Miles of track equipped.....	276.6
Total engines equipped.....	142
Total indication points.....	276
Total signals.....	275
Total mileage of engines in equipped zone.....	721,581
Total operations of train-control device (passage of equipped engine, with device in service, over an indication point counted as one operation).....	659,875
Proper operations—Clear.....	656,045
Caution.....	2,053
Stop.....	945
	659,043

Failures—	
False clear.....	15
Other causes resulting in stops to the number of.....	341
Undesirable stops.....	
Due to train-control device.....	73
Due to signal failure.....	418

An undesirable stop is one which occurs when there is no operating or traffic condition which requires the stop to be made. Where the train-control device causes a stop under such conditions the action is upon the side of safety. It is undesirable, however, from an operating point of view. A false clear failure on the other hand is one in which the train-control device indicates by its action or lack of action, that no danger exists, when as a matter of fact, the contrary is true. Failure in this case is a dangerous one.

These three installations which have been under close observation are of the ramp type and the record indicates that automatic train-control devices of this type are practicable under actual service conditions, that they properly perform the functions for which they are designed, and that when properly installed and maintained they unquestionably increase the safety of train operation. The record holds out expectation of satisfactory tests and operation of the other types of train-control devices.

Undesirable Features May Be Corrected

The respondents called attention to many features of construction and operation of ramp type devices which they classed as undesirable and which, they urge, should be eliminated before the devices may reasonably be said to operate to a degree of

efficiency warranting the issuance of an order requiring their installation as safety measures. From the close and detailed observations which have been made we are convinced that the features claimed to be undesirable are not such as cannot be corrected, as the systems are utilized extensively. In fact, some of them have already been corrected. The discovery and the elimination of undesirable features is a natural growth, inevitable in the development of the art, such has been the history of the development of the automatic block signals, of the air brake and of the automatic coupler.

Carriers who have stressed the difficulties of the ramp type urge that more time should be allowed in which to test induction devices. Two devices of the magnetic induction type are now installed for test purposes, one upon the Southern Pacific [the National] and the other upon the New York Central [the Sprague]. Arrangements have been completed for a test installation of another device of the induction type upon the Delaware, Lackawanna & Western [the Finnigan]. One device of the continuous control induction type is now being installed upon the Pennsylvania [the Union] upon 52 miles of track between Lewistown and Sunbury, Pa., and arrangements have been made by the Pere Marquette Railway for a test installation of another continuous control device of the induction type [Clark's].

Effect on Track Capacity

Respondents, through their committee, state that the installation of automatic train control devices upon lines handling heavy traffic will tend to slow up train movements, decrease track capacity, and, therefore, may require the addition of more running tracks to accommodate the same volume of traffic. * * * It is obvious that this difficulty arises only upon roads and portions of roads now operating to full capacity, or nearly so. The problem is one not generally confronting all the respondent carriers. * * * In some locations a simple automatic stop will be adequate, in others speed control may be necessary or desirable or automatic stops on part of the line and speed control on other parts where traffic is heavy may be needed. * * *

Cost of Installation

The cost per mile of road and per mile of track can not be stated generally. The cost for locomotive apparatus and for roadside or track apparatus will therefore be given together with the cost of the installations which have been under observation.

From the various figures submitted by respondents and by proprietors and manufacturers, it appears that the cost of locomotive apparatus for an intermittent control device of the ramp type ranges from \$400 to \$1,000; for an intermittent control device of the induction type, from \$375 to \$2,100, and for a continuous control device, induction type, from \$1,000 to \$3,000. Assuming one indication point per block the cost of track equipment of the ramp type is from \$200 to \$550 per block; of the induction type, intermittent control, from \$400 to \$2,000 per block, and of the induction type, continuous control, from \$300 to \$1,000 per block. These prices cover installation costs and are stated to be the maximum prices for each unit of the particular device. They may be reduced when the apparatus is manufactured and installed upon a large scale. * * *

Maintenance Costs

Maintenance costs have been ascertained in connection with the installations that have been under observation as follows:

On the Chicago & Eastern Illinois installation the average maintenance cost per locomotive, per month, over a three months' period was \$13.02; per ramp, per month, over same period, \$2.74; per mile of track, per month, \$2.27. On the Chesapeake & Ohio installation the average per locomotive per month over a six months' period was \$12.23; per ramp per month over same period, \$5.68; per mile of track per month, \$18.12. On the Rock Island installation average per locomotive per month over a nine months' period was \$10.33; per ramp per month, \$12.43; per mile of track per month, \$9.44.

The above figures were compiled from monthly statements furnished to the joint inspectors by the railroad companies and the train-control companies. The maintenance figures for the Rock Island installation represent much higher maintenance costs than would be required under normal operating conditions, because of the nature and extent of the tests conducted during the observation period. The proprietors of this device state that, based upon their experience, the average annual cost of maintenance per mile of track on a double track division, consisting of 165 miles of road with 120 equipped engines and 273 ramps, will be \$54.09, or a total cost per annum of \$18,047.88.

Many of the respondents have filed estimates of the cost of installation upon selected portions of their roads, comprising passenger locomotive divisions, which show a much higher cost than those indicated in the foregoing figures. The estimated figures show a wide variation both for engine equipment and roadway equipment. The differences are due in part to the type

of device selected and the measure of control to be secured and in part to the varying number of locomotives to be equipped and the number of indication points upon the road.

With these figures as bases, they urge that a greater degree of safety might be secured by spending the money to eliminate grade crossings, to extend their automatic block signal systems, and interlocking plants, and to construct additional tracks. All of these are unquestionably desirable. Automatic train control, however, will still be a necessary safety measure when all of these things shall have been completed. The compensation from a financial standpoint which will result from securing added safety should not be overlooked, however, when costs are being considered.

Cost of Collisions

The accident reports made by the railroads to us show that from January 1, 1936, to December 31, 1921, there were 26,297 lead-on and rear-end collisions. These resulted in death to 4,326 persons and injury to 60,682. The damage to railway property alone amounted to \$40,969,663. The annual average of these collisions amounted to 1,643, the average number killed, 270, and the average number injured, 3,792. The average damage to railroad property amounted to \$2,560,603 per year. Losses due to damage to lading are not included in these figures but they are no doubt considerable. If to the large property losses there be added the death losses and the damages paid for persons injured, the total amount will be very great. As an indication of what these latter losses are, a number of carriers have furnished us with the death and personal injury claims paid by them as a result of a number of accidents.

New York, New Haven & Hartford, for example, paid \$412,210 upon death and injury claims as a result of a collision at North Haven, Conn., on September 2, 1913, in which 21 persons were killed and 42 injured; \$131,543 for like claims from a collision at Milford, Conn., on February 22, 1916, in which 10 persons were killed and 152 injured; and \$29,580 for like claims from a collision at Norwood Junction, Mass., on March 17, 1921, in which 4 were killed and 11 injured. The total claims paid for these three accidents amount to \$573,335.

The Delaware, Lackawanna & Western as a result of a collision at Corning, N. Y., in 1912, which caused the death of 39 persons and injury to many others, paid out in death and injury claims \$326,133; for a similar accident at Ackerman, Pa., in 1919, in which 3 persons were killed and 2 injured, it paid for death and injury claims \$10,469. In ten years from 1912 to 1922 it paid for death and injury losses a total of \$367,360, for 12 collisions, including the two mentioned. These, it is admitted, might have been prevented by an automatic train control device.

The New York Central paid death and personal injury claims in the amount of \$226,616 as a result of a collision at Amherst, Ohio, in March, 1916, in which 23 persons were killed and 125 injured; \$356,478 for like claims from a collision at South Byron, N. Y., in January, 1919, in which 22 persons were killed and 183 persons were injured; \$201,119 as a result of a collision at Schenectady, N. Y., in June, 1920, in which 15 were killed and 47 injured. As a result of a collision at Porter, Ind., in February, 1921, in which 37 were killed and 124 injured, the cost for death and personal injury claims is estimated at \$175,000. Thus in these four accidents such payments amounted to \$959,214.

We are convinced that the carriers can, if they are determined to do so, readily install upon their roads devices which will meet the requirements of safety and which at the same time will not unduly interfere with operating requirements. Had the railroads taken prompt action when the Block Signal and Train Control Board pointed the way in 1911, the art would have been far advanced today. Many of the operating problems, such as interchangeability, effect on track capacity, and others which respondents have stressed in this proceeding, would have been solved. The development of the automatic block signal system to its present state of efficiency is evidence of what can be accomplished.

It is evident from the record that automatic block signals were primarily installed as a means of increasing the capacity of existing lines. This very fact, however, increases the possibility of accidents. Much has been done to furnish the engineman with reliable information, by means of wayside signals, of the conditions of the track ahead but progress has been slow in providing means to automatically compel obedience to the signal indications. The fact remains that the correct operation of trains in compliance with the signals still depends entirely upon the knowledge, alertness and skill of the engine crew. The danger is ever present that the engineman may fail to observe, correctly interpret and obey the signals. * * *

Experimental Stage Passed

Our investigations have shown that the art of automatic train control has long since passed the experimental stage. The 15 years of investigation and study and the results obtained in the actual employment of these devices over periods of years upon

some of the railroads have clearly demonstrated the practicability of and the necessity for automatic train-stops or train-control. The time has now arrived when the carriers should be required to select and install such device or devices as will meet our specifications and requirements.

Time for Compliance

* * * The fixing of a time limit should be based upon a consideration of the time which has already run since the passage of the act and the progress and present state of the art. There should be considered also the time reasonably required to enable the carriers to select suitable devices from among those available, to develop them to meet their operating conditions and requirements in the designated locations and to provide for the manufacture and installation of the apparatus.

Some of the respondents contend that devices of the ramp type are unsuited to their needs and hence undesirable. They state that devices employing the induction principle will better meet their requirements and therefore desire more time in which to test such devices. This is necessary, they believe, because there has been relatively less development of the induction type as compared with the ramp type. Proprietors and manufacturers of devices of the induction type support, in some measure, this request, because they are of the opinion that unless more time is allowed, respondents will perform be limited to the employment of devices of the ramp type. The request for additional time was made by respondents in their answers and at the hearing. Although the proposed order was issued on January 10 of this year, it appeared at the close of the hearings on April 15 that only a few of the respondents had made arrangements or were contemplating making arrangements to make the tests which they consider to be necessary.

We do not desire to force any carrier to adopt a particular type which it believes is not entirely suitable to its peculiar needs, if there are others available which, within a reasonable time, may be shown to be more suitable. In view, however, of the investigations which have already been made and the time which has elapsed, we are of the opinion that a six months' period will give sufficient time for any road to decide upon the device it should select. Within this time, provided a sufficient installation is made and intensive tests of the device are conducted, it can be determined whether or not the device will be suitable.

Respondents will be required to make monthly reports to us, during the six months' period beginning July 1, 1922, of their arrangements for such tests and of the progress made.

Requirements and Specifications

The definitions, functions, requirements and specifications which we have adopted are set forth in the appendix. They are based upon the facts developed in our investigations and upon the requisites laid down by the Block Signal and Train Control Board in its report in 1910, the requisites of the Railway Signal Association reported in 1914, the requisites of the American Railway Association adopted in 1914, and of the automatic train control committee of the United States Railroad Administration adopted in 1919, together with those adopted by the joint committee on automatic train-control of the American Railway Association in March, 1921.

Permissive Feature Eliminated

We have eliminated the provision in the specifications of the joint committee under which the engineman would be permitted, if alert, to forestall the automatic brake application and proceed. Some of the respondents object to the elimination of this provision. They contend that, in many instances, it is proper for a train to pass an automatic block signal in the stop position, and that there are so many such conditions that the elimination of the manual control provision practically eliminates the simple automatic stop from consideration. * * * Where the device is made subject to the manual control of the engineman so that he may prevent the automatic brake application according to his own judgment of the conditions, the automatic safety feature of the device is, to that extent, nullified. It is assumed, by the proponents of manual control, that no engineman, if alert to a dangerous situation, will deliberately cut out the automatic stop device. The proper use of the manual control would depend, therefore, upon the judgment of the engineman. His judgment would be the determining factor in situations of known or unknown danger. This factor of human judgment is the factor which an automatic train-stop device is designed to eliminate. The manual control feature is, in our opinion, a dangerous one which will permit the judgment of the engineman to intervene and thus may prevent the essential function of the train-stop device, namely, its automatic operation in cases of emergency.

The respondents, required to install upon designated portions of their respective roads, automatic train-control devices in accordance with our specifications and requirements, have been selected with regard to the measure of the risk of accident in

connection with traffic conditions thereon. Some of the respondents called attention to their records of operation to show that there have been relatively few accidents of the character which automatic train-control devices are intended to prevent, and that the possibility of such accidents is relatively remote. These respondents therefore request that they be excluded from the provisions of our order. The reasons advanced do not, however, appear to be sufficient justification for such action.

We have decided not to limit by our order the installation of automatic train-control devices to roads or portions of roads already equipped with automatic block signals, because we have no desire to discourage efforts to automatically control trains without the aid of fixed wayside signals. The statement, therefore, of the primary function of automatic train-stop or train-control devices recognizes the possibility of installing such a device without the use of automatic block signals.

Freight Car Loading

WASHINGTON, D. C.

LOADING of revenue freight during the week ended June 10 totaled 846,002 cars compared with 750,645 cars during the previous week, or an increase of 95,357 cars, according to reports received by the Car Service Division of the American Railway Association. A large amount of the increase was due to the fact that the previous week had included the Decoration Day holiday but there was an increase of 24,871 as compared with the week before the holiday. The loading for the week of June 10 also came within 33 cars of the largest loading for any week this year preceding the coal strike, the week of March 25.

Compared with the corresponding week of last year, there was an increase of 58,719 cars, but as compared with the corresponding week of 1920, the total for the week of June 10 represented a decrease of 84,974 cars. If the same amount of coal had been loaded as in 1920, the loading would have exceeded that of 1920.

Increases as compared with the corresponding week of last year were shown in the loading of all classes of commodities except grain and grain products and coal. The coal loading, 94,824, was larger than for any previous week during the strike, but represented a decrease of 67,074 as compared with the corresponding week of 1921 and of 96,670 as compared with 1920. This was an increase, however, of 8,000 cars as compared with the preceding week.

Merchandise and miscellaneous freight combined, which includes manufactured products, totaled 563,640 cars, an increase compared with the corresponding week of last year, of 93,988, and an increase of 35,702 as compared with the corresponding week two years ago.

Grain and grain products loading amounted to 40,035, a decrease of 905 cars as compared with last year. Livestock loading totaled 29,765, an increase of 794 cars.

The loading of coke, 9,008 cars, represented an increase of 4,124 cars as compared with last year and the loading of forest products, 62,355, was an increase of 11,329 cars, while ore loading, 46,372, showed an increase of 16,463.

Compared by districts, increases as compared with the corresponding week of last year were shown in all districts except the Allegheny and the Eastern. In the Pocahontas and Southern districts there are increases as compared with 1920.

The Car Service Division has compiled charts indicating the extent to which the average loading in tons of selected manufactures and miscellaneous commodities utilized car capacity in 1920 and 1921. The first chart shows the average tons per car loaded, by quarterly periods, separated as to eight selected commodities. Sewer pipe and drain tile, fertilizer, chemicals and explosives, and canned goods all made a very much poorer showing from a tonnage standing in 1921 than in the previous year. Paper, printed matter and books, with the exception of the first quarter, also loaded considerably less tons per car, the last quarter making an especially low record. On the other hand, it is encouraging to note that automobiles and trucks, a high class commodity, and ice, a low class commodity, both being bulky freight, made a very much better record on the average than in 1920. Freight not otherwise classified, and coming under the heading "other manufactures and miscellaneous" also shows an improvement in 1921.

Car Surplus Decreases

The freight car surplus for the period from June 1 to 8 was 284,189, a decrease in approximately a week of 21,009. Of the total 65,161 were box cars and 180,831 were coal cars.

The percentage of bad-order freight cars in June 1 was 15 as compared with 14.7 on May 15.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, WEEK ENDED SATURDAY, JUNE 10, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdsc. L.C.L.	Miscellaneous	Total revenue freight loaded		
										This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	8,999	3,132	7,666	1,463	5,835	3,354	70,834	89,925	191,205	.....	.....
	1921	7,194	3,271	44,374	1,031	6,262	2,245	58,625	71,646	.....	194,648	223,389
Allegheny	1922	2,715	2,471	16,708	4,620	3,114	6,966	51,662	72,713	160,969	.....	.....
	1921	2,454	3,355	51,684	2,371	2,969	6,973	44,280	52,094	.....	166,180	199,644
Pocahontas	1922	217	158	31,002	238	1,441	27	6,465	4,173	43,221	.....	.....
	1921	181	153	24,687	160	1,287	2c	5,120	3,469	.....	35,083	32,036
Southern	1922	3,532	2,407	25,830	779	19,563	1,195	38,090	41,163	132,559	.....	.....
	1921	3,392	2,349	18,359	445	14,576	648	35,620	34,769	.....	110,152	126,439
Northwestern	1922	10,418	8,404	6,942	1,536	17,893	32,112	31,096	38,477	147,278	.....	.....
	1921	11,460	7,323	5,362	627	13,869	18,582	27,222	31,345	.....	115,790	158,651
Central Western	1922	9,944	10,856	4,215	217	6,467	1,702	34,114	43,085	110,600	.....	.....
	1921	11,333	9,931	13,262	136	5,912	710	30,099	36,309	.....	107,692	128,646
Southwestern	1922	4,213	2,337	2,461	155	8,045	616	16,144	25,699	59,670	.....	.....
	1921	4,926	2,589	4,170	114	6,160	725	15,619	23,435	.....	57,738	62,171
Total Western districts	1922	24,575	21,597	13,618	1,908	32,405	34,830	81,354	107,261	317,548	.....	.....
	1921	27,719	19,843	22,794	877	25,941	20,017	72,940	91,089	.....	281,220	349,468
Total all roads	1922	40,035	29,765	94,824	9,008	62,358	46,372	248,405	315,235	846,002	.....	.....
	1921	40,940	28,971	161,898	4,884	51,029	29,909	216,585	251,067	.....	787,283	.....
	1920	34,408	27,591	191,494	11,543	62,978	75,024	164,637	163,301	.....	.....	930,976
Increase compared	1921	.....	794	.....	4,124	11,329	16,463	31,820	62,168	58,719	.....	.....
Decrease compared	1921	905	.....	67,074	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	5,627	2,174	.....	.....	.....	.....	83,768	.....	.....	.....	.....
Decrease compared	1920	.....	.....	96,670	2,535	620	28,652	.....	48,066	84,974	.....	.....
June 10	1922	40,035	29,765	94,824	9,008	62,358	46,372	248,405	315,235	846,002	787,283	930,976
June 3	1922	37,911	27,792	86,626	8,927	58,923	31,552	217,254	281,640	750,645	693,003	828,907
May 27	1922	45,712	29,502	91,370	8,851	64,020	23,871	247,331	310,464	821,211	795,335	898,169
May 20	1922	49,772	29,131	81,967	9,135	61,030	16,917	243,971	306,434	792,459	770,991	862,074
May 13	1922	42,270	29,940	79,170	8,813	60,661	14,403	241,418	300,684	777,359	751,186	843,145

Addresses at the Accounting Officers' Meeting

Speakers Analyze Present Railway Conditions and Requirements from Accounting Viewpoint

THE ANNUAL MEETING of the Railway Accounting Officers' Association, held at Cleveland, Ohio, June 7 to 9, was addressed by Samuel O. Dunn, editor of the *Railway Age*, by Col. W. A. Colston, formerly director of the I. C. C. Bureau of Finance and now vice-president and general counsel of the New York, Chicago & St. Louis, and by S. Ennes, vice-president and general manager of the Wheeling & Lake Erie. Abstracts of the addresses follow:

The Railway Situation

By Samuel O. Dunn
Editor of the *Railway Age*

It seems to me that on the whole we may reasonably anticipate that throughout the present year the financial results of railway operation will be somewhat better than they were last year. There does seem ground for hoping that we have entered or soon will enter a period when shippers will desist for a while from constantly attacking rates, when wages and working conditions will cease for a while to be the subjects of acute and dangerous controversy, and when, if the railways do not enjoy a period of real calm, they will at least not constantly be tossed about by a tempest which threatens to engulf them. Looking farther ahead, if we could reasonably hope that railway officers would be accorded some measure of that freedom to conduct their business which men are accorded in other lines of commerce and industry, we might anticipate a period of real prosperity for the railroads.

Probably it is not far from the truth to say that the future of the railways can and will be mainly determined by their own officers. Summarizing the matter roughly, there are two things that their officers must do if they are to do their part in bringing about a solution of the problem which will be fair and beneficial to all concerned. First, they must manage the properties honestly and efficiently and give the public good service at the lowest rates compatible with the rendering of good service. Secondly, they must build up an intelligent, healthy and friendly sentiment on the part of railway employees and the public toward the railways.

The Recent Rate Case

The opinion rendered by the Interstate Commerce Commission in the recent reduced rate case is a remarkable and historic document in some respects. In the first place, it is a high tribute to the honesty and efficiency with which the railroads are being managed. The commission is an arbiter between those who own and manage the railways, on the one side, and those who use and pay for their service on the other side. Now, the railroads for years have been criticized and attacked upon the grounds, among others, that their accounts have not been correctly kept; that their capitalization greatly exceeds their value, and that they have not been efficiently managed. Criticisms and attacks upon all these grounds were made against them in the recent rate case. Having heard both the attack and the defense and having weighed all the evidence presented by both sides, the Interstate Commerce Commission has held that all the major attacks have been without sufficient justification. To the credit and vindication of the accounting officers it found that the books and accounts have been correctly kept, and show the facts. In spite of all that has been alleged to the contrary, it has found that the present value of the railways

as a whole is approximately \$19,700,000,000. It has expressly held that there is no evidence of general inefficiency of management.

The commission, by prescribing the way in which the accounts of the railways have been kept for years, by requiring them to make detailed reports regarding all their operations and transactions, by having its examiners check their accounts and reports to see that they have been correctly made up, and by holding extended hearings in which their managers and officers have been subjected to the severest examination by members of the commission and by representatives and attorneys of adverse interests, has got for itself and given to the public more complete and reliable information regarding the way the railways have been managed than has ever been obtained and made public by any government body regarding any other class of business concerns. The findings of the commission in its opinion, therefore, constitute a remarkable vindication of the railways.

Of course, the commission does not say, and nobody would say, that they have been or are now managed with complete honesty or perfect efficiency. Many offenses have been committed and many mistakes have been made in their management in the past. There are still abuses which ought to be abolished. There still remain many ways in which efficiency can and should be increased. But this is true of concerns of every kind. On the whole it is very doubtful if any class of business men in America could have had all their work studied and all their transactions scrutinized as those of the managers of the railways have been and established a cleaner and more defensible record than the railway managers have.

The findings made by the commission should be very gratifying to the railway officers. They should have a great effect upon public sentiment. There are, however, some other things in the decision of the commission which are not only not gratifying, but disquieting.

The Rate of Return

Undoubtedly the most unsatisfactory feature of the decision is its ruling that in future $5\frac{3}{4}$ per cent will be treated as a fair average return upon their valuation as a whole. Of course, such a return would be a great improvement over the average of less than four per cent which the railways received during the time when under the commission's ruling in the 1920 rate case they were entitled to six per cent. But during the dismal period of struggle in which very few roads earned six per cent and many were trying merely to avert bankruptcy, their officers were at least stimulated by the expectation that if they ever did earn an average of six per cent they would be allowed to have it. Now, before they have even been able in a single month to earn that much they find what is held to be a fair return cut down from six per cent to $5\frac{3}{4}$ per cent.

The difference may seem small. It means, however, a reduction in the amount the railways may earn for interest, dividends and improvements of about \$50,000,000 a year. It means a reduction in the amount of capital on which they will be able to pay a return at six per cent of about \$800,000,000. It means that they have been deprived of the ability to raise this much new capital and to provide the public with the additional transportation facilities which the investment of it would have provided. And how much of a saving in rates can it mean to the American public?

About 45 cents per year per person, or less than one cent a week per inhabitant. Which does the American public need more—this less than one cent a week per capita, or the \$800,000,000 investment in railway facilities which the commission's ruling makes impossible?

It is worth while to speculate upon the reason or reasons which caused the commission to make this reduction in the "fair return." The experience of the last 15 years does not indicate that after the recapture of one-half of all net return exceeding six per cent earned by individual railways the amount of return which would be left out of the 5¾ per cent would be sufficient to enable the railways as a whole to raise adequate amounts of new capital. Furthermore, past experience would be rather a dangerous guide to follow under present conditions in the money market of the world. It is true that interest rates are now lower and that in consequence all security prices are higher than a few months ago. In spite of this, however, the present market prices of American railway securities do not support the view that an average return of 5¾ per cent will be sufficient.

Probably the best test of whether it will be sufficient is afforded by the prices at which the bonds and stocks of the stronger companies are selling. All but their best secured bonds are selling at prices which yield five per cent or more, while the best dividend paying stocks are selling at prices which yield six per cent or more. Now, new bonds which may be sold will necessarily be less well secured than most of those now outstanding and will have to be sold for relatively lower prices than are commanded by those now outstanding. Furthermore, new issues of stock would have to be sold for less than the market prices now commanded by the present stocks of the companies issuing them.

The estimates of the amount of new capital which ought to be invested in railways annually vary widely, but probably the annual investment for some years to come should be at least one billion dollars. President Storey of the Santa Fe in a recent address estimated at one and one-half billion dollars for three years the new investment which ought to be made to bring the railways up to date. Can the railways, with the prospect of an average annual return of only 5¾ per cent on their valuation, reasonably hope to raise one and one-half billion, or even one billion, dollars of new capital annually?

If there is anything in the past experience of the railways to show that they can, there certainly is not in the past experience of any other industry. The average return earned in the banking business is at least twice that large. The banking like the railroad business is under government supervision, and yet nobody has proposed that it should be restricted to any such average return as the commission has held will be fair and sufficient for the railways. No other large industry would be satisfied with 5¾ per cent. In fact, the courts in many cases have held that to restrict public service concerns to less than six per cent was confiscatory.

It is remarkable that this ruling of the commission was received with little comment and almost no criticism by the press and general public. They took it as a matter of course that railways should be restricted to a rate of return which would not be considered sufficient in any other business. We should frankly recognize that this is because the commission's ruling was in accordance with the prevailing public sentiment. The public knows the courts have held that the net returns of railways and public utilities may be reduced and limited to any basis which is not confiscatory. It has been led to believe that because this can be done it is to the public's interest that it shall be done. There are very few who have ever considered the matter enough to have perceived that the least return to which the railways can constitutionally be restricted is not necessarily the return to which, in the public interest, they ought to be restricted. Perhaps, although it is doubtful, the courts would

rule that the commission could restrict the railways to an average return of 5¾ per cent without violating the constitutional prohibition of confiscation. Suppose, however, that the public welfare demanded a large expansion of railway facilities and that the railways could not, unless they earned an average return of at least say, 6½ per cent, raise the necessary capital. Clearly, it would then be to the public interest not to restrict the railways to less than 6 per cent, but to let them earn at least 6½ per cent.

The fact that the press and public accept with little comment and virtually no criticism the ruling of the commission that the railways shall be restricted to an average return which is much less than is earned in other lines of business and which closely approaches, or actually crosses, the line of confiscation, strikingly illustrates the fact that the railroad problem never will be solved by the most honest and efficient management, essential as that is to its solution. It is also essential to the solution of the problem that the public shall be given a better understanding of railway matters, and especially that public sentiment more friendly to the railways shall be secured. The public must be made to understand that it is contrary to its own interest to have the railways regulated, as they have been in the past, on the principle that their average return should be restricted just as much as it can be without confiscating their properties. It must be made to understand that a prosperous railroad industry is just as essential to the welfare of the public as a prosperous agricultural or mining or manufacturing industry.

Public Opinion

The public, however, will never see and admit this, because it will be unwilling to see and admit it, until the suspicion and hostility which a large part of the people now feel toward the managements of the railways have been eliminated. Many of you may doubt if this suspicion and hostility still prevail. Unfortunately, one who reads all kinds of newspapers and magazines, and comes in contact with all classes of people, cannot fail to be convinced that in spite of the proof to the contrary which has been accepted by the Interstate Commerce Commission, there are still many millions of people who do believe that the railways are inefficiently operated; that they are grossly overcapitalized; that graft prevails extensively in the relations between their officers and outside concerns, and that excessive amounts of the rates they collect from the public find their way through some channel or other into the pockets of the "malefactors of great wealth" in Wall Street. The policies adopted by all of the regulating bodies are strongly influenced by this widely prevalent public sentiment, and the railways will never be able to get the regulation which they ought to have, in justice to the owners of their securities and to enable them properly and adequately to serve the public, until this public sentiment has been changed.

How is this atmosphere of suspicion and hostility to be cleared away? I think the first thing that must be done is to awaken the managers and officers of the railways to a vivid realization of the fact that the future of these properties does not lie in the hands of legislatures, commissions and courts, but in the hands of the public. Almost any railway officer to whom you make that statement will assent to it. It is so obviously true that nobody can dispute it. But while most railway officers accept the theory, it is a remarkable fact how comparatively few of them actually act in accordance with it. A great deal of work has been done to improve public sentiment, but the fact that public sentiment is still what it is today, demonstrates that this work has not been sufficiently effective either because there has not been enough of it, or because it has not been well done, or for both reasons. Too many unjust criticisms of the railways which for years have constantly been made throughout the

country have not been answered promptly, clearly and conclusively enough. In consequence the minds of many people have been filled with misinformation and prejudice. The good things the railroads have done and are doing to develop the country and to increase its prosperity by improving their service, making it more safe, and increasing the economy with which it is rendered, have not been told often and well enough.

This good side of the railroad business should be presented to the public through every available channel until the misconceptions and prejudices which prevail in the minds of so many people are destroyed.

Public Relations Work

I believe it is possible for the railways by carrying on extensive and perfectly legitimate public relations work to change the atmosphere of public sentiment in which the railroad business is conducted and in which the railroad problem is discussed. There are many persons in the railroad business who are skeptical about the value of public relations work. They live in terror lest the railways may be criticized for carrying on what has come to be stigmatized by the odious word "propaganda." It may be that it is impossible to create an intelligent and friendly public sentiment regarding the railways. If that is the case, then it follows that private ownership and management in this country is doomed. Nothing could be more certain than that unless a great effort to create a more healthy public sentiment is made that sentiment will not be created. Since unless such a sentiment is created it is a foregone conclusion that private ownership is doomed, there is to my mind no escape from the conclusion that the railway managements should see that more intelligent and comprehensive public relations work is done. It is just as vital to the future of the railways that this be done as that the properties be developed and operated efficiently.

Why is it that after so many years of struggle over government regulation of railways it is still necessary frankly to recognize the fact that public sentiment regarding railway matters is not what it ought to be? You have all heard the old story of the Arkansas man, the roof of whose house long needed repairing, but who never repaired it. He did not repair it when it was raining because he couldn't, and he did not repair it when it was not raining because he didn't need to. A very large part of our railway executives have assumed a similar attitude toward public relations work. When earnings have been bad they have considered that they could not afford to do it, and when earnings have been good they have considered it unnecessary.

In view of past experience, if it is true that we have reached or are approaching a pause in the storm, it is probable we are entering a period of danger to the railways. The only time that most railway managers have recognized the need for extensive and effective public relations work has been in periods of emergency when they have been engaged in great struggles with shippers over rates, or with labor over wages, or with unfriendly public men over legislation. It is in those periods, however, that public relations work is likely to be the least effective, because in those periods there already prevails a spirit of antagonism on the part of employees, or of shippers, or of public men which it is extremely difficult to allay. The best time to do effective public relations work is in the periods of calm when no large parts of the public are up in arms against the railways and when people are more disposed to listen to reason.

"In time of peace prepare for war." The periods when no great contentions or struggles are going on are the best times to present to the public the facts about the great increases in the safety and economy of operation which are being secured, the relative lowness of our railway capitalization and rates, and what the railways need to enable them

to provide the public with the service that will be required in future months and years.

Valuation—Recapture—Depreciation Reserves

By Col. W. A. Colston

Vice-President and General Counsel, New York, Chicago & St. Louis Ry. Co.

Good times are coming on. Heretofore we haven't realized that there is such a thing as excess earnings, but some of us are coming along pretty close to the line now, some of us have passed it, and we have got to see that in this respect we will do fairness to the government and see that there is fairness done to the railroads. We must look to it that we play the game according to the rules of the game, and those rules should be announced before the game is started.

Prior to 1907 or thereabouts we could charge what we wished to, within reason, to operating expenses for improvements. There was no thought of depreciation.

After 1907 we began to have refinements in accounting, and we were required to charge depreciation on equipment, and we were permitted to charge it or not charge it on way and structures. So far as I know, there is only one large railroad in the country that did charge depreciation to any substantial degree on way and structures. You were permitted to charge or not charge in accordance with your judgment. Why? Accounting to be of any value must afford a true exhibit of the facts of the company's business. It is not a mere question of putting down columns of figures and making stereotyped statistical reports. The purpose of keeping accounts is to show the condition of the company's business, and so that the people who are responsible for managing that business may know how to proceed. Nobody knew then, and nobody knows now, any generally applicable rule for depreciation of way and structures, and the commission very sensibly left it to the judgment of the roads. In other words, the rule was that each road should determine for itself the facts and should account upon the facts so determined. Now, the railroads having been given that as the rule and having adopted that as the method and having said, as the roads of the country generally have said, "there is no depreciation of way and structures"; that, I submit, should be accepted as a fact. However much some of us may disagree with the majority or with individual roads in that respect, the convention has been established. However willingly we may all admit that as to the individual item, the separate rail, the separate tie, the separate bridge, or the separate other structure, there is depreciation, yet the consensus of opinion of the railroad accountants and engineers of this country is that combining appreciation and depreciation, taking the whole road as a complete tool, or working machine, there is no net depreciation of way and structures. Consequently, you have charged nothing to operating expenses for such depreciation. You have lived up to the rule and when you have had your rate investigations, when you have paid your taxes, when you have had all the troubles that the railroad man has, you have not fallen back on the defense that you had to make good depreciation of way and structures, or that the government or the people of the country had to pay for it.

Recapture

We had a valuation act. We had no misgivings. Nobody knew what the valuation act would amount to. We went along swimmingly. Then came the transportation act, which says that there shall be a recapture of earnings and that the recapture of earnings under Section 15a of the Interstate Commerce Act shall be based upon the value of property devoted to the transportation service, and that when the

values required to be found under Section 19a, or the valuation act, shall have been determined, those values shall be taken as the values upon which recapture will be based.

Now, what is the situation? You have come along with, say, a \$100,000,000 property. Omitting equipment, your way and structures cost and stand on your books at \$100,000,000. You have not charged any depreciation on this account. You have not collected anything from the public for such depreciation. Your franchises have been computed and your taxes have been paid without any allowance for such depreciation. Your rates in the past have been fixed; your rates for the future under Section 15a have been fixed; your reductions in charges as recommended by the commission have been made; your reparations have been paid; all without any allowance for depreciation of way and structures, but when the time comes to value the property, you receive an engineer's report which says, "The cost of reproducing this property is \$100,000,000, just as its investment shows, but we find its condition is only 80 per cent of its cost new, and therefore we take 20 per cent off for depreciation, and you get \$80,000,000 as your value." Now, if you are allowed before recapture only 6 per cent on that cost of reproduction less depreciation, you are allowed before recapture only \$4,800,000, and if you actually earn \$6,000,000, or 6 per cent, on your real investment of \$100,000,000, you have to split \$1,200,000 up with Uncle Sam and give him \$600,000, although you have not collected anything from anybody for this used-up value of property devoted to the public service, and your accounting, with the approval of public authority, has been based upon a determination that such shrinkage of value, or depreciation, does not exist.

I think this little illustration will emphasize the necessity for our making an earnest effort to harmonize and co-ordinate the accounting practices under the accounting rules of the Commission, and the engineering practices under the valuation act. I think we may expect the full and fair co-operation of all of the bureaus of the Commission in such an effort at harmonious adjustment.

The Rules of the Game

Now, I don't say whether it is better to charge depreciation or not to charge depreciation. I am not bringing that into the question. But, I say, let us get the rules of the game at the start and play it throughout one way or the other way, and don't let us work both ends against the middle. If we are to continue our old methods and are not to charge income for depreciation of way and structures, then obviously we must treat such depreciation as non-existent in determining valuations or capital accounts. If, on the other hand, we are now to admit depreciation in way and structures for valuations or capital accounts we must recognize that our income accounts have been over-stated in the past and just as we raise reserves to cover overcharges and loss and damage, failure to acknowledge which has occasioned over-statement of income in the past, so should we now raise reserves by periodical charges to income until we have provided for that depreciation which was, but was not admitted, as well as for that depreciation which evermore shall be.

The Opportunities of the Auditor

By S. Ennes

Vice-President and General Manager, Wheeling & Lake Erie

For years we operating men have, in some degree, charged a large part of our trouble to inadequate rates, adverse legislation, labor unions, government control, but a man now on the Supreme Bench is reported to have said a great many years ago that a million dollars was wasted every day on the railroads of the United States. As I grow older, I am less inclined to take issue with him.

Many here represent roads with a gross business in excess

of \$100,000,000 a year, and some of you represent roads with a much larger gross income. Most of your roads are spending for operation 75 cents out of every dollar taken in over the counter. As we say, your operating ratio is 75 per cent or greater. Now one per cent of \$100,000,000 is \$1,000,000; and if the operating ratio can be reduced one per cent, the latter amount can be left in the treasury at the end of the year, and \$1,000,000 is a lot of money, particularly when available at the end of the year.

Who is there about a railroad that has a better opportunity to find leaks, both of outgo and income, than the man who, from day to day, is recording the income and the outgo? Who has a better opportunity to know when the revenue for handling a car is too small, or the expense of handling too great, than the auditor? And who can question that it is not only his duty and responsibility but his opportunity to bring to the attention of his executives the costly irregularity?

It is possible, and I regard it as the auditor's duty, to make these important figures impressive and striking and to make them show up like the tail light on an overland passenger train, and it can be done. For example, not long ago we found we were handling some carloads approximately 50 miles for \$3. When that was brought to the attention of the traffic manager, he at least promised himself that he would not get caught in that way again. Again, a year ago, we found it was costing us \$10 every time we put an engine over the turntable. It has now been cut to five, largely by analyzing the costs which showed where reductions could be made.

Comparison affords the auditor an opening to introduce information regarding irregularities that will receive attention even if it is not always sympathetic. Give this a trial. When you get back home, some of you take your major accounts, and also the principal accounts that go to make up these major accounts, and compare them with neighboring roads of the same general characteristics, and I warrant you that you will find some very happy and some equally disappointing situations. For example, after comparing maintenance and transportation expense as a whole, see how your track laying and surfacing, account No. 220, compares in cost per mile and per 1,000 gross ton miles, with your neighbor's. In your maintenance of equipment see how your repairs to steam locomotives, account No. 308, compare. On this account there are three ways of comparison, one being per engine mile, another per 1,000 gross ton miles, and another for 100 tons of tractive effort. Also see how the amount your railroad is spending on repairs per freight car, account No. 314, compares with your neighbor's.

In transportation, yard service usually carries the leaks, and it is well to compare accounts 377 to 382, inclusive, and, with the results obtained, I want to again say that unless the road you are connected with is an unusual one, you will develop some figures that will get very earnest attention.

Now that you have developed the leaks, the question is how to stop them, how to correct the irregularity, and, in my judgment, the remedy is simple—expose it; advertise it.

Begin by tabulating costs down to the last cent and setting up one unit against another, and it has been my experience, based on a number of trials, that just the minute you begin to do this, you begin to get satisfying results. You have all of this information in your offices, and in actual practice you will find the cost of assembling it in a manner necessary to get results very much less than expected. As stated before, we cut our cost of handling engines in two in less than a year, and it was done by separating the expenses in accordance with I. C. C. classification, and showing the man in charge of each unit not only what it was costing him for washing boilers, cleaning fires, coaling engines, etc., but the number of men he was using on each job, and alongside of it we placed the figures of what was being done at other engine terminals—with the result they all got busy and the cost came down, and I never have known it to fail.

General News Department

The Sunshine Special of the Texas & Pacific was derailed nine miles east of Mineola, Tex., on June 14, and two coaches fell down a bank and were overturned. Eighteen passengers were reported injured.

Passenger Train No. 4 of the Louisville & Nashville was derailed at a switch near Flomaton, Ala., on June 15, and the engine and first three cars were overturned. The wreck fell against a warehouse at the side of the railroad and two workmen therein were killed. A number of passengers were injured.

Citizens of Palestine, Tex., are agitated over the expected removal of the International & Great Northern's shops from that city, and several heated conferences have been held between citizens and officers of the city, the citizens being determined to contest the contemplated removal. In behalf of bondholders a suit has been filed in the federal district court against the city of Palestine and the citizens, to enjoin them from interfering with the road's removal plans.

A train robbery which was committed near Webster, Pa., on the Pittsburgh & Lake Erie, last Saturday, was begun and finished, and the robbers escaped, all within about five minutes. It was on the Fairmont express about 10 a. m. After passing Monessen, two men passed from the smoking car to the baggage car, putting on masks as they went, and, intimidating the baggageman and the express messenger with pistols, they gagged them, took the messenger's keys and rifled the safe. When the train stopped at Webster, the robbers jumped off and entered a waiting automobile. The station agent, finding the baggage car door closed, went in and found that the baggageman had just succeeded in freeing himself.

O. C. Fairfield, a former flagman of the Atlanta, Birmingham & Atlantic, one of the employees who went out on strike in March, 1921, has been convicted of bridge burning, in a Georgia court, and sentenced to imprisonment for life. Under the law of Georgia, burning a railroad bridge is a capital offense; and the solicitor general, in the trial of Fairfield, asked that the accused be hanged; but the jury had added to its verdict of guilty a recommendation for mercy. Fairfield was one of five men charged with burning a bridge near Musselwhite, Crisp County, Georgia, on May 30, 1921. Fairfield is, we believe, also one of those who were indicted on a charge of murder in connection with a derailment at Fitzgerald, Ga., in July, 1921, when the engineman of the train was killed in the wreck.

Radio on Shriners Excursion Train

Radio messages were lately received on an excursion train of the Southern Pacific (while it was moving at regular speed) from distances of 2,000 to 3,000 miles, according to a statement issued by that company; and it was in the day time. The train was a special carrying the Syrian Temple of Shriners from Cincinnati over the Southern Pacific. Receiving record of 2,000 miles for radiophone was established, and a 3,000 mile record for telegraph reception. Aerials were strung 8 inches above the roof of one of the cars and were 160 ft. in total length. A rail ground was used. The receiving equipment included honeycomb coils and a two-step-audio-frequency amplifier. The train left Cincinnati in radio touch with both coasts. At Denver, music programs were copied from the radio stations at Pittsburg and Chicago. At Colorado Springs the Cincinnati station was heard. The long distance record was made at Santa Barbara when the radio, while the train was in motion, picked up the United States Government station NSS at Annapolis, 3,000 miles away. This is claimed to be a record for daylight reception under any conditions.

For Safety at Crossings

The highway commission of Indiana is preparing to issue an order requiring that all advertising signs shall be removed (by the owners) from the right-of-way of the State Highway Commission and that no signs of any kind shall be erected on the public highways without the permission of the highway commission. It is anticipated that this order will eliminate much of the confusion with warning signs at railroad crossings. The state authorities of Illinois have already taken similar action.

No Dust on the Long Island

The Long Island Railroad is now oiling its roadbed, a special train having been assigned to that work for the next four weeks. C. D. Baker, general superintendent, announces that the oiling program for 1922 will be the most extensive ever carried out by the company. In 1921 they used 30,000 gallons of oil; this year 150,000 gallons. Last year about \$2,200 was spent for oil and labor; this year about \$10,000. The oil tank car holds about 8,000 gallons and the perforated pipes extending from each side extend out about three feet.

C. F. Loweth Leads in A. S. C. E. Nominations

In the first ballot for official nominees of the American Society of Civil Engineers, C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, received 1,423 votes for president out of a total of 2,309 cast. Among the candidates for vice-president in zone 2 is S. T. Wagner, chief engineer of the Philadelphia & Reading, and in zone 3, F. G. Jonah, chief engineer of the St. Louis-San Francisco. Among the candidates for directors are J. E. Crawford, chief engineer of the Norfolk & Western (District 5); H. W. Hudson, chief engineer of the Interstate Railroad (District 5); H. A. Lane, chief engineer of the Baltimore & Ohio Lines East (District 5); A. S. Baldwin, vice-president of the Illinois Central (District 8) and R. N. Begien, general manager of the Baltimore & Ohio (District 9).

To Form New Hardwood Association

Organization of a national hardwood lumber association to create an inspection service, form a statistical bureau and carry on trade extension work will be effected at a meeting of hardwood manufacturers at Louisville, Ky., now in session. The purposes of the new association are outlined as follows:

1. To have inspection rules and service in conformity with the ideas expressed by Secretary of Commerce Hoover, setting up technical and engineering service to co-operate with the National Lumber Manufacturer's Association.
2. To establish a statistical bureau providing such information as may be of benefit to the industry and within the legal rights of association activities.
3. To carry on such trade extension work as may be deemed wise by the convention to promulgate.

M. & N. A. To Begin Passenger Service

The Missouri & North Arkansas restored through passenger service between Neosho, Mo., and Kensett, Ark., on June 18. A mixed train had been operating daily between those points since the first of June, but, there has been a large increase in freight traffic, and a separation of the freight and passenger service was deemed necessary. Following a meeting of the Boone County Protective League, held in Harrison, Ark., on June 6, many Harrison business houses placed signs in their shop windows stating: "We are for open shop; show your card." The meeting and the decision to place business houses on record for or against the open shop idea is the result of increasing bitterness between striking railroad men and their sympathizers and the residents

of Harrison, who blame the unions for much of the trouble which caused a nine months' suspension of operations of the road. Officers of the Protective League declare that not only do the majority of the residents of Harrison favor the open shop plan of operating the road, but that the farmers generally are incensed at tactics adopted by union labor to prevent operation of that territory's only railroad. Another meeting was held on June 17, at which there was a large attendance of farmers. The Protective League is seeking through these meetings and other methods to defeat the strikers through the pressure of public opinion.

New England Governors' Committees

The commission which has been appointed by the Governor of Connecticut to represent the state at Washington in connection with the proposal to favor the organization of a consolidated railroad company for all New England, consists of E. Kent Hubbard, chairman; E. O. Goss; C. G. Woodward; F. L. Ford; D. S. Day and S. H. Bullard.

The Governor of Massachusetts has appointed a similar committee. It is said that the six New England states are planning to establish a combined committee. The Massachusetts committee consists of James J. Storrow; A. W. Gilbert, F. H. Willard, Philip Dexter and Carl Dreyfus.

The Governor of Rhode Island has appointed a committee of five members, namely, G. L. Crooker, E. E. Salisbury, William Trafton, H. W. Fitz and W. F. Morse.

Pennsylvania Women's Aid

The Women's Aid of the Pennsylvania Railroad System is conducting a campaign to increase its membership among the families of the 17,000 employees in the Northwestern Region. The Women's Aid was described in the *Railway Age* of April 15 last. It aims to organize the women of the families connected with the Pennsylvania System in order that they may know one another and, when occasion arises, render aid and sympathy in such manner as may be most helpful. It has already more than 50,000 members. The wives, mothers, sisters and daughters of Pennsylvania employees and all women employees are eligible for membership. The dues are uniformly 25 cents a year. The badge is a small pin inscribed "P. S. Women's Aid." Mrs. W. W. Atterbury is director of the Aid for the System, and Mrs. J. G. Rodgers is associate director for the Northwestern Region. The six operating divisions in the Northwestern Region have been organized under the following superintendents: Chicago Terminal, Mrs. W. H. Scriven; Fort Wayne, Mrs. T. A. Roberts; Logansport, Mrs. B. Il. Hudson; Toledo, Mrs. J. B. Hutchinson, Jr.; Grand Rapids, Miss Hilda Jones; Mackinaw, Mrs. R. E. Casey.

The Pennsylvania Railroad's Insurance Fund

The Pennsylvania Railroad began to insure its own property against loss by fire, in a small way, over 40 years ago—in 1879. From time to time the plan has been expanded until it now includes the assumption of marine losses, payments on account of injuries to persons and damage to freight and other insurable risks and losses. The average fire loss cost on the Pennsylvania System during 43 years has been only 14 cents per \$100 at risk. As the result of the development of systematic inspections the cost of the road's fire protection has been substantially less than the premiums generally charged by insurance companies for railroad risks. In addition the unknown element is eliminated from the cost of operation. The properties are regularly inspected by the Insurance Department and reports are forwarded to the operating officers interested. Plans for fire protection and contracts for the construction of structures and vessels are referred to the Insurance Department so that the most suitable type of fire protection may be recommended. The excellent fire fighting record of the road is attributed principally to the installation of adequate fire equipment and the maintenance of fire brigades regularly drilled at all points where the valuations warrant and sufficient employees are available to form a fire brigade. There are approximately 400 fire brigades organized on the Pennsylvania System.

B. L. E. Buys Coal Lands

The Brotherhood of Locomotive Engineers has entered the wholesale and retail coal business, according to a statement by Albert F. Coyle, editor of the *Brotherhood of Locomotive Engineers' Journal*. "The locomotive engineers are making a \$2,000,000 investment in the West Virginia and Kentucky coal mines," said Mr. Coyle; and he promises a "fair deal for the miners, and better and cheaper coal for the consuming public." The purchase covers more than 6,000 acres of "the best coal land in the United States," situated on the Coal river, in Boone County, West Virginia, and in Floyd county, the heart of the Big Sandy coal district, near Prestonburg, Ky. The Coal river Collieries is the name of the new company. Locomotive engineers throughout the country have subscribed in small amounts to the capital stock of \$2,000,000. It is planned to establish retail yards in the large cities. Locomotive engineers and their friends have already organized some of these local yards in Ohio and Michigan.

Coal Car Distribution to be Investigated

The Interstate Commerce Commission has instituted an investigation into the matter of the justness, reasonableness and lawfulness of the rules and practices governing the distribution of cars to coal mines, other than anthracite, for coal loadings, and as to the ratings for such mines as the basis for the distribution of cars. A just and reasonable basis of mine ratings will tend to make effective a just and reasonable distribution of cars to coal mines. The Car Service Division of the American Railway Association, after collaboration with the important bituminous coal loading railroads and the National Coal Association, has submitted to the commission a proposed revision of the rules now incorporated in what is known as Circular CS 31 (revised). A copy of the rules as proposed was attached to the commission's announcement, marked exhibits A and B. Exhibit A shows the changes proposed in the uniform rating and car distribution rules governing tippie mines. Exhibit B shows suggested rules governing the rating of and car distribution to other than tippie mines. While representatives of the National Coal Association do not agree in every instance that the rules proposed embody all that they might desire, they join with the Car Service Division in recommending the revision for early promulgation, except as to Rule 8.

The initial hearing will be at Washington on July 17.

Nearly Eleven Million Tons of Coal in Stock

The American Railway Association has just issued a report showing that all railroads in the United States had on June 1 in stock piles or in cars 10,847,000 tons of bituminous coal. The average daily consumption of coal for the month of May was about 284,000 tons, of which 145,000 tons a day, on average, was being taken from stock on hand.

Based upon the total average daily consumption, including the product of operating mines, the railroad's position showed that they had on hand on the first of May, 94 days' supply and a month later, 75 days' supply, on the average.

The following statements showing the information as to the railroads as a whole are self-explanatory:

Month	Total Consumption	Consumed from Current Coal Received	Consumed from Stock
April	8,350,000	3,550,000	4,800,000
May	8,520,000	4,320,000	4,200,000

Day	Stocks on Hand	Total Daily Average Consumption	Daily Average Consumption from Stock	Day's Supply on Hand (*)
April 1	19,843,813	271,000	145,000	136
May 1	15,057,268	278,000	160,000	94
June 1	10,816,567	284,000	145,000	75

(*) Based only upon that portion being actually taken from stock piles at the rate established during April and May, respectively.

Rock Island Anniversary Program Announced

The Chicago, Rock Island & Pacific has announced plans for the celebration of its 70th anniversary on October 10. Employees on all divisions will co-operate to make the observance a success. A general program has been prepared which will be supplemented later by features to be developed by employees on the various

divisions. The general program, as agreed upon by the executive officers at a staff meeting held recently in Chicago, is as follows:

(1) Co-operation by the Rock Island Employees' Clubs to the end that meetings be held by these organizations on the evening of October 10, at which time programs will be rendered appropriate to the anniversary and in accordance with the desires of the individual clubs. (2) An address to be delivered by President Gorman at the radiophone studio of the Westinghouse company, K Y W Chicago on the evening of October 10. Each employees' club throughout the system will be asked to equip with a radiophone receiving set so that the address can be heard by all those attending these club meetings. (3) At points where there are no employees' clubs, the local commercial clubs or chambers of commerce will be asked to co-operate and hold meetings at which a representative of the Rock Island will attend to deliver a special message. Commercial clubs will also be asked to provide themselves with radiophone receiving instruments. (4) The Rock Island is to issue a special historical booklet for general distribution.

The Rock Island Magazine will issue a special Seventieth Anniversary number. (5) The planting at various suitable points on the system of anniversary trees as a means of further beautifying company property and station grounds. Similar planting of "honor trees" to retired employes was also suggested. (6) Special menu cards to be issued on all Rock Island dining cars on October 10. (7) The suitable decoration of all passenger engines on the system, likewise passenger stations. It is proposed to adopt a uniform Seventieth Anniversary design which design will be used on buttons to be issued to all employees. (8) The installation of a permanent historical exhibit of the Rock Island in the La Salle Station (Chicago) waiting room. (9) The launching of a campaign before October 10 for a general "cleaning up" working up to Anniversary Day, the campaign to include painting of buildings. (10) A dinner to be given by the management to all pensioners.

Automobile Wrecks

Eastbound passenger train No. 804, of the Pennsylvania Railroad, was derailed near Allaire, N. J., on June 16, by striking an automobile which had been stalled on a crossing. The locomotive and two cars were ditched and the locomotive was overturned. It had run about 500 ft. beyond the crossing before it tipped over, the wrecked automobile being pushed that distance when a switch was encountered.

The engineman and fireman were not injured. Seven passengers were injured, none seriously. Of the two persons in the automobile, one, the driver, was killed.

A track walker was an eye witness. The day previous he had noted a narrow escape at the same crossing and was on the alert for something similar. He saw Train 804 approaching and at the same time observed the automobile approaching the crossing at 15 or 20 miles an hour. He stepped out into the road and held out his hand as a warning but the automobile continued on to the crossing and finally stopped with the rear wheels between the rails, evidently stalled.

The regulation whistle signal was blown for this crossing and the crossing bell was ringing. There is a plain view of an approaching train on the roadway 138 ft. from the crossing for a distance up the track of 1,300 ft.

The automobile was driven by a West Point cadet who was not authorized to operate an automobile under the laws of the State of New Jersey. He was accompanied by a young lady, 17 years old, who also was without a license to drive an automobile in New Jersey. It is said that the brakes of the automobile would not work.

The damage to locomotive, cars and track amounted to about \$6,000.

The investigation of the automobile disaster near Atlantic City, N. J., on June 10, reported in the *Railway Age* of June 17, page 1497, developed the fact that the engineman of the train did not know that there had been any trouble at the crossing; and the conclusion is that the automobile must have struck the locomotive on the side. The driver of the automobile, with the five members of his family accompanying him, were all killed.

New York City papers of Monday morning, June 19, reported accidents causing the deaths of 14 persons at grade crossings; five at Carman, N. Y.; four at Peabody, Mass., and five at Royal Center, Ind.

Traffic News

The Philadelphia & Reading has increased its train service to Atlantic City and now runs each week day between that city and Philadelphia 18 expresses each way; besides regular daily excursion trains on which the fare is \$1.50.

Freight rates are to be reduced in Indiana on July 1, to correspond with the reductions which are to be made in interstate rates. On coal for distances of less than 30 miles, and on cement, the rates, it is understood, will not be changed.

The Chicago & North Western re-established its Northern Lakes Special on June 16. This train leaves Chicago every evening except Sunday at 7:00 for northern Wisconsin and Michigan. It carries passengers to the fishing districts of Manitowish, Cisco, Eagle and Turtle.

The Southern Pacific announces reductions in the freight rates on cotton by steamship from Galveston and other Gulf ports to New York, Boston and other points, to take effect on July 1. To New York the reduction is from 50 cents per 100 lb. to 35 cents; to Fall River and New Bedford the present rate is 88.5 cents; new rate 55.5 cents.

The National Automobile Chamber of Commerce reports that in the month of May manufacturers shipped 252,000 automobile passenger cars and trucks, an increase of 53 per cent over May of last year. There is increasing demand for motors in practically every part of the country except Maine and Georgia. In April the exports of passenger cars and trucks gained more than 40 per cent over March. These cars went to 114 different countries.

The Southern Pacific's carloading record for 1921, with an average load of 26.2 tons per car, was the best in the history of that company. Prior to last year, the best carloading record was made in 1918 when the railroad administration was in a position to deal more or less arbitrarily with patrons who were not inclined to load cars heavily, the average load for that year being 25.6 tons. For the first four months of this year the average car load has been 26.5 tons as compared with 24.7 tons last year.

W. H. Quigg, traffic assistant, in the office of the United States Railroad Administration, Washington, has been assigned to duty with the Federal Traffic Board, in a similar capacity. This Board deals with the traffic problems of the different departments and establishments of the United States Government, co-ordinating their relations with the carriers. Mr. Quigg has served as a railroad traffic officer on lines in the southwest and southeast and in Eastern Trunk Line and Central Freight Association territories. He was a member of the Uniform Freight Classification Committee at Chicago for several years, and just prior to his connection with the United States Railroad Administration, was secretary of the traffic division of the American Railway Association.

Coal Production

Production of soft coal in the tenth week of the strike was 5,078,000 net tons, but the eleventh week (June 12-17) is expected to show a decrease, according to the Geological Survey. Production of anthracite remains practically zero.

Complete returns confirm the forecast of output in the tenth week of the strike (June 5-10). Including the 13,000 tons of anthracite dredged from the rivers, the total output of all coal was 5,091,000 tons. In the corresponding week of 1921, a year of acute business depression, production (including anthracite) was 9,974,000 tons. In the active year, 1920, it was 12,315,000 tons.

There has been little change during the week in the number of men on strike. The accumulation of unbilled loads is still declining. How great is the draft upon stocks can not be accurately stated, because the rate of consumption is not known. There are evidences that business is reviving and the consumption of coal increasing.

Commission and Court News

Interstate Commerce Commission

The commission has suspended to October 13 the operation of schedules which propose reductions in the rates on coffee from New Orleans, La., and sub-ports to points in Texas.

The commission has suspended until October 13 the operation of schedules contained in Northern Pacific tariffs which proposed to increase from 5 to 7 cents per gross ton present storage charges on iron ore at Lake Superior docks.

The commission has vacated its order requiring an increase in Florida intrastate freight rates, the Florida commission having vacated its order which allowed less of an increase in state rates than was applied to the interstate rates by the federal commission.

The commission has suspended until October 13 the operation of schedules which propose to establish import commodity rates on paper stock from New York and other North Atlantic ports to points in Central Freight Association territory which are higher than present domestic rates.

The commission has suspended from June 21 until October 19 the operation of schedules which propose to increase commodity rates on butter in straight carloads, and on butter, eggs and dressed poultry in mixed carloads, from points in Texas to various eastern and northern destinations.

The commission has suspended until October 13 the operation of schedules published by the Chicago, Milwaukee & St. Paul, which propose to reduce the rates on hogs from Mitchell, S. D., to Kansas City, Mo., St. Joseph, Mo., Atchison, Kans., and Leavenworth, Kans., from 52 cents per 100 lb. to 47½ cents.

The commission has suspended until October 17 the operation of schedules which propose to modify existing regulations in connection with proportional rates on grain between the Twin Cities and Lake Superior Ports by removing the requirements for surrendering inbound billing as a condition precedent to application of proportional rates.

Ore Rates to Upper Lake Ports to Be Reduced

The commission has issued a supplemental report in the general rate case in which it finds that the rates on iron ore from ranges in Minnesota, Wisconsin and Michigan to Lake Superior and upper Lake Michigan ports will be unjust and unreasonable after July 1 to the extent that they exceed 90 per cent of the existing rates, thereby including them in the general 10 per cent reduction. These rates were not advanced in Ex Parte 74 because they had been advanced by the director general in 1918 without corresponding advances in the rates from the lower lake ports. Since August 26, 1920, none of the rates on iron ore to upper lake ports have been reduced, while some have been increased. All are still on or higher than the level found reasonable in Ex Parte 74. Commissioner Hall dissented from the finding.

Southern Freight Rates Investigation

Commissioner Joseph B. Eastman has announced the dates for future hearings in the above-entitled proceeding as follows: Atlanta, beginning September 14, to September 23; Asheville, October 2, to October 21; New Orleans, October 23, to November 4; Chicago, November 6, to November 18; New York, beginning November 20. The hearings at Atlanta, Asheville, and New Orleans will be confined to the presentation of evidence with respect to rates applying within southern classification territory, and the hearings at Chicago and New York will be confined to the presentation of evidence with respect to interterritorial rates. There are two exceptions to this program. It appears that the rates between St. Louis and points within southern territory are closely allied with

the rates in southern territory, and have been included in that category in the presentation of the carriers' evidence. So the rates to and from St. Louis will be covered at the hearings at Atlanta, Asheville, or New Orleans. The same is true as to any evidence that may be offered with respect to the rates from the group including Portsmouth, Ohio, Iron-ton, Ohio, Ashland, Kenova and Huntington, W. Va., which are closely allied with the rates within southern classification territory.

Federal Valley Case

The application of the Federal Valley for increase of its divisions has been denied by the Interstate Commerce Commission on the ground that the record fails to show that the divisions are unjust, unreasonable, inequitable or otherwise unlawful. The commission says: "The record is not sufficient to enable us to compare the amount and cost of the service rendered in the joint traffic by the complainant and by the defendant respectively, to say nothing of other participating carriers; nor can we determine whether or not an increase in the Federal Valley's divisions would compel the defendant to carry the traffic at less than the actual out-of-pocket cost. The information which has been furnished does not, in short, make possible adequate consideration of the various factors which Paragraph (6) of Section 15 of the Interstate Commerce Act requires us to consider in fixing divisions."

Chairman McChord filed a dissenting opinion, in which he declares: "The situation of this road as shown in the majority report is one which calls for remedial action upon our part in the exercise of our comprehensive power to prescribe just, reasonable, and equitable divisions. * * * We have power under Paragraph (6) of Section 15 of the Interstate Commerce Act to make at least a temporary adjustment in the divisions of the joint rates so as to make the compensation allowed the Federal Valley more nearly equal to the cost of rendering the service."

State Commissions

The Corporation Commission of Virginia has ordered a general reduction of freight rates, July 1, to correspond with the reductions to be made on that date in interstate rates.

The Railroad Commission of Georgia has issued an order authorizing a general reduction of 10 per cent in intrastate freight rates to correspond with the reduction which has been ordered in interstate rates, to go into effect on July 1.

The Louisiana Public Service Commission has issued an order, order No. 48, dated June 15, calling for a general reduction of freight rates on July 1, corresponding to the reduction taking effect on that day in interstate rates. The order contains exceptions to allow for cases where rates have already been reduced.

The Public Service Commission of Alabama has sent a notice to each of the railroads in the state calling their attention to the law, passed in 1919, requiring the windows of all passenger trains to be fitted with screens. Complaints have been received that some railroads never have complied with the law.

The Public Service Commission of New York has authorized a general reduction of 10 per cent in freight rates on July 1, but the order does not apply to grain and certain articles which already are carried at rates lower than the proposed basis. On iron ore, gravel, and certain other articles, no reduction is to be made as the rates on these were not advanced in August, 1920. The reduction now ordered will not include the minimum charge of fifty cents per shipment for less than carload traffic; the minimum charge of \$15 on carload traffic; the minimum scale for class rates when published as such; the charges for special service other than those for switching, transit, reconsignment, etc.

The California Railroad Commission has invited the public utility commissions of Oregon, Washington, Nevada, Utah, Arizona, New Mexico and Texas to a conference to be held in San Francisco on June 19, to discuss possible joint action by these states with reference to the separation of the Southern

Pacific and Central Pacific railroads as was ordered by the United States Supreme Court in its recent decision. It is expected that this conference will also consider whether an appeal should be made to the Interstate Commerce Commission, to exercise the powers conferred upon it by the Transportation Act of 1920, for the consolidation of the railroads of the country into regional systems.

United States Supreme Court

Service Letter Laws Upheld

The Supreme Court of the United States holds valid and not in violation of the Fourteenth Amendment, the Service Letter Law of Oklahoma, of April 24, 1908, applicable to public service corporations and the like, in a case in which the plaintiff, a switchman on the Rock Island, averred that he had received personal injuries; the railroad acknowledged liability, settled with him on the basis of its responsibility, furnished him with hospital treatment, and then refused to re-employ him on the ground of physical incapacity; that, two years afterwards the road gave him a service letter certifying (correctly) that he had been employed as switchman for a period named, and (contrary to the fact) that he had been dismissed on account of his responsibility in a case of personal injury to himself June 30, 1913, his service being otherwise satisfactory. Plaintiff also averred that because of this letter he had been unable to secure employment although competent, able and willing. The railroad, besides a general denial, averred that the statute upon which the action was based was void because it deprived defendant of the due process of law and denied to it the equal protection of the laws; and also because it violated a section of the state Constitution in denying to defendant freedom of speech, including the right to remain silent. A trial by jury resulted in a verdict and judgment for plaintiff, which on appeal was affirmed by the State Supreme Court (*Dickinson v. Perry*, 75 Okla., 25).

The United States Supreme Court sustained the statute as not inconsistent with the guaranty of "due process of law." Except for the particular requirements contained in the proviso, the Oklahoma Service Letter Law does not differ substantially from the Missouri statute sustained in the *Cheek* case. "The right to conduct business in the form of a corporation, and as such to enter into relations of employment with individuals, is not a natural or fundamental right. It is a creature of the law; and a State in authorizing corporations to carry on business and employ men may qualify the privilege by imposing reasonable conditions. . . ."

The proviso in the Oklahoma statute requires that the service letter shall be written entirely upon a plain sheet of white paper to be selected by the employee and no printed blank to be used; with other details. On this point the Supreme Court says: "Manifestly these provisions are designed to insure the authenticity of the document and to make sure that it shall not only be fair and plain upon its face but shall exclude any cryptic meaning. They are contrived to prevent the purpose of the act from being set at naught by fraudulent service letters, which while bearing one meaning to the employee might bear another and very different one to the prospective employer to whom they might be presented. The act being valid in its main purpose, these provisions intended to carry it into effect must be sustained."

The opinion concludes: "The contention that the Service Letter Law denies to plaintiff the equal protection of the laws is rested upon the fact that it is made to apply to public service corporations to the exclusion of others, but it may have been that the public had a greater interest in the personnel of the public service corporations, or that the legislature deemed it expedient to begin with them as an experiment. It was peculiarly a matter for the legislature to decide, and we feel safe in relying upon the general presumption that they 'knew what they were about.'"—C. R. I. & P. v. *Perry*. Decided June 5, 1922. Opinion in this and *Prudential Ins. Co. v. Cheek*, both by Justice Pitney. In both cases the Chief Justice, with Justices Van Devanter and McReynolds dissented, but without separate opinion.

Other states having somewhat similar statutes are Indiana, Montana, Nebraska and Texas.

Foreign Railway News

Columbian Executive Comes to

U. S. to Buy Equipment

General Vassauze Cobo, president of the Pacific & Atlantic Railroad of Columbia, which is now in course of construction, has arrived in New York with the announced intention of purchasing some \$2,500,000 in equipment for his company.

Revenue from Platform Tickets

LONDON.

The Midland Railway of England at about 30 of its largest stations will not allow anyone without a ticket to go on the platforms. People who are not passengers and wish to get on to the platforms must purchase "platform tickets", the cost of which is one penny (approximately 2 cents at the normal rate of exchange). During last year the income earned from this source amounted to £6,708 (about \$32,600 at the normal rate of exchange).

Argentina Buys German Locomotives

The Argentine State Railways have ordered 50 locomotives from Germany, according to the *Wall Street Journal*. The Argentine Port Zones Authority has, according to the same publication, opened bids for 130 cars and 10 locomotives. Ninety concerns in the United States, England, Germany and Belgium bid on this business and, since the American bids were the lowest, it is thought that the contracts will come to this country.

Long Tunnel in New Zealand Nearly Finished

The Arthur's Pass Tunnel to facilitate communication between the east and west coasts of South Island, New Zealand, is nearing completion, according to the *Times* (London). Work on the tunnel was begun in 1908 but was seriously delayed by the failure of the original contractor to go through with the work. The tunnel will be electrified. Its dimensions are: Length, 5 mi. 545 yds.; height, 15 ft. 6 in.; width at rail, 14 ft., at widest point, 15 ft.; grade, 1 in 33. The approximate cost of the work is £800,000 and £382,000 for the electrification.

Large Expenditures for Rolling Stock

Disapproved in Italy

ROME, Italy

With regard to the credit of 1,750 millions of lire granted with a decree of the Italian Council of Ministers to the Italian State Railway Administration for the purchase of rolling stock and other supplies it is now learned that the parliamentary committee for public works has not approved the above mentioned decree and that it has observed that at least one part of such material could be obtained from Germany on account of reparations.

It is known in this connection that it had been decided to grant such credit in order to aid industry, and that manufacturers are urging that the government refuse to accept from Germany machinery and manufactured products on account of reparations. Up until the present time Italy has received from Germany on the reparation's account only 50 locomotives.

Italian Railways Deficit

ROME, Italy

Mr. Riccio, Italian minister of public works, has submitted to parliament the budget for the Italian Railway Administration for the fiscal year 1922-1923 and took the opportunity to point out that during the first eight months of the present fiscal year the loss of the administration amounts to 709 millions of lire. He believes that such loss is not due to an increase of expenses but to a decrease of revenues during January and February, 1922.

"However," said Mr. Riccio in the speech delivered to the parliament, "There is no doubt that one of the causes of the

loss is also the inflated personnel which, with the hurried application of the law regarding the eight-hour day and compelling the employment of former soldiers, has reached 212,852 persons." He does not believe that the loss has any connection with the increased quantity of fuel used.

Other causes of the loss are, according to Mr. Riccio, the necessity of heavy repairs to locomotives and low rates. He pointed out that he does not believe in the right to strike in the public service and that he hopes strikes will be avoided.

The High Speed of British Passenger Trains

The announcement by a number of British railway companies of accelerations of train services to take effect next month directs attention to the subject of train speeds for which British railways have long held a high reputation, according to the Times (London).

The number of trains traveling at high speeds has undergone a material increase during recent years but the maximum speed attained by main line trains is little in excess of the best speeds recorded many years ago. It is the case, however, that the locomotives haul much heavier loads, which calls for the employment of much greater power. This in turn has raised the whole question of permissible weights on bridges, and has involved railway companies in considerable expenditure.

Excluding "slip-coach" (whereby a car is detached from a local station without stopping the train) records, the London & North Western heads the speed table for 1922 with the run between Birmingham and Coventry at an average speed of 60 miles per hour. The Great Western's achievement of running the 107 miles between Paddington Station, London, and Bath, where a slip-coach is detached, in one hour forty-five minutes, giving an average speed of 61 miles per hour, is in some respects a finer performance, and the same company has an excellent achievement standing to its credit in the two-hour train to Bristol via Box, which represents an average speed of 59.1 miles per hour. The two-hour trains to Birmingham on both the London & North Western and the Great Western, are slower by comparison, but the average speed of these trains (about 55 miles per hour) is greater than it was, as the run is now performed in two hours by both routes with an intermediate stop.

The Great Central occupies a high place among high-speed runs. The best trains of this company are those running in the London and Manchester service over a road which is very severe in comparison with those of the North Western and Great Western. The best average speed of the Great Central London and Manchester services is 50.29 miles per hour, and the highest scheduled speed attained by the same train is for the 58.75 miles between Quainton Road and Leicester, which is covered in 56 minutes, giving an average speed of 62.89 miles per hour. This is not, of course, a start-to-stop run, as the train does not stop at Quainton Road. The highest speed run on the Caledonian Railway is that from Forfar to Perth, 32.5 miles in 34 minutes; of the Midland Railway, Kettering to St. Pancras Station, London, 72 miles in 77 minutes, giving an average speed of 56.1 miles per hour; of the North Eastern Railway, York to Darlington, 44.25 miles in 48 minutes, which works out at 53.3 miles per hour; and of the Great Northern Railway, Grantham to Doncaster, 50 miles at an average of over 54 miles per hour. The best Great Northern long-distance trains are the Scottish express, London to York, 188 miles at an average speed of nearly 52 miles an hour, including one stop, and to Peterborough, including stops, 76 miles at an average speed of nearly 52 miles per hour. The fastest North British trains are those between Glasgow and Edinburgh with an average of 40 miles.

Nor do the Southern lines, in spite of the handicap in some instances of heavy gradients and speed restrictions on account of bridges, fall far short of the records set up by the trunk railways serving the Midlands and the North. The South Western Company has in service trains which cover the 108 miles from Waterloo to Bournemouth at an average speed of 54 miles an hour; the Brighton and London services, 51 miles in 60 minutes, are known to most people; and the boat trains of the South Eastern Company to Dover and Folkestone are, considering the character of the road, as good as can be expected. The Dover trains make the trip at an average speed of 45 miles per hour, which is not however, quite so good as that of a limited train in the pre-war period, which had an average speed of 51 miles

and ran to Dover in an hour and a half. The new train to Folkestone Harbor, which is coming into the time-table next month and will make the trip in one hour and thirty-five minutes, is almost as good, as the train has to stop and reverse at Folkestone Junction. This represents an average speed of 52.4 miles. The best performance of the Great Eastern Railway is the London and Cromer express, which makes the journey of 138 miles at a speed of 47.5 miles per hour.

Notable Irish train speeds are the Great Northern, Dublin to Dundalk, 51 miles per hour, and the Great Southern & Western 48.5 miles per hour.

The most famous of the long runs on British railways is that between Paddington Station, London, and Plymouth, a distance of 225.75 miles for which 247 minutes are allowed, giving an average speed of 54.8 miles per hour. Second place was formerly occupied by the non-stop Marylebone Station, London, to Sheffield Great Central train on a timing for 165 miles of 177 minutes, but there is apparently no immediate intention of reinstating this train. Second place is now held by the Euston Station, London to Crewe non-stop trains, which for 158 miles show an average speed of 53.5 miles per hour, this being followed by the North-Eastern, Newcastle to Edinburgh, 124.5 miles at 50.8 miles per hour.

It is improbable that anything beyond small improvements in average speed will be made by British main-line railways while steam operation remains the rule. For higher speeds it will be necessary to await the advent of electric traction on main lines. It is known that the Brighton Railway Company has plans well advanced for the conversion of its main line from steam to electric traction, and it has been suggested that when this reform is carried out it would be possible to run a service every fifteen minutes between London and Brighton and to make the trip by non-stop trains in 45 minutes. The fact has also been made public that a passenger locomotive is being built by the North-Eastern Railway Company, which will be designed for a maximum speed of 90 miles per hour.

The Significance of Oil to the Argentine Railways

BUENOS AIRES.

The Argentine government controls most of the petroleum measures in Patagonia in the coastal region about Comodoro Rivadavia, as well as those in the North of the republic, in the province of Jujuy. The national petroleum administration works in close co-operation with the government railway administration and the latter itself has charge of the drilling in the northern fields. Excellent results have been obtained by the drilling at Morro Quemado (province of Jujuy) and at many other places in this province.

At the present time the State Railways are using about one million tons of wood per annum as fuel, which involves the felling of some three million trees annually. Most of the Argentine trees are hardwoods such as "quebracho," "algorrobo" and "ombu" which have a high heat value. Their use is hard on fire-boxes and makes continual repairs necessary and, naturally, greatly increases operating expenses. Consequently the railway administration expects to effect considerable savings by the use of oil.

It is planned, however, to do away with wood fuel by degrees in order to allow the forest owners to adapt themselves to new conditions and locate other outlets for their product. It is estimated that the State Railways will need altogether about 250,000 cubic meters of petroleum per annum. They will, however, use but 60,000 cubic meters the first year, 120,000 the second and so on, so that four years will elapse before wood will be abandoned altogether.

The government is now building 620 miles of narrow gauge railways in Patagonia and these will be extended as the region develops. Oil from Comodoro Rivadavia will be used as fuel. The State Railways have erected tanks at the ports of Rosario and Santa Fe on the Parana river and are now putting up 70 distribution tanks.

It is estimated that if the destruction of the forests continues at the present rate, 50,000,000 trees a year, the country will be without trees in 30 years. The government oil is now sold at the current market price and not at a fixed price as formerly; naturally this has led to a decrease in the price of fuel.

Equipment and Supplies

Locomotives

THE LEHIGH VALLEY is inquiring for 5 locomotives.

THE SOUTHERN PACIFIC has ordered 55 locomotive boosters from the Franklin Railway Supply Company.

THE NEW YORK CENTRAL has ordered 100 locomotive boosters from the Franklin Railway Supply Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS, reported in the *Railway Age* of June 3 as inquiring for 5 Mountain and 5 Mikado locomotives, has ordered the 5 Mikado locomotives from the Baldwin Locomotives Works.

Freight Cars

MIDLAND TERMINAL.—This company is inquiring for 10 dump cars.

THE PENNSYLVANIA has ordered 16,000 continuous joints from the Rail Joint Company.

THE ST. LOUIS SOUTHWESTERN is considering the purchase of 100 automobile cars.

MISSOURI, KANSAS & TEXAS.—This company is inquiring for 25 dump cars of 20 yd. capacity.

THE DETROIT & MACKINAC has ordered 2,000 continuous joints from the Rail Joint Company.

THE CHICAGO, MILWAUKEE & ST. PAUL is asking prices for repairs to 300 all steel hopper cars.

THE MICHIGAN CENTRAL has ordered 20,000, 100 per cent joints from the Rail Joint Company.

THE WABASH has placed an order with the Decatur Bridge Company for 689 tons of steel to be used for 500 car underframes.

THE MISSOURI, KANSAS & TEXAS has placed an order with the General American Car Company for 200 refrigerator cars of 40 tons capacity.

THE TENNESSEE CENTRAL, reported in the *Railway Age* of April 15 as inquiring for 350 gondola cars, has ordered this equipment from the Western Steel Car & Foundry Co.

THE GRAND TRUNK, reported in the *Railway Age* of May 20 as inquiring for 250 refrigerator cars, has ordered this equipment from the National Steel Car Corporation, Hamilton, Ont.

THE NEW YORK, CHICAGO & ST. LOUIS, reported in the *Railway Age* of June 10 as inquiring for 1,000 automobile box cars, has ordered this equipment from the Illinois Car & Manufacturing Company.

THE FLORIDA EAST COAST, reported in the *Railway Age* of May 27, as inquiring for 30 tank cars of 10,000 gal. capacity, has ordered this equipment from the General American Tank Car Corporation.

THE NORTHERN PACIFIC, reported in the *Railway Age* of May 13 as inquiring for a large number of cars, has ordered 250 ballast cars, included in that number from the Rodger Ballast Car Company.

WESTERN PACIFIC.—This company, reported in the *Railway Age* of June 10, as considering the purchase of a large number of refrigerator cars, has received prices on 2,000 of these cars. It is expected that an order will be placed late this week or early next.

THE ERIE, reported in the *Railway Age* of June 10 as having let repairs to 1,500 freight cars, has contracted for the following additional repair work: 1,000 cars to the Buffalo Steel Car Company; 1,000 to the Youngstown Steel Car Company; 1,000

to the Illinois Car & Manufacturing Company and 500 to the Western Steel Car & Foundry Company.

THE WABASH, reported in the *Railway Age* of June 10, as inquiring for 2050 composite gondola car bodies of 50 tons capacity and 1,500 steel underframe automobile cars, 40 ft. in length and of 40 tons capacity, has ordered the former from the General American Car Company, and 750 of the latter from the American Car & Foundry Company and 750 from the Pullman Company.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of May 13 as inquiring for repairs to 4,000 cars, has contracted with the Streater Car Company for repairs to 1,300 automobile box cars, with the Interstate Car Company for 500 box cars, with the Illinois Car Company for 300 steel general service cars, and the Ryan Car Company for 600 steel general service cars. These orders are in addition to the one given to the Pullman Company for repairs to 800 box cars reported in last week's issue. The company will also repair 500 cars in its Burnside shops.

Passenger Cars

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for one business car.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is reported to be considering the purchase of five passenger coaches.

THE INTERBOROUGH RAPID TRANSIT COMPANY, reported in the *Railway Age* of May 20, as inquiring for 100 new cars, has ordered this equipment from the Pullman Company with an option on some additional cars.

Iron and Steel

THE SEABOARD AIR LINE has ordered 3,000 tons of rail from the Tennessee Coal, Iron & Railroad Co.

ALABAMA & VICKSBURG has ordered 150 tons of steel from the American Bridge Company for a bridge at Vicksburg, Miss.

THE MICHIGAN CENTRAL is inquiring for 8,000 tons of structural steel for a bridge across the gorge at Niagara Falls, N. Y.

THE SIAM STATE RAILWAYS are asking for bids at Bangkok, Siam, until 2 p. m. October 1, 1922, for superstructures of steel railway bridges. General Purachatra is commissioner general of the state railways. Specifications and plans may be obtained from C. B. Sandberg, 143 Liberty street, New York City.

THE MICHIGAN CENTRAL will receive bids until June 30 for the fabrication, delivery and erection of the necessary structural steel, including castings, rollers, railings, etc., for its proposed 640 ft. steel arch and approaches aggregating approximately 7,500 tons. to be constructed over the Niagara river between the city of Niagara Falls, Ont., and Niagara Falls, N. Y.

Track Specialties

THE NORFOLK & WESTERN is inquiring for about 3,000 tons of plates, shapes and bats.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age* of June 10, as inquiring for 800,000 tie plates, 300,000 of which were to be for 66-lb. rail and 500,000 for 85 to 90-lb. rail, has ordered this material from the Railroad Supply Company, Chicago.

Machinery and Tools

THE CHICAGO, ROCK ISLAND & PACIFIC is preparing to send out inquiries for a large list of machine tools.

THE ATCHISON, TOPEKA & SANTA FE is expected to place orders within the next week against its large outstanding machine tool inquiry.

THE SOUTHERN PACIFIC has ordered a 200-ton locomotive lifting crane of 77 ft. span, and a 15-ton overhead crane of 75 ft. span, from the Niles-Bement-Pond Company.

Supply Trade News

J. S. O'Connor, Standard Supply Company, 315 Beatty Building, Houston, Texas, has been appointed Texas agent for the Track Specialties Company.

F. S. Wilcoxon, formerly system fuel supervisor of the Chicago Great Western, has joined the service department of the Edna Brass Mfg. Company, Cincinnati, Ohio.

The Carborundum Company, Niagara Falls, N. Y., has appointed the American Abrasive Metals Company, 50 Church street, New York, to act as United States sales representative for the Carborundum anti-slip tile.

The Northwest Engineering Company, Green Bay, Wis., manufacturers of crawler trains and draglines, has moved its general sales offices to 1220 Steger building, Chicago. W. W. Mutter, vice-president, is in charge of this office.

Orton & Steinbrenner Company, manufacturers of locomotives' cranes, grab buckets and coal crushers, have moved their offices from the 11th to the 19th floor of the Transportation Building, 608 South Dearborn street, Chicago.

J. W. McCabe has been appointed manager of the St. Louis branch of the Chicago Pneumatic Tool Company. Mr. McCabe has been connected with that company for 20 years and has recently returned from a three years' business trip around the world.

H. B. Thurston, whose appointment as sales manager of the Talmadge Manufacturing Company, Cleveland, Ohio, was noted in the *Railway Age* of April 8, has for the past ten years been inspector for the Interstate Commerce Commission with headquarters at Pittsburgh, Pa. While with the commission and during the strike and congestion period of 1920 he was appointed chairman of the Pittsburgh Terminal Committee, working in that office until the trouble was over. Later he worked in conjunction with the Bureau of Accounting through the guaranty period. Mr. Thurston served about 23 years with various railroads in the capacity of general foreman of boilers and general inspector. He was for 13 years with the Pennsylvania Railroad as division inspector and for a number of years with the Pittsburgh, Shawmut & Northern and the Philadelphia & Reading. He also served as railroad inspector at locomotive builders' plants; also as a Pennsylvania State inspector.



H. B. Thurston

On June 24 the American Bridge Company, New York, will move its vice-president's, chief engineer's, eastern division contracting, and treasury departments to 71 Broadway. The eastern division engineering, traffic department and eastern division sub-contract departments will remain at 30 Church street.

The Black & Decker Manufacturing Company, Baltimore, Md., has established a new Detroit office in the General Motors building in that city. C. G. Odell, assistant to the president of this company will make this office his headquarters, in addition to which it will provide headquarters for the local Detroit representative.

James I. Vincent has been appointed eastern representative of the Chicago Bascule Bridge Company with offices at 30

Church street, New York. Mr. Vincent, who was graduated from the University of Michigan in 1896, spent several years with bridge fabricating companies and railroads. In 1903 he joined the Scherzer Rolling Lift Bridge Company where, from 1905 to 1912, he was in charge of its New York office except during 1908, which year he spent abroad in charge of the construction of a bridge in Burma, and in obtaining orders in Europe. From 1912 until very recently Mr. Vincent was eastern representative of the Strauss Bascule Bridge Company in charge of the New York office.

W. Woodward Williams has been appointed vice-president of the Titan Iron & Steel Company, Newark, N. J. Mr. Williams' experience in the iron and steel industry began immediately upon his graduation from Harvard University in 1905. After six years in the mills of the Carnegie Steel Company at Pittsburgh, Duquesne, Pa., and Youngstown, Ohio, he entered the sales department of the Bourn-Fuller Company of Cleveland, Ohio, and was later appointed manager of its Pittsburgh office. In January, 1914, he became general manager of sales of the A. M. Byers Company, Pittsburgh, and subsequently was made general manager. In August, 1919, he became general manager of the Reading Iron Company, being later elected vice-president in charge of sales and operations. In September, 1920, he became associated with the Pittsburgh Gage & Supply Company, jobbers of wrought iron merchant pipe. He resigned the vice-presidency of this company on May 31 of this year, entering immediately upon his present office of vice-president of the Titan Iron & Steel Company.



W. W. Williams

Signal Appliance Association Officers

The Signal Appliance Association held its annual meeting and election of officers at Spring Lake, N. J., on June 16, in connection with the annual meeting of the Signal Section of the American Railway Association. The officers elected for the following year are G. A. Blackmore, vice-president, Union Switch & Signal Company, chairman; E. A. Condit, Jr., The Rail Joint Company, vice-chairman; F. W. Edmunds, Sunbeam Electric Company, New York, secretary. The board of directors for the ensuing year are J. Warren Young, Kerite Insulated Wire & Cable Company; L. Thomas, General Railway Signal Company; W. J. Gillingham, Hall Switch & Signal Company; J. S. Hobson, Massey Concrete Products Corporation; R. E. Trout, Thomas A. Edison, Inc.; S. G. Johnson, Okonite Company; M. R. Brincey, Federal Signal Company; G. A. Nelson, Waterbury Battery Company, and Henry Lee, *Railway Age*.

Obituary

Joseph Maycock, for more than 20 years a railway representative of Pratt & Lambert, Inc., Buffalo, N. Y., died at his home in that city on June 15. Mr. Maycock was formerly master painter of the Erie.

Trade Publications

"G-R-S AUTOMATIC TRAIN CONTROL" is the title of Bulletin No. 138, which has been issued by the General Railway Signal Company, Rochester, N. Y., describing its apparatus for automatic train speed control and also auto-manual train control. Accounts of the experiments recently made with this apparatus were given in the *Railway Age* of October 29, 1921, and March 4, 1922.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has authorized extensive repairs to the crossing over the San Gabriel river near Los Angeles, Cal. This is to include the construction of a 32 by 704 ft. spillway and the rebuilding of a pier destroyed by a flood.

CANADIAN PACIFIC.—This company, reported in the *Railway Age* of March 18, as about to construct coaling plants at Swift Current, Sask., Medicine Hat, Alta., La Riviere, Man., and Eagle River, Ont., has awarded contracts to the Clayton Company, for the plants at Eagle River, Ont., and La Riviere, Man., and a contract to D. E. Hughes, Calgary, Alta., for the plant at Medicine Hat, Alta. The Swift Current plant will be built by company forces.

This company, which was reported in the *Railway Age* of March 25 as calling for bids for the construction of a new bridge over the Coquitlam river, Vancouver, B. C., to replace the structure washed away during the November flood, has ordered the steel from the Canadian Bridge Company and has awarded the contract to W. D. Grant, Vancouver, for the construction of the concrete abutments necessary for the new structure.

CHESAPEAKE & OHIO.—This company which was reported in the *Railway Age* of June 10, as calling for bids for the construction of terminal facilities at Peach Creek, W. Va., involving a five-stall engine house addition, a shop, storehouse and power house, and for the construction of a five-stall addition to its roundhouse and shop at Peru, Ind., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago, the work at Peru and Peach Creek to involve expenditures of approximately \$125,000 and \$350,000, respectively.

CHICAGO & ALTON.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Titus, Ill., south about 3¼ miles, and a branch from a point about two miles south of Titus and extending westerly approximately two miles.

CHICAGO, BURLINGTON & QUINCY.—This company is calling for bids for a new five stall roundhouse at Council Bluffs, Iowa, a combination freight and passenger station at West Frankfort, Ill., and for the construction of a power house addition at Plattsmouth, Neb.

CHICAGO, BURLINGTON & QUINCY.—This company, which was reported in the *Railway Age* of June 3, as about to close bids for the construction of a passenger station at Mitchell, Neb., has awarded the contract for this work to G. A. Johnson, Chicago; and has awarded a contract to Frank Jacoby, Billings, Mont., for the construction of station extensions at Thermopolis, Wyo., which were first awarded to B. J. Martin, Billings, Mont., as reported in the *Railway Age* of June 10.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company is calling for bids for the construction of a passenger station at 38th street, Indianapolis, Ind.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract for the construction of a water softening plant at Council Bluffs, Iowa, to Joseph E. Nelson & Sons, Chicago.

CHICAGO UNION STATION.—This company, reported in the *Railway Age* of March 20 as calling for bids for the widening of Canal street between Madison and Washington streets, a distance of about 600 ft., has awarded the contract to George P. Cullen, Chicago, and has awarded a contract to Paschen Bros. Co., Chicago, for the superstructure for the Union Station power house reported in the *Railway Age* of June 10 as the subject of bids. A contract has also been awarded to the Mellon Stewart Company, Chicago, for the construction of a concrete and steel viaduct over the tracks at Madison street, as noted in the *Railway Age* of June 17.

CINCINNATI NORTHERN.—This company will accept bids until July 3 for eight bridge spans.

ILLINOIS CENTRAL.—This company which was reported in the *Railway Age* of April 22, as accepting bids for the construction of a joint passenger station with the Toledo, Peoria & Western at Gilman, Ill., has awarded the contract for this work to the Ellington-Miller Company, Chicago, the work to cost approximately \$48,000.

ILLINOIS CENTRAL.—This company, which was reported in the *Railway Age* of June 10, as calling for bids for the installation of a mechanical hump and track scale at Centralia, Ill., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago.

KANSAS CITY SOUTHERN.—This company is now preparing plans for and expects to undertake in the near future with its own forces, improvements to its shop at Pittsburg, Kan., which will consist principally of erecting 160-ft. and 110-ft. extensions to the present structure to provide facilities respectively for additional erecting space and for a blacksmith shop, and a 64-ft. extension to the present transfer table. The building will have a concrete foundation, brick walls with wire glass in metal sash, and composition roofing supported on steel trusses. Each of the six bays in the extensions to the erecting shop will be provided with engine pits to be served by a 10-ton and a 250-ton traveling crane. The work will cost approximately \$200,000.

MICHIGAN NORTHERN.—The Interstate Commerce Commission, after a rehearing has denied this company's application for authority to construct a new line out of Lansing, Mich., on the ground that public convenience and necessity are not shown to require it.

MISSOURI PACIFIC.—This company is calling for bids for the construction of an interlocking tower at Kenneth, Kan.

UNION PACIFIC.—This company, which was reported in the *Railway Age* of April 29, as planning to construct the substructure of a bridge across the Columbia river near Atlatia, Wash., this season, has awarded the contract for this work to the Missouri Valley Bridge & Iron Works, Kansas City, Mo.

UNION PACIFIC.—This company is calling for bids for extensions to the eating house at Cheyenne, Wyoming, to exceed \$50,000 and for the lining of two tunnels in Wyoming.

WABASH.—This company is calling for bids for the construction of the reclamation plant at Decatur, Ill.

WESTERN PACIFIC.—This company has obtained authority from the War Department to reconstruct its drawbridge across the San Joaquin river about 14 miles south of Stockton, Cal., and has notified the public of its intention to close navigation some time during the period from July 15 to January 1 for the purpose of undertaking this work.

ILLINOIS CENTRAL RULES FOR STORING COAL.—The Illinois Central has issued rules governing the unloading and caring for storage coal. The ground upon which coal is to be stored must be firm, level, clean and properly drained, although no drainage should pass through or under the storage coal piles. Coal, which is unloaded into storage should not be placed on loose cinders, against woden posts, wooden trestle bents or hot or warm pipes or flues; nor should it be placed in piles to exceed 12 ft. in height and 36 ft. in width at ground level, with the piles limited to 1,500 tons, and spaced with intervening distances of at least 5 ft. The piles must not be ventilated by artificial methods. Coal of different sizes should be placed in separate units and this same practice of segregation holds true when unloading coal of same size from different mines. Coal should not be dropped from the grab buckets more than 3 ft. The coal should not be moved after once being placed in storage, unless absolutely necessary. The temperature of the coal should be taken at least once each week, and oftener if possible, using either the thermometer or rod method; and when coal is stored under cover, the structure should be well ventilated to afford outlet for gases. Under no circumstances should water be applied to a heated coal pile. Heated or burning coal should be removed and used, or extinguished by scattering and then applying water.

Railway Financial News

ANN ARBOR.—Annual Report.—The corporate income account for the year 1921 and the consolidated income account for the year 1920 follow:

	1921	1920
Operating revenues	\$5,122,112	\$5,385,992
Operating expenses	4,209,106	4,953,662
Net from railway operations	913,006	432,330
Railway tax accruals	257,278	250,027
Railway operating income	655,820	181,966
Total non-railway income	56,161	63,957
Gross income	711,781	245,923
Interest on funded debt	266,417	358,080
Total deductions from gross income	632,732	772,417
Net income	79,049	Def. 526,494

BALTIMORE & OHIO.—Equipment Notes Offered.—J. S. Wilson & Co., of Baltimore, Freeman & Co., and Hayden, Stone & Co., are offering \$1,502,800 Baltimore & Ohio System, Morgantown & Kingwood Railroad Company, 6 per cent equipment gold notes, maturing \$115,000 annually, January 15, 1923, to January 15, 1935, inclusive, at prices to yield from 5 per cent to 5.75 per cent. The notes are redeemable as a whole, but not in part, on 60 days' notice at 103. They are guaranteed, principal and interest, by the Baltimore & Ohio Railroad. The notes are a first lien on 1,000 55-ton hopper coal cars.

CAMBRIA & INDIANA.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized an issue of \$1,000,000 of general mortgage 6 per cent bonds to be sold at not less than 97½, the proceeds to be used to pay notes and to reimburse the treasury for expenditures for additions and betterments.

CENTRAL OF NEW JERSEY.—Authorized to Issue Equipment Bonds.—The Interstate Commerce Commission has authorized the sale or pledge of \$2,000,000 of 6 per cent equipment trust bonds at not less than 98.

CHESAPEAKE & OHIO.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Chesapeake & Ohio Not Hurt by Coal Strike." See also excerpts from annual report on adjacent pages.

CHICAGO & EASTERN ILLINOIS.—Guaranty Certified.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period of 1920 as \$2,223,982, of which \$723,982 remained to be paid.

CHICAGO & NORTH WESTERN.—Guaranty Certified.—The Interstate Commerce Commission has issued a final certificate certifying the amount of this company's guaranty for the six months' period of 1920 as \$15,533,520 of which \$3,733,520 was still to be paid.

CHICAGO MILWAUKEE & ST. PAUL.—Equipment Trusts Offered.—White, Weld & Co. are offering a new issue of \$8,085,000 equipment trust 5 per cent gold certificates, series "A." The certificates are dated July 15, 1922. They are due \$39,000 annually from July 15, 1923, to 1937, inclusive, and are offered at prices to yield from 5 per cent to 5.40 per cent, according to maturity.

CHICAGO, ROCK ISLAND & PACIFIC.—Payment on Account of Loan.—The War Finance Corporation announces that it has received a repayment of \$5,500,000 on account of loans aggregating \$10,430,000 made to this company in 1918 and 1919. It is expected the balance will be repaid in the near future.

DULUTH & NORTHERN MINNESOTA.—Report Approving Abandonment Reaffirmed.—The Interstate Commerce Commission, after a rehearing on the petition of the attorney general of Minnesota, has reaffirmed the conclusions of its former report authorizing the abandonment of this company's line from Knife River to Cascade, Minn., 99.25 miles. Chairman M. Cherdron dissented on the ground that greater consideration should have been given to an offer of the Minnesota Forest Products Company's offer to purchase the property. Commissioners Cox and Lewis also dissented.

EASTERN MAINE.—Certificate for Construction Denied.—The Interstate Commerce Commission has denied the application of

this company and the Mattawamkeag & Eastern for a certificate authorizing the construction of new lines of railroad between Houlton and Bangor, Me.

GREAT NORTHERN.—Dividend Declared.—This company has declared a semi-annual dividend of 3½ per cent on the preferred stock. Although at the regular 7 per cent rate, this declaration is the first to be made on a semi-annual payment basis instead of quarterly. Total dividend payment for the year will be 5¼ per cent. The first quarter dividend was 1¾ per cent; the next semi-annual payment will not be due until February 1, 1923.

New Director.—A. C. Loring, president of the Pillsbury Milling Company, has been elected a director to succeed E. C. Lindley, vice-president and general counsel, resigned.

HOCKING VALLEY.—Annual Report.—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "The Hocking Valley's Place in the C. & O. System." See also excerpts from annual report on adjacent pages.

KANSAS CITY, MEXICO & ORIENT.—Employees to Decide Fate of Road.—Receiver W. T. Kemper met the employees of this road in conference at Wichita, Kan., on June 17, for the purpose of discussing the road's financial condition and outlining a plan under which service may be continued. He stated that for the first five months of this year the road has incurred a deficit of \$450,000, that it has a bank account of only \$46,000 remaining, and that unless financial assistance is obtained immediately the property will have to be sold at auction after July 1. Mr. Kemper called upon employees of the road to accept a wage cut as the only means of allowing the road to reduce its operating expenses. He sketched the history of the line and said the road, if completed, would be 1,687 miles in length, extending from Kansas City, Mo., to Topolobampo, Mexico, on the Gulf of California. Governors Allen, of Kansas and J. B. A. Robertson, of Oklahoma, were present at the conference as were a number of the members of the railroad and public utilities commissions of the three states in which the road operates. Previous attempts have been made by the local management of the railroad to interest the employees in a proposition whereby they would voluntarily accept slightly reduced wages scale in order to enable the road to continue operations, but to date none have been effective. The K. M. & O. went into receivership on April 16, 1917. It operates 273 miles of road in Kansas and Oklahoma, while the Kansas City, Mexico & Orient of Texas operates 464 miles of line in the Lone Star state.

NEW YORK CENTRAL.—Equipment Trusts Offered.—J. P. Morgan & Co. and associates are offering an issue of \$27,645,000 5 per cent New York Central Lines equipment trust certificates at prices to yield from 5 per cent to 5.30 per cent. The certificates mature \$1,843,000 per year from June 1, 1923, to June 1, 1937, both inclusive. They are to be sold subject to the approval of the Interstate Commerce Commission.

NEW YORK, LACKAWANNA & WESTERN.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$30,000,000 of first and refunding mortgage bonds and \$5,000,000 of additional capital stock. The Delaware, Lackawanna & Western also asks authority to guarantee the bonds. It is proposed to issue at this time \$12,000,000 of the bonds at 5 per cent to reimburse the lessee for expenditure, \$1,639,000 to retire a note of the lessor to the lessee, also \$10,000,000 to retire consolidated mortgage bonds and terminal and improvement mortgage bonds maturing next year.

NEW YORK, NEW HAVEN & HARTFORD.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$5,900,000 of first and refunding mortgage bonds to be deposited as collateral security for loans from the United States.

President Pearson on R. & M. Control Reports.—In a statement given out on June 21 President E. J. Pearson, of the New York, New Haven & Hartford, stated that the New Haven is making no attempt to control the Boston & Maine or interfere in any manner in the handling of matters between the Boston & Maine and those in the territory which it serves. He added that the only interest of the New Haven is to promote policies and practices that are of mutual interest toward such co-operation

within New England with respect to its transportation as is brought about from time to time by the New England states and the public in regard to other matters of important but common interest.

Concerning the rumored attempt at control of the New Haven or of the New England situation by the Pennsylvania Railroad, Mr. Pearson quoted the statement of President Rea of the Pennsylvania that there has been no change during the past ten years in the holdings of New Haven stock by the Pennsylvania which approximates but three per cent of the total, and that no attempt or arrangements have been or are being made for securing control of the New Haven, or purchasing its capital stock. The only purpose of the Pennsylvania is to be helpful to the New England railroads and their patrons by increasing the traffic exchange facilities, which is indicated by the large expenditure for the construction of the New York Connecting Railroad for the unloading of the New York gateway, and the operation of joint through trains where required by the New England traffic. This means the continuance and expansion of the long established friendly business and traffic relations of about 50 years between the New England states and the populous territory served by the Pennsylvania Railroad System and the railroads west and south with which it exchanges traffic.

NEW ORLEANS-GREAT NORTHERN.—Guaranty Certified.—The Interstate Commerce Commission has issued a final certificate certifying the amount of this company's guaranty for the six months of 1920 at \$366,555, of which \$131,055 was still to be paid.

NORFOLK SOUTHERN.—Asks Authority for Equipment Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$375,000 of 10-year equipment trust or conditional sales agreement notes at 6 per cent for the purchase of 397 rebuilt freight cars. The notes are to be pledged as collateral for a loan from the government.

PITTSBURGH & WEST VIRGINIA.—To Vote on Stock Increase.—A special meeting of stockholders will be held at Pittsburgh on July 27 to vote upon the proposed increase of authorized capital stock from \$47,000,000 to \$51,900,000, increase to consist of 49,000 shares (par \$100). Holders will also be asked to vote on issuance of the new shares as preferred stock.

In regard to the proposed stock increase President H. E. Farrell says:

Since April 1, 1917, the company has expended for additions and betterments over \$2,000,000, and the total will reach nearly \$3,000,000 by the end of this year. Reason for issuing \$4,900,000 of additional stock instead of \$3,000,000 is to provide for future improvements and obviate the necessity of calling on stockholders and going to the Interstate Commerce Commission for authorization again in a year or so. Following favorable action on July 27, 1922, application will be made to the Commission for authority to issue \$4,900,000 preferred stock to remain in the treasury available for future corporate needs.

The \$7,400,000 authorized by stockholders November 15, 1920, has not been issued, as we are awaiting the approval of the Interstate Commerce Commission, which we hope shortly. This \$7,400,000 is to take the place of the \$1,080,000 capital stock of, and \$6,320,000 of advances to, West Side Belt Railroad, the property of that corporation. The issuance of \$7,400,000 stock is to remain in the company's treasury available for future corporate needs.

Present and proposed situation of the issuance of stock is as follows:

	Common	Preferred	Total
Outstanding	\$30,500,000	\$9,100,000	\$39,600,000
Authorized by stockholders and awaiting approval of I. C. C.	4,400,000	3,000,000	7,400,000
Present authorization	\$34,900,000	\$12,100,000	\$47,000,000
Proposed issues to reimburse treasury for expenditures made and to be made for additions, improvements and betterments.		4,900,000	4,900,000
Total proposed.....	\$34,900,000	\$17,000,000	\$51,900,000

READING COMPANY.—Bondholders' Protective Committee.—A protective committee for the Reading Company general mortgage 4 per cent bonds, due January 1, 1927, has been organized by holders of approximately \$12,000,000 of the bonds. The total amount of the issue outstanding is about \$94,000,000. James M. Wilcox, vice-president of the Philadelphia Saving Fund Society, is chairman, and A. S. Fenimore, assistant secretary of that institution, is secretary of the committee. Other members are:

George W. Davison, president Central Union Trust Company, New York; William A. Day, president Equitable Life Assurance Society, New York; Edward B. Duffield, vice-president Prudential Life Insurance Company, Newark, N. J.; William P. Gest, president Fidelity Trust Company; Efnegham B. Morris, president Girard Trust Company; C. S. W. Packard, president Pennsylvania Company, and Asa S. Wing, president Provident Life Insurance and the Provident Trust companies. Henry Pepper, Bodine & Stokes, of this city, are counsel.

The organization of the committee is a result of the recent decision of the United States Supreme Court in ordering modifications in the contract provisions of the mortgage under the segregation plan.

The Reading Company has filed a petition in the United States District Court at Philadelphia asking permission to consult with the bondholders' protective committee for presentation of a modified dissolution plan in the Reading case in conformity

with the recent decision of the Supreme Court. The court directed that the petition be filed and it will be acted on later. A petition also was filed by members of the bondholders' committee to intervene in the case because of the Supreme Court decision. The petition was allowed by the court.

SEABOARD AIR LINE.—Annual Report.—The income account for the year ended December 31, 1921, compares with the previous year as follows:

	1921	1920
Gross revenue	\$42,844,933	.....
Operating expenses, taxes, uncollectible railway revenues and equipment and joint facility rents—net.	40,782,562	.....
Net railway operating income.....	2,062,372	\$2,481,981
Compensation accrued—federal control.....	11,473,279	1,153,337
Government guaranty, six months.....	.....	3,460,012
Other income	1,433,689	423,884
Gross income	4,989,340	7,519,215
Applicable to interest.....	4,768,759	7,226,772
Fixed interest charges.....	5,201,299	5,745,705
Balance.....	Dr. 432,540	1,481,067
Interest adjustment (income bonds).....	Cr. 4,208,333	1,250,000
Net income	Dr. 224,207	231,067

*Includes the same accounts that were used in determining the standard return; 1920 figures are for period Sept. 1-Dec. 31.

†1921 figures are an accrual of estimated additional compensation for the entire period of federal control; 1920 figures are an accrual for January and February.

‡Reversal of November and December, 1920, accrual.

TUCKASEEGEE & SOUTHEASTERN.—Authorized to Issue Stock.—This company has been authorized by the Interstate Commerce Commission to issue \$300,000 of capital stock at par for the purpose of acquiring the railroad from Sylva to Blackwood, N. C., 12.26 miles.

VIRGINIAN TERMINAL.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$509,000 of first mortgage 50-year gold bonds to be delivered to the Virginian in reimbursement of advances. The Virginian is also authorized to guarantee the bonds and to issue a similar amount of like bonds to be pledged with the director general of railroads in connection with the funding of indebtedness.

Railroad Administration Settlements

The Administration reports the following final settlements, and has paid out to or received from the several roads the following amounts:

Wiggins Ferry Company.....	\$145,000
Terminal Railroad Association of St. Louis.....	60,000
St. Louis Merchants Bridge Terminal paid Director General.....	205,000
Little Kanawha paid Director General.....	1,160
Belington & Northern paid Director General.....	495

Dividends Declared

Atlantic Coast Line.—3½ per cent, semi-annually, payable July 10 to holders of record June 24.
 Canada Southern.—1½ per cent, payable August 1 to holders of record June 30.
 Chicago, Burlington & Quincy.—5 per cent, semi-annually, payable June 26 to holders of record June 19.
 Cincinnati, New Orleans & Texas Pacific.—Common, 3½ per cent, semi-annually; extra, 3 per cent; both payable June 26 to holders of record June 16.
 Colorado & Southern.—1st preferred, 2 per cent, semi-annually, payable June 30 to holders of record June 19.
 El Paso & Southwestern.—1½ per cent, quarterly, payable July 1 to holders of record June 28.
 Great Northern.—Preferred 3½ per cent semi-annually, payable August 1 to holders of record June 30.
 Illinois & Chicago.—\$1.75, quarterly, payable July 3 to holders of record June 20.
 Kansas City Southern.—Preferred, 1 per cent, payable July 15 to holders of record June 30.
 Lehigh Valley.—Preferred, 2½ per cent, quarterly; common, 1¼ per cent, quarterly; both payable July 1 to holders of record June 17.
 Louisville & Nashville.—3½ per cent, semi-annually, payable August 10 to holders of record July 17.
 Reading Company.—Common, 2 per cent, quarterly, payable August 10 to holders of record July 18; 1st preferred, 1 per cent, quarterly, payable September 14 to holders of record August 29.
 Western Pacific.—Preferred, 1½ per cent, quarterly, payable July 1 to holders of record June 19.
 Northern Pacific.—1¼ per cent, quarterly, payable August 1 to holders of record June 30.

Trend of Railway Stock and Bonds Prices

	Last June 20	Last Week	Last Year
Average price of 20 representative railway stocks	64.42	64.18	51.56
Average price of 20 representative railway bonds	85.47	85.62	72.65

Annual Reports

Forty-fourth Annual Report of The Chesapeake and Ohio Railway Company

RICHMOND, Va., April 17, 1922.

To THE STOCKHOLDERS:

The Forty-fourth Annual Report of the Board of Directors, for the fiscal year ended December 31, 1921, is herewith submitted.

The average mileage operated during the year was 2,545.9 miles, an increase over the previous year of 26.7 miles. The mileage at the end of the year was 2,548.0 miles, an increase of 8.8 miles over mileage on December 31, 1920.

THE CHESAPEAKE AND OHIO RAILWAY COMPANY

RESULTS FOR THE YEAR.

Operating Revenues	\$83,687,957.92
(Decrease \$6,502,787.22, or 7.21%)	
Operating Expenses	66,603,076.81
(Decrease \$11,141,444.37, or 14.33%)	
Net Operating Revenue	\$17,084,881.11
(Increase \$4,638,657.15, or 37.25%)	
Taxes and Uncollected Railway Revenue	2,702,869.27
(Decrease \$297,050.43, or 9.90%)	
Railway Operating Income	\$14,382,011.84
(Increase \$4,925,747.60, or 32.25%)	
Net Equipment and Joint Facility Rents	Dr. 721,085.64
(Decrease \$2,433,147.88, or 142.12%)	
Net Railway Operating Income	\$13,660,926.20
(Decrease \$598,263.00, or 4.19%)	
Miscellaneous Income	1,120,750.48
(Decrease \$780,832.76, or 41.06%)	
Total Gross Income	\$14,781,676.68
(Decrease \$1,379,095.82, or 8.53%)	
Rentals and Other Payments	897,673.69
(Increase \$676,756.05, or 24.60%)	
Income for the year available for interest	\$13,884,002.99
(Decrease \$2,055,861.91, or 12.90%)	
Interest (69.81% of amount available) amounted to	9,691,401.51
(Decrease \$262,005.18, or 2.63%)	
Net Income for the year, equivalent to 6.68% of capital stock outstanding, amounted in	\$4,192,601.48
(Decrease \$1,793,856.73, or 29.96%)	
2% Dividend declared during year payable January 3, 1922	1,255,632.00
Remainder, devoted to improvement of physical and other assets	\$2,936,969.48

RETURN ON PROPERTY.

The following table shows the amount of return to your Company, including subsidiary companies, from transportation operations only, upon its investment in road and equipment at the termination of each year of the five year period ended December 31, 1921, and the average for the five years.

	Property Investment.	Total Operating Income.	Percentage of Return.
Year ended December 31, 1921	\$304,485,230.91	\$12,924,848.76	4.24%
*Year ended December 31, 1920	291,179,583.14	14,410,821.80	4.95%
*Year ended December 31, 1919	287,864,838.63	13,725,866.83	4.77%
*Year ended December 31, 1918	269,914,419.76	12,871,539.79	4.77%
*Year ended December 31, 1917	263,397,068.67	14,871,459.45	5.64%
Yearly average for five years ended December 31, 1921	\$283,368,228.22	\$13,760,907.32	4.85%

*The road having been operated in 1918, 1919 and during January and February, 1920, by the United States Railroad Administration, the compensation payable during the period mentioned has been used in lieu of operating, and other items making up the return from transportation operations. In these computations, interest payable by way of compensation for additions and betterments completed during Federal control has been excluded.

FINANCIAL.

During 1921 the issue of six per cent. Equipment Trust Notes, Series 13 and 13-A, referred to in the Annual Report for 1920, was completed, the total amount of the notes being fixed at an aggregate of \$11,367,000, for the two issues. Of this amount the annual maturities due January 15, 1921, and January 15, 1922, have been paid, the aggregate amount of said payments being \$1,515,600. The equipment contracted for and subject to "Chesapeake and Ohio Equipment Trust, Series S," referred to in the Annual Report for 1921, has all been delivered and is now in service. Your Company at the date of this Report has received on account of the loan from the United States of \$5,318,000 under the provisions of Section 16 of the Trust Instrument, A. T. 1921, to be applied toward additions and betterments the sum of \$4,073,500. It is noted that the balance of the loan will be received before July 1st, and that the additions and betterments to be completed or contracted for by that date.

Your Company is now endeavoring to secure satisfactory bids for the following new equipment:

- 30 All Steel Passenger Coaches;
- 8 All Steel Combination Passenger and Baggage Cars;
- 2 All Steel Baggage, Express and Mail Cars;
- All Steel Door Cars;
- 150 40-ton Steel underframe Box Cars;
- 50 40-ton Steel underframe Ventilated Box Cars;
- 20 40-ton Steel underframe Stock Cars;
- 60 40-ton Steel underframe Refrigerator Cars;
- 16 50-ton All Steel Flat Bottom Gondola Cars;
- 14 50-ton All Steel Hopper Bottom Gondola Cars.

Your Company expects to obtain approximately 80% of the cost of this equipment through an Equipment Trust, which it is believed can be placed in a more advantageous year.

The officers of your Company have also prepared a comprehensive budget of additions, betterments and improvements which should be made during the next four years in order to adequately and economically maintain

the present-day maximum volume of traffic, provide for anticipated growth, and provide its facilities most nearly equal to those of your principal competitors. The estimated capital charge for the work contemplated by this budget is about \$17,000,000, the expenditure of which will be spread over the next four years. Conditions at the present time are reasonably favorable for railroad financing and plans are now under consideration for providing at least a part of the total capital expenditure involved, announcement respecting which will be made in due course.

The changes in funded debt in the hands of the public during the year were as follows:

4 per cent. Big Sandy Ry. First Mortgage Bonds	Retired \$33,000.00
4 per cent. Cal River Railway First Mortgage Bonds	37,000.00
4 per cent. Greenbrier Ry. First Mortgage Bonds	22,000.00
5 per cent. Kanawha Bridge and Terminal Co. First Mortgage Bonds	7,000.00
Equipment Trust Obligations	1,871,800.00
Decrease	\$1,970,800.00

Other changes in obligations shown under funded debt on balance sheet of December 31, 1921, were as follows:

	Increase.
First Lien and Improvement 5 per cent. Mortgage Bonds	\$8,541,000.00
6 per cent. Equipment Trust Certificates Series "13" (Additional)	162,000.00
Secured Obligations to United States Government	7,762,500.00
5 per cent. Chesapeake & Ohio Northern Ry. Co. First Mortgage 5 per cent. Bonds (Assumed)	1,000,000.00
Increase	\$17,465,500.00

GENERAL REMARKS.

Branch Line Extensions during the year have been as follows: Guyandot Division-Main Island Creek, Barnabas to End of Line, 1.98 Miles; Guyandot Division-Little Creek Branch, Sistratt to End of Line, 1.00 Miles; Island Creek Railroad-Mud Fork Branch, Mud Junction to Argonne, W. Va., 3.25 Miles; Island Creek Railroad-Whitman Creek Branch, Whitman Junction to Whisman, W. Va., .79 Miles; Hazy Creek Branch-Edwight to End of Line, 1.80 Miles; Huntington Division-Adjustment of Mileage, .05 Miles.

making total increase in Branch Lines put into operation during the year 8.87 Miles. Additional third track mileage put into operation during the year is as follows:

Cincinnati Division-Edgington-Passing Track converted into third track	1.00 Miles
Extension of Third Track	1.73 Miles
making total increase in third track	2.73 Miles

The equipment inventory as of December 31, 1921, was as follows:

	Increase	Decrease
Locomotives owned	675	10
Locomotives leased	271	.....
Total	946	10
Passenger train cars owned	348	7
Passenger train cars leased	62	.....
Total	410	7
Freight train and miscellaneous cars owned	34,251	694
Freight train cars leased	18,000	.....
Total	52,251	694

The changes during the year in the accrued depreciation of equipment were as follows:

Balance to credit of account December 31, 1920	\$12,430,963.54
Amount credited during year ended December 31, 1921, by charges to Operating Expenses	\$2,047,384.78
Charges to account for:	
Accrued depreciation on equipment retired during year—891 freight train and work cars; 1 passenger train car; 2 locomotives; 2 float ing equipment	\$185,436.86
1,861,947.92	
Balance to credit of account December 31, 1921	\$14,292,911.46

Operating Revenues were	\$83,687,957.92	\$90,190,745.14	Dec. \$6,502,787.22
Net Operating Revenues were	17,084,881.11	12,446,233.96	Inc. 4,638,657.15
Operating Ratio	79.6%	86.2%	Dec. 6.6%
Tons of Revenue Freight carried one mile	9,136,050.51	11,720,030.89	Dec. 2,583,980.37
Revenue train loads tons	1,090	1,131	Dec. 41
Revenue tons per loaded car	39.3	39.1	Inc. .2

The revenue coal and coke tonnage was 24,074,459, a decrease of 18.0 per cent; other freight tonnage was 7,418,628, a decrease of 35.4 per cent. Total revenue tonnage was 31,493,087 tons, a decrease of 22.9 per cent. Freight revenue was \$67,367,982.78, a decrease of 7.0 per cent. Freight train mileage was 3,382,284 miles, a decrease of 19.1 per cent. Revenue ton miles were 9,136,050.51, a decrease of 22.9 per cent. Ton mile revenue was 2.73 mills, an increase of 19.3 per cent. Revenue per freight train mile was \$8.07, an increase of 14.9 per cent. Revenue tonnage per train mile was 1,090 tons, a decrease of 3.6 per cent; including Company's freight, the tonnage per train mile was 1,131 tons, a decrease of 4.4 per cent. Tonnage per locomotive, including Company's freight, was 1,026 tons, a decrease of 1.9 per cent. Revenue tonnage per loaded car was 39.3 tons, an increase of .5 per cent. Tons of revenue freight carried one mile per mile of road were 1,388.535, a decrease of 22 per cent.

It will be observed that freight train mileage did not decrease in the same ratio as revenue tonnage and revenue ton miles, which is occasioned by the

fact that in times of decreased business it is not possible to dispense with the running of many local freights and other necessarily lightly loaded trains, which must result in lesser loading of tons per train and, consequently, more train mileage proportionately.

There were 7,590,673 passengers carried, a decrease of 9.3 per cent. The number carried one mile was 331,513,000, a decrease of 13.7 per cent. Passenger revenue was \$11,739,627.10, a decrease of .6 per cent. Revenue per passenger per mile was 3,544 cents, an increase of 15.1 per cent. Number of passenger miles per train mile was 1.99, an increase of .01 per cent. of 14.6 per cent. Passenger train mileage was 5,284,065, an increase of 1.9 per cent. Passenger revenue per train mile was \$2,223, a decrease of 2.5 per cent, including mail and express it was \$2,502, a decrease of 6.9 per cent. Passenger service train revenue per train mile was \$2,577, a decrease of 5.7 per cent.

There were 337,249 tons of new rail (80,501 tons of 130 lb., 211,956 tons of 105 lb., 3517.9 tons of 90 lb., 956.3 tons of 80 lb., and 4.1 tons 67½ lb.) equal to 206,700 tons of old track, used in renewal of existing track.

There were 1,085,047 cross ties used in maintaining existing tracks, an increase of 32,678.

There were 626,034 yards of ballast (390,854 yards stone) used in maintaining existing tracks, a decrease of 265,024 yards. Beginning 1921 careful survey was made of the ballast on the entire line, and while there was a decrease in the number of yards of ballast applied as compared with previous year, cur track has been fully maintained in equally as good condition as last year insofar as ballast is concerned.

The average cost of repair of a locomotive was \$6,469.27; per passenger train car, \$1,705.05; per freight train car \$183.65.

Due to the complexity of the accounts involved and the necessity of carefully checking an enormous number of items, it has not yet been practicable for your Company to make a final settlement with the Director General of Railroads for the period of Federal control with the Interstate Commerce Commission for the so-called Guaranty Period, March 1 to September 1, 1920. Your directors and officers are making every effort to reach a conclusion of these matters as promptly as possible and are receiving the cordial cooperation of the Interstate Commerce Commission. Your Company received from the Secretary of the Treasury an additional payment of \$600,000 on account of the guaranty under Section 209 of the Transportation Act, 1920, based upon a partial payment certificate of the Interstate Commerce Commission. As the amount of any further settlement on either of these accounts is still impossible of ascertainment no accrual in respect thereof has as yet been included in your income account.

In the Annual Report for 1920 reference was made to the substantial falling off in the volume of business subsequent to January 1, 1921, and the probability of a resulting unsatisfactory showing for the year 1921. The condition forecasted in the Annual Report continued during the early part of the year with the result that, notwithstanding the increase of about 33% of your Company's average freight rates effective in the summer of 1920, the gross earnings of your Company during the first six months of the year were actually less than during the corresponding period of 1920. Meantime the heavy operating costs resulting from war conditions, particularly those due to the high wages and the working rules established by Governmental authorities, and the fact that your Company has had to make a drastic reduction of working forces and curtailing of purchases wherever possible, to reduce expenses immediately to anything like the extent to which business fell off.

These conditions resulted in an income deficit for the first five months of 1921 of approximately \$1,650,000, as against a surplus (taking into consideration only the comparable items) of about \$1,000,000 for the corresponding period of 1920. The actual net income of your Company for this period of 1921 was a net contribution payable to you or your Company with the Director General of Railroads was only \$1,400,000, so that your Company was actually at least \$3,000,000 worse off during these five months than it was in the corresponding period of the previous year. This represented nearly 5% on the total outstanding capital stock. During May, 1921, your Company had on hand over \$7,000,000 in unpaid vouchers past due for sixty days or more. Under these circumstances your directors deemed it advisable at their May meeting, in order to conserve your cash resources, to omit the declaration of a dividend payable in June. As a result of these efforts made to reduce expenditures to a minimum, and the substantial reduction in the salaries of the higher officials) and increased efficiency of employees resulting from a better labor supply due to depression in general business, together with reduction in wages ordered by the United States Railroad Board, your Company was able notwithstanding the reduction in expenditures for Additions and Betterments to the lowest point consistent with safety of operation and reasonably satisfactory service, accompanied by some improvement in the volume of traffic, a better showing was made during the last six months of the year and the customary dividend of 2% was declared in November payable January 3rd, 1922. The directors of your Company are keenly alive to the hardship to many of its stockholders resulting from any interruption in the regular payment of dividends, and the deferring of the dividend which would ordinarily have been paid in June was due only to their conviction that its payment at that time would have interfered with the ability of the Company to meet promptly and adequately its obligations to its creditors and to the public. The period of deflation through which your Company, in common with the other carriers of the country, has been passing has, however, had the necessity of substantial sacrifice by many, including the employees and the officers as well as the stockholders of your Company.

Your directors think it proper to point out the fact that there is sometimes a misapprehension of the significance of the dividend which is paid which indicates a given percentage earned upon outstanding capital stock. The balance of income after payment of fixed charges of your Company, for example, constitutes a fund out of which must be paid not only dividends to the stockholders but also to retain other obligations, notably sinking funds on outstanding bond issues and other payments accruing on maturing equipment trusts. Payments of this character by your Company during 1921 aggregated \$1,968,270, an amount equal to approximately 3% upon your Company's capital stock. Provision must also be made out of income for certain of the other directors' obligations. It is, therefore, of some importance that it be made. Amounts thus expended accrue to the benefit of the stockholders in the form of additions to the Company's permanent investment, but the portion of the surplus of the Company that is so invested is, of course, not available for dividends.

In common with other companies your Company is seeking further readjustments in its labor costs where these are out of line with those prevailing in other industries. Reductions in wages, however, are naturally not accepted readily by your employees and the matter must ultimately be settled by decision of the United States Railroad Labor Board, which cannot be expected for some months. On the other hand there is insistent pressure by shippers for a reduction in freight and passenger rates, many of which have already become effective as a result of orders of the Interstate Commerce Commission. Should the Commission be forced by pressure brought to bear upon it to order such reductions, before we were effective your Company can reduce its present operating costs, the improvement now in progress in your Company's financial condition is likely to be considerably interfered with.

Pursuant to authority previously given by the stockholders and after approval by the Interstate Commerce Commission upon due application, the properties of The Chesapeake and Ohio Northern Railway Company were, effective December 1, 1921, conveyed to your Company and the properties of the Chesapeake and Ohio Railway Company, which were acquired by your Company January 1, 1922, leased to your Company for nine hundred and ninety-nine years. As a condition of the conveyance by The Chesapeake and Ohio Northern Railway Company your Company assumed direct liability for \$1,000,000 first mortgage 5% bonds of that Company, and these bonds appear upon the balance sheet, page 17.

During the year the line and grade revision on the Coal River District between St. Albans and Ferrell, a distance of 4.2 miles, was completed and put in operation. This revision gives a maximum of .2 per cent compensated grade against eastbound or empty traffic and a .5 per cent compensated grade against westbound or empty traffic and permits of the use of heaviest equipment on this District, due to the elimination of a tunnel of small section.

Second track on the Logan Division was completed and put in operation between Clover Valley and Salt Rock, a distance of 9.6 miles, and between Big Creek and Pecks Mill, a distance of 9.7 miles, which makes a continuous stretch of second track on this Division between Barboursville and West Hamlin, 18 miles, and between Big Spring and Peach Creek terminals, 14.4 miles, leaving a single track section between West Hamlin and Big Creek of 31 miles.

The Hazy Creek Branch extending from Edwight up Hazy Creek of Coal River about 2.2 miles, was constructed by the Rowland Land Company, taken over by the Railway Company and put in operation. At Gladstone, Va., the eastbound yard, consisting of 14 tracks, was extended to hold 90 car trains, and at Hinten, W. Va., the eastbound yard, consisting of 10 tracks, was extended to hold 80 car trains; two additional tracks to hold 100 car trains or locomotives were constructed at St. Albans to hold 80 car trains were constructed at Tram, Ky., three tracks were added to the yard at Ashland, Ky., two tracks were added to the yard at Shelby, Ky., and two tracks were added to the yard at Paintsville, Ky.

Model buildings, consisting of new power plant, 10 stall round-house, storeroom, oil house, icehouse and toilet buildings, were constructed at Clifton Forge, Va., rectangular frame engine house to hold two engines was constructed at Raleigh, W. Va., and the frame engine house at Thurmond, W. Va., was extended during the year.

100 foot Turntables at Russell, Ky., and Peach Creek, W. Va., 85 foot turntables at Stevens, Ky., and 70 foot turntables at Netherland, Ky., and Clifton Forge, Va., were replaced with new 100 foot twin span turntables, new 100 foot twin span turntable was built at Ashland, Ky., second hand 70 foot turntable was installed at Paint Creek Junction, W. Va., in addition to which the existing 100 foot turntables at Fulton, Va., Ronceverte, W. Va., and Cheviot, Ohio, were strengthened.

Interlocking plant was constructed during the year at Big Sandy Junction, Ky., the junction of Big Sandy Division with the main line.

During the year bridge O2 at Brems, Va., was replaced with heavier bridge; at Bridgetown, Ohio, trestle over Cleves and Bridgetown Pike was renewed with steel bridge, and three trestles on Chicago Division were filled.

Water Softening Plants were constructed at Russell, Ky., Concord, Ky., and Stevens, Ky.

New Freight Depot was built at Logan, W. Va., and small depots were constructed during the year at Hilton Village, Va., Atlee, Va., and Sweetser, Va.

Additional fire protection was installed at 17th Street, Richmond, Va., for protection of shop properties.

There are now under construction at Peach Creek, W. Va., 5 additional yard tracks and engine dispatching tracks, which work should be completed during the year of 1922.

The three channel spans of Licking River Bridge at Covington, Ky., are being replaced with heavier span, which work should be completed during the year of 1922.

New Passenger Stations are now in process of construction at Covington, Ky., and Logan, W. Va., which should be completed during the year of 1922. New Westbound Yard, consisting of seven 100 car tracks, is now under construction at Gladstone, Va., which work should be completed during the year of 1922.

Automatic Train Control System is being installed between Charlottesville, Va., and Staunton, Va., a distance of about 40 miles, which work should be completed this year, and when completed will give a continuous section of automatic control from Gordonsville, Va., to Staunton, Va., a distance of about 61 miles.

Among the new local industries were the following:
 25 manufacturers of farm implements and farm products.
 13 lumber producers.
 31 manufacturers of mineral, metal and other products.
 42 new coal mines.

Your directors again acknowledge with appreciation the faithful and efficient service of the directors of your Company, since 1909, and Vice-President from July 1, 1915, to the time of his death. Appropriate resolutions of regret and appreciation were adopted by your directors with reference to his death. Effective June 17th, 1921, Mr. W. J. Luderbach was elected a director of your Company to succeed Mr. Davis.

Your directors again acknowledge with appreciation the faithful and efficient service of your officers and employees.

By order of the Board of Directors,
 H. E. HUNTINGTON, Chairman.
 W. J. HARAHAN, President.

[ADVERTISEMENT]

Twenty-third Annual Report of The Hocking Valley Railway Company

Columbus, Ohio, May 18, 1922.

To the Stockholders:

The Twenty-third Annual Report of the Board of Directors, for the fiscal year ended December 31, 1921, is herewith submitted.

The average mileage operated during the year was 350.1 miles, a decrease compared with previous year of 1.1 miles. The mileage at end of the year was 350.1 miles.

RESULTS FOR THE YEAR.	
Operating Revenues	\$14,093,001.38
(Decrease \$3,008,491.78 or 17.59%)	
Operating Expenses	11,572,394.38
(Decrease \$4,369,040.19 or 27.41%)	
Net Operating Revenue	\$2,520,607.00
(Increase \$1,360,548.41 or 117.28%)	

Railway Officers

Executive

R. S. Marshall, has been appointed assistant to the president of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., effective June 15, succeeding C. S. Lake, resigned.

Winfield S. Haines, master mechanic of the Hornell Region of the Erie at Dunmore, Pa., has been appointed assistant to the vice-president in charge of operation, with headquarters at New York, effective June 15.

Operating

E. Stroud has been appointed trainmaster of the Southern Pacific, Portland division, with headquarters at Eugene, Ore., effective June 13.

R. E. Titus has been promoted to assistant superintendent of the Idaho division of the Oregon Short Line, with headquarters at Nampa, Idaho, effective June 25, to succeed **R. A. Brooks** promoted to superintendent of the Montana division, with headquarters at Pocatello, Idaho. He succeeds **C. E. Brooks** transferred to the Utah division with the same headquarters in place of **R. A. Pierce**.

Lynne L. White, whose promotion to superintendent of the Chicago division of the Erie, with headquarters at Chicago, effective June 10, was reported in the *Railway Age*

of June 17, page 1514, was born on July 2, 1889, at Kenwood Park, Iowa, and entered railway service on March 10, 1904, as a file clerk in the office of the division passenger agent of the Chicago, Rock Island & Pacific at Cedar Rapids, Iowa. Thereafter, excepting for the period from December 1, 1905, to April 1, 1906, when he attended business college, he was employed in various stenographic and clerical capacities in passenger and division operating offices on the Chicago, Rock Island & Pacific at

Cedar Rapids, Iowa, and Esterville, until June 1, 1907, when he entered the employ of the St. Louis-San Francisco, as stenographer and clerk for the division superintendent at Enid, Okla. He re-entered the service of the Chicago, Rock Island & Pacific, on November 5, 1907, as stenographer and clerk in the division superintendent's office at Cedar Rapids, Iowa, and from that time served consecutively as stenographer and clerk at Cedar Rapids, Iowa, from November 5, 1907, to March 1, 1909; as secretary to the division superintendent and later to the general superintendent at Cedar Rapids from March 1, 1909, to November 20, 1911; as clerk in the office of the general superintendent at Davenport, Iowa, from November 20, 1911, to May 15, 1912; as secretary to the general manager at Des Moines, Iowa, thereafter until February 28, 1913, and as chief clerk in the division office, and for a portion of the time night chief dispatcher at Manly, Iowa, thereafter until February 16, 1918, when he entered the employ of the Erie, holding the position of chief of the several regional offices in Chicago until October 1, 1920, when he was promoted to trainmaster of the Hammond division, with headquarters at Hammond, Ind., the position he held at the time of his recent promotion.

Robert E. Ryan, whose promotion to general manager of the Minneapolis & St. Louis with headquarters at Minneapolis, Minn., effective June 15, to succeed **Elliot E. Nash** resigned

to accept service with another company, was reported in the *Railway Age* of June 17, page 51, was born September 18, 1872, in Newbern, N. C., and commenced his business career as a telegraph operator in the employ of the Western Union, serving in that position at St. Louis, Kansas City, Mobile and New Orleans for eight years thereafter. He entered railway service in 1894 as an operator on the St. Louis, Iron Mountain & Southern. He continued with that road as operator and agent at various sta-

tions on the Arkansas division for several years, following which he served as trainmaster at Poplar Bluff, Mo., and Little Rock, Ark. On November 1, 1908, he became trainmaster on the Iowa Central, now part of the Minneapolis & St. Louis, at Marshalltown, Ia. Two years later, he was promoted to assistant superintendent of the Minneapolis & St. Louis at Watertown, S. D., and on September 1, 1917, was advanced to superintendent of the Central and Western divisions with headquarters at Minneapolis, holding this position until his recent promotion to general manager.

Financial, Legal and Accounting

D. J. Bond, assistant comptroller, has been appointed comptroller of the Minneapolis, St. Paul & Sault Ste. Marie, effective June 15, succeeding **C. W. Gardner**, retired.

Lewis A. Bell, whose promotion to comptroller of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, effective May 23, was reported in the *Railway Age* of June 3, page 1317, was born on September 20, 1875, at Toledo, Ohio, and entered railway service September, 1891, as telegraph operator on the New York, Chicago & St. Louis. After serving as telegraph operator and station agent from September, 1891, to August, 1899, he entered the employ of the Chicago Junction, where he served consecutively as freight claim investigator, traveling auditor and chief clerk to the auditor until November, 1908, when he was appointed examiner of accounts for the Inter-

state Commerce Commission. A few years later he was placed in charge of the Chicago office of this department of the commission where he also completed a course of study in law at Chicago Kent College in 1913 and was admitted to law practice in 1916. He was subsequently advanced to assistant chief examiner of accounts, a position he held at Chicago and later at Washington until October, 1918, when he was placed in charge of the Washington office and the several branch offices throughout the country, giving attention to the commission's certification of the carriers standard returns and



R. E. Ryan



L. L. White



L. A. Bell

acting also as referee in the merchants' and miners' and the Ulster & Delaware cases. He re-entered railway service June 15, 1920, as auditor on the New York, Chicago & St. Louis and continued in this capacity until May 10, 1922, when he was appointed comptroller of the Lake Erie & Western, with headquarters at Cleveland, Ohio, the position he held at the time of his recent promotion.

T. Broom, secretary of the Chicago Junction, has resigned to become treasurer of the syndicate, which is to construct the new Union Stock Yards in Los Angeles, Cal., of which J. A. Spoor, A. J. Leonard and H. E. Poronto will constitute the managing board.

Henry S. Mitchell, whose election as general counsel of the Minneapolis, St. Paul & Sault Ste Marie, with headquarters at Minneapolis, Minn., to succeed H. B. Dike retired, was reported in the *Railway Age* of June 10, page 1326, was born at Milwaukee, Wis., in 1882, studied at the University of Minnesota, from 1901 to 1905, and was educated in law at Oxford University, England, from which he was graduated in 1908. Subsequently, he was employed as an instructor in the law school of the University of Minnesota until 1910, when he engaged upon the practice of law in Minneapolis. He relinquished this work four years later to become special assistant to the attorney general of the United States at Washington, D. C., where he remained until 1921, when he was appointed advisory counsel with headquarters in New York city, in which capacity he represented the government during the following year. He entered railway service on January 19, 1922, as assistant general counsel of the Minneapolis, St. Paul & Sault Ste Marie, with headquarters at Minneapolis, Minn., and continued in this capacity until June 1, 1922, the date of his election as general counsel to succeed Mr. Dike.



H. S. Mitchell

Engineering, Maintenance of Way and Signaling

G. W. Hegel, chief engineer of the Chicago Junction, with headquarters at Chicago, has resigned to go to Los Angeles, Cal., where he will have charge of an important construction enterprise in connection with new stock yards, connected with the Union Pacific.

H. N. Huntsman, assistant engineer of the Wabash with headquarters at Montpelier, Ohio, has been promoted to division engineer of the St. Louis Terminals, with headquarters at St. Louis, Mo., effective June 15, to succeed J. T. Vitt, who is transferred to the Springfield division with headquarters at Springfield, Ill., to succeed Edward Shelah, promoted to the newly-created position of inspector of maintenance.

Traffic

S. A. Campbell has been appointed division freight agent of the Norfolk & Western, with headquarters at Winston Salem, N. C., succeeding F. W. Jones, promoted.

F. D. Hammer, assistant general passenger agent of the Wabash, with headquarters at St. Louis, Mo., has been transferred temporarily to Detroit, Mich., effective June 5.

R. A. Bishop, general agent, freight traffic, of the Chicago Great Western, has been appointed division freight and passenger agent at Red Wing, Minn., effective June 1.

A. W. Nelson, traveling freight agent on the Chicago Great Western, with headquarters at St. Louis, Mo., has been promoted to general agent to take charge of the newly established agency at St. Louis, Mo.

Paul P. Hastings, whose appointment to the newly created position of general freight agent of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., was reported in the *Railway Age* of May 27, page 1263, was born at Farmington, Kan., October 22, 1872, and attended the National Business College at Kansas City, Mo. He entered railway service in August, 1891, as an employee on the Atchison, Topeka & Santa Fe and served as freight clerk at Phoenix, Ariz., from April 1, 1895, to December 1, 1898, when he left railway service to become traffic manager of the United Verde Copper Company at Jerome, Ariz., where he remained until September 1, 1900. Beginning October 1, 1900, he was engaged as auditor and general freight and passenger agent of the United Verde & Pacific Railway with headquarters at Jerome, Ariz., until December, 1902, when he became associated with mining interests in southern Arizona and Mexico. He re-entered railway service as auditor on the Atchison, Topeka & Santa Fe at Prescott, Ariz., in April, 1903, following which he served as auditor at Prescott until March, 1907, as general freight and passenger agent with the same headquarters until June, 1912, and thereafter as assistant general freight agent with headquarters at San Francisco, until February, 1908, when he became assistant to director of traffic of the United States Railroad Administration with headquarters at Washington, D. C., in charge of the freight rate department. Thereafter he continued as assistant to the director of traffic until February, 1920, and thence as special traffic assistant, division of law, until January, 1921, when he relinquished his connection with the United States Railroad Administration to become a member of the Standing Rate Committee of the trans-continental freight bureau, with headquarters at Chicago, the position he held at the time of his recent appointment as general freight agent.



Paul Hastings

Purchasing and Stores

W. McMaster, purchasing agent of the Indiana Harbor Belt, with headquarters at Chicago, has been appointed purchasing agent also of the Chicago River & Indiana and the Chicago Junction, with headquarters at Chicago, in which capacity he succeeds S. Salter, heretofore purchasing agent of the Chicago Junction.

Obituary

James Franklin Ingram, retired bridge engineer of the Louisville & Nashville and an employee of that company for 57 years, died in Louisville, Ky., June 9, at the age of 87 years.

C. P. Torrey, superintendent of transportation of the Hocking Valley, with headquarters at Columbus, Ohio, died at his home in that city, June 9, after having been in the service of that company for a period of 30 years.

THE MISSOURI, KANSAS & TEXAS burns approximately 10,000 bbl. of fuel oil a day in its locomotives. It is the third largest consumer of fuel oil in Texas.

Another Way To Save— And Earn

ON a number of roads, passenger engines are running from 400 to over 700 continuous miles.

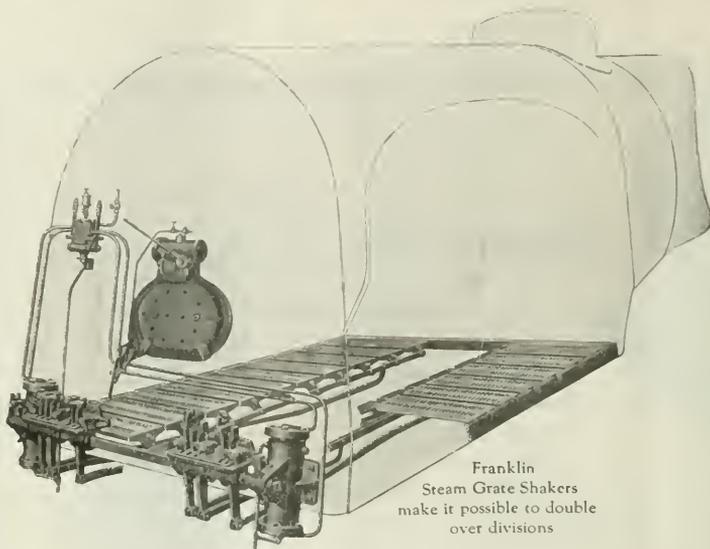
These long runs are making money for the railroads. They reduce the number of engines in use; they eliminate a great deal of maintenance, and they save an immense amount of stand-by loss in coal.

The better your locomotives, the more you can save by lengthening your runs. The Vitalizing Factors, on new or old locomotives, collectively add 30 to 80 per cent more power per pound of fuel, according to speed.

Vitalize a locomotive and it will pull more tons a greater distance than it ever did before.

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We will gladly answer any questions concerning vitalizing factors and their uses. Write us at 17 East 42nd Street, New York City.



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Steam Grate Shakers
make it possible to double
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Full Steam Pressure All the Way

LONGER locomotive runs are logical to secure greater service from the locomotive investment.

But keeping locomotives longer on the road involves keeping their fires clean. Here is where the Franklin Steam Grate Shaker fits in.

When a fire becomes over 8 inches deep, little air gets through the grates to assist combustion.

A man firing heavily has no time to stir the fire by hand; so coal impurities collect on the grates to form clinkers and the fire grows steadily worse.

But with grate shaking made easy by the Franklin Steam Grate Shaker, just a touch of a lever shakes the grates by power and keeps the fire free and clean.

Limiting locks prevent any possibility of the grates dumping when the fireman only wants to stir the fire.

When you try longer locomotive runs, as you will, use a Steam Grate Shaker engine.

This will help keep full steam pressure all the way.

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The Big Moment

There are many big moments in the life of a staybolt.

Every time the fire-door is opened the fire-box breathes — and staybolts must bend.

When the throttle is moved, when the fire is cleaned — staybolts must bend with the movement of the fire-box sheets.

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These boilers, removed because of a recently enacted state law prohibiting the use of boilers after 30 years' service, were fitted with boiler tubes made of Parkesburg Charcoal Iron. After 40 years of service, these tubes of Parkesburg Charcoal Iron are in almost perfect condition.

The Longer They Last, The Less They Cost

THE discriminating motorist buys a 12,000 or 10,000 mile tire in preference to the one guaranteed for 5,000 miles. He willingly pays the higher price because he knows the tire of longest mileage is really the cheapest.

Unfortunately, operating, mechanical and geographical conditions make it impracticable to guarantee the service life of any boiler tube.

But this much we know: On road after road, Parkesburg Charcoal Iron Boiler Tubes are giving much longer service than that previously received from tubes of other material.

Retube a few of your locomotives with Parkesburg Charcoal Iron Boiler Tubes. Select your most troublesome district for the test. Compare the service and figure the comparative cost.



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"V" Pilot Packing in spiral form comes in 10 ft. lengths from one quarter inch in diameter up, including all one sixteenth sizes.

In ordering specify whether for steam, air or water service.

"V" Pilot Packing combines the wear resisting features of solid metal packing with the easy adaptability of the soft, fibrous packing.

It presents a continuous metal bearing surface to the rod; backed by a resilient fabric of asbestos.

Service results on "V" Pilot Packing have proven an increase in packing life of several hundred per cent.

RAILROAD STATIONARY POWER PLANTS
 Steam Rods (Either Rotary or Reciprocating)
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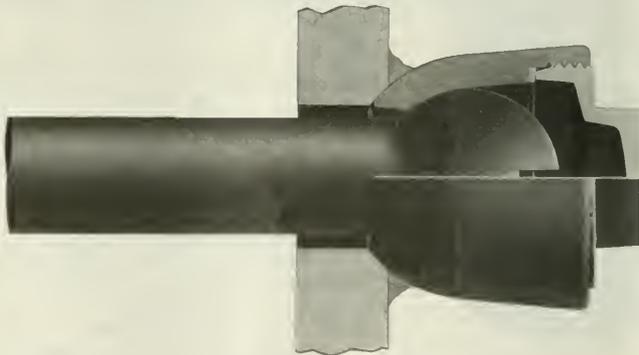
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The shorter sleeve projection in the sheet and around the bolt body under the head of F. B. C. Flexible Staybolts not only permits greater range of flexibility, but is particularly advantageous in renewing fireboxes or sheets.

Slight errors in hole alignment, after sleeve is secured, are also readily accommodated because of this feature.

If you are not familiar with all the features of F. B. C. Welded Flexible Staybolts—let us send complete information today as to how you can advantageously standardize on the F. B. C. Staybolt.

FLANNERY BOLT CO.

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FAITH JUSTIFIED

On May 30th a special silk train on the Lackawanna, consisting of one coach and six refrigerators, left Black Rock, N. Y., at 1:30 a. m., arriving at Hoboken, N. J., at 9:18 a. m.—a distance of 401 miles in 468 minutes. This time includes five stops for water and change of engines. The train was hauled by three Alco designed and built locomotives, one of which is shown above.

The importance of this shipment dictated the necessity for locomotives of unusual stamina—faith in Alco influenced their selection, which the gratifying results abundantly justified.

This performance must impress those who seek the utmost in design and construction, with the desirability of Alco qualities, and you may profitably consider whether or not you can afford to invest in locomotives that do not embody them.

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The first Baltimore & Ohio Mikados were built by these Works in 1911, and due to their success, orders for additional locomotives of this type soon fol-

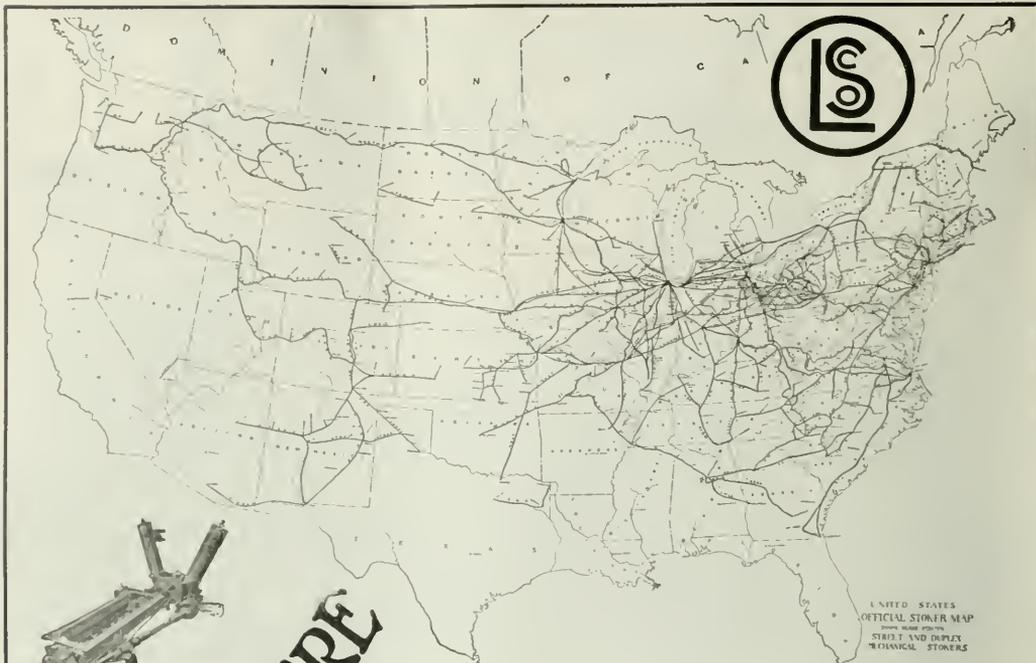
lowed. The total number of Baldwin Mikados thus far built for this railroad is 520.

These locomotives have been generally distributed over the system and are now working the greater part of the through freight traffic, excepting on certain mountain divisions where Mallet and Ten-Coupled locomotives are used.

The illustration shows Engine 4507, a Class Q-3 Mikado, hauling 4343 adjusted tons, in 57 loaded cars, on the run from Wilsmere, near Wilmington, Del., to Jersey City. The full rating for Class Q-3 on this division is 4400 adjusted tons.

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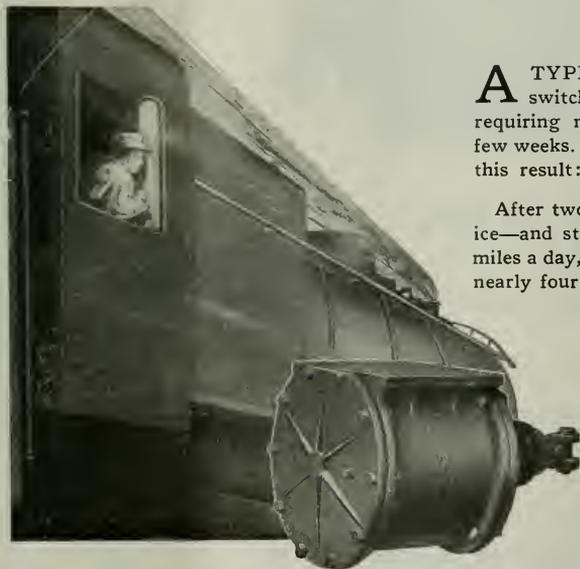
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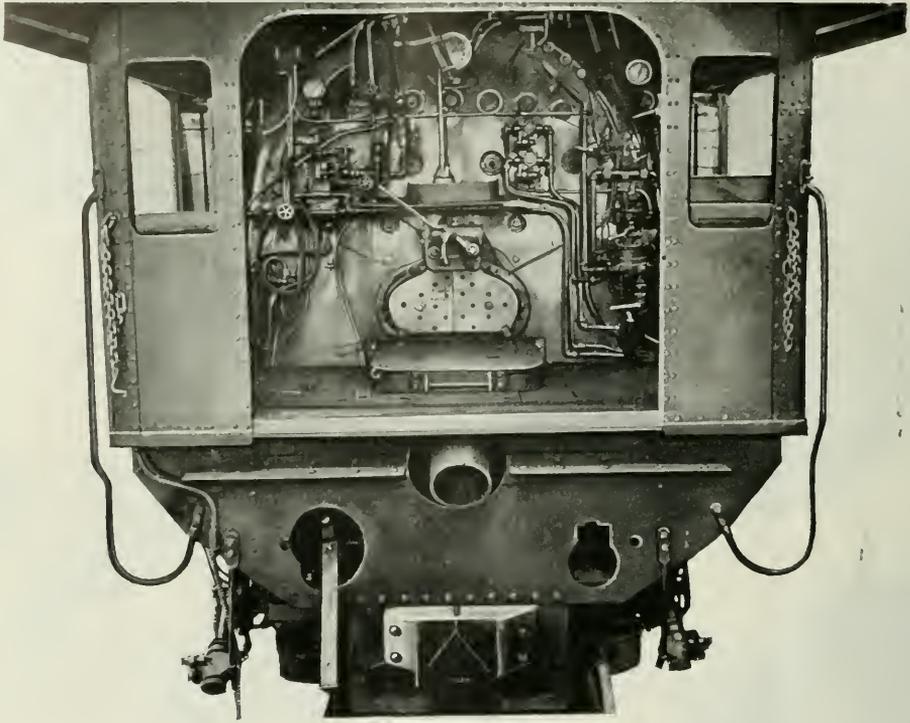
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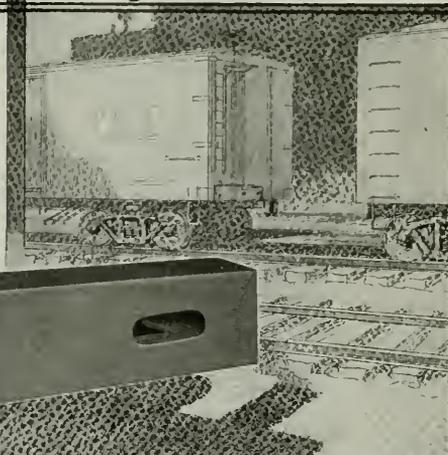
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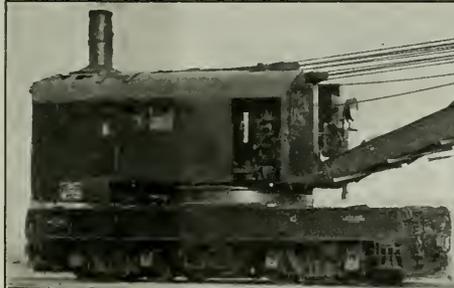
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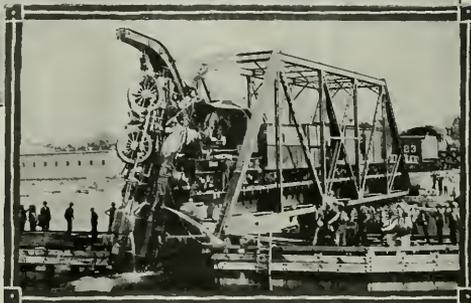


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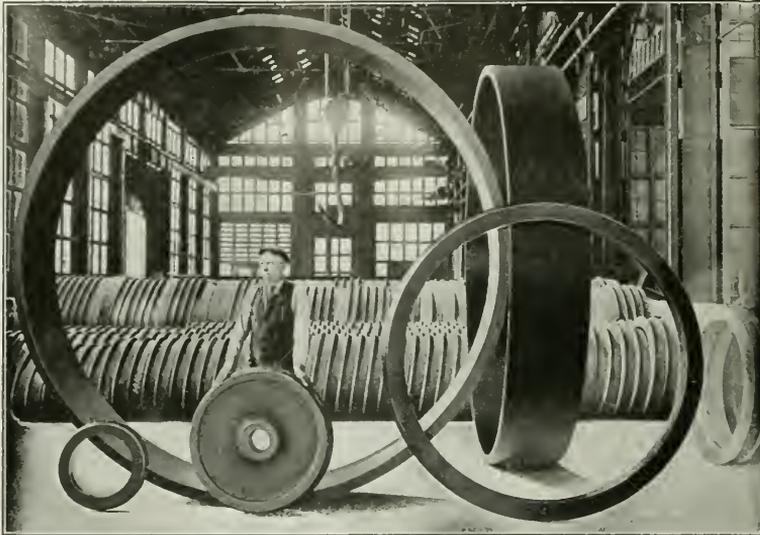
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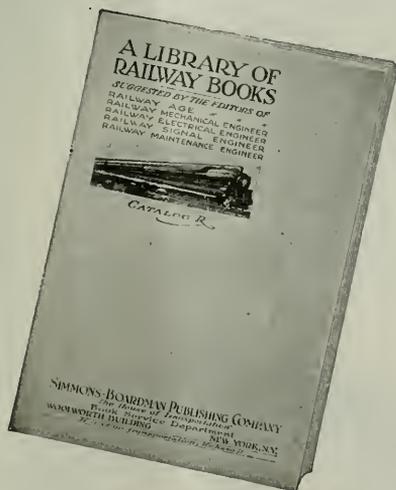
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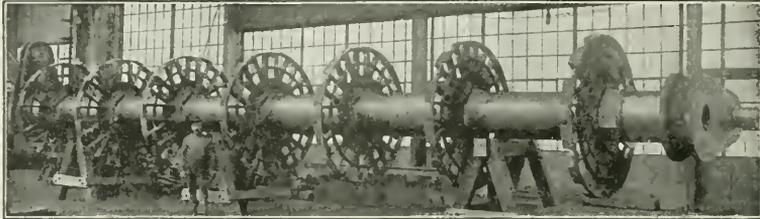
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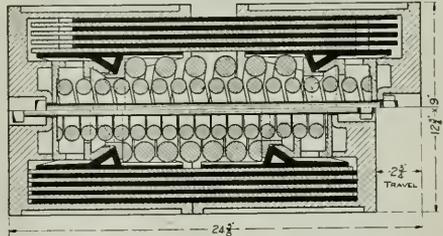
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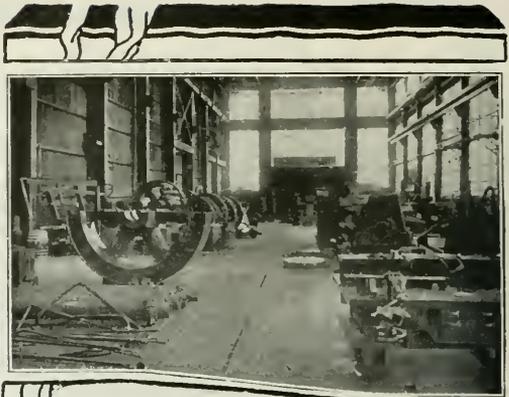
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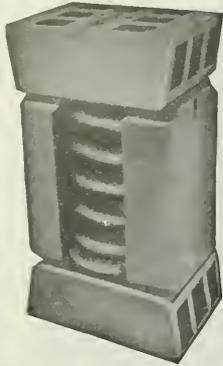
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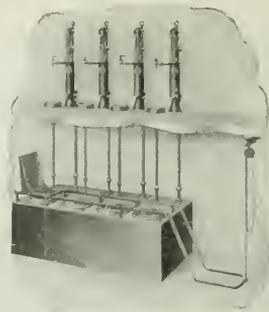


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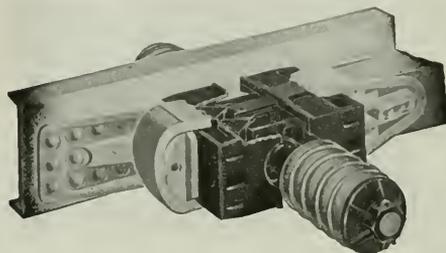
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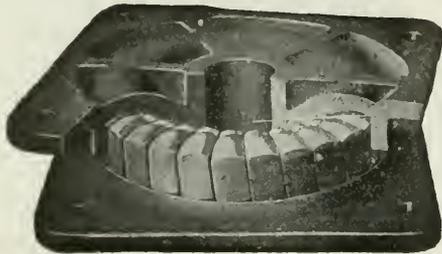
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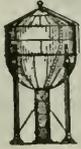
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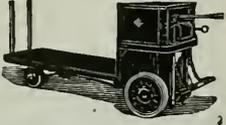
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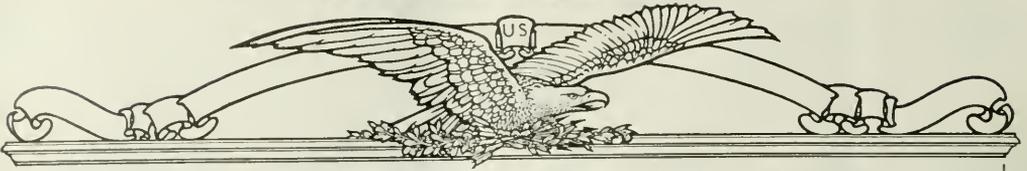
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(Quartermaster Intermediate Depot)

75 Box Cars

529 Flat Cars

1,550 Low Side Gondolas

3,650 High Side Gondolas

(No tarp, rigging)

1,450 High Side Gondolas

(With tarp, rigging)

At Brooklyn, N. Y.

(General Intermediate Depot)

1st Ave. and 59th St.

300 Low Side Gondolas

*The Government reserves
the right to reject any or
all bids.*

The cars offered in this sale were built by American manufacturers for military service in France. They are unused, but the government does not guarantee their condition.

Component parts of these cars are stored in lots of 50 cars each at Norfolk, Va., with one or two exceptions, where lots include a smaller number of cars.

Contents of the various lots of cars are listed in the standard packing list on file in the office, Chief of Engineers. The War Department does not guarantee that all parts necessary are contained in each lot. Bids must be for lots as they now exist. One car has been assembled at Norfolk Q. M. Intermediate Depot for inspection by prospective bidders.

No proposal will be considered unless accompanied by certified check of 10% of bid. Bids must be made in duplicate upon special form sent upon request.

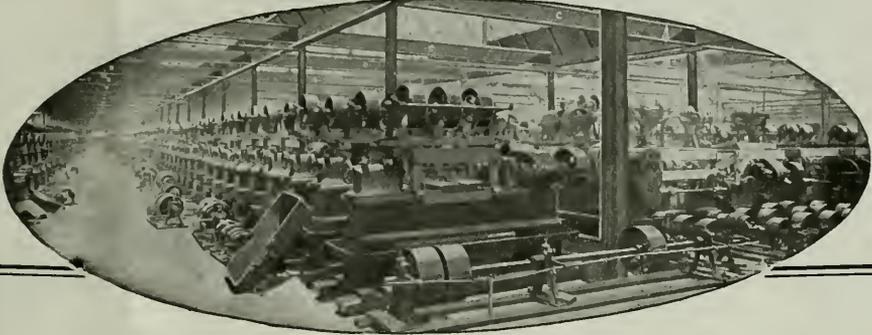
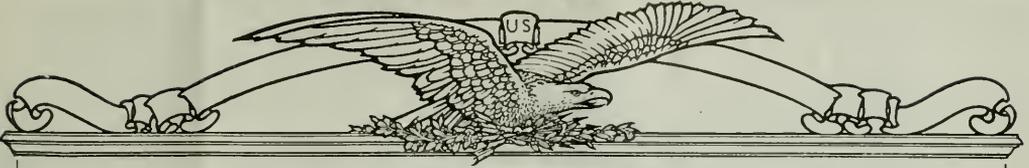
Send for Proposal Blank and full information, which is necessary before making inspection and filing bid. Address:

Chief of Engineers

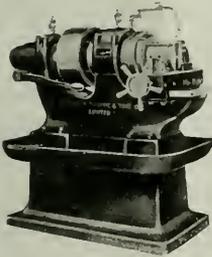
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WAR DEPARTMENT



Get Your Shop Equipped to the last needed machine



You can't afford to miss a trip through the War Department's great warehouse full of machinery. It will be a revelation. Your own equipment needs will spring into instant response to the possibilities revealed. Send a man or go yourself to

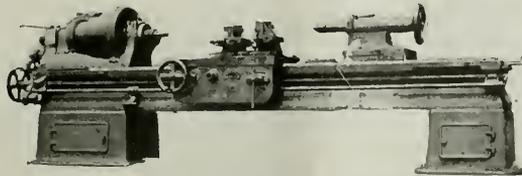
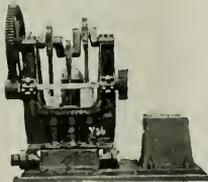
CHICAGO, During JUNE or JULY

There are:—

Lathes up to 26 in. swing by 16 ft. bed; Grinders; Pumps (Hydraulic); Accumulators; Hydraulic Fittings; Forging Presses; Steam Hammers; Power Presses; Blowers; Furnaces; Air Compressors; Magnets; Jib Cranes; Roller Conveyor; Miscellaneous Shop Maintenance Supplies. The sale is by negotiation, and you may easily complete your purchase at once. The Government will accept any price it considers reasonable, but reserves the right to reject any or all bids.

Write to Chairman,

**Chicago District Ordnance Salvage Board,
7400 South Ashland Avenue, Chicago, Ill.**



WAR DEPARTMENT

BUYERS INDEX

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.

Acetylene, Dissolved. Air Reduction Sales Co.	Billets, Steel. United Alloy Steel Corp. Illinois Steel Co.	Brakes, Air. Westinghouse Air Brake Co.	Carlins. Chicago Cleveland Car Roofing Co. Pressed Steel Car Co. Standard Ry. Equipment Co. Car Material, Wood. Dunham Lumber Co. Exchange Sawmill Sales Co. Mummet Lumber & Tie Co.	Castings, Malleable Iron. American Malleable Castings Assn. The Fort Pitt Malleable Iron Co. National Malleable Castings Co. P. & M. Co., The
Air Lifts. Ingersoll Rand Co.	Blocks, Crosscutted. Century Wood Preserving Co. International Crosscutting & Constr. Co. Jeannison Wright Co.	Brakes, Clasp. American Steel Foundries.	Car Steps, Safety. American Abrasive Metals Co. Morton Mfg. Co.	Castings, Steel. American Locomotive Co. Americo Steel Foundry. Edgewater Steel Co. McConway & Turley Co. Standard Steel Works. Union Spring & Mfg. Co.
Air Reservoir Joints—(See Joints, Air Reservoir).	Blower Fittings, Automatic Smokbox. Barco Mfg. Co.	Brakes, Electric. Westinghouse Air Brake Co.	Carriers, Monorail. Conveyors Corp. of America	Cement. Portland Cement Assn.
Angle Bars—(See Joints, Rail).	Blow Off Line Joints, Roundhouse—(See Joints, Etc.)	Brakes, Hand. Miner, W. H. Minch Ry. Appliance Corp. National Malleable Castings Co. Wine Ry. Appliance Co.	Car, Ballast. General American Car Co. Pressed Steel Car Co. Western Wheeled Scraper Co.	Cement, High Temperature. Johns-Manville, Inc.
Angles, Channels and Tees—(See Shapes, Structural).	Boilers, Locomotive. American Locomotive Co. Baldwin Locomotive Works.	Brick Locomotive Arch. American Arch Co.	Car, Bumper. Clark Car Co. General American Car Co. Pressed Steel Car Co.	Center Plates—(See Bearings, Center).
Arch, Locomotive Brick. Americo Arch Co.	Boilers, Water Tube. Esbeck & Wilcox.	Bridge Builders. American Bridge Co. Arnold Co. Fowler, Chas. Evan Pittsburgh-Des Moines Steel Co.	Car, Dump. Clark Car Co. General American Car Co. Pressed Steel Car Co.	Chain. American Chain Co.
Arrangers, Lighting. Federal Signal Co. General Railway Signal Co. Hall Switch & Signal Co. P. & M. Co., The Union Switch & Signal Co.	Boilers, Steel. American Steel Foundries. Scullin Steel Co.	Bridge Stringers—(See Stringers, Bridge).	Cars, Freight. General American Car Co. Greenville Steel Car Co. Pressed Steel Car Co. Ralston Steel Car Co. Ryan Car Co.	Chemical. Dearborn Chemical Co.
Ash Conveyors. Conveyors Corp. of America.	Boils and Nuts. Boss Nut Co. National Malleable Castings Co. Russell, Burdall & Ward Bolt & Nut Co. Ryerson & Son, Joseph T.	Buckets, Clam Shell. Blaw-Knox Co. Brown Hoisting Mch'y. Co. Browning Co. Industrial Works. Orton & Steinbrenner Co.	Cars, Hand and Push. Fairbanks Morse & Co. Mudge & Co.	Chemists. Dearborn Chemical Co. Hunt & Co., Robert W. Pittsburgh Testing Laboratories.
Automatic Train Control. Miller Train Control Corp. National Safety Appliance Co.	Boils, Patch. Falls Hollow Staybolt Co.	Buckets, Grab. American Bridge Co. Blaw-Knox Co. Brown Hoisting Mch'y. Co. Hayward Co. Industrial Works. Orton & Steinbrenner Co.	Cars, Industrial. Pressed Steel Car Co. Whiting Corp.	Chimneys, Cast Iron. Dickinson, Inc., Pa. Cinder Handling Plants. Conveyors Corp. of America Roberts and Schaefer Co.
Axis, Car and Locomotive. Americo Locomotive Co. Baldwin Locomotive Works. Illinois Steel Co. Johnson Co., J. R. Standard Steel Works.	Boles, Tack. Illinois Steel Co.	Buffers, Friction. Miner, W. H. Westinghouse Air Brake Co., Inc.	Clark Motor (Section). Clark Car Co. Fairbanks Morse & Co. Mudge & Co.	Circuit Breakers. Federal Signal Co. General Ry. Signal Co. Hall Switch & Signal Co. Union Switch & Signal Co.
Babbit Metal. Morr-Jones Brass & Metal Co.	Bolts, Railway. Gibson-Tribble Co. Simmons-Bosrdman Publishing Co.	Buffers, Radial. Franklin Railway Supply Co., Inc.	Clark Car Co. Pressed Steel Car Co. Ralston Steel Car Co.	Clamps, Flanging. Ryerson & Son, Joseph T.
Barges, Steel. American Bridge Co. Pittsburgh-Des Moines Steel Co.	Boosters. Franklin Ry. Supply Co., Inc.	Buildings, Iron Steel and Steel Concrete. Arnold Co. Ferguson Co., H. K. McClellan & Junkerfeld, Inc. Pittsburgh-Des Moines Steel Co. Robertson Co., H. H. Robinson Co., Dwight P. Stons & Webster. White Eng. Corp., J. G.	Cars, Motor (Section). Clark Car Co. Fairbanks Morse & Co. Mudge & Co.	Clamps, Guard Rail. American Chain Co. Q & C Co., The
Barris, Tumbling. Whiting Corp.	Boths, Telephone. Dickinson, Inc., Pa.	Buildings, Portable Steel. Blaw-Knox Co.	Cars, Ore. Clark Car Co. Pressed Steel Car Co.	Clamps, Hess. National Malleable Castings Co. Westinghouse Air Brake Co.
Bars, General Refractories. Americo Steel & Wire Co. Cumbria Steel Co. Illinois Steel Co. Interstate Iron & Steel Co. Midvale Steel & Ordnance Co.	Boring and Turning Mills, Vertical. Niles-Bement-Pond Co.	Buildings, Ready-to-Erect, Structural Steel. Steel Fabricating Corp., The	Cars, Passenger. Pressed Steel Car Co. Ralston Steel Car Co.	Clamp, Pipe. Franklin Ry. Supply Co., Inc. National Malleable Castings Co.
Bars, Iron and Steel. Ewald Iron Co. Falls Hollow Staybolt Co. Illinois Steel Co. Ryerson & Son, Joseph T.	Braces, Guard Rail. American Chain Co.	Bulldozers. Niles-Bement-Pond Co. Ryerson & Son, Joseph T.	Cars, Self-Propelled Passenger. Russell Co., The.	Clevises, Flat. Ryerson & Son, Joseph T.
Batteries, Electric Storage. Electric Storage Battery Co. Safety Car Heating & Lighting Co. Stonon Franklin Co.	Braces, Rail. Fort Pitt Malleable Iron Co. National Malleable Castings Co. Q & C Co., The. Ramapo Iron Works.	Burners. Burnson, Oxygen. Oas. Air Reduction Sales Co.	Cars, Second Hand. Morse Bros. Machinery Co.	Clasets, Water. Dunar Co.
Batteries, Wet Cell. Electric Storage Battery Co.	Brake Beams. American Steel Foundries. Chicago Railway Equipment Co.	Cables, Electric. American Steel & Wire Co. Kerris Insulated Wire & Cable Co.	Cars, Shaper, Pressed Steel. Morton Mfg. Co. Sharon Pressed Steel Co.	Coach and Coach Yard Steam Joints—(See Joints, Etc.).
Bearings, Center. Chicago Ry. Equipment Co. Miner, W. H. Rymington Co., T. H. Woods & Co., Edwin S.	Brake Beams—Supports. American Steel Foundries. Chicago Railway Equipment Co.	Cableways—(See Tramways). Caldron Carbidis. Air Reduction Sales Co.	Cars, Tank. General American Car Co. General American Tank Corp. Pennsylvania Tank Car Co. Pressed Steel Car Co. Western Wheeled Scraper Co.	Coal Ore and Ash Handling Machines. Brown Hoisting Machinery Co.
Bearings, Journal. Mazum Co., Inc. Morr-Jones Brass & Metal Co.	Brake Heads. American Steel Foundries. Chicago Railway Equipment Co. National Malleable Castings Co.	Car Ends, Steel. Chicago Cleveland Car Roofing Co.	Cars, Third Hand. General American Car Co. General American Tank Corp. Pennsylvania Tank Car Co. Pressed Steel Car Co. Western Wheeled Scraper Co.	Coaling Stations. American Bridge Co. Fairbanks Morse & Co. Gilford-Wood Co. Pittsburgh-Des Moines Steel Co. Roberts and Schaefer Co.
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Benders, Rail. American Chain Co.	Brake Shoes. American Brake Shoe & Fdy. Co. Schaefer Equipment Co. Steel Car Forge Co.	Car Lighters. Chicago Cleveland Car Roofing Co.	Castings, Gray Iron. American Brake Shoe & Fdy. Co. Americo Locomotive Co. Baldwin Locomotive Works. Midvale Steel & Ordnance Co. National Malleable Castings Co. Ramapo Iron Works.	Conveyors Corp. of America. Orton & Steinbrenner Co. Roberts and Schaefer Co.
Bending and Straightening Machines. Ryerson & Son, Joseph T. Rollers & Co., Inc. Wm				

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

Compounds, Beltes. Dearborn Chemical Co.	Crossed Lumber. American Crosscutting Co. See, This International Crosscutting & Constr. Co.	Dredging Machinery. Industrial Works. Pittsburgh-Des Moines Steel Co.	Expanders, Tube. Ryerson & Son, Joseph T.	Frames, Locomotive. American Locomotive Co. American Steel Foundries. Baldwin Locomotive Works.
Compressors, Air. Ingersoll Rand Co.	Cross-Arms. American Bridge Co.	Drills, Track and Bonding. Ingersoll Rand Co.	Fans, Exhaust and Ventilating. Buffalo Forge Co. Mudge & Co.	Frames, Truck. American Locomotive Co. American Steel Foundries. Baldwin Locomotive Works. Franklin Railway Supply Co., Inc. Scullin Steel Co.
Conduits, Metallic Flexible. Barco Mfg. Co. Franklin Railway Supply Co., Inc.	Crossings—(See Frogs and Crossings).	Drills, Twist. Greenfield Tap & Die Corp.	Fasteners, Car Door. Arnold Co. Port Pitt Malleable Iron Co. Miner, W. H. National Malleable Castings Co.	Frames, Vanadium. American Locomotive Co. Baldwin Locomotive Works.
Connections, Track Lower. National Malleable Castings Co. Scheefer Equipment Co.	Crossheads and Shoes. Baldwin Locomotive Works. Barco Mfg. Co.	Drilling Machines, Pneumatic. Ingersoll Rand Co.	Ferro Molybdenum. Vanadium Corp. of America.	Frogs and Crossings. Barnapo Iron Works.
Connectors, Automatic T. P.— (See Train Pipe Connectors, Automatic).	Crushers, Coal. Orton & Steinbrenner Co.	Drilling Machines, Upright and Radial. Niles-Bement-Pond Co. Ryerson & Son, Joseph T.	Ferro Tungsten. Vanadium Corp. of America.	Fulcrums, Brake Beam. American Steel Foundries. Chicago Ry. Equipment Co. National Malleable Castings Co.
Connectors, Electrical. Westinghouse Elec. & Mfg. Co.	Culverts. American Sheet & Tin Plate Co. Armed Culvert & Flume Mfg. Assn. Canton Culvert & Silo Co. U. S. Cast Iron Pipe & Fdry Co.	Drinking Fountains. Glessel Co., Henry	Ferro Vanadium. Vanadium Corp. of America.	Furnaces, Annealing and Case Hardening. Ferguson Furnace Co. Whiting Corp.
Control Devices, Train Speed. Federal Signal Co. General Ry. Signal Co. Miller Train Control Corp. Elliot Switch & Signal Co.	Curtains and Fixtures, Car Vestibule. Morton Mfg. Co.	Driving Boxes (Extra and Main). Franklin Railway Supply Co.	Ferro Vanadium. Vanadium Corp. of America.	Furnaces, Forging. Ferguson Furnace Co.
Coverlets, Steel. Whiting Corp.	Curtains and Fixtures, Car Window. Morton Mfg. Co.	Dryers, Rotary. Whiting Corp.	Fencing, Wire—(See Wire Fence).	Furnaces, Heat Treating. Ferguson Furnace Co.
Conveyer, Ash—(See Coal, Ore and Ash Handling Mach.)	Cutters, Flue. Ryerson & Son, Joseph T.	Dynamoes—(See Generators, Electric, Economizers, Fuel).	Fibre and Fibre Products. Continental Fibre Co.	Furnaces, Melting. Whiting Corp.
Conveying Machinery. American Bridge Co. Conveyors Corp. of America Gifford-Wood Co. Industrial Works. Orton & Steinbrenner Co.	Cutting and Welding Apparatus (Gray Acetylene). Air Reduction Sales Co.	Electricity, Railroad. McClelland & Junkerfeld. Robinson Co., Dwight P. Smith & Co., C. E. Westinghouse Elec. & Mfg. Co.	Filters, Water and Industrial. Graver Corp.	Furnaces, Rivet Heating—(See Forges, Rivet Heating).
Cooling Compounds, Journal Hot Box. Mohawk Lubricating Co.	Cylinders, Gas, Acetylene, Etc. Air Reduction Sales Co.	Electrification, Railroad. McClelland & Junkerfeld. Robinson Co., Dwight P. Smith & Co., C. E. Westinghouse Elec. & Mfg. Co.	Filtration Plants, Water. Graver Corp.	Gage Testers—(See Testers, Gage).
Corbark. Stone Corp., Junius H.	Derricks. Industrial Works.	Enamels, Air Drying and Baking. Newly Varnish Co.	Fireboxes. American Locomotive Co. Baldwin Locomotive Works.	Gages, Machinists. Greenfield Tap & Die Corp.
Counselor, Railway. Hale, Arthur	Diaphragms for Cars, Canvas and Steel. Morton Mfg. Co.	Engineers, Air Drying and Baking. Newly Varnish Co.	Fittings, Air Brake. National Malleable Castings Co. Westinghouse Air Brake Co.	Gages, Steam. Ashton Valve Co.
Couplers. American Steel Foundries. Franklin Railway Supply Co., Inc. McConway & Turley Co. National Malleable Castings Co. & C. Co., The Standard Coupler Co. Westinghouse Air Brake Co.	Diaphragms, Bufling Moohaniam. Morton Mfg. Co.	Engineers and Contractors. Ferguson Co., H. K. Roberts and Schaefer Co. Robinson Co., Dwight P. Stone & Webster. Watson Engineering Co. White Eng. Corp., J. G.	Fittings, Flanged Pipe. U. S. Cast Iron Pipe & Fdry Co.	Gages, Wheel Press Recording. Ashton Valve Co.
Complex Pockets—(See Draft Yokes).	Diaphragms, Bufling Moohaniam. Morton Mfg. Co.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Fixtures, Car Door. Miner, W. H. National Malleable Castings Co.	Gaskets. Continental Fibre Co.
Couplings, Kose. Port Pitt Malleable Iron Co. Ingersoll Rand Co. Westinghouse Air Brake Co.	Dies, Threading. Greenfield Tap & Die Corp.	Engineers, Construction. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., Robert W. McClelland & Junkerfeld. Mehfield, John E. Smith & Co., C. E.	Flanges, Snow. Q. & C. Co., The	Gates, Tail. Morton Mfg. Co.
Covering, Seat Balttan. Hale & Kilburn Corp.	Ditching Machinery. Industrial Works.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floors. Jenkinson Wright Co. Stone Corp., Junius H.	Gear Blanks, Rolled Steel. Standard Steel Works.
Cranes, Electric Travelling. Brown Hoisting Mch. Co. Ferguson Co., H. K. Niles-Bement-Pond Co. Whiting Corp.	Door Fixtures—(See Fixtures, Car Door).	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floors, Composition Car. American Mason Safety Tread Co. Stone Corp., Junius H.	Gears and Pinions. American Steel Foundries.
Cranes, Gantry. Brown Hoisting Mch. Co. Industrial Works. Niles-Bement-Pond Co. Orton & Steinbrenner Co. Whiting Corp.	Door, Locomotive, Fire-Box. Franklin Railway Supply Co., Inc.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floors, Steel. Morton Mfg. Co.	Gears, Valve—(See Valve Gears).
Cranes, Locomotive. Brown Hoisting Mch. Co. Industrial Works. Ohio Locomotive Crane Co. Orton & Steinbrenner Co.	Doors, Car. Miner, W. H. Wine Ry. Appliance Co.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floors, Wood Block—(See Also Blocks, Crossed). Carter Blosswood Flooring Co. Exchange Sawmills Sales Co.	Generators, Air Reduction Sales Co.
Cranes, Portable. Brown Hoisting Mch. Co. Industrial Works. Orton & Steinbrenner Co.	Doors, Grain. Exchange Sawmills Sales Co. Mummert Lumber & Tie Co.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floors, Wood Block—(See Also Blocks, Crossed). Carter Blosswood Flooring Co. Exchange Sawmills Sales Co.	Generators, Car Lighting and Heat-Ing Co. Stone Franklin Co.
Cranes, Tractor. Industrial Works. Northwest Engineering Co.	Doors, Steel. Morton Mfg. Co.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Flue Cleaners—(See Cleaners, Flue).	Generators, Electric. Fairbanks Morse & Co.
Cranes, Wrecking. Brown Hoisting Mch. Co. Industrial Works. Orton & Steinbrenner Co.	Draft Arms. American Steel Foundries.	Engineers, Consulting, Civl, Elec. Hydraulio Mech. Val. Arnold Co. Battey, Paul L. Bush, Roberts & Schaefer. Ferguson Co., H. K. Hunt & Co., E. B. Powler, Geo. L. Gillmore Co., Thomas N. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Flue Cutters—(See Cutters, Flue).	Glass, Wire. Mississippi Wire Glass Co.
Crank Pins—(See Pins, Crank).	Draft Gears. Port Pitt Malleable Iron Co. Hall Draft Gear Corp. Koyoko Ry. Equip. Co. Miner, W. H. Koyoko Ry. Equip. Co. Standard Coupler Co. Springton Co., T. H. Union Draft Gear Co. Westinghouse Air Brake Co.	Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Floss, Boiler—(See Tubes, Boiler).	Graphite, Lubricating. Gateson Signal Oil Co.
Crosscut. American Crosscutting Co. Century Wood Preserving Co.	Draft Yokes. American Steel Foundries. Miner, W. H. National Malleable Castings Co. Steel Car Forge Co.	Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Forges, Rivet Heating. Buffalo Forge Co. Ferguson Furnace Co. Ryerson & Son, Joseph T.	Grapples, Wood. Industrial Works.
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		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Forging. American Bridge Co. American Steel Foundries. Edgewater Steel Co. Gifford-Wood Co. Illinois Steel Co. Steel Car Forge Co.	Grease Forming Machines. Franklin Railway Supply Co., Inc.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Forgings, Drop. Steel Car Forge Co.	Grinding Machines, Portable. Ingersoll Rand Co. Guard Rail (One Piece). American Chain Co.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Forms, Steel, For Concrete Construction. Blaw-Knox Co.	Guards, Cattle. American Bridge Co.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Foundations. Fowler, Chas. E. B. Smith & Co., C. E.	Guards, Dust. Symington Co., T. H.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Foundry Equipment. Whiting Corp.	Hammers, Pneumatic. Ingersoll Rand Co. Oldham & Son Co., Geo.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.	Foundry Supplies. Whiting Corp.	Hammers, Steam. Industrial Works. Niles-Bement-Pond Co. Ryerson & Son, Joseph T.
		Engineers, Inspecting. Arnold Co. Bush, Roberts & Schaefer. Ferguson Co., H. K. Powler, Geo. L. Gulick, Henderson. Hunt & Co., Robert W. Mehfield, John E. Smith & Co., C. E.		Head Brakes—(See Brakes, Head).

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Hesters, Ford Water. Graver Corp. Superheater Co., The	Jacks, Lifting. Buckeye Jack Mfg. Co.	Locomotive Repair Parts. American Locomotive Co. Baldwin Locomotive Works.	Paper Shaving. Chicago-Cleveland Car Roofing Co. Lahon Co., The.	Poles, Telegraph and Telephone. Duncan Lumber Co.
Heating and Ventilating, Apparatus. Buffalo Forge Co. Vapor Car Heating Co., Inc.	Jacks, Smokes. Dickinson, Inc. Pash.	Locomotives, Steam. American Locomotive Co. Baldwin Locomotive Works.	Pier Builders. Bush, Roberts & Schaefer.	Posts, Steel Lances. American Steel & Wire Co.
Heating Systems, Car (Electric and Steam). Safety Car Heating & Lighting Co. Vapor Car Heating Co., Inc. Winn Ry. Appliance Co.	Joints, Air Reservoir. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lubricants, Driving Box. Franklin Railway Supply Co., Inc.	Pile Drivers. Browning Co. Industrial Works. Orton & Steinbrenner Co.	Powder Blasting—(See Explosives).
Heating Units, Independent. Sturtevant Co., E. F.	Joints, Blow Off Line (Round-boss). Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lubricants (Oil and Grease). Galena Signal Oil Co. Mohawk Lubricating Co. Texas Co.	Piling, Sheet Steel. American Bridge Co.	Power Plants. McClelland & Junkersfeld, Inc. Muhlfield, John E. Stone & Webster. White Eng. Corp., J. G.
Hoisting Machinery. American Bridge Co. Brown Hoisting Mch'y Co. Gifford-Wood Co. Industrial Works. Orton & Steinbrenner Co.	Joints, Coach and Coach Yard. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lumber. American Crosscutting Co., Inc., The Duncan Lumber Co. Exchange Sawmills Sales Co. Manumet Lumber & Tie Co., Inc.	Piling Wood. Duncan Lumber Co. Munmeret Lumber & Tie Co.	Preservatives, Wood. Century Wood Preserving Co. Jennison Wright Co.
Holds, Coach. Whiting Corp.	Joints, Flexible. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Magnets, Lifting. Industrial Works.	Piling, Crossed Wood. International Crosscutting & Constr. Co.	Presses, Wheel. Niles-Bement-Pond Co. Sellers & Co., Inc., Wm.
Holds, Chain. Ryerson & Son, Joseph T.	Joints, Rail. American Chain Co. American Steel Foundries. Illinois Steel Co. Q. & C. Co., The	Mechanical Draft Apparatus—(See Heating and Vent. App.).	Pins, Air Brake and Clevis. Steel Car Forge Co.	Pulverizers, Coal—(See Crushers, Coal).
Holds, Electric. Brown Hoisting Mch'y Co.	Joints, Steam, Air and Liquid. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Melters, Electric, Snow, Q. & C. Co., The	Pins, Center. Miller, W. H.	Pumps and Pumping Machinery. Fairbanks, Morse & Co. Ingersoll Rand Co.
Holds, Locomotives. Whiting Corp.	Journal Boxes and Lids. Allegheny Steel Co. American Steel Foundries. National Malleable Castings Co. Symington Co., T. H. Union Spring & Mfg. Co.	Milling Machines, Plain and Universal. Ryerson & Son, Joseph T.	Pins, Coupler Knuckles. National Malleable Castings Co. Steel Car Forge Co.	Pumps, Oil, Gas Measuring. Tokheim Oil Tank & Pump Co.
Holds, Pneumatic. Ingersoll Rand Co. Oldham & Son Co., Geo. Whiting Corp.	Keys, Brake Shoe. Steel Car Forge Co.	Mixing Machines, Concrete. Blaw-Knox Co.	Pins, Crank. American Locomotive Co. Baldwin Locomotive Works.	Pumps, Vacuum. Ingersoll Rand Co.
Holders, Angle Cock. Mudge & Co.	Kilns, Dry. Sturtevant Co., E. F.	Monorail Systems. Whiting Corp.	Pipe, Cast Iron. Cast Iron Pipe Publicity Bureau. U. S. Cast Iron Pipe & Fdry. Co.	Punching and Shearing Machines. Buffalo Forge Co. Ryerson & Son, Joseph T.
Hooks, Wrecking. National Malleable Castings Co.	Koukoles, Emergency. Q. & C. Co., The	Motors, Electric. Fairbanks Morse & Co.	Pipe Cutting and Threading Machinery. Greenfield Tap & Die Corp.	Pushers, Locomotive Coal. Locomotive Stoker Co.
Hoppers, Wet and Dry (Car). Dunbar Co.	Laboratories, Testing. Hunt & Co., Robert W.	Nails. American Steel & Wire Co. Interstate Iron & Steel Co.	Pipe Fittings—(See Fittings, Pipe).	Rail Anchors. P. & M. Co., The.
Hose, Air, Steam, Etc. Oldham & Son Co., Geo. Westinghouse Air Brake Co.	Ladders, Steel Car. Winn Railway Appliance Co.	Nitrogen. Air Reduction Sales Co.	Pipe Metal Culvert. American Steel & Tin Plate Co. Canton Culvert & She Co. U. S. Cast Iron Pipe & Fdry. Co.	Rail Banders. American Chain Co. Verona Tool Works.
Hydrogen. Air Reduction Sales Co.	Ladies. Whiting Corp.	Nozzles, Exhaust. Franklin Railway Supply Co., Inc.	Pipe, Riveted Steel. Pittsburgh-Des Moines Steel Co.	Rail Bonds. American Steel & Wire Co. Niles-Bement-Pond Co. Westinghouse Elec. & Mfg. Co.
Iceing Station Equipment. Gifford-Wood Co.	Lathas, Axle. Niles-Bement-Pond Co. Sellers & Co., Inc., Wm.	Nuts—(See Bolts and Nuts).	Pipe, Wrought Iron. Heading Iron Co.	Rail Braces—(See Braces, Rail).
Ingots. Edgewater Steel Co. Illinois Steel Co. McConway & Torley Co. Midvale Steel & Ordnance Co. National Malleable Castings Co. United Alloy Steel Corp.	Lathas, Engine. Niles-Bement-Pond Co. Ryerson & Son, Joseph T.	Net Locks. Boan Nut Co. Franklin Ry. Supply Co., Inc. Verona Tool Works.	Plansra. Niles-Bement-Pond Co. Ryerson & Son, Joseph T. Sellers & Co., Inc., Wm.	Rail Banders. American Chain Co. Verona Tool Works.
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Insulation, Electrical. Continental Fibre Co. Johns-Manville, Inc.	Lathas, Wheel. Niles-Bement-Pond Co. Sellers & Co., Inc., Wm.	Oil Filtering and Storage Systems. Graver Corp.	Plates, Center—(See Bearings, Center).	Rail Braces—(See Braces, Rail).
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Insulation, Trunk. Continental Fibre Co.	Lighting Equipment, Car. Electric Storage Battery Co.	Oil, Fuel. Texas Co.	Plates, Iron and Steel. Illinois Steel Co. Interstate Iron & Steel Co. Pittsburgh-Des Moines Steel Co.	Rails, Relaying. Hyman Michaels Co.
Iron Chain. Falls Hollow Staybolt Co.	Lighting Equipment, Car. Electric Storage Battery Co.	Oil Plugs, Steam Chest. Franklin Railway Supply Co., Inc.	Plates, Safety Floor. American Abrasive Metals Co.	Rail Splice Plates—(See Joints, Rail).
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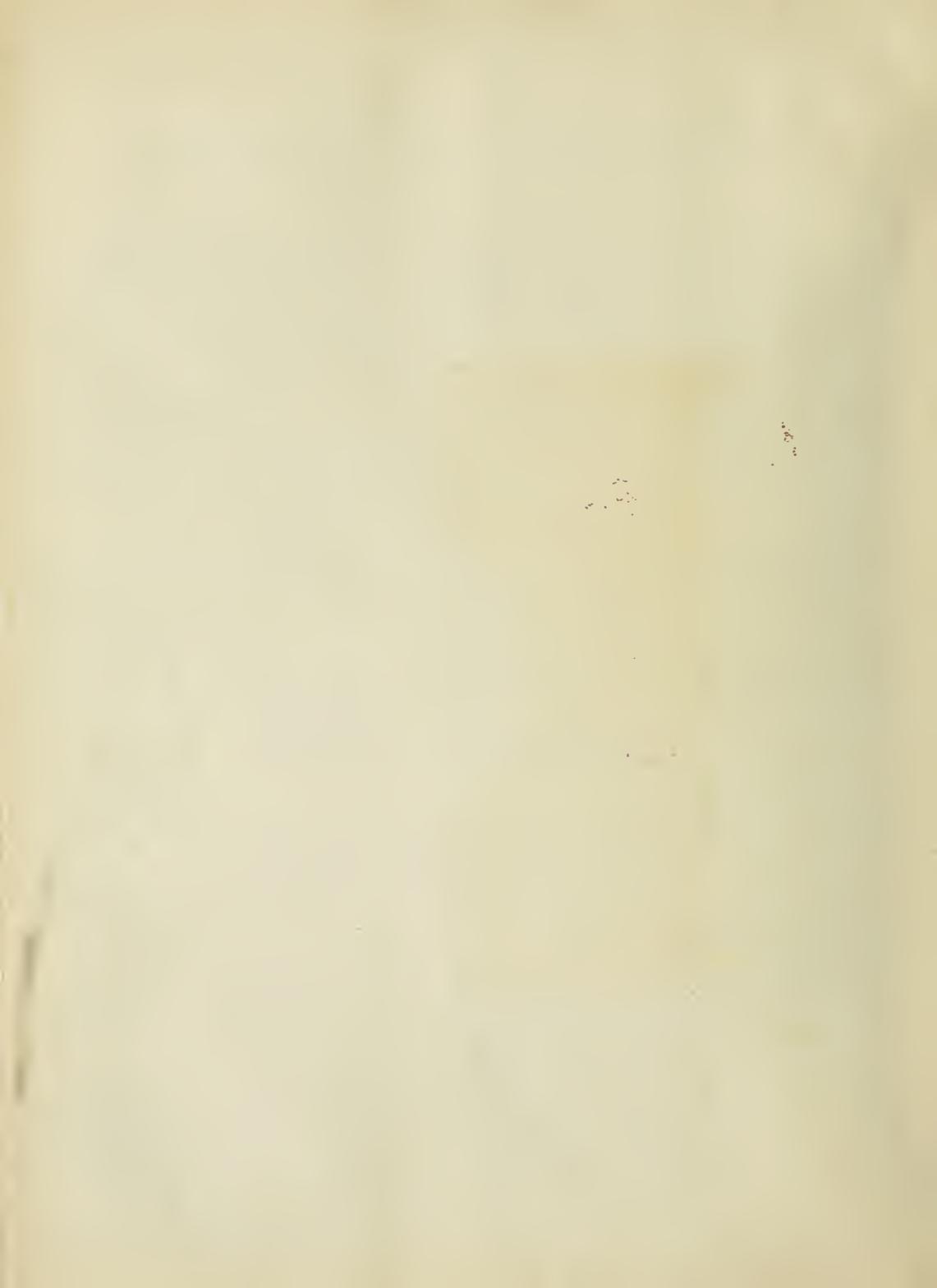
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